# REPORT FOR AN INITIAL PHASE II ENVIRONMENTAL SITE ASSESSMENT

# FOR THE SOUTH BEND AREA A PROPERTIES

Located at:

SOUTH OF SAMPLE STREET, EAST OF PRAIRIE AVENUE, NORTH OF CONRAIL, AND WEST OF FRANKLIN STREET SOUTH BEND, INDIANA

Prepared for:

THE CITY OF SOUTH BEND DEPARTMENT OF COMMUNITY AND ECONOMIC DEVELOPMENT 1200 COUNTY-CITY BUILDING SOUTH BEND, INDIANA 46601

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**VOLUME 1** 



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### 1.0 INTRODUCTION

## 1.1 General

Hull & Associates, Inc. (Hull) was retained by the City of South Bend Department of Community and Economic Development (City) to complete an initial Phase II Environmental Site Assessment (ESA) for the Area A properties of the Studebaker Corridor. This assessment was conducted as part of a beneficial reuse study for Area A and to investigate recognized environmental conditions (RECs) that were identified during a Phase I ESA (Hull Document #SBI002.100.0001) for Area A, completed by Hull in January 2001.

Work for the initial Phase II ESA was conducted in general conformance with the initial Phase II ESA Work Plan (Hull Document # SBI002.100.0003) that was prepared in December 2000. The initial Phase II ESA Work Plan was prepared, and field work was performed, consistent with Indiana Department of Environmental Management's (IDEM's) Voluntary Remedial Program (VRP) guidance and a Quality Assurance Project Plan (QAPP) dated August 2001 (Hull Document # SBI002.300.0008). Following completion of fieldwork and due to a variety of circumstances, the City elected to evaluate risk at the Site consistent with Indiana's Risk Integrated System of Closure (RISC) non-rule policy. For this reason, the scope of work completed at the Site slightly differs from protocols recommended under RISC. Hull has made an attempt to point out these differences where applicable in this report.

#### 1.2 Site History

Area A, shown on Figure 1, comprises four contiguous properties that occupy approximately 88 acres. The properties are located south of Sample Street, east of Prairie Avenue, north of Conrail and west of Franklin Street. The properties included in Area A are the Underground Pipe & Valve property located at 1100 Prairie Avenue, the Huckins Tool & Die property located at 1010 Prairie Avenue, the South Bend Lathe property located at 400 West Sample Street and the Allied Products Corp. property located at 601 West Broadway Street. Cumulatively, these properties make up Area A.

The above properties have been historically used as a lumber yard and in the manufacturing and supplying parts for the automobile industry. Operations under the Studebaker Corporation began as early as 1927 and consisted of a foundry and manufacturing facilities. During subsequent years, numerous buildings were added to the Facility. Operations of the properties,

apparently ceased in the early 1960's and the majority was subdivided and sold to Mr. Jay Huckins, ARG Corporation (South Bend Lathe), Allied Products Corporation, and Cummins Engine Co, Inc.

Based on the Phase I ESA Report, the following RECs were revealed:

# RECOGNIZED ENVIRONMENTAL CONDITIONS

REC	REC ITEM	POTENTIAL CHEMICALS OF CONCERN			
Huckins Tool & Die Property(Property A)					
A1	10,000-gallon UST reportedly stored oil was located on the north portion of the Huckins Tool & Die property	Total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs)			
A2	Drywell located north of the Huckins building	VOCs, semivolatile organic compounds (SVOCs), TPH, metals			
A3	10,000-gallon UST reportedly stored oil was located near the exterior northeast corner of the Huckins Tool & Die building	TPH, VOCs			
A4	Drywell located east of the east building addition	VOCs, SVOCs, TPH, metals			
A5	Dust collector and metal shavings located at the exterior southwest corner of the east building addition	metals, VOCs			
A6	5,000-gallon UST reportedly stored gasoline is located east of the south portion of the building	TPH, VOC, lead			
A7	Former hydraulic lift located centrally in the Huckins Tool & Die building	TPH, VOCs, PCBs			
A8	Former rails located on the east portion of the property	metals, SVOCs			
	Underground Pipe & Valve Property (Pi	roperty B)			
B1	500-gallon UST reportedly stored gasoline, located north of the west portion of the main building	TPH, VOCs, lead			
B2	10,000-gallon UST reportedly stored fuel oil, located north of the east portion of the main building	TPH, VOCs			
В3	Three, 10,000-gallon core oil tanks located north of the east portion of the main building	TPH, VOCs			
B4	A pit with a steel-plate cover located northwest of the former pumphouse	TPH, VOCs, SVOCs			
B5	Former rails located on the east and north portions of the property	metals, SVOCs			
B6	Two outfalls from the direction of the facility to the reservoir located on the southwest portion of the property	metals, VOCs, SVOCs			
B7	Half-buried metal structure (potential tank) located in the east wall of the reservoir	VOCs, TPH, lead			
B8	Numerous pits located inside the foundry filled with wood and metal debris	VOCs, SVOC,s metals			

REC	REC ITEM	POTENTIAL CHEMICALS OF CONCERN			
	Underground Pipe & Valve Property (Prope				
B9	Bins with sand and potential historic coke pits located at the eastern portion of the Underground Pipe & Valve building	metals, VOCs, SVOCs, TPH			
B10	Four historic ASTs located at the south end of the Underground Pipe & Valve building	metals, VOCs, SVOCs, TPH			
South Bend Lathe (Property C)					
C1	2 5,000-gallon USTs with unknown contents located east of the southern portion of the building	VOCs, SVOCs, metals, TPH			
C2	3,000-gallon gasoline tank located south of the Engineering Building	VOCs, SVOCs, TPH, lead			
C3	2 8,000-gallon USTs of unknown contents located south of the Engineering Building	VOCs, SVOCs, metals, TPH			
C4	2 5,000-gallon USTs reportedly containing motor oil, located south of the eastern portion of the building	VOCs, SVOCs, TPH			
C5	20,000-gallon UST reportedly containing fuel oil, located north of the AEP property	VOCs, SVOCs, TPH			
C6	2 20,000-gallon USTs reportedly containing fuel oil, located west of the AEP property	VOCs, SVOCs, TPH			
C7	Heavy oil staining by the trash bin containing metal shavings and associated catch basin	VOCs, SVOCs, metals, TPH			
C8	Oil staining by the wood bins located east of the chip house on the south side of the main building and associated catch basin	VOCs, SVOCs, metals, TPH			
C9	Areas of stressed vegetation and bare soil located between the AEP property and the metal storage building	VOCs, SVOCs, metals, TPH			
C10	6,000-gallon UST reportedly containing waste oil, located south of the west portion of the building	VOCs, SVOCs, TPH			
C11	Former rails located on the west and east portions of the property	metals, SVOCs			
C12	Pit located in the heat treat room located in the south portion of the main building	VOCs, SVOCs, metals			
C13	Potential releases from PCB-containing transformers located in the building	PCBs			
	Allied Products Corporation Property (F				
D1	20,000-gallon UST reportedly containing heating oil located near the northwest corner of Building 78	VOCs, SVOCs, TPH			
D2	Potential UST of unknown size and contents located south of Building 78 approximately 130 ft. west of the southeast corner of the building	VOCs, SVOCs, metals, TPH			
D3	10,000-gallon enamel reducer tank (removed), located on the northeast portion of the property	VOCs, SVOCs, TPH			
D4	Former and current rails located on the property	metals and SVOCs			
D5	6,000-gallon enamel reducer tank, located west of the south end of Building 79	VOCs, SVOCs, TPH			

REC	REC ITEM	POTENTIAL CHEMICALS OF CONCERN		
Allied Products Corporation Property (Property D)(cont.)				
D6	Tank farm formerly comprised ten USTs reportedly containing gasoline and kerosene	VOCs, SVOCs, TPH, lead		
D7	Catch basin with an oily sheen located west of Building 80	VOCs, TPH		
D8	4 4,000-gallon USTs reportedly containing trichloroethene and fuel oil locate west of Building 86	VOCs, SVOCs, TPH		
D9	5,000-gallon UST reportedly containing gasoline, located east of the central portion of Building 86	VOCs, SVOCs, TPH, lead		
D10	5,000-gallon UST reportedly containing diesel fuel, located east of Building 93	VOCs, SVOCs, TPH		
D11	Potential releases from PCB-containing transformers	PCBs		
D12	Press pits with petroleum product located inside building 80	VOCs, TPH, metals		
D13	Oil change pit located near the northeast corner of Building 93	VOCs, TPH		
D14	Former die wash area located at the south end of Building 142	VOCs, TPH, SVOCs		
D15	Press pits with petroleum product located in Building 142	VOCs, TPH, SVOCs		
D16	Press pits with petroleum product located in Building 86	VOCs, TPH, SVOCs		
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D18	Potential releases from ASTs and 55-gallon drums located south of Building 93.	VOCs, TPH, SVOCs		
D19	Potential releases from ASTs that were historically located at the south end of Building 93.	VOCs, SVOCs		

The locations of these RECs and other pertinent Site features and property usage are shown on Figure 2. A detailed description of the Site history and background is presented in the Phase I ESA (Hull document #SBI002.100.0001).

# 1.3 Previous Environmental Site Assessments

A number of Phase I and II ESAs have been completed on Area A and adjacent properties. These investigations were reviewed as part of the Phase I ESA. It should be noted that the reviewed information is not a complete package of previous studies performed at Area A. The provided previous investigation information is discussed below. A copy of the reviewed previous reports is provided in Appendix L of the Phase I ESA.

An "Interim Phase I Environmental Site Assessment" for the Studebaker Corridor, prepared by ATEC (September 21, 1990) was reviewed for the Assessment. The report discussed the area to the east of the Site. The report states that eight USTs containing petroleum, kerosene and fuel oil are located at the Allied Products Corp. property. The report also cited the Michiana Area Council of Governments, stating that several potential sites impacting groundwater south and east of the Site include South Bend Auto Parts, Bush Auto Salvage, Steve and Jean's Junk Yard and AM General LTV. Based on the Phase I information, an initial Phase II Study was performed under a separate cover at Lot One Site, which refers to the previous Avanti Manufacturing Plant located north of the Site where Franklin Street dead-ends into Sample Street (presently the site of the new County Detention Center). This report is discussed below.

The "Initial Phase II Final Report" for the Lot One Studebaker Corridor, prepared by ATEC in March of 1991, was reviewed for the Phase I ESA. Four groundwater-monitoring wells (MW-1 through MW-4) were installed near a U-shaped building located on the northern portion of the property. The locations of these wells are shown on Figure 3 of the report. One well was installed south and west of the U-shaped building and three wells were installed north of the Ushaped building. Soil samples were collected during the installation of the monitoring wells and were sent to a laboratory for analysis. Partial laboratory results for total heavy metals were included in the provided information. The report indicates that barium, chromium and lead were detected in the soil samples. The highest concentration of barium was detected at MW-3 at 6.7 mg/kg (depth of 23.5 to 25.0 ft. below ground surface (bgs)). The highest concentration of chromium was detected at MW-4 at 5.8 mg/kg (depth of 21.0 to 22.5 ft. bgs). The highest concentration of lead was detected in MW-1 at 3.5 mg/kg (depth of 23.5 to 25.0 ft. bgs). Groundwater samples were also collected from the monitoring wells. Partial laboratory results for volatile organic compounds (VOCs) were included in the provided information. compounds were listed in the report. The highest concentration of trans-1,2-dichloroethene (trans-1,2-DCE) was detected in MW-2 at 37 ug/L. The highest concentration of 1,1,1trichloroethane (1,1,1-TCA) was detected in MW-3 at 10 ug/L. The highest concentration of trichloroethene (TCE) was detected in MW-2 at <5 ug/L. The highest concentration of tetrachloroethene (PCE) was detected in MW-2 at 10 ug/L. Soil boring logs were also included in the provided information for the Lot 1 Phase II Study.

A report titled "Environmental Investigation South Bend Lathe" was prepared by EIS Environmental Engineers, Inc. in July of 1992. Only portions of this report were received for this Assessment. This report was prepared to address potential impact to soil and groundwater from five USTs and an associated fuel oil piping track and to analyze possible asbestoscontaining roofing materials. Four of the USTs investigated are located on the south side of the South Bend Lathe building near the chip house. The remaining UST is located at the east portion of the South Bend Lathe property, south of the Engineering Building. The approximate locations of these USTs are shown on Figure 2. According to the report, eight borings were installed near the five tanks and soil and groundwater samples were collected from each boring location and were submitted to a laboratory. The report states that soil samples were analyzed only for total petroleum hydrocarbons (TPH), groundwater samples were analyzed for TPH and VOCs. The report also states that 24 samples of potential asbestos-containing roofing material were collected for analysis.

Borings 1 and 2 (B-1 and B-2) were installed near the waste oil UST located approximately 135 ft. east of the southwest corner of the South Bend Lathe building. The higher concentration of TPH in soil from these two borings is 10,400 mg/kg from B-2 at a depth of 16.5 to 18 ft. bgs. The higher concentration of TPH in groundwater is 124 mg/L from B-2. Xylenes were detected in B-2 at 0.013 mg/L and 1,1-DCA was detected in B-1 at 2.9 ug/L. The following chemicals of concern (COCs) were detected in B-2; p-isopropyltoluene was detected at 24 ug/L, naphthalene was detected at 20 ug/L, 1,2,4-trimethylbenzene was detected at 125 ug/L.

Borings 3 and 4 (B-3 and B-4) were installed near a 20,000-gallon fuel oil UST located southwest of the chip house on the south side of the South Bend Lathe building. TPH and benzene, toluene, ethylbenzene, and xylenes (BTEX) results were below the laboratory's detection limit. The higher concentration of 1,1-DCA was collected from B-3 at 2.0 ug/L. The higher concentration of cis-1,2-DCE was collected from B-3 at 4.6 ug/L. The higher concentration of 1,1,1-TCA was collected from B-3 at 3.1 ug/L and the higher concentration of TCE was collected from B-3 at 15 ug/L.

Boring 5 was installed north of the piping track and east of the previously mentioned chip house. Two soil samples were submitted from B-5 for TPH. One sample was collected 1.5 to 3.0 ft. bgs (2,550 mg/kg) and one sample was collected 16.5 to 18.0 ft. bgs (112 mg/kg). Groundwater

analysis results from B-5 include the following; TPH at 0.44 mg/L, toluene at 0.010 mg/L, xylenes at 0.008 mg/L, 1,1-DCA at 1.5 ug/L, cis-1,2-dichloroethene (cis-1,2-DCE) at 3.5 ug/L, 1,1,1-TCA at 1.4 ug/L and TCE at 11 ug/L.

Borings 6 and 7 (B-6 and B-7) were installed near a 20,000-gallon fuel oil UST located approximately 105 ft. east of the chip house on the south side of South Bend Lathe. TPH and BTEX results of the soil and groundwater samples were below the laboratory's detection limit. Remaining VOC analytical information was either not provided or was not included in the parameter list for analysis.

Boring 8 was installed near 5,000-gallon gasoline UST located on the South Bend Lathe property, approximately 60 ft. south of the Engineering Building. The only result above the laboratory's detection limit for the soil and groundwater collected from B-8 is TPH in groundwater at 0.59 mg/L. Remaining VOC analytical information was either not provided or was not included in the parameter list for analysis.

A report titled "Site Remediation, 10,000-Gallon Underground Storage Tank, 32,000-gallon Cistern" was prepared by Warner & Sons, Inc. in June of 1993 and was reviewed for this Assessment. The report states that during demolition of the Avanti building located north of Area A, a 10,000-gallon heating oil UST and a large cistern with obviously contaminated materials were encountered. The UST was removed in December of 1992 and approximately 200 cubic yards of impacted soil was excavated from near the UST. The UST reportedly stored heating oil. Less than 50 gallons of sludge were removed from the tank prior to the tank's removal. Five confirmation soil samples were collected following the removal of the UST. The samples were submitted to a laboratory and analyzed for TPH. One sample resulted in a TPH concentration of 14 PPM and the other four samples were below the laboratory's detection limit. The impacted soil was disposed of as special waste at Prairie View Landfill on April 20, 1993. An approximately 32,000-gallon cistern, located at the Avanti property, was discovered during demolition operations. A dark, oily, aqueous solution was observed in the cistern. The source of the material is unknown. On December 2, 3, and 4, 1992 and on April 20 and 22, 1993, a total of 20,432 gallons of the material were removed from the cistern and disposed of at SER Oil Services. A sample of the material was collected and analyzed for TPH, ignitability, paint filter testing, TCLP volatiles and semivolatiles, total PCBs, reactivity, cyanide, total phenolics, pH, and TCLP metals. A TPH concentration of 190,000 PPM, a barium concentration of 9.0 mg/L, a

cadmium concentration of 0.15 mg/L and a lead concentration of 1.4 mg/L were detected in the sample. The concrete material associated with the cistern was also sampled prior to removal. The material was found to be a special waste and was disposed of at Prairie View Landfill on April 20 and 21, 1993. No visual impact was detected in soils adjacent to the cistern.

A letter prepared by APT in April of 1994 was reviewed for this Assessment. The letter was prepared for IDEM concerning a historic release from the four USTs located on the west end of Building 86 on the Allied Products Corp. property. The report indicates that, during the closure in-place of four USTs, Allied temporarily stored fuel oil and Studebaker reportedly used to store solvents. Soil samples were therefore collected near the USTs. These samples were submitted to a laboratory for TPH and VOC analysis. Results indicated elevated concentrations of PCE in soil near the tank. The report also indicated that no product was located in the tank prior to closure activities. The report states that IDEM incident number 94031118 was issued for the incident. No further action regarding remediation activities is stated in the letter.

A report titled "Site Investigation Report," prepared by APT in May of 1995 was reviewed for this Assessment. A portion of the report was received from the City of South Bend; however, this copy of the report did not include figures that showed the locations of the USTs that were removed from the Site (as discussed below), nor did it contain the majority of laboratory data from the on-Site investigations. A copy of what is believed to be the full report was received from IDEM on January 18, 2001. A review of the report and associated figures and laboratory data follows.

The report discusses potential releases associated with seventeen UST systems. Thirteen of the tanks were reportedly closed by Petroleum Equipment, Inc. during June 1989 to October 1991 and the remaining four tanks were closed by APT in March 1994. Ten USTs were reportedly removed from a tank farm located between Building 86 and 79. The tank farm consisted of six-10,000-gallon tanks, one-8,000-gallon tank, and three-12,000-gallon tanks that reportedly stored gasoline, kerosene and heating oil prior to closures. However, based on the age of the USTs the tanks may have stored several different materials in their lifetime. Soil samples were collected near the USTs and were sent to a laboratory and analyzed for TPH. The report stated that, based on the results of these samples, a release did not occur from this UST system. The report also stated that groundwater was not sampled in this area since it was not encountered during the UST excavation.

One 5,000-gallon UST, which was reportedly used to store gasoline, was located approximately midway along the outside of the east wall of the east building (Building 86). The report does not indicate if the tank was removed or closed in-place. Soil samples were collected near the UST and were sent to a laboratory for TPH analysis. Sample results indicated that releases had occurred from the UST and, therefore, soil was overexcavated and disposed of. Groundwater was not sampled at this time because it was not encountered during tank closure. The report does not state whether confirmatory samples were collected following excavation.

One 20,000-gallon UST that reportedly stored heating oil prior to its closure was located near the northwest corner of the west building (Building 86). The tank was abandoned in-place and soil samples were collected near the tank and sent to a laboratory for TPH analysis. It is not stated how many samples were collected; however, the report did state that two of the soil samples exhibited concentrations of TPH at 62 mg/kg and at 17 mg/kg. No remedial action was discussed in association with this tank. Groundwater was not sampled at this time because it was not encountered during tank closure.

According to the report, a 10,000-gallon UST that reportedly stored mineral spirits and kerosene was removed from the Site in October of 1991. The tank was located north of the east building. Strong petroleum odors were noted during the excavation of the UST. Soil samples were collected and sent to a laboratory for TPH and VOC analysis. A sample collected from the soil stockpile produced during the excavation exhibited a TPH concentration of 6,300 mg/kg and a soil sample collected from the floor of the excavation exhibited a TPH concentration of 31 mg/kg and a 1,2,4-trimethylbenzene concentration of 1,052 ug/kg. 2,264 cubic yards of soil near the tank was excavated, bioremediated, and returned to the excavation after concentrations of constituents were below the detection limit.

Four 4,000-gallon USTs historically containing PCE and fuel oil at different times of their operational use were closed in 1994. One monitoring well was installed near the tanks and one sample analyzed from the monitoring well indicated a release of PCE from the UST. The report also states that soil samples collected near the UST system confirmed a release of material with concentration of PCE and TPH. Table 1 through Table 3 in the report lists the parameter and the concentration of the respective COC. A narrative of the tables is provided below.

Samples were collected from the sidewalls and bottoms of the tank excavations and were analyzed for TPH diesel range organics (TPH-DRO). The laboratory's lower detection limit in these samples ranged from 10 mg/kg to 5,000 mg/kg. Five of the sample results were above the laboratory's detection limit. Sample T4-SSE (Tank 4 south side, east end) analysis resulted in a TPH-DRO concentration of 2,300 mg/kg. Sample T4-SSW (Tank 4 south side, west end) analysis resulted in a TPH-DRO concentration of 11 mg/kg. Sample T4-WE (Tank 4, west end) analysis resulted in a TPH-DRO concentration of 11 mg/kg. Sample T3-WE (Tank 3, west end) analysis resulted in a TPH-DRO concentration of 11 mg/kg. Sample T4-NSW (Tank 4 north side, west end) analysis resulted in a TPH-DRO concentration of 3,600 mg/kg.

Samples were collected from the sidewalls and bottoms of the tank excavations and were analyzed for VOCs. Acetone was detected in the samples collected from Tanks 1, 2, 3 and 4. The highest concentration of acetone detected was from sample T1-SSE (Tank 1 south side, east end) at 1,000 ug/kg. Acetone was also detected in the laboratory blank indicating that the acetone concentrations may be due to a laboratory contaminant. Acetone is a typical laboratory contaminant. 2-butanone was detected in samples collected from Tanks 1, 2, 3 and 4. The highest concentration of 2-butanone detected was from sample T3-NSE (Tank 3-north side, east end) at 34 ug/kg. Carbon disulfide was detected in one sample collected from Tank 4. The concentration of carbon disulfide detected was from sample T4-NSE (Tank 4-north side, east end) at 2.7 ug/kg. 1,2-dichloroethene (1,2-DCE) was detected in samples collected from Tanks 3 and 4. The highest concentration of 1,2-DCE detected was from sample T3-EE (Tank 3- east end) at 8.7 ug/kg. Ethylbenzene was detected in samples collected from Tanks 3 and 4. The highest concentration of ethylbenzene detected was from sample T4-NSE (Tank 4- north side, east end) at 6.1 ug/kg. 2-hexanone was detected in one sample collected from Tank 4. The concentration of 2-hexanone detected was from sample T4-BE (Tank 4- bottom, east end) at 12 ug/kg. Methylene chloride was detected in samples collected from Tanks 1, 2, 3 and 4. The highest concentration of methylene chloride detected was from sample T3-NSE (Tank 3- north side, east end) at 17 ug/kg. 1,1,2,2-tetrachloroethane was detected in one sample collected from Tank 1. The concentration of 1,1,2,2-TCA detected was from sample T1-SSE (Tank 1south side, east end) at 610 ug/kg. PCE was detected in samples collected from Tanks 1,2,3 and 4. The highest concentration of PCE detected was from sample T2-SSE (Tank 2- south side, east end) at 72,000 ug/kg. Toluene was detected in samples collected from Tanks 3 and 4. The highest concentration of toluene detected was from sample T4-NSE (Tank 4- north side, east end) at 7 ug/kg. TCE was detected in samples collected from Tanks 3 and 4. The highest concentration of toluene detected was from sample T3-EE (Tank 3- east end) at 6.8 ug/kg. Total xylenes were detected in samples collected from Tanks 3 and 4. The highest concentration of xylenes detected was from sample T4-NSE (Tank 4- north side, east end) at 24 ug/kg. No other VOCs were detected above the laboratory's detection limit.

Samples were collected from the sidewalls and bottoms of the tank excavations and were analyzed for semivolatile organic compounds (SVOCs). Benzo (a) pyrene was detected in one sample collected from Tank 1 (T1-NSW-north side, west end) at 59 ug/kg. fluoranthene was detected in one sample collected from Tank 1 (T1-NSW-north side, west end) at 94 ug/kg. Benzo(ghi)perylene was detected in one sample collected from Tank 1 (T1-NSWnorth side, west end) at 55 ug/kg. Benzo (k) fluoranthene was detected in one sample collected from Tank 1 (T1-NSW-north side, west end) at 53 ug/kg. Bis(2-ethylhexyl)phthalate was detected in samples collected from Tanks 1 and 4. The highest concentration of bis(2ethylhexyl)phthalate detected was from sample T4-BW (Tank 4- bottom, west end) at 2,900 ug/kg. Carbazole was detected in one sample collected from Tank 1 (T1-NSW-north side, west end) at 35 ug/kg. Chrysene was detected in samples collected from Tanks 1 and 3. The highest concentration of chrysene detected was from sample T3-NSE (Tank 3- north side, east end) at 930 ug/kg. Di-n-butyl phthalate was detected in samples collected from Tanks 1, 2, 3 and 4. The highest concentration of di-n-butyl phthalate detected was from sample T3-NSW (Tank 3- north side, west end) at 480 ug/kg. Diethyl phthalate was detected in one sample collected from Tank 2 (T2-SS-south side) at 42 ug/kg. Fluoranthene was detected in one sample collected from Tank 1 (T1-NSW-north side, west end) at 160 ug/kg. Indeno (1,2,3-cd) pyrene was detected in one sample collected from Tank 1 (T1-NSW-north side, west end) at 53 ug/kg. Phenathrene was detected in samples collected from Tanks 1, 3 and 4. The highest concentration of phenathrene detected was from sample T4-SSE (Tank 4- south side, east end) at 2,100 ug/kg. Pyrene was detected in samples collected from Tanks 1 and 3. The highest concentration of pyrene detected was from sample T3-NSE (Tank 3- north side, east end) at 670 ug/kg. No other SVOCs were detected above the laboratory's detection limit.

The report also discusses the hydrogeology of the area, stating that, according to referenced materials, there is a shallow, unconfined aquifer located approximately 25 ft. bgs and a generally confined deep aquifer located approximately 100 ft. bgs. The report states that based

on on-Site investigations, a single, unconfined aquifer underlies the facility from ground surface to approximately 76 ft. bgs, followed by a 37 ft. thick interval consisting of interbedded till and sand/gravel units down to bedrock, which occurs at approximately 113 ft. bgs.

As part of the Phase II investigation performed at the Allied Products Corp. property, 24 shallow monitoring wells, 17 deep monitoring wells and nine soil borings were installed on the property. Shallow wells were screened at the water table (approximately 25 ft. bgs) and deep wells were screened at approximately 40-45 ft. bgs at a stained interval identified during previous investigations.

# A summary of the soil analysis results follows:

- 1. six of the 71 soil samples analyzed for TPH exceeded the IDEM LUST cleanup objective of 100mg/kg<sup>1</sup>, the highest of which was 39,000 mg/kg in MW1D at 38 ft. bgs; the remaining exceedences were 930 mg/kg (MW-2 at 21 ft. bgs), 320 mg/kg (MW-7 at 40 ft. bgs), 290 mg/kg (MW20D at 42 ft. bgs), 2,300 mg/kg (T4-SSE) and 3,600 mg/kg (T4-NSW);
- 2. VOCs were detected in 46 of the 47 soil samples collected and two VOC constituents were detected in concentration that exceeded the VRP Tier II cleanup objectives<sup>2</sup>. The PCE cleanup objective of 8,010 ug/kg was exceeded in six samples, and the 1,1,2,2-tetrachloroethane cleanup objective of 210 ug/kg was exceeded in one of the samples; and,
- 3. none of the 73 soil samples analyzed for SVOCs exceeded the IDEM LUST nor the VRP Tier II cleanup objectives.

# A summary of the groundwater analysis results follows:

1. thirty-four of the 68-groundwater samples were analyzed for TPH and the 18 samples that exhibited concentrations of TPH were above the IDEM LUST cleanup objective of 100/ug/L³. These samples were collected from MW-E, MW-2, MW-3, MW-4, MW-12, MW-7, MW-23S, MW-13S, MW-13D, MW-15S, MW-15D, MW-11D, MW-16D, MW-18D, MW-20D, MW-22;

<sup>3</sup> See footnote #1.

<sup>&</sup>lt;sup>1</sup> Note that the LUST program developed under RISC does not include a default closure level for TPH.

<sup>&</sup>lt;sup>2</sup> These concentrations also exceed RISC Commercial /Industrial default closure levels for soil.

- 2. forty of the 43-groundwater samples analyzed for VOCs exhibited concentrations of one or more VOCs. Two constituents of VOCs were detected in concentrations that exceeded the VRP Tier II cleanup criteria<sup>4</sup>. PCE was detected at concentrations that exceeded this criteria in eight samples (MW-1, MW-2, MW-6, MW-13-GW1, MW13D-GW1, MW-15D-GW1, and MW15-GW2). Vinyl chloride was detected in MW17S-GW1 that exceeded the cleanup criteria of 10ug/L. The concentration of this sample was not provided; and,
- 3. twenty-one of the 26 groundwater samples analyzed for SVOCs exhibited concentrations of one or more SVOC. Two SVOC constituents were detected in concentrations that exceeded the VRP Tier II cleanup criteria Bis(ethylhexyl)phthalate was detected at a concentration of 300 ug/L. APT stated that they believe this is a laboratory contaminant. Pentachlorophenol was detected in MW-3 at a concentration of 82 ug/L. This well was then resampled and Pentachlorophenol was not detected.

A portion of a Phase II report prepared by EIS Environmental Engineers, Inc. was made available for review for this Assessment. The report was prepared in August of 1995 and includes two figures. The first figure shows groundwater flow on the properties east of the Site to be towards the northeast. The second figure shows groundwater analytical results of monitoring wells installed off-Site northeast of the Site properties. Elevated concentrations of PCE and TCE were detected in the closest downgradient well to the Site.

A letter prepared by ATEC Associates, Inc. in January of 1996 summarizes the findings of the APT report that was prepared in 1995. It is likely that this is the same report that was reviewed for this Assessment and is summarized previously in this report.

A letter report provided for review included an April 1998 letter prepared by EIS Environmental Engineers, Inc. The cover letter includes a brief narrative describing groundwater sampling and analysis and well abandonment at the Avanti facility, a summary of analytical results, laboratory analytical results, the chain-of-custody for the samples, field sampling forms, and IDNR water well records documenting well abandonment. The letter stated that three of the four wells located on the Avanti property were abandoned and the fourth well was not located. The wells were installed by ATEC in November 1990. Sampling conducted prior to well abandonment indicates that VOCs in the submitted samples were below the laboratory's detectable limit. VOCs was the only parameter analyzed. Field forms for wells 1 and 2 indicate an odor was

<sup>&</sup>lt;sup>4</sup> These concentrations also exceed RISC Commercial/Industrial default clósure levels for groundwater.

detected during the well abandonment. The type of odor was not specified. One figure was included that showed the location of monitoring wells on the Avanti property located north of Area A.

A report prepared by Grauvogel & Associates in April of 2000 was reviewed for this Assessment. The report discusses the removal of three USTs and the closure in-place of one UST on the Engineering Building property located adjacent to the west of South Bend Lathe and northeast of Allied Products. Two 8,000-gallon USTs and one 5,000-gallon UST that historically stored gasoline were removed from the property in January of 2000. One 1,500-gallon UST that historically stored, at different periods, lubrication oil and mineral spirits. The 1,500-gallon UST was reportedly closed in-place due to its close proximity to a building foundation. No visual signs of leakage were noted near any of the tanks during excavation. The excavated tanks were observed for corroded areas where product might have escaped the tank. No such areas were noted. Approximately 150 gallons of mineral spirits were removed from the 1,500-gallon UST prior to closure. Approximately 1,120 gallons of water was removed from one of the 8,000gallon USTs and approximately 8,000 gallons of water with trace gasoline was removed from the other 8,000-gallon UST prior to removal. Approximately 5,000 gallons of water with trace gasoline was removed from the 5,000-gallon UST prior to removal. One excavation was created to remove the two 8,000-gallon USTs and to expose the 1,500-gallon UST (east excavation) and another excavation was created to remove the 5,000-gallon UST (west Groundwater was not encountered during excavation. Soil samples were excavation). collected from both excavations. Soil samples from the east excavation were analyzed for lead and TPH. The highest result of lead was collected from the north portion of the west wall at 119 mg/kg. All TPH results were below the laboratory's detectable limit of 20 mg/kg. All TPH results from the west excavation were below the laboratory's detectable limit of 20 mg/kg. samples of the excavated soil was collected and found to be below the laboratory's detectable limit of 20 mg/kg. The excavated soil was returned to the excavation and additional backfill was brought in to return the excavations to grade. One sample was collected from the additional fill material required and was found to be below the laboratory's detectable limit of 20 mg/kg. Additional sampling is recommended for the area of the closed USTs to address the potential for the presence of VOCs and SVOCs.

#### 2.0 STATEMENT OF WORK

## 2.1 Phase II Environmental Site Assessment Work Plan

The statement of work and objectives of the Phase II ESA are presented in the Work Plan and Field Sampling and Analysis Plan for a Phase II ESA (Hull Document #SBI002.100.0003) that was prepared for the City prior to the initiation of field activities. This work plan contained descriptions of the sampling rationale and methods for soil and groundwater investigation during the Phase II ESA.

The Work Plan assumed that environmental data collected as part of the assessment will be compared with Indiana RISC default closure levels. It is Hull's understanding that the Site will be developed for a future commercial/Industrial land use. RISC default closure levels for soils have therefore been considered to be applicable to commercial and industrial land use assumptions. Groundwater analytical data have been compared with closure levels assuming both commercial/industrial and residential land uses. Residential closure levels have been included in the evaluation as the downgradient extent of the COC has not been determined at the time this report was completed. Additional data collected downgradient of the Site would support the determination of applicable closure levels for the off-Site receptors.

#### 2.2 Site-Specific Health and Safety Plan

Prior to initiation of the Phase II ESA field activities, Hull prepared a Health and Safety Plan (Hull Document #SBI001.100.0010) in general conformance with IDEM's Site Safety Plan requirements.

## 2.3 Quality Assurance Project Plan

The field work was performed consistent with U.S. EPA Region V requirements, the Indiana Department of Environmental Management's (IDEM's) VRP Program, and the U.S. EPA-approved Quality Assurance Project Plan (QAPP) dated August 2001 (Hull Document # SBI002.300.0008).

### 3.0 SITE CHARACTERIZATION INVESTIGATION

# 3.1 Baseline Ecological Assessment

The Site is located within the City of South Bend corporate limits in an urban (commercialized and residential) area. The storm water runoff for Area A is largely controlled by the Site's internal drainage system. Storm water collected by this system is then diverted to the City's combined sanitary and storm sewer system. An apparent retention basin that is located west of the building at the former Studebaker foundry (currently Underground Pipe & Valve – Property B). Based on observations during the Phase I and II ESA, it appears that this basin is used to management storm water from the roof drain system of the foundry. The nearest surface water body is the St. Joseph River, which is located approximately 1.5 miles northeast of the Site. Based on moderate concentrations of the COC in the subsurface and groundwater at the Site, the potential threat to aquatic wildlife and the river is limited.

There are no wetland areas, riparian areas, or other environmentally sensitive areas on, or adjacent to the Site. The locations of floodplain and wetland areas are described and mapped in the Phase I ESA Report. Environmental conditions at the Site do not appear to represent a threat to the local wildlife or potential endangered species.

# 3.2 Background Concentrations

Hull did not establish background concentrations for soils given the fact that risk-based cleanup goals were available for comparison to sampling data and considering that past industrial activities over most of the surrounding areas. As described in section 3.4, concentrations of the COCs in soil are evaluated based on RISC default closure levels consistent with the intended final use of the Site.

Hull evaluated background concentrations for groundwater based on the analytical results from an upgradient monitoring well. These analytical data, as described in section 3.5, are used to evaluate if the detected concentrations in on-Site wells are from releases on-Site, or are the result of migration onto the Site from on upgradient source.

### 3.3 Background Hydrogeologic Assessment

The Site is located along the southern edge of the Michigan Basin and northeast of the Kankakee Arch that separates the Illinois and Michigan Basins. The surface and near-surface

geology is part of the Kankakee Lowland. This area is characterized by fine-grained Holocene alluvium overlying the outwash sand and gravel deposit, which in turn overlies lacustrine silty clay materials. These unconsolidated materials are approximately 20 to 400 ft. thick, overlying the Devonian Age Ellsworth Shale. The Ellsworth Shale is described as predominantly green marine shale.

The Site lies above the St. Joseph Aquifer System, a highly productive aquifer capable of yielding greater than 250 gallons per minute. The St. Joseph Aquifer System is primarily composed of fine to medium sand with layers of sand and gravel. These granular deposits range in thickness from 20 to 400 ft. Groundwater is typically encountered at depths ranging from 15 to 75 ft. bgs. The regional groundwater flow within the aquifer system is to the northeast at a hydraulic gradient of 0.005 ft/ft and generally follows the surface topographic expression. The St. Joseph River appears to be the local discharge area for groundwater. Recharge to the aquifer system is primarily through the vertical percolation of the rain through the highly permeable subsurface. Therefore, the aquifer would be highly susceptible to releases of contaminants at the surface.

According to reviewed publications, thin (3 to 5 ft. thick) silty clay layers are interspersed within the aquifer and moderately thick deposit of the glacial tills separate the upper sand and gravel aquifer from the lower more productive sand and gravel aquifer. Based upon review of available information, there are no faults beneath, or within the vicinity of the Site.

Geologic information obtained from continuously sampled soil borings and monitoring wells indicate that subsurface soils and the aquifer consist of predominantly medium sand with secondary percentages of gravel and fines (clay and silt). Groundwater in the aquifer was encountered at depth ranging from approximately 20 to 27 ft. bgs. Beneath the aquifer unit, a low permeability layer unit was encountered at a number of deep monitoring well locations. Where present, this unit was encountered at depths ranging from approximately 60 to greater than 120 ft. bgs. In some areas, the unit was described as grey and brown dense sandy silt that was noted as being damp. In other areas, the unit was described as being a dense, grey and brown silty clay with secondary percentage of sand and gravel. Note that this unit was not fully penetrated to preclude creating a pathway to potential lower water bearing zones.

# 3.4 Phase II Environmental Site Assessment Sampling Methodology

The Phase II ESA was designed to evaluate the concentrations of COCs (in surface and subsurface soils and groundwater) and to characterize the geologic and hydrogeologic conditions beneath the Site. Field activities included the installation of the numerous groundwater monitoring wells and soil borings. The locations of these soil borings and monitoring wells are shown on Figure 3. Selected soil borings and monitoring wells were continuously sampled using 24-inch split-spoon samplers that were decontaminated between each sampling interval. Monitoring wells were installed in boreholes created by advancing 4.25 inch, inside-diameter (ID), hollow stem augers. The wells were constructed of two-inch ID Schedule 40 PVC screen and casing. Soil boring logs and monitoring well construction diagrams are provided in Appendix A. Construction information for the monitoring wells is summarized in Table 1.

As stated in the Initial Phase II ESA work plan, the objectives of the soils investigations were to:

- 1. evaluate the stratigraphy and textural characteristics of the vadose zone and the unconfined aquifer;
- 2. collect soil samples and conduct geotechnical analyses to evaluate contaminant transport characteristics;
- 3. provide initial data to demonstrate the completeness or incompleteness of potential exposure pathways of identified COCs; and,
- 4. collect soil samples from identified REC areas and additional areas for chemical analyses to evaluate the absence/presence and concentration of COCs.

To address these objectives, continuous sampling was completed at 32 shallow direct-push borings (to a depth of four ft. bgs), five shallow soil borings, and at selected shallow and deep monitoring well locations to characterize the vadose zone stratigraphy and potential exposure pathways. Note that when nested wells were installed, only the deeper of the borings was continuously sampled.

To evaluate the horizontal and vertical extent of COCs in the vadose zone, 98 discrete samples (excluding quality assurance/quality control (QA/QC) samples) were submitted to the analytical laboratory for analyses. In addition, six samples were submitted to a geotechnical laboratory to evaluate the textural composition and physical properties of the unsaturated soils.

The objectives of the groundwater investigation were to:

- 1. assess the location and stratigraphy of the unconfined aquifer(s) and the presence or absence of confining layers in the unconsolidated material;
- determine the nature and concentrations of COCs in groundwater;
- evaluate the groundwater yield and hydraulic characteristics of the unconsolidated aquifer; and,
- 4. evaluate the general flow direction and gradient of groundwater.

These objectives were achieved by installing 26 shallow monitoring wells, 9 intermediate monitoring wells, and 21 deep monitoring wells. Continuous sampling of the saturated portion of the unconfined aquifer was completed in selected deep monitoring well locations, and at selected intermediate monitoring well locations where no deep monitoring wells were proposed. In addition, continuous sampling of the upper portion of the unconfined aquifer was completed when only a shallow monitoring well was installed.

The newly installed monitoring wells were properly developed in accordance with procedures described in the Initial Phase II ESA Work Plan. Field data sheets for the well development activities are provided in Appendix B.

To determine the extent of COCs in the unconfined aquifer, 72 representative groundwater samples were collected from the newly installed monitoring wells and from selected existing monitoring wells installed by APT, Inc. Field data sheets documenting that the groundwater samples were collected consistent with the procedures in the Work Plan are provided in Appendix C. In conjunction with the groundwater sampling event, static water levels were collected to evaluate horizontal and vertical groundwater flow.

Detailed descriptions of the investigative and sampling rationale, soil and groundwater sampling methods, analytical methods for soil and groundwater, and QA/QC protocols are provided in the Work Plan for a Phase II ESA (Hull Document # SBI002.100.0003) and the QAPP (Hull Document # SBI002.300.0008). This Work Plan was prepared prior to completing the field work for the Initial Phase II ESA. Adherence to the procedures in the Work Plan and QAPP provided for collection of representative soil and groundwater samples.

# 3.5 Phase II Environmental Site Assessment Results

# 3.5.1 Sample Analysis Results

#### Soil

Hull selected at least one representative soil sample from the soil borings and monitoring wells for laboratory analysis based on the results of photoionization detector (PID) headspace screening or by evidence (staining, odors, etc.) of the presence of COCs as observed in the field. If a boring or well did not exhibit any evidence of COCs, Hull submitted the sample from the upper two ft. of the soil column to TestAmerica Laboratories for analysis. In cases where field screening and/or visual observation identified the potential presence of COCs, Hull submitted two soil samples from a boring or well to evaluate the vertical extent of the potential contaminants. In addition to the soil samples, Hull collected trip and field blanks, duplicate samples, and matrix spike/matrix spike duplicate (MS/MSD) samples for submittal to the laboratory as QA/QC measure. During collection, handling, and transportation of these samples, Hull maintained strict chain-of-custody protocols to protect the chemical integrity of the soil samples. Laboratory analytical reports for the soil samples and QA/QC samples along with the chain-of-custody documents are included in Appendix D.

These soil analytical data generated during the course of this investigation were evaluated in accordance with the procedures described in the QAPP. These data were determined to meet the substantive requirements for the precision, accuracy, representativeness, completeness, and comparability (PARCC). An evaluation of field blank (equipment rinseate) samples result indicate that the field decontamination procedures were effective since no target analytes were detected in any of the field blank samples. Similarly, target analytes were not detected in any of the trip blank samples.

Analytical data generated by the subcontracted laboratory were evaluated in accordance with the QAPP. Specifically, laboratory QA/QC samples (i.e., replicates, MS/MSD, calibration checks, etc.) were performed in strict accordance with laboratory's Standard Operating Procedures (SOPs) that were included as Appendix A of the QAPP. Any deviations were clearly indicated in the case narrative for each sample delivery group and the analytical results were qualified as appropriate. Upon receipt, Hull's Quality Assurance Officer reviewed analytical data generated by the laboratory subcontractor prior to distribution. The analytical

reports with case narratives and QC summaries for the soil samples have been included as Appendix D of this report. Level 4 data packages (CLP-like deliverables) were prepared for each sample delivery group and are available upon request.

Tables 2 and 5, summarizes the analytes that were detected above respective method detection limits for the surface soils (i.e., 0 to 0.5 ft. bgs) and subsurface soils (i.e., > 0.5 ft. bgs and above the water table smear zone). In addition, Table 2 provides a summary of applicable RISC commercial/industrial default closure levels. These data are also shown on Figure 4 to illustrate the distribution of COCs that exceed RISC commercial/industrial closure levels. As summarized in Tables 2 and 5, COCs at the Site that exceed RISC Commercial/Industrial default closure levels include:

#### Metals

- 1. arsenic;
- 2. cadmium;
- 3. chromium; and,
- 4. lead.

### **SVOCs**

- benzo(a)anthracene;
- 2. benzo(a)pyrene;
- 3. benzo(b)fluoranthene;
- 4. chrysene;
- 5. dibenzo(a,h)anthracene; and,
- 6. indeno(1,2,3-cd)pyrene.

# **VOCs**

1. PCE.

Arsenic was detected in 33 samples at concentrations ranging from 3.4 mg/kg at SB-6 to 114 mg/kg at HA-3. Arsenic exceeded the RISC Commercial/Industrial default closure level of 20 mg/kg at 10 locations with concentrations ranging from 21.4 mg/kg at HMW-22D to 114 mg/kg

at HA-3. Locations where arsenic concentrations exceed closure levels are shown on Figure 4 and are summarized in Table 5. The source of the elevated arsenic concentrations is probably the former railroad spurs and ties.

Cadium was detected in five samples at concentrations ranging from 2.0 mg/kg at GB-19 to 89.2 mg/kg at GB-10. Cadium exceeded the RISC Commercial/Industrial default closure level of 77 mg/kg at GB-10. The location where the cadium concentration exceeds the closure level is shown on Figure 4 and is summarized in Table 5. The source of the elevated cadium concentration is currently unknown.

Chromium was detected in 70 samples at concentrations ranging from 2.8 mg/kg at HMW-19D to 177 mg/kg at GB-12. Chromium exceeded the RISC Commercial/Industrial default closure level of 120 mg/kg only at GB-12 at a concentration of 177 mg/kg. The location where chromium concentration exceeds the closure level is shown on Figure 4 and is summarized in Table 5. The source of the elevated chromium concentration is currently unknown.

Lead was detected at 67 locations at concentrations ranging from 5.9 mg/kg at HMW-6S to 13,600 mg/kg for the duplicate sample at HMW-24D. Lead exceeded or equaled the RISC Commercial/Industrial default closure level of 230 mg/kg at 19 locations with concentrations ranging from 241 mg/kg at HMW-12S to 13,600 mg/kg at HMW-24D. Locations where lead concentrations exceed closure levels are shown on Figure 4 and are summarized in Table 5. The source of the elevated lead concentrations is currently unknown. Possible sources could be residual paint chips that were incorporated into the soil during the demolition of the residents that once occupied this portion of Area A, fugitive dust from foundry operations, or paints used in the automobile manufacturing process.

Benzo(a)anthracene was detected in 33 samples at concentrations ranging from 353 ug/kg at HMW-34S to 29,200 ug/kg at GB-34. Benzo(a)anthracene exceeded the RISC Commercial/Industrial default closure level of 15,000 ug/kg only at GB-34. The location where the benzo(a)anthracene concentration exceeds the closure level is shown on Figure 4 and is summarized in Table 5. The suspected source of the benzo(a)anthracene is likely the railroad ties and cutting oil that occupy Area A. Note that at no single location is the total SVOC concentration greater than 10,000 mg/kg.

Benzo(a)pyrene was detected at 39 locations at concentrations ranging from 195 ug/kg at GB-2 to 30,900 ug/kg at GB-34. Benzo(a)pyrene concentrations exceed the RISC Commercial/Industrial default closure level of 1,500 ug/kg at 12 location at concentrations ranging from 1,610 ug/kg at GB-11 to 30,900 ug/kg at GB-14. Locations where benzo(a)pyrene concentrations exceed closure levels are shown on Figure 4 and are summarized in Table 5. The suspected source of the benzo(a)pyrene is likely the railroad ties and cutting oil that occupy Area A.

Benzo(b)fluoranthene was detected in 35 samples at concentrations ranging from 415 ug/kg at SB-3 to 48,600 ug/kg at GB-34. Benzo(b)fluoranthene concentrations exceed the RISC Commercial/Industrial default closure level of 15,000 ug/kg at GB-10 (16,000 ug/kg) and GB-34 (48,600 ug/kg). Locations where benzo(b)fluoranthene concentrations exceed closure levels are shown on Figure 4 and are summarized in Table 5. The suspected source of the benzo(b)fluoranthene is likely the railroad ties and cutting oil that occupy Area A.

Chrysene was detected in 36 samples at concentrations ranging from 360 ug/kg at GB-33 to 36,900 ug/kg at GB-34. Chrysene exceeded the RISC Commercial/Industrial default closure level of 25,000 ug/kg only at GB-34. The location where the chrysene concentration exceeds the closure level is shown on Figure 4 and is summarized in Table 5. The suspected source of the benzo(a)anthracene is likely the railroad ties and cutting oil that occupy Area A.

Dibenzo(a,h)anthracene was detected in five samples at concentrations ranging from 368 ug/kg at HMW-27S to 2,530 ug/kg at GB-34. Dibenzo(a,h)anthracene exceeds the RISC Commercial/Industrial default closure level of 1,500 ug/kg only at GB-34 (2,530 ug/kg). The locations where dibenzo(a,h)anthracene exceeds closure levels is shown on Figure 4 and is summarized in Table 5. The suspected source of the dibenzo(a,h)anthracene is likely the railroad ties and cutting oil that occupy Area A.

PCE was detected at nine locations at concentrations ranging from 9.7 ug/kg at HMW-18S to 4,740 ug/kg at HMW-9I. PCE exceeds the RISC Commercial/Industrial default closure level of 640 ug/kg only at HMW-9I. In addition, based on Hull's experience modeling volatilization to indoor in soils similar to the soils at Area A, the concentration of PCE at HMW-9I would result in

an unacceptable risk should a build be constructed over this area. The likely source of the PCE is spill from prior part degreasing operations. Note that at no single location is the total VOC concentration greater than 1,000 mg/kg.

### Groundwater

The groundwater data generated during the course of this investigation were evaluated in accordance with the procedures described in the QAPP. The data were determined to meet the substantive requirements for the precision, accuracy, representativeness, completeness, and comparability (PARCC). All field measurements were reviewed by the Project Manager or Quality Assurance Officer and any corrections have been clearly documented on the field data sheets that have been included in this report. An evaluation of field blank (equipment rinseate) samples result indicates that the field decontamination procedures were effective since no target analytes were detected in any of the samples. Similarly, target analytes were not detected in any of the trip blank samples.

Analytical data generated by the subcontracted laboratory was evaluated in accordance with the QAPP. Specifically, laboratory QA/QC samples (i.e., replicates, MS/MSD, calibration checks, etc.) were performed in strict accordance with laboratory's SOPs that were included as Appendix A of the QAPP. Any deviations were clearly indicated in the case narrative for each sample delivery group and the analytical results were qualified as appropriate. Upon receipt, Hull's Quality Assurance Officer reviewed analytical data generated by the laboratory subcontractor prior to distribution. The analytical reports with case narratives and QC summaries for the groundwater samples have been included as Appendix E of this report. Level 4 data packages (CLP-like deliverables) were prepared for each sample delivery group and are available upon request.

Following development and purging, Hull collected groundwater samples from 74 monitoring wells. In addition to the groundwater samples, Hull collected trip and field blanks, a duplicate sample, and a MS/MD sample for submittal to the laboratory as a QA/QC measure. During collection, handling, and transportation of these samples, strict chain-of-custody protocols were maintained to protect the chemical integrity of the groundwater samples. Laboratory analytical reports for the groundwater and QA/QC samples along with the chain-of-custody document are included in Appendix E.

Table 3 summarizes the analytical parameters in groundwater that were detected above their respective method detection limit. In addition, Table 3 provides a summary of applicable RISC commercial/industrial and residential default closure levels. Sampling locations exceeding the RISC default closure levels are shown on Figure 5 to illustrate the lateral extent of groundwater above applicable default closure levels. As summarized on Table 3, several analytical results for groundwater are above the applicable land use closure levels.

Arsenic was detected in 22 groundwater sampling locations at concentrations ranging from 5.3 ug/L at HMW-33S to 2,860 ug/L at HMW-19S. Of these locations, arsenic concentrations exceeded both RISC commercial/industrial and residential default closure levels (50 ug/L) at seven locations. Default closure levels were exceeded at HMW-2S, HMW-6S, HMW-19S, HMW-25S through HMW-27S, and HMW-31S. Figure 6 shows the approximate extent of groundwater that exceed commercial/industrial and residential closure levels for arsenic. As shown on Figure 6, there appears to be three separate areas or plumes where arsenic exceeds industrial and residential closure levels. However, it is evident that the arsenic concentrations, above closure levels, are apparently confined to the upper portion of the aquifer.

Barium was detected at 55 groundwater sampling locations at concentrations ranging from 29 ug/L at HMW-4S to 7,030 ug/L at HMW-25S. Of these locations, barium concentrations did not exceed the RISC commercial/industrial default closure levels of 7,200 ug/L. RISC residential default closure levels of 2,000 ug/L were exceeded at two locations. These locations are HMW-19S (3,100 ug/L) and at HMW-25S in the northeast portion of Area A. The locations of the monitoring wells are shown on Figure 5.

Chromium was detected at 14 groundwater sampling locations at concentrations ranging from 8.8 ug/L at HMW-33D to 224 ug/L at HMW-25S. Of these locations, chromium concentrations exceeded the RISC residential default closure level of 100 ug/L at two locations. No groundwater sample exceeded the RISC commercial/industrial default closure level of 310 ug/l. HMW-2S (163 ug/L) is located in the western portion of Property B and at HMW-25S in the northeast portion of Property D. The locations of these monitoring wells are shown on Figure 6.

Lead was detected at 54 groundwater sampling locations at concentrations ranging from 1.1 ug/L at MW-1D to 1,410 ug/L at HMW-25S. The RISC residential default closure level of 15 ug/L was exceeded at 19 locations. The RISC commercial/industrial default closure level for

lead of 42 ug/L was exceeded at 11 locations. Figure 7 shows the approximate extent of groundwater that exceeds commercial/industrial and residential closure levels for lead. As shown on Figure 7, there are several apparently non-contiguous areas or plumes where lead exceeds industrial and residential closure levels, thereby indicating several potential source areas. The majority of the exceedances are concentrated in the southeastern half of Area A. It is also evident that the highest lead concentrations primarily within the upper portion of the aquifer.

One lead plume may originates from the former retention basin located southwest of the Property B building and extend to the northeast. However, as shown on Figure 7, the residential closure level was exceeded in HMW-1I (which is the upgradient well in this area). It is therefore not possible to distinguish whether the former retention basin is the source of the lead or if the lead is migrating onto Area A from an off-Site source. An additional well nest would need to be installed upgradient of the former retention basin to complete this determination. In addition, several monitoring well nests would need to be installed to evaluate the western extent of this lead plume.

A second lead plume appears to have originated from the northern portion of the Huckins Property. Additional monitoring wells would need to be installed to further characterize this plume. A third apparent lead plume appears to be originating from the northeast of the Allied Product Corp. Property. Based on the results of the monitoring wells located north of Sample Street, it appears that this plume is migrating off-Site.

A fourth lead plume appears to have originated from the southwest of the Property D and extended to the northeast. The plume appears to end in the vicinity of monitoring well nest #13, as shown on Figure 7. This plume is apparently confined within Area A boundaries.

The last lead plume appears to have originated from the southeastern portion of Area A, as shown on Figure 7, and may migrate off-Site. Note that since no monitoring wells have been installed upgradient, it is possible to conclude whether the plume originated from an on- or off-Site source. Additional monitoring wells would need to be installed to further characterize the upgradient and downgradient extent of this area.

Mercury was detected at four groundwater sampling locations at concentrations ranging from

0.3 ug/L at HMW-27S to 2.3 ug/L at HMW-25S. Of these locations, the mercury concentration exceeded the RISC residential default closure level of 2 ug/L only at HMW-25S. No groundwater sample exceeded the RISC commercial/industrial default closure level. HMW-25S is located in the northeast portion of Area A, as shown on Figure 5. Note that the detected mercury concentrations are concentrated in the northeast portion of Area A.

PCE was detected at 34 groundwater sampling locations at concentrations ranging from 1.0 ug/L at HMW-28S and HMW-31D to 749 ug/L at HMW-9S. The RISC residential default closure level of 5 ug/L was exceeded at 22 locations primarily in the southeastern half of Area A. The RISC commercial/industrial default closure level of 55 ug/L was exceeded at 12 sampling locations. As shown on Figure 8, the sampling locations that exceed the residential and commercial/industrial default closure level apparently coincide with the axis of the plume that appears to have originated from the southern portion of buildings 86 and 93. Based on the sampling results on the north side of Sample Street, the PCE plume has migrated off-Site. As no VOCs were detected in upgradient monitoring wells MW-8S, MW-8D and MW-30D, it is apparent that the source of PCE is located southeast portion of Area A, as supported by the detection of PCE in unsaturated soil in building 142.

TCE was detected at 35 groundwater sampling locations at concentrations ranging from 1.1 ug/L at MW-11S and MW-11D to 386 ug/L at HMW-13D. The RISC residential default closure level of 5 ug/L was exceeded at 26 locations. The RISC commercial/industrial default closure level of 260 ug/L was exceeded only at HMW-13D, located in the northern portion of building 80.

As shown on Figure 9, there appears to be two discrete TCE plumes in Area A. One TCE plume appears to have originated from the southern portion of buildings 86 and 93 and extend to the northeast and migrates off-Site. As no VOCs were detected in upgradient monitoring wells MW-8S, MW-8D and MW-30D, it is apparent that the TCE is originating from the southeast portion of Area A. An additional monitoring well nest would need to be installed to the southeast of building 142 to verify this conclusion.

The second TCE plume appears to have originated from the former retention basin located southwest of the Property B and extended to the northeast. As with the other TCE plume, based on the groundwater sampling results from monitoring wells on the north side of Sample Street, this plume is migrating off Area A. As shown on Figure 9, the residential closure level

goal was exceeded in HMW-1I (which is the upgradient well in this area). Therefore, it is not possible to identify whether the former retention basin is the source of the TCE, or if the TCE is migrating onto Area A from an off-Site source. An additional well nest would be required to be installed upgradient of the former retention basin to complete this determination. In addition, several other monitoring well nests would need to be installed to evaluate the western extent of this TCE plume.

Vinyl Chloride was detected at three groundwater sampling locations at concentrations ranging from 1.3 ug/L at HMW-31I to 4.1 ug/L at HMW-14S, exceeding the RISC commercial/industrial and residential default closure levels of 2 ug/L only at HMW-14S. HMW-14S is located in the northwest portion of Area A south of the western portion of the building on Property C, as shown on Figure 5. Vinyl Chloride may be biodegradation of TCE/or PCE, and appears to be isolated beneath Area A.

1,2,4-trimethylbenzene was detected at three groundwater sampling locations at concentrations ranging from 1.3 ug/L at HP-2d to 7,740 ug/L at HMW-23S. The 1,2,4-trimethylbenzene concentration at HMW-23S exceeded the commercial/industrial and residential closure levels that were derived by Hull from equations in Appendix F of the VRP Guidance Document. HMW-23S is located in the northeast portion of Area A, as shown on Figure 5. This COC appears to be related to the oily layer that was periodically encountered below the water table.

1,3,5-trimethylbenzene was detected at four groundwater sampling locations at concentrations ranging from 1.4 ug/L at MW-15D to 2,330 ug/L at HMW-23S. The 1,3,5-trimethylbenzene concentration at HMW-23S exceeded the RISC commercial/industrial and residential default closure levels that were derived by Hull from equations in Appendix F of the VRP Guidance Document. HMW-23S is located in the northeast portion of Area A as shown on Figure 5. This COC appears to be related to the oily layer that was periodically encountered below the water table.

# 3.5.2 Hydrogeologic Investigation Results

Based on the geologic information collected from the continuously sampled soil borings and monitoring wells, the Site is underlain by brown fine to medium sand with traces of silt and clay. The geologic conditions are illustrated on the generalized geologic cross sections A-A', B-B', C-

C' D-D' shown on Figure 10, 11, 12, and 13, respectively. Detailed descriptions of the unconsolidated materials encountered at each location are described on the Soil borings logs provided in Appendix A.

As shown on the geologic cross-sections and describe on the soil boring/monitoring well logs, the vadose zone ranges in thickness from approximately 20 to 27 ft. thickness. Soil samples collected from this zone were described in the field as predominantly brown fine to medium sand with a trace of gravel and fines (silt and clay). Soil samples submitted to the geotechnical laboratory for grain-size distribution analysis indicate that materials in this zone are primarily classified as SP, in accordance with Unified Soil Classification System (USCS), and are described as brown poorly sorted sands with trace to some gravel and trace to little fines.

Selected samples were also submitted to the analytical laboratory for total organic carbon (TOC) analysis – Walkley Black Method. The results of this analysis indicates that the TOC in vadose zone ranges from 0.036% to 0.18% with an average of 0.072%. This range and average appears to be typical of soil types encountered at Area A.

The saturated portion of the unconsolidated aquifer ranges in thickness from approximately 40 ft. to greater than 100 ft. As with the vadose zone, the aquifer material was described in the field as predominantly a brown fine to medium sand with secondary percentage gravel and fines. In addition, this portion of the unconsolidated deposits was also noted to contain relatively thin layer of sand and gravel and silty sand. These zones were determined to be isolated based on the fact that they were not encountered in adjacent soil borings/monitoring wells. These units are considered minor in term of the overall hydraulics of the aquifer system.

Beneath the aquifer, a lower confining layer was encountered at all locations, except HMW-22D and HMW-28D. Where present, the layer was described in the field as either a very dense, damp, silt or a hard, damp, silty clay. As shown on Figure 14, the top of this unit was encountered at elevations ranging from 631.1 ft. (USGS) at HMW-32D to 678.3 ft. at HMW-21D. Review of the Figure 8 suggests that this surface is likely an erosional surface that was created by fluvial activities prior to the depositional of the unconsolidated aquifer.

Soil samples submitted to geotechnical laboratory for grain-size analysis indicates that the saturated portion of the aquifer exhibit similar grain-size distribution as the unsaturated portion. Results of this analysis indicate that the materials are primarily classified as SP and are described as brown poorly sorted sand with some gravel and a trace of fines.

Selected samples from the aquifer were also submitted to the analytical laboratory for total organic carbon (TOC) analysis – Walkley Black Method. The results of this analysis indicates that the TOC in aquifer ranges from 0.088% to 0.17% with an average of 0.13%. This range and average appears to be typical of soil types encountered at Area A.

Legitimate slug tests could not be completed due to extremely fast recovery rates. Published hydraulic conductivity values from laboratory analyses indicate a range of conductivity values from 10<sup>-3</sup> to 10<sup>-4</sup> cm/sec for well sorted sands/glacial outwash (Fetter, 1994). Single well pumping tests may need to be completed to further characterize the hydraulic conductivity of the aquifer.

Static water levels from selected monitoring wells were used to evaluate the groundwater flow conditions in the upper and lower portions of the unconsolidated aquifer. These water levels were collected prior to groundwater sampling event. As shown on Figures 15 and 16, groundwater flow in upper and lower portions of the aquifer is to the northeast at a hydraulic gradient of 0.0007 ft/ft and is essentially identical. The highly variable nature of the lower confining units does not appear to significantly effect the groundwater flow regime in the lower portion of the aquifer.

#### 4.0 CONCLUSIONS AND RECOMMENDATIONS

# 4.1 Summary of Potential Risks

Hull has conducted a preliminary evaluation of risk based on current Site conditions, as determined by the Initial Phase II ESA, available risk-based standards, and assumed future land uses. The evaluation considers:

- 1. potential receptors;
- 2. COC transport mechanisms; and,
- 3. Exposure pathways.

A brief discussion of the above factors follows.

# **Potential Receptors**

Potential receptors include:

- 1. on-Site populations;
- 2. off-Site populations;
- on-Site ecological resources; and,
- 4. off-Site ecological resources.

Current on-Site receptors primarily consist of workers at Underground Pipe & Valve and South Bend Lathe, visitors to these facilities and trespassers. Until recently, only a caretaker was consistently present at the Allied Products Corp. property. Both the Allied Product Corp property and the Huckins Tool & Die property are currently unoccupied. Trespassers may also be potential receptors.

Future use of the Site is expected to be commercial/industrial, and following development the population of potential receptors is expected to grow. During development activities construction workers are expected to be future on-Site receptors.

Off-Site populations consist of industrial, commercial and residential populations. Transient off-Site populations may also be present as construction workers (e.g., sewer repair).

As described in section 3 of this report, there are no known sensitive ecological receptors on the Site. Furthermore, potential off-Site ecological receptors (e.g., the St. Joseph River) are far enough from the Site to pose limited concern.

# **COC Transport Mechanisms**

The primary transport mechanisms associated with COCs in soil and groundwater at the Site include:

- 1. direct contact with soil;
- 2. soil to air (particulates);
- 3. leaching of soil to groundwater;
- 4. groundwater migration;
- 5. migration via buried utilities:
- 6. vapor migration from soils; and,
- 7. vapor migration from groundwater.

Current conditions at the Site would greatly inhibit direct contact with soil, considering that most of the land surface is covered by asphalt, concrete and industrial buildings. Assuming that the Site will be developed as a commercial or industrial enterprise, the potential for soil contact or soil transport may be similar to what it is today. However, contact and transport could temporarily increase during demolition and construction activities.

The presence of asphalt, concrete and buildings over the Site probably limits infiltration of water, and thus leaching of COCs from soil to groundwater. However, the potential exists for leaching of COCs from unsaturated soils and migration into groundwater.

Initial Phase II ESA investigations determined that COC concentrations exceed risk-based closure levels in groundwater beneath the Site. Sampling has also determined probable migration from the Site to downgradient properties north of the Site.

Hull has a partial understanding of the utility and tunnel network beneath the Site. However, it is clear that sewers and other buried utilities traverse and leave the Site at several locations (refer to Figure 2). To Hull's knowledge, all utilities beneath and adjacent to the Site are above the

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water table, and are therefore not subject to infiltration by groundwater. However, the current and future potential exists for limited infiltration by vapor-phase VOCs into sewers and subsequent transport as vapor or, via partitioning, as water carried by the sewers. Utility backfill materials do not appear to have significantly different permeabilities than the native soils and area fill materials, and are thus not expected to act as preferential pathways.

VOCs were detected in soils and groundwater beneath the Site. The potential therefore exists for vapors to migrate to indoor and outdoor air. Future development of the Site may or may not influence this transport mechanism.

# **Exposure Pathways**

#### Soils

Based on current conditions at the Site, exposure pathways have the potential to result in unacceptable risk. As shown on Figure 4 and described on Table 5, soils exceed RISC commercial/industrial closure levels at 33 locations at the Site<sup>5</sup>. Of these locations, default direct contact closure levels are exceeded at the following 26 locations<sup>6</sup>:

- 1. GB-10;
- 2. GB-11;
- GB-12;
- GB-15;
- 5. GB-16;
- 6. GB-17;
- 7. GB-19;
- 8. GB-24;

<sup>&</sup>lt;sup>5</sup> Soil concentrations were compared with single-chemical default closure levels derived for direct contact, construction worker and migration to groundwater (leaching) pathway values. For pH-dependent COCs, the soil pH was assumed to be within default ranges. Concentrations were also compared with soil saturation and soil attenuation capacity values, where applicable. Cumulative values for metals and organics fell below soil attenuation capacity ceilings (i.e., 10,000 mg/kg for metals, 6,000 mg/kg for organics in surface (0.0-0.5 ft. bgs) soils and 2,000 mg/kg in subsurface (>0.5 ft. bgs) soils).

<sup>&</sup>lt;sup>6</sup> Samples in the above borings were collected from the upper two ft. bgs, consistent with original VRP protocol for surface sample analyses. While several of these samples include soils below 0.5 ft. bgs (i.e., the depth above which materials are considered surface soil pursuant to RISC guidance), Hull has conservatively compared COC concentrations against default direct contact closure levels for surface soils.

- 9. GB-29;
- 10. GB-31;
- 11. GB-32;
- 12. GB-34
- 13. GB-35;
- 14. GS-2;
- 15. GS-3;
- 16. HA-3;
- 17. HMW-2S;
- 18. HMW-15S;
- 19. HMW-18S
- 20. HMW-22D;
- 21. HMW-24D;
- 22. HMW-27D;
- 23. HMW-33D;
- 24. SB-1; and,
- 25. SB-5.

Fourteen of the locations exceeding single-chemical default closure levels, based on direct contact, are located along former railroad spurs that were paved over following decommissioning of the tracks. The locations exceeding the RISC direct contact exposure level are summarized in Table 5. The primary COCs exceeding closure levels at these locations are arsenic and benzo(a)pyrene, compounds commonly included in preservatives used on railroad ties. Two locations in the vicinity of Building 83 on Property D have lead concentrations ranging from 2,720 to 13,600 mg/kg. One of the samples was collected from beneath the slab in Building 83 and the other sample was collected from beneath the asphalt-covered parking lot. Other areas containing COCs at concentrations above single-chemical direct contact closure levels include:

three locations south of the building at Property C exhibiting oil staining or stressed vegetation and (benzo(a)pyrene);

- 1. near USTs on Property C containing (benzo(a)pyrene);
- 2. one location near the northern boundary of Property A containing (PCBs); and,
- 3. various locations on Property B including areas inside the building and in the apparent retention basin (benzo(a)pyrene and arsenic).

Considering that most of the locations exceeding single-chemical soil closure levels are presently beneath asphalt or concrete which extends at least 100 ft. in all directions from the sampling points, current direct contact and airborne dust exposure pathways appear to be incomplete. Future exposures could occur during construction activities and if cover is not replaced or maintained. Furthermore, soils exceed default construction closure levels at two locations, including:

- 1. HMW-24D; and,
- 2. HMW-33D.

Both of the above locations are near locations in the vicinity of Building 83 Property D, and contain elevated concentrations of lead. As described previously, the elevated lead concentrations may be related to painting operations when the facility was used for automobile production.

No samples tested below a depth of two ft. bgs exceeded default leaching closure levels. The location exceeding RISC migration to groundwater closure levels are summarized in Table 5. However, soils within the upper two ft. bgs exceeded leaching closure levels at the following 24 locations:

- 1. GB-3;
- 2. GB-10;
- 3. GB-11;
- 4. GB-12;
- 5. GB-15;

- 6. GB-17;
- 7. GB-19;
- 8. GB-24;
- 9. GB-29;
- 10. GB-31;
- 11. GB-33;
- 12. GB-35;
- 13. GS-2;
- 14. GS-3;
- 15. HA-1;
- 16. HA-2;
- 17. HA-3;
- 18. HMW-4S;
- 19. HMW-7S;
- 20. HMW-9I;
- 21. HMW-12S;
- 22. HMW-24D;
- 23. HMW-33D; and,
- 24. SB-5.

Eleven of the locations that exceed migration to groundwater closure levels are along the former railroad spurs. The primary COCs that exceed closure levels in these locations are lead, arsenic and benzo(a)pyrene. Furthermore, cadmium, chromium, chrysene and indeno(1,2,3-cd)pyrene exceed their respective closure levels in at least one location. Two locations described previously near Building 83 on Property D contain lead at concentrations exceeding the migration to groundwater closure levels. Other areas containing soils that exceed migration to groundwater levels include:

- 1. two locations south of the building at Property C exhibiting oil staining or stressed vegetation (lead at one location chromium at another);
- 2. one location in building 142 on Property D near the former die washing area (PCE);
- 3. one location on Property A near an apparent dry well (lead);
- 4. two locations inside the southwest portion of the building at Property B in residual foundry materials (lead)<sup>7</sup>;
- 5. beneath the slab in building 80 at Property D (lead);
- 6. west of building 86 at Property D (lead); and,
- 7. three locations in, or near the apparent retention basis at Property B (lead at two locations and arsenic at one):

The default migration to groundwater levels are conservative. Further evaluation using Sitespecific factors may result in fewer locations where the closure levels are exceeded.

VOCs were detected in unsaturated soils and groundwater beneath the Site. Surface and subsurface soils are very permeable, and would not form a natural barrier to limit the migration of vapors, although the presence of impervious cover across most of the Site would greatly limit movement to indoor and outdoor air. Nevertheless, potential current and future completed exposure pathways exist. Given the types of COCs detected, their concentrations and their distribution, it is unlikely that volatilization to outdoor air currently poses (or in the future will pose) an unacceptable risk. Volatilization of VOCs from soils to indoor air does not currently appear to pose an unacceptable risk as the highest concentrations are either outside buildings or beneath unoccupied buildings on. Absent remediation, and based on available data, future indoor exposures would likely pose an unacceptable risk in only one location: in the southern portion of Property D in Building 142, where the PCE concentration in surface soil is 4,740 ug/kg. Quantification of the risk would require Site-specific modeling.

#### Groundwater

As shown on Figures 6 though 9, various metals and VOCs in on-Site groundwater exceed default closure levels. However, there are no drinking water wells on-Site, and therefore no exposure pathways are currently complete. While unlikely, a water supply well would be

installed on-Site (a scenario that could be eliminated via deed restriction), resulting in a completed exposure pathway.

<sup>&</sup>lt;sup>7</sup> Materials sampled inside the foundry are unlikely to leach to groundwater as they appear to rest on the building slab.

Figures 6 through 9 and Table 6 indicate that COC concentrations in groundwater downgradient (i.e., north and potentially east) of the Site exceed default closure levels. As the City currently provides off-Site drinking water<sup>8</sup> completed pathways for exposure to groundwater at off-Site properties are currently unlikely. However, delineation of the extent of COCs exceeding closure levels and a survey of water use within the delineated plume would be required to definitively exclude the possibility of exposure. As the City currently does not prohibit installation of wells for private use within its corporate limits, there is future potential for creation of exposure pathways.

Based on Hull's experience and these data obtained during this investigation, volatilization from groundwater is unlikely to pose unacceptable risk on- or off-Site. However, as with unsaturated soils, quantification of risk would require Site-specific modeling.

In summary, current on-Site risk is limited due to an absence of receptors in many portions of the Site as well as a prevalence of impervious cover. As discussed in more detail in section 4.2, remediation, engineering controls and/or institutional controls may be used to address future on-Site risks.

Consistent with definitions and guidance provided in the RISC technical guide, the perimeter of compliance for a contaminant plume must be within an area of control by the property owner/volunteer. Control is defined by the ability to monitor and restrict access to the contaminated groundwater through engineering or institutional controls. The area that the City could rapidly implement control is assumed to be within the Site boundaries.

Based on analysis of water samples collected from wells north of Sample Street, it is apparent that COCs exceeding RISC commercial/industrial and residential default closure levels have migrated beyond the Site's perimeter of compliance. Furthermore, Initial Phase II ESA data indicate that the COCs originated at least in part from on-Site sources. As shown on Figure 17, historical sampling of monitoring wells indicates the presence of various COCs detected at the Site. While certainly not conclusive, these detections may be related to migration of COCs from

<sup>&</sup>lt;sup>8</sup> Municipal water supply wells are sufficiently removed from the Site such that they are unlikely to be impacted by COCs originating at the Site.

the Site. Limited knowledge about activities at properties surrounding the Site adds uncertainties to the evaluation of current and future risk. For this reason, the lateral extent of off-Site groundwater contamination is the most significant data gap remaining.

#### 4.2 Recommendations

The City has several options in addressing environmental conditions at the Site. Primary among these are:

- 1. entry into Indiana's VRP and use RISC guidance; or
- 2. use of a development agreement at the time of property transfer that addresses risk at the Site using RISC guidance<sup>9</sup>.

#### Participation in the VRP would entail:

- submittal of a confidential Voluntary Remediation Application (VRA) and a \$1,000 fee to IDEM;
- 2. upon its review and approval, endorsement of the VRA by IDEM and the volunteer:
- 3. submittal of a Remediation Work Plan that would include:
  - documentation of previous investigations (e.g., Work Plan(s) and Phase I and Phase II ESA reports);
  - cleanup criteria selection:
  - statement of work:
  - risk assessment (as applicable)
  - remedial design/planning;
  - community relations plan;
  - schedule of implementation; and,
  - remedial cost estimate.
- 4. review and approval of the Remediation Work Plan by IDEM;
- 5. submittal of notice to IDEM of impending implementation of the Remediation Work Plan;
- 6. implementation of the Remediation Work Plan (with IDEM oversight), including:
  - any required supplemental pre-remedial studies;
  - selection and placement of land-use restrictions, as appropriate;
  - remedial construction:

<sup>&</sup>lt;sup>9</sup> Although cleanups may be led by the U.S. EPA, detailed discussions on the options are outside the scope of this report.

- implementation of the remedial action;
- systems operations and maintenance, including ongoing environmental monitoring; and,
- confirmatory sampling.
- 7. preparation and submittal of a Remediation Completion Report to IDEM;
- 8. review and acceptance of the Remediation Completion Report by IDEM;
- 9. issuance of a Certificate of Completion by IDEM's Commissioner; and,
- 10. issuance of a Covenant not to Sue by the Governor's office<sup>10</sup>.

RISC provides for default and non-default investigative approaches. Default sampling approaches are prescriptive, typically costly, and may be time consuming. Non-default approaches may be less costly and time consuming, but they may not provide as definitive quantification of risk as would default sampling approach.

Use of a development agreement in which cleanup standards are identified and agreed upon would probably be least costly of the options due to an absence of regulatory oversight costs. Furthermore, elimination of regulatory review periods would probably result in a reduced time period for investigation and cleanup. However, the development agreement would not result in a release of liability via a Covenant not to Sue.

Assuming that the project continues under the VRP, the City will have the opportunity to select source areas to receive a Certificate of Completion and Covenant Not to Sue following cleanup. Based upon information obtained to date, Hull recommends that at a minimum the City obtain liability limitation for those areas of soils known to exceed default closure levels (refer to Table 5) and any other source areas in soils determined through future investigation or identified during structure demolition/Site development. Known source areas will need to be further delineated. Hull recommends that the City meet with IDEM prior to initiating delineation efforts in order to identify non-default sampling strategies that would be suited to the size and complexity of the Site.

<sup>&</sup>lt;sup>10</sup> A Memorandum of Agreement between IDEM and the U.S. EPA is in place that extends a release of liability to actions by the U.S. EPA when a Covenant not to Sue is obtained.

Future opportunities to incorporate development activities (i.e., demolition and/or construction) into remediation and potentially use of engineering controls to eliminate exposure pathways may limit remedial costs for contaminated soils. As described below, the City may wish to defer a decision on seeking a Certificate of Completion and Covenant Not to Sue for groundwater until additional data are gathered.

Uncertainties about the off-Site extent of COCs exceeding closure levels is the most significant data gap at the completion of the Initial Phase II ESA. Furthermore, addressing off-Site contamination is likely to be the most costly component of the environmental component of redevelopment.

Strategies for remediating and/or containing groundwater may be dependent upon the areal extent of off-Site contamination exceeding default closure levels, and may include one or a combination of the following general technologies:

- groundwater extraction and ex-situ treatment;
- 2. groundwater extraction and discharge to the public operated treatment works;
- 3. installation of a reaction wall (or reaction wall in combination with barrier walls as a "funnel and gate" system) at the point of compliance;
- 4. in-situ chemical application (i.e., chemical oxidation, application of hydrogen-and/or oxygen-releasing compounds); and,
- 5. determination of a stable plume and ongoing monitoring to document stability.

In all cases, it is probable that some efforts in source control/remediation will be necessary. To the extent that unsaturated soils contribute to groundwater contamination, they may require excavation and off-Site disposal and/or treatment and/or in-situ remediation by methods such as soil vacuum extraction or chemical application.

Hydrogeology beneath the Site and in surrounding areas is such that all of the above technologies (with the exception of plume stability) would be effective in removing contaminant mass from the aquifer. To the extent that there are no dense nonaqueous phase liquids in groundwater, attainment of closure levels should be technically practicable, although the length of time and cost to achieve cleanup could be great. On-Site containment of COCs exceeding closure levels should also be achievable. Again, the design and efficacy of various cleanup or

containment strategies is highly dependent on the lateral extent of off-Site contamination and nature of potential exposures. In general, costs for addressing groundwater contamination will be high and long-term relative to soil contamination at the Site.

Given issues of cost and probable long duration of "active" groundwater remediation, and considering groundwater use within the City of South Bend, Hull recommends that the City consider using institutional controls to limit future exposures to groundwater contamination. Appendix 5 of the RISC Technical Guide (refer to Appendix G of this document) provides guidance on environmental notices (i.e., deed notices) that serve as institutional controls for contaminated sites that: receive a commercial or industrial land-use designation; have a remedy that includes an activity restriction; and/or have a remedy that employs an engineering control. Primary criteria for an institutional control, as described in the guidance document, include:

- 1. legal notice to current and potential future property owners of the nature and extent of the restrictions;
- 2. permanence; and,
- 3. legal validity.

An environmental notice can be applied to the VRP Site or, contingent upon agreement by the property owner, property onto which contamination has migrated. Such a scenario may be feasible when the volunteer and the adjacent property owner share common interests. However, implementation of environmental notices for multiple properties under which contaminated groundwater has migrated could prove cumbersome.

Possibly in consideration of such problems, IDEM has offered an alternative to an environmental notice that addresses groundwater contamination. The alternative approach allows a unit of local government to adopt an ordinance that limits exposure to groundwater (i.e., a prohibition of new drinking water wells within the municipality). IDEM would require documentation supporting the ordinance, including:

- 1. a copy of the ordinance and a proof of its recordation with the county;
- 2. mapped delineation of groundwater exceeding closure levels; and,
- 3. mapped boundaries and ownership of properties overlying the above-delineated plume.

The above information would be provided to all of the affected property owners. The owner of the site from which contamination originated would be required to monitor and notify IDEM of variances and contain or remediate contamination if variances result in unacceptable risks to groundwater users.

In order to delineate groundwater exceeding closure levels, the City would be required to gain access to off-Site properties, install probes/monitoring wells and collect groundwater samples for chemical analysis. A monitoring program would also need to be established to demonstrate that the plume is stable or diminishing.

#### 5.0 REFERENCES

A variety of technical manuals, administrative documents and publications were referred to in preparing this document. Some of the references consulted are presented below. Referenced documents and publications may or may not have been reviewed in their entirety. The guidelines and procedures presented in the documents and publications referenced have been strictly adhered to unless stated otherwise.

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#### FEBRUARY 2002 SBIO02.XXXX

# INITIAL PHASE II ENVIRO ENTAL SITE ASSESSMENT CITY OF SOUTH BEND, INDIANA

TABLE 1

# SUMMARY OF MONITOR WELL INSTALLATION AND CONSTRUCTION DATA AREA A

Concrete interval (ff. bgs)	0.50	0.5-0.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-0.5	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-0.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-0.5	0.0-0.0	0.0-0.0	0.0-1-0.0		0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0
Benfonte																												1.0-41.0	1.0-41.0	1.0-30.0	1.0-46.0				
Bentonite Chip Interval (ft. bgs)		1.0-13.0	1.0-18.0	1.0-20.0	1.0-18.0	0.5-18.0	1.0-21.0	1.0-13.0	1.0-18.0	1.0-21.0	1.0-18.0	1.0-21.0	0.5-19.5	1.0-18.0	1 0-23 0	1.0-20.0	1.0-23.0	1.0-17.0	1.0-15.0	1.0-21.0	1.0-13.0	0.5-18.0	1.0-23.0	0.6-19.6	1.0-18.0		1.0-41.0	41.0-43.0	41.0-43.0	30.0-31.0	46.0-48.0	1.0-25.0	1.0-27.0	1.0-33.0	1.0-29.0
Pack Finterval Fintings		13.0-20.0	18.0-25.0	20.0-26.0	18.0-25.0	18 0-24 0	21.0-28.0	.13.0-25.0	18.0-30.0	21.0-28.0	18.0-30.0	21.0-28.0	19.5-31.5	18.0-30.0	20.0-32.0	20.0-27.0	23.0-30.0	17.0-29.5	15.0-28.0	21.0-33.0	13.0-25.0	16.0-28.0	23.0-30.0	19.6-31.6	18.0-30.0		41.0-48.0	43.0-50.0	43.0-50.0	31.0-38.0	48.0-55.0	25.0-37.0	27.0-39.0	33.0-45.0	29.0-41.0
Screened Screened Finerval (ft. bgs)		15.0-20.0	20.0-25.0	21.0-26.0	20.0-25.0	10.02.00	23.0-28.0	,	20.0-30.0	23.0-28.0	20.0-30.0	23.0-28.0	21.5-31.5	20.0-30.0	22.0-32.0	22.0-30.0	25.0-30.0	19.5-29.5	18.0-28.0	23.0-33.0	15.0-25.0	18.0-28.0	25.0-30.0	21.6-31.6	20.0-30.0		43.0-48.0	45.0-50.0	45.0-50.0	33.0-38.0	50.0-55.0	27.0-37.0	29.0-39.0	35.0-45.0	31.0-41.0
	ELLS	2.0" PVC	2.0" PVC	2.0" PVC	2.0" PVC	20.00	2.0 PVC	2.0" PVC	2.0" PVC	2.0" PVC	2.0" PVC	2.0" PVC	2.0" PVC	2.0" PVC	2.0" PVC	2.0 PVC	2.0" PVC	2.0" PVC	2.0" PVC	2.0" PVC	2.0" PVC	2.0" PVC	2.0" PVC	2.0" PVC	2.0" PVC	R WELLS	2.0" PVC	2 0" PVC							
Cotal	SHALLOW MONITOR WELLS	25.0	25.0	26.0	25.0	25.0	0.42	25.0	30.0	28.0	30.0	28.0	31.5	30.0	32.0	30.0	30.0	29.5	28.0	33.0	25.0	28.0	30.0	31.6	30.0	INTERMEDIATE MONITOR WELLS	48.0	50.0	50.0	38.0	55.0	37.0	39.0	45.0	74.0
Surface Surface Elevation (ff):	SHALLO	728.66	724.86	725.65	725.52	725.34	720.24	729.39	730.79	730.96	729.72	729.80	728.75	728.81	728.90	729.45	731.21	729.32	729.24	728.45	723.73	725.34	730.78	728.71	728.86	INTERMED	728.77	729.49	730.95	730.07	731.24	723.64	724.76	725.20	775 OB
rdinates Crassing		3178692.95	3177376.15	3177542.45	3177590.56	3177588.19	3177570.51	3177977.36	3178197.56	3178392.76	3178515.16	3178495.92	3177830.98	3178055.59	3178621.08	3178700.02	3178714.95	3178878.10	3178968.67	3178850.99	3177954.94	3178696.09	3178932.59	3178156.93	3177974.74		3177114 05	3477978 32	3178202.73	3178271.36	3178922.55	3178227.82	3178471.68	3178693.60	77 0000770
Coording		2338460.72	2337648.27	2337868.73	2337892.10	2337987.21	2338087.11	2337093.63	2336735 87	2336800.30	2337350.86	2337482.45	2337889.66	2337903.79	2337934.77	2337662.06	2336649.12	2337831 22	2337844.28	2338095.23	2338439.11	2338462.53	2337079.59	2337917.74	2337618.32		2337058 35	7338078 37	2336736 66	2336972.73	2336484.80	2338445.18	2338465.32	2338460.81	0, 01, 000
Date 17 Installed		7-31-01	8-02-01	8-01-01	8-01-01	8-01-01	8-02-01	8-07-01	20.00	8-07-01	8-14-01	8-01-01	8-15-01	8-23-01	8-14-01	8-08-01	8-06-01	8-40-01	8-09-01	8-13-01	9-12-01	9-10-01	8-09-01	8-14-01	8-16-01		7 24 04	1-21-01	8-20-01	8-22-01	8-08-01	9-12-01	9-13-01	9-10-01	3
Hydraulic																																			
Piezometer (ID)		HMW-1S	HMW-2S	HMW-3S	HMW-4S	HWM-5S	HMW-6S	HMW-7S	HMW-8S	HMW-9S	HIMW-103	HMW-13S	HMW-14S	HMW-15S	HMW-18S	HMW-19S	HMW-20S	HMW-23S	HMW-23S	HIMW-ZGS	UNANAL 28C	HMW-31S	HMW-33S	HMW-34S	HMW-35S			HMW-11	HMW-81	11000 441	HMW-22	HMW-291	HMW-30I	HMW-31	

TABLE 1

### SUMMARY OF MONITOR WELL INSTALLATION AND CONSTRUCTION DATA AREA A

Interval Concrete (ft, bgs) 0.0-1.0 0.0-1.0 0.0-1.0 0.0-1.0 0.0-1.0 0.0-41.0 0.0-1.0 0.0-1.0 0.0-2.0 0.0-2.0 0.0-1.0 0.0-1.0 0.0-1.0 0.0-1.0 0.0-2.0 0.0-1.0 0.0-1.0 0.0-1.0 0.0-1.0 0.0-1.0 0.0-1.0 Bentonite Franciscout Interval (ft. bgs) 10.0-32.0 10.0-46.0 12.0-58.0 2.0-57.0 2.0-57.0 1.0-73.0 15.0-78.0 13.0-64.0 5.0-69.0 5.0-76.0 2.0-61.0 1.0-57.0 1.0-54.0 1.0-58.0 1.0-59.0 5.0-83.0 8.0-71.0 5.0-59.0 5.0-51.0 5.0-84.0 1.0-41.0 80.0-85.0/69.0-71.0/1.0-5.0 34.0-47.0 47.0-60.0/32.0-34.0/1.0-10.0 Date Northing | Setting | Screen | Screen | Solum | Solum | Screen | Sand | Solum | Solum | Date | Screen | Interval | In 51.0-58.0/41.0-43.0 78.0-79.0/1.0-15.0 46.0-48.0/1.0-10.0 64.0-66.0/1.0-13.0 58.0-59.0/1.0-12.0 84.0-86.0/1.0-5.0 71.0-73.0/1.0-8.0 59.0-61.0/1.0-5.0 51.0-53.0/1.0-5.0 76.0-78.0/1.0-5.0 59.0-61.0 73.0-75.0 54.0-56.0 57.0-59.0 57.0-59.0 57.0-59.0 58.0-60.0 61.0-62.0 1.0-5.0 66.0-78.0 71.0-80.0 73.0-80.0 73.0-80.0 61.0-68.0 86.0-93.0 43.0-51.0 56.0-63.3 59.0-70.0 79.0-88.3 48.0-60.0 83.0-95.0 53.0-60.0 78.0-88.0 59.0-66.0 59.0-70.0 60.0-69.0 61.0-72.0 59.0-68.0 62.0-72.7 31.0-46.0 81.0-86.0 63.0-68.0 88.0-93.0 61.0-66.0 63.0-68.0 75.0-80.0 50.0-55.0 75.0-80.0 61.0-66.0 85.0-95.0 45.0-50.0 55.0-60.0 57.0-63.0 73.0-78.0 80.0-85.0 68.0-73.0 61.0-66.0 64.0-69.0 61.0-66.0 61.0-66.0 2.0" PVC DEEP MONITOR WELLS 95.0 88.0 78.0 66.0 68.0 70.0 63.3 69.0 70.0 72.0 47.0 80.0 86.0 60.0 80.0 68.0 60.0 93.0 72.7 729.99 730.39 729.11 730.42 730.08 723.63 724.95 729.32 729.79 728.72 731.64 729.21 725.34 725.07 731.02 728.42 724.27 730.32 729.24 729.44 723.65 2338459.90 3178697.29 3178071.83 3178062.62 2337876.58 3178277.93 3178323.03 2337901.08 3178726.78 2336492.22 3178911.70 2337023.47 3178677.72 2338436.46 3177958.96 2338444.95 3178222.97 2338461.13 3178471.56 3178967.48 3178933.69 2336975.99 3178274.81 2337266.37 3178211.28 3178502.62 2337024.15 3178818.17 3179036.08 2336939.59 3177977.88 3177113.38 3177571.71 2337903.93 2338468.95 2337072.09 2337592.20 2336791.64 2337475.46 2337484.17 2337063.92 2338075.22 8-21-01 8-09-01 8-22-01 8-15-01 8-27-01 8-22-01 8-13-01 8-08-01 8-21-01 9-05-01 8-31-01 8-08-01 8-01-01 9-15-01 8-23-01 9-11-01 9-06-01 8-13-01 8-22-01 8-29-01 7-31-01 HMW-33D HMW-22D HMW-24D HMW-30D HMW-6D HMW-11D HMW-13D HMW-15D HMW-16D HMW-17D HMW-19D HMW-21D HMW-23D **HMW-28D** HMW-29D HMW-31D HMW-32D HMW-8D HMW-12D HMW-9D HMW-1D

SUMMARY OF DETECTED ANALYTES IN SOILS AREA A

Metals   Chromium   8.8 mg/kg dw   120**	
Acenaphthene   114   mights dw	
Acenaphthene 357 ug/kg dw Anthracene 1,230 ug/kg dw Benzo(a)anthracene 1,200 ug/kg dw Benzo(b)filuoranthene 2,860 ug/kg dw Benzo(b)filuoranthene 2,860 ug/kg dw Fluoranthene 2,700 ug/kg dw Fluoranthene 455 ug/kg dw Fluoranthene 455 ug/kg dw Fluoranthene 455 ug/kg dw Phenanthrane 4,530 ug/kg dw Phenanthrane 311 mg/kg dw Chromium 10 mg/kg dw Metals Lead 1,25 mg/kg dw Mercury 0,053 mg/kg dw Mercury 0,053 mg/kg dw Bartiur 311 mg/kg dw Mercury 0,053 mg/kg dw Bartiuracene 934 ug/kg dw Bartiuracene 934 ug/kg dw Benzo(a)anthracene 934 ug/kg dw Benzo(a)anthracene 934 ug/kg dw Benzo(a)huoranthene 1,320 ug/kg dw Fluoranthene 2,170 ug/kg dw Phenanthrane 2,530 ug/kg dw Phenanthrane 3,150 ug/kg dw Phenanthrane 3,150 ug/kg dw Pyenanthrane 3,150 ug/kg dw	
Anthracene 1,230 ug/kg dw Benzo(a)anthracene 1,200 ug/kg dw Benzo(b)fluoranthene 2,860 ug/kg dw Benzo(b)fluoranthene 2,860 ug/kg dw Chysene 1,650 ug/kg dw Fluoranthene 455 ug/kg dw Fluoranthene 455 ug/kg dw Phenanthrane 455 ug/kg dw Phenanthrane 4,630 ug/kg dw Phenanthrane 4,630 ug/kg dw Chromium 10 mg/kg dw Merals Chromium 311 mg/kg dw Merals Lead 0,053 mg/kg dw Merals Bariuracene 934 ug/kg dw Bariuracene 934 ug/kg dw Benzo(a)nthracene 934 ug/kg dw Benzo(a)nthracene 934 ug/kg dw Benzo(a)nthracene 934 ug/kg dw Benzo(a)nthracene 934 ug/kg dw Fluoranthene 2,090 ug/kg dw Fluoranthene 1,320 ug/kg dw Phenanthrane 2,170 ug/kg dw Phenanthrane 3,150 ug/kg dw Pyenen Phenanthrane 3,150 ug/kg dw Pyenen Phenanthrane 3,150 ug/kg dw Pyenen Dry Weight Dry	
SVOCs (Chycene 1,170 ug/kg dw Benzo(b)fluoranthene 2,860 ug/kg dw 1,650 ug/kg dw	_
SVOCs         Benzo(b)fluoranthene         2,860         ug/kg dw           Chrysene         1,650         ug/kg dw           Fluoranthene         4,550         ug/kg dw           Fluoranthene         4,550         ug/kg dw           Fluoranthene         4,690         ug/kg dw           Phenanthralene         4,690         ug/kg dw           Phenanthrene         4,630         ug/kg dw           Pyrene         4,630         ug/kg dw           Dry Weight         94.2         %           Chromium         11         mg/kg dw           Anthracene         783         ug/kg dw           Mercury         0,053         ug/kg dw           Anthracene         934         ug/kg dw           Benzo(a)anthracene         934         ug/kg dw           Benzo(a)pyrene         2,090         ug/kg dw           SVOCs         Benzo(k)fluoranthene         7,44         ug/kg dw           Fluoranthene         2,170         ug/kg dw           Phenanthrene         3,150         ug/kg dw           Phenanthrene         3,150         ug/kg dw           Phenanthrene         3,150         ug/kg dw           Phenanthrene         3,15	-
SVOCs         Benzo(k)fluoranthene         916         ug/kg dw           Chrysene         1,650         ug/kg dw           Fluoranthene         455         ug/kg dw           Fluoranthrene         4690         ug/kg dw           Phenanthrene         4,680         ug/kg dw           Pyrene         4,680         ug/kg dw           Pyrene         4,680         ug/kg dw           Pyrene         4,680         ug/kg dw           Chromlum         311         mg/kg dw           Metals         125         mg/kg dw           Meraury         0,053         mg/kg dw           Meraury         0,053         mg/kg dw           Benzo(a)pyrene         2,990         ug/kg dw           Benzo(a)pyrene         2,990         ug/kg dw           SVOCs         Benzo(k)fluoranthene         2,170         ug/kg dw           Fluoranthene         2,170         ug/kg dw           Phenanthrene         3,150	
Chrysene	8/9/01 0.0'-
Fluoranthene	
Fluorene	
Phenanthralene	_
Prenanthrene	
Dry Weight   Dry	_
Metals	
Chromium	
Lead   Mercury   Mercoroly might dw   Benzo(a) pryrene   Mercorol filturanthene   744   ug/kg dw   Fluoranthene   744   ug/kg dw   Fluoranthene   747   ug/kg dw   Mercury   M	
Mercury 0.053 mg/kg dw	
Anthracene 783 ug/kg dw Benzo(a)anthracene 934 ug/kg dw Benzo(b)huranthene 2,090 ug/kg dw Benzo(b)huranthene 774 ug/kg dw Chrysene 1,320 ug/kg dw Fluoranthene 2,170 ug/kg dw Naphthalene 5,180 ug/kg dw Phenanthrene 3,150 ug/kg dw Dry Weight Dry Weight Py	
Benzo(a)anthracene   934   ug/kg dw	
Benzo(a)pyrene   299   ug/kg dw	
SVOCs         Benzo(b)fluoranthene         2,090         ug/kg dw           SVOCs         Chrysene         7,44         ug/kg dw           Chrysene         2,170         ug/kg dw           Fluoranthene         5,18         ug/kg dw           Phenalthrene         5,530         ug/kg dw           Pyrene         3,150         ug/kg dw           Dry Weight         94.2         %	
Benzo(k)fluoranthene         744         ug/kg dw           Chrysene         1,320         ug/kg dw           Fluoranthene         2,170         ug/kg dw           Naphthalene         518         ug/kg dw           Phenanthrene         2,530         ug/kg dw           Pyrene         3,150         ug/kg dw           Dry Weight         94.2         %	8/9/01 0.0
Chrysene         1,320         ug/kg dw           Fluoranthene         2,170         ug/kg dw           Naphthalene         2,530         ug/kg dw           Phenanthrene         3,150         ug/kg dw           Dry Weight         94.2         %	
Fluoranthene   2,170   ug/kg dw   Naphthalene   2,530   ug/kg dw   1   Phenanthrene   3,150   ug/kg dw   Pyrene   94,2   %	
Naphthalene         518         ug/kg dw         1           Phenanthrene         2,530         ug/kg dw         1           Pyrene         3,150         ug/kg dw         64.2         %	_
Phenanthrene         2,530         ug/kg dw         1           Pyrene         3,150         ug/kg dw           Dry Weight         94.2         %	-
Pyrene         3,150         ug/kg dw           Dry Weight         94.2         %	
Dry Weight 94.2 %	

SUMMARY OF DETECTED ANALYTES IN SOILS AREA A

								RISC Delault Closure
		Sample			buildand	Results	Units	Level -
Soil Boring	Sample Identification	Date	Sample Deptn Analyte I ype	Analyte Iype				Commercial/Industrial
					Barium	191	mg/kg dw	5,900
					Chromium	9.3	mg/kg dw	120**
			i	Metals	Lead	62.5	mg/kg dw	230
GB-2	SBI002:GB-2:S010015:412	8/9/01	1.0'-1.5'		Mercury	0.278	mg/kg dw	32
				SOONS	Benzo(a)pyrene	195	ug/kg dw	1,500
				=	Dry Weight	88	%	NS
				11	Arsenic	13.5	mg/kg dw	20
					Barium	342	mg/kg dw	2,900
			_	Metals	Chromium	32.3	mg/kg dw	120**
					Lead	306	mg/kg dw	230
					Mercin	0.576	mg/kg dw	32
					Acenaphthylene	419	ug/kg dw	7,565,408***
					Benzo(a)anthracene	999	ug/kg dw	15,000
	2.000000443	10/8/8	0.5-2.0		Benzo(a)ovrene	710	ug/kg dw	1,500
	SBIOUZ;GB-3;S0030Z0.41Z		2		Benzo(b)fluoranthene	1,430	ug/kg dw	15,000
				SVOCs	Benzo(k)flunranthene	434	ug/kg dw	39,000
					Chryspie	755	ug/kg dw	25,000
					Fluoranthene	810	ug/kg dw	880,000
GB-3					Phenanthrene	657	ug/kg dw	126,049,825***
					Pyrene	1,640	ug/kg dw	570,000
				Dry Weight	Dry Weight	86.8	%	SN
					Arsenic	8.3	mg/kg dw	20
					Barium	159	mg/kg dw	2,900
				Metals	Chromium	#	mg/kg dw	120**
					Lead	102	mg/kg dw	230
	SBI002:GB-3D:S005020:412	8/8/01	0.5'-2.0'		Mercury	0.396	mg/kg dw	32
		i			Benzo(a)pyrene	282	ug/kg dw	1,500
				SVOCs	Benzo(b)fluoranthene	532	ug/kg dw	15,000
					Pyrene	596	ug/kg dw	270,000
				Dry Weight	Dry Weight	87.2	%	NS
				ız	IES			

SUMMARY OF DETECTED ANALYTES IN SOILS AREA A TABLE 2 (Cont'd)

								RISC Default Closure
	noite afficult clauses	Sample	Sample Depth Analyte Type	Analyte Type	Compound	Results	Units	Level -
Sou pouring	Sample definition	Date		,				Land Use
					Barium	18.3	mg/kg dw	5,900
					Chromium	6.4	mg/kg dw	120**
		-	i	Metals	Lead	7.7	mg/kg dw	230
GB-5	SBI002:GB-5:S015025:412	8/8/01	1.5'-2.5'		Mercury	0.008	mg/kg dw	32
				SVOCs	All Analytes	유	ı	1
				<b> </b> =	Dry Weight	94.3	%	SN
					Barinm	88.9	mg/kg dw	5,900
					Chromium	6.5	mg/kg dw	120**
-				Metals	Lead	28.3	mg/kg dw	230
			i		Mercury	0.024	mg/kg dw	32
GB-8	SBI002:GB-8:S000015:412	8/8/01	0.0'-1.5'	VOCs	All Analytes	<rl< td=""><td>1</td><td>ŧ</td></rl<>	1	ŧ
				Ī.	All Analytes	<rl< td=""><td>ŧ</td><td>l</td></rl<>	ŧ	l
				Τ	TPH - FTIR Non-ad	유	SN	NS
				돍	Dry Weight	96	%	NS
				Т	Barium	398	mg/kg dw	5,900
					Chromium	90.2	mg/kg dw	120**
				Metals	Lead	193	mg/kg dw	230
					Mercury	1.38	mg/kg dw	32
				VOCs	All Analytes	糸	:	
					Benzo(a)anthracene	574	ug/kg dw	15,000
					Benzo(a)pyrene	427	ug/kg dw	1,500
					Benzo(b)fluoranthene	986	ug/kg dw	15,000
GB-9	SBI002:GB-9:S000020:412	10/6/8	0.0'-2.0'	00.00	Benzo(k)fluoranthene	451	ug/kg dw	39,000
				SVOCS	Chrysene	753	ug/kg dw	25,000
					Fluoranthene	1,040	ug/kg dw	880,000
					Phenanthrene	749	ug/kg dw	126,049,825***
					Pyrene	2,340	ug/kg dw	570,000
				PCBs	All Analytes	^RL	1	
				TPH	TPH - FTIR Non-ag	2,320	mg/kg dw	NS
				Dry Weight	Dry Weight	95	%	NS
				TABLE CONTINUES	ES			

TABLE 2 (Cont'd)

SUMMARY OF DETECTED ANALYTES IN SOILS AREA A

								10 11
						_		Kisc Delault Closure
Soil Boring	Sample Identification	Sample Date	Sample Depth	Sample Depth Analyte Type	Compound	Results	Units	Commercial/Industrial
								Land Use
					Barium	237	mg/kg dw	5,900
					Cadmium	89.2	mg/kg dw	77
				Metals	Chromium	16.2	mg/kg dw	120**
					l pad	147	ma/kg dw	230
					Mercury	0.419	mg/kg dw	32
				VOCs	Trichloroethene	7.9	ug/kg dw	3,000
					Anthracene	5,270	ug/kg dw	51,000
					Benzo(a)anthracene	12,300	ug/kg dw	15,000
					Benzo(a)pyrene	10,900	ug/kg dw	1,500
CB-10	SBI002:GB-10:S000020:412	8/9/01	0.0'-2.0'		Benzo(b)fluoranthene	16,000	ug/kg dw	15,000
				Ċ.	Benzo(k)fluoranthene	6,170	ug/kg dw	000'68
				SVOCS	Chrysene	12,500	ug/kg dw	25,000
					Fluoranthene	20,000	ug/kg dw	880,000
					Indeno(1,2,3-cd)pyrene	3,160	ug/kg dw	3,100
					Phenanthrene	19,100	ug/kg dw	126,049,825***
					Pyrene	30,600	ug/kg dw	570,000
				PCRs	All Analytes	꿈	1	1
				TEH	TPH - FTIR Non-ad	199	mg/kg dw	SN
				Dry Weight	Dry Weight	95.4	%	NS
					Amonio Amonio	83	ma/ka dw	20
					Alsellic	2, 22	molka dw	5.900
				;	Banum	121	wb gallen	120**
				Metals	Chromium		wb ga/gm	330
					Lead	979	wn gy/gm	32
					Mercury	0.275	тд/кд ом	35
				NOCs	All Analytes	-RE	1	1
					Anthracene	412	ug/kg dw	51,000
					Benzo(a)anthracene	1,740	ng/kg dw	15,000
					Benzo(a)pyrene	1,610	ug/kg dw	1,500
GB-11	SBI002:GB-11:S000015:412	8/10/01	0.0'-1.5'		Benzo(b)fluoranthene	2,090	ug/kg dw	15,000
:				00,00	Benzo(k)fluoranthene	751	ug/kg dw	39,000
				8000	Chrysene	1,880	ug/kg dw	25,000
					Fluoranthene	4,210	ug/kg dw	880,000
					Indeno(1,2,3-cd)pyrene	521	ug/kg dw	3,100
					Phenanthrene	4,170	ug/kg dw	126,049,825***
					Pvrene	4,750	ug/kg dw	570,000
				PCBs	All Analytes	Ŗ	:	.1
				ТРН	TPH - FTIR Non-au	Å	SN	NS
				Dry Weight	Dry Weight	86.9	%	SN
				TABLE CONTINUES	11.65: (12)			
				ABLE COVING	JES			

SUMMARY OF DETECTED ANALYTES IN SOILS AREA A

								RISC Default Closure
i co	Sample Identification	Sample	Sample Denth Analyte Type	Analyte Type	Compound	Results	Units	Level -
B		Date			•			Land Use
					Barium	187	ma/ka dw	5,900
					Chromium	171	mg/kg dw	120**
				Metals	Pad	167	mg/kg dw	230
					Mercury	0.523	mg/kg dw	32
					Anthracene	689	ug/kg dw	51,000
				VOCs	All Analytes	유		
					Benzo(a)anthracene	2,740	ug/kg dw	15,000
					Benzo(a)pyrene	2,650	ug/kg dw	1,500
					Benzo(b)fluoranthene	5,660	ug/kg dw	15,000
GB-12	SBI002:GB-12:S000020:412	8/9/01	0.0'-2.0'		Benzo(k)fluoranthene	2,170	ug/kg dw	39,000
!				50,6	Chrysene	2,830	ug/kg dw	25,000
				SOAS	Fluoranthene	5,540	ug/kg dw	880,000
					Indeno(1,2,3-cd)pyrene	377	ug/kg dw	3,100
					Phenanthrene	4,650	ug/kg dw	126,049,825***
					Phenol	529	ug/kg dw	320,000
					Pyrene	9,230	ug/kg dw	570,000
				PCBs	All Analytes		1	1
				TPH	TPH - FTIR Non-aq	3,510	mg/kg dw	NS
				Dry Weight	Dry Weight	94	%	NS
					Barium	110	mg/kg dw	2,900
				- Indian	Chromium	12.5	mg/kg dw	120**
				Metals	Lead	201	mg/kg dw	230
					Mercury	1.25	mg/kg dw	32
					Benzo(a)anthracene	712	ug/kg dw	15,000
					Benzo(a)pyrene	899	ng/kg dw	1,500
GB-13	SBI002:GB-13:S010020:412	8/8/01	1.0'-2.0'		Benzo(b)fluoranthene	1,130	ug/kg dw	15,000
:				٥٨١٥	Benzo(k)fluoranthene	378	ug/kg dw	39,000
				8000	Chrysene	712	ug/kg dw	25,000
					Fluoranthene	1,300	ug/kg dw	880,000
					Phenanthrene	1,450	ug/kg dw	126,049,825***
					Pyrene	1,990	ug/kg dw	570,000
				Dry Weight	Dry Weight	94.6	%	NS
			7	TABLE CONTINUES	IES			

SUMMARY OF DETECTED ANALYTES IN SOILS AREA A

								RISC Default Closure
		Sample	:		7	Doeulte	Units	Level -
Soil Boring	Sample Identification	Date	Sample Deptn Analyte Type	Analyte Iype	punodino			Commercial/Industrial
								000
					Barium	64.2	mg/kg dw	006,6
					Chromium	9	mg/kg aw	77
	•		i	Metals	Lead	69.3	mg/kg dw	230
GB-14	SBI002:GB-14:S015025:412	8/8/01	1.5'-2.5		Mercury	0.095	mg/kg dw	32
				SVOCS	All Analytes	^RL	1	1
				Ę	Dry Weight	90.1	%	SN
				1	Arsenic	27.6	mg/kg dw	20
					Baring	171	mg/kg dw	5,900
					Salum		ma/kg dw	11
				Metals	Chromium	22.6	mg/kg dw	120**
					Lead	391	mg/kg dw	230
					Mercury	0.716	mg/kg dw	32
					Benzo(a)anthracene	452	ug/kg dw	15,000
1	25,0000010 1E-S0000102	R/7/01	0.0'-1.0'		Benzo(a)pvrene	200	ug/kg dw	1,500
GB-15	SBI002:GB-19:S0000 10:412	5	2		Benzo(h)fluoranthene	826	ug/kg dw	15,000
					Chokene	644	ug/kg dw	25,000
				SVOCs	Finoranthene	489	ug/kg dw	880,000
					Indeno(1.2.3-cd)pyrene	371	ug/kg dw	3,100
	-				Phenanthrene	719	ug/kg dw	126,049,825***
					Pyrapa	2,140	ug/kg dw	570,000
				Dry Weight	Dry Weight	89.4	%	NS
					Arsenic	17.2	mg/kg dw	20
			_		Barium	87	mg/kg dw	5,900
	-			Metals	Chromism	11.8	mg/kg dw	120**
					Lead	174	mg/kg dw	230
					Mercury	0.879	mg/kg dw	32
					Acenaphthylene	1210	ug/kg dw	7,565,408***
					Anthracene	851	ug/kg dw	51,000
					Benzo(a)anthracene	2,700	ug/kg dw	15,000
			i		Benzo(a)pyrene	3,030	ng/kg dw	1,500
GB-16	SBI002:GB-16:S000005:412	8/7/01	0.0'-0.5'		Benzo(b)fluoranthene	6,540	ug/kg dw	15,000
				0010	Benzo(k)fluoranthene	2,070	ug/kg dw	39,000
-				SNOS	Chrysene	4,040	ug/kg dw	25,000
					Dibenzo(a.h)anthracene	602	ug/kg dw	1,500
					Fluoranthene	1,740	ug/kg dw	880,000
					Indeno(1.2.3-cd)pyrene	1,410	ug/kg dw	3,100
					Phenanthrene	539	ug/kg dw	126,049,825***
					Pyrene	4,020	ug/kg dw	570,000
				Dry Weight	Dry Weight	92.1	%	NS
					150			
				April Commit	JES			

# INITIAL PHASE II ENVIRONMENTAL SITE ASSESSMENT CITY OF SOUTH BEND, INDIANA TABLE 2 (Cont'd) SUMMARY OF DETECTED ANALYTES IN SOILS AREA A

								RISC Default Closure	
		2			,	;	11-11	Level -	
Soil Boring	Sample Identification	Sainple	Sample Depth Analyte Type	Analyte Type	Compound	Kesuits	<u> </u>	Commercial/Industrial	
S		Date						Land Use	
					Arsenic	56	mg/kg dw	20	
					Rarium	300	mg/kg dw	5,900	
				Metals	Chromium	14.3	mg/kg dw	120**	
					Lead	337	mg/kg dw	230	
					Merciny	0.445	mg/kg dw	32	
ļ	41.000045.440	101710	7.70		Borzo(a)byrene	245	ua/ka dw	1,500	
GB-17	SBI002:GB-17:S000015:41z	10//6	5.		Derizo(a)Pyrerie	530	ua/ka dw	15,000	
				SVOC	Charges	434	na/ka dw	25,000	
				2000	Cillysene	503	who own	126.049.825***	
					Prenamiene	1 120	ua/ka dw	570,000	
				Do, Waight	Dry Weight	88.9	%	SN	
				Ш	Arsenic	34	mg/kg dw	20	
					Baring	456	mg/kg dw	2,900	
					Cadmin	2	ma/kg dw	11	
				Metals	Cadiman	22.4	ma/ka dw	120**	
					1000	429	mg/kg dw	230	
					Moroun	0.588	ma/ka dw	32	
		70,00	5		Descriptions of the second	313	no/ka dw	1,500	
GB-19	SBI002:GB-19:S000010:412	L0/8/8	0.0-0.0		Benzu(a)pyrene	2 6	un/ka dw	15.000	
				_	Benzo(b)nuoranmene	990	and called	25,000	
				SVOCs	Chrysene	170	ug/kg uw	500,03	
				3	Fluoranthene	722	ug/kg aw	000,000	
					Phenanthrene	421	ug/kg dw	126,049,825	
					Pyrene	681	ug/kg dw	570,000	
				Dry Weight	Dry Weight	88.5	%	SN	
				1	Barium	54.6	mg/kg dw	5,900	
					Chromium	5.5	mg/kg dw	120**	
				Metals	Lead	174	mg/kg dw	230	
GB-20	\$B1002:GB20:S005020:428	8/7/01	0.5-2.0		Mercury	0.071	mg/kg dw	32	
				SVOCS	All Analytes	≺RL	1	1	
				Dry Weight	Dry Weight	93.9	%	NS	
					Barium	65.7	mg/kg dw	5,900	
					Chromium	6.1	mg/kg dw	120**	
				Metals	l ead	79.7	mg/kg dw	230	
GB-21	SBI002:GB21:S010030:428	8/7/01	1.0'-3.0'		Mercury	0.081	mg/kg dw	32	
				SVOCs	All Analytes	-RL	1	1	
				Dry Weight	Dry Weight	89.1	%	NS	
				TABLE CONTINUES	)ES				

TABLE 2 (Cont'd)
SUMMARY OF DETECTED ANALYTES IN SOILS
AREA A

								RISC Default Closure
		Sample				:	21.51	Level -
Soil Boring	Sample Identification	Campie	Sample Depth   Analyte Type	Analyte Type	Compound	Kesnits	SIIIO	Commercial/Industrial
		רמופ						Land Use
					Barium	26.6	mg/kg dw	5,900
					Chromium	8.9	mg/kg dw	120**
			i	Metals	Lead	15.6	mg/kg dw	230
GB-22	SBI002:GB22:S005020:428	8/7/01	0.5-5.0		Mercury	0.051	mg/kg dw	32
				SVOCs	Benzo(a)pyrene	199	ug/kg dw	1,500
				Dry Weight	Dry Weight	88.3	%	NS
					Barium	36.1	mg/kg dw	5,900
					Chromium	4.7	mg/kg dw	120**
				Metals	Lead	27.6	mg/kg dw	230
					Mercury	0.059	mg/kg dw	32
					Benzo(a)anthracene	487	ug/kg dw	15,000
	1		i		Benzo(a)pyrene	442	ug/kg dw	1,500
GB-23	SB1002:GB23:S005020:428	8/7/01	0.5-5.0		Benzo(b)fluoranthene	663	ug/kg dw	15,000
				SVOCs	Chrysene	520	ug/kg dw	25,000
					Fluoranthene	845	ug/kg dw	000'088
					Phenanthrene	462	ug/kg dw	126,049,825***
					Pyrene	820	ug/kg dw	570,000
				Dry Weight	Dry Weight	91.6	%	NS
					Arsenic	35.9	mg/kg dw	20
					Barium	114	mg/kg dw	5,900
				Metals	Chromium	7.3	mg/kg dw	120**
GB-24	SB1002:GB24:S005020:428	10/1/8	0.5-5.0		Lead	28	mg/kg dw	230
1					Mercury	0.08	mg/kg dw	32
				SVOCS	All Analytes	-RL	1	1
				Dry Weight	Dry Weight	89.1	%	NS
					Barium	15.6	mg/kg dw	5,900
					Chromium	3.9	mg/kg dw	120**
	SBI002:GR26:S020040:428	8/7/01	2.0'-4.0'	Metais	Lead	7.6	mg/kg dw	230
					Mercury	0.011	mg/kg dw	32
GB-26	-			VOCs	All Analytes	^RL	ı	1
3	SB1002:SB26A:S020040:505#	8/23/01	2.0'-4.0'	SVOCS	All Analytes	-RI	1	;
			200	TPH	TPH - FTIR Non-aq	≺RL	SN	NS
	SBI002:GB26:S020040:428	L0///8	2.0.4.0	Dry Weight	Dry Weight	94.6	%	SN
	SBI002:SB26A:S020040:505#	8/23/01	2.0'-4.0'	Dry Weight	Dry Weight	93.3	%	SN

SUMMARY OF DETECTED ANALYTES IN SOILS AREA A TABLE 2 (Cont'd)

								DISC Default Closure
								omeon management
		Sample			6	Doerife	Ilnits	Fevel -
Soil Boring	Sample Identification	oteC	Sample Depth Analyte Type	Analyte Type	Compound	cincar	3	Commercial/Industrial
		1						Land Use
					Barium	36	mg/kg dw	2,900
					Chromium	5,5	mg/kg dw	120**
	007000000000000000000000000000000000000	101718	20'40'	Metals		33.6	ma/ka dw	230
	024:0400000:1200:00100	5			Mercury	0.227	mg/kg dw	32
			•	VOCs	All Analytes	유	1	1
					Benzo(a)anthracene	753	ug/kg dw	15,000
					Benzo(a)pvrene	815	ug/kg dw	1,500
					Benzo(b)fluoranthene	1,170	ug/kg dw	15,000
GB-27				0	Benzo(k)fluoranthene	206	ug/kg dw	39,000
	SBI002:SB27A:S020040:505#	8/23/01	2.0.4.0.	SNOCS	Chrysene	096	ug/kg dw	25,000
					Fluoranthene	2,130	ug/kg dw	880,000
					Phenanthrene	1,170	ug/kg dw	126,049,825***
					Pyrene	1,790	ug/kg dw	570,000
				TPH	TPH - FTIR Non-ad	유	SN	SN
	SBI002:GB27:S020040:428	8/7/01	2.0'4.0'	Dry Weight	Dry Weight	92.9	%	SN
	#\$0500000000000000000000000000000000000	8/23/01	20.40	Dry Weight	Dry Weight	98.6	%	SN
	SDIOUZ.SDZ/A.SUZUCTU.SUST				Barium	77.5	mg/kg dw	5,900
					Chromium	5.6	mg/kg dw	120**
		_		Metals	Lead	33	mg/kg dw	230
					Mercury	0.068	mg/kg dw	32
					Anthracene	521	ug/kg dw	51,000
					Benzo(a)anthracene	899	ug/kg dw	15,000
CB.28	SBI002:GB-28:S000020:412	8/7/01	0.0'-2.0'		Benzo(a)pyrene	707	ug/kg dw	1,500
02-50	1	:		ć	Benzo(b)fluoranthene	1,320	ug/kg dw	15,000
				SVOCS	Chrysene	827	ug/kg dw	25,000
					Fluoranthene	1,340	ug/kg dw	880,000
					Phenanthrene	1,800	ug/kg dw	126,049,825***
					Pyrene	1,660	ug/kg dw	570,000
				Dry Weight	Dry Weight	95.2	%	SN
				I٦	150			

#### TABLE 2 (Cont'd) SUMMARY OF DETECTED ANALYTES IN SOILS AREA A

								DISC Default Closure
								Level -
Soil Boring	Sample Identification	Sample	Sample Depth	Sample Depth Analyte Type	Compound	Results	Units	Commercial/Industrial
		Date						Land Use
					Arsenic	41.5	mg/kg dw	20
					Barium	230	mg/kg dw	5,900
				Metals	Chromium	22.9	mg/kg dw	120**
					Lead	225	mg/kg dw	230
					Mercury	4.17	mg/kg dw	32
					Acenaphthylene	1,040	ug/kg dw	7,565,408***
					Anthracene	666	ug/kg dw	51,000
			i		Benzo(a)anthracene	2,570	ug/kg dw	15,000
GB-29	SBI002:GB-29:S005015:412	8/7/01	0.5'-1.5'		Benzo(a)pyrene	2,620	ug/kg dw	1,500
					Benzo(b)fluoranthene	5,110	ug/kg dw	15,000
				SNOCS	Benzo(k)fluoranthene	2,380	ug/kg dw	39,000
					Chrysene	3,370	ug/kg dw	25,000
					Fluoranthene	4,580	ug/kg dw	000'088
					Phenanthrene	1,350	ug/kg dw	126,049,825***
					Pyrene	6,650	ug/kg dw	570,000
				Dry Weight	Dry Weight	85.2	%	NS
					Barium	80.9	mg/kg dw	2,900
				Motole	Chromium	9.3	mg/kg dw	120**
;		70,00	5	Metals	Lead	22.9	mg/kg dw	230
GB-30	\$BI002:GB30:S000020:428	8///01	0.2-0.0		Mercury	0.022	mg/kg dw	32
				SVOCs	All Analytes	<rl< td=""><td>1</td><td>1</td></rl<>	1	1
				<u>ــ</u> ــــــــــــــــــــــــــــــــــ	Dry Weight	89.7	%	SN
				┰	Arsenic	6.7	mg/kg dw	. 20
					Barium	370	mg/kg dw	5,900
				1-1-14	Cadmium	2.2	mg/kg dw	77
				Metals	Chromium	16.5	mg/kg dw	120**
					Lead	429	mg/kg dw	230
					Mercury	5.13	mg/kg dw	32
					Acenaphthene	561	ng/kg dw	1,200,000
					Acenaphthylene	2,060	ug/kg dw	7,565,408***
					Anthracene	1,490	ng/kg dw	51,000
					Benzo(a)anthracene	4,380	ug/kg dw	15,000
ć	24.800001412	10/2/01	0 0.10		Benzo(a)pyrene	8,900	ng/kg dw	006,1
5-85 5-85	SBI002:05-91:30000 10:4 12	000	2		Benzo(b)fluoranthene	8,600	ug/kg dw	15,000
				,	Benzo(k)fluoranthene	1,270	ug/kg dw	39,000
				SVOCs	Chrysene	3,180	ng/kg dw	25,000
					Dibenzo(a,h)anthracene	1,430	ug/kg dw	1,500
					Dibenzofuran	637	ug/kg dw	4,716,192
					Fluoranthene	1,820	ng/kg dw	000,088
					Fluorene	1,620	ug/kg dw	1,100,000
					Indeno(1,2,3-cd)pyrene	2,370	ng/kg dw	3,100
					Phenanthrene	5,340	ug/kg dw	126,049,825***
					Pyrene	7,210	ug/kg dw	000,076
				Dry Weight	Dry Weight	82	%	NS
			_	TABLE CONTINUES	ES			

SUMMARY OF DETECTED ANALYTES IN SOILS

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								RISC Delault Closure
:	a cita citizana La cita con C	Sample	Samnle Denth Analyte Type	Analyte Type	Compound	Results	Units	Level -
Soil Boring	Sample Identification	Date			•			Land Use
					Barium	65	mg/kg dw	5,900
					Chromium	6.5	mg/kg dw	120**
				Metals	Lead	23	mg/kg dw	230
				-	Mercury	0.014	mg/kg dw	32
					Acenaphthene	1,950	ug/kg dw	1,200,000
					Acenaphthylene	780	ug/kg dw	7,565,408***
					Anthracene	4,830	ug/kg dw	51,000
					Benzo(a)anthracene	1,960	ug/kg dw	15,000
					Benzo(a)pyrene	1,570	ug/kg dw	1,500
6	SBI002-GB-32-S000015-412	8/8/01	0.0'-1.5'		Benzo(b)fluoranthene	4,110	ug/kg dw	15,000
75-95	25.0000.20.000.000	i i			Benzo(k)fluoranthene	998	ug/kg dw	39,000
				SVOCS	Chrysene	2,340	ug/kg dw	25,000
					Dibenzofuran	1,170	ug/kg dw	4,716,192***
					Fluoranthene	8,610	ug/kg dw	880,000
					Fluorene	2,250	ug/kg dw	1,100,000
					Naphthalene	2,710	ug/kg dw	170,000
					Phenanthrene	12,600	ug/kg dw	126,049,825***
					Pvrene	11,300	ug/kg dw	570,000
				Dry Weight	Dry Weight	95.4	%	SN
				1	Arsenic	9.7	mg/kg dw	20
					Barium	238	mg/kg dw	5,900
				Metals	Chromium	13	mg/kg dw	120**
					Lead	397	mg/kg dw	230
					Mercury	0.504	mg/kg dw	32
50 33	SBI002:GB-33:S000010:412	8/7/01	0.0'-1.0'		Benzo(a)pyrene	339	ug/kg dw	1,500
22-05	10.000000000000000000000000000000000000	;			Benzo(b)fluoranthene	569	ug/kg dw	15,000
				SVOCs	Chrysene	360	ug/kg dw	25,000
					Fluoranthene	440	ug/kg dw	000'088
					Phenanthrene	456	ug/kg dw	126,049,825***
				Dry Weight	Dry Weight	92.9	%	SN.
				TABLE CONTINUES	ES			

#### INITIAL PHASE II ENVIRONMENTAL SITE ASSESSMENT CITY OF SOUTH BEND, INDIANA TABLE 2 (Cont'd) SUMMARY OF DETECTED ANALYTES IN SOILS AREA A

			_	_			_		_			_					_			-	_
Level - Commercial/Industrial Land Use	20	120**	230	32	1,200,000	7,565,408***	51,000	15,000	1,500	15,000	39,000	25,000	1,500	4,716,192***	000'088	1,100,000	3,100	170,000	126,049,825***	570,000	NS
Units	mg/kg dw ma/ka dw	mg/kg dw	mg/kg dw	mg/kg dw	ug/kg dw	ug/kg dw	ug/kg dw	ng/kg dw	ug/kg dw	ug/kg dw	ug/kg dw	ng/kg dw	ug/kg dw	ug/kg dw	ug/kg dw	ug/kg dw	ng/kg dw	ug/kg dw	ug/kg dw	ug/kg dw	%
Results	34	9.4	125	0.23	2,620	1,430	6,720	29,200	30,900	48,600	16,600	36,900	2,530	1,290	435	2,130	8,260	879	55,600	74,900	88.7
Compound	Arsenic	Chromium	Lead	Mercury	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Dibenzofuran	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene	Dry Weight
Analyte Type		Metals											SNOCS								Dry Weight Dry Weight
Sample Depth - Analyte Type										į	0.0'-1.5										
Sample Date											8/7/01										
Sample Identification											SBI002:GB-34:S000015:412										
Soil Boring								-			GB-34										

### SUMMARY OF DETECTED ANALYTES IN SOILS AREA A TABLE 2 (Cont'd)

								DISC Default Closure
								2000
Soil Boring	Sample Identification	Sample	Sample Depth Analyte Type	Analyte Type	Compound	Results	Units	Commercial/Industrial
6 III 00		Date	•	,				l and Ilse
								200
					Arsenic	17.1	mg/kg dw	20
					Barium	170	mg/kg dw	5,900
				Metals	Chromium	13	mg/kg dw	120**
					Lead	315	mg/kg dw	230
					Mercury	0.635	mg/kg dw	32
					Benzo(a)anthracene	502	ug/kg dw	15,000
	SBI002:GB-35:S000015:412	8/7/01	0.0'-1.5'		Benzo(a)pyrene	469	ug/kg dw	1,500
					Benzo(b)fluoranthene	805	ug/kg dw	15,000
				SVOCs	Chrysene	548	ug/kg dw	25,000
					Fluoranthene	874	ug/kg dw	880,000
					Phenanthrene	521	ug/kg dw	126,049,825***
					Pyrene	1,010	ug/kg dw	570,000
				Dry Weight	Dry Weight	87.6	%	SN
					Arsenic	13.3	mg/kg dw	20
GB-35					Barium	136	mg/kg dw	5,900
				Metals	Chromium	17.1	mg/kg dw	120**
					Lead	163	mg/kg dw	230
					Mercury	0.558	mg/kg dw	32
					Anthracene	497	ug/kg dw	51,000
					Benzo(a)anthracene	1,930	ug/kg dw	15,000
	SBI002:GB-35D:S000015:412	8/7/01	0.0'-1.5'		Benzo(a)pyrene	1,920	ug/kg dw	1,500
					Benzo(b)fluoranthene	2,940	ug/kg dw	15,000
				SVOCs	Benzo(k)fluoranthene	1,060	ug/kg dw	39,000
					Chrysene	1,750	ug/kg dw	25,000
					Fluoranthene	3,170	ug/kg dw	880,000
					Indeno(1,2,3-cd)pyrene	393	ug/kg dw	3,100
					Phenanthrene	2,050	ug/kg dw	126,049,825***
				Dry Weight Dry Weight	Dry Weight	88.2	%	NS

TABLE 2 (Cont'd) SUMMARY OF DETECTED ANALYTES IN SOILS AREA A

Level -Commercial/Industrial Land Use RISC Default Closure 25,000 39,000 51,000 15,000 1,500 25,000 25,000 170,000 126,049,825\*\*\* 320,000 570,000 NS NS 5,900 120\*\* 230 32 NS 5,900 120\*\* 230 32 mg/kg dw ugikg dw Units Results Anthracene
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(k)fluoranthene
Chrysene
Dibenzofuran
Naphthalene
Phenanthrene Pyrene TPH - FTIR Non-aq Dry Weight All Analytes 2,4-Dimethylphenol 2-Methylphenol Compound Mercury All Analytes Dry Weight All Analytes
Dry Weight
Barium
Chromium
Lead Arsenic Barium Chromium Barium Chromium Lead TPH TPH TPH Dry Weight Dry V Sample Depth | Analyte Type SVOCs Dry Weight SVOCs Dry Weight SVOCs Metals Metals Metals VOCs 0.5-1.0 0.0'-2.0' 0.0'-2.0' Sample Date 8/10/01 8/7/01 8/1/01 SBI002:GB-36:S000020:412 SBI002:GS-2:S005010:412 SBI002:GB37:S000020:428 Sample Identification Soil Boring GB-36 GB-37 **GS-2** 

### INITIAL PHASE II ENVIRONMENTAL SITE ASSESSMENT CITY OF SOUTH BEND, INDIANA TABLE 2 (Cont'd) SUMMARY OF DETECTED ANALYTES IN SOILS ARFA A

				AREA A				
								RISC Default Closure
						:	4511	Level -
Coil Boring	Samule Identification	Sample	Sample Depth   Analyte Type	Analyte Type	Compound	Results	Onits	Commercial/Industrial
61100		Date						Land Use
					Arsenic	33.3	mg/kg dw	20
					Barium	115	mg/kg dw	5,900
				Metals	Chromium	15.5	mg/kg dw	120**
					Lead	259	mg/kg dw	230
					Mercury	0.058	mg/kg dw	32
				VOCs	All Analytes	유	1	1
					Benzo(a)anthracene	379	ug/kg dw	15,000
			i		Benzo(a)pyrene	269	ug/kg dw	1,500
	SBI002:GS-3:S005010:412	8/1/01	0.5'-1.0'		Benzo(b)fluoranthene	295	ug/kg dw	15,000
					Chrysene	445	ug/kg dw	25,000
				SAOCS	Fluoranthene	298	ug/kg dw	880,000
					Naphthalene	363	ug/kg dw	170,000
ć					Phenanthrene	889	ug/kg dw	126,049,825***
200					Pyrene	856	ug/kg dw	570,000
				Hdl	TPH - FTIR Non-ad	AR.	SN	NS
				Dry Weight	Dry Weight	95.3	%	NS
				6.1	Barium	80.3	mg/kg dw	5,900
				-	Chromium	80.2	mg/kg dw	120**
				Metals	Lead	38.6	mg/kg dw	230
					Mercury	0.054	mg/kg dw	32
	SPI003-GS 3D-S005010-412	8/1/01	0.5'-1.0'	VOCs	All Analytes	-RI	1	-
	211.50.0000.00.00.00.000	; ; ;			Phenanthrene	409	ug/kg dw	SN
				SVOCS	Pyrene	351	ng/kg dw	570,000
				TPH	TPH - FTIR Non-aq	<rl< td=""><td>NS</td><td>SN</td></rl<>	NS	SN
				Dry Weight	Dry Weight	96	%	SN
					Arsenic	13.4	mg/kg dw	20
					Barium	63.9	mg/kg dw	2,900
				al a table	Cadmium	4.4	mg/kg dw	77
				Metals	Chromium	33.8	mg/kg dw	-120-
	SECOND 1.500005.412	7/31/01	0.0'-0.5'		Lead	299	mg/kg dw	230
					Mercury	0.138	mg/kg dw	32
				NOCs	All Analytes	-R	1	1
•				SVOCs	All Analytes	-RL	î	
				Dry Weight	Dry Weight	90.8	%	SN

SUMMARY OF DETECTED ANALYTES IN SOILS AREA A TABLE 2 (Cont'd)

								RISC Default Closure
		olumes			•	1	1 laik	Level -
Soil Boring	Sample Identification	Date	Sample Depth	Sample Depth   Analyte Type	Compound	Kesuits		Commercial/Industrial
•								Land Use
					Arsenic	18	mg/kg dw	20
					Barium	49.6	mg/kg dw	5,900
				Metals	Chromium	32.5	mg/kg dw	120**
					Lead	449	mg/kg dw	230
					Merciny	0.114	mg/kg dw	32
				NOC8	All Analytes	^R.	1	
				3	Benzo(a)anthracene	839	ug/kg dw	15,000
					Benzo(a)nvrene	748	ug/kg dw	1,500
	SBI003:UA 2:SD00010:412	7/31/01	0.0'-1.0'		Benzo(b)fluoranthene	1,690	ug/kg dw	15,000
HA-Z	SBI002:04-2:3000010:412		?		Benzo(k)fluoranthene	362	ug/kg dw	000'68
					Bis/2-ethylhexyl)nhthalate	493	ug/kg dw	000'086
				SVOCs	Chrysene	1.580	ug/kg dw	25,000
					Fluoranthene	644	ug/kg dw	880,000
					Nanhthalene	927	ug/kg dw	170,000
					Dhonanthrone	1.170	ua/ka dw	126,049,825***
					Pyrene	1.540	ug/kg dw	570,000
		-	-	Do. Moight	Dr. Weight	95	%	SN
				Oly weight.	Arsenic	114	mg/kg dw	20
					Barin	454	mg/kg dw	5,900
				Metals	Chromium	13.2	mg/kg dw	120**
					Lead	278	mg/kg dw	230
					Mercury	0.188	mg/kg dw	32
					Acenaphthylene	1,000	ug/kg dw	7,565,408***
					Anthracene	1,860	ug/kg dw	51,000
					Benzo(a)anthracene	2,830	ug/kg dw	15,000
		:	;		Benzo(a)pyrene	3,100	ug/kg dw	1,500
HA-3	SBI002:HA-3:S000010:412	7/31/01	0.0'-1.0'		Benzo(k)fluoranthene	1,910	ug/kg dw	39,000
				Ċ	Chrysene	3,190	ug/kg dw	25,000
				SVOCS	Dibenzofuran	914	ug/kg dw	4,716,192***
					Fluoranthene	3,770	ug/kg dw	000'088
					Indeno(1,2,3-cd)pyrene	584	ug/kg dw	3,100
					Naphthalene	1,300	ug/kg dw	170,000
					Phenanthrene	5,440	ug/kg dw	126,049,825***
					Pyrene	4,380	ug/kg dw	570,000
				Dry Weight	Dry Weight	78.7	%	1
				TARI F CONTINUES	JES			

# INITIAL PHASE II ENVIRONMENTAL SITE ASSESSMENT CITY OF SOUTH BEND, INDIANA TABLE 2 (Cont'd) SUMMARY OF DETECTED ANALYTES IN SOILS AREA A

								RISC Default Closure
	:	Sample	4	Anglish Tuno	pullodado	Results	Units	Level -
Soil Boring	Sample Identification	Date	Sample Deptin Analyte Type	Analyte 1ype				Commercial/Industrial
							,	
					Arsenic	=	mg/kg dw	50
					Barium	89.1	mg/kg dw	2,900
				Metals	Chromium	41	mg/kg dw	120**
					peo	45.5	mg/kg dw	230
					Mercin	0.203	ma/ka dw	32
					Accountifylene	421	ua/ka dw	7,565,408***
					Actinplication	410	ua/ka dw	51,000
					Allunacene	670	in/kn dw	15.000
HA-4	SBI002:HA-4:S000010:412	7/31/01	0.0'-1.0'		Delizo(a)aliullacelle	2:0	in/kn dw	1.500
					perizo(a)pyrene	3 6	:	15,000
				SVOCs	Benzo(b)fluoranthene	2450	ug/kg aw	000,00
				3	Benzo(k)fluoranthene	633	ug/kg dw	39,000
					Chrysene	783	ug/kg dw	25,000
					Fluoranthene	1,020	ug/kg dw	880,000
					Phenanthrene	0	ug/Kg	126,049,825***
					Pyrene	1,820	ug/kg dw	570,000
				Dry Weight	Dry Weight	83.7	%	SN
				┰	Arsenic	7.4	mg/kg dw	20
					Barium	194	mg/kg dw	5,900
				Motale	Chromium	σ	ma/ka dw	120**
					200	. 89	ma/kg dw	230
					Morcing	0.1	ma/kg dw	32
				7000	All Applying	₩ V	1	:
	000000000000000000000000000000000000000	7/04/04		300	All Alialytes	777	ua/ka dw	1,500
HMW-1D	SBIODZ:HWWH:SUDDISS	10/10/1	0.2-0.0		Benzo(h)@ioranthene	563	ua/ka dw	15,000
				eyoce.		288	in/ka dw	880,000
				300	Changiniene	357	na/ka dw	126.049.825***
					Pilelanulene	544	ua/ka dw	570,000
				Har	TPH - GBO (Non-Agueous)	₹	SN	NS
				Doy Weight	Dry Weight	93.2	%	SN
				DI) WEIGHT	Arsenic	25	mg/kg dw	20
					Barium	58.6	mg/kg dw	5,900
				Motals	Chromium	5.3	ma/kg dw	120**
					700	38.5	ma/ka dw	230
		70,0,0	5		Mozonia	0.27	ma/ka dw	32
HMW-2S	SBI002:HMW2S:S020020:428	8/2/01	0.0-2.0		Mercury	13.0	Sale Control	240 000
				VOCs	Toluene	30.2	mg/kg uw	000,042
				TPH	TPH - GRO (Non Aqueous)	축 :	2 4	2 2
				- 1	TPH - FTIR Non-aq	÷ ;	S S	2 2
				Dry Weight	Dry Weight	73.6	%	02

TABLE 2 (Cont'd) SUMMARY OF DETECTED ANALYTES IN SOILS AREA A

								RISC Default Closure
	:	Sample	Analy Douth Analyte Tyne	Analyte Tyne	Compound	Results	Units	Level -
Soil Boring	Sample Identification	Date	Sample Ceptin		-			Land Use
					Barium	26.6	mg/kg dw	5,900
					Chromium	7.8	mg/kg dw	120**
			1	Metals	ead	27.8	mg/kg dw	230
	SBI002:HMW3S:S060070:428	8/1/01	6.0'-7.0'		Mercury	0.018	mg/kg dw	32
				VOCs	All Analytes	-RI	1	*
				ŧ	Dry Weight	93	%	NS
HMW-35				Т	Barium	8	mg/kg dw	5,900
				Metals	Chromium	7.3	mg/kg dw	120**
	SPICE COLORS CORPORES 428	8/1/01	6.0'-8.5'		ead	6.1	mg/kg dw	230
	SBIOUZ: HIMIWASS. SOCOCOS. 420	5	}	VOCs	All Analytes	유	1	*
				ŧ	Dry Weight	96.6	%	SN
					Arsenic	15.8	mg/kg dw	20
					Barium	215	mg/kg dw	5,900
				Metals	Chromium	1	mg/kg dw	120**
					Lead	426	mg/kg dw	230
					Mercury	1:1	mg/kg dw	32
				VOCs	All Analytes	-RI	1	-
					Anthracene	466	ug/kg dw	51,000
					Benzo(a)anthracene	1,120	ug/kg dw	15,000
07.200	8CF:0C00000S:SVWW-C001GS	8/1/01	0.0'-2.0'		Benzo(a)pyrene	913	ug/kg dw	1,500
HIMIW 40	SELOGE: INVANCED CONTROL	; i			Benzo(b)fluoranthene	1,610	ug/kg dw	15,000
				SVOCs	Benzo(k)fluoranthene	531	ug/kg dw	39,000
					Chrysene	1,030	ug/kg dw	25,000
					Fluoranthene	1,850	ug/kg dw	880,000
					Phenanthrene	2,230	ug/kg dw	126,049,825***
					Pyrene	2,620	ug/kg dw	570,000
				TPH	TPH - GRO (Non Aqueous)	-RL	NS	SN
				Dry Weight	Dry Weight	86.1	%	NS
				NOCs	All Analytes	-R	1	1
				SVOCs	All Analytes	.R	1	***
HMW-5S	SBI002:HMW5S:S000020:428	8/1/01	0.0'-2.0'	표	TPH - FTIR Non-aq	160	mg/kg dw	SN
		_		Dry Weight	Dry Weight	93.3	%	SN

SUMMARY OF DETECTED ANALYTES IN SOILS AREA A TABLE 2 (Cont'd)

Soil Boring Sample Identification SBI002:HMW6S:S040060:505 HMW-6S	ation	Sample Date	Sample Depth Analyte Type	1		:	1	Level -
	ation 0060:505		Sample Depuil	Annual Contract		Recilia	Units	
	909-009			Alidiyte i ype				Commercial/Industrial Land Use
	0080:505				Bariım	141	mg/kg dw	2,900
	0080:505			_=	Chromium	57.8	mg/kg dw	120**
	0080:505			Metals	Lead	9.77	mg/kg dw	230
	0060:505				Mercury	0.036	mg/kg dw	32
	0060:505		•		Acetone	205	ug/kg dw	3100
	0060:505				Ethylbenzene	5.6	ug/kg dw	200000
	0060:505				n-Isonropyltoluene	13.1	ng/kg dw	21,884,454***
	0060:505				n-Propylhenzene	6.2	ug/kg dw	704,658***
		10/C/B	40'-60'	VOCs	Nanhthalene	16.1	ug/kg dw	170000
HMW-6S		- 0770	2		Toliane	12.7	ua/kg dw	240000
HMW-6S					1 2 4-Trimethylhenzene	51.7	ua/ka dw	215,329***
HMW-6S					1.2.7-Timediyibonzone	%	na/ka dw	86,840***
HMW-bo					Yylonos Total	39.5	ua/ka dw	410,000
		_		000/0	All Analytes	₹		1
				Ţ	All Analytes	₩.	:	1
				T	TELL CBO (Non Agricus)	@	SN	SN
				Т	(choanhy lion) Ovo - H-I	300	0%	SN N
				Dry Weight	Dry Weight	30.0	9/	000
					Barium	2 ;	mg/kg aw	5,900
				Metals	Chromium	6.2	mg/kg dw	120
					Lead	5.9	mg/kg dw	230
		,	2000	NOCs	Toluene	6.9	ug/kg dw	240,000
SBI002:HMW6S:S180	:S180200:505	8/2/01	18.0-20.0		All Analytes	<rl< td=""><td></td><td>1</td></rl<>		1
				Γ	Ali Analytes	-RL	1	1
				HAL	TPH - GRO (Non Aqueous)	જ	SN	SN
				냚	Dry Weight	95	%	SN
				$\Gamma$	Arsenic	12.7	mg/kg dw	20
					Barium	299	mg/kg dw	5,900
				Metals	Chromium	65.4	mg/kg dw	120**
					Lead	124	mg/kg dw	230
HMW.ED SRIDO2:HMW6D:S000	:S000020:505	8/1/01	0.0'-2.0'		Mercury	0.151	mg/kg dw	32
				VOCs	All Analytes	<rl< td=""><td>1</td><td>1</td></rl<>	1	1
				SVOCs	All Analytes	ΥRΓ	-	1
				댎	TPH - GRO (Non Agueous)	-RL	SN	SN
				Dry Weight	Dry Weight	96.4	%	NS
					Barium	496	mg/kg dw	5,900
					Chromium	9.6	mg/kg dw	120**
			;	Metals	Lead	388	mg/kg dw	230
HMW-7S SBI002:HMW7S:S000020:428	00020:428	8/7/01	0.0-2.0		Mercury	0.158	mg/kg dw	32
				VOCs	All Analytes	-RL	:	:
				Ħ	Dry Weight	77.8	%	SN
	1			-	3 / 1			

SUMMARY OF DETECTED ANALYTES IN SOILS AREA A TABLE 2 (Cont'd)

						_		Fevel -
Soil Boring	Sample Identification	Sample	Sample Depth   Analyte Type	Analyte Type	Compound	Results	Units	Commercial/Industrial
		Date						Land Use
					Barium	14.3	mg/kg dw	2,900
					Chromium	3.7	mg/kg dw	120**
			i	Metals	pead	Ξ	mg/kg dw	230
HMW-8D	SBI002:HMW8D:S010020:505	8/9/01	1.0'-2.0'		Mercury	0.055	mg/kg dw	32
				VOCs	All Analytes	☆	1	1
				Dry Weight	Dry Weight	92.6	%	NS
					Arsenic	4.4	mg/kg dw	20
					Barium	51.3	mg/kg dw	5,900
				Metals	Chromium	4.7	mg/kg dw	120**
	303:0c000003:00 /www.i-coolege	8/15/01	00-50		lead	52.7	mg/kg dw	230
	SBIOUZ: HIMIW-9D. SOUGZO, SOS	5			Mercury	0.082	mg/kg dw	32
				VOCs	Tetrachloroethene	50.1	ug/kg dw	640
				ŧ	Dry Weight	93.2	%	SN
					Arsenic	4.8	mg/kg dw	20
HMW-9D					Barium	47.3	mg/kg dw	2,900
				Metals	Chromium	c	mg/kg dw	120**
-	SP1002:UMM/Janp:S000001505	8/15/01	0.0'-2.0'		Lead	47.3	mg/kg dw	230
	201025-10102-1010-1010-1010-1010-1010-1010-1010-1010-1010-1010-1010-1010	: ! :			Mercury	0.082	mg/kg dw	32
				VOCs	Tetrachloroethene	83.9	ug/kg dw	640
				Dry Weight	Dry Weight	94	%	SN
	203-006000-Govern Locotton	2/15/01	30.0'-32.0'	TOC	100	0.17	%	SN
	SBIOUZ:HMWSD:SOUSZU:SUS	000	0.00		Carbon tetrachloride	158	ug/kg dw	290
				VOCs	Chloroform	45.5	ug/kg dw	1,200
					Tetrachloroethene	4,740	ug/kg dw	640
					Benzo(a)anthracene	746	ug/kg dw	15,000
					Benzo(a)pyrene	613	ug/kg dw	1,500
			i		Benzo(b)fluoranthene	989	ug/kg dw	15,000
HWM-91	SBI002:HMW9I:S005020:428	8/20/01	0.5-2.0	SVOCs	Chrysene	743	ug/kg dw	25,000
					Fluoranthene	1,590	ug/kg dw	000'088
					Phenanthrene	2,020	ug/kg dw	126,049,825***
					Pyrene	1,310	ug/kg dw	570,000
				TPH	TPH - GRO (Non Aqueous)	-RL	NS	SN
				博	Dry Weight	88.7	%	SN

#### INITIAL PHASE II ENVIRONMENTAL SITE ASSESSMENT CITY OF SOUTH BEND, INDIANA TABLE 2 (Cont'd) SUMMARY OF DETECTED ANALYTES IN SOILS AREA A

Compound         Results         Units           Tetrachloroethene         16         ug/kg dw           Benzo(a)anthracene         524         ug/kg dw           Benzo(a)pyrene         602         ug/kg dw           Benzo(a)pyrene         602         ug/kg dw           Chrysene         720         ug/kg dw           Fluorantheine         600         ug/kg dw           Pyrene         600         ug/kg dw           Dry Weight         87         %           All Analytes <rl< td="">         -           All Analytes         <rl< td="">         -           All Analytes         <rl< td="">         -           All Analytes         <rl< td="">         -           All Analytes         <rl< td="">         -           All Analytes         <rl< td="">         -           All Analytes         <rl< td="">         -           All Analytes         <rl< td="">         -           All Analytes         <rl< td="">         -           All Analytes         <rl< td="">         -           All Analytes          93.5         mg/kg dw           Chromium         11.4         mg/kg dw           Chromium         58         mg/kg dw</rl<></rl<></rl<></rl<></rl<></rl<></rl<></rl<></rl<></rl<>									RISC Default Closure
Sample Identification         Sample Identification         Sample Identification         Compound         Results         Compound         Needs         Units of white           SBI002-HMW10S-S040060428         -8/1701         4,0-5.0°         SVOCS         Filed bit incode there         264         Units of white           SBI002-HMW10S-S040060428         -8/1701         4,0-5.0°         SVOCS         Filed bit incode there         265         Units of white of white           SBI002-HMW10S-S10011042B         8/1701         10.0-11.0°         TPH         TPH <td< td=""><td></td><td></td><td>damo</td><td></td><td></td><td></td><td></td><td>1</td><td>Level -</td></td<>			damo					1	Level -
SBI0022HMW10S.S040050.428   ST701   4.9-5.0   SVOCs   Chromosthere   16   United gw   SVOCs   Chromosthere   254   United gw   United gw   SVOCs   Chromosthere   254   United gw   United gw   SVOCs   Chromosthere   254   United gw   United gw   SVOCs   Chromosthere   255   United gw	Soil Boring	Sample Identification	Sample	Sample Depth	Analyte Type	Compound	Kesults	SILIO	Commercial/Industrial
SBI002-HMW10S-S040050428	n 1		Date						Land Use
SBI002:HMW10S:S140050428 81701 100-110 TOT Weekling SBI002:HMW12S:S050070428 81701 100-110 TOT Weekling SBI002:HMW12S:S05007042505 817301 0.0-2.0 Weekling SBI002:HMW12S:S050070428 81701 100-110 TOT Weekling SBI002:HMW12S:S050070428 81701 12:0-140 TOT Weekling SBI002:HMW12S:S050070428 81701 12:0-140 TOT Weekling SBI002:HMW13S:S050070428 81701 12:0-140 TOT Weekling SBI002:HMW13S:S140150-428 81701 12:0-140 TOT Weekling SBI002:HMW13S:S140150-428 81701 12:0-140 TOT SBI002:HMW13S:S140150-428 81701 12:0-140 TOT SBI002:HMW13S:S050070-428 81701 12:0-140 TOT SBI002:HMW13S:S0					T	Tetrachloroethene	16	ug/kg dw	640
SBI002-HMW10S.S100110A28					Ī	Benzo(a)anthracene	524	ug/kg dw	15,000
SBI002:HMW10S.S140160428						Benzo(a)pyrene	246	ug/kg dw	1,500
SBI00Z-HMW10S:S100110.428 8/7/01 1.00-11.0 SBI00Z-HMW112S:S000020-505 8/14/01 2.04-10 FOrmation SBI00Z-HMW12S:S000020-505 8/14/01 2.04-10 FORMATION SBI00Z-HMW12S:S000020-505 8/13/01 0.0-2.0 FORMATION SBI00Z-HMW12S:S000020-428 8/14/01 0.0-2.0 FORMATION SBI00Z-HMW12S:S00007428 8/14/01 0.0-2.0 FORMATION SBI00Z-HMW13S:S00007428 8/14/01 0.0-2.0 FORMATION SBI00Z-HMW13S:S00007428 8/14/01 0.0-2.0 FORMATION SBI0Z-HMW13S:S00007428 8/14/01 0.0-2.0 FORMATION SBI0Z-HMW13S:S00007488 8/14/01 0.0-2.0 F						Benzo(h)flugranthene	602	ug/kg dw	15,000
SBI002-HMW10S-S140050-428						Chrysene	720	ug/kg dw	25,000
SBI002:HMW105:S100110428		SBI002:HMW10S:S040050:428	. 8/7/01	4.0'-5.0'		Fluoranthene	615	ug/kg dw	880,000
TPH						Nanhthalene	489	ug/kg dw	170,000
SBI002:HMW10S:S100110:428	HMW-10S					Director	009	ua/ka dw	570,000
SBI002:HMW10S:S100110:428 817/01 10.0*-11.0 TPH DRO Non-Aqueous 87 (-84.					TOL	TEU DEO Non-Aguents	931	ma/ka dw	SN
SBI002:HMW10S:S100110:428 87701 10.0-11.0 SVOCs All Analytes CRL 174 SBI002:HMW-12D:S020040:505 8/14/01 2.0-4.0 Weight Dry Weight Dr					TLU Moisht	IFR - DAO NOISAGES	87	%	SN
SBI002:HMW-105.S100110:428 817/01 10.0-11.0 VOCS AII Analytes CRL Dry Weight					Ury weignit	Ory weight	5 8	2 1	1
SBI002:HMW10S:S100110:428  SBI002:HMW10S:S100110:428  SBI002:HMW-11D:S020040:505  SBI002:HMW-12D:S000020:505  SBI002:HMW-12D:S000020:505  SBI002:HMW-12D:S000020:505  SBI002:HMW-12D:S000020:505  SBI002:HMW-12D:S000020:505  SBI002:HMW-12D:S000020:505  SBI002:HMW-12D:S000020:505  SBI002:HMW-12D:S000020:505  SBI002:HMW-12D:S000020:505  SBI002:HMW-12D:S000020:428  SBI002:HMW-12D:S0000020:428  SBI002:HMW-12D:S000020:428  SBI002:HMW-13D:S0000020:428  SBI002:HMW-13D:S0000020:428  SBI002:HMW-12D:S0000020:428  SBI002:HMW-12D:S000020:428  SBI002:HMW-12D:S0000020:428  SBI002:HMW-12D:S000000000000000000000000000000000000					300	All Analytes	<u>a</u>	:	1
SBI002:HMW-13D:S020040:505  SBI002:HMW-14D:S020040:505  SBI002:HMW-14D:S020040:505  SBI002:HMW-14D:S020040:505  SBI002:HMW-14D:S020040:505  SB		SB1002-HMM/10S:S100110:428	8/7/01	10.0'-11.0'	SVOCS	All Analytes	1 2	who cho	SZ.
SBI002:HMW-11D:S020040:505 8/14/01 2.0'-4.0' Metals Earlum 11.4		SECOL DOLO COL DIVINA			TH	TPH - DRO Non-Aqueous	42.4	IIIG/KU UW	NN NN
SBI002:HMW-12D:S020040:505  SBI002:HMW-13S:S050070:428  SBI002:HMW-13S:S050070:428  SBI002:HMW-13S:S050070:428  SBI002:HMW-13S:S050070:428  SBI002:HMW-13S:S050070:428  SBI002:HMW-13S:S140150:428  SBI002:HMW-13S:S140150:428  SBI002:HMW-13S:S140150:428  SBI002:HMW-13S:S140150:428  SBI002:HMW-13S:S140150:428  SBI002:HMW-13S:S140150:428  SBI002:HMW-13S:S140150-428  SBI003:HMW-13S:S140150-428  SBI003:HMW-13S:S140150-430  SBI003:HMW-1450-4450  SBI003:HMW-1450-4450  SBI003:HMW-1450-4450  SBI003:HMW-1450-4450  SBI003:HMW-1450-4450  SBI0					Dry Weight	Dry Weight	84.6	0/	25
SBI002:HMW12D:S000020:505  SBI002:HMW12D:S000020:505  SBI002:HMW12S:S005020:428  SBI002:HMW13S:S140150:428  SBI003:HMM14150:428  SBI003:HMM14150:428  SBI003						Barium	99.5	mg/kg dw	006'9
SBI002:HMW-11D:S020040:505  SBI002:HMW-12D:S020040:505  SBI002:HMW-12D:S020040:505  SBI002:HMW-12D:S000020:505  SBI002:HMW-12D:S000020:505  SBI002:HMW-12D:S000020:505  SBI002:HMW-12D:S000020:428  SBI002:HMW-13D:S000020:428  SBI002:HMW-13D:S0000020:428  SBI002:HMW-13D:S0000020:428  SBI002:HMW-13D:S0000020:428  SBI002:HMW-13D:S00000020:428  SBI002:HMW-13D:S00000020:428  SBI002:HMW-13D:S000000020:428  SBI002:HMW-13D:S00000020:428  SBI002:HMW-13D:S00000020:428  SBI002:HMW-13D:S000000000000000000000000000000000000						Chromium	11.4	mg/kg dw	120**
SBI002:HMW-11D:S020040:505         8/14/01         2.0-4.0°         VOCS         All Analytes         0.159           SBI002:HMW-12D:S000020:505         8/13/01         0.0-2.0°         Metals         Chromium         8.4           SBI002:HMW-12D:S000020:505         8/13/01         0.0-2.0°         Metals         Chromium         8.4           SBI002:HMW-12D:S000020:505         8/13/01         12.0-14.0°         TOC         All Analytes         -Ret           SBI002:HMW-12D:S000020:428         8/13/01         12.0-14.0°         TOC         Bartium         8.4           SBI002:HMW-12D:S000020:428         8/13/01         12.0-14.0°         TOC         Metals         Chromium         6.4           SBI002:HMW-12D:S000020:428         8/13/01         12.0-14.0°         TOC         Metals         Chromium         6.4           SBI002:HMW-12S:S005020:428         8/14/01         0.5-2.0°         VOCS         TPH         TPH - GRO/MON Aqueous)         -RL           SBI002:HMW-13S:S060070:428         8/2/01         6.0-7.0°         TPH         TPH - FTIR Non-aqueous         -RL           SBI002:HMW-13S:S140150:428         8/2/01         6.0-7.0°         TPH         TPH - FTIR Non-aqueous         -RL           SOVOCs         Acetone         8.9				;	Metals	Lead	177	mg/kg dw	230
Netals   N	HMW-11D	SBI002:HMW-11D:S020040:505	8/14/01	2.0.4.0		Mercury	0.159	mg/kg dw	32
SBI002:HMW-12D:5000020:505  SBI002:HMW-12D:5000020:505  SBI002:HMW12D:120140:505  SBI002:HMW12D:120140:505  SBI002:HMW13S:S060070:428  SBI002:HMW13S:S060070:428  SBI002:HMW13S:S140150:428  SBI003:HMW13S:S140150:428  SBI003:HMW1418  SBI003:HMW1418  SBI003:HMW1418  SBI003:HMW1418  SBI003:HMW1						All Analytes	<rl< td=""><td>1</td><td></td></rl<>	1	
SBI002:HMW/12D:S000020:505  SBI002:HMW/12D:120140:505  SBI002:HMW/12D:120140:505  SBI002:HMW/12S:S005020:428  SBI002:HMW/13S:S060070:428  SBI002:HMW/13S:S060070:428  SBI002:HMW/13S:S140150:428  SBI003:HMW/13S:S140150:428  SBI003:HMW/13S:S140150:428  SBI003:HMW/13S:S140150:428  SBI003:HMW/13S:S140150:428  SBI003:HMW/13S:S140150:428  SBI0						Dry Weight	93.1	%	NS
Metals   Chromium   Signoz:HMW12D:3000020:505   8/13/01   0.0-2.0°   Metals   Chromium   Signoz:HMW12D:3000020:505   8/13/01   12.0-14.0°   TOC   TOC   TOC   Chromium   Signoz:HMW12D:30140:505   8/13/01   12.0-14.0°   TOC   TOC   TOC   Chromium   Signoz:HMW13D:3005020:428   8/14/01   0.5-2.0°   VOCs   Tetrachforcethene   19.6   Chromium   Signoz:HMW13S:5060070:428   8/12/01   6.0-7.0°   TPH   TPH - CRO (NON Aqueous)   Right   Chromium   Signoz:HMW13S:5140150:428   8/12/01   14.0-15.0°   TPH   TPH - DRO Non-Aqueous   Signoz:HMW13S:5140150:428   8/12/01   14.0-15.0°   TPH   TPH - DRO Non-Aqueous   CRL   C					Ш	Amonio	49	ma/ka dw	20
SBI002:HMW12D:120140:505 8/13/01 0.0'-2.0' Metals Chromium 8.4						Alseine	, a	ma/ka dw	5,900
SBI002:HMW-12D:S000020:505  SBI002:HMW13S:S005020:428  SBI002:HMW13S:S140150:428  SBI002:HMW13S:S140150:448  SBI002:HMW13S:S140150:448  SBI003:HMW13S:S140150:448  SBI003:HMW13S:MMM14MM14MM14MM14MM14MM14MM14MM14MM14MM							3 6	mo/ka dw	120**
SBI002:HMW-12D:S000020:505   8/13/01   0.0*-2.0   Read   Mercury   Mercury   0.047					Metals	Chromium	÷ 6	an Bulbur	230
VOCs   Mercury   VOCs   ToC   ToC   ToC   ToC   ToC   ToC		SBI002;HMW-12D:S000020:505	8/13/01	0.0'-2.0'		Lead	8 3	wn faylun	32
VOCS   All Analytes   VOCS   All Analytes   VOCS   Strain   Dry Weight   Dry Weig	HMW-1ZD					Mercury	j	an Ruffill	
SBI002:HMW12D:120140:505   8/13/01   12.0-14.0   TOC					NOCs	All Analytes	충	3	
SBI002:HMW12D:120140:505         8/13/01         12.0-14.0°         TOC					Dry Weight	Dry Weight	91.6	%	SS
SBI002:HMW12S:S005020:428		2010001 18 WAY OD: 47004 40:E0E	8/13/01	12 0'-14 0'	100	Toc	0.047	%	NS
SBI002:HMW13S:S005020:428		SBIUUZ:HMW1ZD:1ZU14U:5U5	00010	2:1-2:31		Barium	176	mg/kg dw	5,900
Netals   Communication   Section						Chromina	6.4	mg/kg dw	120**
SBI002:HMW13S:S060070:428 8/14/01 0.5'-2.0' VOCs Tetrachloroethene 19.6 TPH GRO (NON Aqueous) -RL SBI002:HMW13S:S060070:428 8/2/01 6.0'-7.0' TPH TPH -GRO (NON Aqueous) -RL SBI002:HMW13S:S060070:428 8/2/01 6.0'-7.0' TPH TPH -DRO Non-Aqueous -RL SBI002:HMW13S:S140150:428 8/2/01 14.0'-15.0' TPH TPH -DRO Non-Aqueous -RL TPH -TIR Non-aq -RL SBI002:HMW13S:S140150:428 8/2/01 14.0'-15.0' TPH TPH -DRO Non-Aqueous -RL SBI002					Metals	- Pad	241	mg/kg dw	230
SBI002:HMW12S:S0U50Z0'4Z6			10,110	0.5.20		Mozeriov	0.089	ma/kg dw	32
TPH   TPH - GRO (NON Aqueous)   CRL	HMW-12S	SBIOUZ:HMW1ZS:SUUSUZU:4Z0	0	2.7	20/2	Tetrachlomethene	19.6	ua/kg dw	640
SBI002:HMW13S:S060070:428					Har	TPH - GRO (NON Agueous)	욯	SN	SN
VOCS   Toluene   39   SBI002:HMW13S:S060070:428   8/2/01   6.0-7.0'   TPH - TIR Non-aq   8.5   SBI002:HMW13S:S140150:428   8/2/01   14.0'-15.0'   TPH - TRIR Non-aq   140					Dry Weight	Dry Weight	88.8	%	NS
SBI002:HMW13S:S060070:428					, VOX	Toltiene	39	ug/kg dw	240,000
SBI002:HMW13S:S060070:428         8/2/01         6.0'-7.0'         TPH         TPH - DRO Non-Aqueous <rl< th="">           Dry Weight         Dry Weight         Dry Weight         96.9           VOCs         Acetone         140           VOCs         Acetone         8.9           SVOCs         All Analytes         <rl< td="">           SVOCs         All Analytes         <rl< td="">           TPH         TPH - DRO Non-Aqueous         <rl< td="">           TPH         TPH - DRO Non-Aqueous         <rl< td="">           ARL         ARL           ARL         ARL</rl<></rl<></rl<></rl<></rl<>					SVOCS	All Analytes	≺RL	1	\$
SBI002:HMW13S:S140150:428         B/2/01         14.0-15.0°         TPH         FTPH -FTIR Non-aq <rl< th="">           Dry Weight         Dry Weight         96.9         96.9         96.9         96.9           VOCs         Acetone         VOCs         140         8.9         8.9           SVOCs         All Analytes         <rl< td="">         R           TPH         TPH - DRO Non-Aqueous         <rl< td="">           All Analytes         AR         R           All Analytes         AR         R           All Analytes         AR         AR</rl<></rl<></rl<>		007-0200903-367744411-0000100	8/2/01	60'-70'		TPH - DRO Non-Aqueous	^RL	SN	SN
Dry Weight   Dry Weight   96.9		SBIDDZ:HMW13S:SUBDD/U:420	0770	5.	HALL HALL	TPH -FTIR Non-ad	유	SN	SN
SBI002:HMW13S:S140150:428 8/2/01 14.0*-15.0* TPH TPH - DRO Non-Aqueous R.L. TPH - DRO Non-Aqueous R.L. TPH - TPH - TRIN Non-aq R.R. R.L. TPH - TRIN Non-aq R.R. R.L. R.C. Maricht Non-aq R.R. R.R. R.C. Maricht Non-aq R.R. R.R. R.C. Maricht Non-aq R.R. R.R. R.R. R.R. R.R. R.R. R.R. R.					Day Weight	Dry Weight	96.9	%	SN
SBI002:HMW13S:S140150:428 8/2/01 14.0*-15.0 TPH - DRO Non-Aqueous - RL TPH - DRO Non-Aqueous - RL TPH - TRIN Non-aq - RL RI					TIRE A	Acetone	140	ug/kg dw	3,100
8/2/01 14.0-15.0 SVOCs All Analytes <rl -="" <rl="" dro="" non-aq<="" non-aqueous="" td="" tph=""><td>HMW-13S</td><td></td><td></td><td></td><td>VOCs</td><td>Toluene</td><td>8.9</td><td>ug/kg dw</td><td>240,000</td></rl>	HMW-13S				VOCs	Toluene	8.9	ug/kg dw	240,000
8/2/01 14.0-15.0 TPH - DRO Non-Aqueous <rl -="" 81.6<="" <rl="" ftir="" non-aq="" td="" tph=""><td></td><td></td><td></td><td></td><td>SVOCs</td><td>All Analytes</td><td>유</td><td>1</td><td>1</td></rl>					SVOCs	All Analytes	유	1	1
TPH -FTIR Non-aq <rl< td=""><td></td><td>SBI002:HMW13S:S140150:428</td><td>8/2/01</td><td>14.0'-15.0'</td><td>1</td><td>TPH - DRO Non-Aqueous</td><td>-RL</td><td>SN</td><td>SN</td></rl<>		SBI002:HMW13S:S140150:428	8/2/01	14.0'-15.0'	1	TPH - DRO Non-Aqueous	-RL	SN	SN
De: 10/ciaht		_		_	<u> </u>	TPH -FTIR Non-aq	^RL	SN	SN
DIS WEIGHT					Dry Weight	Dry Weight	81.6	%	SS
					ישוני ספונים				

TABLE 2 (Cont'd) SUMMARY OF DETECTED ANALYTES IN SOILS AREA A

				נ נ נ				
								RISC Default Closure
Soil Boring	Sample Identification	Sample Date	Sample Depth	Sample Depth Analyte Type	Compound	Results	Units	Commercial/Industrial Land Use
					Arsenic	5,210	ug/kg dw	20,000
					Barium	156,000	ug/kg aw	ກຸກກາກກາຮີດ
				Metals	Chromium	5,020	ug/kg dw	-120,000
		777	č		Lead	230,000	ng/kg dw	230,000
HMW-13D	SBI002:HMW13D:S005020:428	8/14/01	0.2-6.0		Mercury	0.121	mg/kg dw	32
				20,7	Tetrachloroethene	65.6	ug/kg dw	640
					Xylenes, Total	7.1	ug/kg dw	410,000
				Dry Weight	Dry Weight	89.3	%	SN
				Г	All Analytes	<rl< td=""><td>1</td><td>1</td></rl<>	1	1
				Γ	Benzo(a)anthracene	1,220	ug/kg dw	15,000
					Benzo(a)pyrene	1,390	ug/kg dw	1,500
					Benzo(b)fluoranthene	1,700	ug/kg dw	15,000
					Benzo(k)fluoranthene	626	ug/kg dw	39,000
				SVOCs	Chrysene	1,160	ug/kg dw	25,000
	CB1001:HMM/148:S010015:412	8/15/01	1.0'-1.5'		Fluoranthene	1,790	ug/kg dw	880,000
		i			Indeno(1.2,3-cd)pyrene	484	ug/kg dw	3,100
					Phenanthrene	209	ug/kg dw	126,049,825***
					Pyrene	1,550	ug/kg dw	570,000
				PCBs	All Analytes	유	1	
					TPH - FTIR Non-ad	182	mg/kg dw	NS
				<u> </u>	Dry Weight	93.3	%	NS
				Т	All Analytes	쓔	ı	:
					Anthracene	396	ua/ka dw	51,000
					Benzo(a)anthracene	1,100	ug/kg dw	15,000
					Benzo(a)pyrene	1,020	ug/kg dw	1,500
					Benzo(b)fluoranthene	1,910	ug/kg dw	15,000
HMW-14S				SVOCs	Benzo(k)fluoranthene	533	ug/kg dw	39,000
	SBI001:HMW-14S:S040050:412	8/15/01	4.0'-5.0'		Chrysene	1,060	ng/kg dw	25,000
					Fluoranthene	2,800	ug/kg dw	880,000
					Phenanthrene	1,570	ug/kg dw	126,049,825***
					Pyrene	1,730	ug/kg dw	570,000
				PCBs	All Analytes	유	ı	1
				TPH	TPH - FTIR Non-aq	1,660	mg/kg dw	SN
				Dry Weight	Dry Weight	90.5	%	NS
				VOCs	All Analytes	<rl< td=""><td></td><td>1</td></rl<>		1
				SVOCs	All Analytes	κR	1	1
	SBI001-HMW-14S-S190210-412	8/15/01	19.0'-21.0'	PCBs	All Analytes	-R	1	:
				TPH	TPH - FTIR Non-aq	<rl< td=""><td>SN</td><td>NS</td></rl<>	SN	NS
				Dry Weight	Dry Weight	92'6	%	NS
				VOCs	All Analytes	<rl< td=""><td>1</td><td>1</td></rl<>	1	1
				SVOCs	All Analytes	≺RL	1	1
	SBI001-HMW-14S:S210230:412	8/15/01	21.0'-23.0'	PCBs	All Analytes	R.	1	:
				댎	TPH - FTIR Non-aq	상	SN	NS
				Dry Weight	Dry Weight	99.96	%	NS

TABLE CONTINUES

### INITIAL PHASE II ENVIRONMENTAL SITE ASSESSMENT CITY OF SOUTH BEND, INDIANA TABLE 2 (Cont'd) SUMMARY OF DETECTED ANALYTES IN SOILS AREA A

								RISC Detault Closure
		Sample	Sample Deoth	Sample Denth   Analyte Type	Compound	Results	Units	Level -
Soil Boring	Sample Identification	Date	Odiniple College					Land Use
				VOCs	All Analytes	<rl< td=""><td>1</td><td>1</td></rl<>	1	1
					Benzo(a)anthracene	906	ug/kg dw	15,000
					Benzo(a)pyrene	988	ug/kg aw	1,300
					Benzo(b)fluoranthene	1,410	ug/kg aw	200'6
				SVOCs	Benzo(k)fluoranthene	420	ug/kg aw	25,000
UNMA 14D	SBI001-HMW-14SD-S010015-412	8/15/01	1.0'-1.5'		Chrysene	939	who cylon	880,000
21-30					Fluoranthene	040	wo gallen	126 049 825***
					Phenanthrene	406	ug/kg dw	570 000
					Pyrene	U+Z-1	an Sy/Sn	200,000
	٠			PCBs	All Analytes	¥ ;	1	1 52
				ТРН	TPH - FTIR Non-ag	1,500	mg/kg aw	SZ
				Dry Weight	Dry Weight	93.5	2	
				VOCs	All Analytes	¥;	1	7 555 400***
					Acenaphthylene	418	ug/kg dw	7,565,408
					Anthracene	2,660	ug/kg dw	000,12
					Benzo(a)anthracene	7,880	ug/kg dw	000'61
•					Benzo(a)pyrene	7,610	ng/kg dw	006,1
					Benzo(b)fluoranthene	10,800	ug/kg dw	15,000
					Benzo(k)fluoranthene	2,990	ug/kg dw	39,000
				SVOC.	Chrysene	7,670	ug/kg dw	25,000
	SBIO02-HMW/15S-S040050:428	8/23/01	4.0'-5.0'	5006	Dibenzo(a,h)anthracene	410	ug/kg dw	1,500
					Dibenzofuran	450	ng/kg dw	4,716,192***
LINAW 15C					Fluoranthene	13,500	ng/kg dw	880,000
SCI-MMH					Fluorene	636	ug/kg dw	1,100,000
					Indeno(1,2,3-cd)pyrene	1,180	ug/kg dw	3,100
					Phenanthrene	099'9	ng/kg dw	126,049,825***
					Pyrene	15,500	ug/kg dw	570,000
				TPH	TPH - FTIR Non-aq	534	mg/kg dw	SN
		_		Dry Weight	Dry Weight	91.7	%	NS
				NOCS	All Analytes	유	:	-
				SVOCS	All Analytes	유	1	-
	SBI002:HMW15S:S080090:428	8/23/01	8.0.9.0	TPH	TPH - FTIR Non-aq	\AR	SN	SN
				Dry Weight	Dry Weight	83.3	%	SN
				VOCs	Tetrachloroethene	157	ug/kg dw	640
					Benzo(a)anthracene	829	ug/kg dw	15,000
					Benzo(a)pyrene	721	ug/kg dw	1,500
					Benzo(b)fluoranthene	944	ug/kg dw	15,000
	1		6	SVOCs	Chrysene	790	ug/kg dw	25,000
	SBI002:MW16D:S010020:480	L0/22/8	1.0-2.0		Fluoranthene	1,450	ng/kg dw	880,000
					Phenanthrene	299	ug/kg dw	126,049,825
HMW-16D					Pyrene	1,290	ug/kg dw	000,078
				TPH	TPH - DRO Non-Aqueous	408	mg/kg dw	SN
				Dry Weight	Dry Weight	88	%	SN
				VOCS	All Analytes	상	1	1
				SVOCs	All Analytes	-RL	1	:   9
	SBI002:MW16D:S041055:480	8/22/01	4.1'-5.5	ТРН	TPH - DRO Non-Aqueous	<u>^</u>	SN	S S
					TPH - FTIR Non-aq	8 8	SS /s	SN SN
				Dry Weight	Dry Weight	93.1	0/_	Ov.
				TABLE CONTINUES	IIES			

#### INITIAL PHASE II ENVIRONMENTAL SITE ASSESSMENT SUMMARY OF DETECTED ANALYTES IN SOILS CITY OF SOUTH BEND, INDIANA TABLE 2 (Cont'd)

	S	IMARY OF DE	TECTED AN	SUMMARY OF DETECTED ANALYTES IN SOILS AREA A			
							RISC Default Closure
	Sample		1		Donulte	Itnite	Level -
Sample Identification	Date	Sample Depth Analyte 1ype	Analyte Iype	Compound	cuncou	}	Commercial/Industrial
							Land Use
				Barium	22.1	mg/kg dw	5,900
				Chromium	4.7	mg/kg dw	120
		ī	Metals	Lead	13.4	mg/kg dw	230
SBI002:MW17D:S005020:428	8/27/01	0.5-2.0		Mercury	0.038	mg/kg dw	32
			VOCs	1.1.1-Trichloroethane	10	ug/kg dw	300
			Dry Weight	Dry Weight	95.2	%	SN
			VOCs	Tetrachloroethene	31.8	ug/kg dw	640
				Anthracene	1,670	ug/kg dw	51,000
				Benzo(a)anthracene	5,510	ug/kg dw	15,000
				Benzo(a)pyrene	5,260	ug/kg dw	006,1
				Benzo(b)fluoranthene	7,920	ug/kg dw	15,000
				Benzo(k)fluoranthene	3,110	ug/kg dw	39,000
			SVOCs	Chrysene	5,280	ug/kg dw	25,000
CD1000:11MM/1488:S0000010:419	8/14/01	0.0'-1.0'		Fluoranthene	10,300	ug/kg dw	880,000
Spidoz.niwiw	5	!		Fluorene	477	ug/kg dw	1,100,000
				Indeno(1,2,3-cd)pyrene	820	ug/kg dw	3,100
				Phenanthrene	8,200	ug/kg dw	126,049,825***
				Pyrene	11,800	ug/kg dw	570,000
			1	TPH - DRO Non-Aqueous	528	mg/kg dw	SN
			HAH	TPH - FTIR Non-ag	395	mg/kg dw	SN
			Dry Weight	Dry Weight	89.6	%	SN
			NOCS	Tetrachloroethene	9.7	ug/kg dw	640
		:	SVOCs	All Analytes	유	1	
SBI002:HMW18S:S230250:412	8/14/01	23.0'-25.0'	HdT	TPH - DRO Non-Agueous	11.8	mg/kg dw	NS
			Dry Weight	Dry Weight	95.4	%	NS
				Barium	2.69	mg/kg dw	5,900
			;	Chromium	5.7	mg/kg dw	120**
			Metals	Lead	89.4	mg/kg dw	230
				Mercury	1.14	mg/kg dw	32
			VOCs	All Analytes	<rl< td=""><td>1</td><td>:</td></rl<>	1	:
				Benzo(a)anthracene	821	ug/kg dw	15,000
				Benzo(a)pyrene	779	ug/kg dw	1,500
SP10000198-S000020-428	8/8/01	0.0'-2.0'		Benzo(b)fluoranthene	1,300	ng/kg dw	15,000
			00,00	Benzo(k)fluoranthene	414	ng/kg dw	39,000
			syovs S	Chrysene	606	ug/kg dw	25,000
				Fluoranthene	1,480	ug/kg dw	880,000
				Phenanthrene	1,330	ug/kg dw	126,049,825
				Pyrene	1,790	ug/kg dw	000,076
			ТРН	TPH - FTIR Non-aq	유	SN	SN CA
			Dry Weight	Dry Weight	89.4	%	CN

Soil Boring

HMW-17D

TPH TPH FTIR Non-aq
Dry Weight Dry Weight
TABLE CONTINUES

HMW-19S

HMW-18S

#### INITIAL PHASE II ENVIRONMENTAL SITE ASSESSMENT CITY OF SOUTH BEND, INDIANA TABLE 2 (Cont'd) SUMMARY OF DETECTED ANALYTES IN SOILS AREA A

Soli Boring         Sample Learnification         Sample Learnification         Sample Learnification         Analyse Sample Identification         Analyse Sample Identification         Analyse Sample Identification         Respect Sample Identification         <									RISC Default Closure
SBIO02-HMW20S-S000020-428 81201 12.0-13.0* Media Chromium 888 mm/kg dw model SBIO02-HMW20S-S000020-428 81601 12.0-13.0* Weight Dry W	:	e citation fit and a land	Sample	Sample Denth	Analyte Type	Compound	Results	Units	Level -
SBI002-HWW19D-S1000056428	Soll Boring	Sample Inclinication	Date			•			Land Use
SBI002-HWW19D-S1000065-428					T	Barium	8.83	mg/kg dw	5,900
SBI00Z-HMW19D.S120130-428   812201   12.0-13.0"   12.0-				i		Chromium	2.8	mg/kg dw	120**
SBI00Z+HMW2DS:S0000Z0428		SBI002:HMW19D:S080095:428	8/22/01	8.0-9.5	Γ	All Analytes	옧		1
SBI00Z-HMW19D.S1201130.428		_			П	Dry Weight	90.5	%	NS
SBI002-HMW205.S000020/428					П	Arsenic	5.7	mg/kg dw	20
SBI002-HMW/3DS120130-428	HMM-19D					Barium	16.3	mg/kg dw	5,900
SBI002-HMW/205-S120130-428						Chromium	5.1	mg/kg dw	120*
SBI002-HMW208-S000020-428   Bi601   0.0°2 or   Type   Type - GRO (Non-Aqueous)   SBI002-HMW208-S000020-428   Bi601   0.0°2 or   Type   Type - GRO (Non-Aqueous)   SBI2   SBI002-HMW208-S000020-505   Bi601   0.0°2 or   Type   Type - GRO (Non-Aqueous)   SR24   SBI002-HMW208-S000020-505   Bi601   0.0°2 or   Type   Type - GRO (Non-Aqueous)   SR24		SBI002-HMW19D:S120130:428	8/22/01	12.0'-13.0'		Lead	80	mg/kg dw	230
VOCS   All Analytes   CRL						Mercury	0.012	mg/kg dw	32
SBI002:HMW20S:S00020428					VOCs	All Analytes	유	1	1
SBI002:HMW20S:S00020428 8/1301 0.0°2.0 SVOGS All Anables SRICE SBI002:HMW21D:S005020428 8/1301 0.0°2.0 Typ4 TiP4-GRO(Non-Aqueous) CRU — SVOGS All Anables CRU — SVOGS All Anab					Dry Weight	Dry Weight	91.5	%	NS
SBI002:HMW2DS:S000020:428 8/1301 0.02.0					VOCs	All Analytes	-RI	1	1
SBI002:HMW23DS:S000020:428 8/6/01 0.07-20° TPH TPH-GRO (Non-Aqueous) 4-RL No. SBI002:HMW23DS:S000020:428 8/6/01 0.05-20° TPH TPH-FITR Non-aq 64 mg/kg dw SBI002:HMW22DS:S000020:505 8/6/01 0.07-20° TPH TPH-FITR Non-aq 64 mg/kg dw SBI002:HMW23DS:S000020:505 8/6/01 16.07-80° SNOCS All Analytes 4-RL - SBI002:HMW23DS:S000020-428 8/6/01 16.07-80° SNOCS All Analytes 4-RL - SRI002:HMW23DS:S000020-428 8/6/01 16.07-10; SNOCS All Analytes 4-RL - SNOCS All Analytes 4-R				;	SVOCs	All Analytes	유	1	1
SBI002:HMW22D:S005020:428	HMW-20S	SBI002:HMW20S:S000020:428	8/6/01	0.0'2.0'	НДТ	TPH - GPO (Non-Agrients)	\$	ş	SN
SBI002:HMW21D:S005020:428 8/13/01 0.5°-2.0° SVOCS AIL Analytes CRI — CNY Weight Dry Weig					- M/ciabt	IPH - GRO (Noir-Addedus)	282	%	SZ
SBI002:HMW21D:S005020:428         8/13/01         0.5°-2.0°         None in the manages of					Dry weignt	DIY WEIGHT	100		
SBI002:HMW22D:S00620:428         8/13/01         0.5-2.0         TPH TIRR Non-aq         64L         mg/kg dw           SBI002:HMW22D:S000020:505         8/6/01         0.0-2.0°         Metals         Chromium         10         mg/kg dw           SBI002:HMW22D:S000020:505         8/6/01         0.0-2.0°         Metals         Chromium         10         mg/kg dw           SBI002:HMW22D:S000020:505         8/6/01         16.0-18.0°         Dry Weight         Dry Weight         0.243         mg/kg dw           SBI002:HMW22D:S000020:505         8/6/01         16.0-18.0°         TOC         All Analytes         -RL         -           SBI002:HMW22B:S000070:428         8/6/01         16.0-18.0°         TOC         All Analytes         -RL         -           SBI002:HMW23B:S100115:428         8/8/01         16.0-18.0°         TOVOS         All Analytes         -RL         -           SBI002:HMW23B:S100115:428         8/8/01         10.0-11.5         TPH         TPH-GRO (Non-Aqueous)         -RL         -           SBI002:HMW23B:S100115:428         8/8/01         10.0-11.5         TPH         TPH-GRO (Non-Aqueous)         -RL         -           SBI002:HMW23B:S100115:428         8/8/01         10.0-11.5         TPH         TPH-GRO (Non-Aqueous)					VOCs	All Analytes	₹	:	1
SBI002:HMW22D:S005020:428   SBI002:HMW22D:S005020:428   SBI002:HMW22D:S005020:428   SBI002:HMW22D:S000020:428   SBI002:HMW23D:S000020:428   SBI002:HMM24   SBI002:HMM24   SBI002:HM24			10/07/07	0	SVOCs	All Analytes	상	:	1
SBI002:HMW22D:S00020:505   8/6/01   0.0°-2.0°   Metals   Chromium   115 mg/kg dw   115 mg/kg dw   146 mg/kg d	HMW-21D	SBIOUZ:HMWZ1D:SU050Z0:4Z8	10/01/0	0.2-0.0	HdT	TPH - FTIR Non-aq	64	mg/kg dw	SN
SBI002:HMW23D::5000020:505   8/6/01   10.0-2.0°   Metals   Crimonium   115 mg/kg dw   110 mg/k					Dry Weight	Dry Weight	94.6	%	SN
SBI002:HMW22D:S000020:505         8/6/01         0.0-2.0*         Metals Lead Lead         Chromium (15) mg/kg dw (17/01)         105         mg/kg dw (17/01)           SBI002:HMW22D:S000020:428         8/6/01         16.0-18.0*         Dy/Weight (17) Hard/Nes         0.243         mg/kg dw (17/01)           SBI002:HMW23D:S000020:428         8/6/01         16.0-18.0*         VOCs (170 All Analytes)         -RL         -           SBI002:HMW23D:S000020:428         8/6/01         16.0-18.0*         VOCs (170 All Analytes)         -RL         -           SBI002:HMW23D:S000020:428         8/6/01         10.0-11.5*         SVOCs (25) All Analytes         -RL         -           SBI002:HMW23D:S000020:428         8/6/01         10.0-11.5*         SVOCs (25) All Analytes         -RL         -           SBI002:HMW23D:S000020:428         8/7/01         10.0-11.5*         SVOCs (25) All Analytes         -RL         -           SBI002:HMW23D:S000020:428         8/7/01         10.0-11.5*         SVOCs (25) All Analytes         -RL         -           SBI002:HMW23D:S000020:428         8/7/01         10.0-2.0*         NOCs (270 All Analytes)         -RL         -           SVOCS (270000020:428         8/7/01         0.0-2.0         NOCs (27000000000000000000000000000000000000						Arsenic	21.4	mg/kg dw	20
SBI002:HMW22D:S000020:505         8/6/01         0.0-2.0*         Metals Lead         Chromium Lead         10         mg/kg dw mg/kg						Barium	115	mg/kg dw	5,900
SBI002:HMW22D:S000020:505   816/01   0.0*2.0*   Lead mount					Metals	Chromium	10	ma/kg dw	120**
SBI002:HMW23S:S060070:428 8/8/01 16.0-18.0		SBI002:HMW22D:S000020:505	8/6/01	0.0'-2.0'		000	24	ma/ka dw	230
SBI002:HMW23D::5050070:428	HMW-22D					Merciny	0.243	ma/ka dw	32
SBI002:HMW22D:160180:505   8/6/01   16.0-18.0°   TOC					Day Majobt	Dr. Moirht	916	%	SN
SBI002:HMW23D:160180:505         8/6/01         16.0-18.0 TOCs         All Analytes         CRL            SBI002:HMW23S:S060070:428         8/8/01         6.0-7.0 TPH         TPH         TPH-GRO (Non-Aqueous)         CRL            SBI002:HMW23S:S100115:428         8/8/01         10.0-11.5 TPH         TPH GRO (Non-Aqueous)         CRL            SBI002:HMW23D:S000020:428         8/17/01         10.0-11.5 TPH         TPH GRO (Non-Aqueous)         CRL            SBI002:HMW23D:S000020:428         8/17/01         0.0-2.0 VOCs         All Analytes         -RL            SBI002:HMW23D:S000020:428         8/17/01         0.0-2.0 VOCs         All Analytes         -RL            SBI002:HMW23D:S000020:428         8/17/01         0.0-2.0 VOCs         All Analytes         -RL            SVOCS         All Analytes         -RL              SVOCS         All Analytes         -RL             SVOCS         All Analytes         -RL            SVOCS         All Analytes         -RL            SVOCS         All Analytes         -RL            SVOCS         All Analytes					ACC.	All Applifice		1	1
SBI002:HMW23S:S060070:428		SBI002:HMW22D:160180:505	8/6/01	16.0'-18.0'	3 5	All Arialytes	0.036	%	SZ.
SBI002:HMW23S:S060070:428   8/8/01   6.0-70°   SVOCs   All Analytes   CRL					202	20	3	2	
SBI002:HMW23S:S060070:428   8/8/01   6.0-7.0   TPH   TPH - GRO (Non-Aqueous)   CRL   NS					VOCs	All Analytes	¥ ;	ı	
SBI002:HMW23S:SU000703426   Oracle		000000000000000000000000000000000000000	0,0104	20.7	SVOCS	All Analytes	₩,	1	1 5
SBI002:HMW23S:S100115:428		SBIOUZ:HMWZ3S:SUBUO7U:420	0/0/0	5.7.00	TPT	TPH - GRO (Non-Aqueous)	AR.	NS	SS
SBI002:HMW23S:S100115:428         8/8/01         10.0-11.5'         VOCs All Analytes					Dry Weight	Dry Weight	82.4	%	SS
SBI002:HMW23S:S100115:428         8/8/01         10.0-11.5′         SVOCs / TPH         All Analytes <rl< td=""><td>HMW-23S</td><td></td><td></td><td></td><td>NOCs</td><td>All Analytes</td><td>^R.</td><td>1</td><td>-</td></rl<>	HMW-23S				NOCs	All Analytes	^R.	1	-
SBI002:HMW23S:S100119:428         Groun Incommended (No. 1) and the control of			20,00	10.0. 11.6	SVOCS	All Analytes	^RL	:	
Dry Weight   Dry Weight   93.3 %		SBI002:HMWZ3S:S100115:428	0/0/0	5.11-0.01	TPH	TPH - GRO (Non-Aqueous)	<rl< td=""><td>SN</td><td>SN</td></rl<>	SN	SN
Barium					Dry Weight	Dry Weight	93.3	%	NS
Metals   Chromium   7.4 mg/kg dw						Barium	44.5	mg/kg dw	5,900
SBI002:HMW23D:S000020:428         8/17/01         0.0*2.0°         VOCs NOGS         All Analytes <rl nogs<="" th="">         All Analytes         RR.L NOGS         All Analytes         RR.L NOGS         RR.L</rl>						Chromium	7.4	mg/kg dw	120**
SBI002:HMW23D:S0000020:428         8/17/01         0.0*2.0°         VOCs NOCs All Analytes         All Analytes <rl< td=""><td>_</td><td></td><td></td><td></td><td>Metais</td><td>Lead</td><td>23.3</td><td>mg/kg dw</td><td>230</td></rl<>	_				Metais	Lead	23.3	mg/kg dw	230
SBi002:HMW23D:S000020:428         8/17/01         0.0*2.U OCS         VOCs All Analytes         ARL						Mercury	0.019	mg/kg dw	32
Analytes	HMW-23D	SBI002:HMW23D:S000020:428	8/17/01	0.0'-2.0'	NOCs	All Analytes	유	1	1
H - DRO Non-Aqueous 95.8 mg/kg dw Weight 85.7 %					SVOCs	All Analytes	유	1	1
Weight 85.7 %					TPH	TPH - DRO Non-Aguseous	95.8	ma/kg dw	NS
					Dry Weight	Dry Weight	85.7	%	SN
					DIY WEIGHT	ini) weight			

TABLE 2 (Cont'd)
SUMMARY OF DETECTED ANALYTES IN SOILS
AREA A

								RISC Default Closure
								Level -
Soil Boring	Sample Identification	Sample Date	Sample Depth	Sample Depth Analyte Type	Compound	Results	Units	Commercial/Industrial
								במום ספפ
				,	Arsenic	9.5	mg/kg dw	02.
					Barium	833	mg/kg dw	5,900
				Metals	Chromium	56	mg/kg dw	120**
	CENTROL INVINCED CONFORMACION	8/21/01	0 5'-2 0'		Lead	5.970	mg/kg dw	230
	SBIOUZ: FIMWZ4D: SOUSUZU: 428	200	2.00		Mercury	0.558	mg/kg dw	32
				NOCs	All Analytes	유	1	1
200				Ę	Dry Weight	85.2	%	SN
HMW-Z4D				Т	Domina	1 260	ma/ka dw	5,900
					Banum	25.	mo/kn dw	120*
				Metals	Cardinam	12 600	wh callen	230
	SBI002-HMW24DD:S005020:428	8/21/01	0.5'-2.0'		Lead	13,600	mg/kg dw	32
					Mercury	0.821	MD GA/BIII	10
				VOCs	All Analytes	<rl< td=""><td>1</td><td></td></rl<>	1	
				눌	Dry Weight	85	%	NS
				Т	Barium	134	ma/ka dw	5,900
					Chromitin	2 6	ma/ka dw	120**
				Metals		7.4	wh cylom	230
					Lead	4.74	wp Byllin	32
					Mercury	0.208	mg/kg uw	30
	SBI002:HMW25S:S010025:412	8/10/01	1.0'-2.5'	VOCs	All Analytes	\A.	1	1
		:		SVOCs	All Analytes	≺RL	1	1
				PCBs	All Analytes	-RI	1	-
				TPH	TPH - FTIR Non-an	유	SN	NS
HMW-25S				Do. Woinht	Dry Weight	85.7	%	NS
				NOCe	All Applytes	₩.	1	1
				800	All Applica	Įą,		I
			3	1	All Analytes	4 5		
	SBI002:HMW25S:020040:505	10/01/8	2.0.4.0	PCBS	All Analytes	7 1	2	92
					TPH - FTIR Non-aq	^RL	2	QN S
					TOC	0.18	%	SZ
		10,077	2 20 20	Metals	Barium	5.9	mg/kg dw	5,900
	SBI002:HMW25S:SZ10Z30:41Z	10/0L/8	0.62-0.12	Dry Weight	Dry Weight	91	%	SN
				li I	Barium	37	mg/kg dw	5,900
				:	Chromium	9.2	mg/kg dw	120**
				Metals	Lead	21.9	mg/kg dw	230
			i		Mercury	0.021	mg/kg dw	32
HMW-26S	SBI002:HMW26S:S015025:412	8/9/01	1.5'-2.5'	VOCs	All Analytes	유	1	1
				SVOCs	All Analytes	-R	:	1
				HE I	TPH - GRO (Non-Aqueous)	꿈	SN	SN
				ŧ	Dr. Weight	91.6	%	SN
				Tien to				
				TABLE CONTINUES	JES			

TABLE 2 (Cont'd) SUMMARY OF DETECTED ANALYTES IN SOILS AREA A

								RISC Detault Closure
		Samula					11.44	Fevel -
Soil Boring	Sample Identification	Campie	Sample Depth	Sample Depth   Analyte Type	Compound	Kesnits	SE D	Commercial/Industrial
•		Cate						Land Use
					Arsenic	11	mg/kg dw	20
					Barium	77.3	mg/kg dw	5,900
				Metals	Chromium	15.5	mg/kg dw	120**
					Lead	132	mg/kg dw	230
					Mercury	0.441	mg/kg dw	32
				VOCs	Tetrachloroethene	14.7	ug/kg dw	640
					Anthracene	930	ug/kg dw	51,000
					Benzo(a)anthracene	4,990	ug/kg dw	15,000
					Benzo(a)pyrene	5,970	ug/kg dw	1,500
0	0000001 WANDZO:000001E:412	10/13/01	0.0'-1 5'		Bonzo(h)filioranthene	9 290	ua/ka dw	15,000
HMW-27S	SBIUUZ:HIMWZ/ S.SUUUUS	5	2		Benzo(k/Alloranthene	3 780	ua/ka dw	39,000
				SVOCs	Christine	6.550	ua/ka dw	25,000
				) ) )	Oil yserie Dibenzo(a h)anthracene	368	ug/kg dw	1,500
					Discretione Electric	11,000	ua/ka dw	880,000
					Indepo(1.2.3-cd)byrene	1 170	ug/kg dw	3,100
					indeno(1,2,3-cu)pyrene	0/1,1	ug/kg cha	126 049 825***
					Phenanthrene	9,000	AND BURD	570.000
				i	Pyrene	2,000	and College	U.Z
				Ī	TPH - FIIK Non-ad	011	MD GA/BIII	
				Dry Weight	Dry Weight	89.1	%	SO Z
COC WANT	SRIO02-HMW29D-040060:505	9/11/01	4.0'-6.0'	100	TOC	0.043	%	SN
CCC WANT	CD1003-114444320-200030-505	9/6/01	20.0'-22.0'	100	Toc	0.053	%	NS
HMVV-32D	SDIOUZ. TIMANSED. EUGESCOSOS	5	2002		Barium	177	ma/ka dw	5,900
					Chromitin	26	ma/ka dw	120**
				Metals		2.720	ma/kg dw	230
	SBI002:HMW33D:S000020:428	8/9/01	0.0'-2.0'		Moroine	30.6	ma/ka dw	32
HMW-33D				a)O/A	Nanhthalana	63.8	ua/ka dw	170,000
				Dry Weight	Dry Weight	90.6	%	SN
	CD1002-UMMM/33D-500500-505	8/9/01	50.0'-52.0'	100	TOC	0.088	%	NS
	COLOGE: IMPACCO COLOGO			VOCs	All Analytes	^RL	1	-
					Benzo(a)anthracene	353	ug/kg dw	15,000
					Benzo(a)pyrene	340	ug/kg dw	1,500
				00,00	Benzo(b)fluoranthene	494	ug/kg dw	15,000
UNAWA 24D	SBI002:HMW/34S:S000010:412	8/14/01	0.0:-1.0	SOOS	Chrysene	408	ug/kg dw	25,000
0+5-WIML	20000000000000000000000000000000000000	; ; ;	!		Phenanthrene	458	ug/kg dw	126,049,825***
					Pyrene	704	ug/kg dw	570,000
				ТРН	TPH - DRO Non-Aqueous	30.4	mg/kg dw	NS
				Dry Weight	Dry Weight	94.1	%	NS
				TABLE CONTINUES	JES			
			•					

SUMMARY OF DETECTED ANALYTES IN SOILS
AREA A

								RISC Default Closure
						:	11.57	Level -
Paring Iros	Sample Identification	Sample	Sample Depth Analyte Type	Analyte Type	Compound	Results	SILLS	Commercial/Industrial
Source mos		Date						Land Use
						000 25	who cylou	59.000.000
					Banum	20,000	un/ka dw	120.000**
				Metals	Chromium	0,720	in Sylen	230,000
					Lead	008'67	uging dw	32
	SB1002:HMW35S:S000020:428	8/16/01	0.0'-2.0'		Mercury	0.411	WD BARRING	
					All Analytes	<u>^</u>	1	
				SVOCS	All Analytes	쭘	:	-
				1_	Dry Weight	93.3	%	NS
				Т	Arsenic	6,080	ug/kg dw	20,000
HMW-355					Barium	59,700	ug/kg dw	59,000,000
				Metals	Chromitum	7.720	ug/kg dw	120**
					, and	97.400	ug/kg dw	230,000
*	SBI002:HMW35SD:S02020:428	8/16/01	0.0'-2.0'		Merciny	0,394	mg/kg dw	32
				NOC'S	All Analytes	夈	1	
				20/15	All Analytes	4	1	-
				Dry Weight	Dry Weight	93.9	%	NS
				11601		338	IIO/ka dw	3,100
					Acetone 2 Butanone (MEK)	7 28	ua/ka dw	11,000
					Z-Dutane	21.7	ug/kg dw	240,000
				VOCs	1 2 4 Trimothylbonzone	=	ua/ka dw	215,329***
					1,2,4-111111eulyluenizenie	- 6	who callon	86.840***
	000000000000000000000000000000000000000	10/2/01	10.0'-11.5'	•	1,3,5-Trimethylbenzene	7.6	wb ga/gn	410.000
	SBI00Z:SB1.S100113.420	5	2		Xylenes, Total	5,	ng/kg aw	
				SVOCs	All Analytes	유	-	
Č				PCBs	Aroclor 1242	5.31	mg/kg dw	5.3
-00				TPH	TPH - FTIR Non-aq	8,100	mg/kg dw	SN
				Dry Weinht	Dry Weight	85.1	%	SN
				NOC'S	Toluene	21.6	ug/kg dw	240,000
				20/8	All Analytes	용		1
		7000	16.0' 17.0'	3	All Analytics	₹		1
	SBI002:SB1:S160170:428	0/5/0	0.0.0	200	TOU CTID Non-20	8 100	ma/ka dw	SN
				Day Woidht	Dry Weight	87.4	%	SN
				DIY WEIGHT	DI) WEIGHT	27.6	who collect	240000
				NOCS	Toluene	0.72	wo Bullion	1 500
				9	Benzo(a)pyrene	200	**D 64/61	15,000
0	SB1002-SB3-S000020-428	8/2/01	0.0'-2.0'	soos	Benzo(b)iiuoranurene	388	in/kn dw	570.000
200					Pyrene	88	molles du	SZ.
				<u>=</u>	TPH - FIIK Non-ad	740	An Bulli	S N
				Dry Weight	Dry Weight	86.4	0/	000
					Barium	48.9	mg/kg dw	006.6
				100	Chromium	=	mg/kg dw	021
				Metals	Lead	18.3	mg/kg dw	230
		_			Mergiry	0.014	mg/kg dw	32
SB-4	SBI002:SB4:S010020:428	8/3/01	1.0'-2.0'		Tolliane	67.2	ug/kg dw	240,000
				VOCs	Yulenes Total	6.4	ua/kg dw	410,000
				90/10	All Analytes	쁗	1	
		_		dried .	On Moinht	87.4	%	SN
				Lity weight	Diy weigin			
				TABLE CONTINUES	UES			

### SUMMARY OF DETECTED ANALYTES IN SOILS

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Soil Boring	Sample Identification	Sample Date	Sample Depth Analyte Type	Analyte Type	Compound	Results	Units	RISC Default Closure Level - Commercial/Industrial Land Use
					Arsenic Barium	<b>57.1</b> 124	mg/kg dw mg/kg dw	20 5,900
				Metals	Chromium	16.2	mg/kg dw	120** 230
			i		Lead	0.092	mg/kg dw	32
SB-5	SBI002:SB-5:S000015:412	8/8/01	0.0'-1.5	VOCs	All Analytes	<rl< td=""><td>1</td><td></td></rl<>	1	
				SVOCS	All Analytes	<rl< td=""><td>-</td><td>1</td></rl<>	-	1
					TPH - GRO (Non-Aqueous)	-KL	SN	SN
				<u> </u>	FTIR Non-aq	<rl< td=""><td>SN</td><td>SN</td></rl<>	SN	SN
				Dry Weight	Dry Weight	98.6	%	NS
				11	Arsenic	3.5	mg/kg dw	20
					Barium	24	mg/kg dw	5,900
				Metals	Chromium	5.2	mg/kg dw	120**
					Lead	32.3	mg/kg dw	230
	SBI002:SB6:S100110:428	8/6/01	10.0'-11.0'		Mercury	0.096	mg/kg dw	32
				VOCs	All Analytes	-RL	1	1
				SVOCs	All Analytes	<rl< td=""><td>1</td><td>-</td></rl<>	1	-
				TPH	TPH - DRO Non-Aqueous	25.8	mg/kg dw	NS
S.B.6				Dry Weight	Dry Weight	93.9	%	NS
3				l	Barium	15	mg/kg dw	2,900
				Matala	Chromium	4.7	mg/kg dw	120**
				Metals	Lead	4	mg/kg dw	230
		70.00	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		Mercury	0.043	mg/kg dw	32
	SBI002:SB6:S140150:428	1.0/9/8	14.0-15.0	VOCs	All Analytes	<rl< td=""><td>1</td><td>:</td></rl<>	1	:
				SVOCs	All Analytes	-RL	1	:
				TPH	TPH - DRO Non-Aqueous	15.7	mg/kg dw	NS
				Dry Weight	Dry Weight	90.8	%	SN

#### Notes:

- Total concentrations of organics do not exceed 2,000 mg/kg (2,000,000 ug/kg) for any subsurface sample, and 6,000 mg/kg for any surface samples.
   concentrations of metals do not exceed 10,000 mg/kg for any sample.
- +\* Assumes hexavalent chromium.
   +\*\* Closure Levels calculated using equations provided in Appendix F of the VRP Resource Guide (July 1996).
   +\*\* Closure Levels calculated using equations provided in Appendix F of the VRP Resource Guide (July 1996).
   # Samples SB1002:SB26A:S020040:505 and SB1002:SB27A:S020040:505 are re-samples from GB-26 and GB-27, respectively.
   Borings were re-sampled because holding times for initial samples were exceeded for SVOC analyses.
   Results are less than the analytical method reporting limit.
   NS No Cleanup Goal/Closure Level Available.
   Analyte concentration exceeds default RISC commercial/industrial closure level.

# TABLE 3 SUMMARY OF DETECTED ANALYTES IN GROUNDWATER AREA A

Monitoring Well Designation	Sample Identification	Sample Date	Analyte Type	Compound	Results (ug/L)	RISC Default Closure Level - Industrial Land Use (ug/L)	RISC Default Closure Level - Residential Land Use (ug/L)
			Metals*	Arsenic Barium Cadmium Chromium	38.6 205 1.2 8.7	50 7,200 51 310**	50 2,000 5 100**
HMW-1S	SBI002:HMW1S:G091801:523	9/18/01	VOCs SVOCs TPH	Lead Trichloroethene All Analytes TPH - Method 418.1 (Aq.) TPH - GRO (Aq.)	2.3 -RI -RI -RI	260 260  NS NS	SN NS NS
HMW-11	SBI002:HMW11:G091801:523	9/18/01	Metals* VOCs SVOCs	Arsenic Barium Chromium Lead cis-1,2-Dichloroethene Trichloroethene	23 94.6 8.7 39.4 4.3 16.8	50 7,200 310** 42 1,000 260	2,000 100** 15 70 5
			TPH	TPH - GRO (Aq.)	- R	SN	SN
HMW-1D	SBI002:HMW1D:G091801:523	9/18/01	Metals* VOCs SVOCs TPH	Barlum Lead cis-1,2-Dichloroethene All Analytes TPH - Method 418.1 (Aq.) TPH - GRO (Aq.)	36.8 3.4 3.4 8.R.L A.R.R.L A.R.L A.R.L A.R.L A.R.L A.R.L A.R.L A.R.L A.R.L A.R.L A.R.L A.R.R A.R.R A.R.R A.R.R A.R.R A.R.R A.R.R A.R.R A.R.R A.R.R A.R.R.R A.R.R.R A.R.R.R A.R.R.R.R	7,200 42 1,000 1,000 NS NS	70 15 70 NS NS NS
MW-1S	SBI002:MW1S:G091701:523	9/17/01	Metals*	Barium Lead cis-1,2-Dichloroethene <b>Tetrachloroethene</b> Trichloroethene	53.8 14.6 2.7 <b>403</b> 4.4	7,200 42 1,000 55 260	70 15 5 5 5 5 0000
MW-1D	SBI002:MW1D:G091701:523	9/17/01	Metals*	Barium Lead All Analytes	25 1.1 양	42	15

TABLE CONTINUES

TABLE 3 (Cont'd)
SUMMARY OF DETECTED ANALYTES IN GROUNDWATER
AREA A

						bic Dofault	
Monitoring Well Designation	Sample Identification	Sample Date	Analyte Type	Compound	Results (ug/L)	Closure Level - Industrial Land Use (ug/L)	RISC Default Closure Level - Residential Land Use (ug/L)
				Arsenic	146	20	20
				Barium	448	7,200	2,000
				Cadmium	4.1	51	တ
			Metals*	Chromium	163	310**	100**
					531	42	15***
HMW-2S	SBI002:HMW2S:G091801:523	9/18/01		Silver	0.7	510	180
			9	cis-1.2-Dichloroethene	1.3	1,000	02
			၁၀ ၁၀	Trichloroethene	8	260	5
				TPH - Method 418.1 (Ag.)	\^RL	NS	SN
			<u>=</u>	TPH - GRO (Ag.)	Å	NS	NS
				Arsenic	18.9	20	20
			:	Barium	81.4	7,200	2,000
			Metals*	Chromium	12.7	310**	100**
				Lead	31.3	42	15
HMW-3S	SBI002:HMW3S:G092001:523	9/20/01		cis-1.2-Dichloroethene	1.6	1,000	02
			VOCs	Tetrachloroethene	1.2	55	ວ
				Trichloroethene	13.8	260	5
			趏	TPH - GRO (Aq.)	<rl< td=""><td>NS</td><td>NS</td></rl<>	NS	NS
			*Actolox	Barium	29	7,200	2,000
			Metais	Lead	3.4	42	15***
HMW-4S	SBI002:HMW4S:G092001:523	9/20/01	VOCs	Trichloroethene	4	260	5
			SVOCs	All Analytes	-≪RL		
			HdT	TPH - GRO (Aq.)	<rl< td=""><td>NS</td><td>NS</td></rl<>	NS	NS
				cis-1,2-Dichloroethene	1.6	1,000	0/
	1		VOCs	Tetrachloroethene	<del>د</del> .	52	2
HMW-5S	SBI002:HMW5S:G092001:523	9/20/01		Trichloroethene	14.2	260	5
			표	TPH - Method 418.1 (Aq.)	<rl< td=""><td>SN</td><td>NS</td></rl<>	SN	NS

TABLE CONTINUES

						Alternation Design	
					Recults	Closure Level -	RISC Default Closure
Monitoring Well Designation	Sample Identification	Sample Date	Analyte Type	Compound	(ug/L)	Industrial Land Use (ug/L)	Level - Residential Land Use (ug/L)
				Arconic	54.2	50	50
				Boring	231	7,200	2,000
			Metals*	Chromium	47.4	310**	100**
	SP1002:HMM/6S:G092001-523	10/02/6		Lead	95	42	15
	SBIOUZ.FIIMWOG.GOSZOO 1.325		VOCs	Trichloroethene	4.1	260	5
			SVOCs.	All Analytes	\A.P.	1	:
			표	TPH - GRO (Ag.)	\A.P.	SN	NS
				Arsenic	44.2	20	20
No-with				Barium	192	7,200	2,000
		_	Metals*	Chromium	39.9	310**	100**
	SBI002:HMW6S:G092001D:523	9/20/01		ped	71.8	42	15
			VOCs	Trichloroethene	4.5	260	5
			800/8	All Analytes	유	1	-
			HEL	TPH - GRO (Ag.)	^R R	SN	NS
				Barium	39	7,200	2,000
			Metals*	Land	1.9	42	15
09/08/11	SBI002:HMM/6D:G092001-523	9/20/01	VOCs	Trichloroethene	6.7	260	5
O-Minici			SVOCs	All Analytes	≺RL	-	:
			표	трн - GRO (Аq.)	<rl< td=""><td>SN</td><td>SN</td></rl<>	SN	SN
			Metals*	Barium	33	7,200	2,000
:	00000000000000000000000000000000000000	0/17/01		Lead	5.1	74 1	2 6
HMW-78	SBI002:HMW/S:G091701:523	10//1/6	VOC8	Chloroform	£	470	<u> </u>
			3	Tetrachloroethene	4.1	22	0
				Arsenic	15.3	20	20
			•	Barium	102	7,200	2,000
HMM/-8S	SBI002-HMW8S:G091701:523	9/17/01	Metals	Chromium	10.1	310**	100**
				Lead	45.2	42	15
			\000 \000	Tetrachloroethene	40.7	55	5
			ľ	OLI MALLIA COLL TO COL		ĺ	

						: : :	
						KISC Detault	RISC Default Closure
Monitoring Well	Sample Identification	Sample	Analyte Tvne	Compound	Results (ug/L)	Glosure Level - Industrial Land	Level - Residential
Designation		3	2			Use (ug/L)	Lalla Ose (ug/L)
				Arsenic	10.5	20	20
			Metals*	Barium	98.2	7,200	2,000
IN/WW/-RI	SBI002-HMW8I:G091701:523	9/17/01		Lead	10.2	42	15
			00,	cis-1.2-Dichloroethene	1	1,000	70
			NOCs	1,1,1-Trichloroethane	3.2	3,600	200
				Barium	81.8	7,200	2,000
	SBI002-HMW8D-G091701-523	9/17/01	Metals*	Lead	4.8	42	15
ראייאון	201002: INVADO: 00010		VOCs	1.1.1-Trichloroethane	3.3	3,600	200
00-201		, 0, 1, 1	******	Barium	82.1	7,200	2,000
	SBI002:HMW8D:G091701D:523	9/17/01	Metals	Lead	3.4	42	15
				Barium	29.7	7,200	2,000
SK/WW	SBI002-MW8S:G091701:523	9/17/01	Metals	Lead	8.5	42	15
			VOCs	All Analytes	≺RL	•••	
				Barium	47.4	7,200	2,000
O8 //W	SBI002-MW8D-G091701-523	9/17/01	Metals*	Lead	5.7	42	15
			VOCs	All Analytes	-RL		
				Carbon fetrachloride	1.3	22	2
			SOC3	Tetrachloroethene	749	55	5
HMW-9S	SBI002:HMW9S:G091901:523	9/19/01	SVOCs	All Analytes	-RL	1	-
			TET.	TPH - GRO (Ag.)	AR!	SN	SN
			VOCs	Tetrachloroethene	349	55	5
10 /////	SBI002-HMM/91-G091901-523	9/19/01	SVOCS		유	1	
IS-MAINILI		· • •	듄		<rl< td=""><td>SN</td><td>NS</td></rl<>	SN	NS
				Barium	82.3	7,200	2,000
			Metals*	Cadmium	1.6	51	വ
HMW-9D	SBI002:HMW9D:G091901:523	9/19/01		Lead	14.2	42	15
			VOCs	Tetrachloroethene	2.5	55	5
				cis-1,2-Dichloroethene	4.2	1,000	20
			0	sec-Butylbenzene	4	SN	SN
HMM/-10S	SBI002-HMW10S:G091801:505	9/18/01	S) ) )	Tetrachloroethene	31.2	55	വ
				Trichloroethene	47.8	260	5
			표	TPH - DRO (Aq.)	2,200	NS	NS
				TABLE CONTINUES			

Monitoring Well Designation	Sample Identification	Sample Date	Analyte Type	Compound	Results (ug/L)	RISC Default Closure Level - Industrial Land Use (ug/L)	RISC Default Closure Level - Residential Land Use (ug/L)
			VOCs	cis-1,2-Dichloroethene 1,1,1-Trichloroethane Trichloroethene	1.1	1,000 3,600 260	70 200 5
HMW-11S	SBI002:MW11S:G091801:505	9/18/01	SVOCs	All Analytes TPH - Method 418.1 (AQ) TPH - DRO (Aq.)	육 육	 SN SN	SN SN
			Metals*	Barium Lead	32.5	7,200 42	2,000 15
	SBI002:HMW111:G091801:505	9/18/01	VOCs	sec-Butylbenzene cis-1,2-Dichloroethene trans-1,2-Dichloroethene	1.3 35.5 5.1	NS 1,000 200	NS 70 100
***				n-Propylbenzene Trichloroethene	1.2	NS 260	NS 5
HMW-111			Metals*	Barium Lead	33.5 2.2	7,200	2,000 15
	SBI002:HMW11I:G091801D:505	9/18/01	VOCs	sec-Butylbenzene cis-1,2-Dichloroethene frans-1,2-Dichloroethene	1.4 34.2 5.3	NS 1,000 200	NS 70 100
			_	n-Propylbenzene Trichloroethene	1.3	NS 260	NS 5
		<u> </u>	Metals*	Barium Lead	55.5 3.6	7,200	2,000
HMW-11D	SBI002:HMW11D:G091801:505	9/18/01	VOCs	Tetrachloroethene TPH - Method 418.1 (Aq.)	34.2 <rl< td=""><td>55 NS</td><td>5 NS</td></rl<>	55 NS	5 NS

						RISC Default	RISC Default Closure
Monitoring Well	Sample Identification	Sample	Analyte	Compound	Results (ug/L)	Closure Level - Industrial Land	Level - Residential
Designation		Cate	2			Use (ug/L)	Land Use (ug/L)
				cis-1,2-Dichloroethene	1.2	1,000	70
			Ċ	Tetrachloroethene	1.7	22	2
			SON	1.1.1-Trichloroethane	4.1	3,600	200
MW-11D	SBI002:MW11D:G091801:505	9/18/01		Trichloroethene	1.1	260	5
			SVOCs	All Analytes	-RI		
			TPH	TPH - DRO (Aq.)	<rl< td=""><td>SN</td><td>NS</td></rl<>	SN	NS
				Arsenic	46.7	20	20
			Metals*	Barium	154	7,200	2,000
				Lead	19.5	42	15***
				Chloroform	2.2	470	100
HMM-125	SBI002-HMW12S:G091901:523	9/19/01		cis-1,2-Dichloroethene	2.4	1,000	20
71 - 141			VOCs	trans-1,2-Dichloroethene	5	200	100
				Tetrachloroethene	52.1	22	သ
				Trichloroethene	29.6	260	5
			TPH	TPH - GRO (Aq.)	-RL	NS	NS
				Barium	62.6	7,200	2,000
			Metals	Lead	2.8	42	15
HMW-12D	SBI002:HMW12D:G091801:505	9/18/01	90,1	Tetrachloroethene	1.4	55	5
			ა ე ე	1,1,1-Trichloroethane	1.6	3,600	200
			9	cis-1.2-Dichloroethene	2.8	1,000	20
*			SOO.	Trichloroethene	19	260	5
HMW-13S	SBI002:HMW13S:G091801:523	9/18/01	SVOCs	All Analytes	^RL		
			Ē	TPH - Method 418.1 (Aq.)	^RL	SN	SN
			<u>ב</u>	TPH - DRO (Aq.)	^RL	NS	NS
				Barium	138	7,200	2,000
			Metals	Lead	7.7	42	15
		70,07,0		cis-1,2-Dichloroethene	8.9	1,000	02
HMW-13D	SBI002:HMW13D:G091901:523	10/61/6	2	trans-1,2-Dichloroethene	8.1	200	100
			3	Tetrachloroethene	290	55	co.
				Trichloroethene	386	260	5
				TABLE CONTINUES			

### SUMMARY OF DETECTED ANALYTES IN GROUNDWATER AREA A TABLE 3 (Cont'd)

						RISC Default	DISC Default Closure
Monitoring Well	Sample Identification	Sample Date	Analyte Type	Compound	Results (ug/L)	Closure Level - Industrial Land	Level - Residential Land Use (ug/L)
Designation						Use (ug/L)	
			*	Barium	57.8	7,200	2,000
MM/ 19C	SBIO02:MM/13S-G091901:523	9/19/01	Metals	peod	5.	42	15
CC I -AAIAI	SDIOOZ:WWW.SOC.OC	-l. ; ;	VOCs	Tetrachloroethene	638	22	5
			1	Doring	75.2	7.200	2,000
	00000000000000000000000000000000000000	0/10/01	Metals*	Dailuii	4	42	15
MW-13D	SBIUUZ:IVIW I SD. GUS I SO I : SZS	200	VOCs	Tetrachloroethene	143	55	5
			00.	Trichloroethene	2.5	260	2
			VOCs	Vinyl Chloride	4.1	2	2
	SBI002:HMW14S:G091901:523	9/19/01	SVOCs	All Analytes	-RL	1	:
		_	PCBs	All Analytes	-RL	•	:
HMW-14S			000	Trichloroethene	2.6	260	ാവ
			3	Vinyl Chloride	4	7	7
	SBI002:HMW14S:G091901D:523	1.0/61/6	PCBs	Ali Analytes	상	1	
			TPH	TPH - Method 418.1 (Aq.)	<rl< td=""><td>NS</td><td>NS</td></rl<>	NS	NS
			*41-4-14	Barium	44.3	7,200	2,000
MW-14	SBI002:MW14:G092001:523	9/20/01	Metals	Lead	1.8	42	15
•			VOCs	1,1,1-Trichloroethane	3.7	3,600	200
			VOCs	Trichloroethene	7.4	260	2
UMM// 150	SBI002-HMW/15S-G091901:523	9/19/01	SVOCs	All Analytes	^RL	1	:
OCI -MINIL			표	TPH - Method 418.1 (Ag.)	-RL	SN	NS
				cis-1.2-Dichloroethene	2.7	1,000	20
			<u>နာ</u>	Trichloroethene	6.5	260	5
HMW-15D	SBI002:HMW15D:G091901:523	10/61/6	SVOCs	All Analytes	<rl< td=""><td>ì</td><td>1</td></rl<>	ì	1
			HAL	TPH - Method 418.1 (Aq.)	^RL	NS	NS
			1	Barium	64.8	7,200	2,000
			Metals	Lead	1.7	42	12
				sec-Butylbenzene	4.1	SN	SN :
				cis-1,2-Dichloroethene	9.7	1,000	02
		9		trans-1,2-Dichloroethene	1.5	200	100
MW-15D	SBI002:MW15D:G091801:505	9/18/01	0	n-Hexane	48.8	SN	SN
			ရ ၁၀۸	n-Propvlbenzene	2.4	SN	SN
				Tetrachloroethene	270	22	ശ
				Trichloroethene	14.8	260	2
				1,3,5-Trimethylbenzene	1.4	NS	NS
			<u> </u>	A PL T CONTENTIFIC			

TABLE CONTINUES

### SUMMARY OF DETECTED ANALYTES IN GROUNDWATER AREA A TABLE 3 (Cont'd)

						RISC Default	RISC Default Closure
Monitoring Well		Sample	Analyte	Compound	Results	Closure Level -	Level - Residential
Designation	Sample Identification	Date	Type		(ng/L)	Industrial Land Use (ug/L)	Land Use (ug/L)
				1.1-Dichloroethane	1.2	10,000	066
			0	cis-1.2-Dichloroethene	2.8	1,000	70
			S) ()	1 1 1-Trichloroethane	1.2	3,600	200
HWW-16D	SB1002-HMW16D-G091801:505	9/18/01		Trichloroethene	2.3	260	5
			SVOCs	All Analytes	-KL	-	1
		1.	TPH	TPH - Method 418.1 (Aq.)	유	SN	တ္ဆ
			:	TPH - DRO (Aq.)	꺆	NS	SN N
				Barium	6.3	7,200	2,000
		77.00	Metals	Lead	3	42	15
HMW-17D	SBI002:HMW17D:G091701:523	10//1/6	۷٥٥،	cis-1,2-Dichloroethene	1.2	1,000	02
			3	1,1,1-Trichloroethane	1.9	3,600	200
				cis-1,2-Dichloroethene	က	1,000	20
			000	trans-1,2-Dichloroethene	1.9	200	100
			SOO N	Tetrachloroethene	36.4	55	ıcı
HMW-18S	SBI002:HMW18S:G091901:523	9/19/01		Trichloroethene	13.1	260	2
)			SVOCs	All Analytes	유	ı	1
		•	표	TPH - Method 418.1 (Ag.)	ÅĽ	SN	SN
			•	TPH - DRO (Ag.)	유	SN	NS
				Arsenic	2,140	20	20
				Barium	2,140	7,200	2,000
			***************************************	Cadmium	7	51	က
			Metals	Chromium	27.6	310**	100**
				Lead	255	42	15
	SBI002:19S:G091801:505	9/18/01		Mercury	0.4	31	2
			3	Tetrachloroethene	185	22	ည
			200	1,1,1-Trichloroethane	1.8	3,600	200
			SVOCs	All Analytes	-⟨RL	!	1
HMW-19S			TPH	TPH - Method 418.1 (Aq.)	^RL	NS	NS
				Arsenic	2,860	20	20
				Barium	3,100	7,200	2,000
				Cadmium	3.3	51	2
			Metals*	Chromium	40	310**	100**
	SBI002:19S:G091801D:505	9/18/01		Lead	329	42	15
				Mercury	9.0	34	2 5
					بة و	010	OC
			SVOCs	_	¥ ;	1 2	1 012
			TPH.	TPH - Method 418.1 (Aq.)	상	QN.	CNI

SUMMARY OF DETECTED ANALYTES IN GROUNDWATER TABLE 3 (Cont'd)

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					41100	RISC Default	RISC Default Closure
Monitoring Well Designation	Sample Identification	Sample Date	Analyte Type	Compound	(ng/L)	Industrial Land Use (ug/L)	Level - Residential Land Use (ug/L)
		70,07,0	:Metals*	Barium	56.1	7,200	2,000
HMW-19D	SBI002:HMW19D:G091801:505	10/81/6	VOCs	Lead Tetrachloroethene	46.9	55	5
			VOCs	All Analytes	-RL	-	•
HMW-20S	SBI002:HMW20S:G092001:503	9/20/01	TPH	TPH - GRO (Aq.)	<rl< td=""><td>NS</td><td>NS</td></rl<>	NS	NS
			Motole*	Barium	76.3	7,200	2,000
CLC 1000	SBI002:HMW21D:G091901:523	9/17/01	a a a a a a a a a a a a a a a a a a a	Lead	2 3	3 600	200
CI Z-MINIT			SOC	1,1,1-I richloroemane	‡   &	SNS	SN
			1	Doming	76.3	7.200	2,000
	001000:1 IN MARCOD: C001704:523	9/17/01	Metals*	Dallulli		42	15
HMW-ZZD	SBIUUZ:FIIMWZZED.GUB 1701.3Z3	5	VOCs	All Analytes	-RL		
				Aronio	7.7	20	20
			Metalc*	Alseliie	61.8	7,200	2,000
HMW-22I	SBI002:HMW22I:G091701:523	9/17/01	Metals	ווייויייי	5.8	45	15
			\SON	1 1 1-Trichloroethane	1.2	3,600	200
				Ethylbenzene	4.8	10,000	200
				Isopropylbenzene (Cumene)	78.3	SN	SN
		_		p-Isopropyltoluene	430	SN	SZ
				Naphthalene	371	2,000	∞
			000 0	등등군소등([[한글소프를		1,020***	76.8***
HMW-23S	SBI002:HMW23S:G091801:505	9/18/01		1.2.4-Trimethylbenzene	7,740	5,110***	16.4***
				1, शुरु महोत्ताव किएप किवास्त्रवा	23390 ·	5,110***	16.4***
				Xvlenes	146	180,000	10,000
			SVOCs	SVOCs   All Analytes	-RL		
			표	TPH - GRO (Ag.)	-RL	SN	NS

TABLE 3 (Cont'd)
SUMMARY OF DETECTED ANALYTES IN GROUNDWATER
AREA A

						RISC Default	RISC Default Closure
Monitoring Well Designation	Sample Identification	Sample Date	Analyte Type	Compound	Results (ug/L)	Closure Level - Industrial Land Use (ug/L)	Level - Residential Land Use (ug/L)
				Arsenic	13.8	20	20
				Barinm	192	7,200	2,000
			Metals*	Chromium	22.3	310**	100**
				ead	60.1	42	15
HMW-23D	SBI002:HMW23D:G091801:505	9/18/01	VOCs	1 1 1-Trichloroethane	3.7	3,600	200
			SVOCs	All Analytes	-R		•
			100	TPH - DRO (Aq.)	<rl< td=""><td>SN</td><td>SN :</td></rl<>	SN	SN :
			=	TPH - GRO (Aq.)	<rl< td=""><td>NS</td><td>NS</td></rl<>	NS	NS
			VOCs	1.1.1-Trichloroethane	3.7	3,600	200
UNA 23D	SBI002-MW23D-G091801:505	9/18/01	SVOCs	All Analytes	.A.	1	1
707-44141		;	TPH	TPH - GRO (Aqueous)	<rl< td=""><td>SN</td><td>NS</td></rl<>	SN	NS
			VOCs	Naphthalene	417	2,000	80
		70,07,0		1,1,1-Trichloroethane	2.3	3,600	200
MW-23S	SBI002:MW23S:G091801:505	10/81/6	SVOCs	All Analytes	<rl< td=""><td>1</td><td>1</td></rl<>	1	1
			표	TPH - GRO (Aq.)	36,200	NS	NS
			Motolo*	Barium	55.6	7,200	2,000
HMW-24S	SBI002:HMW24D:G092001:523	9/20/01	Melals	Lead	1.7	42	15
			NOCs	1,1,1-Trichloroethane	3.7	3,600	200
				Arsenic	10	20	20
			Metals*	Barium	72.3	7,200	2,000
				Lead	110	42	25
		70,0	9	Tetrachloroethene	8.8	52	2
MW-24D	SBI002:MW24D:G091801:505	9/18/01	S) (S)	1,1,1-Trichloroethane	3.2	3,600	200
			SVOCs	All Analytes	<rl< td=""><td>1</td><td>1</td></rl<>	1	1
			T T	TPH - DRO (Aq.)	-RL	SN	SN :
			=	TPH - GRO (Aq.)	^RL	NS	NS
				Arsenic	647	20	20
				Barium	7,030	7,200	2,000
			Metals*	Chromium	224	310**	100**
				Lead	1,410	42	15
HMW-25S	SBI002:HMW25S:G091901:5Z3	10/61/6		Mercury	2.3	31	2
			VOCs	1,1,1-Trichloroethane	2.4	3,600	200
			SVOCs	All Analytes	<rl< td=""><td>1</td><td>-</td></rl<>	1	-
		_	臣	7	<rl< td=""><td>NS</td><td>SN</td></rl<>	NS	SN
				TARIFCONTINIES			

TABLE CONTINUES

						RISC Default	
In the second second		Sample	Analyte	•	Results	Closure Level -	I evel - Residential
Designation	Sample Identification	Date	Type	Compound	(ng/L)	Industrial Land Use (ug/L)	Land Use (ug/L)
				Arsenic	5.6	50	20
			:	Barium	189	7,200	2,000
			Metais"	Chromium	89.9	310**	100**
MW-25S	SBI002:MW25S:G091701:523	9/17/01		Lead	20.9	42	15
			9	Tetrachloroethene	4.7	22	5
			SOO A	1,1,1-Trichloroethane	1.3	3,600	200
				Barinm	64.7	7,200	2,000
			Metals*	Chromium	30.4	310**	100**
AWA 25D	SBI002:MM/25D:G091701:523	9/17/01			3.8	42	15
OCZ-WIW		;	9	Tetrachloroethene	2.2	55	5
			ടാറ	11.1.1-Trichloroethane	2.7	3,600	200
				Arsenic	112	20	20
				Barium	240	7,200	2,000
			Metals*	Cadmium	-	51	ည
		70,0710		Chromium	33.2	310**	100**
HMW-26S	SBI002:HMW26S:G091901:523	10/61/6		Lead	127	42	15
-				sec-Butylbenzene	2	SN	SN
			200 200	p-Isopropyltoluene	1.2	SN	NS
			HdT	TPH - GRO (Aq.)	-RL	SN	NS
				Arsenic	144	20	20
				Barium	783	7,200	2,000
			•	Cadmium	3.3	51	ស
			Metals*	Chromium	40	310**	100**
		_		Lead	240	42	15
	1			Mercury	0.3	31	2
HMW-27S	SBI002:HMW27S:G091901:523	10/61/6		Tetrachloroethene	136	52	သ
			VOCs	1,1,1-Trichloroethane	2.2	3,600	200
				Trichloroethene	3.2	260	5
			SVOCs	All Analytes	유	:	1
			Ē	TPH - GRO (Aq.)	^RL	SN	SZ.
			<u>-</u>	TPH - Method 418.1 (Aq.)	^RL	SN	NS
			Metals*	Barium	72.5	7,200	2,000
				cis-1,2-Dichloroethene	2.6	1,000	20
HMW-28S	SBI002:HMW28S:G091401:505	9/14/01	VOCs	Tetrachloroethene	Ψ-	22	ເດ
				Trichloroethene	15.1	260	2
			HAT.	TPH - Method 418.1 (Aq.)	<rl< td=""><td>NS</td><td>SN</td></rl<>	NS	SN
				TABLE CONTINUES			

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 AREA A

						RISC Default	200 die 2
					Doerife	Cheura Level -	KISC Default closure
Monitoring Well	Sample Identification	Sample	Analyte	Compound	(ng/L)	Industrial Land	Level - Residential
Designation		Date	346		)	Use (ug/L)	Land Use (ug/L)
				Barium	37.5	7,200	2,000
			Metals*	ר מיו ייני השל	8.3	42	15
				cis-1 2-Dichloroethene	2	1,000	70
COC /4/4/11	SPI002:HMM/N/28D:G091401:505	9/14/01		Tetrachloroethene	4.	55	S
707-MINIU	351002:1 IIMAZOC:000		SOON	1 1 1-Trichloroethane	1.8	3,600	200
				Trichloroethene	51.4	260	5
			TPH	TPH - Method 418.1 (Aq.)	유	SN	NS
				Arsenic	11.1	20	20
	,		Metals*	Barium	163	7,200	2,000
MW-28S	SBI002:MW28S:G091801:505	9/18/01		Lead	17	42	15
			VOCs	Tetrachloroethene	2.9	55	5
				Arsenic	11.2	20	50
	!	!	Metals*	Barium	62.8	7,200	2,000
MW-28D	SBI002:MW28D:G091801:505	9/18/01		Lead	17	42	15
			VOCs	Tetrachloroethene	12.8	55	5
				Arsenic	11.5	20	20
			Metals*	Barium	58.5	7,200	2,000
		-		Lead	20.8	42	15
				sec-Butylbenzene	1.8	SN	SN
		2		cis-1,2-Dichloroethene	2.3	1,000	70
HMW-291	SBI002:HMW29I:G091401:505	9/14/01	VOCs	(Sopropylbenzene (Cumene)	1.8	SN	SN
			_	n-Propylbenzene	2.1	SN	SN -
				Trichloroethene	13.9	260	5
			SVOCs	Fluorene	18	2,000	310
			된	TPH - Method 418.1 (Aq.)	3,600	SN	NS

TABLE 3 (Cont'd)
SUMMARY OF DETECTED ANALYTES IN GROUNDWATER
AREA A

						PISC Default	
		•			41	- leve Louis	RISC Default Closure
Monitoring Well	Sample Identification	Sample	Analyte	Compound	Kesuits (ua/L)	Industrial Land	Level - Residential
Designation	•	Date	ìÀhe		î B	Use (ug/L)	Land Use (ug/L)
				Barium	48.3	7,200	2,000
			Metals*		2.2	42	15
		•		cis-12-Dichloroethene	3.7	1,000	20
HMM4-29D	SBI002-HMW29D:G091401:505	9/14/01		Isopropylbenzene (Cumene)	2.8	SN	NS
DEZ-MINIU	200000000000000000000000000000000000000		NOCs	n-Pronylhenzene	3.4	SN	SN
				Trichloroethene	10.5	260	2
			TPH	TPH - Method 418.1 (Ag.)	7,500	SN	SN
				Ш	59.9	7,200	2,000
			Metals*	200	6	42	15
				sec-Butylbenzene	3.4	SN	SN
				1.1-Dichloroethane	1.3	10,000	066
				cis-1.2-Dichloroethene	1.4	1,000	02
				n-Hexane	44.8	SN	SN
				Isopropylbenzene (Cumene)	-	SN	SN
HMW-301	SBI002:HMW30I:G091401:505	9/14/01	VOCs	n-Isopropyltoluene	3.2	SN	SN
				n-Propvlbenzene	3.8	SN	SN
				Trichloroethene	1.2	260	S.
				1.2.4-Trimethylbenzene	2.6	SN	SN
				1.3.5-Trimethylbenzene	2.6	SN	SN
				Xvlenes	1.5	180,000	10,000
			TPH	TPH - Method 418.1 (Aq.)	400	SN	NS
DAM.30D	SBIO02 MW30D G092001:523	9/20/01	VOCs	All Analytes	-RL		
				Barium	47.3	7,200	2,000
			Metals*	ead	2.5	42	15***
				sec-Butylbenzene	1.4	NS	NS
				1.1-Dichloroethane	1.4	10,000	066
				cis-1,2-Dichloroethene	4.2	1,000	02
HMW-30D	SBI002:HMW30D:G091401:505	9/14/01	VOCs	n-Hexane	12.5	SN	SN
	-			p-Isopropyltoluene	_	SN	SN
				1.1.1-Trichloroethane	7.	3,600	200
				Trichloroethene	10.8	260	2
			TPH	TPH - Method 418.1 (Aq.)	300	SN	SN

TPH TPH - Method 418.1 (Aq.)

TABLE CONTINUES

SUMMARY OF DETECTED ANALYTES IN GROUNDWATER AREA A TABLE 3 (Cont'd)

						RISC Default	RISC Default Closure
Monitoring Well	Sample Identification	Sample Date	Analyte Type	Compound	Results (ug/L)	Closure Level - Industrial Land	Level - Residential Land Use (ua/L)
Designation			:			Use (ug/L)	(-i6:-) 222 min
				Arsenic	121	20	20
				Barium	1020	7,200	2,000
			*dotolo*	Cadmium	6.8	51	ഹ
			Metals	Chromium	55.3	310**	100**
				Lead	387	42	15
HMW-31S	SBI002:HMW31S:G091701:523	9/17/01		Mercury	0.5	31	2
)				Tetrachloroethene	11.8	22	2
			VOCs	1.1.1-Trichloroethane	4.1	3,600	200
				Trichloroethene	2	260	2
			SVOCs	All Analytes	유		1
		·	Т	TPH - Method 418.1 (Aq.)	-RL	SN	NS
			Metale*	Barium	9.07	7,200	2,000
			Metals	Lead	7.9	42	15
				n-Butylbenzene	10.3	SN	SN
				sec-Butylbenzene	8.6	SN	SN
				n-Hexane	89	SN	SN
_	SBI002:HMW31I:G091701:523	9/17/01	VOCs	Isopropylbenzene (Cumene)	3.2	SN	SN
				p-Isopropyltoluene	5.1	SN	SN
				n-Propylbenzene	4.1	SN	SN
				Vinyl Chloride	1.5	2	2
			SVOCs	All Analytes	-RL	1	1
HMW-311			г –	TPH - Method 418.1 (Aq.)	1,400	SN	NS
			Matalat	Barium	73.2	7,200	2,000
				Lead	8.8	42	15
				n-Butylbenzene	10.3	SN	SN
				sec-Butylbenzene	6.6	SN	SN
•				n-Hexane	83.6	SN	SN 
	SBI002:HMW31I:G091/01D:523	10//1/6	VOCs	Isopropylbenzene (Cumene)	က	SN	SN
				p-Isopropyltoluene	5.2	SN	SN
				n-Propylbenzene	4	SN	SN
				Vinyl Chloride	1.3	2	2
			SVOCs	All Analytes	^RL	1	1

TABLE CONTINUES

TABLE CONTINUES

### INITIAL PHASE II ENVIRONMENTAL SITE ASSESSMENT CITY OF SOUTH BEND, INDIANA

						RISC Default	
		1	Amolisho		Results	Closure Level -	KISC Derault Closure
Monitoring Well	Sample Identification	Sample	Analyte	Compound	(ug/L)	Industrial Land	Level - Residential
Designation			246.			Use (ng/L)	Land Use (ug/L)
				Barium	85.2	7,200	2,000
			Metals	Lead	5.2	42	15
				1,1-Dichloroethane	1.3	10,000	066
				cis-1,2-Dichloroethene	1.6	1,000	20
HMW-31D	SBI002:HMW31D:G091701:523	9/17/01	VOCs	n-Hexane	78.2	SN	SN
				Isopropylbenzene (Cumene)	3.6	SN	NS
				Tetrachloroethene		55	5
			SVOCs	All Analytes	-RL	-	l
			TPH	TPH - Method 418.1 (Aq.)	13,000	SN	NS
				Arsenic	9.4	20	20
			Metals*	Barium	108	7,200	2,000
				Lead	29.2	42	15
				sec-Butylbenzene	9.3	SN	SN
				cis-1,2-Dichloroethene	7	1,000	20
	1			trans-1,2-Dichloroethene	9.1	200	100
HMW-32I	SBI002:HMW32I:G091401:505	9/14/01		n-Hexane	114	SN	٩Z
			NOCs	p-Isopropyltoluene	2.3	SN	SN
				n-Propylbenzene	1.9	SN	SN
				Tetrachloroethene	363	55	ς,
				Trichloroethene	98.8	260	5
			TPH	TPH - Method 418.1 (AQ)	700	NA	NA
			Metale*	Barium	98.2	7,200	2,000
			Metals	Lead	10.1	42	15***
				Acetone	21.4	10,000	770
				sec-Butylbenzene	10.8	SN	SN
				cis-1,2-Dichloroethene	33.3	1,000	22
	0000	777		trans-1,2-Dichloroethene	3.5	200	100
HMW-32D	SBI002:HMW3ZD:G091401:505	9/ 14/0	VOCs	n-Hexane	23.3	SN	Y N
				p-Isopropyitoluene	2.5	SN	SN
				n-Propylbenzene	<del>7</del> .	SN	S .
				Tetrachloroethene	35.9	22	ı, n
				Trichloroethene	18.2	260	c i
			Hdl	TPH - Method 418.1 (Aq.)	800	NS	NS

						RISC Default	RISC Default Closure
Monitoring Well Designation	Sample Identification	Sample Date	Analyte Type	Compound	Results (ug/L)	Closure Level - Industrial Land Use (ug/L)	Level - Residential Land Use (ug/L)
				Arsenic	5.3	50	50
HMW-33S	SBI002:HMW33S:G091901:523	9/19/01	Metals*	Barium	<b>132</b> ≘	7,200 42	15
			VOCs	All Analytes	쑴		•
				Arsenic	11.1	50	20
			:	Barium	116	7,200	2,000
HMW-33D	SBI002:HMW33D:G091901:523	9/19/01	Metals	Chromium	8.8	310**	100**
				Lead	12.9	3 600	200
			3	1, 1, 1-11Cilloroculario	-	1 000	20
			VOCs	cis-1,2-Dichloroethene	- 5	260	5
OVE WANT	SBI002:HMW/34S-G091901:523	9/19/01	SVOCs	All Analytes	-RL	1	•
O+O-AAIMIL		; ;		TPH - Method 418.1 (Aq.)	\ <u></u>	SN	SN
			_ _ _	TPH - DRO (Aq.)	^RL	NS	NS
			Motole*	Barium	47.1	7,200	2,000
		7	Metals	Lead	2.8	42	15
HMW-35S	SBI002:HMW35S:G091701:523	10//1/6	200	cis-1,2-Dichloroethene	1.5	1,000	- 70 -
			3	Trichloroethene	7.4	260	2
			VOCs	Trichloroethene	7.3	260	5
SB-1	SBI002:SB1:G092001:523	10/02/6	TPH	TPH - Method 418.1 (Aq.)	-RL	NS	NS
				cis-1,2-Dichloroethene	4	1,000	02
		2	00,	trans-1,2-Dichloroethene	4.2	200	100
	ZHG001:HP1s:G051401:412 <sup>a</sup>	5/14/01	ടാറ	Tetrachloroethene	165	22	က
				Trichloroethene	7.78	260	ည
				cis-1,2-Dichloroethene	3.5	1,000	20
		2.0	00,7	trans-1,2-Dichloroethene	4.6	200	100
HP-1#	ZHG001:HP1d:G051401:412"	5/14/01	200	Tetrachloroethene	53.8	22	د
				Trichloroethene	87.8	260	5
				cis-1,2-Dichloroethene	3.3	1,000	02
				trans-1,2-Dichloroethene	4.2	200	100
	ZHG001:HP1dD:G051401:412 <sup>b</sup>	5/14/01	\ \ \ \ \	n-Hexane	13.4	SN	¥.
				Tetrachloroethene	64.3	22	ລ ເ
				Trichloroethene	92.2	260	C

### SUMMARY OF DETECTED ANALYTES IN GROUNDWATER AREA A TABLE 3 (Cont'd)

ZHG001:HP2s:G051401:412° 5/1 HP-2# ZHG001:HP2d:G051401:412 <sup>d.</sup> 5/1		Analyte Type	Compound	Results (ug/L)	Closure Level - Industrial Land Use (ug/L)	Level - Residential Land Use (ug/L)
ZHG001:HP2s:G051401:412 <sup>6</sup> .			n-Butylbenzene	2	SN	SN
ZHG001:HP2s:G051401:412 <sup>6</sup> .			sec-Butylbenzene	4:1	SN	SN
ZHG001:HP2s:G051401:412 <sup>6</sup> . ZHG001:HP2d:G051401:412 <sup>d</sup> .			cis-1,2-Dichloroethene	10.4	1,000	20
ZHG001:HP2s:G051401:412 <sup>cc</sup> ZHG001:HP2d:G051401:412 <sup>dc</sup>		Ö	trans-1,2-Dichloroethene	4.1	200	100
ZHG001:HP2d:G051401:412 <sup>d.</sup>	5/14/01	S) )	n-Hexane	21.2	SN	¥.
ZHG001:HP2d:G051401:412 <sup>d.</sup>			n-Propylbenzene	4:1	NS	SN
ZHG001:HP2d:G051401:412 <sup>d.</sup>			Tetrachloroethene	13.7	55	2
ZHG001:HP2d:G051401:412 <sup>d.</sup>			Trichloroethene	2.4	260	2
ZHG001:HP2d:G051401:412 <sup>d.</sup>			n-Butylbenzene	10.4	SN	SN
			sec-Butylbenzene	10	SN	SN
			cis-1,2-Dichloroethene	15.7	1,000	20
			trans-1,2-Dichloroethene	2.6	200	100
	200	00,	n-Hexane	189	SN	¥
	5/14/01	30A	Isopropylbenzene (Cumene)	4.2	SN	SN
			n-Propvlbenzene	15.2	SN	SN
			p-Isopropyltoluene	7	SN	SN
			1.2.4-Trimethylbenzene	1.3	SN	SN
			1,3,5-Trimethylbenzene	2	NS	SN

#### Notes:

- Total metals.
- Assumes hexavalent chromium.
- Cleanup goals derived using equations in NS - No standard available.
  \*\*\* - Cleanup goals derived
- Analyte concentration exceeds default RISC commercial/industrial & residential Closure Levels.

  - Analyte concentration exceeds default RISC residential closure level. Direct-push (hydropunch) sampling location, completed before initiation of the Initial Phase II ESA.
    - Direct-push water sample collected from a depth interval of 26'-30'.

#

- Direct-push water sample collected from a depth interval of 36'-40'.
  - Direct-push water sample collected from a depth interval of 26'-30'.
- Direct-push water sample collected from a depth interval of 36'-40'.

TABLE 4

### SUMMARY OF GEOTECHNICAL DATA AREA A

Lab	Lab.		100	Description	Gravel %			Sand %		Silt % Clay %	1118	Ы	nscs
Number	Number Number Number		( <b>W</b> )		Coarse	Fine	Coarse Medium Fine	Medium	Fine				*
107	0		7000	DECIMIN DOORS VERANER SAND TRACE FINES	0.0	0.0	1.0	27.9	68.1	3.0	Š	Ş	SP
01-405	Co-value	00-10	30.032.0	CDEV POOR! V GRADED SAND TRACE GRAVEL, FINES	0.0	9.9	5.6	50.5	36.3	1.0	Š	S S	SP
01400	- VIVINI		14 0 18 0	REDOWN BOORLY GRADED SAND, TRACE GRAVEL, FINES	0.0	1.6	2.0	26.3	68.6	1.5	S	S S	SP
10 20	O CO		12 0 44		0.0	19.1	16.3	31.2	30.3	3.1	S	Ş	SP
60409	1 - VININ		0.4.0	PROMINE CONTROL OF STAND WITH GRAVEL TRACE FINES	6.6	18.6	11.1	28.5	30.3	1.6	ပ္	Š	SP
01-402	HIMIVV-13D	200	20.00	BEOWN WEIL GRADED SAND LITTLE GRAVEL TRACE SILT, CLAY	6.2	5.9	5.3	24.6	46.5	7.7. 3.8	Š	S	SW-SM
0 20	LIMINA-180	_i_	2007	DECAMA BOOR V GRADED SAND TRACE FINES, GRAVEL	0.0	0.1	9.0	10.8	86.6	1.9	Š	S	SP
082-10	CI Z-ANINIL		4.0-0.0		0.0	16.2	7.4	43.3	31.1	2.0	S	SC	SP
01-408	HMW-ZZD		16.0-16.0	BROWN POORLY GRADED SAND WITH GRAVEL, INSUEL INC.	0.0	0.8	2.3	36.8	56.8	3.3	NC	SC	SP
01-406	HIMW-235		14.0-13.0	BECOMM FOORET GRADEL GANCE, INCLE INCLES GRAVEL	0.0	13.8	10.1	22.6	36.7	7.4 9.4	22.0	15.0	SC-SM
01-398	COZ-MINIU		7.04.0	DECAME DOOR V CRAPE SAND TRACE FINES GRAVEL	0.0	3.9	7.9	51.0	32.6	4.6	S	2	SP
01-397	TIMIN'-ZBD	200	4.0-0.0		0.0	23.9	18.6	42.7	11.6	3.2	SC	S	SP
04 404	CCS /VIVIL		20 0-22 0	BROWN POORLY GRADED SAND, TRACE GRAVEL, FINES	0.0	8.3	8.0	59.1	22.5	2.1	S	Š	S
01-401	HMW-33D	1	50.0-52.0		0.0	5.4	9.9	30.3	43.9	11.4 2.4	SC	NC	SM
		11.		The second section is the second									

NOTE: NC - Analysis not completed due to lack of fines.

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# INITIAL PHASE II ENVIRONMENTAL SITE ASSESSMENT CITY OF SOUTH BEND, INDIANA

#### **TABLE 5**

# SUMMARY OF SOIL SAMPLES EXCEEDING RISC COMMERCIAL/INDUSTRIAL DEFAULT CLOSURE LEVELS OR OTHER QUALITATIVE RISK GOALS

AREA A	

Soll Boring	Location	Suspected Source	Sample Depth	Compound	Results	Default Closure Level	Units	Exceeded RISC Exposure Media or Pathway Closure Level
GB-3	Former Railroad Spur, Northwest portion of the Underground Pipe & Valve Property	Spills from Prior Parts Degreasing Operations	0.5-2.0'	Lead	906	230	mg/kg dw	Migration to Groundwater
GB-10	Former Railroad Spur, Outside and South of the South-central Portion of the South Bend Lathe Building	Railroad Ties	0.0'-2.0'	Benzo(a)pyrene Benzo(b)flouranthene Indeno(1,2,3-cd)pyrene Cadium	10,900 16,000 3,160 89.2	1,500 15,000 3,100 77	ug/kg dw ug/kg dw ug/kg dw mg/kg dw	Direct Contact Exposure Direct Contact Exposure Migration to Groundwater Migration to Groundwater
GB-11	Oil Staining Area, Outside and South of the South-central Portion of the South Bend Lathe Property	Probable Cutting Oils	0.0'-1.5'	Lead Benzo(a)pyrene	628	230	mg/kg dw ug/kg dw	Migration to Groundwater Direct Contact Exposure
GB-12	Oil Staining Area, Outside and South of the South-central Portion of the South Bend Lathe Property	Probable Cutting Oils	0.0'-2.0'	Chorium Benzo(a)pyrene	177	120	mg/kg dw ug/kg dw	Migration to Groundwater Direct Contact Exposure
GB-15	Former Railroad Spur, Outside and East of the Northern Portion of Underground Pipe & Valve	Railroad Ties	0.0'-1.0'	Arsenic Lead	391	20	mg/kg dw mg/kg dw	Direct Contact Exposure Migration to Groundwater
GB-16	Former Railroad, Outside and East of the Central Portion of Underground Pipe &Valve	Railroad Ties	0.0'-0.5'	Вепzо(а)ругепе	3,030	1,500	ug/kg dw	Direct Contact Exposure
GB-17	Former Railroad Spur, Outside and east of the Southern Portion of Underground Pipe & Valve	Railroad Ties	0.0'-1.5'	Arsenic Lead	337	20	mg/kg dw mg/kg dw	Direct Contact Exposure Migration to Groundwater
GB-19	Former Railroad Spur, Outside and southeast of the Southern Portion of Underground Pipe & Valve	Railroad Ties	0.0'-1.0'	Arsenic Lead	34	20	mg/kg dw mg/kg dw	Direct Contact Exposure and Migration to Groundwater Migration to Groundwater
GB-24	Former Railroad Spur, Outside and West of Allied Products Corp. Building 86	Railroad Ties	0.5'-2.0'	Arsenic	35.9	50	ug/kg dw	Direct Contact Exposure and Migration to Groundwater

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### INITIAL PHASE II ENVIRONMENTAL SITE ASSESSMENT CITY OF SOUTH BEND, INDIANA

#### TABLE 5 (cont'd)

# SUMMARY OF SOIL SAMPLES EXCEEDING RISC COMMERCIAL/INDUSTRIAL DEFAULT CLOSURE LEVELS OR OTHER QUALITATIVE RISK GOALS

**AREA A** 

		;						
Soil Boring	Location	Suspected Source	Sample Depth	Compound	Results	Defauilt Closure Level	Units	Exceeded RISC Exposure Media or Pathway Closure Level
9	Former Railroad Spur, Outside and	ooil bearing	0 5'-1 5'	Arsenic	41.5	20	mg/kg dw	Direct Contact Exposure and Migration to Groundwater
67-05 	Southwest of Allied Frontess Colp.  Building 80	ממן ומס	5.1	Benzo(a)pyrene	2,620	1,500	ug/kg dw	Direct Contact
	Former Railroad Spur. Outside and West	ji T	7 7 7	Lead	429	230	mg/kg dw	Migration to Groundwater
	of Allied Products Corp. Building 79	Kaliroad Hes	0.0-1.0	Benzo(a)pyrene	8,900	1,500	ug/kg dw	Direct Contact Exposure
GB-32	Former Railroad Spur, Outside and South of the Allied Product Corp. Building 86	Railroad Ties	0.0'-1.5'	Benzo(a)pyrene	1,570	1,500	ug/kg dw	Direct Contact Exposure
GB-33	Former Railroad Spur, Outside and east of the Southern Portion of Allied Product Corp. Building 83	Railroad Ties	0.0'-1.0'	Lead	397	230	mg/kg dw	Migration to Groundwater
				Benzo(a)anthracene	29,200	15,000	ug/kg dw	Direct Contact Exposure
				Benzo(a)pyrene	30,900	1,500	ug/kg dw	Direct Contact Exposure and Migration to Groundwater
				Benzo(b)flouranthane	48,600	15,000	ug/kg dw	Direct Contact Exposure
GB-34	Former Railroad Spur, Outside and East	Railroad Ties	0.0'-1.5'	Chrysene	36,900	25,000	ug/kg dw	Migration to Groundwater
	of Allied Products Corp. Building os			Dibenzo(a,h)anthracene	2,530	1,500	ug/kg dw	Direct Contact Exposure
			-	Indeno(1,2,3-cd)pyrene	8,260	3,100	ug/kg dw	Migration to Groundwater
				Arsenic	34	20	mg/kg dw	Direct Contact Exposure and Migration to Groundwater
	Former Rairoad Spur, Outside and North	oritonal Ting	.3 + .0 0	Lead	315	230	mg/kg dw	Migration to Groundwater
çç. 195	of Allied Product Corp. Building 86	Hallroad Hes	6.1-0.0	Benzo(a)pyrene	1,920	1,500	ug/kg dw	Direct Contact Exposure
	Probable Spent Foundry Sand and Misc.	L	4	Lead	240	230	mg/kg dw	Migration to Groundwater
25.5	Depris, inside mesoumeast Pomon or Underground Pipe & Valve	Sperii rouildiy Salid	di an	Benzo(a)pyrene	2,820	1,500	ug/kg dw	Direct Contact Exposure
8.99	Probable Spent Foundry Sand and Misc. Debris, Inside the Southeast Portion of	Spent Foundry Sand	Grab	Arsenic	33.3	20	mg/kg dw	Direct Contact Exposure and Migration to Groundwater
3	Underground Pipe & Valve	ì	<b> </b>	Lead	259	230	mg/kg dw	Migration to Groundwater
			Table C	Table Continues				

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Migration to Groundwater

ug/kg dw

230,000

230,000

Lead

0.5-2.0

Probable Fugitive Dust

Former Press Pits, Inside in the Northern Portion of Allied Product Corp. Building 80

HMW-13D

Direct Contact Exposure

ug/kg dw

1,500

7,610

Benzo(a)pyrene

4.0'-5.0'

Probable Cutting Oils

Oil Staining Area, Outside and South of the South-central Portion of the South Bend Lathe Property

HMW-15S

# INITIAL PHASE II ENVIRONMENTAL SITE ASSESSMENT CITY OF SOUTH BEND, INDIANA

#### TABLE 5 (cont'd)

# SUMMARY OF SOIL SAMPLES EXCEEDING RISC COMMERCIAL/INDUSTRIAL DEFAULT CLOSURE LEVELS OR OTHER QUALITATIVE RISK GOALS

-					_				-		
	Exceeded RISC Exposure Medial or Pathway Closure Level	Migration to Groudwater	Migration to Groudwater	Direct Contact Exposure and Migration to Groundwater	Direct Contact Exposure	Direct Contact Exposure	Direct Contact Exposure	Migration to Groundwater	Migration to Groudwater	Migration to Groundwater	Migration to Groundwater
	Units	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mp By/Bn	mg/kg dw	mg/kg dw	mg/kg dw	ug/kg dw	mg/kg dw
	Default Closure Level	230	230	20	230	1,500	20	230	230	640	230
٠	Results	599	449	114	278	3,100	25	426	388	4,740	241
A A	Compound	Lead	Lead	Arsenic	Lead	Benzo(a)pyrene	Arsenic	Lead	Lead	Tetrachloroethene	Lead
AREAA	Sample Depth	0.0'-0.5'	0.0'-1.0'		0.0'-1.0'	•	0.5'-2.0'	0.0'-2.0'	0.0'-2.0'	0.5'-2.0'	0.5'-2.0'
ARE	Suspected Source	Proabable Fugitive Dust	Probable Fugitive Dust		Railroad Ties	ı	Railroad Ties	Probable Fugitive Dust	Probable Fugitive Dust	Spills from Prior Parts Degreasing Operations	Probable Fugitive Dust
	Location	Former Retention Basin, Outside and Souhwest of Underground Pipe & Valve Building	Former Retention Basin, Outside and Southwest of Underground Pipe & Valve	Engrand Court Outside and Stutish	of Underground Pipe & Valve		Former Railroad Spur, Outside and North of Underground Pipe & Valve	Potential Drywell, Outside and East of the Central Portion of the Huckins Building	Hydraulic Control, Outside and West of the Central Portion of Building 86	Southern Portion of Allied Products Corp. Building 142	Former Press Pits, Inside in the Central Portion of Allied Product Corp. Building 80
	Soll Boring	HA-1	HA-2		HA-3		HMW-2S	HMW-4S	HMW-7S	HMW-9I	HNW-12S

TABLE 5 (cont'd)

# SUMMARY OF SOIL SAMPLES EXCEEDING RISC COMMERCIAL/INDUSTRIAL DEFAULT CLOSURE LEVELS OR OTHER QUALITATIVE RISK GOALS AREA A

Soll Boring	Location	Suspected Source	Sample Depth	Compound	Results	Default Closure Level	Units	Exceeded RISC Exposure Media of Pathway Closure Level
HMW-18S	Former Degreasing Operation, Outside and South of the Eastern Portion of the South Bend Lathe Porperty	Spills from Prior Parts Degreasing Operations	0.0'-1.0'	Benzo(a)pyrene	5,260	1,500	ug/kg dw	Direct Contact Exposure
HMW-22D	Former Railroad Spur, Outside and South of Allied Product Corp. Building 83	Railroad Ties	0.0'-2.0'	Arsenic	21.4	20	mg/kg dw	Direct Contact Exposure
HMW-24D	East and Outside of the Northern Portion of Allied Products Corp. Building 83	Potential Paint Disposal - Otherwise Unknown	0.5-2.0	Lead	13,600	230	mg/kg dw	Construction Worker and Direct Contact Exposure and Migration to Groundwater
HMW-27S	Former Railroad Spur, Outside and East of the South Bend Lathe Building	Railroad Ties	0.0'-1.5'	Benzo(a)pyrene	5,970	1,500	ug/kg dw	Direct Contact Exposure
HMW-33D	South-central Portion of Allied Products Corp. Building 83	Potential Paint Disposal - Otherwise Unknown	0.0'-2.0'	Lead	2,720	230	mg/kg dw	Construction Worker and Direct Contact Exposure and Migration to Groundwater
SB-1	Former UST Location, Outside and North of the Huckins Tool & Die Building	Probable Used Oils	10.0'-11.5'	PCBs	5.31	5.3	mg/kg dw	Direct Contact Exposure
SB-5	Former Retention Basin, Outside and Southwest of Underground Pipe & Valve	Railroad Ties	0.0'-1.5'	Arsenic	57.1	20	mg/kg dw	Direct Contact Exposure and Migration to Groundwater

Note:

1. - Based on Hull's experience modeling volatilization to indoor air in soils similar to those seen at the Site, the concentration of tetrachloroethene detected in a surface soil sample at HMW-9I may result in also unacceptable risk.

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#### TABLE 6

### SUMMARY OF GROUNDWATER NEAR OR BEYOND THE POINT OF COMPLIANCE EXCEEDING RISC COMMERCIAL/INDUSTRIAL DEFAULT CLOSURE LEVELS **AREA A**

Cleanup Goal (ng/L) 5,110<sup>1.</sup> 42 42 က္ထ 42 22 22 22 Results (ng/L) 7,740 1,410 240 136 112 127 4 647 1,2,4-Trimethylbenzene Tetrachloroethene Compound Arsenic Arsenic Arsenic Lead Lead Lead Sample Date 9/18/01 9/19/01 9/19/01 9/19/01 9/19/01 9/19/01 9/19/01 9/19/01 Releases from fuel storage or transfer (1,2,4-Trimethylbenzene is a constituent of Downgradient of former degreasing operations in southeast portion of South Bend Lathe building. Downgradient of probably source areas on Allied Products Corp. Potential releases from leaded fuel storage or transfer. Potential releases from Potential releases from leaded fuel storage or transfer. Potential releases from Potential releases from leaded fuel storage or transfer. Potential releases from mobilization of arsenic in groundwater. Other potential sources include paints, mobilization of arsenic in groundwater. Other potential sources include paints, mobilization of arsenic in groundwater. Other potential sources include paints, property (beneath buildings 86 and 142). Potential contribution from off-Site Potential change in redox conditions within or near the "oil zone" may allow Potential change in redox conditions within or near the "oil zone" may allow railroad ties or past wood treating operations during lumber yard operations. Potential change in redox conditions within or near the "oil zone" may allow railroad ties or past wood treating operations during lumber yard operations. railroad ties or past wood treating operations during lumber yard operations. used oil storage or spills. Potential use in paints. used oil storage or spills. Potential use in paints. used oil storage or spills. Potential use in paints. petroleum fuels - particularly gasoline) **Suspected Source** sonices Near Northeast Corner of Allied Products Corp Building 82, ~140 ft. West of Point of Former Engineering Building, ~260 ft. West and ~280 ft. South of Point of Compliance South Bend Lathe Property, ~160 ft. West Between South Bend Lathe Building and East of Allied Products Corp Building 78, Immediately West of Guard Shack on ~250 ft. West of Point of Compliance of Point of Compliance Compliance Location Soil Boring HMW-27S HMW-25S HMW-23S HMW-26S

**Table Continues** 

#### TABLE 6 (Cont'd)

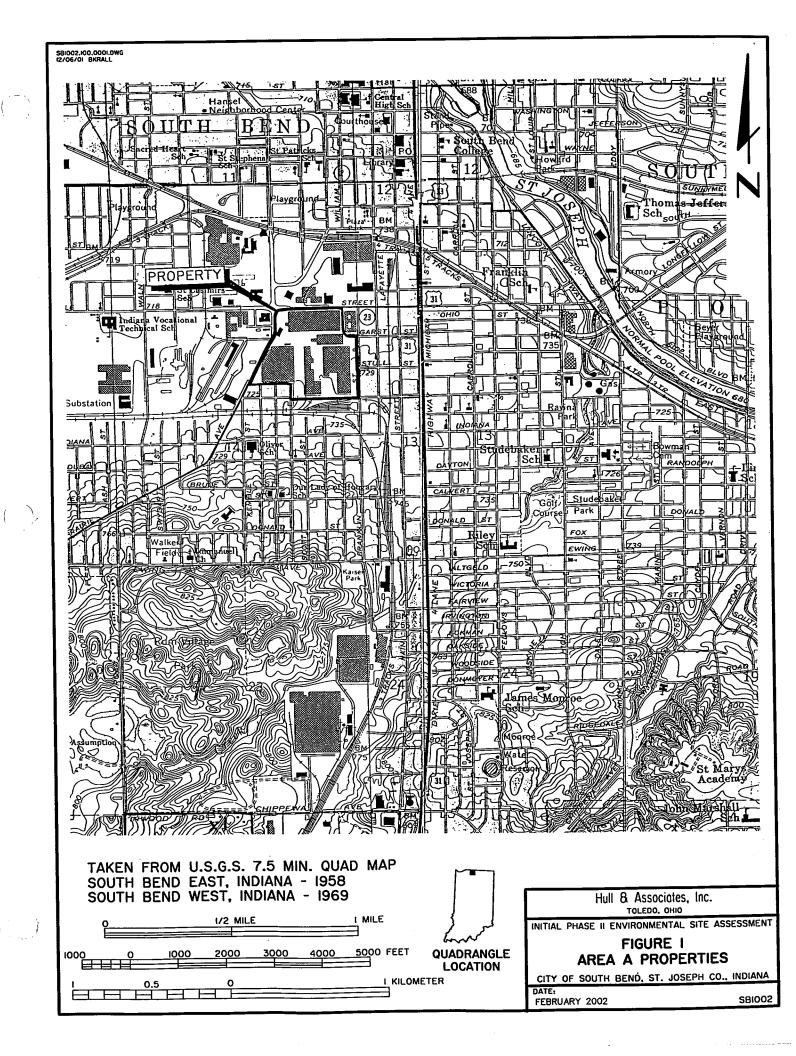
### SUMMARY OF GROUNDWATER NEAR OR BEYOND THE POINT OF COMPLIANCE EXCEEDING RISC COMMERCIAL/INDUSTRIAL DEFAULT CLOSURE LEVELS

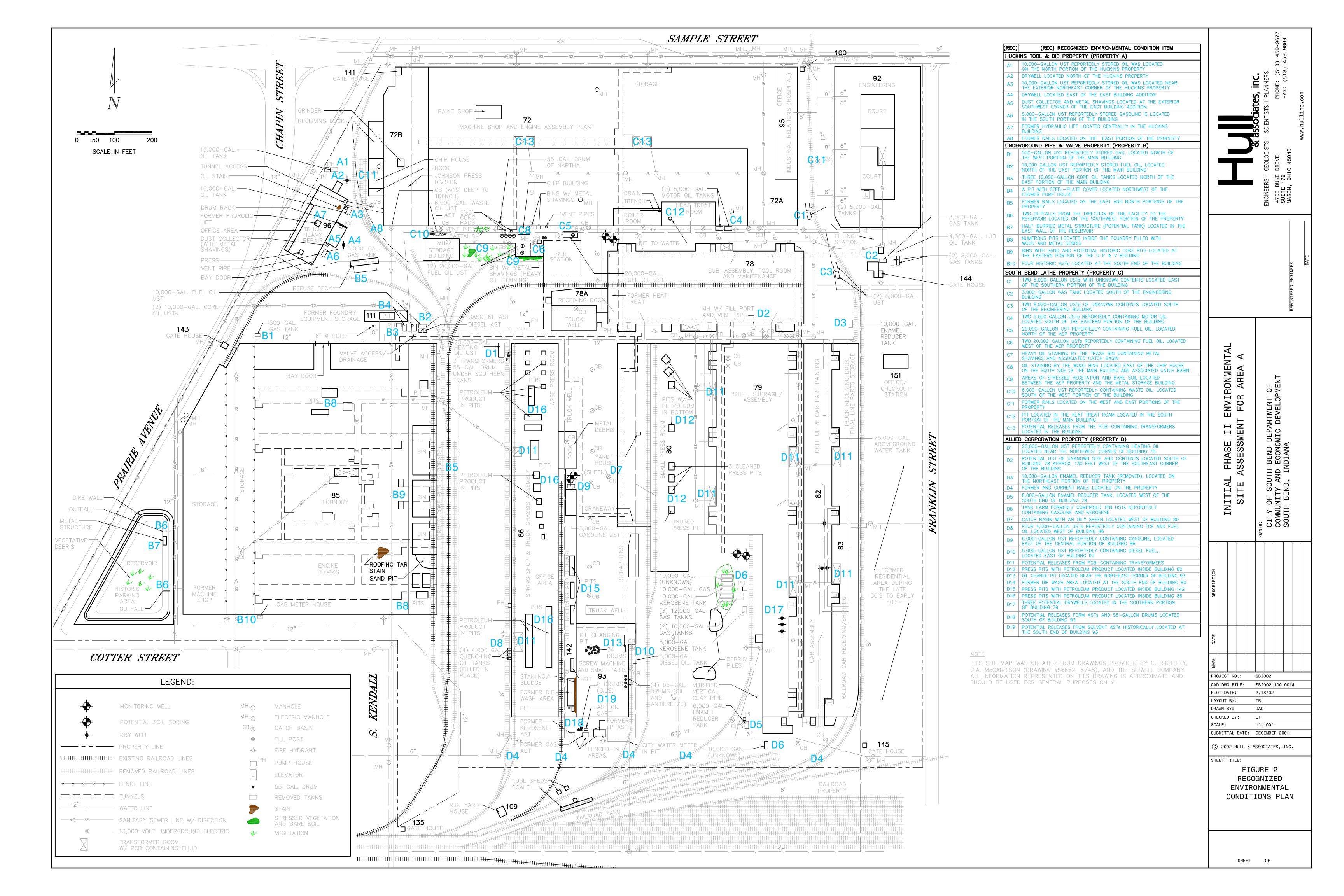
**AREA A** 

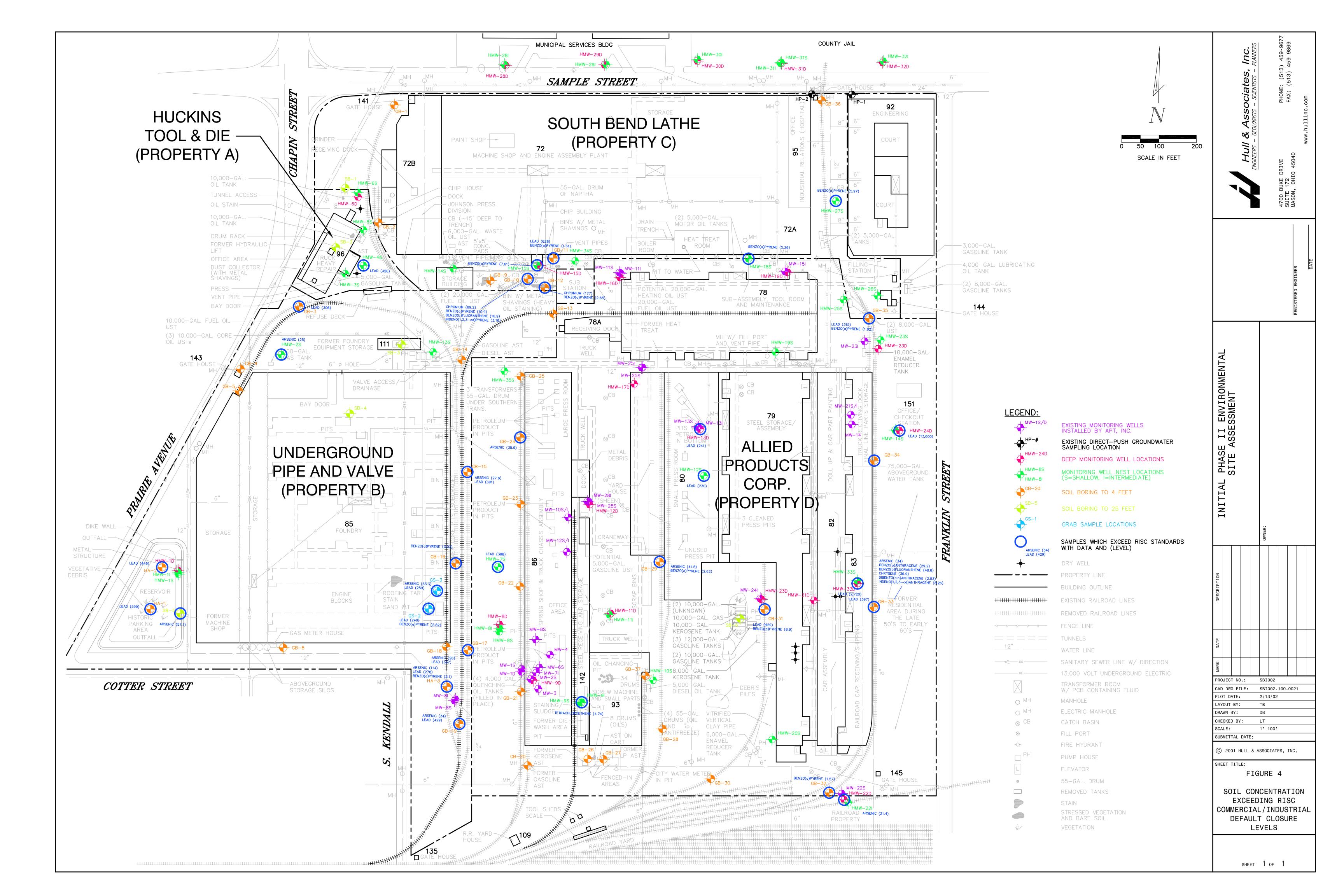
Soil Boring	Location	Suspected Source	Sample Date	Compound	Results (ug/L)	Cleanup Goal (ug/L)
HMW-31S	North of Sample Street on County Jail Property, ~ 90 ft. Outside (north) of Point of	Potential change in redox conditions within or near the "oil zone" may allow mobilization of arsenic in groundwater. Other potential sources include paints, railroad ties or past wood treating operations during lumber yard operations.	9/17/01	Arsenic	121	50
	Compliance	Potential releases from leaded fuel storage or transfer. Potential releases from used oil storage or spills. Potential use in paints.	9/17/01	Lead	387	42
HMW-32I	North of Sample Street on County Jail Property, ~ 80 ft. Outside (north) of Point of Compliance	Downgradient of former degreasing operations in southeast portion of South Bend Lathe building. Downgradient of probably source areas on Allied Products Corp. property (beneath buildings 86 and 142). Potential contribution from off-Site sources.	9/14/01	Tetrachloroethene	363	55
HMW-33S	In South-central Portion of Allied Products Corp. Building 83, -210 ft. West of Point of Compliance	Potential releases from leaded fuel storage or transfer. Potential releases from used oil storage or spills. Potential use in paints.	9/19/01	Lead	132	42
	Near Northeast Corner of Engineering	Downgradient of former degreasing operations in southeast portion of South Bend Lathe building. Downgradient of probably source areas on Allied Products Corp. property (beneath buildings 86 and 142). Potential contribution from off-Site sources.	5/14/01	Tetrachloroethene	165	55
HP-1 <sup>3</sup>	Building, ~ Five ft. South of Point of Compliance	Downgradient of former degreasing operations in southeast portion of South Bend Lathe building. Downgradient of probably source areas on Allied Products Corp. property (beneath buildings 86 and 142). Potential contribution from off-Site sources.	5/14/01	Tetrachloroethene	64.3	55

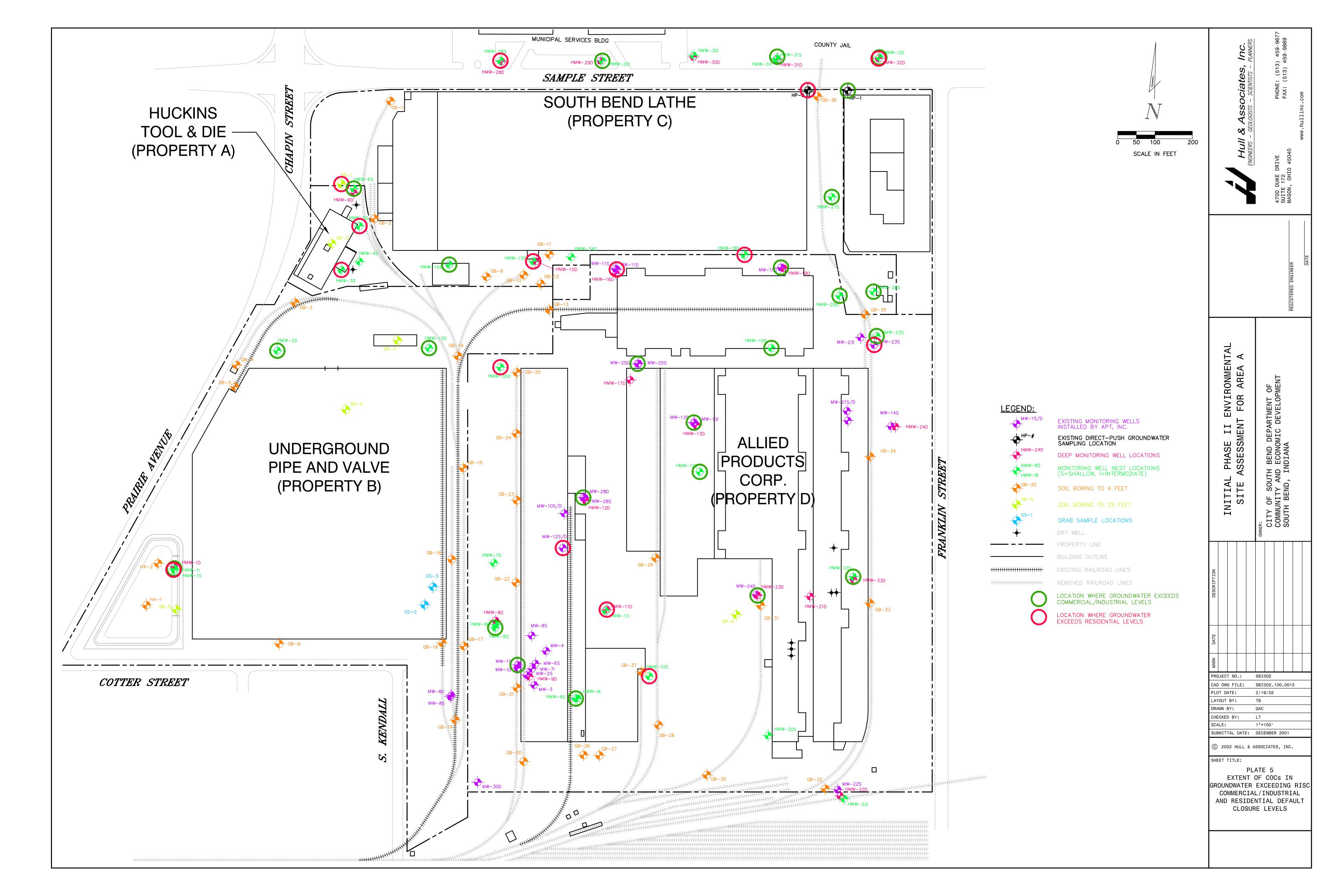
#### Notes:

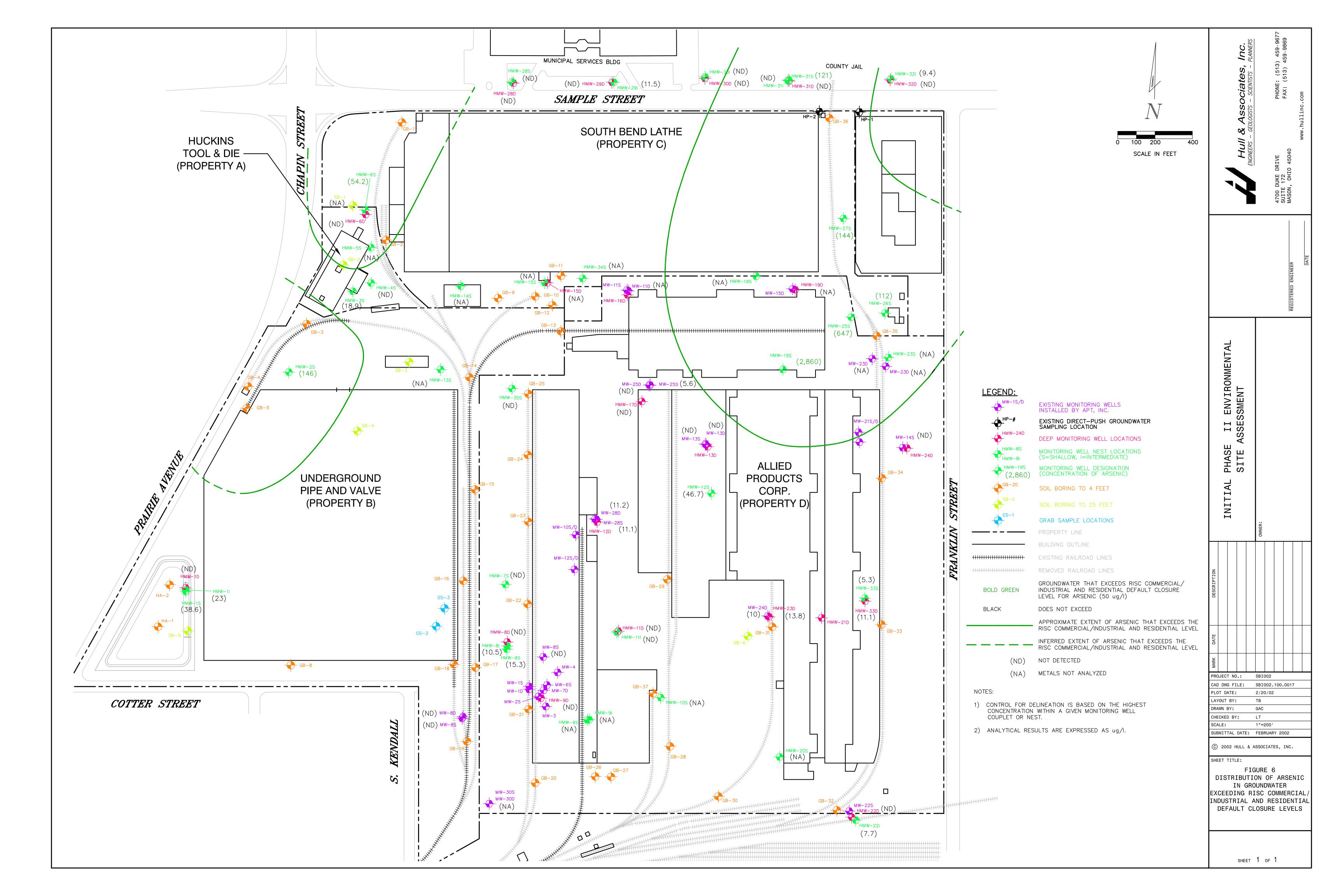
- 1. Cleanup goals derived using equations in the VRP Resource Guide (Appendix F), July 1996.
- 2. Direct-push (hydropunch) sampling location, completed before initiation of the Initial Phase II ESA. Sample containing 165 ug/L tetrachloroethene was collected from depth interval of 36'-40'.
  of 26'-30'. Sample containing 64 ug/L tetrachloroethen was collected from depth interval of 36'-40'.

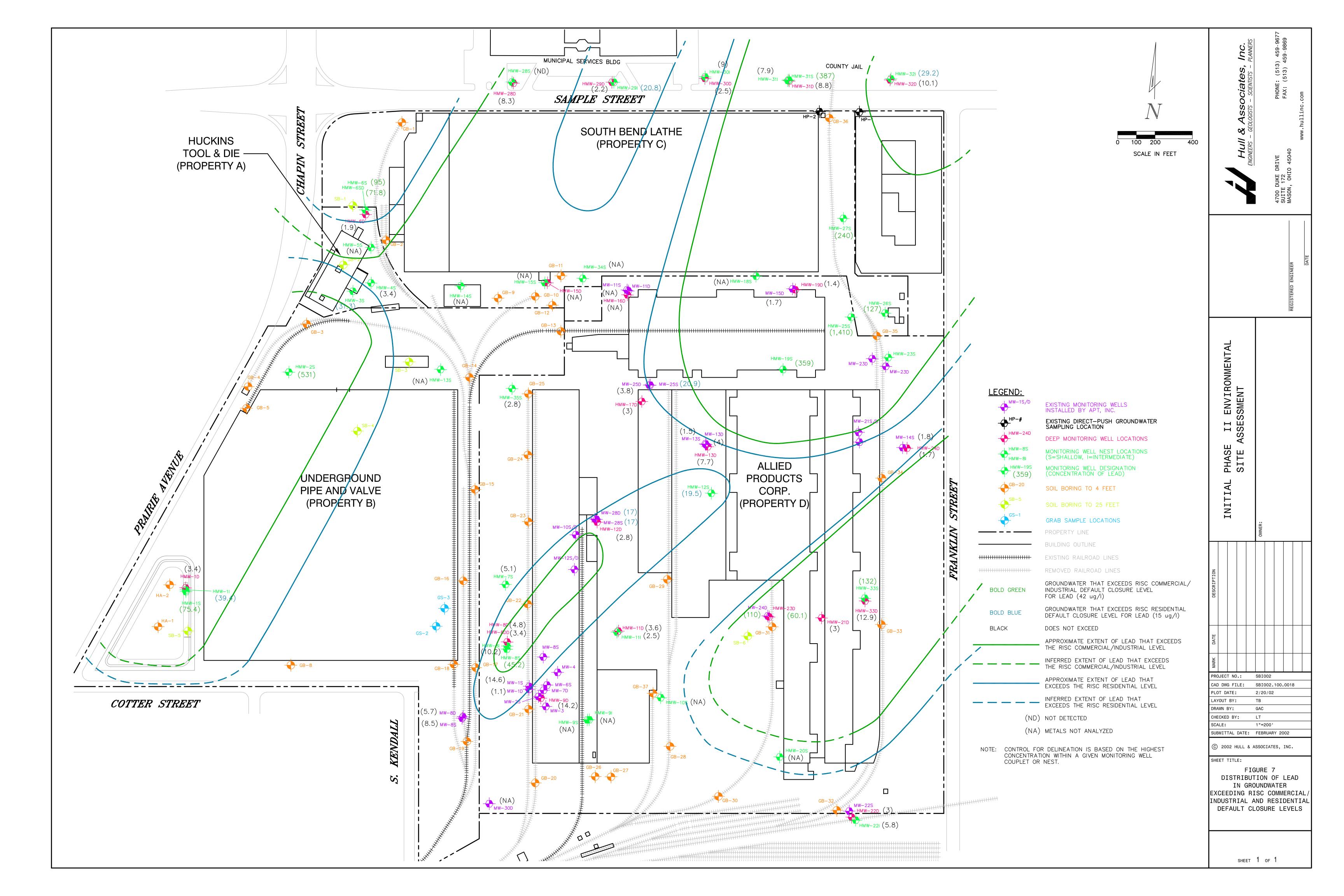


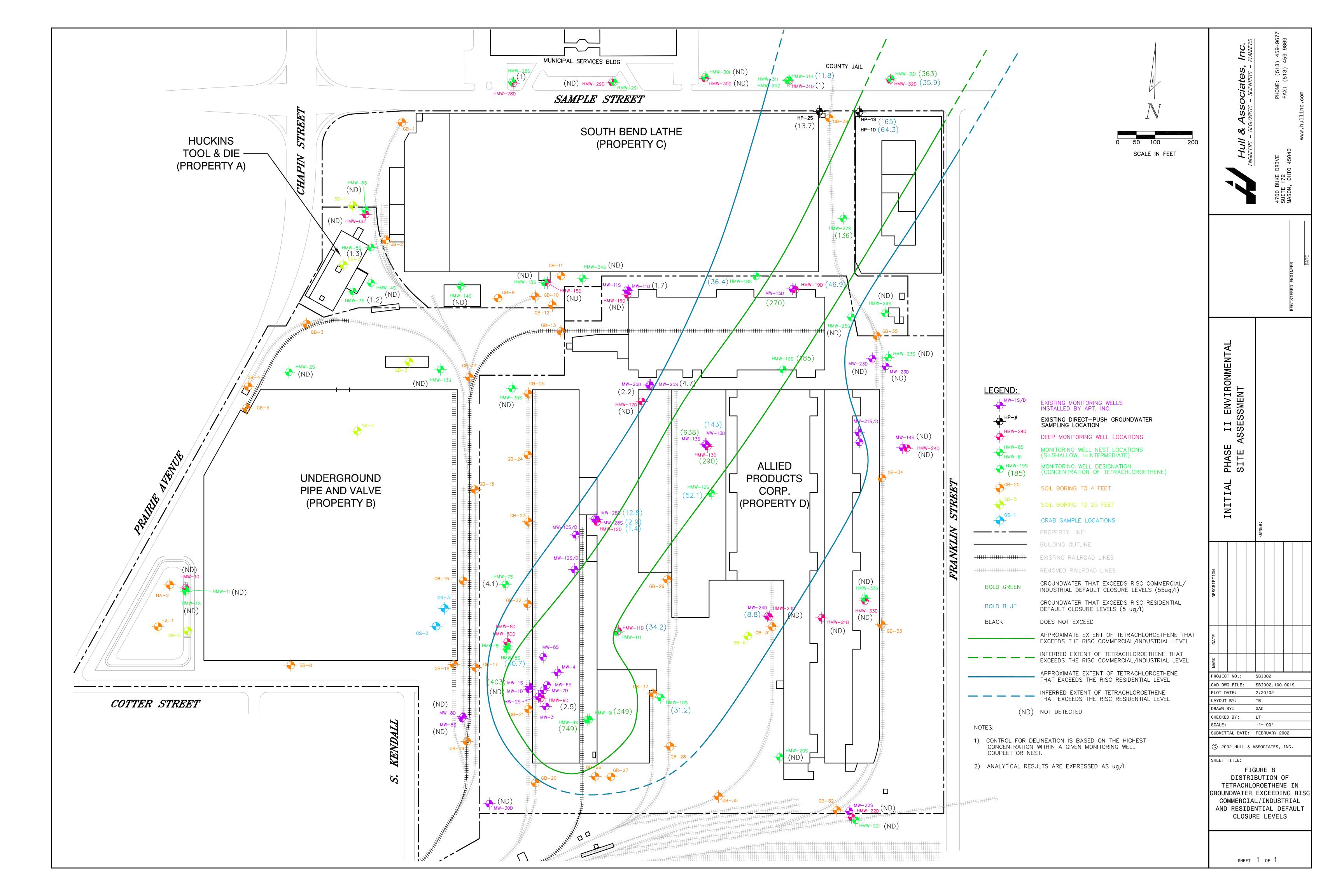


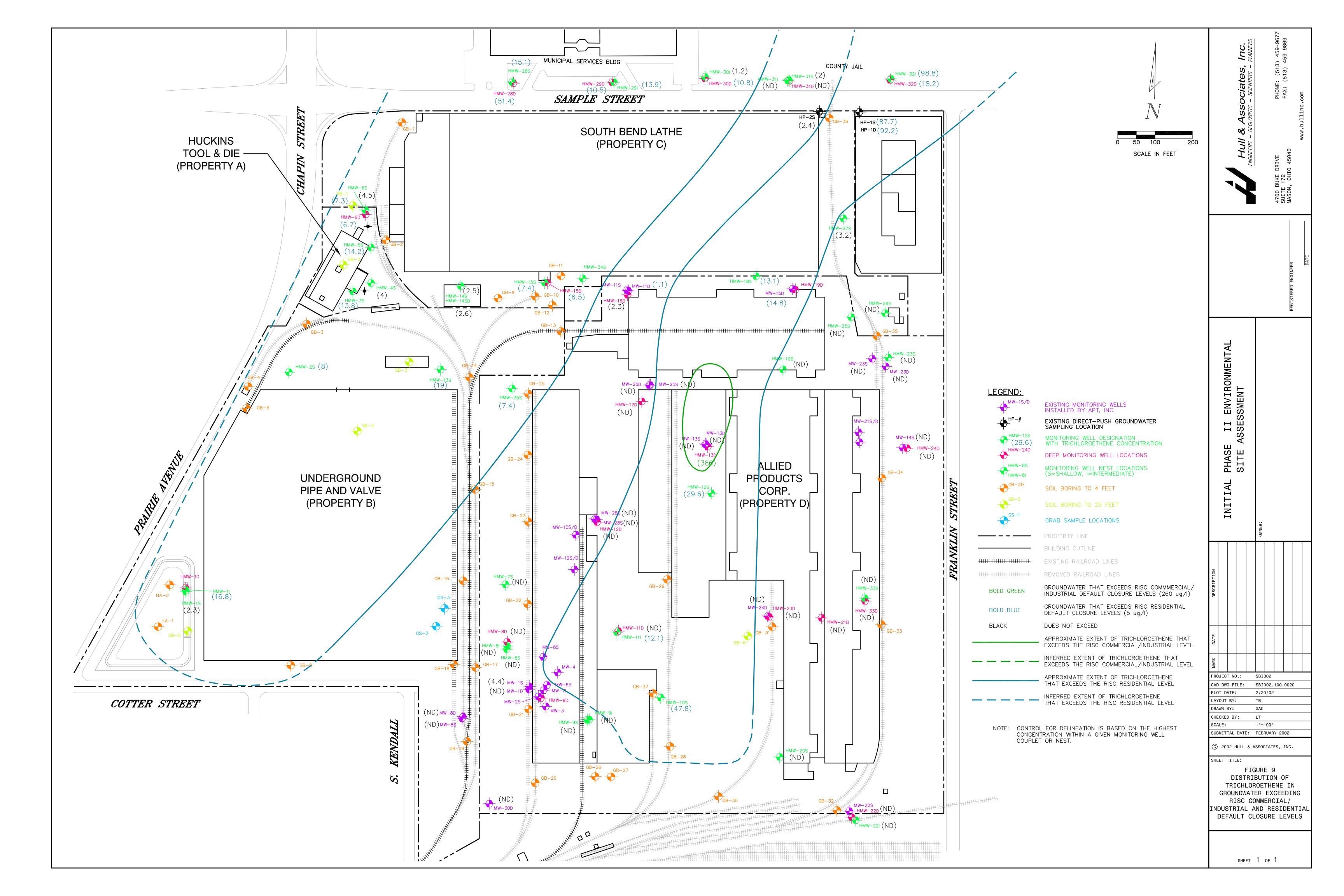


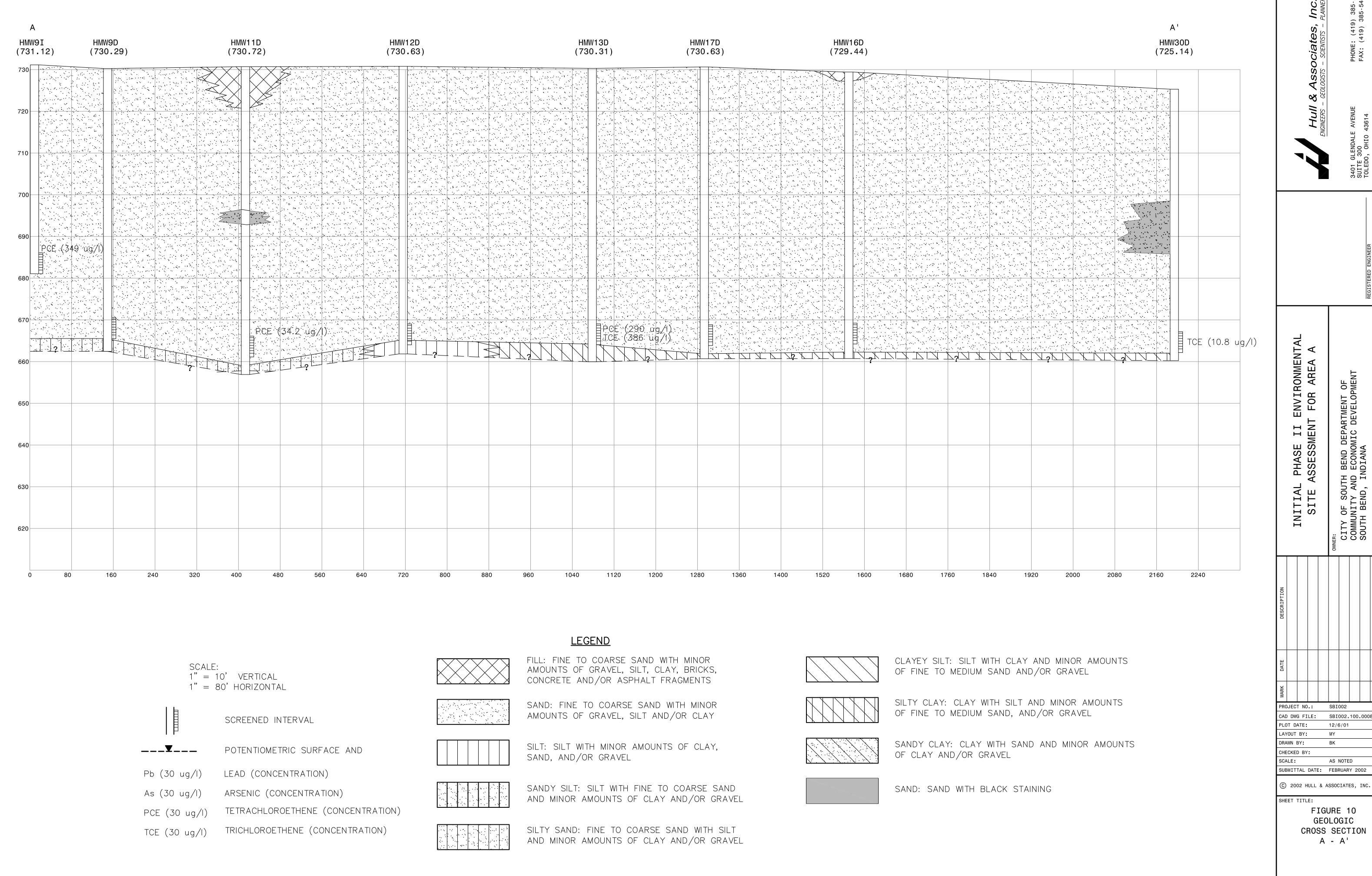










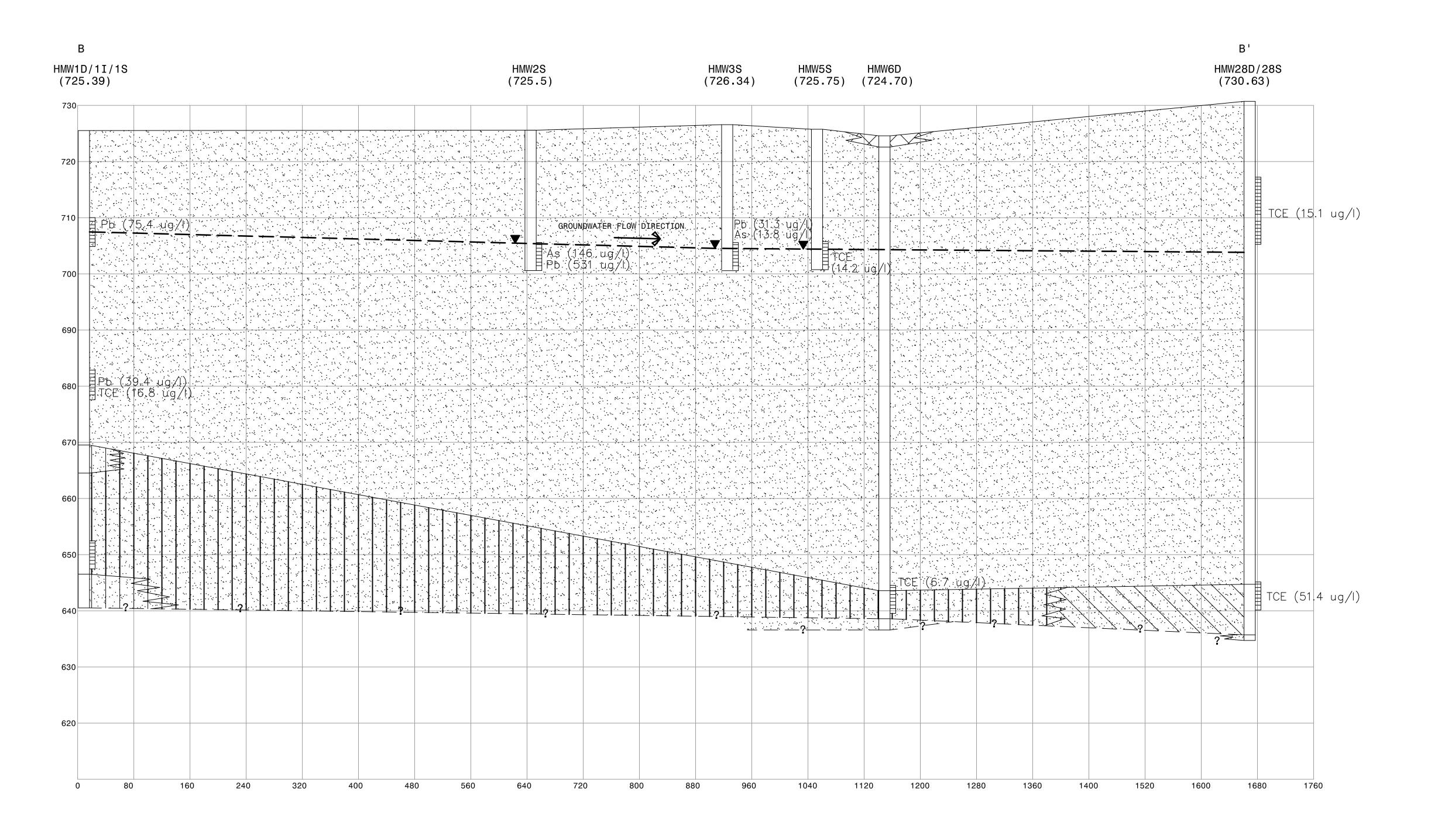


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SBI002.100.0008

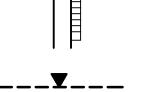
SUBMITTAL DATE: FEBRUARY 2002

CROSS SECTION



# <u>LEGEND</u>

SCALE: 1" = 10' VERTICAL 1" = 80' HORIZONTAL



SCREENED INTERVAL

\_\_\_\\_\_

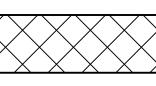
POTENTIOMETRIC SURFACE AND

Pb (30 ug/l) LEAD (CONCENTRATION)

As (30 ug/l) ARSENIC (CONCENTRATION)

PCE (30 ug/l) TETRACHLOROETHENE (CONCENTRATION)

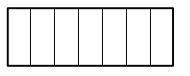
TCE (30 ug/I) TRICHLOROETHENE (CONCENTRATION)



FILL: FINE TO COARSE SAND WITH MINOR AMOUNTS OF GRAVEL, SILT, CLAY, BRICKS, CONCRETE AND/OR ASPHALT FRAGMENTS



SAND: FINE TO COARSE SAND WITH MINOR AMOUNTS OF GRAVEL, SILT AND/OR CLAY



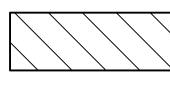
SILT: SILT WITH MINOR AMOUNTS OF CLAY, SAND, AND/OR GRAVEL



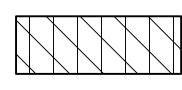
SANDY SILT: SILT WITH FINE TO COARSE SAND AND MINOR AMOUNTS OF CLAY AND/OR GRAVEL



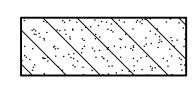
SILTY SAND: FINE TO COARSE SAND WITH SILT AND MINOR AMOUNTS OF CLAY AND/OR GRAVEL



CLAYEY SILT: SILT WITH CLAY AND MINOR AMOUNTS OF FINE TO MEDIUM SAND AND/OR GRAVEL



SILTY CLAY: CLAY WITH SILT AND MINOR AMOUNTS OF FINE TO MEDIUM SAND, AND/OR GRAVEL



SANDY CLAY: CLAY WITH SAND AND MINOR AMOUNTS OF CLAY AND/OR GRAVEL



SAND: SAND WITH BLACK STAINING

INITIAL SITE /

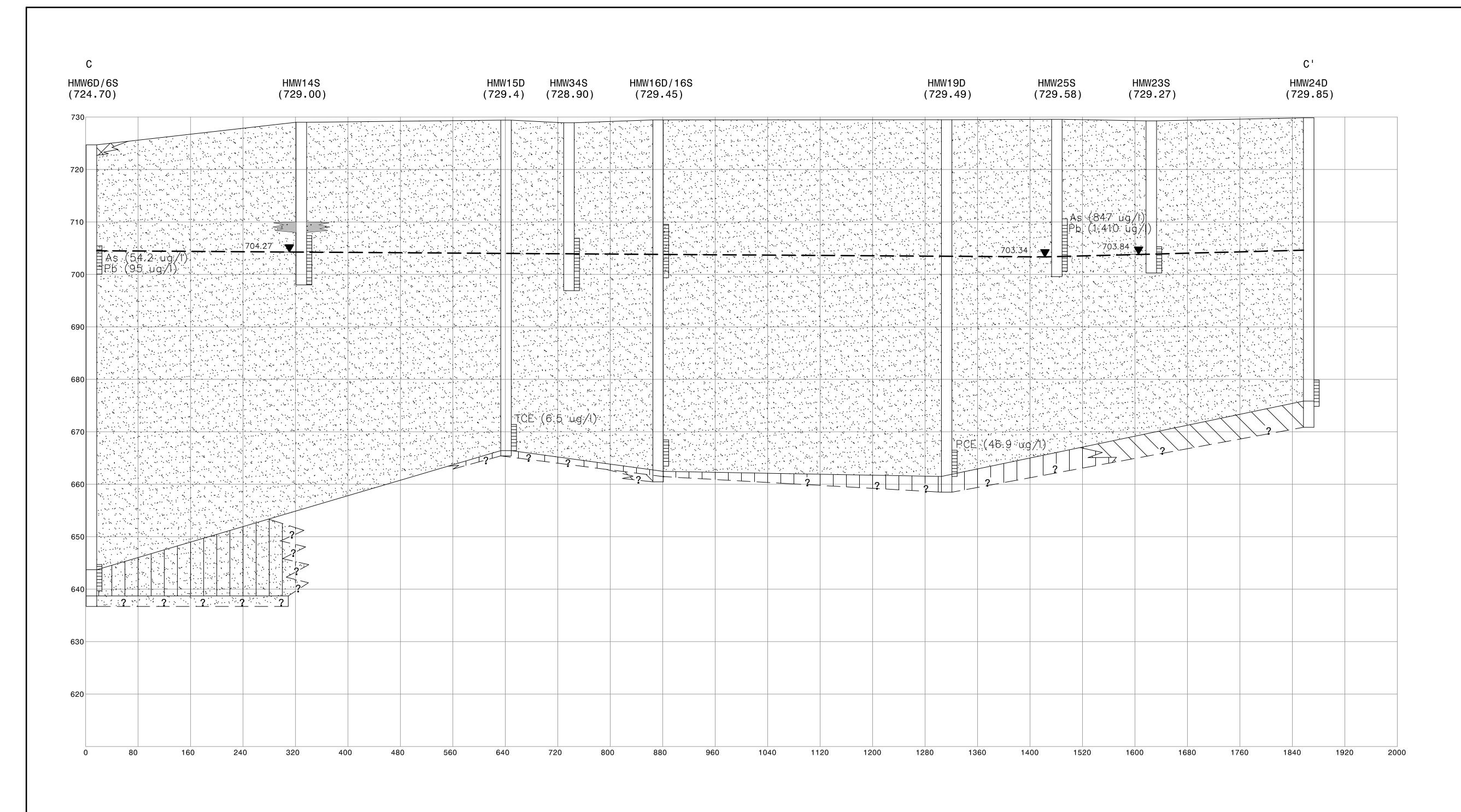
PROJECT NO.: SBI002 SBI002.100.0009 AYOUT BY: MY DRAWN BY:

CHECKED BY: SUBMITTAL DATE: FEBRUARY 2002

© 2002 HULL & ASSOCIATES, INC.

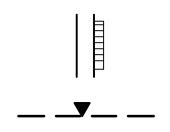
SHEET TITLE:

PLATE 11 GEOLOGIC CROSS SECTION B - B'





SCALE: 1" = 10' VERTICAL 1" = 80' HORIZONTAL



SCREENED INTERVAL

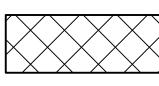
POTENTIOMETRIC SURFACE AND

Pb (30 ug/l) LEAD (CONCENTRATION)

As (30 ug/l) ARSENIC (CONCENTRATION)

TETRACHLOROETHENE (CONCENTRATION) PCE (30 ug/l)

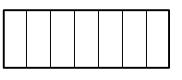
TRICHLOROETHENE (CONCENTRATION) TCE (30 ug/l)



FILL: FINE TO COARSE SAND WITH MINOR AMOUNTS OF GRAVEL, SILT, CLAY, BRICKS, CONCRETE AND/OR ASPHALT FRAGMENTS



SAND: FINE TO COARSE SAND WITH MINOR AMOUNTS OF GRAVEL, SILT AND/OR CLAY



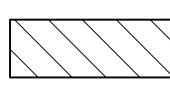
SILT: SILT WITH MINOR AMOUNTS OF CLAY, SAND, AND/OR GRAVEL



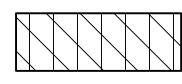
SANDY SILT: SILT WITH FINE TO COARSE SAND AND MINOR AMOUNTS OF CLAY AND/OR GRAVEL



SILTY SAND: FINE TO COARSE SAND WITH SILT AND MINOR AMOUNTS OF CLAY AND/OR GRAVEL



CLAYEY SILT: SILT WITH CLAY AND MINOR AMOUNTS OF FINE TO MEDIUM SAND AND/OR GRAVEL



SILTY CLAY: CLAY WITH SILT AND MINOR AMOUNTS OF FINE TO MEDIUM SAND, AND/OR GRAVEL



SANDY CLAY: CLAY WITH SAND AND MINOR AMOUNTS OF CLAY AND/OR GRAVEL



SAND: SAND WITH BLACK STAINING

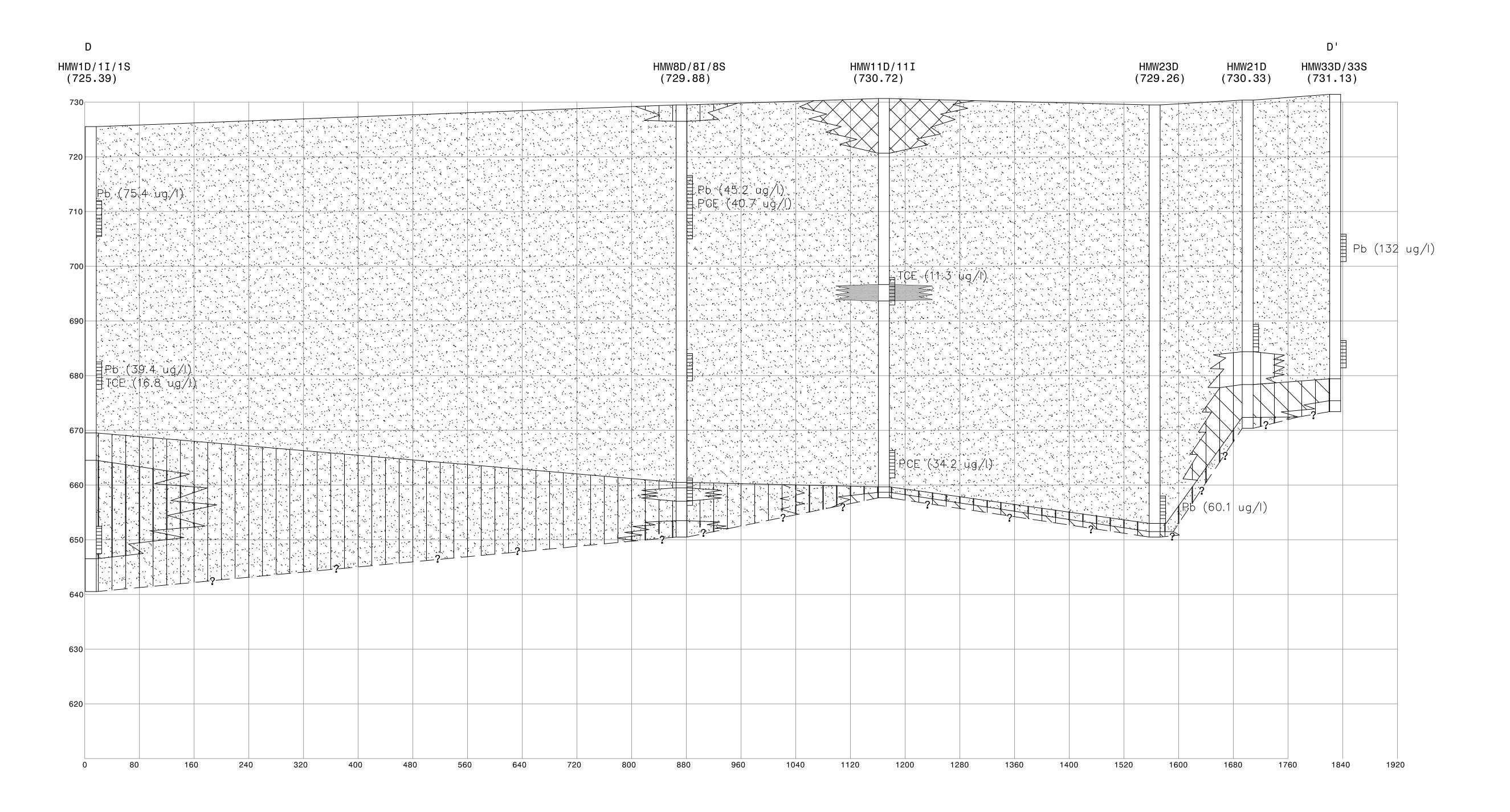
INITIAL SITE / CITY OF (COMMUNITY SOUTH BEN

SBI002.100.0010

PROJECT NO.: SBI002 AYOUT BY: MY DRAWN BY: GAC

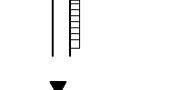
CHECKED BY: SUBMITTAL DATE: FEBRUARY 2002

© 2002 HULL & ASSOCIATES, INC. SHEET TITLE: PLATE 12 GEOLOGIC CROSS SECTION C - C'





SCALE: 1" = 10' VERTICAL 1" = 80' HORIZONTAL



SCREENED INTERVAL

\_\_\_\\_\_

POTENTIOMETRIC SURFACE AND

Pb (30 ug/l)

LEAD (CONCENTRATION)

As (30 ug/l)

ARSENIC (CONCENTRATION)

TCE (30 ug/l)

PCE (30 ug/l)

TETRACHLOROETHENE (CONCENTRATION) TRICHLOROETHENE (CONCENTRATION)

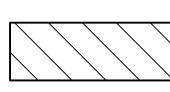
FILL: FINE TO COARSE SAND WITH MINOR AMOUNTS OF GRAVEL, SILT, CLAY, BRICKS, CONCRETE AND/OR ASPHALT FRAGMENTS

SAND: FINE TO COARSE SAND WITH MINOR AMOUNTS OF GRAVEL, SILT AND/OR CLAY

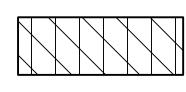
SILT: SILT WITH MINOR AMOUNTS OF CLAY, SAND, AND/OR GRAVEL

SANDY SILT: SILT WITH FINE TO COARSE SAND AND MINOR AMOUNTS OF CLAY AND/OR GRAVEL

SILTY SAND: FINE TO COARSE SAND WITH SILT AND MINOR AMOUNTS OF CLAY AND/OR GRAVEL



CLAYEY SILT: SILT WITH CLAY AND MINOR AMOUNTS OF FINE TO MEDIUM SAND AND/OR GRAVEL



SILTY CLAY: CLAY WITH SILT AND MINOR AMOUNTS OF FINE TO MEDIUM SAND, AND/OR GRAVEL



SANDY CLAY: CLAY WITH SAND AND MINOR AMOUNTS OF CLAY AND/OR GRAVEL



SAND: SAND WITH BLACK STAINING

ENVIRONMENTAL T FOR AREA A

INITIAL SITE /

PROJECT NO.: SBI002 SBI002.100.0011

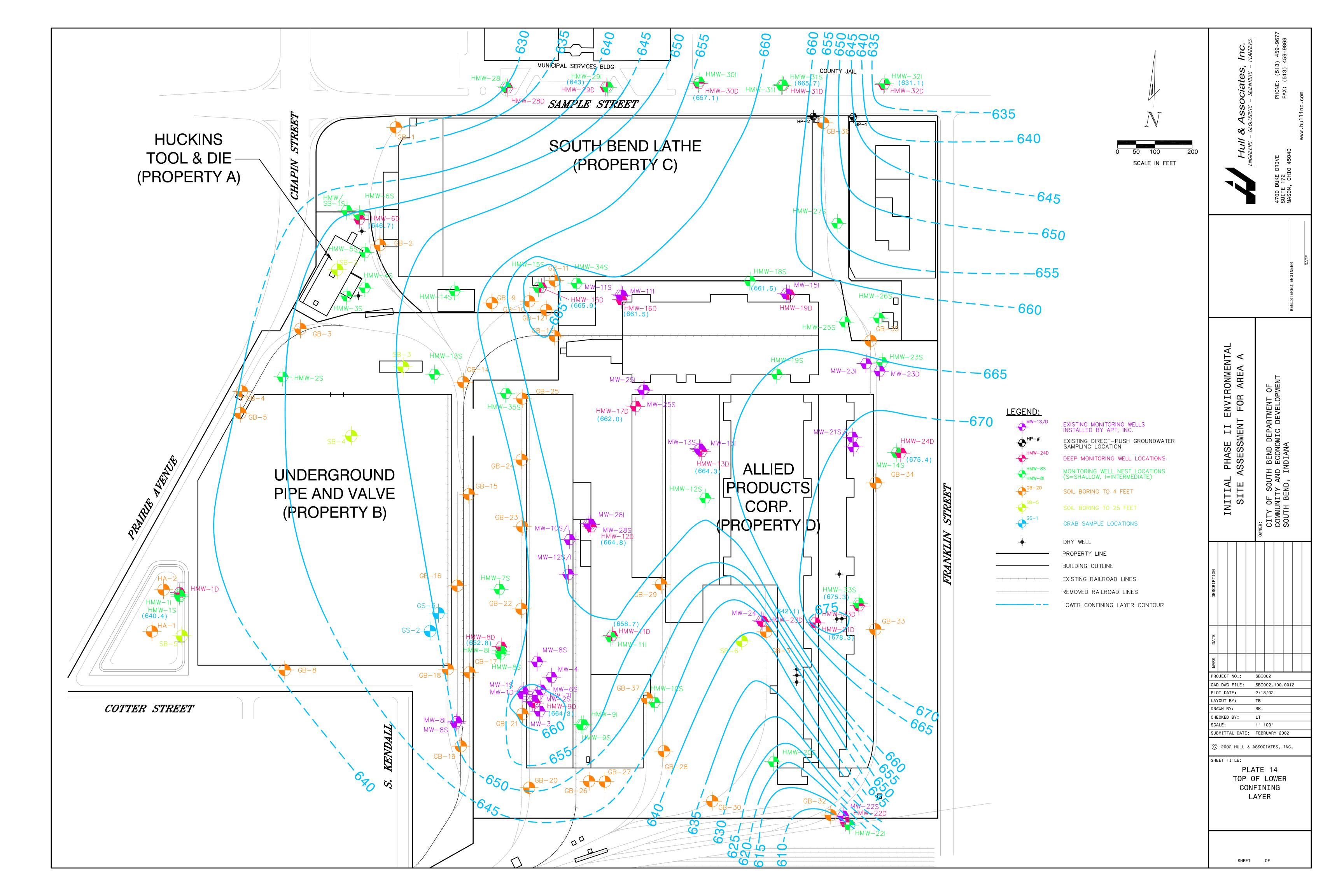
AYOUT BY: MY DRAWN BY: CHECKED BY:

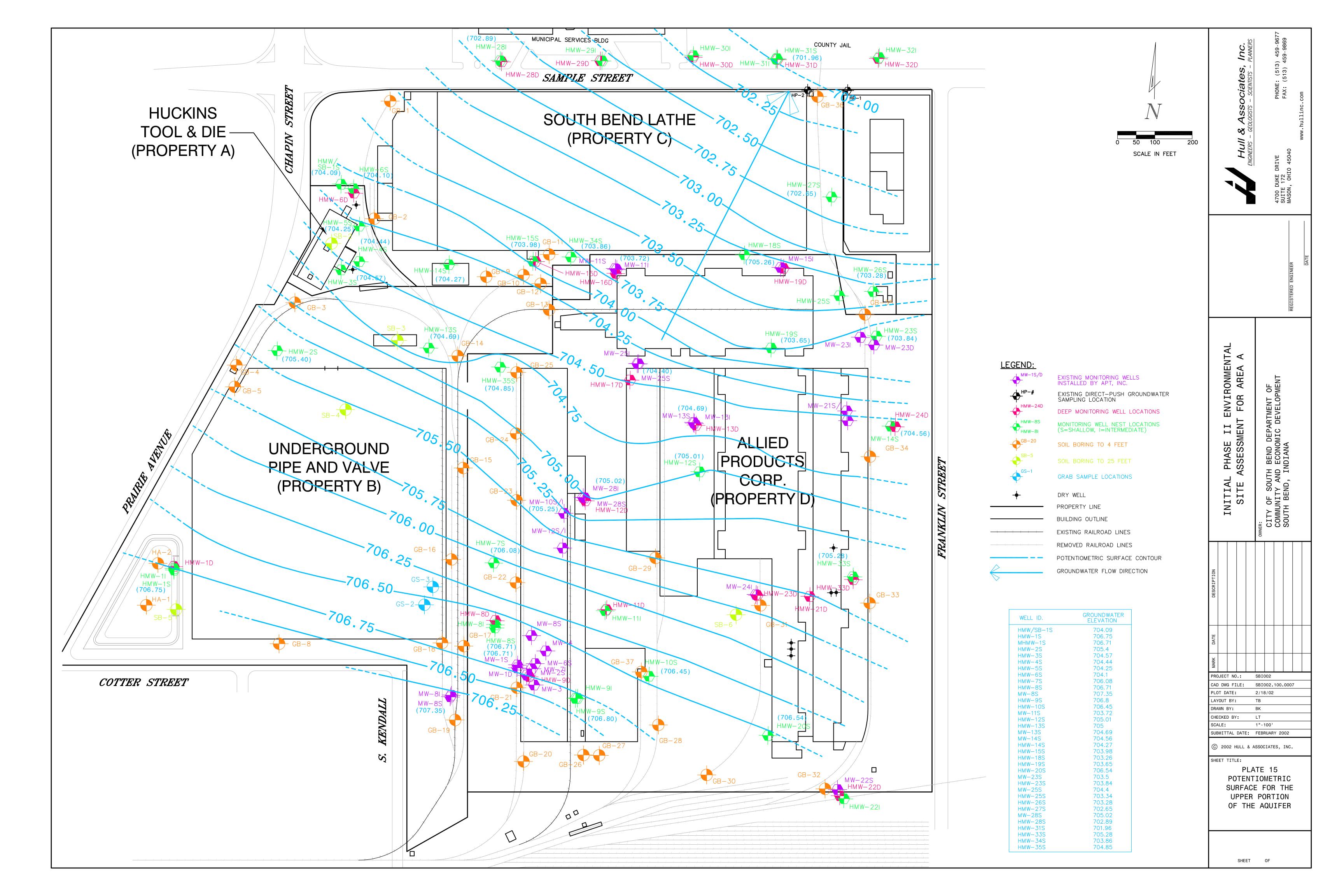
SUBMITTAL DATE: FEBRUARY 2002

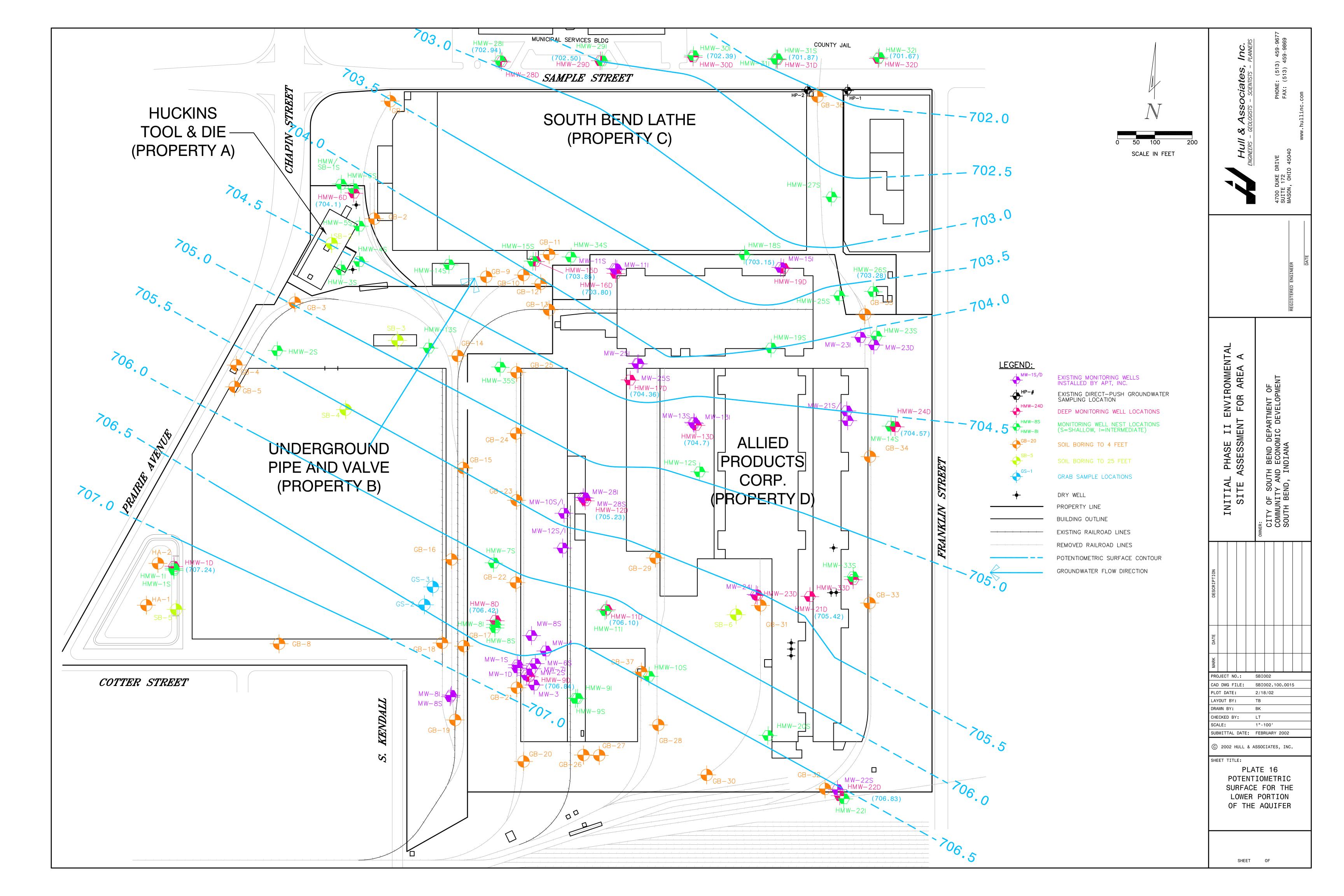
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SHEET TITLE:

PLATE 13 GEOLOGIC CROSS SECTION D - D'







# **APPENDIX A**

Soil Boring Logs and Well Construction Diagrams

: 07/31/01 Date Started : 07/31/01 LOG OF BORING HA-1 **Date Completed** Logged by : Mike Coonfare Reviewed by (Page 1 of 1) **Drilling Contractor** : ProbeTech & āssociates, inc. Drilling Method G. Elev. (ft. USGS) : Not Surveyed : Hand Auger South Bend Area A : 0.0 (10.2 EV) Sampling Method PID/FID Model Franklin & Sample South Bend, IN : 4.0' PID/FID Calibration : 100ppm Isobutylene Total Depth (ft.) S. Water Level Date : Drum Label ID SBI002 S. Water Level (ft.) Water Levels Soil Samples ▼ Static Sampled Int. Sample Recovery Sampler Type/ Sample Number Sample Interval/ During Drilling PID / FID (ppm) Soil Samples Water Levels Graphic Log Lab Sample Blow Count (6"-12"-6") Depth Surf. **REMARKS** Elev. in **DESCRIPTION** Feet 0 + 0Topsoil, rootlets SS-1 2.6 0.0-0.5 SS-1 Dark brown SAND, rootlets 0.5-1.0 Same as above **SS-2** 5.1 1.0-1.3 Brown SAND, some gravel, dry SS-2 1.3-1.5 Brown SAND, coarse, moist, trace gravel SS-3 4.7 1.5-2.3 Same as above 2---2 SS-4 4.1 2.3-2.8 F:\CLIENTS\SB\\SB\\02\SO\L BORING LOGS\HA-1.BOR Same as above SS-5 4.0 2.8-3.3 -3 3-Same as above SS-6 3.5 3.3-4.0 End of boring at 4' 11-28-2001

: 07/31/01 Date Started : 07/31/01 **LOG OF BORING HA-2 Date Completed** Logged by : Mike Coonfare Reviewed by (Page 1 of 1) associates, inc. **Drilling Contractor** : ProbeTech G. Elev. (ft. USGS) : Hand Auger : Not Surveyed Drilling Method South Bend Area A PID/FID Model Sampling Method : 0.0 (10.2 EV) Franklin & Sample PID/FID Calibration : 100ppm Isobutylene South Bend, IN Total Depth (ft.) : 4.0' S. Water Level Date Drum Label ID SBI002 S. Water Level (ft.) Water Levels Soil Samples ▼ Static Sampled Int. Sample Recovery Sampler Type/ Sample Number Sample Interval/ \_\_\_\_ During Drilling PID / FID (ppm) Soil Samples Water Levels Graphic Log Lab Sample **Blow Count** (6"-12"-6") Depth Surf. REMARKS Elev. in **DESCRIPTION** Feet 0-10 Dark brown SAND with gravel, rootlets, Brown SAND with gravel, rootlets SS-1 2.7 0.0-0.7 SS-2 4.5 0.7-1.3 1. Same as above (no rootlets) SS-3 4.7 1.3-1.7 Light brown SAND, some gravel 6.4 SS-4 1.7-2.2 2 -2 Light brown coarse SAND, trace gravel, moist **SS-5** 8.1 2.2-2.7 SS-6 7.8 Same as above F:\CLIENTS\SB\\SB\02\SO\L BORING LOGS\HA-2.BOR 2.7-3.3 3 - - 3 Same as above **SS-7** 6.8 3.3-4.0 End of boring at 4'

: 07/31/01 Date Started : 07/31/01 **LOG OF BORING HA-3 Date Completed** : Mike Coonfare Logged by Reviewed by (Page 1 of 1) associates, inc. **Drilling Contractor** : ProbeTech : Not Surveyed G. Elev. (ft. USGS) **Drilling Method** : Hand Auger South Bend Area A : 0.0 (10.2 EV) PID/FID Model Sampling Method Franklin & Sample PID/FID Calibration : 100ppm Isobutylene : 1.4' South Bend, IN Total Depth (ft.) Drum Label ID S. Water Level Date SBI002 S. Water Level (ft.) Water Levels Soil Samples ▼ Static Sampled Int. Sample Recovery Sample Interval/ During Drilling Sampler Type/ Sample Number PID / FID (ppm) Water Levels Soil Samples Graphic Log Lab Sample Blow Count (6"-12"-6") Depth Surf. **REMARKS** Elev. in **DESCRIPTION** Feet Dark brown SAND with cinder, rootlets, dry 0+0 SS-1 0.0 0.0-0.9 Same as above but cinders are in smaller pieces; rootlets are less prevelant **SS-2** 3.3 1-----1 0.9-1.4 Refusal at 1.4' (rock) End of boring at 1.4' FICLIENTSISBINSBI002/SOIL BORING LOGSIHA-3.BOR 2-11-28-2001

: 07/31/01 Date Started **LOG OF BORING HA-4** Date Completed : 07/31/01 Logged by : Mike Coonfare Reviewed by (Page 1 of 1) : ProbeTech <u>associates</u>, inc. **Drilling Contractor** : Hand Auger G. Elev. (ft. USGS) : Not Surveyed South Bend Area A **Drilling Method** PID/FID Model : 0.0 (10.2 EV) Sampling Method Franklin & Sample South Bend, IN Total Depth (ft.) : 2.0' PID/FID Calibration : 100ppm Isobutylene S. Water Level Date Drum Label ID SBI002 S. Water Level (ft.) Water Levels Soil Samples Sampled Int. ▼ Static Sample Recovery Sample Interval/ During Drilling PID / FID (ppm) Soil Samples Water Levels Lab Sample Graphic Log **Blow Count** (6"-12"-6") Depth Surf. **REMARKS** Elev. in **DESCRIPTION** Feet 0-0 Dark brown SAND with cinder, rootlets, dry 2.2 **SS-1** 8.0-0.0 Same as above with less rootlets SS-2 5.2 0.8-1.4 1 - 1 FICLIENTS\SBI\SBI\02\SOIL BORING LOGS\HA-4.BOR Cinder fill SS-3 5.1 1.4-2.0 End of boring at 2.0' 11-28-2001

: 08/23/01 Date Started : 08/23/01 **LOG OF BORING SB-26A Date Completed** : Matt Young Logged by Reviewed by (Page 1 of 1) **Drilling Contractor** : ProbeTech āssociates, inc. **Drilling Method** : Split Spoon / GeoProbe G. Elev. (ft. USGS) : Not Surveyed South Bend Area A **UP&V Reservoir** Sampling Method PID/FID Model : PID / 2020 : 4.0' South Bend, IN Total Depth (ft.) PID/FID Calibration : 100ppm Isobutylene S. Water Level Date : Drum Label ID SBI002 S. Water Level (ft.) Water Levels Soil Samples Sampled Int. ▼ Static Sampler Type/ Sample Number Sample Recovery Sample Interval/ PID / FID (ppm) During Drilling Soil Samples Water Levels Graphic Log Lab Sample Blow Count (6"-12"-6") Surf. Depth REMARKS Elev. **DESCRIPTION** Feet 0-0 Concrete to 9" 3.2 **SS-1** 24/24 0.0-2.0 Brown clayey SAND, moist Same as above - -2 SS-2 24/18 6.8 2-2.0-4.0 F:\CLIENTS\SB\\SB\\SB\\OS\\SO\\LOGS\\SB-26A.BOR 3--3 Brown fine to medium SAND, trace silt End of boring at 4.0' 11-30-2001

: 08/23/01 Date Started : 08/23/01 **Date Completed** LOG OF BORING SB-27A Logged by : Matt Young Reviewed by (Page 1 of 1) : ProbeTech & associates, inc. **Drilling Contractor** : Split Spoon / GeoProbe G. Elev. (ft. USGS) : Not Surveyed **Drilling Method** South Bend Area A : PID / 2020 **UP&V** Reservoir Sampling Method PID/FID Model : 4.0' South Bend, IN Total Depth (ft.) PID/FID Calibration : 100ppm Isobutylene S. Water Level Date : Drum Label ID SBI002 S. Water Level (ft.) Soil Samples Water Levels ▼ Static Sampled Int. Sample Recovery Sampler Type/ Sample Number Sample Interval/ PID / FID (ppm) During Drilling Soil Samples Water Levels Graphic Log Lab Sample Blow Count (6"-12"-6") Depth Surf. **REMARKS** Elev. in **DESCRIPTION** Feet 0+0 Crushed LIMESTONE and slag gravel SS-1 24/24 4.1 0.0-2.0 SS-2 24/24 6.5 -2 Dark brown clayey FILL, few gravel, few sand, brick fragments, cloth noted 2.0-4.0 FICLIENTSISBINSBI002\SOIL BORING LOGS\SB-27A.BOR **↓ -**3 End of boring at 4.0'

South Bend Area A UP&V Reservoir South Bend, IN

SBI002

Date Started

Date Completed Logged by

Reviewed by **Drilling Contractor** 

Drilling Method Sampling Method

Total Depth (ft.) S. Water Level Date : S. Water Level (ft.)

: 07/31/01

: 07/31/01

: Matt Young

: Topflite : 4.25 HSA

: Split Spoon : 85.0'

**LOG OF BORING HMW-1D** 

(Page 1 of 5)

G. Elev. (ft. USGS)

: Not Surveyed

PID/FID Model

: Photo vac 100ppm ISO

PID/FID Calibration

: 100ppm Isobutylene

			1								I	
									Soil Samples	Water Levels		
	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Sampled Int.  Lab Sample  DESCR	▼ Static □ During Drilling	Well: HN Elev.:	//W-1D
ŀ			0) 0)		ш.							
	0- 1-		HA-1/ 0.0-2.0		2.3				Black organic rich me trace silt, trace grave throughout	edium to fine SAND, el, dry, rootlets		Surface Casing
	=	2	HA-2/ 2.0-4.0		4.8				Brown medium to co gravel, moist, loose	arse SAND, trace		Bentonite Seal
	3-	-3					$\  \Lambda \ $					1
	4-	-4	SS-3 4.0-6.0	24/10	4.9	1-5-1			Used tile probe from 4.0'	4 to 5, begin s/s at		
	5-	-5							Same as above, trac	e silt	0 0	4
ı	6-	6	SS-4 6.0-8.0	24/12	3.3	2-3-1			Same as above		0 0 0 0	
	7-	-7					$   \rangle  $				0 0	
	8-	-8	SS-5 8.0-10.0	24/18	6.0	2-2-3			Same as above, less	s silt	0 0	. 4
	10	-9 10 11	SS-6 10.0-12.0	24/12	6.4	3-9-9			Same as above		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	2" Sch. 40 PVC riser
SHMW-1D.BOR	12	-12	SS-7 12.0-14.0	24/14	4.8	4-14-11			Same as above		0 a	a
F:CLIENTS\SB\\SB\\SD\\SO\\LBOR\\GLGS\\HMW-1D.BOR	13- 14-	-13 -14	SS-8 14.0-16.0	24-12	3.1	4-20-11			Same as above		1 1.11	0
2/SOI	15-	-15					V					
ITS\SBI\SBI002	16-	-16	SS-9 16.0-18.0	24/24	4.7	9-26-12			Same as above, we coarse sand	t, more gravel, more	-	
CLIEN	17-	-			<u> </u>		$\mathbb{I}^{\prime}$	<u>                                     </u>	]		00	
ű.	l	ــــــــــــــــــــــــــــــــــــــ	<del></del>									

South Bend Area A **UP&V** Reservoir South Bend, IN

SBI002

: 07/31/01 Date Started : 07/31/01

: Matt Young

: Topflite

: 4.25 HSA

: Split Spoon

Date Completed Logged by

Reviewed by **Drilling Contractor** 

Drilling Method Sampling Method

Total Depth (ft.) : 85.0 S. Water Level Date S. Water Level (ft.)

LOG OF BORING HMW-1D

(Page 2 of 5)

G. Elev. (ft. USGS) : Not Surveyed

PID/FID Model : Photo vac 100ppm ISO PID/FID Calibration : 100ppm Isobutylene

		OBIOUZ			s. w	ater Le	evel (ft	i.) :		
Depth in	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples  Sampled Int.  Lab Sample	Water Levels  ▼ Static  ¬ During Drilling	Well: HMW-1D Elev.:
Feet		Sam	Sam	PID.	Blow (6"-1	Soil	Grap	DESCR	RIPTION	
	17 18	SS-10 18.0-20.0	24/12	2.8	9-24-6	X		Same as above		
	-19		24/12	6.1	3-10-7			Same as above		, , , , , , , , , , , , , , , , , , ,
	20 21	SS-11 20.0-22.0	24/12	0.1	J-10-7			Came as above		
	-22	SS-12 22.0-24.0	24/12	5.9	4-10-8			Same as above		
	-24	SS-13 24.0-26.0	24/12	5.0	5-18-13			Same as above, les sand	s gravel, less coarse	
25- 26-		SS-14 26.0-28.0	24/12	4.1	2-14-2			Same as above		Grout 2" Sch. 40 PVC riser
28-	-27 -28	SS-15 28.0-30.0	24/16	3.0	4-16-13			Same as above		
WHW.	-29 -30	SS-16 30.0-32.0	24/14	8.4	5-18-15			Same as above, hit	rock in end of spoon	
OIL BORING L	-31	30.0-32.0								
32 - 32 - 33 -	-32	SS-17 32.0-34.0	24/12	5.1	9-48-30			Same as above		
E:\CLIENTS\						//	∭.: ::: —————————————————————————————————			0 0 0

South Bend Area A UP&V Reservoir South Bend, IN

SBI002

Date Started

Date Completed Logged by

: Matt Young

: 07/31/01

: 07/31/01

: Topflite

Reviewed by

**Drilling Contractor** Drilling Method

: 4.25 HSA Sampling Method : Split Spoon Total Depth (ft.) : 85.0'

S. Water Level Date : S. Water Level (ft.)

#### **LOG OF BORING HMW-1D**

(Page 3 of 5)

G. Elev. (ft. USGS)

: Not Surveyed

PID/FID Model

: Photo vac 100ppm ISO : 100ppm Isobutylene

PID/FID Calibration

Drum Label ID

			· · · · · · · · · · · · · · · · · · ·						Cail Camples	Mater Levels		
									Soil Samples	Water Levels		·
	Depth	Surf.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	ount -6")	Samples	c Log `	Sampled Int.  Lab Sample	▼ Static	Welf: HN Elev.:	MW-1D
	in Feet	Elev.	Sample	Sample	PID / F	Blow Count (6"-12"-6")	Soil Sa	Graphic Log	DESCR	IPTION		
	34-	34	SS-18	24/18	7.1	7-38-29	K A		Same as above, mor	o graval	जिन्ह	7]
	_		34.0-36.0	24/10	7.1	1-30-29	$\  \setminus / \ $		Same as above, mor	e graver	0 .	
	35 –	-35	ا , ا				X				0	
	36	-36	, SS-19 36.0-37.0	24/0 12/6	7.1 5.8	15-50-27			No recovery, resamp	led at 36 to 37'	\$ a } t	
	27	-37		24/12	5.5	8-34-25			Same as above incr	ease to a few	0 .	
	31 -	-31	SS-20 37.0-39.0	24/12	5.5	0-34-23			Same as above, incregravel, more coarse	sand		
	38-	-38					V				0	d
	-						$\  \wedge \ $				0 .	
	39-	-39	SS-21 39.0-41.0	24/12	0	21-40-27	$ \leftarrow\rangle$		Same as above, bac	k to trace of gravel	0 0	
	-		39.0-41.0				$\  \setminus / \ $				0 0	<u>.</u>
}	40 –	-40					X				0	
				0440		00 00 07	/ \		0		0 0	. 4
	41-	-41	SS-22 41.0-43.0	24/12	1.9	29-66-27			Same as above		0 0	
	42	-42					IIV:				0 0	. 4
	-	"-					$   \Lambda   $				0 0	- Grout - 2" Sch. 40 PVC riser
	43	-43	SS-23 43.0-45.0	24/18	3.5	15-51-27			Same as above		0.	. d
	-		43.0-45.0				$\  \setminus A \ $				. 0 .	. 4
	44 –	-44					X				0 0	. d
		1					$\mathbb{N}_{\mathbb{N}}$				0 .	
æ	45_	<b>-4</b> 5	SS-24 45.0-47.0	24/12	1.7	18-85-50			Same as above		0 0	
RING LOGS/HMW-1D.BOR	46	-46					IIVI				0.0	
-MMI		1					$   \wedge   $				0 0	
JISS(F	47 -	47	SS-25 47.0-49.0	24/22	1.8	14-66-40			Same as above, less	s gravel	0.	. 🖠
NG LC		1	47.0-49.0		1		$\  \setminus f \ $				0.0	
SORII	48	-48					X		Brown fine SAND, tra	ace silt, wet	0	
OIL E	-	-					$\parallel/\parallel$				0 -	. 9
1002\\$	49-	49	SS-26 49.0-51.0	24/16	1.1	7-39-27			Same as above, sluf	f in 1st feet	0 0	
3I\SBI	50-	-50					$\  \bigvee \ $				0 0	. 4
ITS/S	50-	50					$\  \wedge \ $					.
F:\CLIENTS\SBI\SBI002\SOIL BO	51 <del>-</del>						<u> </u>	<u> </u>	]	•	0 4	
ű.			1					***				

South Bend Area A UP&V Reservoir South Bend, IN

SBI002

Date Started

Date Completed Logged by

Reviewed by Drilling Contractor

Drilling Method Sampling Method Total Depth (ft.)

S. Water Level (ft.)

: 07/31/01

: 07/31/01 : Matt Young

: Topflite : 4.25 HSA : Split Spoon

: 85.0'

S. Water Level Date :

# LOG OF BORING HMW-1D

(Page 4 of 5)

G. Elev. (ft. USGS)

PID/FID Model

: Not Surveyed : Photo vac 100ppm ISO

PID/FID Calibration

: 100ppm Isobutylene Drum Label ID

	_		 	
r L	evels	_		

						·				
Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log`	Soil Samples Sampled Int.  Lab Sample  DESCR	Water Levels  ▼ Static  ▼ During Drilling  IPTION	Well: HMW-1D Elev.:
51-	-51	00.07	0.4/00		5 40 44			] n	tions CAND trans	0 0 0
52	-52	SS-27 51.0-53.0	24/22	2.3	5-46-44			Brown coarse to med silt, wet Brown fine SAND, tra		, , , , , , , , , , , , , , , , , , ,
53	-53	SS-28 53.0-55.0	24/14	3.0	5-29-21			Same as above, trac gravel	e medium sand and	< c < c <
54	-54					$\ \chi\ $				0 0 0 0
55	-55	SS-29 55.0-57.0	24/22	4.0	7-26-28			Same as above, no e	coarse sand or	
56-	-56					$\  \mathbf{y} \ $				0 0 0
57-	-57	SS-30 57.0-59.0	24/12	3.7	3-9-11			Grey fine silty SAND Same as above, sluf		0
58-	-58					$\  \mathbf{y} \ $				0 0 0
	-59	SS-31 59.0-61.0	24/24	1.3	8-26-16			Same as above, 12"	shoe ss	Grout - Grout - 2" Sch. 40 PVC riser
60-	-60									0 0 0
61-	<b>-</b> 61	SS-32 61.0-63.0	24/24	9.1	13-31-21			Grey fine sandy SIL	Γ, wet, 1st 6" sluff	
62	-62					$\parallel \chi \parallel$				
63-	63	SS-33 63.0-65.0	24/24	7.8	29-45-26			Same as above, inci	rease silt with depth	
64	-64					$\ \chi\ $				
65-	-65	SS-34 65.0-67.0	24/10	9.2	35-50			Same as above		
66-	-66					$\  \mathbf{y} \ $				0 0 0
	-67	SS-35 67.0-69.0	24/24	6.5	15-46-27			Interbeded with clay	at end of spoon	0 0 0
68-	_							Same as above, inte	erbeded clayey silt	0 0
	J	.1								



South Bend Area A **UP&V** Reservoir South Bend, IN

SBI002

Date Started

Date Completed Logged by

Reviewed by **Drilling Contractor** 

Drilling Method Sampling Method

Total Depth (ft.) S. Water Level Date :

: 07/31/01

: 07/31/01

: Matt Young : Topflite

: 4.25 HSA : Split Spoon : 85.0

S. Water Level (ft.)

#### **LOG OF BORING HMW-1D**

(Page 5 of 5)

G. Elev. (ft. USGS)

: Not Surveyed

PID/FID Model PID/FID Calibration

: Photo vac 100ppm ISO : 100ppm Isobutylene

Drum Label ID

					0. 11			., .			
Depth in	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples Sampled Int.  Lab Sample	▼. ▽.	ter Levels Static During Drilling	Well: HMW-1D Elev.:
Feet		San	San	PD	Blov (6"-	Soil	Ö	DESCR	IPTI(	ON	
-	68 69	SS-36 69.0-71.0	24/24	8.2	11-30-19			Same as above, trac	e gra\	/el	Grout  Bentonite Seal
	-70 71	SS-37 71.0-73.0	24/24	3.1	11-48-26			Same as above			2" Sch. 40 PVC riser
	-72 -73	SS-38 73.0-75.0	24/24	6.4	8-34-27			Same as above, mo	e gra	vel	
	-74 -75	SS-39 75.0-77.0	24/24	8.9	6-18-14			Same as above, no	clay, l	ess gravel	2" Sch. 40 0.010-inch Sand Filter Pack Slotted PVC screen
76-	-76 -77	75.0-77.0 SS-40 77.0-79.0	24/24	5.8	4-15-13			Same as above			slotted PVC screen
79-	-78 -79		24/24	3.5	7-17-13			11.5			
Š.	-80	SS-41 79.0-81.0						Grey silty fine SAND	, wet,	trace gravei	
81 - 82 -	-81 82	SS-42 81.0-83.0	24/18	3.9	23-31-50			Same as above  Brown and grey layer	ering		
83 -	-83	SS-43 83.0-85.0	24/24	3.6	14-34-23			Same as above, no	layeriı	ng less silt	
84 -	-84							Same as above, bro layering End of boring at 85'	wn an	nd grey	

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South Bend Area A UP&V Reservoir South Bend, IN

SBI002

Date Started

Date Completed Logged by

: 08/02/01 : 08/02/01 : Matt Young

Reviewed by

**Drilling Contractor** 

: Topflite : 4.25 ID HSA Drilling Method Sampling Method : Split Spoon

Total Depth (ft.) : 24.0' S. Water Level Date :

S. Water Level (ft.)

LOG OF BORING HMW-6S

(Page 1 of 2)

G. Elev. (ft. USGS) PID/FID Model

: Not Surveyed : PID / 2020

PID/FID Calibration

: 100ppm Isobutylene Drum Label ID

					5. W	ater Level (	il.) :		
Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples Graphic Log	Soil Samples Sampled Int.  Lab Sample  DESCR	Water Levels  ▼ Static  ▽ During Drilling	Well: HMW-6S Elev.:
0 - - -		SS-1 0.0-2.0	24/12	7.1	7-27-8		Black organic rich n sand FILL, few silt, slag fragments note	nedium to fine trace gravel, dry, d	Surface Casing
2-	1 2		24/0	8.9	1-4-3				
	<b>-4</b>	SS-3 4.0-6.0	24/10	14.5	1-4-3		No recovery, no cat on spoon  Black stained medi SAND, trace gravel		
		SS-4 6.0-8.0	24/12	11.9	1-4-4		Same as above		Plug 2" Sch. 40 PVC riser
1	-8	SS-5 8.0-10.0	24/12	5.4	2-5-3		Same as above, we	et	
F.ICLIENTSISBINSBIODZISOIL BORING LOGSIHMW-6S.BOR		SS-6 10.0-12.0	24/12	10.5	2-6-7		Same as above		
FACLIENTSISBIO 17	-11						Brown medium to o trace silt, trace gra	coarse SAND, vel	

South Bend Area A UP&V Reservoir South Bend, IN

SB1002

Date Started

Date Completed Logged by

Reviewed by

**Drilling Contractor** Drilling Method

Sampling Method Total Depth (ft.) S. Water Level Date :

: 08/02/01

: 08/02/01 : Matt Young

: Topflite

: 4.25 ID HSA : Split Spoon

: 24.0'

S. Water Level (ft.)

LOG OF BORING HMW-6S

(Page 2 of 2)

G. Elev. (ft. USGS) PID/FID Model

: Not Surveyed : PID / 2020

PID/FID Calibration

: 100ppm Isobutylene

Drum Label ID

	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples  Sampled Int.  Lab Sample  Lab Sample  DESCRIPTION  Water Levels  To Static  During Drilling  Well: HMW-6S  Elev.:
ŀ	12-	12							
	-	12	;	24/2		7-18-12			Same as above, increase gravel,
	14 —	14	SS-7 14.0-16.0	24-10	9.2	6-13-10			Same as above, few gravel, more coarse sand
	15— -	- <b>-</b> 15	·						Plug 2" Sch. 40 PVC riser
)	- - -	16 17	SS-8 16.0-18.0	24/10	8.6	4-15-12			Same as above, less staining
	- - -	-18 19	SS-9 18.0-20.0	24/10	2.5	4-17-9			Same as above, wet at end of spoon, no staining
IMW-6S.BOR	20 –	20	SS-10 20.0-22.0	24/12	8.4	6-15-10			Same as above, wet
FICLIENTSISBISBI002\SOIL BORING LOGSHMW-6S.BOR	21	21 22	SS-11 22.0-24.0	24/12	9.4	4-12-9			Same as above, wet, black staining noted
F:\CLIENTS\SBI\SBI	23-	23							End of boring at 24'

South Bend Area A UP&V Reservoir South Bend, IN

SBI002

Date Started

Date Completed

Logged by Reviewed by

**Drilling Contractor** 

Drilling Method Sampling Method Total Depth (ft.)

S. Water Level (ft.)

: 08/02/01

: 08/02/01

: Matt Young

: Topflite : 4.25 HSA

: Split Spoon : 88.0

S. Water Level Date

# LOG OF BORING HMW-6D

(Page 1 of 5)

G. Elev. (ft. USGS) PID/FID Model

: Not Surveyed : PID / 2020

PID/FID Calibration : 100ppm Isobutylene

Drum Label ID

		, ,	<del>-</del>								
-									Soil Samples	Water Levels	
	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log `	Sampled Int.  Lab Sample  DESCR	▼ Static	Well: HMW-6D Elev.:
			ου ου	ഗ് ഗ്	۵.	в 9	رن س	Ø			
	0- 1-	- 0 1	HA-1/ 0.0-2.0		1.6				Black organic rich r sand FILL, trace sil slag fragments note	nedium to fine t, trace gravel, dry, ed	Surface Casing
ı	2-	-2	HA-2/		4.1		$ \rangle$	$\mathbb{X}$			
	3-	3 4	2.0-4.0 SS-3	24/14	3.4	4-9-4			Brown medium to c trace gravel, trace s Same as above	oarse SAND, silt, moist	Bentonite Seal
	5	5 6	4.0-6.0	24/12	6.4	3-7-3			Same as above, bl	ack colored	
)	7-	-7 8	SS-4 6.0-8.0	24/18	3.4	5-10-5			banding Same as above		
	9	-9	SS-5 8.0-10.0								2" Sch. 40 PVC riser
	-	-10 -11	SS-6 10.0-12.0	24/18	5.3	3-5-3			Same as above		Grout
RING LOGS/HMW-6D.BOR		12 - 13	SS-7 12.0-14.0	24/14	2.8	7-29-15			Same as above, m more gravel	ore coarse SAND,	
OIL BORING LOC		-14 -15	SS-8 14.0-16.0	24/10	5.6	17-61-20			Same as above, in gravel	crease to a few	
F.\CLIENTS\SBI\SBI002\SOIL BO	17-	-16 17	SS-9 16.0-18.0	24/12	8.8	13-28-16			Same as above		
걸	18-				1						· · · · · · · · · · · · · · · · · · ·
-											

South Bend Area A **UP&V** Reservoir South Bend, IN

SBI002

Date Started

Date Completed Logged by

: 08/02/01 : Matt Young

Reviewed by

**Drilling Contractor** Drilling Method

: Topflite : 4.25 HSA

: 08/02/01

Total Depth (ft.) S. Water Level Date : S. Water Level (ft.)

: Split Spoon Sampling Method : 88.0'

# LOG OF BORING HMW-6D

(Page 2 of 5)

G. Elev. (ft. USGS) PID/FID Model

: Not Surveyed : PID / 2020

PID/FID Calibration

: 100ppm Isobutylene

								<del></del>	<u> </u>		
Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples Sampled Int.  Lab Sample  DESCR	Water Levels  ▼ Static  □ During Drilling	Weil: HMV Elev.:	V-6D
18-	-18	SS-10	24/12	9.5	16-35-15	1		Same as above		7 0 0	
1 40	10	SS-10 18.0-20.0	21,12	0.0	.0 00 10	V					
19-	-19					$  \Lambda  $				Ç 0   . <	
20-	-20	SS-11	24/16	1.3	10-26-15			Same as above, we	et	7 0	
		SS-11 20.0-22.0				\ /				▽ " " "	
21-	-21					X					
						/ \		Same as above, bl	ack staining at	0 0	
22-	-22	SS-12 22.0-24.0	24/12	0.3	8-37-17			Same as above, in	ncrease medium	00	
22	-23					V		grain SAND		0 0 0	
20-	23					$  \Lambda  $					
24-	-24	SS-13 24.0-26.0	24/8	0.0	11-28-17			Same as above		0 0 0	
		24.0-26.0		ļ		11\ /1			·	0 0	
25-	-25					11 X I					
	-					$\parallel / \parallel$	·			0 0 0	
26-	-26	SS-14 26.0-28.0	24/14	2.4	10-27-11			Same as above		0 0	– Grout
07	-	2010 2010		i		$   \bigvee  $					-2" Sch. 40 PVC riser
27-	-27					$   \wedge  $					-2 Oon. 401 VO 11001
28-	28	SS-15	24/10	0.9	5-15-9			Same as above			
20	=	28.0-30.0		0.0		11 /	<del>                                   </del>			0 0 0	
29-	-29					$\parallel \chi \parallel$				0 0 0	
İ	1					$\parallel/\parallel$				0 <b>0</b> 0	
ട്ട് 30-	<del> </del> -30	SS-16 30.0-32.0	24/12	1.3	23-52-28	$ \langle \cdot \rangle $		Same as above, in trace)	crease silt (still	0 0 0	
ĝ.	_	30.0-32.0				$   \setminus /  $		14400)			
<b>≩</b> 31-	-31					ШĂ					
8	]	00 17	24/16	2.3	7-27-31	$\parallel / \parallel \parallel$		Same as above fir	ne to medium grain	0 0 0	
ဂ္ဂို 32 - စ္ခု	<del>-</del> -32	SS-17 32.0-34.0	24/10	2.3	1-21-31			SAND, trace grave	ne to medium grain el, trace silt, wet		
g 33-	-33					$   \vee  $					
9	1 -		i			$\  / \ $				0 0	
S 34-	-34	SS-18 34.0-36.0	24/12	0.0	13-39-31				arge stone in end of		
ISBI	‡	34.0-36.0				$\  \cdot \ $		spoon			
35	-35					$ $	.			0 0	
30 - 31 - 32 - 35 - 35 - 35 - 35 - 35 - 35 - 35	=					$\  \  \ $	:			. 0	
징 36-	1							<del>-</del>			

South Bend Area A **UP&V** Reservoir South Bend, IN

SB1002

Date Started

Date Completed Logged by

: 08/02/01 : Matt Young

: 08/02/01

Reviewed by

**Drilling Contractor** Drilling Method

: Topflite : 4.25 HSA

Sampling Method Total Depth (ft.)

: Split Spoon : 88.0

S. Water Level Date :

S. Water Level (ft.) :

LOG OF BORING HMW-6D

(Page 3 of 5)

G. Elev. (ft. USGS) PID/FID Model

: Not Surveyed : PID / 2020

PID/FID Calibration : 100ppm Isobutylene

- 1									<u> </u>		
									Soil Samples	Water Levels	
	Depth in .	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Sampled Int.  Lab Sample	▼ Static	Well: HMW-6D Elev.:
	Feet		Sam	Sarr	PID	Blov (6"-	Soil	Gra	DESCR	IPTION	
	36_ 37_	36 37	SS-19 36.0-38.0	23/14	1.4	36-61-50			Same as above, in size gravel, become	crease silt, larger ing very dense	7 0   0   0   0   0   0   0   0   0   0
		-38	SS-20 38.0-40.0	24/16	1.7	15-54-40			Same as above		, , , , , , , , , , , , , , , , , , ,
	39	-39	38.0-40.0								
	40-	-40	SS-21 40.0-42.0	24/16	0.0	29-78-50			Same as above, ve	ery dense	
	41 <u> </u>	-41 -42	ee 22	24/8	0.7	15-54-39			Same as above le	es gravel	0 0 0
)	-	-43	SS-22 42.0-44.0	24/0	0.7	10-04-09			Same as above, le (Note: Had to move large rock and it ca offset 2 to 3", Didn'	e rig, possibly hit lused augers to t move boring)	
	44	-44	SS-23 44.0-46.0	23/12	0.1	28-88-50			Same as above, le	ss silt	oo
	45-	-45									2" Sch. 40 PVC riser
:	46	<b>-46</b>	SS-24 46.0-48.0	24/4	0.0	15-88-4			Same as above		
ŭ	]	-47 -48	SS-24	11/10	0.0	38-50			Same as above		
MW-6D.BC	49	-49	SS-24 48.0-50.0								
HISDOT SI	50-	-50		23/0		9-63-50					
F:/CLIENTS/SBI/SBI002/SOIL BORING LOGS/HMW-6D.BOR	51-		!							spoon, no recovery	0 0 0
31/SB1002/S	52-	-52	\$\$-25 52.0-54.0	23/12	1.6	15-67-50			Same as above, m SAND, trace silt, to	edium to fine ace gravel	7 u
LIENTS\SE	53 - 54 -	-53									
Ä		<u></u>									

āssociates. inc.

South Bend Area A UP&V Reservoir South Bend, IN

SBI002

Date Started

Date Completed Logged by

Reviewed by **Drilling Contractor** 

Drilling Method Sampling Method

Total Depth (ft.) S. Water Level Date

: 08/02/01

: 08/02/01

: Matt Young

: Topflite : 4.25 HSA

: Split Spoon : 88.0'

S. Water Level (ft.)

#### LOG OF BORING HMW-6D

(Page 4 of 5)

G. Elev. (ft. USGS) PID/FID Model

: Not Surveyed : PID / 2020

PID/FID Calibration

: 100ppm Isobutylene

1							ator Le		··/ ·		<u> </u>		
	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log *	Soil Samples Sampled Int.  Lab Sample  DESCR	Water Le  ▼ Stati  ▼ Durin	c	Well: HMV Elev.:	√-6D
	54 –	54		23/0		25-71-50						70 0	
	<b>55</b>	55		31					No recovery, resam interval, no recovery		1	7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	=	- <b>-</b> 56 57	SS-26 56.0-58.0	23/14	1.3	18-54-50	$\bigvee$		Same as above, bla	ick stainin	g at 57.5	\$ a . c	:
	]	58	SS-27	17/14	1.6	13-28-50			Same as above			0 0 0	
	-	59	SS-27 58.0-60.0	,									
	60	60	SS-28 60.0-62.0	24/12	2.1	15-52-38			Same as above			0 0 0	
	61 -	61									i		•
	62	-62	SS-29 62.0-64.0	17/0		18-36-50			No Recovery				– Grout
	63											0 0 0 0	-2" Sch. 40 PVC riser
	64		SS-30 64.0-66.0	16/10	8.4	17-32-50			Same as above, les	ss gravel		0 0 0	
BOR.	66	-65 -66	SS-31 66.0-68.0	17/14	0.5	7-32-50			Same as above, mo	ore gravel		0	
ING LOGS/HMW-6D.BOR		-67										0	
BORING LO	68 – 69 –	68 69		15/15		27-25-50			1" of brown clayey spoon, dry 14" of sluff 1" claye			0 0 0 0	
F:\CLIENTS\SB\\SB\002\SOIL BOR	70	-70	SS-32 70.0-72.0	21/18	4.1	6-38-50			Brown medium to o		D, trace	0	
JENTS\SBI).		-71										0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
FiCL	72 -	1									<u> </u>		

South Bend Area A UP&V Reservoir South Bend, IN

SBI002

**Date Started** 

Date Completed Logged by

: 08/02/01

: 08/02/01

: Topflite : 4.25 HSA

: Matt Young

: Split Spoon

Reviewed by

**Drilling Contractor** 

Drilling Method Sampling Method Total Depth (ft.)

: 88.0' S. Water Level Date S. Water Level (ft.)

**LOG OF BORING HMW-6D** 

(Page 5 of 5)

G. Elev. (ft. USGS) PID/FID Model

: Not Surveyed : PID / 2020

PID/FID Calibration

: 100ppm Isobutylene

- 1										11111	
ł									Soil Samples	Water Levels	
	Depth in	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	Graphic Log	Sampled Int.	▼ Static	Well: HMW-6D Elev.:
	Feet		San	San	PID	Blov (6"-	Soil	Gra	DESCR	IPTION	
	72-	72	\$\$-33 72.0-74.0	21/16	2.5	13-48-50			Same as above		
	73	-73 .*	,				X				Grout
	74	-74	SS-34 74.0-76.0	12/12		38-120			Same as above, les	ss gravel	
	75-	-75					X				
	76	-76	SS-35 76.0-78.0	21/21	1.1	18-63-50			Same as above, no	gravel	2" Sch. 40 PVC riser —Bentonite Seal
	77	-77									
}	78	78	SS-36 78.0-80.0	15/15	7.5	18-72-50			Brown silty CLAY, f gravel, 1" thick in e No recovery on first to go 6"	ew sand and nd of spoon	
	79	-79					$\ X\ $	1.14	Brown medium to fi	ne SAND, trace	
	-	-80	SS-37 80.0-82.0	12/12	4.2	34-100			gravel, wet, very de Same as above, n fines		
	81	-81					$\ \lambda\ $				01 Oak 40 0 040 izak
	-	-82		24/0		12-89			Brown fine to very f wet, no recovery	ine silty SAND,	2" Sch. 40 0.010-inch slotted PVC screen Sand Filter Pack
		<b>-83</b>					:		_		Sand Filter Pack
-6D.BOR	84-	-84	SS-38 84.0-86.0	24/4	0	1-9-20			Same as above, 1" spoon	silt seem at end of	
GS\HMW	85-	-85									· · · · · ·   · · · · · · · · · · · ·
RINGLO	86-	-86	SS-39 86.0-88.0	24/12	0	23-9			Brown fine to media trace gravel, trace s	um grain SAND, silt	
F:\CLIENTS\SBI\SBI002\SOIL BORING LOGS\HMW-6D.BOR	87-	-87					$\ \dot{\mathbb{N}}\ $		End of boring at 88	.0'	
31/SB1002	88-				1						
IENTS\SE	89-	<b>89</b>									
Ę.	90 -	1	<u> </u>								

South Bend Area A **UP&V** Reservoir South Bend, IN

SB1002

Date Started

Date Completed Logged by

: 08/09/01 : Matt Young

Reviewed by

**Drilling Contractor** 

Drilling Method Sampling Method Total Depth (ft.)

S. Water Level Date : S. Water Level (ft.)

: 08/09/01

: Topflite

: 78.0'

: 4.25 ID HSA

: Split Spoon

#### **LOG OF BORING HMW-8D**

(Page 1 of 6)

G. Elev. (ft. USGS)

: Not Surveyed : PID / 2020

PID/FID Model

: 100ppm Isobutylene

PID/FID Calibration Drum Label ID

						0. 11	ator Le	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	, .	
	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	•	ell: HMW-8D ev.:
	0-	- 0			T		]		Concrete	1 3
	- - 1 -	1	HA-1/ 1.0-2.0		1.8					Surface Casing
	2-	- <b>-</b> 2	HA-2/		2.3			[ ] [ ] [	Brown silty medium to carse SAND, trace gravel moist	, ,
	_		2.0-4.0				$   \rangle /  $		trace gravel moist	
	3_	3					$\parallel \chi \parallel$		Light brown medium to carse SAND, trace gravel moist	
	-						$\parallel/\parallel$		trace gravel moist	
	4-	-4	SS-3 4.0-6.0	24/14	0.9	4-17-8		-:::	Same as above	
	-		4.0-0.0				$\  \setminus \ $			
	5-	5					X		·	
	6- -	6	SS-4 6.0-8.0	24/18	2.1	4-9-5			Same as above, less gravel	2" Sch. 40 PVC riser — Chips
		-7								
	8-	<del>-</del> 8	SS-5 8.0-10.0	24/22	5.6	3-6-4			Same as above	
ő							$\  \setminus \ $			
N-8D.E	9-	9 1					$\ \lambda\ $			
:\CLIENTS\SBI\SBI002\SOIL BORING LOGS\HMW-8D.BOR	10-	-10	SS-6 10.0-12.0	24/16	0.6	2-6-4			Same as above, increase gravel	
	11-	-11					$\parallel \chi \parallel$			
S\SBI\SBI002\S	12-	12	SS-7 12.0-14.0	24/14	2.9	4-19-16			Same as above	
LIENT	13-							<u> </u>		
ပ္										

: 08/09/01 Date Started **Date Completed** : 08/09/01 LOG OF BORING HMW-8D Logged by : Matt Young Reviewed by (Page 2 of 6) **Drilling Contractor** : Topflite & associates, inc. **Drilling Method** : 4.25 ID HSA G. Elev. (ft. USGS) : Not Surveyed South Bend Area A : Split Spoon **UP&V** Reservoir Sampling Method PID/FID Model : PID / 2020 : 78.0' South Bend, IN Total Depth (ft.) PID/FID Calibration : 100ppm Isobutylene S. Water Level Date : Drum Label ID SBI002 S. Water Level (ft.) Water Levels Soil Samples ▼ Static Sampled Int. Sample Recovery Sample Number Sample Interval/ PID / FID (ppm) During Drilling Sampler Type/ Soil Samples Well: HMW-8D Graphic Log Lab Sample Blow Count (6"-12"-6") Elev.: Depth Surf. Elev. in DESCRIPTION Feet -13 13-4-21-13 14 - - 14 **SS-8** 24/14 2.4 Same as above, no gravel 14.0-16.0 15 - -15 4-47-31 Same as above -16 24/20 2.1 16-**SS-9** 16.0-18.0 17 - - 17 24/24 8.0 11-29-17 Same as above, trace gravel SS-10 18--18 18.0-20.0 -2" Sch. 40 PVC riser -Grout 19--19 SS-11 24/20 0.0 11-31-17 Same as above 20 <del>↓</del> -20 20.0-22.0 21 + -21 F:\CLIENTS\SB\\SB\\02\SO\\LBOR\\\\GLOGS\HMW-8D.BOR 22 --- -22 SS-12 24/18 0.0 8-16-12 Same as above, wet 22.0-24.0 23 - -23 0.0 4-22-21 SS-13 24/20 Same as above 24 --- -24 24.0-26.0 25 - -25 26

South Bend Area A UP&V Reservoir South Bend, IN

SBI002

Date Started

Date Completed

: 08/09/01 Logged by : Matt Young

Reviewed by

**Drilling Contractor** : Topflite **Drilling Method** : 4.25 ID HSA : Split Spoon

Sampling Method Total Depth (ft.)

S. Water Level Date : S. Water Level (ft.) :

: 08/09/01

: 78.0'

LOG OF BORING HMW-8D

(Page 3 of 6)

G. Elev. (ft. USGS) PID/FID Model

: Not Surveyed : PID / 2020

PID/FID Calibration

: 100ppm Isobutylene

Drum Label ID

						3. W	alei Le	vei (i	<i>)</i> .				
	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples Sampled Int.  Lab Sample  DESCR	Water Lev  Station  During	:	Well: HMW-8D Elev.:	
	26 <i>-</i>	- <b>-</b> 26	SS-14	24/24	0.0	5-15-13			Same as above			,	
	27 	27	26.0-28.0	, ,									
	28-	- <b>-</b> 28	SS-15 28.0-30.0	24/22	0.0	4-19-19			Same as above, mo gravel	ore coarse,	less		
	29 - - -	29			-								
)	30	-30	SS-16 30.0-32.0	24/22	0.0	4-18-13	$\left  \left( \cdot \right) \right $		Same as above, les	ss coarse, r	nore		
	31-	31	00.0-02.0						·				
	32-	-32	SS-17	24/20	0.0	4-16-17			Same as above			2" Sch. 40 PVC riser	
	33	-33	32.0-34.0										
	34-	-34	SS-18 34.0-36.0	24/22	0.0	5-24-25		· · ·	Same as above, indepth	crease grav	el with		
NG LOGS/HMW-8D.BOR	35-	35											
	36 –	-36	SS-19 36.0-38.0	24/20	0.0	2-15-13			Same as above, le coarse	ss fines, mo	ore		
02\SOIL BOR	37-	-37											
F.ICLIENTSISBIISBI002\SOIL BOR	38- -	-38	\$\$-20 38.0-40.0	24/10	0.0	13-31-19			Same as above				
F\CLE	39-						<u> </u>					[0 0 0	
_												·	

South Bend Area A **UP&V** Reservoir South Bend, IN

SBI002

Date Started

Date Completed Logged by

Reviewed by

**Drilling Contractor** 

Drilling Method Sampling Method Total Depth (ft.)

S. Water Level Date :

: 08/09/01

: 08/09/01

: Matt Young

: Topflite : 4.25 ID HSA

: Split Spoon : 78.0'

S. Water Level (ft.)

# LOG OF BORING HMW-8D

(Page 4 of 6)

G. Elev. (ft. USGS) PID/FID Model

: Not Surveyed : PID / 2020

PID/FID Calibration

: 100ppm Isobutylene

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									Soil Samples	Water Levels	
	Depth in · Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Sampled Int.  Lab Sample  DESCR	▼ Static □ During Drilling	Well: HMW-8D Elev.:
1			0) 0)	0) 0)	ш.	ш С	0)		<del></del>		
	39- ; 40-	39 40	SS-21 40.0-42.0	24/10	0.0	16-29-16			Same as above, le	ss gravel	
	41 —	41 42	SS-22 42.0-44.0	24/16	0.0	11-39-23			Same as above, in	crease gravel	
)	44	-43 -44 -45	SS-23 44.0-46.0	24/20	0.0	7-60-45			Same as above, la of spoon	rge cobble in end	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	-	-46	SS-24 46.0-48.0	24/10	0.0	8-27-24			Same as above		2" Sch. 40 PVC riser Grout
SHMW-8D.BOR	-		SS-25 48.0-50.0	24/14	0.0	9-28-21			Same as above		
F:\CLIENTS\SBI\SBI002\SOIL BORING LOGS\HMW-8D.BOR	49 50	-50	SS-26 50.0-52.0	24/10	0.0	8-20-16			Same as above		
F:\CLIENTS\SBI\SI	51 – 52 –	-51									, , , , , , , , , , , , , , , , , , ,

South Bend Area A UP&V Reservoir South Bend, IN

SB1002

Date Started

Date Completed

Logged by

Reviewed by **Drilling Contractor** 

Drilling Method Sampling Method

Total Depth (ft.)

S. Water Level (ft.)

: 08/09/01

: 08/09/01

: Matt Young

: Topflite

: 4.25 ID HSA : Split Spoon

: 78.0'

S. Water Level Date :

**LOG OF BORING HMW-8D** 

(Page 5 of 6)

G. Elev. (ft. USGS)

: Not Surveyed : PID / 2020

PID/FID Model PID/FID Calibration

: 100ppm Isobutylene

						ator Love	(			
Dep ir Fe	n Elev.		Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples  Sampled Int.  Lab Sample  DESCRIPTION	c	-8D
5	52 -52	00.07	0440		40.07.00	X /  -	]	Come se above four gravel		
	5353	SS-27 52.0-54.0	24/12	0.0	12-37-23			Same as above, few gravel	, , , , , , , , , , , , , , , , , , ,	
	54 -54	SS-28 54.0-56.0	24/12	0.0	9-35-30			Same as above		
	5555									
	5656	SS-29 56.0-58.0	24/10	0.0	11-26-17			Same as above		
	5757									
	5858	SS-30 58.0-60.0	24/16	0.0	19-45-27			Same as above, large cobble spoon	in on the second	Grout 2" Sch. 40 PVC riser
1 :	59 🕂 -59					X   :				
	6060	SS-31 60.0-62.0	24/18	0.0	10-50-43			Same as above, brown medicoarse sand, trace silt, trace wet	um to	
8D.B(	<b>61</b> <del>-</del> -61					X   :				
NGL	62 -62	SS-32 62.0-64.0	23/12	0.0	14-60-50			Same as above		
B .	63 + -63								0 0 0	
F./CLIENTS/SBI/SBI002/SOIL BOR	6464	SS-33 64.0-66.0	24/20	0.0	16-51-35			Same as above		-Chips
OCE.	65			<u> </u>	<u></u>	<u> </u>				
a: 1										

āssociates, inc.

South Bend Area A **UP&V** Reservoir South Bend, IN

SBI002

Date Started

**Date Completed** Logged by

Reviewed by **Drilling Contractor** 

**Drilling Method** Sampling Method

Total Depth (ft.) S. Water Level Date

: 08/09/01

: 08/09/01

: Matt Young

: Topflite : 4.25 ID HSA

: Split Spoon : 78.0'

S. Water Level (ft.)

LOG OF BORING HMW-8D

(Page 6 of 6)

G. Elev. (ft. USGS) PID/FID Model

: Not Surveyed : PID / 2020

PID/FID Calibration

: 100ppm isobutylene

Drum Label ID

Soil Samples Water Levels ▼ Static Sampled Int. Sample Recovery Sample Interval/ PID / FID (ppm) Sample Number During Drilling Sampler Type/ Soil Samples Well: HMW-8D Blow Count (6"-12"-6") Graphic Log Lab Sample Elev.: Surf. Depth Elev. **DESCRIPTION** Feet -65 65 Chips Same as above, few gravel 24/18 0.0 14-61-37 2" Sch. 40 PVC riser SS-34 66 -- -66 Brown silty CLAY seam, 1" thick at end of spoon 66.0-68.0 67 + -67Brown medium to coarse SAND, trace silt, trace gravel, wet 23/16 0.0 23-60-50 Same as above, few gravel - -68 SS-35 68 68.0-70.0 Same as above, trace gravel 69 -69 Greyish to brown silty SAND 8" of greyish to brown clayey SILT, dry -2" Sch. 40 0.010-inch -slotted PVC screen 15/10 34-50 70 SS-36 0.0 -70 70.0-72.0 -Sand Filter Pack 71 -71 Brown medium to fine SAND, trace silt, trace gravel, wet SS-37 23/23 0.0 6-36-50 72 -72 72.0-74.0 Same as above 73--73 Grey very fine very silty SAND, wet FICLIENTSISBI\SBI002\SOIL BORING LOGS\HMW-8D.BOR 37-42-50 Same as above SS-38 17/17 0.0 74 -74 74.0-76.0 75-- -75 76--76 SS-39 17/17 0.0 23-41-50 Grey very fine sandy SILT, wet 76.0-78.0 77 - -77 Grey SILT outer beded with clay Grey very fine very silty SAND -End of boring at 78' 78

South Bend Area A UP&V Reservoir South Bend, IN

SBI002

Date Started

Date Completed Logged by

: 09/15/01 : Matt Young

: 09/15/01

Reviewed by

**Drilling Contractor** : Topflite Drilling Method : 4.25 ID HSA

Sampling Method Total Depth (ft.)

: 48" Split Spoon : 69.0'

S. Water Level Date : S. Water Level (ft.)

## **LOG OF BORING HMW-9D**

(Page 1 of 5)

G. Elev. (ft. USGS)

: Not Surveyed

PID/FID Model PID/FID Calibration : PID 2020 / 100ppm Iso. · 100nnm Isobutylene

FIDIFID Calibration . IC	oppin isobutylene
Drum Label ID :	

						s. w	/ater Le	evel (fl	i.) :			
	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples Sampled Int. Lab Sample DESCR	Water Levels  ▼ Static  ¬ During Drilling  IPTION	Well: HI Elev.:	MW-9D
		- 0	03 03	0) 0)	ш	ш С	0)					<b>t</b> = 1
	-	-1	HA-1/ 0.0-2.0		3.3				Dark brown fine to trace gravel, moist	medium SAND,		Surface Casing
	-	2 3	HA-2/ 2.0-4.0		2.9				Brown fine to medion gravel, moist	um SAND, trace		
)	-	-4 5	SS-3 4.0-6.0	24/20	0.6				Dark brown fine to trace gravel, moist Brown medium to o gravel, moist			
,		-6	SS-4 6.0-8.0	24/10	0.0				gravel, moist Same as above			Bentonite
Œ	8- - 9-	7 8 9	SS-5 8.0-10.0	24/12	0.9				Same as above			2" Sch. 40 PVC riser
OGS/HMW-9D.BO	10-	-10	SS-6 10.0-12.0	24/10	0.0				Same as above			
F:/CLIENTS/SBI/SBI002/SOIL BORING LOGS/HMW-9D.BOR	12- 13-	11 12 13	SS-7 12.0-14.0	24/8	3.2				Same as above		000	Slurry
CLIEN	14-						<u> </u>				.00	
ű			1									

South Bend Area A UP&V Reservoir South Bend, IN

SB1002

Date Started

Date Completed Logged by

Reviewed by

**Drilling Contractor** Drilling Method

Sampling Method Total Depth (ft.)

S. Water Level Date :

: 09/15/01

: 09/15/01

: Matt Young

: Topflite : 4.25 ID HSA

: 48" Split Spoon

: 69.0'

S. Water Level (ft.)

### **LOG OF BORING HMW-9D**

(Page 2 of 5)

G. Elev. (ft. USGS)

: Not Surveyed

PID/FID Model PID/FID Calibration

: PID 2020 / 100ppm Iso. : 100ppm Isobutylene

Drum Label ID

1										
	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples  Sampled Int.  ✓ Static  ✓ During Drilling  DESCRIPTION	Well: HMW-9D Elev.:
	- - -	14 15,	SS-8 14.0-16.0	24/12	3.9				Same as above	(7 a) 1 a (
	16-	16	SS-9 16.0-18.0	24/14	2.7	·			Same as above, less coarse, more fine sand	
		-17 -18	SS-10 18.0-20.0	24/14	3.4				Same as above, increase coarse	
) .		19 20	SS-11 20.0-22.0	24/10	1.0				Same as above	
	-	-21 22	SS-12 22.0-24.0	24/10	2.1				Same as above, wet	Slurry 2" Sch. 40 PVC riser
S\HMW-9D.BOR	23 24	-23 24	SS-13 24 <sub>.</sub> 0-26.0	24/15	0.5	5-13-10			Same as above	
F:/CLIENTS\SBI\SBI002\SO!L BORING LOGS\HMW-9D.BOR	25- 26-		SS-14 26.0-28.0	24/10	2.4	6-17-11			Same as above	
F:\CLIENTS\SBI\SBIO(	27 - 28-	-27								

South Bend Area A UP&V Reservoir South Bend, IN

SBI002

Date Started

Date Completed Logged by

: 09/15/01 : 09/15/01 : Matt Young

: Topflite

: 4.25 ID HSA

Reviewed by

**Drilling Contractor** 

Drilling Method Sampling Method

: 48" Split Spoon : 69.0'

Total Depth (ft.) S. Water Level Date :

S. Water Level (ft.)

LOG OF BORING HMW-9D

(Page 3 of 5)

G. Elev. (ft. USGS) PID/FID Model

: Not Surveyed

: PID 2020 / 100ppm Iso. : 100ppm isobutylene

PID/FID Calibration Drum Label ID

ı											
[									Soil Samples	Water Levels	·
			_	ج _					Sampled Int.	▼ Static	
			Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)		s	<b>,</b>		During Drilling	
			Sampler Type/ Sample Numb	ntel Rec	<u>ā</u>	art ()	Soil Samples	Graphic Log	Lab Sample		Well: HMW-9D
- 1	Depth in	Surf. Elev.	le le	<u>e</u> e	문	Blow Count (6"-12"-6")	Sam	iệ.			Elev.:
- [	Feet	LIEV.	amp	뼕뼕	_	ow 1.12	) <del> </del>	lap	DESCR	IPTION	
١			ις Υ	ഗ് ഗ്	面	B)	Ø	ဖ	5200.		ļ
	28	- <b>-2</b> 8	SS-15	24/20	1.9	5-13-8	1		Same as above		[ ] [ ] [ ]
	_		28.0-30.0	24/20	1.9	5-13-6	\		Same as above		0 0 0
	29	- <b>-29</b>									7 0 1 0 1 . C
	=						$\  \  \ $	1			
					_		/ \				
	30 –	- <b>-</b> 30	SS-16 30.0-32.0	24/12	1.5	2-6-5			Same as above, Pe odor (start drummir	etro staining and ng soils)	
	=		00.0 02.0				\/		·		0 0 0 0
i	31	- <b>-</b> 31					II X I				
	1						/\				0 0 0 0
	3.7	20	00.47	24/24	10	7-16-13	W V	7.1.	Same as above, st	aining continues	1 1.1.4
	32	32	SS-17 32.0-34.0	24/24	1.0	7-10-13			Same as above, st	anning continues	
							$   \setminus / $				
	33	- <b>-3</b> 3					II X I				0 0 0
	=						/\				0 0 0
	34	34	SS-18	24/15	1.6	7-17-14		·	Same as above, st	aining continues	0 0 0
	34-	-57	34.0-36.0	24/13	1.0	,,	IN A	·		anning commission	
	-						\/	·			Slurry
	35_	- <b>-3</b> 5					11 X I				2" Sch. 40 PVC riser
	_						/\				000
•	36-	36	SS-19	24/15	0.2	7-19-17			Same as above, st	aining continues	
	_		36.0-38.0	·			IN A			-	
							V	·			
~	37 –	37			1		ΠĂΙ	1			
0.80	-						$\parallel \parallel $	· · ·			
W-9	38-	-38	SS-20	24/12	1.6	5-16-11			Same as above, st	aining continues	0 0 0 0
NHW.	-		38.0-40.0				11\ /1				00000
ő	30 -	20					V				0 0 0
NG	39	- <b>-</b> 39					$\parallel \wedge \parallel$	<del> </del>	1		
30RI	_	}					II/ \				0 0 0
등	40-	-40	SS-21	24/12	1.8	7-18-10			Same as above, st	aining continues	
302/5	-	]	40.0-42.0				][\ /[	•••			
NSBI\SBI002\SOIL BORING LOGS\HMW-9D.BOR	/11	<u>-4</u> 1					$\ V\ $				
S\SB[	-41	T <b>"</b> '					$\  \  \ $				

11-30-2001

42-

South Bend Area A UP&V Reservoir South Bend, IN

SBI002

**Date Started** 

Date Completed

: 09/15/01 Logged by : Matt Young

Reviewed by

**Drilling Contractor** 

: Topflite Drilling Method : 4.25 ID HSA : 48" Split Spoon

: 09/15/01

Sampling Method : 69.0' Total Depth (ft.)

S. Water Level Date : S. Water Level (ft.)

LOG OF BORING HMW-9D

(Page 4 of 5)

G. Elev. (ft. USGS)

: Not Surveyed

PID/FID Model

: PID 2020 / 100ppm Iso. : 100ppm Isobutylene

PID/FID Calibration

					0. 11	ater Le	3001 (1	, .		
Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples Sampled Int.  Lab Sample  DESCR	Water Levels  ▼ Static  ▽ During Drilling  IPTION	Well: HMW-9D Elev.:
42-	-42	SS-22	24/15	1.6	7-14-10			Same as above, st	aining continues	7 a 7 a 7 a 7 a 7 a 7 a 7 a 7 a 7 a 7 a
43-	43	42.0-44.0								
44-	-44	SS-23 44.0-46.0	24/15	1.1	7-19-14			Same as above, st	aining continues	
45	-45 45					$\ X\ $				0 0
46-	-46	SS-24 46.0-48.0	24/10	3.1	7-25-21			Same as above, st	aining continues	
47 -	-47									
48-	-48	SS-25 48.0-50.0	24/10	2.2	7-17-14			Same as above, m bottom 5" of spoon	ore gravel in , less staining	color
49	-49					$\ X\ $				Slurry 2" Sch. 40 PVC riser
50-	-50	SS-26 50.0-52.0	24/10	2.0	10-26-17			Same as above, le staining	ess gravel, slight	
	-51					$\ X\ $				7 a 7 a 7 a 7 a 7 a 7 a 7 a 7 a 7 a 7 a
52 – 53 – 53 – 53 – 53 – 53 – 53 – 53 –	-52	SS-27 52.0-54.0	24/10	4.2	8-24-26			Same as above, m bottom 6" of spoor	nore gravel in n, slight staining	
53-	-53	JZ.U-34.U				$\  \mathbf{y} \ $				
54 - 55 - 55 - 56 - 56 - 56 - 56 - 56 -	-54	SS-28 54.0-56.0	24/8	2.1	8-17-8			Same as above, le	ess gravel, slight	
55 -	-55 55					$\  \  \ $				C 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
56 -										C 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

South Bend Area A UP&V Reservoir South Bend, IN

SBI002

Date Started Date Completed

Logged by Reviewed by

**Drilling Contractor** Drilling Method

Sampling Method Total Depth (ft.)

S. Water Level Date S. Water Level (ft.)

: 09/15/01

: 09/15/01

: Matt Young

: Topflite : 4.25 ID HSA

: 48" Split Spoon : 69.0'

### LOG OF BORING HMW-9D

(Page 5 of 5)

G. Elev. (ft. USGS)

: Not Surveyed

PID/FID Model

: PID 2020 / 100ppm Iso.

PID/FID Calibration

: 100ppm Isobutylene

Drum Label ID

I				r						
Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples Sampled Int.  Lab Sample  DESCR	Water Levels  ▼ Static  ▽ During Drilling  IPTION	Well: HMW-9D Elev.:
56- 57-	56 57	SS-29 56.0-58.0	24/3	2.2	17-24-50			Same as above, sli	ght staining	Slurry
58	58	SS-30 58.0-60.0	24/10	1.0	21-64-50			Same as above, mobile of spoon	ore gravel in , slight staining	2" Sch. 40 PVC riser
	59 60	SS-31 60.0-62.0	24/10	1.5	5-12-9			Same as above, sli	ght staining	
	61 62	SS-32	24/8	1.3	10-28-36			Same as above si	ight odor no	
	62 63	62.0-64.0	24/0	1.3	10-20-30			Same as above, sli obvious staining	giit dudi, tid	Sand Filter Pack  2" Sch. 40 0.010-inch  slotted PVC screen
64-		SS-33 64.0-66.0	24/15	1.7	5-12-40			Same as above		
66-	<b>66</b>	SS-34 66.0-68.0	14/12	1.7	44-34-52			Tight grey sandy S moist	ILT, trace gravel,	
66 67 68 69			12/6	0.2	34-50			Same as above		
69-	-69							End of boring at 69	0.0'	
70-										

F:\CLIENTS\SB\\SB\\02\SO\\LBOR\\NG\LOGS\\HMW-9D.BOR

Phase II Drilling Franklin & Sample South Bend, IN

SB1002

Date Started

Date Completed

Logged by

Reviewed by

: Matt Young : James P. Hogan

**Drilling Contractor** Drilling Method

: Topflite : 4.25 ID HSA

: 08/22/01 : 08/22/01

Sampling Method Total Depth (ft.)

: 48" Split Spoon : 74.0'

S. Water Level (ft.)

S. Water Level Date :

# **LOG OF BORING HMW-11D**

(Page 1 of 5)

G. Elev. (ft. USGS) : Not Surveyed

PID/FID Model

: PID 2020 / 100ppm Iso. : 100ppm Isobutylene

PID/FID Calibration

Drum Label ID

				1					
							Soil Samples	Water Levels	
					Ì		Sampled Int.	▼ Static	İ
	e/ ber	val/	Ē					During Drilling	
1	₽ ≣	b 8	ద	بــ	es	g	Lab Sample		1

De <sub>l</sub> ir Fe	n	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Lab Sample  DESCR	□ During Drilling     □ During Drilling  IPTION	Well: HMW-11D Elev.:
	9	0							Concrete and rebar	•	Concrete Seal
	1	-1									Surface Casing
	2	-2	HA-1/ 2.0-4.0					XX	FILL - Brown claye	y sand, trace	
	3	-3		•	:				FILL - Brown claye gravel / crushed lim concrete, piece of o	estone / crusnea cloth noted	
	4	-4	SS-2 4.0-6.0	14/6		4-6-50			Same as above, re fragment at 5.1', au Boring located on a filled truck dock	fusal on concrete igered to 10' abandoned and	
	5	<b>-</b> 5					$\ \chi\ $		filled fruck dock		
	6	<b>-</b> 6	:								
	7	-7									Colors AD DVC rices
	8	8	:								2" Sch. 40 PVC riser
	9	<b>-9</b>									
JU.BOR	10	-10	SS-3 10.0-12.0	24/18	11.1	6-10-7			Brown medium to f silt, trace gravel, m	ine SAND, trace	0 a
L-MWIHNSS	11	-11							,		
SORING LO	12	-12	SS-4 12.0-14.0	24/16	14.8	4-12-8			Same as above, le	ss silt with depth	0 0 0
UUZ\SOIL E	13	-13								•	
ENIO	14 <del>-</del>	-14	SS-5 14.0-16.0	24/22	17.8	4-10-10			Same as above		
Ē								-			

F/CLIENTS/SBI/SBI002/SOIL BORING LOGS/HMW-11D.BOR

Phase II Drilling Franklin & Sample South Bend, IN

SB1002

Date Started

Date Completed Logged by

Reviewed by

**Drilling Contractor** Drilling Method

Sampling Method Total Depth (ft.)

S. Water Level Date :

: 08/22/01

: 08/22/01

: Matt Young

: James P. Hogan : Topflite

: 4.25 ID HSA

: 48" Split Spoon : 74.0'

S. Water Level (ft.)

### **LOG OF BORING HMW-11D**

(Page 2 of 5)

G. Elev. (ft. USGS)

: Not Surveyed

PID/FID Model PID/FID Calibration : PID 2020 / 100ppm Iso.

Drum Label ID

: 100ppm Isobutylene

									Soil Samples	Water Levels	
			e/ ber	val/ overy	Ē (				Sampled Int.	Static     During Drilling     During Drilling     During Drilling     During Drilling     Static     During Drilling     During Drilling	
١	Depth	Surf.	er Type Num	Inter Reco	gg) Cl	ount -6")	mples	c Log	Lab Sample		Well: HMW-11D Elev.:
١	in Feet	Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	DESCR	IPTION	
ŀ	15-	 - <b>-</b> 15	0, 0,			ш )					المالية
١	1										
ı	16	16	SS-6 16.0-18.0	24/22	16.0	6-17-12			Same as above		♥ a
١	47	- <del>-</del> 17	10.0 10.0								,   , d
	1/-	17				1					, , , , , , , , , , , , , , , , , , ,
	18	18	SS-7 18.0-20.0	24/22	16.8	5-9-6			Same as above, les	ss fines, increase	0 0 0
	40	40	16.0-20.0					7			
	19-	- <b>-</b> 19									
	20-	- <b>-</b> 20	SS-8	24/20	16.9	6-16-12			Same as above, inc	crease gravel	
			20.0-22.0								
	21	- <b>-21</b>									0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
١	<b>22</b> —	22	SS-9	24/20	19.2	6-19-12			Same as above, les	ss gravel	Grout
	-		22.0-24.0		·						2" Sch. 40 PVC riser
	23	-23				l l					0 0 0 0
	24 –	24	SS-10	24/20	11.0	4-10-11			Liaht brown mediur	n to fine sand.	
l			24.0-26.0						Light brown mediur trace silt trace grav	el	
D.BOR	25 –	25							Same as above, les	ss fines, wet	
MW-11	26-	26	SS-11	24/24	44.6	2-7-7			Grev medium to fin	e SAND trace silt	
JGS/H	20-	20	26.0-28.0	24/24	44.0	2-1-1			Grey medium to fin strong odor (petro to black stains noted	oitter) noted, few	
SING L	27	27									
JL BO	-		00.40	04/04	04.5	2 40 04			Some so shows st	rong odor poted	, , , , q
002\SC	28 <i>-</i>	28	SS-12 28.0-30.0	24/24	94.2	3-19-21			Same as above, st	ong odor noted	
SBINSBI	29-	29									
F:\CLIENTS\SBI\SBI002\SOIL BORING LOGS\HMW-11D.BOR	- - -										
F.CL	30 –			<u> </u>		1		- · ·	J		! [ ] [ ]

& associates, inc.
Phase II Drilling
Franklin & Sample
South Bend, IN

SBI002

Date Started

Date Completed Logged by

Reviewed by

**Drilling Contractor** Drilling Method

Sampling Method Total Depth (ft.)

S. Water Level (ft.)

: 08/22/01

: 08/22/01

: Matt Young : James P. Hogan

: Topflite

: 4.25 ID HSA : 48" Split Spoon

: 74.0'

S. Water Level Date :

**LOG OF BORING HMW-11D** 

(Page 3 of 5)

G. Elev. (ft. USGS)

: Not Surveyed

PID/FID Model

: PID 2020 / 100ppm Iso. : 100ppm Isobutylene

PID/FID Calibration Drum Label ID

							т			
1		.						Soil Samples	Water Levels	
Į į			_ ≥					Sampled Int.	▼ Static	
1		e/	val, ove	(mc		w			During Drilling	
		ης μη Ι	nter Sec	d)	rit	<u>p</u>	g	Lab Sample		Well: HMW-11D
Depth	Surf.	<u> </u>	<u>а</u> <u>а</u>	문	Cot "-6,	am	일			Elev.:
in Feet	Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	DESCR	IPTION	
		တိ တိ	ഗ് ഗ്	죠	B 9)	Й	Ø			
30-	-30	00.43	24/16	89.4	2-12-15			Same as above tra	ace gravel sample	7
		SS-13 30.0-32.0	24/10	09.4	2-12-13			Same as above, tra	out, increase fine	
31-	-31							sand, strong odor n	loted	
-								1		
32	-32	SS-14	24/18	81.8	6-29-24		7	Same as above, st	rong odor noted	
02	02	32.0-34.0	2 10		• = • = •		[· ` · ·		Ū	
1:										0 0 0
33~	-33							1		
] :							·	1		
34 –	-34	SS-15	24/18	120	3-11-15		·	Same as above, st increase gravel with	rong odor noted, h depth. less	
1 :	1	34.0-36.0					1	fines, brown oily st	aining noted (free	0 0
35	-35							phase)		
	1				ŀ					0 0 0
20	-36	SS-16	24/24	121	5-30-24			Same as above st	rong odor noted.	
36-	-30	36.0-38.0	24/24	121	3-30-24			Same as above, st brown oily staining	noted	
1:							<del> </del>		SAND	Grout
37-	-37							Brown medium to ditrace silt, trace gra	vel, strong odor	Giodi
	1			1				(petro bitter)		2" Sch. 40 PVC riser
38-	-38	SS-17	24/18	70.7	4-16-20			Same as above		
	}	38.0-40.0								
39-	-39									
	-									0 0 0
ğ 40-	40	SS-18	24/22	15.4	6-36-30			Same as above, sl	iaht odor	
	<del>  -4</del> 0	40.0-42.0	24122	13.4	0-00-00	]		Camo de abore, e.	.g	
W-11								·		
至 41-	-41						- , -			
41- 41- 41- 42-										
<u>ଅ</u> 42-	-42	SS-19	24/16	17.5	7-25-23		:::	Same as above, sl	ight odor	
BOR	3	42.0-44.0								
d 43-	-43						·			0 0
3028	╡ .。						·	•		
NSBIC 4.	<del>-</del>	00.00	24/45	10.4	4 22 27		<b> </b>  .′.'.	Same as shows a	light odor black	
Mass 44-	<del>  -44</del> 	SS-20 44.0-46.0	24/12	18.1	4-33-27			Same as above, stain noted	iigiit ouoi, biack	7 0 0
FICELENT SISBINGS IO BOIL BOIL BOIL BOIL BOIL BOIL BOIL B	]									
45-	7		<u> </u>	<u> </u>			٠٠٠٠			1
α										

Phase II Drilling Franklin & Sample South Bend, IN

SB1002

**Date Started** 

Date Completed Logged by Reviewed by

: Matt Young : James P. Hogan

: 08/22/01

: 08/22/01

: Topflite

**Drilling Contractor Drilling Method** Sampling Method

: 4.25 ID HSA : 48" Split Spoon : 74.0'

Total Depth (ft.) S. Water Level Date : S. Water Level (ft.)

**LOG OF BORING HMW-11D** 

(Page 4 of 5)

G. Elev. (ft. USGS) PID/FID Model

: Not Surveyed : PID 2020 / 100ppm Iso.

PID/FID Calibration

: 100ppm Isobutylene

									Soil Samples	Water Levels	
			İ	>					Sampled Int.	▼ Static	
Dep in	E	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log `	Lab Sample	_ <u></u> During Drilling	Well: HMW-11D Elev.:
Fee	et		San	San San	밀	Blov (6"-	Soil	ည်	DESCR	IPTION	
4	5	-45									
4	6 <del>- </del> -	-4 <b>6</b>	SS-21 46.0-48.0	24/12	15.8	14-54-33			Same as above, sli	ght odor	
4	ı7 <sup>‡</sup> -	-47									0 0 0
4	18 <del></del>	-48	SS-22 48.0-50.0	24/12	11.4	8-44-33			Same as above, in increase gravel, sli from pulling spoons water	crease silt, ght odor may be s through bad	
4	19	-49							114101		
5	50	-50	SS-23 50.0-52.0	24/12	15.4	12-79-37			Same as above		
۽ ا	51 <del>-</del> -	-51			-						
5	52-	-52 -53	SS-24 52.0-54.0	21/14	16.3	8-61-50			Same as above		Grout  2" Sch. 40 PVC riser
	54		SS-25 54.0-56.0	24/16	15.9	9-46-33			Same as above		
0.80	) -	-55									0 0
RING LOGS/HMW-11D.BOR	56 <del>-</del>	-56	SS-26 56.0-58.0	24/12	15.3	6-25-50			Same as above, le less gravel	ess coarse sand,	
NG t	57	-57						F	1		0 0 0 0
8	58-	-58	SS-27 58.0-60.0	24/8	7.8	20-70-35			Brown fine to medi gravel trace clay	ium SAND, trace	
BISE	59	-59							Large cobble in sp	oon	0 0 0
-(CLIENTS\S	60-										

Phase II Drilling Franklin & Sample South Bend, IN

SBI002

Date Started

Date Completed Logged by

Reviewed by **Drilling Contractor** 

Drilling Method Sampling Method

S. Water Level (ft.)

Total Depth (ft.) S. Water Level Date

: 08/22/01

: 08/22/01

: Matt Young : James P. Hogan

: Topflite

: 4.25 ID HSA : 48" Split Spoon

: 74.0'

### **LOG OF BORING HMW-11D**

(Page 5 of 5)

G. Elev. (ft. USGS)

: Not Surveyed

PID/FID Model PID/FID Calibration

: PID 2020 / 100ppm Iso. : 100ppm Isobutylene

J										
	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log		ell: HMW-11D ev.:
1	60-	-60	00.00	24/12	0.0	16-60-28			Same as above	Grout
	-		SS-28 60.0-62.0	24/12	0.0	10-00-20			Same as above	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	61	-61			İ	:				Bentonite Seal
	62	62	SS-29 62.0-64.0	24/14	0.0	16-73-50			Same as above, less clay, few gravel	2" Sch. 40 PVC riser
	63	-63								
	64	-64	SS-30 64.0-66.0	24/6	0.0	24-45-50			Same as above, large cobble in spoon	
	65-	-65						::::	·	
	- -	-66	SS-31 66.0-68.0	24/14	0.0	25-60-50			Same as above, no clay, trace silt	slotted PVC screen
	67-	-67								Sand Filter Pack
,	68-	-68	SS-32 68.0-70.0	24/18	0.0	18-58-38			Same as above, 2" very fine sand, trace silt seem at top of spoon	
	69	-69								· · · · ·
11D.BOR	70-	-70	SS-33 70.0-72.0	24/16					Same as above	
OGS/HMW.	71 <u> </u>	-71								
RINGL	72	-72	SS-34 72.0-74.0						Brown very fine silty SAND	
:\CLIENTS\SBI\SBI\002\SOIL BORING LOGS\HMW-11D.BOR	73-	-73								
BINSBIC	74 <i>-</i>	-74					<u> </u>			
JENTS/S	7,5	1 1 1								
ö	75-	1								

Phase II Drilling Franklin & Sample South Bend, IN

SBI002

Date Started

Date Completed Logged by

Reviewed by **Drilling Contractor** 

Drilling Method Sampling Method

Total Depth (ft.) S. Water Level Date S. Water Level (ft.)

: 08/22/01

: 08/22/01

: Matt Young

: James P. Hogan

: Topflite : Canterra CT250

: Hand Auger/Split Spoon

: 74.0'

# **LOG OF BORING HMW-11DA**

(Page 1 of 5)

G. Elev. (ft. USGS) PID/FID Model

: Not Surveyed : PID 2020 / 100ppm Iso.

PID/FID Calibration

: 100ppm Isobutylene

						s. w	ater L	evel (f	t.) :		
	Depth in Feet	Surf. Elev.	Sampler Type/ : Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples Sampled Int. Lab Sample DESCR	Water Levels  ▼ Static  ▽ During Drilling  IPTION	Well: HMW-11DA Elev.:
F:/CLIENTS/SBI/SBI/SCI/L BORING LOGS/HMW-41DA.BOR	2—3 3—4—5 5—6—8—9—9—9—9—9—9—9—9—9—9—9—9—9—9—9—9—9—9	12345678910111213	SS-2 4.0-6.0 SS-3 10.0-12.0 SS-4 12.0-14.0	24/18 24/16 24/22		4-6-50 6-10-7 4-12-8			FILL - Brown clayer gravel / crushed lim concrete, piece of concrete,	fusal on concrete gered to 10' bandoned and	Bentonite Seal  2" Sch. 40 PVC riser

Phase II Drilling Franklin & Sample South Bend, IN

SB1002

Date Started

Date Completed Logged by

Reviewed by **Drilling Contractor** 

Drilling Method Sampling Method

Total Depth (ft.) S. Water Level Date :

: 08/22/01

: 08/22/01 : Matt Young

: James P. Hogan

: Topflite

: Canterra CT250 : Hand Auger/Split Spoon

: 74.0'

S. Water Level (ft.)

# **LOG OF BORING HMW-11DA**

(Page 2 of 5)

G. Elev. (ft. USGS) PID/FID Model

: Not Surveyed : PID 2020 / 100ppm Iso.

PID/FID Calibration

: 100ppm Isobutylene

ŀ			· · · ·		1						
1									Soil Samples Sampled Int.	Water Levels ▼ Static	
	Depth in	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Lab Sample	During Drilling	Weli: HMW-11DA Elev.:
ı	Feet		San	San San	吕	Blo (6"-	Soil	Gra	DESCR	IPTION	
Ī	15-	15							]		
	16	16	SS-6 16.0-18.0	24/22	16.0	6-17-12	,		Same as above		
	17	-17								•	0 0 0 0
	18	- <b>-</b> 18	SS-7 18.0-20.0	24/22	16.8	5-9-6			Same as above, les	ss fines, increase	
	19-	19									0 0 0
	20	- <b>-2</b> 0	SS-8 20.0-22.0	24/20	16.9	6-16-12			Same as above, inc	crease gravel	
i	21_	-21									0 0 0
	22	22	SS-9 22.0-24.0	24/20	19.2	6-19-12			Same as above, les	ss gravel	Grout Grout Grout Grout Grout Grout Grout
30R	23 – 24 – 25 –		SS-10 24.0-26.0	24/20	11.0	4-10-11			Light brown mediur trace silt trace grav		
DA.E	25-	-25							Same as above, les	ss mies, wet	∇ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
RING LOGS/HMW-11DA.BOR	26-	26	SS-11 26.0-28.0	24/24	44.6	2-7-7			Grey medium to fin strong odor (petro to black stains noted	e SAND, trace silt, bitter) noted, few	
SING	27	-27									0 0 0
F:\CLIENTS\SB\\SB\002\SO\L BO	28-	-28	SS-12 28.0-30.0	24/24	94.2	3-19-21		- · · · · · · · · · · · · · · · · · · ·	Same as above, st	rong odor noted	
SBISE	29-	-29							1		
F:\CLIENTS\	30	-									0 0

Phase II Drilling Franklin & Sample South Bend, IN

SBI002

**Date Started** 

**Date Completed** Logged by

Reviewed by **Drilling Contractor** 

Drilling Method Sampling Method

Total Depth (ft.) S. Water Level Date

: 08/22/01

: 08/22/01

: Matt Young : James P. Hogan

: Topflite

: Canterra CT250

: Hand Auger/Split Spoon

: 74.0

S. Water Level (ft.)

LOG OF BORING HMW-11DA

(Page 3 of 5)

G. Elev. (ft. USGS)

: Not Surveyed

PID/FID Model PID/FID Calibration : PID 2020 / 100ppm Iso.

: 100ppm Isobutylene

						0	ator Ec	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	., .	
	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log`	Soil Samples Sampled Int.  Lab Sample  DESCRIPTION  Water Leve  To Static  During	
	30 – - - 31 –	30 31	SS-13 30.0-32.0	24/16	89.4	2-12-15			Same as above, trace gravel, sa wax have washed out, increase sand, strong odor noted	ample
	32		SS-14 32.0-34.0	24/18	81.8	6-29-24			Same as above, strong odor not	ted
		33 34	SS-15 34.0-36.0	24/18	120	3-11-15			Same as above, strong odor no increase gravel with depth, less fines, brown oily staining noted	ted, (free , )
)	35- 36-	-35 36	SS-16 36.0-38.0	24/24	121	5-30-24			phase)  Same as above, strong odor no brown oily staining noted	ted,
	37 – 38 –	37 38	SS-17	24/18	70.7	4-16-20			Brown medium to coarse SAND trace silt, trace gravel, strong or (petro bitter)  Same as above	dor Grout 2" Sch. 40 PVC riser
ĸ	39-	-39	38.0-40.0							
NG LOGS\HMW-11DA.BOR	40 – 41 –	-40 -41	SS-18 40.0-42.0	24/22	15.4	6-36-30			Same as above, slight odor	
			SS-19 42.0-44.0	24/16	17.5	7-25-23			Same as above, slight odor	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
F:\CLIENTS\SB\\SB\02\SO\L BOR	44 - 45 -	-44 44	SS-20 44.0-46.0	24/12	18.1	4-33-27			Same as above, slight odor, bla stain noted	
S.										

Phase II Drilling Franklin & Sample South Bend, IN

SB1002

Date Started

Date Completed

Logged by

Reviewed by **Drilling Contractor** 

Drilling Method

Sampling Method Total Depth (ft.)

S. Water Level Date :

: 08/22/01

: 08/22/01

: Matt Young

: James P. Hogan : Topflite

: Canterra CT250

: Hand Auger/Split Spoon

: 74.0'

S. Water Level (ft.)

# LOG OF BORING HMW-11DA

(Page 4 of 5)

G. Elev. (ft. USGS)

: Not Surveyed

PID/FID Model PID/FID Calibration

: PID 2020 / 100ppm Iso. : 100ppm Isobutylene

Drum Label ID

	_						· · ·		
Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples  Sampled Int.  Lab Sample  DESCRIPTION  Water Levels  Value During Drilling	Well: HMW-11DA Elev.:
1 661		Sa	တ္တတ္တ	₫	Blc (6°	တိ	ত	DESCRIPTION	
45-	-45								[ - ]
46-	-46	SS-21 46.0-48.0	24/12	15.8	14-54-33			Same as above, slight odor	
47 -	-47								, , , , , , , , , , , , , , , , , , ,
48-	-48	SS-22 48.0-50.0	24/12	11.4	8-44-33			Same as above, increase silt, increase gravel, slight odor may be from pulling spoons through bad	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
49-	<del>-</del> -49							water	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
50 -	-50	SS-23 50.0-52.0	24/12	15.4	12-79-37			Same as above	
51 -	-51 -51							,	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
52-	-52	SS-24 52.0-54.0	21/14	16.3	8-61-50			Same as above	Grout 2" Sch. 40 PVC riser
53-	-53								
54	-54	SS-25 54.0-56.0	24/16	15.9	9-46-33			Same as above	
1DA BOR	-55 -								
988II/SBIOQZISOIL BORING LOGSIHMW-11DA.BOR 55 59 59 59	-56	SS-26 56.0-58.0	24/12	15.3	6-25-50			Same as above, less coarse sand, less gravel	
ORING LO	-57								
58 58	-58	SS-27 58.0-60.0	24/8	7.8	20-70-35			Brown fine to medium SAND, trace gravel trace clay	
59 59	-59							Large cobble in spoon	-

F:\CLIENTS\SBI\SB 11-30-2001

60-

& associates, inc.
Phase II Drilling
Franklin & Sample
South Bend, IN

SBI002

**Date Started** Date Completed

Logged by

Reviewed by **Drilling Contractor** 

**Drilling Method** Sampling Method

Total Depth (ft.) S. Water Level Date :

: 08/22/01

: 08/22/01

: Matt Young

: James P. Hogan

: Topflite : Canterra CT250

: Hand Auger/Split Spoon

: 74.0'

LOG OF BORING HMW-11DA

(Page 5 of 5)

G. Elev. (ft. USGS)

: Not Surveyed

PID/FID Model

: PID 2020 / 100ppm Iso.

PID/FID Calibration

: 100ppm Isobutylene

Drum Label ID

			•		s. w	ater Le	evel (f	i.) :			
								Soil Samples	Water Le		
		.	ر ح					Sampled Int.	<u></u> Statio		:
Depth in	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	Graphic Log	Lab Sample	Durir	ng Drilling	Well: HMW-11DA Elev.:
Feet	Liov.	Samı	Samı	PID /	Blow (6"-1	Soil (	Grap	DESCR	IPTION		
60	60	SS-28 60.0-62.0	24/12	0.0	16-60-28			Same as above			Grout
61 –	- <b>-</b> 61										Bentonite Seal
62	62	SS-29 62.0-64.0	24/14	0.0	16-73-50			Same as above, le	ss clay, few	gravel	2" Sch. 40 PVC riser
63	- <b>-</b> 63		i								
64	64	SS-30 64.0-66.0	24/6	0.0	24-45-50			Same as above, la spoon	rge cobble	in	
65	65										
66	-66	SS-31 66.0-68.0	24/14	0.0	25-60-50			Same as above, no	o clay, trace	e silt	2" Sch. 40 0.010-inch
67	-67										Sand Filter Pack
68	-68	SS-32 68.0-70.0	24/18	0.0	18-58-38			Same as above, 2' trace silt seem at t	' very fine s op of spoor	and,	
1 -	69							Drilling note: Enco	untered har 0 to 69.5'	d gray	
70-	-70	SS-33 70.0-72.0	24/16					Same as above			
71 –	-71	:									
72 – 72 –	-72	SS-34 72.0-74.0						Hard gray clayey s dry	SILT, trace	sand;	
70 – 71 – 72 – 73 – 74 – 75 – 75 – 75 – 75 – 75 – 75 – 75	-73										
74 -	-74			1		<u> </u>					
75-											

F.\CLIENTS\SBI\SBI002\SOIL BORING LOGS\HMW-11DA.BOR

: 08/22/01 **Date Started** : 08/22/01 **LOG OF BORING HMW-11I Date Completed** : Matt Young Logged by Reviewed by : James P. Hogan (Page 1 of 2) & associates, inc. : Topflite **Drilling Contractor** : Canterra CT250,4 1/4"HSA **Drilling Method** : Not Surveyed G. Elev. (ft. USGS) Phase II Drilling : Hand Auger/Split Spoon PID/FID Model : PID 2020 / 100ppm Iso. Sampling Method Franklin & Sample : 40.0' South Bend, IN Total Depth (ft.) PID/FID Calibration : 100ppm isobutylene S. Water Level Date : Drum Label ID SBI002 S. Water Level (ft.) Soil Samples Water Levels ▼ Static Sampled Int. Sample Recovery Sample Number Sample Interval/ PID / FID (ppm) During Drilling Sampler Type/ Soil Samples Well: HMW-11I Graphic Log Lab Sample **Blow Count** (6"-12"-6") Elev .: Depth Surf. in Elev. DESCRIPTION Feet 0 10 15" Concrete Surface Casing FILL - Brown clayey sand, trace gravel / crushed limestone / crushed concrete, piece of cloth noted 2 7 -2 HA-1/ 2.0-4.0 3 - 3 Same as above, refusal on concrete fragment at 5.1', augered to 10' Boring located on abandoned and filled truck dock 4-6-50 SS-2 4.0-6.0 14/6 4-4 5-1-5 -1--6 9-7 -9 -2" Sch. 40 PVC riser 6-10-7 10 7 -10 24/18 11.1 SS-3 10.0-12.0 Brown medium to fine SAND, trace silt, trace gravel, moist 11 - - 11 Same as above, less silt with depth 12 - 12 24/16 14.8 4-12-8 SS-4 12.0-14.0 13 -13 F:\CLIENTS\SBI\SBI002\SOIL BORING LOGS\HMW-111.BOR Same as above 14 - 14 24/22 17.8 4-10-10 SS-5 14.0-16.0 15 - 15 Same as above 24/22 16.0 6-17-12 16 7 -16 SS-6 16.0-18.0 17-- -17 18-1-18 24/22 16.8 5-9-6 Same as above, less fines, increase SS-7 18.0-20.0 19-7-19 20 11-30-2001

Phase II Drilling Franklin & Sample South Bend, IN

SBI002

Date Started Date Completed

Logged by

Reviewed by **Drilling Contractor** 

**Drilling Method** Sampling Method

Total Depth (ft.) S. Water Level Date :

: 08/22/01

: 08/22/01 : Matt Young

: James P. Hogan

: Topflite

: Canterra CT250,4 1/4"HSA : Hand Auger/Split Spoon

: 40.0'

S. Water Level (ft.)

### **LOG OF BORING HMW-11I**

(Page 2 of 2)

G. Elev. (ft. USGS)

: Not Surveyed

PID/FID Model

: PID 2020 / 100ppm Iso.

PID/FID Calibration

: 100ppm Isobutylene

-			· · · · · · · · · · · · · · · · · · ·			- 1			0 !! 0	10111		
ı									Soil Samples	Water Levels		
	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Sampled Int.  Lab Sample  DESCR	▼ Static	Well: I Elev.:	⊣MW-11I
$\vdash$	20-	- <b>-2</b> 0									, , ,	, ,
	21		20.0-22.0	24/20	16.9	6-16-12			Same as above, inc	crease gravel		
	22		SS-9 22.0-24.0	24/20	19.2	6-19-12			Same as above, les	ss gravel		
	24		SS-10 24.0-26.0	24/20	11.0	4-10-11			Light brown mediun trace silt trace grav	n to fine sand, el		
	25 <u> </u>		SS-11	24/24	44.6	2-7-7			Same as above, les	-		
	27		SS-11 26.0-28.0	<u> </u>	1.0				Grey medium to fin strong odor (petro b black stains noted	oitter) noted, few		2" Sch. 40 PVC riser
	28		SS-12 28.0-30.0	24/24	94.2	3-19-21			Same as above, str	•		
	29 <u> </u>		SS-13 30.0-32.0	24/16	89.4	2-12-15			Auger 28' to 33' – p Product encountered Same as above, tra wax have washed		0 a	Grout Bentonite Seal
	31	-31	30.0-32.0						sand, strong odor r	out, increase fine increase fine		1
	32		SS-14 32.0-34.0	24/18	81.8	6-29-24			Same as above, st	rong odor noted		
7-111.BOR		-33 -34	SS-15 34.0-36.0	24/18	120	3-11-15			Same as above, st increase gravel with	h denth, less		Sand Filter Pack
RING LOGS/HMW-111.BOR	35	35	0 1.0 00.0						fines, brown oily staphase)	aining noted (free		2" Sch. 40 0.010-inch slotted PVC screen
L BORING	36 – 37 –	-36 37	SS-16 36.0-38.0	24/24	121	5-30-24			Same as above, st brown oily staining Brown medium to o	noted coarse SAND,		7.`  7.`  8.`
SBI002\SOI	=	-38	SS-17 38.0-40.0	24/18	70.7	4-16-20			trace silt, trace gra (petro bitter) Same as above	vel, strong odor		
F:\CLIENTS\SB\\SB\002\SO\L BO	39	-39										
딣	40	1	-	I		J			1			

South Bend Area A Franklin & Sample South Bend, IN

SB1002

**Date Started** 

Date Completed Logged by

Reviewed by

**Drilling Contractor** 

: Topflite **Drilling Method** : 4.25 ID HSA Sampling Method : Split Spoon

: 08/13/01

: 08/13/01

: Matt Young

: 68.0' Total Depth (ft.) S. Water Level Date :

S. Water Level (ft.)

**LOG OF BORING HMW-12D** 

(Page 1 of 4)

G. Elev. (ft. USGS) PID/FID Model

: Not Surveyed : PID / 2020

PID/FID Calibration : 100ppm Isobutylene

						─ s. w	ater Le	vel (fi	t. <b>)</b> :					ı
	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples Sampled Int.  Lab Sample  DESCR	Water Lev  ▼ Statio  □ During	;	Well: HI Elev.:	MW-12D	·
F.YCLIENTSISBINSBI002ISOIL BORING LOGSIHMW-12D.BOR	0 — 1 — 2 — 3 — 4 — 5 — 6 — 7 — 11 — 12 — 12 — 13 —	1 2 3 4 5 6 7 8 9 10 11	HA-1/ 0.0-2.0 HA-2/ 2.0-4.0 SS-3 4.0-6.0 SS-4 6.0-8.0 SS-6 10.0-12.0 SS-7 12.0-14.0 SS-8 14.0-16.0	24/12 24/22 24/14 24/14 24/14	7.8 7.8 4.7 10.1 7.0	4-3-2 3-3-1 3-6-3 9-9-5 8-21-14 8-21-15	S V	Ō .	Brown medium to contrace silt, trace gravel, trace gravel, trace gravel, trace gravel, trace gravel, trace gravel, trace gravel, trace gravel, trace silt, trace gravel, t	oarse SANI el; small ar oist ss staining n to coarse silt, moist coarse SAN vel, moist	SAND,		Surface Casing  Grout  2" Sch. 40 PVC riser	Γ
F.	17-	1		····				· · ·						

<u>associates</u>, inc.

South Bend Area A Franklin & Sample South Bend, IN

SBI002

Date Started

Date Completed

: 08/13/01 Logged by : Matt Young

Reviewed by

**Drilling Contractor** : Topflite Drilling Method Sampling Method

: 4.25 ID HSA : Split Spoon : 68.0'

Soil Samples

: 08/13/01

Total Depth (ft.) S. Water Level Date :

S. Water Level (ft.)

### **LOG OF BORING HMW-12D**

(Page 2 of 4)

G. Elev. (ft. USGS) PID/FID Model

: Not Surveyed : PID / 2020

PID/FID Calibration : 100ppm Isobutylene

Drum Label ID

Water Levels

	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Sampled Int.  Lab Sample  DESCR	Static	Well: HMW-12D Elev.:	
	17-	17					M					
	18	-18	SS-10 18.0-20.0	24/22	2.0	6-16-10			Same as above, gra through spoon, less medium to coarse	adual black s fines more		
	19	-19					$\ X\ $				700	
	20-	-20	SS-11 20.0-22.0	24/18	0.0	6-16-12			Same as above, tra	ace gravel		
	21	<b>-2</b> 1					$\ X\ $		Same as above			
	<b>2</b> 2	-22	SS-12 22.0-24.0	24/24	0.0	8-23-14			Same as above			
j	23	-23			:		$\ X\ $				, , , d	
	24	-24	SS-13 24.0-26.0	24/18	0.0	5-25-13			Same as above, we	et		
	25	-25					$\ \lambda\ $		Brown medium to o gravel, trace silt, we	coarse SAND, few et	Grout 2" Sch. 40 PVC r	iser
	26-	26	SS-14 26.0-28.0	24/12	0.0	4-22-13			Same as above			·
	27	-27										
D.BOR	28	-28	SS-15 28.0-30.0	24/20	0.0	13-24-17			Same as above			
\HMW-12	29	-29					$\ \lambda\ $		Same as above, bl	ack stain	-   - d	
BORING LOGS/HMW-12D.BOR	30 -	-30	SS-16 30.0-32.0	24/20	0.0	7-33-27			Same as above			
	31	-31		:			$\ \lambda\ $					
(SB1002\S	32	-32	SS-17 32.0-34.0	24/20	0.0	13-30-16			Same as above			
F:\CLIENTS\SB\\SBI002\SO\!	33	33					$\ \lambda\ $					
F:\CLI	34 -	-			<u></u>		<u> </u>	<u> </u>				

South Bend Area A Franklin & Sample South Bend, IN

SBI002

Date Started

Date Completed Logged by

Reviewed by

**Drilling Contractor Drilling Method** 

Sampling Method Total Depth (ft.)

S. Water Level Date : S. Water Level (ft.)

: 08/13/01

: 08/13/01

: Matt Young

: Topflite : 4.25 ID HSA

: Split Spoon : 68.0'

### **LOG OF BORING HMW-12D**

(Page 3 of 4)

G. Elev. (ft. USGS)

: Not Surveyed : PID / 2020

PID/FID Model PID/FID Calibration

: 100ppm Isobutylene

Drum Label ID

	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Lòg	Soil Samples Sampled Int.  Lab Sample  DESCR	Water Levels  ▼ Static  ▽ During Drilling	Well: HMW-12D Elev.:
	34-	34 35	SS-18 34.0-36.0	24/16	0.9	29-22-17			Same as above		7 0 1 0 7 0 0 0 7 0 0 0 7 0 0 0
	36	-36	SS-19 36.0-38.0	24/12	1.6	42-28-18			Same as above, 2 l	arge cobbles	
	-	-37 -38	SS-20 38.0-40.0	24/18	0.0	23-29-17			Same as above		
	-	-39 40	SS-21 40.0-42.0	24/12	0.0	47-34-27			Same as above, mo	ore silt	
	-	-41 -42	SS-23 42.0-44.0	24/18	0.4	14-50-29			Same as above		Grout Grout Grout Grout Grout Grout Grout Grout Grout Grout Grout Grout
	44 -	-43 -44	SS-23 44.0-46.0	24/16	0.0	7-23-14	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		Same as above, 4"	at top, no gravel	
SSHMW-12D.BOR	45	-46	SS-24 46.0-48.0	24/18	0.0	14-49-27			Same as above		
SOIL BORING LOG	48-	-47 -48	SS-25 '48.0-50.0	24/16	0.0	11-55-27			Same as above	·	
F:\CLIENTS\SB\\SB\\0002\SO\\LBOR\\\GLOGS\\HMW-12D.BOR	49 – 50 –	-49 -50	SS-26 50.0-52.0	24/18	0.0	15-45-44			Same as above, tra	ace gravel	
Ŋ.	51 –	1	, , ,				- N				

11-30-2001

South Bend Area A Franklin & Sample South Bend, IN

SBI002

Date Started

**Date Completed** 

: 08/13/01 : 08/13/01 : Matt Young

Logged by Reviewed by

**Drilling Contractor** Drilling Method

: Topflite : 4.25 ID HSA : Split Spoon

Sampling Method Total Depth (ft.) S. Water Level (ft.)

: 68.0' S. Water Level Date

**LOG OF BORING HMW-12D** 

(Page 4 of 4)

G. Elev. (ft. USGS)

: Not Surveyed : PID / 2020

PID/FID Model PID/FID Calibration

: 100ppm Isobutylene

Drum Label ID

								Soil Samples	Water Levels	Ī
			ح ا					Sampled Int.	▼ Static	İ
		e/ iber	val/	(mdd)		"	1		During Drilling	
		Typ fum	nter	1	# <u>_</u>	bles	Ĺòg	Lab Sample		
Depth	Surf.	<u>p</u> <u>o</u>	<u>a</u> <u>a</u>	먎	To Com	gau	<u>:</u>			l

Well: HMW-12D Elev.:

Depth in	Surf. Elev.	Sampler Type/ Sample Numbe	Sample Interva Sample Recov	PID / FID (ppm	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Lab Sample	
Feet		Sam	Sam	PID	Blow (6"-1	Soil	Grap	DESCR	IPTION
51	51								
52_	52	SS-27 52.0-54.0	23/16	0.0	13-67-50			Same as above, les	ss gravel
53-	53	;				X			
54-	54	SS-28 54.0-56.0	16/12	0.0	37-50-50			Same as above, bla	ack banding
55-	-55					X			
56	_ <b>-56</b>	SS-29 56.0-58.0	24/14	0.0	17-49-33	$\mid \mid	Same as above, bla	ack banding	
57-	- <b>-</b> 57		·			$\ \chi\ $			
58	- <b>-</b> 58	SS-30 58.0-60.0	23	0.0	11-72-50	$\mid \mid \rightarrow \mid$		Same as above	
59-	59					$\ X\ $			
60	-60	SS-31 60.0-62.0	24/18	0.0	10-51-42			Same as above, le	ss gravel
61-	-61				,	$\ X\ $			
62-	-62	SS-32 62.0-64.0	24/4	0.0	10-50-50			Same as above, no most likely washed	gravel, sample out
63	-63					X			
64 –	-64	SS-33 64.0-66.0	23/20	3.4	8-54-50	$\left  \left\langle \cdot \right\rangle \right $		Same as above, tra	ace gravel
65	-65					$\ X\ $		Same as above, bl	ack staining
66-	-66	SS-34 66.0-68.0	24/22	0.0	10-62-50	$\ \cdot\ $		Brown SILT, trace	gravel
67-	-67					$\ X\ $		trace gravel	ne to medium sand,
68 -				1		<u> </u>		End of boring at 68	i.0'

Grout 2" Sch. 40 PVC riser Bentonite Seal Sand Filter Pack 2" Sch. 40 0.010-inch slotted PVC screen

FICLIENTS\SBI\SBI002\SOIL BORING LOGS\HMW-12D.BOR

**Date Started** : 08/15/01 **LOG OF BORING HMW-14S Date Completed** : 08/15/01 Logged by : Mike Coonfare Reviewed by (Page 1 of 4) associates, inc. : ProbeTech **Drilling Contractor** : 4.25 ID HSA G. Elev. (ft. USGS) : Not Surveyed **Drilling Method** South Bend Area A : 2' Split Spoon : PID / 2020 Sampling Method PID/FID Model Franklin & Sample South Bend, IN Total Depth (ft.) : 31.5 PID/FID Calibration : 100ppm Isobutylene S. Water Level Date Drum Label ID SBI002 S. Water Level (ft.) Water Levels Soil Samples Sampled Int. ▼ Static Sample Recovery Sample Interval/ Sample Number During Drilling PID / FID (ppm) Sampler Type/ Soil Samples Well: HMW-14S Lab Sample Graphic Log **Blow Count** (6"-12"-6") Elev.: Surf. Depth Elev. **DESCRIPTION** Feet  $0 \rightarrow 0$ Asphalt / concrete Surface Casing HA-1/ 8.0 1 Brown fine SAND, some gravel, moist 1.0-1.5 3.0 HA-2/ Black silty SAND, some gravel, organics, moist 1.5-2.0 Black silty SAND, trace gravel, moist HA-3/ 6.8 2.0-2.7 Same as above, slight petro odor 7.3 HA-4/ 3--3 2.7-3.3 Same as above 9.3 HA-5/ 3.3-4.2 Bentonite Seal 2" Sch. 40 PVC riser 20.6 Same as above HA-6/ 4.2-4.8 Brown fine SAND, trace gravel, slight petro staining and odor 24/24 2-5-4 SS-7 1.8 -5 Brown clayey SAND, trace gravel, moist F:\CLIENTS\SB\\SB\\0002\SO\L BOR\NG LOGS\HMW-14S.BOR 5.0-5.8 Brown coarse SAND, trace gravel, 6--6 2-3-2 Same as above 7-SS-8 24/18 3.7 7.0-8.5

: 08/15/01 **Date Started** : 08/15/01 **Date Completed LOG OF BORING HMW-14S** Logged by : Mike Coonfare Reviewed by (Page 2 of 4) āssociates. inc. **Drilling Contractor** : ProbeTech : 4.25 ID HSA **Drilling Method** G. Elev. (ft. USGS) : Not Surveyed South Bend Area A Sampling Method : 2' Split Spoon Franklin & Sample PID/FID Model : PID / 2020 South Bend, IN Total Depth (ft.) : 31.5 PID/FID Calibration : 100ppm Isobutylene S. Water Level Date Drum Label ID SB1002 S. Water Level (ft.) Soil Samples Water Levels Sampled Int. ▼ Static Sample Recovery Sample Interval/ Sample Number PID / FID (ppm) During Drilling Sampler Type/ Soil Samples Well: HMW-14S Graphic Log Lab Sample Blow Count (6"-12"-6") Elev .: Depth Surf. in Elev. **DESCRIPTION** Feet 8--8 Same as above, trace clay at 9.3 to 9.8 **SS-9** 24/15 5.1 6-7-4 9 -9 9.0-10.3 10 -10 Light brown coarse SAND, trace gravel, moist 11 - -11 SS-10 24/20 1.1 4-7-2 11.0-12.7 Bentonite Seal 2" Sch. 40 PVC riser 12 -12 Light brown fine SAND, trace gravel, moist 24/20 SS-11 0.0 3-5-3 13--13 F:\CLIENTS\SB\\SB\\SD\\SOR\\\OGS\\HMW-14S.BOR 13.0-14.7 14--14 SS-12 15 - - 15 24/20 3.0 4-5-2 Same as above Light brown coarse SAND, trace gravel, moist 15.0-15.3 16 11-30-2001

: 08/15/01 **Date Started** : 08/15/01 **Date Completed LOG OF BORING HMW-14S** : Mike Coonfare Logged by Reviewed by (Page 3 of 4) & associates, inc. **Drilling Contractor** : ProbeTech : 4.25 ID HSA G. Elev. (ft. USGS) : Not Surveyed South Bend Area A **Drilling Method** Sampling Method : 2' Split Spoon Franklin & Sample PID/FID Model : PID / 2020 : 31.5 South Bend, IN Total Depth (ft.) : 100ppm Isobutylene PID/FID Calibration S. Water Level Date Drum Label ID SBI002 S. Water Level (ft.) Soil Samples Water Levels ▼ Static Sampled Int. Sample Recovery Sample Interval/ Sample Number During Drilling PID / FID (ppm) Sampler Type/ Soil Samples Well: HMW-14S Graphic Log Lab Sample Blow Count (6"-12"-6") Elev.: Depth Surf. Elev. in **DESCRIPTION** Feet - -16 16 Same as above 17 - - 17 SS-13 24/20 4.3 7-13-12 17.0-18.7 Bentonite Seal 18-+ -18 2" Sch. 40 PVC riser Light brown coarse SAND, with gravel, band of dark staining from 19.4 to 19.6 and from 19.9 to 20.2 19--19 SS-14 24/15 5.1 7-21-14 19.0-20.3 20 -20 8-33-20 Same as above (no staining) -21 **SS-15** 24/15 4.0 F:\CLIENTS\SB\SB\02\SO\L BORING LOGS\HMW-14S.BOR 21.0-22.3 -Sand Filter Pack 22--22 2" Sch. 40 0.010-inch slotted PVC screen Light brown coarse SAND, some gravel, very moist from 23.0 to 24.0 and saturated at 24.0 -23 24/24 5.0 10-22-9 23-**SS-16** 23.0-25.0 24 11-30-2001

: 08/15/01 Date Started : 08/15/01 **Date Completed** LOG OF BORING HMW-14S Logged by : Mike Coonfare Reviewed by (Page 4 of 4) & associates, inc. **Drilling Contractor** : ProbeTech : 4.25 ID HSA **Drilling Method** : Not Surveyed South Bend Area A G. Elev. (ft. USGS) Sampling Method : 2' Split Spoon Franklin & Sample PID/FID Model : PID / 2020 South Bend, IN Total Depth (ft.) : 31.5 PID/FID Calibration : 100ppm Isobutylene S. Water Level Date : Drum Label ID SBI002 S. Water Level (ft.) Soil Samples Water Levels Sampled Int. ▼ Static Sample Recovery Sample Interval/ Sample Number PID / FID (ppm) During Drilling Sampler Type/ Soil Samples Well: HMW-14S Graphic Lòg Lab Sample Blow Count (6"-12"-6") Elev .: Depth Surf. Elev. **DESCRIPTION** Feet 24 -24 -25 SS-17 24/17 8.9 3-7-10 Same as above 25 25.0-26.4 26 -26 Same as above, petrol, stain and odor from 27.7 to 28.5 27 \_\_\_- -27 SS-18 24/18 27.7 4-8-10 27.0-28.5 2" Sch. 40 0.010-inch Sand Filter Pack slotted PVC screen 28 -28 29-SS-19 24/18 11.5 3-5-3 Same as above -29 F:\CLIENTS\SB\\SB\\02\SO\\LBOR\\\NG\LOGS\\HMW-14S.BOR 29.0-30.5 30 -- -30 31 4 -31 End of boring at 31.5' 32

South Bend Area A Franklin & Sample South Bend, IN

SBI002

Date Started Date Completed

Logged by

: 08/15/01 : James P. Hogan

Reviewed by **Drilling Contractor** 

: ProbeTech : CT250 4 1/4 HSAs

: 08/15/01

Drilling Method Sampling Method Total Depth (ft.)

S. Water Level Date : S. Water Level (ft.)

# **LOG OF BORING HMW-15D**

(Page 1 of 4)

G. Elev. (ft. USGS)

: Not Surveyed

: Hand Auger, Split Spoons PID/FID Model : PID / 2020 : 64.0' PID/FID Calibration : 100ppm Isobutylene Drum Label ID

									1		
Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Sampled Int.	ater Levels Static During Drilling ON	Well: H	HMW-15D
11 22 3 4 5 6 7 8 9 10 11 12 13 13 13 13 13 13 13 13 13 13 13 13 13	-1	HA-1/ 1.0-1.5 HA-2/ 1.5-2.0 HA-3/ 2.0-2.7 HA-4/ 2.7-3.3 HA-5/ 3.3-4.2 HA-6/ 4.2-4.8 SS-7 5.0-5.8 SS-8 7.0-8.5 SS-9 9.0-10.3 SS-10 11.0-12.7 SS-11 13.0-14.7	24/24 24/18 24/15 24/20 24/20	0.8 3.0 6.8 7.3 9.3 20.6 1.8 3.7 5.1	2-5-4 2-3-2 6-7-4 4-7-2 4-5-2			Asphalt / concrete  Brown fine SAND, some Black silty SAND, some organics, moist Black silty SAND, trace Same as above Same as above  Brown fine SAND, trace petro staining and odor Brown clayey SAND, tra moist Brown coarse SAND, tra moist Same as above  Light brown coarse SAN gravel, moist  Same as above  Light brown fine SAND, moist  Same as above  Light brown coarse SAN gravel, moist	gravel, egravel, moist petro odor  gravel, slight ace gravel, ace gravel, slay at 9.3 to  ND, trace		Surface Casing  —— 2" Sch. 40 PVC riser

South Bend Area A Franklin & Sample South Bend, IN

SBI002

Date Started Date Completed

Logged by

Reviewed by

**Drilling Contractor** Drilling Method

Sampling Method Total Depth (ft.) S. Water Level Date :

: 08/15/01

: 08/15/01

: James P. Hogan

: ProbeTech

: CT250 4 1/4 HSAs : Hand Auger, Split Spoons

: 64.0'

S. Water Level (ft.)

**LOG OF BORING HMW-15D** 

(Page 2 of 4)

G. Elev. (ft. USGS)

: Not Surveyed : PID / 2020

PID/FID Model PID/FID Calibration

: 100ppm Isobutylene

1						5. W	ater Le	vei (ii	L-) :			
	Depth in	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	l Samples	Graphic Log	Soil Samples Sampled Int.  Lab Sample	Water Lev  ▼ Static  ▽ During		Well: HMW-15D Elev.:
	Feet		Sar	Sar	71	Blo (6".	Soil	ຶ້	DESCR	IPTION		
	16	16									1	П
	17	- <b>-</b> 17	SS-13 17.0-18.7	24/20	4.3	7-13-12	abla		Same as above			
	18		SS-14	24/15	5.1	7-21-14			Light brown coarse	SAND with		,
	20		19.0-20.3	24/15	5.1	7-21-14			Light brown coarse gravel, band of darl 19.4 to 19.6 and fro	staining from 19.9 to 20	om 0.2	
	21	21	SS-15 21.0-22.3	24/15	4.0	8-33-20			Same as above (no	staining)		
	22	22							·			
	23-	23	SS-16 23.0-25.0	24/24	5.0	10-22-9			Light brown coarse gravel, very moist f and saturated at 24	SAND, som rom 23.0 to	ne 24.0	
	24 <u> </u>	24 25	SS-17	24/17	8.9	3-7-10			Same as above			2" Sch. 40 PVC riser
2	26	26	25.0-26.4					· · · · · · · · · · · · · · · · · · ·				
F:\CLIENTS\SB\\SB\02\SO\L BORING LOGS\HMW-15D.BOR	27	27	SS-18 27.0-28.5	24/18	27.7	4-8-10			Same as above, per from 27.7 to 28.5	etrol, stain ar	nd odor	
G LOGS\F	28- -	-28										
IL BORIN	29 <u> </u>	29	SS-19 29.0-30.5	24/18	11.5				Same as above			
SB1002\SO	30-	-30	SS-1 30.0-31.2	2.0/1.2	2.5	8-21-15		- · · · · · · · · · · · · · · · · · · ·	Medium dense to c medium brown SAI wet	lense coarse ND; trace gra	e and avel;	
NTS\SBI\£	31 <u> </u>	-31										
E'CLE	32_							<u> </u>				Ц
-												

South Bend Area A Franklin & Sample South Bend, IN

SBI002

Date Started Date Completed

: 08/15/01 : James P. Hogan Logged by

Reviewed by

**Drilling Contractor** 

Drilling Method Sampling Method

: CT250 4 1/4 HSAs : Hand Auger, Split Spoons Total Depth (ft.) : 64.0'

: ProbeTech

: 08/15/01

S. Water Level Date : S. Water Level (ft.)

### **LOG OF BORING HMW-15D**

(Page 3 of 4)

G. Elev. (ft. USGS)

: Not Surveyed

PID/FID Model

: PID / 2020 : 100ppm Isobutylene

Drum Label ID

PID/FID Calibration

							-		Soil Samples	Water Levels	
				ح _					Sampled Int.	▼ Static	
			Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)		စ္ဆ			_ During Drilling	Weil: HMW-15D
	Donth	Surf.	Sampler Type/ Sample Numbe	Rec	9	ount 3")	Soil Samples	Graphic Log	Lab Sample		Elev.:
	Depth in	Elev.	ple ple	ple ple	臣	/ Co  2"-(	Sar	hic			
	Feet		Sam	Sam	윤	Blow Count (6"-12"-6")	Soil	Ga	DESCR	IPTION	
	32-	32	0, 0,	0, 0,			-				
	3	0	SS-2 32.0-33.3	2.0/1.3	2.4	7-20-12	$\mathbb{N}$		Medium dense, san	ne as above	
	33-	33	32.0-33.3				$  \lambda  $	]			
	-					,					
	34-	34	SS-3	2.0/1.3	7.0	9-23-15			Medium dense to d	ense, same as	
	_		34.0-35.3						above		
	35-	35					$\  \wedge \ $				
	-						السا				
	36-	36	SS-4	2.0/1.3	6.2	8-28-17	<u></u>	::::	Same as above		
	-		36.0-37.3						·		
	37-	37					$\  \wedge \ $				
	-										
)	38-	- <b>-</b> 38	SS-5	2.0/0.9	5.0	6-20-13			Medium dense brow	wn SAND, trace	
	-		38.0-38.9			1	IIXI		gravel; wet		
	39-	-39									
	-			:							
	40-	-40	SS-6	2.0/1.3	6.8	4-13-34			Medium dense brow	wn SAND; wet	2" Sch. 40 PVC riser
	-	-	40.0-41.3								
	41 –	-41	l	ľ							
	-			i							
	42-	-42	SS-7 42.0-43.0	2.0/1.0	5.3	9-50-33		000	Dense to very dens	se orange-brown	
30R	-	1	42.0-43.0					0.0	Dense to very dens gravelly coarse SA trace clay; wet	ND; trace of silt,	
15D.E	43-	-43						00.0			
¥ ¥		]			1			0 0 0			
SS/	44	-44	SS-8 44.0-45.3	2.0/1.3	5.7	11-95-40		00.0	: :		
010	]	-	11.0 10.0					000	:		
ÖRIÄ	45-	-45						0 0 0			
OIL B		1	00 -	0.000		44.40.5=		000			
)02\S	46-	<b>-4</b> 6	SS-9 46.0-46.7	2.0/1.3	7.5	14-48-37		0.0	Dense to very dens	se, same as above	
I\SBIC			SS-10 46.7-47.3		8.0			000	Dense to very dens	se fine SAND: wet	.
ACLIENTSISBINSBI002\SOIL BORING LOGS\HMW-15D.BOR	47-	-47	46.7-47.3						20.100 to 70.7 doi:		
IENT.		1									
덜	48-	1				-t					

& associates, inc.
South Bend Area A
Franklin & Sample
South Bend, IN
SBI002

Date Started
Date Completed
Logged by

rted : 08/15/01 mpleted : 08/15/01

: 08/15/01 : James P. Hogan

Reviewed by Drilling Contractor Drilling Method

: ProbeTech : CT250 4 1/4 HSAs

Sampling Method : Hand Auger, Split Spoons Total Depth (ft.) : 64.0'

S. Water Level Date : S. Water Level (ft.) :

### **LOG OF BORING HMW-15D**

(Page 4 of 4)

G. Elev. (ft. USGS)

: Not Surveyed

PID/FID Model PID/FID Calibration : PID / 2020 : 100ppm Isobutylene

Drum Label ID

ı			SB1002			S. W	ater Le	vel (ft	.) :	_		
	Depth in	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples Sampled Int.  Lab Sample	Water Le ▼ Stati	С	Well: HMW-15D Elev.:
	Feet		Samı	Sam	PID /	Blow (6"-1	Soil	Grap	DESCR	IPTION		
	48 49	48 49	SS-11 48.0-48.8	2.0/0.8	6.8	9-32-31			Dense, same as ab	ove		
	1	50	SS-12 50.0-50.9	2.0/0.9	7.0	11-14-17			Medium dense brov gravel; wet	vn SAND,	trace	
	-	51 52	SS-13	2.0/0.8	7.2	7-45-45			Dense to very dens	e brown S	AND;	
	-	53	52.0-52.8						wet			2" Sch. 40 PVC riser
	-	-54	SS-14 54.0-55.5	2.0/1.9	4.6	4-22-28			Medium dense to d SAND; wet	ense brow	n fine	
		55 56	SS-15 55,5-55,9 56.0-56.8	2.0/0.8	4.5 5.4	17-38-40			Medium dense to c gravel; wet Dense brown SAN	ense SAN D; wet	ID, litle	
		-57										
D.BOR	-	58 59	SS-17 58.0-59.3	2.0/1.3	4.0	7-51-48			Very dense, same	as above		Bentonite Seal Sand Filter Pack
LOGS/HMW-15D.BOR	60-	-60	SS-18 60.0-61.0	2.0/1.0	3.3	19-32-31			Dense brown SAN wet	D, trace gr	avel;	2" Sch. 40 0.010-inch
IL BORING L	61-											
3BI002\SOI	62-	-62	SS-19 62.0-63.0	1.3/1.3	1.4	3-34-50			Very dense brown	SAND; we	et	
F:\CLIENTS\SB\\SB\002\SO\L BORING	63-	-63	SS-20 63.0-63.3		2.9				Hard clayey SILT,	little sand;	dry	
::OLIE	64-	]		l					<u> </u>			J

& associates, inc.
South Bend Area A
Franklin & Sample
South Bend, IN
SBI002

Date Started
Date Completed
Logged by

: 08/22/01 ed : 08/22/01 : James Hogan

: 69.0'

Reviewed by Drilling Contractor Drilling Method

: Topflite Drilling : CT250, 4 1/4" HSAs : Split Spoon, Hand Auger

Sampling Method Total Depth (ft.)

S. Water Level Date :

# **LOG OF BORING HMW-16D**

(Page 1 of 5)

G. Elev. (ft. USGS)

: Not Surveyed : PID / 2020

PID/FID Model PID/FID Calibration

: 100ppm Isobutylene

Drum Label ID

ŀ						s. w	ater Le	evel (ft	:.) :		
	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Lòg	Soil Samples Sampled Int.  Lab Sample  DESCR	Water Levels  ▼ Static  ▽ During Drilling  IPTION	Well: HMW-16D Elev.:
	0_	- 0	0, 0,								
FICLIENTS/SBI/SBI/OZISOIL BORING LOGS/HMW-16D.BOR	2- 3- 3- 5- 6- 7- 10- 11- 12-	1 2 3 4 5 6	HA-1/ 1.0-2.0 HA-2/ 2.0-4.0 SS-3 4.1-5.5 SS-4 6.0-7.1 SS-5 8.0-9.5	2.0/1.5 2.0/1.1 2.0/1.1	6.7 5.3 0	6-11-6 4-10-8 5-12-6 3-10-8		7 0 7 0 7 0 7 0 0 0 0 0 0 0 0 0 0 0 0 0	Dark brown gravelly wood, moist  Dark brown gravelly wood, moist  Dark brown silty SA moist  Same as above  Medium dense orat SAND; moist  Loose orange-brow gravel; moist  Medium dense orat trace gravel; moist  Loose orange-brow gravel, moist	y SAND, brick, AND, trace gravel; Inge to brown Inge to brown Inge-brown SAND;	Concrete Seal Surface Casing  Bentonite Seal  2" Sch. 40 PVC riser
F;C	14-	1							-		

South Bend Area A Franklin & Sample South Bend, IN

SBI002

Date Started

Date Completed Logged by

Reviewed by **Drilling Contractor**  : James Hogan : Topflite Drilling

: 08/22/01

: 08/22/01

**Drilling Method** Sampling Method : CT250, 4 1/4" HSAs : Split Spoon, Hand Auger

# LOG OF BORING HMW-16D

(Page 2 of 5)

G. Elev. (ft. USGS)

: Not Surveyed : PID / 2020

PID/FID Model

		3.0	14/-41				
	S. Water Level (ft.)	:					
	S. Water Level Date			Drum La	bel ID	:	,
	Total Depth (ft.)					: 100ppm Isob	utylene
	Tatal Danth (ft.)	: 69.0'	_			. 400 1	t t
I	Sampling Memou	. Opiil Opoon, nai	iu Augei	PIU/FIU	Model	. PID / 2020	

Depth   Surf.   Elev.   Surf.   Elev.   Surf.   Elev.   Surf.   Elev.   Surf.   Elev.   Surf.   Elev.   Surf.   Elev.   Surf.   Elev.   Surf.   Elev.   Surf.   Elev.   Surf.   Elev.   Surf.   Elev.   Surf.   Elev.   Surf.   Elev.   Surf.   Elev.   Surf.   Surf.   Elev.   Surf.   Sur										0 11 0 1 1 1	
Depth   Surf.   Feet   Surf.   Feet   Surf.										Soil Samples Water Levels	
14 - 14		in		mpler Type/ mple Number	mple Interval/ mple Recovery	O / FID (ppm)	w Count -12"-6")	il Samples	aphic Lòg	Lab Sample	
14 - 14		reel		Sa	Sa	뭅	Blc (6"	တိ	້	DESCRIPTION	
SS-8 14.0-15.1   0   5-6-7     Same as above     me as above     Same as above   Same as above   Same as above     Same as above     Same as above     Same as above     Same as above     Same as above     Same as above     Same as above     Same as above     Same as above     Same as above     Same as above     Same as above     Same as above     Same		14-	14								
15 - 15   16 - 16   16 - 16   16 - 17.0   17 - 17   18 - 18   18 - 18   18 - 19.0   19.0		-			2.0/1.1	0	5-6-7			Same as above	
16		45	15	14.0-15.1							0 0 0
16—16 SS-9 16.0-17.0 0.7 9-18-10		15-	15					_			7 0 7 0
16 - 16		_									1   .     .
1717   1818   SS-10   18.0-19.3   2.0-1.3   2.0   9-22-8		16-	-16		2.0/1.0	0.7	9-18-10		· · · ·	Medium dense brown gravelly SAND;	0 0
1818		-	1	16.0-17.0					0 0 0	moist	
1818		17 –	17						0 0 0		0 0
19—-19 20—-20		-							0.0		0 0 0 0
19—-19 20—-20		-							2 0. 1	Mandana dana da dana dana da barran	
19—-19 20—-20		18-	18		2.0-1.3	2.0	9-22-8			gravelly SAND; moist	
2020		-	1	10.0 10.0					0.0		0 0
2020	)	19-	-19				į		0.00		
20.0-20.7  2121  2222	′	-						_	0 0 0		
20.0-20.7  2121  2222		20-	-20	SS-11	20/07	13	8-18-13		0 0 0		
2121 2222 SS-12 22.0-23.0  2323 SS-13 24.0-25.1  2.0/1.1  3.2 6-17-13	:	20-	7-20		2.0/0.7	1.3	0-10-13		0.0	Medium dense brown sandy	
2222		-	}			1			0 0	Gravez, molec	
2323   22.0-23.0   2.0/1.1   3.2   6-17-13		21 –	-21						000		2" Sch. 40 PVC riser
2323   22.0-23.0   2.0/1.1   3.2   6-17-13			1						00.0		
2323   2424   SS-13   24.0-25.1   3.2   6-17-13		22-	-22	SS-12	2.0/1.0	2.0	13-31-14		707	Dance brown grouply CAND: moint	
SS-13 24.0-25.1 2.0/1.1 3.2 6-17-13 Medium dense brown SAND; wet				22.0-23.0						Dense brown gravelly SAND, moist	
SS-13 24.0-25.1 2.0/1.1 3.2 6-17-13 Medium dense brown SAND; wet			22						. 0.		0 0 0
	К	23	-23						000		
	6D.B		1						000		0 0
	₩-1	24-	-24		2.0/1.1	3.2	6-17-13		a a a	Medium dense brown SAND: wet	
	S/H/S			24.0-25.1							
	õ	25-	-25			•			7		
	SING.										
2626		]							. ,	0	0 0 0
2727	NSOIL	26-	+ <b>-2</b> 6	SS-14 26.0-27.4	2.0/1.4	2.3	5-16-13			Same as above	
2727	31002	] :	1						ļ		
28- 28-	BINSE	27-	- <b>-2</b> 7						ļ		
28-	ITS/S	] :	}		-						
	LIEN	28.									0 1 0
	Ę.		J	I							

South Bend Area A Franklin & Sample South Bend, IN

SBI002

Date Started Date Completed

Logged by

Reviewed by

**Drilling Contractor Drilling Method** 

: Topflite Drilling : CT250, 4 1/4" HSAs Sampling Method : Split Spoon, Hand Auger : 69.0'

: James Hogan

: 08/22/01

: 08/22/01

Total Depth (ft.) S. Water Level Date S. Water Level (ft.)

**LOG OF BORING HMW-16D** 

(Page 3 of 5)

G. Elev. (ft. USGS)

: Not Surveyed

PID/FID Model PID/FID Calibration

: PID / 2020 : 100ppm Isobutylene

					s. w	ater L	evel (f	t.) :		
Depth in	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples Sampled Int.  Lab Sample	Water Levels  ▼ Static  ∇ During Drilling	Well: HMW-16D Elev.:
Feet		San	San San	PID	Blov -"-)	Soil	Gra	DESCR	IPTION	
28-		SS-15 28.0-29.3	2.0/1.3	4.0	3-17-13			Same as above		
30-	29 30	SS-16 30.0-31.0	; 2.0/1.0	1.7	10-17-9		¢ 0 ¢	Medium dense brov GRAVEL; wet	wn sandy	
	-31	00.47	2.04.0	<b>5</b> 1	9.25.16		0 0 0 0 0 0	Modium donse to d	lanca brown candy	
32-	-32	SS-17 32.0-33.0	2.0/1.0	5.1	8-25-16		00000	Medium dense to d GRAVEL; wet	ense blown sandy	
34-	-34	SS-18 34.0-35.0	2.0/1.0	4.8	6-18-12		0 0 0	Medium dense bro coarse sand; wet	wn SAND; some	Grout
36-	-35 36 37	SS-19 36.0-37.2	2.0/1.2	4.3	4-14-13			Same as above		2" Sch. 40 PVC riser
38 - 88	-38	SS-20 38.0-39.3	2.0/1.3	2.9	4-24-18			Medium dense to o SAND; trace grave	dense brown ol; wet	
CLIENTS/SBI/SBI002/SOIL BORING L	-39 -40	SS-21 40.0-40.9	2.0/0.9	3.1	8-12-20			Same as above		
41 - 42 - 42 -	-41 41				_					

South Bend Area A Franklin & Sample South Bend, IN

SBI002

Date Started Date Completed

Logged by

Reviewed by **Drilling Contractor** 

Drilling Method

Sampling Method Total Depth (ft.)

S. Water Level Date :

: 08/22/01 : 08/22/01

: James Hogan

: Topflite Drilling : CT250, 4 1/4" HSAs

: Split Spoon, Hand Auger

: 69.0'

S. Water Level (ft.) :

**LOG OF BORING HMW-16D** 

(Page 4 of 5)

G. Elev. (ft. USGS)

: Not Surveyed : PID / 2020

PID/FID Model PID/FID Calibration

: 100ppm Isobutylene

1					0. 11	alei Le	1) 1945	·/ ·	
Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples  Sampled Int.  ✓ Static ✓ During  DESCRIPTION	
42	-42	97 07	0, 0,			٠,			
	-43	SS-22 42.0-43.1	2.0/1.1	3.1	6-30-19			Medium dense to dense brown SAND; wet	. d   . d   . d   . d   . d   . d   . d
44	-44 -	SS-23 44.0-45.0	2.0/1.0	3.9	4-12-10			Medium dense, same as above	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	-45 46	SS-24	2.0/0.8	4.1	4-21-21			Medium dense to dense, same above	eas
47	-47	46.0-46.8						above	
48			0.2/0.0		50/2			No recovery	Grout  Control  Contr
	- <del>-</del>	SS-25 50.0-50.1	0.1/0.0	4.1	50/1			Very dense SAND, some coars sand; wet	
51 20 20 20	-51		:						
25 23 23 23 25 25 25 25 25 25 25 25 25 25 25 25 25		SS-26 52.0-52.1	0.3/0.1	3.9	100/3	-	0.00	Very dense gravelly SAND; we	et control of the con
SACLIENTS/SBI/SBI002/SOIL BORING 5 2 2 5 6		SS-27 54.0-54.3	0.3/0.3	3.5	50/3		0.00	Very dense SAND, some coan sand; wet	
PATS/SBI/SBI/SBI/SBI/SBI/SBI/SBI/SBI/SBI/SB	-55 -								
56	-		<u> </u>	L	1	J	1		

**Date Started** : 08/22/01 : 08/22/01 LOG OF BORING HMW-16D **Date Completed** Logged by : James Hogan Reviewed by (Page 5 of 5) : Topflite Drilling **Drilling Contractor** & āssociates, inc. **Drilling Method** : CT250, 4 1/4" HSAs G. Elev. (ft. USGS) : Not Surveyed South Bend Area A : Split Spoon, Hand Auger PID/FID Model : PID / 2020 Sampling Method Franklin & Sample South Bend, IN Total Depth (ft.) : 69.0' PID/FID Calibration : 100ppm Isobutylene S. Water Level Date Drum Label ID SBI002 S. Water Level (ft.) Soil Samples Water Levels Sampled Int. ▼ Static Sample Recovery Sample Interval/ Sample Number During Drilling PID / FID (ppm) Sampler Type/ Soil Samples Well: HMW-16D Lab Sample Graphic Log **Blow Count** (6"-12"-6") Elev.: Depth Surf. in Elev. Feet DESCRIPTION 56--56 Very dense coarse SAND; trace sand; trace gravel; wet 4.8 138-219-SS-28 2.0/0.7 Grout 25 56.0-56.7 57 -57 Very dense SAND; wet; clayey sand in tip Bentonite Seal 58--58 SS-29 2.0/1.0 39-56-61 58.0-59.0 2" Sch. 40 PVC riser -59 59 Very dense brown SAND; wet; sandy gravel in tip 60 - -60 SS-30 1.3/1.1 4.3 10-31-50 60.0-61.1 61 SS-31 1.9/1.3 12-55-50 Very dense brown SAND; wet -62 62 62.0-63.3 2" Sch. 40 0.010-inch <del>-</del> -63 63 slotted PVC screen 1.5/1.3 24-35-50 Same as above -64 SS-32 4.0 Sand Filter Pack 64.0-64.7 SS-33 4.3 Very dense brown sandy GRAVEL; 65 -65 64.7-65.3 BORING LOGS/HMW-16D.BOR SS-34 1.5/1.2 9-27-50 66--66 5.2 Very dense brown SAND; wet 66.0-66.9 SS-35 5.8 Very dense brown silty, little sand; trace clay; moist 67 --67 66.9-67.2 F:\CLIENTS\SBI\SBI002\SOIL 68--68 SS-36 1.5/0.9 4.4 23-42-50 Hard gray clayey SILT, trace sand; 68.0-68.9 End of boring at 69.0' 69--69

11-30-2001

70

South Bend Area A Franklin & Sample South Bend, IN

SBI002

SS-7 7.0-8.3

SS-8 9.0-10.3

SS-9 11.0-12.3

SS-10 13.0-13.8

SS-11

15.0-16.3

-9

10 - - 10

11 7-11

12 -12

13 -13

14 -14

15 -15

16-

24/20

24/15

24/15

24/15

24/15

4-6-3

5-11-7

5-7-2

3-5-2

4-10-6

3.9

5.7

6.3

1.4

3.7

Date Started

Date Completed

Logged by

: 08/14/01 : Mike Coonfare

: 32'

Reviewed by

**Drilling Contractor Drilling Method** 

: ProbeTech : 4.25 HSA : Split Spoons

: 08/14/01

Sampling Method Total Depth (ft.)

S. Water Level Date S. Water Level (ft.)

#### **LOG OF BORING HMW-18S**

(Page 1 of 2)

G. Elev. (ft. USGS)

: Not Surveyed

PID/FID Model PID/FID Calibration

: PID / 2020 : 100ppm Isobutylene

Drum Label ID

					S. W	ater Le	evel (1	t.) :			
			. >					Soil Samples Sampled Int.	Water Le		
Depth	Surf.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	nic Log	Lab Sample	Durin	g Drilling	Well: HMW-18S Elev.:
in Feet	Elev.	Samp	Sample Sample	PID /	Blow Cour (6"-12"-6")	Soil 9	Graphic	DESCR	IPTION		
0-	- 0	SS-1 0.0-1.2		1.5	-			Black silty SAND, s organics, very mois	ome gravel		Surfa
1_	-1	SS-2 1.2-2.1		2.1				Same as above			
2-	2	SS-3 2.1-2.3		4.9				Brown fine SAND,	some grave	l, very	
3-	-3							<sup>\</sup> Same as above			
4-		SS-4 3.5-4.2	i	2.6				Same as above, we	ood fragme	nts	
4-	-4	SS-5 4.2-5.0		1.9				Same as above, tra	ace coal fra	gments	
5-	-5	SS-6 5.0-6.7	24/20	7.8	4-7-3			Brown fine SAND,	trace grave	l, moist	
6-	-6					$\ X\ $					

Brown coarse SAND, trace gravel, moist

Same as above

Same as above

Brown coarse SAND, some gravel, very moist

Same as above

Brown clayey SILT, some gravel, moist

Brown coarse SAND, some gravel, very moist

Brown coarse SAND, some gravel, trace clay, very moist

Surface Casing

Bentonite Seal 2" Sch. 40 PVC riser

F:\CLIENTS\SB\\SB\02\SO\L BORING LOGS\HMW-18S.BOR

South Bend Area A Franklin & Sample South Bend, IN

SB1002

Date Started

: 08/14/01 : 08/14/01 Date Completed : Mike Coonfare Logged by

Reviewed by

**Drilling Contractor** Drilling Method

: ProbeTech : 4.25 HSA

Sampling Method : Split Spoons Total Depth (ft.) : 32'

S. Water Level Date : S. Water Level (ft.)

**LOG OF BORING HMW-18S** 

(Page 2 of 2)

G. Elev. (ft. USGS)

: Not Surveyed : PID / 2020

PID/FID Model PID/FID Calibration

: 100ppm Isobutylene

ľ						S. W	ater Le	evel (ft	i.) :			
	Depth	Surf.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples Sampled Int.  Lab Sample	Water Lev _▼ Statio	;	Well: HMW-18S Elev.:
	in Feet	Elev.	Samp	Samp	PID /	Blow Cour (6"-12"-6")	Soil S	Graph	DESCR	IPTION		
	17-	16 17 18	SS-12 17.0-18.0	24/12	3.8	3-8-7			Same as above			Bentonite Seal
	-	19 20	SS-13 19.0-20.7	24/20	6.2	6-19-18			Brown coarse SAN very moist	D, some gra	avel,	2" Sch. 40 PVC riser
).	21-	21 22	SS-14 21.0-22.3	24/15	4.7	9-21-24			Same as above			
	23 – 24 –	23 24	SS-15 23.0-24.7	24/20	8.4	12-15-6			Same as above, bl 23.8 to 24.7, slight	ack staining petro odor	g from	
JR.	25 – 26 –		SS-16 25.0-26.0	24/12	7.8	6-13-9		4 0 4 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	SAND and GRAVE from 25 to 25.3, sa	L, black sta turated at 2	aining !5.3'	Sand Filter Pack
IG LOGS/HMW-18S.BOR	27 - 28 -	27 28	SS-17 27.0-28.3	24/15	6.7	1-3-2			Light brown coarse gravel, saturated	SAND, trad	ce	slotted PVC screen
ACLIENTS/SBI/SBI002/SOIL BORING	29-	-29 30	SS-18 29.0-30.0	24/12	5.8	1-2-1			Same as above			
CLIENTSISBIN	31 - 32 -	31	SS-19 31.0-31.4	24/5	5.9	2-3-2			Same as above			

South Bend Area A Franklin & Sample South Bend, IN

SB1002

Date Started

: 08/08/01 Date Completed : 08/08/01 : Matt Young Logged by

Reviewed by **Drilling Contractor Drilling Method** 

Sampling Method

Total Depth (ft.)

: Topflite

: 4.25 ID HSA : Split Spoon : 119'

S. Water Level Date : S. Water Level (ft.)

**LOG OF BORING HMW-22D** 

(Page 1 of 8)

G. Elev. (ft. USGS)

: Not Surveyed

Surface Casing

PID/FID Model PID/FID Calibration : PID / 2020 : 100ppm Isobutylene

Drum Label ID

					0		٠.٠٠ (٠	••/		
		· · · · · · · · · · · · · · · · · · ·						Soil Samples	Water Levels	
			>				1	Sampled Int.	_ <b>y</b> Static	
		e/ ber	val/	(mg					During Drilling	
		Typ m	nter Reco	[ 호	i i	bles	Ş	Lab Sample		İ
Depth	Surf.		0 0	₽	- G C	E	0			

HMW-22D

	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Sampled Int.  Lab Sample  DESCRIPTION	Well: HI Elev.:
	0- - 1-	- 0 1	HA-1/ 0.0-2.0		3.1				Crushed stone, slag fragments, black FILL medium to coarse grain sand / cinders, dry	, , ,
-	-	2	HA-2/ 2.0-4.0		3.1				Brown medium to fine grain SAND, trace silt, trace gravel, moist	7 0
	3 - 4-	3 4	SS-3 4.0-6.0	24/8	4.4	7-17-13			Same as above, light brown	0 0
<b>)</b>	5- 6-	5 6	SS-4	24/18	3.8	2-8-6			Same as above Same as above, interbeded silty sand	0.0.0.0
			5.0-6.7						seam at 6.5'  Light brown medium to fine grain SAND, moist trace silt	0 0
	8- 9-	-8 8 9	SS-5 8.0-10.0	24/12	2.6	2-4-6			Same as above  Brown medium to coarse SAND, trace silt, trace gravel	
22D.BOR		-10	SS-6 10.0-12.0	24/12	2.4	9-18-11			trace silt, trace gravel Same as above	5
IL BORING LOGS/HMW-22D.BOR		-11 12	SS-7	24/18	3.7	6-21-15			Same as above, interbeded clayey sand seam at 12.5'	
1002\SOIL BORII	13-	-13	12.0-14.0						sand seam at 12.5°	
F:\CLIENTS\SB\\SB\02\SO	14 - 15 -	-14	SS-8 14.0-16.0	24/16	8.6	12-29-17			Same as above	, o
Ę.		1	1							

2" Sch. 40 PVC riser

11-05-2001

: 08/08/01 Date Started Date Completed : 08/08/01 LOG OF BORING HMW-22D Logged by : Matt Young Reviewed by (Page 2 of 8) : Topflite associates, inc. **Drilling Contractor** : 4.25 ID HSA South Bend Area A Drilling Method G. Elev. (ft. USGS) : Not Surveyed Sampling Method : Split Spoon PID/FID Model : PID / 2020 Franklin & Sample : 119' South Bend, IN Total Depth (ft.) PID/FID Calibration : 100ppm Isobutylene S. Water Level Date Drum Label ID SBI002 S. Water Level (ft.) Soil Samples Water Levels \_\_\_\_ Static Sampled Int. Sample Recovery Sample Interval/ Sample Number PID / FID (ppm) During Drilling Sampler Type/ Well: HMW-22D Soil Samples Graphic Log Lab Sample Blow Count (6"-12"-6") Elev.: Depth Surf. in Elev. **DESCRIPTION** Feet 15 SS-9 24/20 1.8 9-26-17 Same as above, less gravel at 17.0 16 -- -16 16.0-18.0 17 - - 17 Same as above 24/20 6.3 8-28-16 18 - - 18 SS-10 18.0-20.0 19 - -19 Same as above, black banding at 21.5' 14.7 10-25-16 -20 SS-11 24/22 20 20.0-22.0 21 - - 21 SS-12 24/20 3.8 8-19-12 22 -- -22 22.0-23.0 2" Sch. 40 PVC riser SS-13 4.1 Same as above, wet at 23.0' -23 23 23.0-24.0  $\nabla$ Same as above, brown coarse to medium sand, trace silt, trace gravel 24 -24 SS-14 24/22 3.6 4-14-9 24.0-26.0 FICLIENTSISBISBI002/SOIL BORING LOGS/HMW-22D.BOR 25 +-25 4-28-20 26 -- -26 SS-15 24/22 9.7 Same as above 26.0-28.0 27 - - 27 28-SS-16 24/16 9.9 6-23-16 Same as above, more gravel -28 28.0-30.0 29--29

30

& associates, inc. South Bend Area A Franklin & Sample South Bend, IN SBI002

Date Started Date Completed

: 08/08/01 : 08/08/01 Logged by : Matt Young

Reviewed by

**Drilling Contractor** Drilling Method Sampling Method

Total Depth (ft.)

: Topflite : 4.25 ID HSA : Split Spoon : 119'

S. Water Level Date : S. Water Level (ft.)

## LOG OF BORING HMW-22D

(Page 3 of 8)

G. Elev. (ft. USGS) : Not Surveyed

PID/FID Model PID/FID Calibration

: PID / 2020 : 100ppm Isobutylene

1			_		3. 77	alci L	CVCI (II		
Depti in Feet	Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples  Sampled Int.  ✓ Static  ✓ During Drilling  DESCRIPTION	Well: HMW-22D Elev.:
30	30	SS-17	24/20	16.0	6-10-13	1 -		Same as above, black banding at 31.5'	
		30.0-32.0	24/20	10.0	0-10 10			31.5'	7 0 7 0
31	-31	SS-18 32.0-34.0	24/22	5.9	9-19-22			Same as above	
	1	32.0-34.0		ŀ					7 9   9
33	-33								
34	-34	SS-19 34.0-36.0	24/18	13.7	6-21-14			Same as above, large stone stuck in end of spoon, less coarse sand	
35	i <del>-</del> -35								
36	3-36	SS-20 36.0-38.0	24/20	5.4	9-22-9			Same as above, more coarse sand	
	3 -38	SS-21 38.0-40.0	24/18	5.6	6-32-35			Same as above	2" Sch. 40 PVC riser
39	9 <del>-  </del> -39								20 0
NG LOGSIHMW-22D.BOR	) <del> </del> -40	SS-22 40.0-42.0	23/22	3.4	8-58-50			Same as above	
∯ 4·	1 - 41								
BORING LOGS	242	SS-23 42.0-44.0	24/16	2.4	9-49-30			Same as above	
등 4:	343								
F:/CLIENTS/SBI/SBI/002/SOIL BORI	1	SS-24 44.0-46.0	24/24	4.1	9-47-25			Same as above	
를 4	5-		<u></u>			<u>.</u>	<u> </u>		
iii 1									

**Date Started** : 08/08/01 **Date Completed** : 08/08/01 LOG OF BORING HMW-22D Logged by : Matt Young Reviewed by (Page 4 of 8) associates, inc. **Drilling Contractor** : Topflite **Drilling Method** : 4.25 ID HSA G. Elev. (ft. USGS) : Not Surveyed South Bend Area A : Split Spoon Franklin & Sample Sampling Method PID/FID Model : PID / 2020 South Bend, IN Total Depth (ft.) : 119' PID/FID Calibration : 100ppm Isobutylene S. Water Level Date Drum Label ID SBI002 S. Water Level (ft.) Soil Samples Water Levels ▼ Static Sampled Int. Sample Recovery Sample Interval/ Sample Number PID / FID (ppm) During Drilling Sampler Type/ Soil Samples Well: HMW-22D Graphic Log Lab Sample Blow Count (6"-12"-6") Elev.: Depth Surf. Elev. in Feet **DESCRIPTION** 45--45 14-47-37 46 SS-25 24/20 5.9 Same as above, increase gravel -46 46.0-48.0 -47 47 SS-26 24/20 5.5 10-38-19 Same as above, few gravel, less 48--48 48.0-50.0 49--49 24/10 13-31-28 Same as above, increase silt SS-27 5.6 -50 50 -50.0-52.0 51 -51 52 -52 SS-28 23/16 4.6 25-88-50 Same as above, large stone in spoon 52.0-54.0 2" Sch. 40 PVC riser Brown fine to medium SAND, trace silt, trace gravel, large stone in end of spoon 53 -53 Same as above 24/18 6.8 24-53-27 54.0-55.0 54 -54 F:\CLIENTS\SB\SS\002\SO\L BORING LOGS\HMW-22D.BOR 55 --- -55 SS-30 6.3 Grey silty clayey SAND, trace gravel 55.0-56.0 SS-31 24/6 39-75-18 Same as above 56 -56 56.0-58.0 57 -- -57 2-19-19 58 - -58 SS-22 24/12 6.6 Same as above 58.0-60.0 59 -59 Brown fine to medium SAND, trace gravel trace silt 60 11-05-2001

South Bend Area A Franklin & Sample South Bend, IN

SBI002

Date Started

Date Completed Logged by

: 08/08/01 : Matt Young

Reviewed by

**Drilling Contractor Drilling Method** 

: Topflite : 4.25 ID HSA : Split Spoon

: 119'

: 08/08/01

Sampling Method Total Depth (ft.)

S. Water Level Date : S. Water Level (ft.)

## LOG OF BORING HMW-22D

(Page 5 of 8)

G. Elev. (ft. USGS) : Not Surveyed

PID/FID Model PID/FID Calibration : PID / 2020 : 100ppm isobutylene

Drum Label ID

					S. W	ater Le	evel (f	t.) :			
Depti in	Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples Sampled Int.  Lab Sample	Water Levels  ▼ Static  □ During D	rilling	: HMW-22D ::
Feet		Sal	Sal	붑	Blo (6"	Sol	ΰ	DESCR	IPTION		
60	-60	SS-23 60.0-62.0	24/24	8.4	8-28-27			Same as above, mo	edium to coars	e	
		SS-27 62.0-64.0	24/24	8.3	13-68-52			Brown fine SAND, gravel 2" brown clayey sal dense, trace gravel Brown fine SAND, gravel	nd seam. verv		
64	-63	SS-28 64.0-66.0	17/6	8.1	18-25-50			Brown fine silty SA 1" brown silt seam, Same as above, n out sand when rem	ND lost last 6" at 6		
66	6 -65 66	SS-29 66.6-68.0	23/18	5.5	10-57-50			Brown fine to medi	um SAND, trac	9	Grout
68	7 67 68 69	SS-30 68.0-70.0	21/24	8.2	15-58-50			Same as above, no	gravel	0	.
W-22D.BOR	7 -70 	SS-31 70.0-72.0	22/20	8.5	18-56-50			2" brown sandy SIL Same as above, tra	T seam at 69. ace gravel	5'	
SOIL BORING LOGS!	-72 	SS-32 72.0-74.0	15/15	8.7	9-25-50			Same as above, no silt seam at 73.5, lo	gravel, 3" bro ost last 6"	wn	Hole plug
SB1002\	-74	SS-33 74.0-76.0	21/18	0.0	25-61-50			Same as above, tra above 1" sandy sill	ace gravel just seam		Sand Filter Pack
75	5-							<u> </u>	·	1 1:	

11-05-2001

& associates, inc. South Bend Area A Franklin & Sample South Bend, IN SBI002

Date Started Date Completed

: 08/08/01 : 08/08/01 : Matt Young

Logged by Reviewed by

**Drilling Contractor** Drilling Method

: Topflite : 4.25 ID HSA : Split Spoon

Total Depth (ft.)

Sampling Method

: 119' S. Water Level Date : S. Water Level (ft.) :

## **LOG OF BORING HMW-22D**

(Page 6 of 8) .

G. Elev. (ft. USGS)

: Not Surveyed : PID / 2020

PID/FID Model PID/FID Calibration

: 100ppm Isobutylene

					5. W	ater Le	evei (i	l.) :			
Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples Sampled Int.  Lab Sample  DESCR	Water Lev  ▼ Static  ▽ During		Well: HMW-22D Elev.:
75-	75					1	1- 10- 10- 10-			1	
	-76	SS-34 76.0-78.0	22/18	0.0	10-75-50			Same as above, in depth, trace gravel	crease silt w	/ith	
77-	-77									i	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
78-	- 78	SS-35 78.0-80.0	24/18	0.0	8-44-50			Same as above			slotted PVC screench Sand Filter Pack
79-	-79							Brown silt seam at Brown sandy silt, 6 Brown silt at end of	79', 1" thick " thick	:	
80-	-80	SS-36 80.0-82.0	24/16	0.0	8-35-35			Brown silt at end of Brown sandy SILT,			
81-	-81			}	·			Brown silt seam, tr	ace gravel,	last 4"	
1	-82	SS-37 82.0-84.0	24/24	0.0	12-38-46			Light brown fine to trace silt, trace gra	medium SA vel	ND,	
83-	-83		1						•		
84 - 85 -	-84	SS-38 84.0-86.0	16/16	0.0	24-45-50			Brown sandy silt, la Same as above, fir	ast 6" st 3"		
Ö. 02-	<del> </del> -85										
96 86	-86	SS-39 86.0-88.0	16/6	0.0	12-25-50			Brown medium to tall, trace gravel			
<u>일</u> 87-	-87							Grey sandy SILT, exidation, last 6"	nanganese		
CLIENTSISBINOZISOIL BORING LOGSIHMW-22D.BOR	-88	SS-40 88.0-90.0	16/14	0.0	11-45-50			Same as above Same asa bove, fil Grey silt, very den	rst 2"		
89	-89				-						
OLIENTSIS 00	-										

South Bend Area A Franklin & Sample South Bend, IN

SB1002

Date Started

: 08/08/01 Date Completed : Matt Young Logged by

Reviewed by

**Drilling Contractor** Drilling Method

: Topflite : 4.25 ID HSA

: 08/08/01

: Split Spoon Sampling Method Total Depth (ft.) : 119' S. Water Level Date :

S. Water Level (ft.)

#### **LOG OF BORING HMW-22D**

(Page 7 of 8)

G. Elev. (ft. USGS)

: Not Surveyed

PID/FID Model PID/FID Calibration

: PID / 2020 : 100ppm Isobutylene

- 1						0			**/
	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples  Sampled Int.  Static  During Drilling  Well: HMW-22D  Elev.:
ı	90	- <del>-</del> 90	SS-41	12/10	0.0	25/86	T 1		Grey silty SAND, last 6"
	91	- <b>-</b> 91	90.0-92.0						Same as above
	92	92		24/0		8-24-13			Gravel (cobbles) at end of spoon, few medium to fine sand, trace silt
	93	93							
	94	-94	SS-42 94.0-96.0	24/14	0.0	8-32-24			Grey silty SAND
	95_ -	- <b>-</b> 95							
	96	96	SS-43 96.0-98.0	24/24	0.0	8-39-31			Same as above
	97	-97							
	98-	-98		21/24		8-69-50			Same as above
i	99	-99							
2D.BOR-II	100 –	-100	SS-45 100-102	24/18	4.2	18-55-50			Same as above
JGS/HMW-2	101 –	-101							Grey SILT, trace fine sand
BORINGLO	102 -	102	SS-46 102-104	21/16	2.8	22-78-50			Grey sandy SILT
12\SOIL	103 -	-103							
CLIENTS\SBI\SBI002\SOIL BORING LOGS\HMW-22D.BOR-II	104 –	-104	SS-47 104-106	15/15	0.0	19-33-50			Same as above
CLE	105 -				<u> </u>				<u> </u>

South Bend Area A Franklin & Sample South Bend, IN

SB1002

Date Started

Date Completed

Logged by Reviewed by

**Drilling Contractor** Drilling Method

: Topflite : 4.25 ID HSA : Split Spoon Sampling Method

: 08/08/01

: 08/08/01

: Matt Young

Total Depth (ft.) : 119' S. Water Level Date : S. Water Level (ft.) :

LOG OF BORING HMW-22D

(Page 8 of 8)

G. Elev. (ft. USGS)

: Not Surveyed

PID/FID Model PID/FID Calibration

: PID / 2020 : 100ppm Isobutylene

Drum Label ID

								•	•		
									Soil Samples	Water Leve	els
		i	>						Sampled Int.	▼ Static	
Depth	Surf.	iler Type/ ile Number	ile Interval/	FID (ppm)	ب ب	76")	Samples	nic Log	Lab Sample	During	Drilling
in Feet	Elev.	Sampler	Sample Sample	PID /	≥ ₹	(6"-12	Soil S	Graphic	DESCR	IPTION	
105_	105										1

Well: HMW-22D Elev.:

Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recove	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Lab Sample	During Drilling  LIPTION
		တ္တတ္တ	တ္တတ္တ		) (6, B,	တိ	Ö	DESCIN	IF HON
105 –	105		-						
106	106	SS-48 106-108	21/16	0.0	19-62-50			Same as above, le gravel	ss sand, trace
107 -	- <b>-</b> 107		ŕ						
108	108	SS-49 108-110	24/18	0.0	12-32-30			Grey fine to mediu	m grain silty SAND
109	109							Same as above	
110 –	110	SS-50 110-112	16/12	0.0	23-37-50			Same as above	
111 -	111								
112	112	SS-51 112-114	17/16	0.0	23-47-50			Same as above	
113	-113								
] :	-114	SS-52 114-116	24/24	0.0	12-71-50			Same as above	
115 -	-115							Grey SILT	
116 –	-116	SS-53 116-118	17/16	0.0	10-31-50			Grey silty fine SAN	ID, grey silt
115 – 116 – 117 – 117 – 118 – 119 –	-117							Same as above, g	rey silt, trace sand
118 –	-118		12/12	0.0	20-50	<u> </u>		dense, moist	, trace gravel, very
119 -	-119		<u></u>					Same as above Sand at end of spo End of boring at 1	oon 19.0
120 -									

F:\CLIENTS\SB\\SB\\SB\\SO\L BOR\\NG LOGS\\HMW-22D.BOR-\\I



SBI002

**Date Started** 

**Date Completed** Logged by

Reviewed by

**Drilling Contractor** Drilling Method

Sampling Method

Total Depth (ft.)

: 08/13/01 : 08/13/01 : Mike Coonfare

: ProbeTech : 4.25 HSA

: Split Spoon, 2" Macro

: 30'

S. Water Level Date :

**LOG OF BORING HMW-25S** 

(Page 1 of 2)

G. Elev. (ft. USGS)

: Not Surveyed : PID / 2020

PID/FID Model PID/FID Calibration

: 100ppm Isobutylene

		SB1002			I	ater Le				Dium Lat	
Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples Sampled Int. Lab Sample  DESCR	Water Lev  Station  During	;	Well: HMW-25S Elev.:
0-	0					·		Asphalt and Concre	ıte.		
1-	-1	HA-1/ 1.0-2.5		0.2				Silty SAND, some g		moist	Surface Casing
3-		HA-2/ 2.5-4.0		0.5				Brown silty SAND, t	few gravel,	very	
4	-4	HA-3/ 4.0-5.0		0.0				Brown SAND, trace moist			
5-	<b>-</b> 5	SS-4 5.0-6.7	24/20	2.5	3-5-2			Light brown fine SA very moist	.ND, trace g	gravel,	
6-	-6										
7-	-7	SS-5 7.0-8.7	24/20	2.6	3-5-2			Same as above			Bentonite Seal
8-	-8							Light brown coarse gravel, very moist	SAND, son	ne	2" Sch. 40 PVC riser
9-	-9	SS-6 9.0-10.0	24/12	0.9	5-10-7	M		Same as above			
10-	-10										
11-	-11	SS-7 11.0-12.5	24/18	2.4	4-6-4			Same as above			
12-	-12							Light brown medium trace gravel, very m	n coarse Sa noist	AND,	
13-	-13	SS-8 13.0-14.5	24/18	1.9	5-12-8			Same as above			
	-14							Light brown coarse gravel, very moist	SAND, sor	me	
15-							1- \ :-	<u> </u>			

South Bend Area A Franklin & Sample South Bend, IN

SBI002

Date Started

Date Completed

Logged by

Reviewed by Drilling Contractor

Drilling Method

Sampling Method Total Depth (ft.)

: 30'

: 08/13/01

: 08/13/01

: Mike Coonfare

: ProbeTech : 4.25 HSA

: Split Spoon, 2" Macro

S. Water Level Date : S. Water Level (ft.)

**LOG OF BORING HMW-25S** 

(Page 2 of 2)

G. Elev. (ft. USGS)

: Not Surveyed : PID / 2020

PID/FID Model PID/FID Calibration

: 100ppm Isobutylene

Drum Label ID

						0	alci Le		•, •			
	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples Sampled Int.  Lab Sample  DESCR	Water Le  ▼ Statio  ▼ Durin	;	Well: HMW-25S Elev.:
	15_	-15	00.0	04/00	0.0	0.40.44	Т	]			ı	ra ra
	-	16 17	SS-9 15.0-16.7 SS-10	24/20	5.3	8-18-14 7-12-5			Same as above			—Bentonite Seal
			17.0-18.7				IN AI					2" Sch. 40 PVC riser
	-	18						ro'ro	Coarse SAND and staining from 18.3 to		etrol y moist	
	19-	19	SS-11 19.0-20.0	24/12	4.5	6-21-9			Same as above (als			
)	20-	- <b>-</b> 20	10.0 20.0						Light brown coarse gravel	SAND, trad	ce	
	21 -	21 22	SS-12 21.0-22.0	24/12	4.3	5-11-9		ዋ በ ብ በ የ በ ብ በ የ በ ብ በ የ በ ብ በ	Light brown coarse GRAVEL, slight pet	SAND and ro staining	at 21.7'	
	-	23 24	SS-13 23.0-24.5	24/18	4.1	14-20-12			Same as above, sa	turated at 2	24.0'	Sand Filter Pack
25S.BOR	25	25	SS-14 25.0-26.2	24/14	4.6	7-10-5			Same as above		-	slotted PVC screen
SOIL BORING LOGS\HMW-25S.BOR	-	26 27 28	SS-15 27.0-28.0	24/12	3.7	7-14-8			Same as above			
F:\CLIENTS\SB\\SB\02\SO\L BOR	29-	29							Total depth of well i	s 29' 6"		

11-30-2001

**Date Started** : 08/09/01 : 08/09/01 **Date Completed LOG OF BORING HMW-26S** Logged by : Mike Coonfare Reviewed by (Page 1 of 2) & associates, inc. **Drilling Contractor** : ProbeTech **Drilling Method** : 4" HSA South Bend Area A G. Elev. (ft. USGS) : Not Surveyed Franklin & Sample Sampling Method : 2' Split Spoon PID/FID Model : PID / 2020 South Bend, IN Total Depth (ft.) : 28' PID/FID Calibration : 100ppm Isobutylene S. Water Level Date : Drum Label ID SBI002 S. Water Level (ft.) Soil Samples Water Levels ▼ Static Sampled Int. Sample Recovery Sample Interval/ Sample Number PID / FID (ppm) During Drilling Sampler Type/ Soil Samples Well: HMW-26S Graphic Log Lab Sample **Blow Count** (6"-12"-6") Elev.: Depth Surf. Elev. in Feet **DESCRIPTION** - 0 0 Asphalt and Concrete Surface Casing HA-1/ 1.8 Silty SAND, some gravel, trace clay, moist 1.5-2.3 2 + -2 HA-2/ 1.7 Brown coarse SAND, trace gravel, 2.3-3.8 HA-3/ 5.2 Same as above 3.8-5.0 2" Sch. 40 PVC riser SS-4 24/24 0.5 4-4-3 Same as above -5 5.0-7.0 6-4-6 Bentonite Seal 7-1-7 SS-5 24/20 0.7 2-2-1 Light brown coarse SAND, trace gravel, very moist 7.0-8.7 8- -8 SS-6 24/15 10.1 3-8-4 9----9 Same as above FACLIENTS\SB\SB\02\SO\L BORING LOGS\HMW-26S.BOR 9.0-10.3 10 -- -10 2" Sch. 40 0.010-inch 11 - 11 SS-7 24/20 1.3 2-6-5 Same as above slotted PVC screen 11.0-12.7 12 -12 Same as above, more gravel from 14.5 to 14.7 13 -- -13 SS-8 24/20 8.3 5-7-8 13.0-14.7 14



SBI002

Date Started

Date Completed

Logged by Reviewed by

**Drilling Contractor** Drilling Method

Sampling Method Total Depth (ft.)

: 08/09/01

: 08/09/01 : Mike Coonfare

: ProbeTech : 4" HSA : 2' Split Spoon

: 28'

S. Water Level Date : S. Water Level (ft.)

### **LOG OF BORING HMW-26S**

(Page 2 of 2)

G. Elev. (ft. USGS)

: Not Surveyed : PID / 2020

PID/FID Model PID/FID Calibration

: 100ppm Isobutylene

						1	alei Le				
	Depth in	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples Sampled Int.  Lab Sample	Water Levels  ▼ Static  ▼ During Drill	well: HMW-26S Elev.:
ı	Feet		Saı	Sal	PIC	Blo (6":	Soi	້ອ	DESCR	IPTION	
	1	14 15 16	SS-9 15.0-16.7	24/20	5.1	6-14-12			Light brown SAND moist	with gravel, very	Bentonite Seal
	17-	17 18	SS-10 17.0-18.7	24/20	6.8	8-10-9			Same as above		
}	19 - - 20	19 20	SS-11 19.0-20.0	24/12	7.9	8-17-12			Same as above		2" Sch. 40 0.010-inch slotted PVC screen
	21		SS-12 21.0-22.7	24/20	6.2	8-17-21			Same as above		Sand Filter Pack
ING LOGS/HMW-26S.BOR	23-		SS-13 23.0-24.7	24/20	3.1	8-13-11			Light brown coarse gravel, very moist	SAND, some	
SOIL BORING LOGS!	25 26	25 26	SS-14 25.0-27.0	24/20	4.0	5-7-4			Same as above	·	
F:\CLIENTS\SBI\SBI002\SOIL BOR	27	27	SS-15 27.3-28.0	24/12	2.5	6-6			Coarse SAND with at 27.0' Coarse sand and Total depth of wel	gravel, saturated	

South Bend Area A Franklin & Sample South Bend, IN

SBI002

Date Started

Date Completed Logged by

Drilling Method

S. Water Level (ft.)

: 08/13/01 : 08/13/01

: Mike Coonfare

Reviewed by Drilling Contractor

: ProbeTech : 4.25 HSA

Sampling Method : Split Spoon Total Depth (ft.) : 33' S. Water Level Date :

**LOG OF BORING HMW-27S** 

(Page 1 of 2)

G. Elev. (ft. USGS) PID/FID Model

: Not Surveyed : PID / 2020

PID/FID Calibration

: 100ppm Isobutylene Drum Label ID

L									7		
	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples  Sampled Int.  Lab Sample  Water Levels  The Static  During Drilling  DESCRIPTION	Well: H	IMW-27S
FACLIENTS/SBI/SBI002/SOIL BORING LOGS/HMW-27S.BOR	0	- 012345671011121314151616	HA-1/ 0.0-0.8 HA-2/ 15-20 2.0-2.5 HA-4/ 2.5-3.5 HA-5/ 35-4-0 4.0-5.0 SS-7 5.0-6.0 SS-7 5.0-6.0 SS-9 9.0-10.0 SS-10 11.0-12.0 SS-11 13.0-14.0	24/12 24/12 24/12 24/12	3.3 1.7 4.3 3.5 3.6 3.9 0.0 2.7 2.4	1-3-3 4-8-2 1-2-4 1-2-12 2-4-4		Gra	Black SAND, rich organics, rootlest Brown fine SAND, trace gravel, moist, rootlets Same as above, no rootlets Same as above Same as above Same as above Same as above Same as above Hit sewer line at 6.5' bg. offset 5' SW, Asphalt cover drill through asphalt and use probe to 5' - probed to 5' - no obstrutions. Straight drill to 7' Brown fine SAND, trace gravel, moist Light brown coarse SAND, trace gravel, moist  Light brown coarse SAND with gravel, moist  Light brown coarse SAND, some gravel, moist  Same as above		Surface Casing  2" Sch. 40 PVC riser  Bentonite Seal
F:\CLIENT	17-		,								<u> </u>

South Bend Area A Franklin & Sample South Bend, IN

SBI002

**Date Started** Date Completed

: 08/13/01 : 08/13/01 : Mike Coonfare Logged by

Reviewed by

**Drilling Contractor** : ProbeTech Drilling Method Sampling Method

: 4.25 HSA : Split Spoon : 33'

Total Depth (ft.) S. Water Level Date : S. Water Level (ft.)

#### **LOG OF BORING HMW-27S**

(Page 2 of 2)

G. Elev. (ft. USGS) PID/FID Model

: Not Surveyed : PID / 2020

PID/FID Calibration : 100ppm Isobutylene

Drum Label ID

Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples Sampled Int.  Lab Sample  DESCR	Water Levels  ▼ Static  ▼ During Drilling	Well: HMW-27S Elev.:
17-	17	SS-13	24/24	3.3	5-16-10		- , -	Same as above		
10	18	17.0-19.0				$\  \bigvee \ $				
	19	SS-14 19.0-20.3	24/18	4.7	10-20-15			Same as above		Bentonite Seal
20-	-20					$\  \wedge \ $				2" Sch. 40 PVC riser
21-	21	SS-15 21.0-22.7	24/20	6.3	5-20-23	$\square$		Same as above		
22	-22					X				
	23	SS-16 23.0-24.0	24/12	6.7	5-20-20			Same as above, ve saturated	ery moist to	
24-	-24			1				•		· ·     · ·
25	-25	SS-17 25.0-26.3	24/15	6.8	6-8-3		2 0 ' 2 '	Sand and Gravel,	saturated at 26.0'	
26	-26					$\  / \ $	e 0 'e			
27 -	-27	SS-18 27.0-27.8	24/10	4.2	5-10-5		P E ' F P E ' P P E ' P	Same as above		Sand Filter Pack
28-	28						9 D 9			slotted PVC screen
29-5/2 29-	29	SS-19 29.0-30.7	24/20	5.5	2-5-4		2 0 ° 6 ° 6 ° 6 ° 6 ° 6 ° 6 ° 6 ° 6 ° 6 °	Same as above		
30-	-30					X	20'F			:  :  :  :  :  :  :  :  :  :  :  :  :
ING FC	-31	SS-20 31.0-32.3	24/15	6.3	4-9-13		20 P	Same as above		
32-	-32					$\  \wedge \ $	\$ 0 \$			
33-	-33						P D P	Total depth is 33.0	) <sup>,</sup>	
E L	_									
ਹੁੰ <b> </b> 34-	1	<u> </u>								

FACLIENTS/SBI/SBI002/SOIL BORING LOGS/HMW-27S.BOR

11-30-2001

: 09/12/01 Date Started Date Completed : 09/12/01 LOG OF BORING HMW-28S Logged by : Matt Young Reviewed by (Page 1 of 1) & associates, inc. **Drilling Contractor** : TopFlight **Drilling Method** : 4.25 ID HSA G. Elev. (ft. USGS) : Not Surveyed South Bend Area A Sampling Method : No Sampling Franklin & Sample PID/FID Model : PID / 2020 South Bend, IN Total Depth (ft.) PID/FID Calibration : 100ppm Isobutylene S. Water Level Date Drum Label ID SB1002 S. Water Level (ft.) Soil Samples Water Levels Sampled Int. ▼ Static Sample Interval/ Sample Recovery Sample Number PID / FID (ppm) \_\_\_\_ During Drilling Sampler Type/ Soil Samples Well: HMW-28S Blow Count (6"-12"-6") Graphic Log Lab Sample Elev.: Depth Surf. Elev. in Feet **DESCRIPTION** 0 1 0 Surface Casing See HMW-28D for geology 1 🕂 -1 2-7-2 3 - 3 4-5--5 6--6 Bentonite Seal 7--7 2" Sch. 40 PVC riser 8--8 9 - - 9 10 4 - 10 11 - 11 12 - 12 13 -- -13 14 🕂 -14 15 - 15 F:\CLIENTS\SB\\SB\\SB\\OGS\HMW-28S.BOR 17 - 17 18 🕂 -18 Sand Filter Pack 19-1-19 2" Sch. 40 0.010-inch slotted PVC screen 20 🕂 -20 21 - - 21 22 - -22 23 - -23 24 - - 24 25-1-30-2001

South Bend Area A Franklin & Sample South Bend, IN

SBI002

Date Started

Date Completed Logged by

Reviewed by

Drilling Contractor Drilling Method Sampling Method

Total Depth (ft.)

: 4.25 ID HSA : Split Spoon : 96.0'

: TopFlight

: 08/30/01

: 08/30/01

: Matt Young

S. Water Level Date : S. Water Level (ft.)

**LOG OF BORING MW-28D** 

(Page 1 of 6)

G. Elev. (ft. USGS) PID/FID Model

: Not Surveyed : 2020 / 100ppm Iso. : 100ppm Isobutylene

Drum Label ID

PID/FID Calibration

			_					Soil Samples Sampled Int.	Water Levels  ▼ Static	
		oe/ nber	rval/	(md		ဟူ	_		During Drilling	
Depth	Surf.	er Typ	e Inte e Rec	a) (]:	ount -6")	ample	c Log	Lab Sample		Well: HMW-28D Elev.:
in Feet	Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	DESCR	IPTION	
0-	- 0	UA 4/		0.0	· · · · · · · · · · · · · · · · · · ·	\ \ \ \ \	17:7	Dark brown organic	rich clavev	
1 1	- <b>-</b> 1	HA-1/ 0.0-2.0		0.0				Dark brown organic SAND, trace gravel	, moist	Surface Casing
'=	·		,			$\  \wedge \ $				
2-	-2	HA-2/ 2.0-4.0	ï	0.0			<u>/ / / / </u>	Brown medium to c silt, trace gravel	oarse SAND, few	
3-	3					$\ X\ $		,, g		Bentonite Seal
4-	-4	SS-3	24/12	0.0	2-3-3			Same as above		
-		4.0-6.0	,			$\mathbb{N}$				
5-	-5					$\ X\ $				
6-	-6	SS-4 6.0-8.0	24/18	0.0	2-4-2			Same as above, les	ss silt	
7-	-7	0.0-0.0				$\  \mathbf{v} \ $	: : : : : :			0 0 0
						$\ /\ $				
8-	-8	SS-5 8.0-10.0	24/20	0.0	2-4-2			Same as above		2" Sch. 40 PVC riser
9-	-9					X				
10-	10	SS-6	24/8	0.0	2-3-1		:::	Same as above, tra	ace clav	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
.] :		10.0-12.0		5.5		$\mathbb{N}$		, , , , ,	<b>,</b>	Grout
11-	-11		٠			$\ X\ $				
	-12	SS-7 12.0-14.0	24/12	0.0	8-19-10			Light brown mediur trace silt, trace grav	m to coarse SAND,	0 0 0
13	-13	12.0-14.0				$\  \bigvee \ $		nace sin, nace grav	io, moiot	
·						$\  \wedge \ $				0 0 0
14-	-14	SS-8 14.0-16.0	24/16	0.0	6-18-14	$\mathbb{H}$		Same as above		0 0 0
15-	-15					$\ \chi\ $				2" Sch. 40 0.010-inch
14 – 15 – 15 – 16 – 16 – 16 – 16 – 16 – 16						$\ /\ $				slotted PVC screen
								-		

F:\CLIENTS\SB\\SB\\0002\SO\\LBOR\\\NG\LOGS\\MW-28D\\BOR\\ 11-30-2001



SBI002

Date Started

Date Completed Logged by

Reviewed by

**Drilling Contractor** Drilling Method Sampling Method

Total Depth (ft.)

: 4.25 ID HSA : Split Spoon : 96.0'

: 08/30/01 : 08/30/01

: Matt Young

: TopFlight

S. Water Level Date : S. Water Level (ft.) :

**LOG OF BORING MW-28D** 

(Page 2 of 6)

G. Elev. (ft. USGS) PID/FID Model

: Not Surveyed : 2020 / 100ppm Iso.

PID/FID Calibration

: 100ppm Isobutylene

						s. w	ater Le	evel (fi	t.) :		
	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples Sampled Int. Lab Sample DESCR	Water Levels  ▼ Static  √ During Drilling  IPTION	Well: HMW-28D Elev.:
	-	16 17	SS-9 16.0-18.0	24/18	0.0	7-20-10			Same as above		
	18-	18 19	SS-10 18.0-20.0	24/16	0.0	7-21-12			Same as above		
	-	20	SS-11 20.0-22.0	24/16	0.0	6-19-9			Same as above, we	et	2" Sch. 40 0.010-inch  Slotted PVC screen
\	22-	21 22 23	\$\$-12 22.0-24.0	24/12	0.0	6-18-14			Same as above, lar of spoon	ge cobble in end	
	-	24	SS-13 24.0-26.0	24/12	0.0	7-21-14			Same as above		Grout 2" Sch. 40 PVC riser
BOR	26-	-25 -26 -27	SS-14 26.0-28.0	24/16	0.0	4-16-15			Same as above	w gravel	
RING LOGS/MW-28D, BOR	28-	-28	SS-15 28.0-30.0	24/14	0.0	6-15-14			Same as above, tra		
F.\CLIENTS\SBI\SBI002\SOIL BORIN	30-	-30 31	SS-16 30.0-32.0	24/12	0.0	2-8-8			Same as above		
F:\CLIENTS\:	32-										7 a   0



SBI002

Sample Number Sampler Type/

SS-17 32.0-34.0

SS-18 34.0-36.0

SS-19

36.0-38.0

SS-20

38.0-40.0

SS-21 40.0-42.0

SS-22

42.0-44.0

SS-23

44.0-46.0

SS-24

46.0-48.0

Depth

in Feet

32-

33

34

35

Surf. Elev.

-32

-33

-34

-35

36 7 - 36

37 -- -37

-39

-40

-42

38--38

39-

40-

41 -41

42-

43-43

44 - 44

45 - 45

46-7 -46

47-7 -47

48-

Sample Recovery Sample Interval/

24/16

24/12

24/18

24/12

24/6

24/20

24/14

24/20

PID / FID (ppm)

0.0

0.0

0.0

0.0

0.0

0.0

0.0

**Date Started** 

**Date Completed** Logged by

Reviewed by

**Drilling Contractor** : TopFlight

: 4.25 ID HSA **Drilling Method** Sampling Method : Split Spoon Total Depth (ft.)

S. Water Level (ft.)

Soil Samples

Graphic Log

Blow Count (6"-12"-6")

3-16-22

8-48-30

13-28-24

0.0 10-31-23

6-25-21

14-53-33

7-40-17

7-61-49

: 96.0' S. Water Level Date :

: 08/30/01

: 08/30/01

Soil Samples

trace gravel

Same as above

Same as above, no clay, increase silt,

Same as above, less gravel

Sampled Int.

: Matt Young

**LOG OF BORING MW-28D** 

(Page 3 of 6)

G. Elev. (ft. USGS) PID/FID Model

: Not Surveyed : 2020 / 100ppm Iso.

PID/FID Calibration

Water Levels Static

: 100ppm Isobutylene Drum Label ID

Lab Sample	During Drilling	Well: HMW-28D Elev.:
DESCR	IPTION	
Same as above		7 a r a c c c
Same as above, la spoon	rge cobble noted in	
Same as above, in	crease gravel	
Same as above		
Same as above		Grout 2" Sch. 40 PVC riser
Same as above		
Same as above, fe clay interbeded	w gravel, trace	d Ç a l a 
1		1 12 21 7 2 1

F:/CLIENTS\SBI\SBI002\SOIL BORING LOGS\MW-28D.BOR

South Bend Area A Franklin & Sample South Bend, IN

SBI002

**Date Started** 

Date Completed Logged by

Reviewed by

**Drilling Contractor** Drilling Method Sampling Method

: Split Spoon Total Depth (ft.) : 96.0' S. Water Level Date : S. Water Level (ft.)

: 08/30/01

: 08/30/01

: TopFlight

: 4.25 ID HSA

: Matt Young

**LOG OF BORING MW-28D** 

(Page 4 of 6)

G. Elev. (ft. USGS) PID/FID Model

: Not Surveyed : 2020 / 100ppm Iso. : 100ppm Isobutylene

PID/FID Calibration Drum Label ID

					,			Soil Samples	Water Levels	
Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Sampled Int.  Lab Sample	▼ Static	Well: HMW-28D Elev.:
reet		Sa Sa	S Sa	ᇤ	98 (6)	တိ	ö	DESCR	IPTION	
48	48 49	SS-25 48.0-50.0	24/18	0.0	6-65-50			Same as above		(7 0 ) 0
	-50	SS-26 50.0-52.0	24/6	0.0	10-29-50			Same as above	;	
] =	-51 52	SS-27 52.0-54.0	24/0	0.0	14-50			Sample may have v	washed out	
	53	00.00	04/0	0.0				Company of the same		
	54 55	SS-28 54.0-56.0	24/8	0.0	13-35-50			Same as above		
	-56 57	SS-29 56.0-58.0	24/18	0.0	9-74-50			Same as above		Grout
	58 59	SS-30 58.0-60.0	24/0	0.0	9-30-50			Same as above, int (grey), sample may	terbeded few silt have washed out	
60-	-60		24/0		1-28-44			May have washed	out sample	
62 – 63 –	-61 -62 -63	SS 62.0-64.0	23/12	0.0	3-53-50			Same as above		
64-		<u>L</u>	I		<u> </u>	1 <u>/</u>	1	J		

F:/CLIENTS\SBI\SBI002\SOIL BORING LOGS\MW-28D.BOR



SBI002

**Date Started** 

Date Completed Logged by

Reviewed by

Drilling Contractor

: TopFlight Drilling Method : 4.25 ID HSA Sampling Method : Split Spoon

: 08/30/01

: 08/30/01

: Matt Young

Total Depth (ft.) : 96.0' S. Water Level Date : S. Water Level (ft.)

**LOG OF BORING MW-28D** 

(Page 5 of 6)

G. Elev. (ft. USGS) PID/FID Model

: Not Surveyed : 2020 / 100ppm Iso.

PID/FID Calibration Drum Label ID

: 100ppm Isobutylene

											-
	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples Sampled Int.  Lab Sample  DESCR	Water Levels  ▼ Static  ▼ During Drillin	Well: HMW-28D Elev.:
	64-	-64					\				
		-65	SS 64.0-66.0	22/18	0.0	7-74-50		· · · · ·	Same as above		
	-	-66	SS 66.0-68.0	23,5/16	0.0	8-71-50			Same as above		
	=	-67 -68	SS 68.0-70.0	22/20	0.0	9-66-50			Same as above, inc	crease silt	
, — ,	-	-69 -70	SS 70.0-72.0	23/20	0.0	6-47-50			Same as above		
		-71 -72	SS 72.0-74.0	21/20	0.0	14-97-50			Same as above		Grout 2" Sch. 40 PVC riser
		73 74	SS 74.0-76.0	21/20	0.0	15-87-50			Same as above		
SIMW-28D.BOR		-75 76	SS 76.0-78.0	24/0	0.0	12-43-50			No recovery		
OIL BORING LOG	77 –	-77								:	
F:\CLIENTS\SBI\SBI002\SOIL BORING LOGS\MW-28D.BOR	78- 79-	-78 79	\$\$ 78.0-80.0	24/20	0.0	9-78-50			Same as above, in trace clay	crease gravel,	
F:\CLIE	80 –			<u> </u>		1	T	<u> </u>			
	ı										



SB1002

**Date Started** 

Date Completed Logged by

Reviewed by

**Drilling Contractor** : TopFlight Drilling Method : 4.25 ID HSA Sampling Method : Split Spoon

: 08/30/01

: 08/30/01

: Matt Young

Total Depth (ft.) : 96.0' S. Water Level Date :

S. Water Level (ft.)

**LOG OF BORING MW-28D** 

(Page 6 of 6)

G. Elev. (ft. USGS) PID/FID Model

: Not Surveyed : 2020 / 100ppm Iso.

PID/FID Calibration

: 100ppm Isobutylene

									Soil Samples	Water Levels	
	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Sampled Int.  Lab Sample  DESCR	▼ Static	well: HMW-28D Elev.:
	80-	-80		20/00		7.50.50	T /	l	0		·
	81 <u>-</u>	81	SS 80.0-82.0	22/22	0.0	7-52-50			Same as above		Grout
	- -	-82 83	SS 82.0-84.0	17/16	0.0	6-55-50			Same as above, lar of shoe	ge cobble in end	2" Sch. 40 PVC riser
	-	-84	SS 84.0-86.0	23/21	0.0	9-45-50			Same as above, inc	crease silt	
	85-	-85	04.0 00.0								
	-	-86 87	SS 86.0-87.0	12/12	0.0	7-79			Same as above		
	-	-88	SS 88.0-90.0	15/5	0.0	9-60-50			Brown sandy CLAY trace gravel, soft - i Same as above, lar inspoon		es
BOR.	90	-89 -90 -91	SS 90.0-92.0	15/15	0.0	7-83-50			Same as above		Sand Filter Pack
FICLIENTSISBIISBI002\SOIL BORING LOGS\MW-28D.BOR	92 – 93 –	-92 -93	SS 92.0-94.0	15/15	0.0	29-36-50			Same as above		
SBI002\SOIL B	94-	-94	SS 94.0-96.0	16/16	0.0	12-35-50			Same as above		
(CLIENTS\SBI)	95 – 96 –	<b>-</b> 95							Brown clayey SAN trace large broken End of boring at 96	D, few gravel, cobbles .0'	
ш											

**Date Started** : 09/11/01 Date Completed : 09/11/01 **LOG OF BORING HMW-29D** Logged by : Matt Young Reviewed by (Page 1 of 6) associates, inc. **Drilling Contractor** : TopFlight **Drilling Method** : 4.25 ID HSA South Bend Area A G. Elev. (ft. USGS) : Not Surveyed Sampling Method : Split Spoon Franklin & Sample PID/FID Model : 2020 / 100ppm Iso. South Bend, IN Total Depth (ft.) : 82.0' PID/FID Calibration : 100ppm Isobutylene SBI002 S. Water Level Date : Drum Label ID S. Water Level (ft.) Soil Samples Water Levels Sampled Int. Static Sample Recovery Sample Interval/ PID / FID (ppm) Sample Number During Drilling Sampler Type/ Soil Samples Well: HMW-29D Graphic Log Lab Sample **Blow Count** 6"-12"-6") Depth Surf. Elev.: Elev. in Feet DESCRIPTION 0 + 0Asphalt top 3" crushed limestone to 6" HA-1/ 0.2 Surface 0.0 - 2.0Casing Brown clayey SAND, trace gravel, 1--2 HA-2/ 0.4 Brown medium to fine SAND, trace 2.0-4.0 silt, trace gravel, moist 3-- **-**3 SS-3 24/20 0.3 4-11-7 Same as above 4.0-6.0 Bentonite Seal 5 -5 Same as above, 1" black stain, no 6 -6 **SS-4** 24/18 0.6 3-9-8 Same as above 6.0-8.0 7 2" Sch. 40 PVC riser 8--8 **SS-5** 24/20 0.2 2-10-6 Same as above 8.0-10.0 -9 9. FICHIENTSISBINSBI002\SOIL BORING LOGS\HMW-29D.BOR 10 --- -10 **SS-6** 24/16 5-23-14 Same as above 0.4 10.0-12.0 Grout Same as above, 4" increase gravel and trace clay seem at 11.5' 11 + -11 **SS-7** 24/20 4-17-17 Same as above, increase coarse 12--12 0.6 sand less fine sand 12.0-14.0 13 -13

14

11-30-2001



SBI002

Date Started
Date Completed

: 09/11/01 : 09/11/01

: Matt Young

: TopFlight

: 4.25 ID HSA

: Split Spoon

Logged by
Reviewed by

Reviewed by Drilling Contractor

Drilling Method
Sampling Method

Total Depth (ft.) : 82.0'
S. Water Level Date :

LOG OF BORING HMW-29D

(Page 2 of 6)

G. Elev. (ft. USGS) PID/FID Model : Not Surveyed : 2020 / 100ppm Iso.

PID/FID Calibration Drum Label ID : 2020 / 100ppm Iso. : 100ppm Isobutylene

				s. w	/ater Level	(ft.) :		
Depth Sur in Elev Feet		Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples Graphic Log	Soil Samples Sampled Int. Lab Sample DESCR	Water Levels  ▼ Static  ▼ During Drilling  IPTION	Well: HMW-29D Elev.:
1414	SS-8 14.0-16.0	24/20	0.3 7	7-35-15		Same as above, inc	crease gravel,	
1616	SS-9 16.0-18.0	24/20	0.8	8-20-11		Same as above, ve	ery coarse sand,	
1818 1919	SS-10 18.0-20.0	24/16	0.0	2-27-15		Same as above, les	ss coarse sand	
2020	SS-11 20.0-22.0	24/18	0.5 1	1-28-15		Same as above, bland no odor, wet	ack stain at 20.5",	□ Grout □ Grout □ 2" Sch. 40 PVC riser
2222 2323 2424 2525 2626 2727	SS-12 25.0-27.0	24/20	0.3 1	1-28-14				7 0 1 0 1 0 1 0 1

11-30-2001 F:ICLIENTS\SBI\SBI\002\SOIL BORING LOGS\HMW-29D.BOR

South Bend Area A Franklin & Sample South Bend, IN

SB1002

11-30-2001

**Date Started** 

Date Completed Logged by

Reviewed by

**Drilling Contractor** 

: TopFlight Drilling Method : 4.25 ID HSA Sampling Method : Split Spoon : 82.0'

: 09/11/01

: 09/11/01

: Matt Young

Total Depth (ft.) S. Water Level Date : S. Water Level (ft.) :

**LOG OF BORING HMW-29D** 

(Page 3 of 6)

G. Elev. (ft. USGS)

: Not Surveyed ne

PID/FID Model	: 2020 / 100ppm Iso
PID/FID Calibration	: 100ppm Isobutylen
Drum Label ID	:

						5. W	ater Le	evei (ii	.) :	
	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples Sampled Int. Sampled Int. Lab Sample  DESCRIPTION	
	28- 29- 30- 31-	30 31	SS-13 30.0-32.0	, 24/20	96.3	11-31-24			Same as above  Brown silty CLAY, trace sand	7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
W-29D.BOR	33 – 34 – 35 – 36 – 37 –		SS-14 35.0-37.0	24/14	191	9-29-24			Black silty SAND, trace gravel, odor  Same as above, strong odor	strong  Grout  - 2" Sch. 40 PVC riser
F:\CLIENTS\SBI\SBI002\SOIL BORING LOGS\HMW-29D.BOR	39	40	SS-15 40.0-42.0	24/22	20.7	12-41-35			Same as above	



SBI002

11-30-2001

**Date Started** 

Date Completed Logged by

Reviewed by

**Drilling Contractor Drilling Method** 

: TopFlight : 4.25 ID HSA Sampling Method : Split Spoon

: 09/11/01

: 09/11/01

: Matt Young

Total Depth (ft.) : 82.0' S. Water Level Date : S. Water Level (ft.)

**LOG OF BORING HMW-29D** 

(Page 4 of 6)

G. Elev. (ft. USGS) PID/FID Model PID/FID Calibration

: Not Surveyed : 2020 / 100ppm Iso. : 100ppm Isobutylene

Drum Label ID

Water Levels Soil Samples ▼ Static Sampled Int. Sample Interval/ Sample Recovery Sample Number PID / FID (ppm) During Drilling Sampler Type/ Soil Samples Well: HMW-29D Blow Count (6"-12"-6") Graphic Log Lab Sample Elev.: Depth Surf. Elev. in Feet **DESCRIPTION** 42--42 Same as above, no staining / brown 43 - 43 -44 SS-16 34/16 0.0 23-51-35 Same as above, few gravel 45--45 45.0-47.0 46--46 47 -47 48 -48 Grout 2" Sch. 40 PVC riser 49--49 SS-17 24/12 20.8 8-36-35 50 --50 Same as above, trace gravel, grey 50.0-52.0 51 - 51 F:\CLIENTS\SB\\SB\\0002\SO\\LOGS\HMW-29D.BOR 52 -- -52 53 - - 53 54 -- -54 55 - -55 No recovery 56



SBI002

Date Started

Date Completed Logged by

: 09/11/01 : Matt Young

Reviewed by **Drilling Contractor** 

: TopFlight : 4.25 ID HSA **Drilling Method** Sampling Method : Split Spoon

: 09/11/01

Total Depth (ft.) : 82.0' S. Water Level Date :

S. Water Level (ft.)

LOG OF BORING HMW-29D

(Page 5 of 6)

G. Elev. (ft. USGS) PID/FID Model

: Not Surveyed : 2020 / 100ppm Iso.

PID/FID Calibration Drum Label ID

: 100ppm Isobutylene

									<u> </u>		
	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples Sampled Int.  Lab Sample  DESCR	Water Levels  ▼ Static  ▽ During Drilling  IPTION	Well: HMW-29D Elev.:
	56-	-56		24/0		6-24-31					7.1.
	57	57		2 0		0210.					7 a a a a a a a a a a a a a a a a a a a
	58 <u>-</u>	58					·				0
	59-	59							·		
	60-	-60		24/0		20-37-37			No recovery		
) /	61 <u>-</u>	-61									
	62-	-62									
	63	-63									Grout 2" Sch. 40 PVC riser
	64	-64									
D.BOR	65 –	-65	SS-18 65.0-67.0	21/18	35.2	8-41-50			Same as above		
GS\HMW-25	66	-66									
ORING LO	67	-67					<u>                                   </u>				
1002/SOIL B	68-	-68									
FICLIENTSISBISBIO02/SOIL BORING LOGSIHMW-29D.BOR	69-	-69									0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
F:\CLIE	70-				<u> </u>			1111		·	60 0

**Date Started** : 09/11/01 Date Completed : 09/11/01 LOG OF BORING HMW-29D Logged by : Matt Young Reviewed by (Page 6 of 6) & associates, inc. **Drilling Contractor** : TopFlight : 4.25 ID HSA **Drilling Method** South Bend Area A G. Elev. (ft. USGS) : Not Surveyed Sampling Method : Split Spoon Franklin & Sample PID/FID Model : 2020 / 100ppm Iso. South Bend, IN Total Depth (ft.) : 82.0' PID/FID Calibration : 100ppm Isobutylene SB1002 S. Water Level Date Drum Label ID S. Water Level (ft.) Soil Samples Water Levels ▼ Static Sampled Int. Sample Interval/ Sample Recovery Sample Number PID / FID (ppm) During Drilling Sampler Type/ Soil Samples Well: HMW-29D Blow Count (6"-12"-6") Graphic Log Lab Sample Elev.: Surf. Depth Elev. in Feet **DESCRIPTION** 70 -- -70 Grout 17/0 11-27-20 No recovery 71 - - 71 Bentonite Seal -72 72-2" Sch. 40 PVC riser 73 - - 73 74--74 75-16.3 11-30-100 -75 SS-19 17/17 Same as above, brown 75.0-77.0 76--76 Sand Filter Pack -2" Sch. 40 0.010-inch 77 - -77 -slotted PVC screen 78--78 79 -79 FICLIENTSISBISBI002\SOIL BORING LOGS\HMW-29D.BOR -80 Same as above 80-81 - -81 SS-20 24/16 14.2 Brown silty CLAY, trace gravel, trace sand, 3" thick 81.0-82.0 Brown SAND, trace gravel, trace 82-- -82 -End of boring at 82.0' 83--83 84 11-30-2001

Date Started : 09/12/01 **Date Completed** : 09/12/01 LOG OF BORING HMW-29I Logged by : Matt Young Reviewed by (Page 1 of 1) & associates, inc. **Drilling Contractor** : TopFlight : 4.25 ID HSA South Bend Area A **Drilling Method** G. Elev. (ft. USGS) : Not Surveyed : No Sampling Sampling Method Franklin & Sample PID/FID Model : 2020 / 100ppm Iso. South Bend, IN Total Depth (ft.) PID/FID Calibration : 100ppm Isobutylene S. Water Level Date Drum Label ID SB1002 S. Water Level (ft.) : Water Levels Soil Samples Sampled Int. ▼ Static Sample Recovery Sample Number Sample Interval/ PID / FID (ppm) During Drilling Sampler Type/ Soil Samples Well: HMW-29I Graphic Log Lab Sample Blow Count (6"-12"-6") Elev.: Depth Surf. Elev. in **DESCRIPTION** Feet 0 1 0 1 <del>-</del> -1 2 <del>-</del> -2 See HMW-29D for geology Surface Casing 3 🗐 -3 4 🗐 -4 -5 6 - 6 7事-7 8- 1-8 -9 9-10 <del>-</del> -10 11 <del>-</del> -11 Bentonite Seal 13 📑 -13 2" Sch. 40 PVC riser 14 🗐 -14 15 - 15 16 -16 17 -17 18 🖶 -18 19 📑 -19 20 4 -20 21 🗐 -21 22 -22 23 -23 24 🕂 -24 F:\CLIENTS\SB\\SB\02\SO\L BOR\NG LOGS\HMW-29I.BOR 25 🗐 -25 26 - - 26 27 -27 28 를 -28 29 🗐 -29 -Sand Filter Pack 30 🕸 -30 2" Sch. 40 0.010-inch 31 -31 32 🗐 -32 -slotted PVC screen 33 🗐 -33 34 🗦 -34 35 🕂 -35 36 🗐 -36 37 🖣 11-30-2001

**Date Started** : 09/13/01 : 09/13/01 Date Completed **LOG OF BORING HMW-30I** Logged by : Matt Young Reviewed by (Page 1 of 1) '& āssociates, inc. **Drilling Contractor** : TopFlight **Drilling Method** : 4.25 ID HSA South Bend Area A G. Elev. (ft. USGS) : Not Surveyed Sampling Method : No Sampling Franklin & Sample PID/FID Model : 2020 / 100ppm iso. South Bend, IN Total Depth (ft.) PID/FID Calibration : 100ppm Isobutylene S. Water Level Date SBI002 Drum Label ID S. Water Level (ft.) Water Levels Soil Samples ▼ Static Sampled Int. Sample Interval/ Sample Recovery Sample Number PID / FID (ppm) During Drilling Sampler Type/ Soil Samples Well: HMW-30I Graphic Log Blow Count (6"-12"-6") Lab Sample Elev.: Depth Surf. Elev. in Feet **DESCRIPTION** 0 1 0 See HMW-30D for geology 1 📑 -1 Surface 2킄-2 3 🗐 -3 4 4 5 - 5 6 - ₹ - 6 74-7 8-18 9 📑 -9 10 🗐 -10 11 -11 12--12 13 <del>-</del> -13 14 <del>-</del> -14 Bentonite Seal 2" Sch. 40 PVC riser 15 -15 16 📑 -16 17 🗐 -17 18 - 18 19 🖶 -19 20 - - 20 21 🗐 -21 22 🗐 -22 23 - -23 24 - 24 25 - - 25 26 🗐 -26 F:\CLIENTS\SB\\SB\02\SO\\L BOR\\\NG LOGS\HMW-30\.BOR 27 <del>- -</del> -27 28 <del>- -</del> -28 29 📑 -29 30 🕂 -30 31 🕂 -31 Sand Filter Pack 32 - 32 -2" Sch. 40 0.010-inch 34 = -34 slotted PVC screen 35 🕂 -35 36 - -36 37 🗐 -37 38 - 38 39-

South Bend Area A Franklin & Sample South Bend, IN

SBI002

: 09/05/01 Date Started

Date Completed : 09/05/01 : Matt Young Logged by

Reviewed by

**Drilling Contractor** : TopFlight **Drilling Method** : 4.25 ID HSA Sampling Method : Split Spoon

Total Depth (ft.) : 70' S. Water Level Date : S. Water Level (ft.)

LOG OF BORING HMW-30D

(Page 1 of 5)

G. Elev. (ft. USGS) PID/FID Model

: Not Surveyed : 2020 / 100ppm Iso.

PID/FID Calibration

: 100ppm Isobutylene Drum Label ID

1					S. W	/ater Level	(п.) :
Dep in Fee	Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples Graphic Log	Soil Samples Sampled Int. Static During Drilling Well: HMW-30D Elev.:
	0 0			I		· · · · · · · · · · · · · · · · · · ·	
	11	HA-1/ 0.0-2.0		0.0			Asphalt top 3", crushed limestone to 6"  Brown clayey SAND, trace gravel, moist  Surface Casing
	22	HA-2/ 2.0-4.0		0.2			Same as above
	33						Bentonite Seal
	4 - 4	SS-3 4.0-6.0	24/24	0.7	4-11-4		Brown fine to medium SAND, trace silt, trace gravel, moist
	55						Same as above, trace clay interbeded
	6 - 6	SS-4 6.0-8.0	24/20	0.8	4-10-4		Same as above
	77 88 99	SS-5 8.0-10.0	24/18	1.6	3-4-3		Same as above
NG LOGS/HMW-30D.BOR	10	SS-6 10.0-12.0	24/18	1.0	2-4-2		Same as above
JORING LOC	1111						Same as above, increase gravel
HO02/SOIL B	1212	SS-7 12.0-14.0	24/10	0.9	4-6-4		Same as above
F-/CLIENTS/SBI/SBI002/SOIL BORI	1313						
] 	14		<u>.                                    </u>	L		<u> </u>	

11-30-2001

South Bend Area A Franklin & Sample South Bend, IN

SBI002

Date Started

Date Completed

: 09/05/01 : 09/05/01

: Matt Young

: TopFlight

: 4.25 ID HSA

: Split Spoon

: 70'

Logged by Reviewed by

**Drilling Contractor Drilling Method** 

Sampling Method Total Depth (ft.)

S. Water Level Date S. Water Level (ft.)

#### LOG OF BORING HMW-30D

(Page 1 of 5)

G. Elev. (ft. USGS)

: Not Surveyed : 2020 / 100ppm Iso.

PID/FID Model PID/FID Calibration

: 100ppm Isobutylene

Drum Label ID

									Soil Samples	Water Levels	
			<u>.</u>	_ کرد					Sampled Int.	_ <b>▼</b> Static	
			Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)		8	, D	Lab Sample	During Drilling	Well: HMW-30D
	Depth	Surf.	Sampler Type/ Sample Numbe	Re Inte	۵	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Lab Sample		Elev.:
	in	Elev.	nple		H	Blow Coun (6"-12"-6")	Sa	phic			
	Feet		San	San	[ 윤 ]	Blo (6"-	Soil	G	DESCR	IPTION	
	0-	- 0					<u> </u>		Applait top 3" crus	had limestone to	
	_		HA-1/ 0.0-2.0		0.0		II\		Asphalt top 3", crus 6"		Surface
	1-	1	0.0				$\parallel  m  m / \parallel$	//	Brown clayey SANI	O, trace gravel,	Casing
	-						$\  \wedge \ $	//			
	2-	-2	HA-2/		0.2			17.	Same as above		
			2.0-4.0				IN A				
	3	3					IIVI				Bentonite Seal
	-						$\  \Lambda \ $	//		•	
		,	SS-3	24/24	0.7	4-11-4	IV V	//	;		
	4-	-4	4.0-6.0	24/24	0.7	4-11-4	$\mathbb{I}$		Brown fine to mediusilt, trace gravel, me	ım SAND, trace	
}	-	_					$   \bigvee  $				
	5-	- <b>-</b> 5							Same as above, tra	ice clay interpeded	
	-		,				11/ N				
	6-	6	SS-4 6.0-8.0	24/20	0.8	4-10-4			Same as above		
	-		0.0 0.0				$   \setminus / $				0 0 0 0
	7-	<b>-</b> 7					X				2" Sch. 40 PVC riser
	-						$\parallel / \parallel$				
	8-	-8	SS-5	24/18	1.6	3-4-3	$\left  \left\langle -\right\rangle \right $		Same as above		
	:		8.0-10.0				\				
ď	9_	-9					$   \chi  $		·		Grout
0.80		]					$\parallel/\parallel$				Glout
W-30	10-	-10	SS-6	24/18	1.0	2-4-2	$ \square $		Same as above		
SHM		1	10.0-12.0				$\mathbb{N}/\mathbb{N}$				0 0 0
100	11-	-11					$\ V\ $		Same as above, in	crease gravel	0 0 0
RING	:						$\  \wedge \ $			· ·	٠٠٠
IL BO	12_	-12	SS-7	24/10	0.9	4-6-4	$\mathbb{I}V$		Same as above		
02/20	'-	- '-	12.0-14.0	24,10	0.3	1-0-4	$\mathbb{N}^{7}$		20.110 20 40070		0 0 0
SBIOC	12	-12				:	$\ V\ $				000000
SISBI	13-	13		1			$   \wedge  $	<b>:</b> :::			0 0 0 0
F:/CLIENTS\SBI\SBI002\SOIL BORING LOGS\HMW-30D.BOR	]:	-					$\  \  \ $				
Ę	14-	1									
1	1										

11-30-2001

South Bend Area A Franklin & Sample South Bend, IN

SBI002

Date Started

Date Completed : 09/05/01 Logged by

: Matt Young Reviewed by

**Drilling Contractor** Drilling Method

: TopFlight : 4.25 ID HSA Sampling Method : Split Spoon : 70' Total Depth (ft.)

: 09/05/01

S. Water Level Date S. Water Level (ft.)

# LOG OF BORING HMW-30D

(Page 2 of 5)

G. Elev. (ft. USGS)

: Not Surveyed : 2020 / 100ppm Iso.

PID/FID Model PID/FID Calibration

: 100ppm Isobutylene

Drum Label ID

	:	pe/ nber	rval/ sovery	(md		S	ĵ.	Soil Samples Sampled Int.	Water Levels  ▼ Static  During Drilling	Well: HMW-30D
Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Lab Sample DESCRI	IPTION	Elev.:
14	14	SS-8	24/20	0.0	5-16-11			Same as above, no	clay, decrease	
15	15	14.0-16.0			•			gravel Same as above, inc large broken cobble	rease in gravel,	
16	16	SS-9 16.0-18.0	24/18	0.6	, 5-17 <b>-</b> 9			Same as above		
17										
18-	- <b>-</b> 18	SS-10 18.0-20.0	24/22	8.0	5-15-9			Light brown medium trace gravel, trace s	n to coarse SAND, silt, moist	
19	-19					$\ X\ $				
20-	20	SS-11 20.0-22.0	24/22	1.0	7-18-11			Same as above		
21	21							Same as above, tra	ce clay interbeded	Grout 2" Sch. 40 PVC riser
22	-22	SS-12 22.0-24.0	24/20	2.2	4-14-8			Same as above, we	et, no clay	
23	23					$\ X\ $				
24-	-24	SS-13 24.0-26.0	24/18	2.1	2-15-15			Same as above		
25_	-25					$\  \mathbf{y} \ $				
26 – 27 – 28 –	-26	SS-14 26.0-28.0	24/18	2.0	4-16-9			Same as above, tra interbeded, increas	ice clay e gravel	
27	<b>-2</b> 7					$\ X\ $				0 0 0
28-						$\mathbb{V}$				

11-30-2001

South Bend Area A Franklin & Sample South Bend, IN

SBI002

Date Started

: 09/05/01 **Date Completed** : 09/05/01 Logged by : Matt Young

Reviewed by

Drilling Contractor **Drilling Method** Sampling Method

: TopFlight : 4.25 ID HSA : Split Spoon

Total Depth (ft.) : 70' S. Water Level Date

S. Water Level (ft.)

#### LOG OF BORING HMW-30D

(Page 3 of 5)

G. Elev. (ft. USGS)

: Not Surveyed : 2020 / 100ppm Iso.

PID/FID Model PID/FID Calibration

: 100ppm Isobutylene

1						3. W	alei Le	vei (i	, .		
	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log`	Soil Samples Sampled Int.  Lab Sample  DESCR	Water Levels  ▼ Static  ▽ During Drilling	Well: HMW-30D Elev.:
1-	28	28	0, 0,						1		l
	29	29	SS-15 28.0-30.0	24/22	3.1	6-19-7			Same as above		
	-	30	SS-16 30.0-32.0	24/20	2.3	7-19-11			Same as above, no	clay, increase silt	
	-	31 32	SS-17 32.0-34.0	24/18	60.2	9-25-20			Same as above, bla	ack staining, strong	
	33-	33							Same as above, gro	ey staining	
	34-	34	SS-18 34.0-36.0	24/24	1196	9-54-50			Same as above, bla strong odor	ack staining, very	Grout
OR	35 – 36 – 37 –	35 36 37	SS-19 36.0-38.0	24/23	1727	11-45-24			Same as above		Grout 2" Sch. 40 PVC riser
ING LOGS/HMW-30D.BOR	-	-38	SS-20 38.0-40.0	24/22	>2000	7-24-13			Same as above		
FICLIENTSISBINSBI002/SOIL BORING LO	40-		SS-21 40.0-42.0	10/10	544	9-50			Same as above, les	ss staining	
FICL	42-						J. J Y.	I	]	·	

South Bend Area A Franklin & Sample South Bend, IN

SBI002

Date Started Date Completed

: 09/05/01 Logged by : Matt Young

Reviewed by

Drilling Contractor Drilling Method

: TopFlight : 4.25 ID HSA Sampling Method : Split Spoon

: 09/05/01

Total Depth (ft.) : 70' S. Water Level Date :

S. Water Level (ft.)

## LOG OF BORING HMW-30D

(Page 4 of 5)

G. Elev. (ft. USGS)

: Not Surveyed : 2020 / 100ppm Iso.

PID/FID Model PID/FID Calibration

: 100ppm isobutylene

Drum Label ID

		, <del></del>			,			<u> </u>	<del></del>
Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples  Sampled Int.  Lab Sample  DESCRIPTION  Water Levels  Static  During Drilling	Well: HMW-30D Elev.:
42-	-42		0/0					No recovery, pushing stone	
43-	-43		5,5					, , , , , , , , , , , , , , , , , , ,	
44-	-44	SS-22 44.0-46.0	24/16	560	24-30-13			Same as above, no staining, few gravel	
	-45								
46-	-46	SS-23 46.0-48.0	24/12	449	13-32-26			Same as above	
47-	-47					$\ \chi\ $			2" Sch. 40 PVC riser
48-	-48	SS-24 48.0-50.0	24/12	53	9-54-26			Same as above, trace clay	
49-	-49								Grout
50 -	-50 -	SS-25 50.0-52.0	24/8	102	56-40-31			Same as above, no clay	
51 -	-51								
52 -	-52·							No recovery	0 0 0 0
53- 53-	-53								C 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0
54 -	-54							No recovery	2" Sch. 40 0.010-inch
20 CLENTS/SBI/SBIOZISOIL BORING LOGS/HAW-30D:BOR 20: 20: 20: 20: 20: 20: 20: 20: 20: 20:	-55 -		:						
56-									00 10

11-30-2001

: 09/05/01 **Date Started** : 09/05/01 **Date Completed** : Matt Young Logged by Reviewed by **Drilling Contractor** : TopFlight āssociates, inc. **Drilling Method** South Bend Area A : 4.25 ID HSA Franklin & Sample Sampling Method : Split Spoon South Bend, IN Total Depth (ft.) : 70' S. Water Level Date SBI002 S. Water Level (ft.) Soil Samples Water Levels Sampled Int. ▼ Static Sample Recovery Sample Interval/ Sample Number □ During Drilling PID / FID (ppm) Sampler Type/ Soil Samples Blow Count (6"-12"-6") Graphic Log Lab Sample Depth Surf. in Elev. Feet DESCRIPTION 56 - **-**56 16/14 102 104-36-50 SS-26 Same as above, no gravel 56.0-58.0 57 --- -57 Same as above, trace gravel, increase silt 58 + -58 SS-27 5/5 119 58.0-60.0 59 -59 SS-28 21/20 6-68-50 Same as above 179 60 --60 60.0-62.0 61 -61 SS-29 22/16 5-52-50 Same as above 117 62 – - -62 62.0-64.0 63 --63

68.3 18-77-50

5-62-33

8-22-50

Same as above

Same as above

Grey very dense silty CLAY, trace sand, trace gravel, dry

End of boring at 70.0'

SS-30

64.0-66.0

SS-31

66.0-68.0

SS-32

68.0-70.0

21/18

24/20

15/15

65.8

0.0

#### LOG OF BORING HMW-30D

(Page 5 of 5)

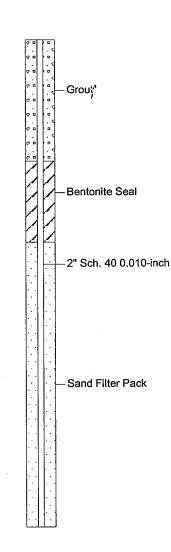
G. Elev. (ft. USGS) PID/FID Model

: Not Surveyed : 2020 / 100ppm Iso. : 100ppm Isobutylene

Drum Label ID

PID/FID Calibration

Well: HMW-30D
Elev.:



FICLIENTSISBISBI002\SOIL BORING LOGS\HMW-30D.BOR

64

65--65

66 + -66

67 - - 67

68 - - - 68

69--69

70

-64

Date Started : 09/10/01 **Date Completed** : 09/10/01 LOG OF BORING HMW-31S Logged by : Matt Young Reviewed by (Page 1 of 1) : TopFlight & āssociates, inc. **Drilling Contractor** : 4.25 ID HSA **Drilling Method** G. Elev. (ft. USGS) : Not Surveyed South Bend Area A : No Sampling Sampling Method PID/FID Model : 2020 / 100ppm Iso. Franklin & Sample South Bend, IN Total Depth (ft.) PID/FID Calibration : 100ppm Isobutylene S. Water Level Date Drum Label ID SB1002 S. Water Level (ft.) Soil Samples Water Levels ▼ Static Sampled Int. Sample Recovery Sample Interval/ Sample Number PID / FID (ppm) During Drilling Sampler Type/ Soil Samples Well: HMW-31S Blow Count (6"-12"-6") Graphic Log Lab Sample Elev.: Depth Surf. in Elev. **DESCRIPTION** Feet 0 1 0 1= Surface See HMW-31D for geology 2= -2 3--3 4 = -5 6 -6 7-3 - -7 Bentonite Seal 8- -8 9 🕂 -9 2" Sch. 40 PVC riser 10-7-10 12 - 12 **13** <del>-</del> -13 14 - 14 15 - 15 16 - 16 17-1-17 18 - - 18 F:\CLIENTS\SB\\SB\\00000000\SO\\LOGS\\HMW-31S.BOR 19 - 19 20 - - 20 -Sand Filter Pack 21 - - 21 2" Sch. 40 0.010-inch slotted PVC screen 23 - -23 24 📑 -24 25 - -25 26 - -26 27 - -27 28-11-30-2001

: 09/10/01 **Date Started Date Completed** : 09/10/01 **LOG OF BORING HMW-31I** Logged by : Matt Young Reviewed by (Page 1 of 1) & āssociates, inc. **Drilling Contractor** : TopFlight : 4.25 ID HSA **Drilling Method** G. Elev. (ft. USGS) : Not Surveyed South Bend Area A Sampling Method : No Sampling Franklin & Sample PID/FID Model : 2020 / 100ppm Iso. South Bend, IN Total Depth (ft.) PID/FID Calibration : 100ppm Isobutylene S. Water Level Date Drum Label ID SBI002 S. Water Level (ft.) Soil Samples Water Levels Sampled Int. Static Sample Recovery Sample Interval/ Sample Number PID / FID (ppm) During Drilling Sampler Type/ Soil Samples Blow Count (6"-12"-6") Graphic Log Well: HMW-31I Lab Sample Surf. Elev.: Depth in Elev. Feet **DESCRIPTION** 0 1 0 1 -1 -2 3 4 -4 See HMW-31D for geology Surface Casing 5 - - 5 6 - 6 7 - 7 8 - 8 9 -9 -10 16 - -16 17 - -17 Bentonite Seal 17 <del>1</del> -17 18 -18 19 -19 2" Sch. 40 PVC riser 20 + -20 21 + -21 22 + -22 23 + -23 24 를 -24 25 26 - -25 - -26 -**-2**7 27-28-₫ - **-**28 29-- **-**29 30 🗐 -30 F:/CLIENTS/SBI/SBI002/SOIL BORING LOGS/HMW-311.BOR 31 - -31 32 - -32 33 🗐 -33 34 📑 -34 35 - 35 36 <del>- 36</del> 37 <del>- 37</del> Sand Filter Pack 38 🗐 -38 -2" Sch. 40 0.010-inch 39 📑 -39 slotted PVC screen 40 - 40 41 -41 42 -42 43 - 43 44 44 45-11-30-2001

Date Started : 09/10/01 **Date Completed** : 09/10/01 **LOG OF BORING HMW-32I** Logged by : Matt Young Reviewed by (Page 1 of 1) & associates, inc. : TopFlight **Drilling Contractor** : 4.25 ID HSA **Drilling Method** G. Elev. (ft. USGS) : Not Surveyed South Bend Area A Sampling Method : No Sampling : 2020 / 100ppm iso. Franklin & Sample PID/FID Model South Bend, IN Total Depth (ft.) PID/FID Calibration : 100ppm Isobutylene S. Water Level Date Drum Label ID SBI002 S. Water Level (ft.) Soil Samples Water Levels Sampled Int. ▼ Static Sample Recovery Sample Interval/ Sample Number PID / FID (ppm) During Drilling Sampler Type/ Soil Samples Well: HMW-32i Blow Count (6"-12"-6") Graphic Log Lab Sample Elev.: Surf. Depth Elev. in Feet **DESCRIPTION** 0 10 See HMW-31D for geology 1 📑 -1 Surface 2 후 -2 3 📑 -3 5 📑 -5 6- ∰-6 7를 -7 8<del>-</del> -8 9- -9 10 du -10 11 du -11 12 du -12 13 du -13 14 du -14 15 du -16 17 du -17 Bentonite Seal 2" Sch. 40 PVC riser 18 -18 19 - 19 21 -21 22 -22 23 🗐 -23 24 🗐 -24 25 - - 25 26 - - 26 27 - 27 F./CLIENTS/SBI/SBI002/SOIL BORING LOGS/HMW-32I.BOR 28 🗐 -28 29 🗐 -29 30 🗐 -30 31 📑 -31 32 📑 -32 33 🖣 -33 Sand Filter Pack 34 🗐 -34 2" Sch. 40 0.010-inch 35 🗐 -35 36 🗐 -36 slotted PVC screen 37 🖶 -37 38 - 38 39 📑 -39 40 - 40 41 -11-30-2001

South Bend Area A Franklin & Sample South Bend, iN

SBI002

Date Started

Date Completed : 09/04/01 Logged by : Matt Young

: 09/04/01

: TopFlight

: 4.25 ID HSA

: Split Spoon

Reviewed by

**Drilling Contractor** 

**Drilling Method** Sampling Method

Total Depth (ft.) : 62.0' S. Water Level Date

LOG OF BORING HMW-31D

(Page 1 of 4)

G. Elev. (ft. USGS)

: Not Surveyed : 2020 / 100ppm Iso.

PID/FID Model PID/FID Calibration

: 100ppm isobutylene

Drum Label ID

l			SBI002				/ater Level D /ater Level (f			Drum Lab	el ID	:
	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples Graphic Log	Soil Samples Sampled Int.  Lab Sample  DESCR	Water Lev  ▼ Static  ▽ During		Well: HN Elev.:	иW-31D
	0- 1- 2-	<b>1</b>	HA-1/ 0.0-2.0		0.0			Black sandy FILL, for gravel, crushed aspositions of the gravel of the g				Surface Casing
)	3- 4- 5-	3 4 5	SS-3 4.0-6.0	24/18	0.0	1-4-3		Brown medium to c clay, trace gravel, n	oarse SAND noist	), few		— Bentonite Seal
	6	6 7	SS-4 6.0-8.0	24/16	0.0	3-11-7		Light brown mediun Trace silt, trace gra	n to coarse svel, moist	SAND,		
	9-	8 9	SS-5 8.0-10.0	24/14	0.0	3-8-6		Same as above				
LOGS/HMW-31D.BOR	11-	-10	SS-6 10.0-12.0 SS-7	24/16	0.0	3-5-2 2-1-1		Same as above, tra	-			- Clout
F:\CLIENTS\SB\\SB\02\SO\L BORING LC	-	-12 -13 14	SS-7 12.0-14.0 SS-8 14.0-16.0	24/8	0.0	2-1-1		Same as above, le			0 0	
F:\CLIENTS\SB\\SE	15-		14.0-16.0								1 - 1 1 -	

& āssōciates, inc. South Bend Area A

Franklin & Sample South Bend, IN

SBI002

**Date Started** Date Completed

: 09/04/01 : 09/04/01 Logged by : Matt Young

: TopFlight

Reviewed by

**Drilling Contractor** Drilling Method

: 4.25 ID HSA Sampling Method : Split Spoon Total Depth (ft.) : 62.0'

S. Water Level Date :

LOG OF BORING HMW-31D

(Page 2 of 4)

G. Elev. (ft. USGS)

: Not Surveyed : 2020 / 100ppm Iso.

PID/FID Model PID/FID Calibration

: 100ppm Isobutylene

Drum Label ID

				s w	ater L	evel (f	t.) :		
				0. 1	rater E		, .		
							Soil Samples	Water Levels	
		>					Sampled Int.	<u>▼</u> Static	
ŀ	e/ ber	val/	(md			١.	-	During Drilling	
	ype/	ec te	효	<b> </b>	es	g	Lab Sample		We

Depth in	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Sampled Int.	▼ Static	Well: HMW-31D Elev.:
Feet	Liev.	Samp	Samp	PID /	Blow (6"-12	Soil S	Grap	DESCR	IPTION	
-	16 17 18	SS-9 16.0-18.0 SS-10 18.0-20.0	24/12 24/6	0.0	3-10-12 ; 6-30-17			Same as above, lar	ge cobble in end	
19	19 20	SS-11 20.0-22.0	24/16	0.0	6-22-14			Same as above, lar		
	21 22	SS-12 22.0-23.0	24/18	0.0	7-21-12			Same as above, no	ace gravel	
24	-23 24 25	SS-13 23.0-24.0		0.0				Same as above, in sand, wet		Grout  Grout  Control
26-	-26		24/0		6-10-9			Begin 5' centers		
28-	28 29	SS-14	24/18	0.0	6-18-17			Same as above		
30 – 31 –		29.0-31.0	24/10	0.0	0-10-17			Camo as assive		
					<u></u>	<u> </u>	1			

11-30-2001 FICLIENTSISBISBI002ISOIL BORING LOGSIHMW-31D.BOR

& associates. inc. South Bend Area A

Franklin & Sample South Bend, IN

SBI002

Date Started

: 09/04/01 **Date Completed** : Matt Young Logged by

: 09/04/01

: TopFlight

Reviewed by Drilling Contractor

Drilling Method : 4.25 ID HSA Sampling Method : Split Spoon

Total Depth (ft.) : 62.0' S. Water Level Date : S. Water Level (ft.) :

## LOG OF BORING HMW-31D

(Page 3 of 4)

G. Elev. (ft. USGS) PID/FID Model

: Not Surveyed : 2020 / 100ppm Iso. : 100ppm Isobutylene

PID/FID Calibration Drum Label ID

						s. w	ater Le	evel (fi	t.) :			·
	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples Sampled Int.  Lab Sample  DESCR	Water Let  ▼ Static  ▼ Durin	;	Well: HMW-31D Elev.:
	32 33 34 35 36 37	34 35 36	SS-15 34.0-36.0	24/12	13.2	8-15-9			Same as above, bla odor, increase grave	ack staining el	ı, petro	
)	38-	38 39 40	SS-16 39.0-41.0	24/12	193	12-18-9			Same as above, str decrease gravel, bla	ong sweet ack staining	odor,	Grout 2" Sch. 40 PVC riser
F:/CLIENTS\SBI\SBI002\SOIL BORING LOGS\HMW-31D.BOR	42— 43— 44— 45— 46—	42 43 44 45 46	SS-17 44.0-46.0	24/16	249	6-49-20			Same as above, no silt, strong odor	staining, ir	ncrease	
11-30-2001 FYCL									1			

Date Started : 09/04/01 **Date Completed** : 09/04/01 LOG OF BORING HMW-31D Logged by : Matt Young Reviewed by (Page 4 of 4) : TopFlight āssociates, inc. **Drilling Contractor Drilling Method** : 4.25 ID HSA G. Elev. (ft. USGS) : Not Surveyed South Bend Area A : Split Spoon Franklin & Sample Sampling Method PID/FID Model : 2020 / 100ppm Iso. South Bend, IN Total Depth (ft.) : 62.0' : 100ppm Isobutylene PID/FID Calibration S. Water Level Date Drum Label ID SBI002 S. Water Level (ft.) Water Levels Soil Samples Sampled Int. ▼ Static Sample Recovery Sample Interval/ Sample Number PID / FID (ppm) During Drilling Sampler Type/ Soil Samples Weil: HMW-31D Blow Count (6"-12"-6") Graphic Log Lab Sample Elev .: Depth Surf. Elev. in Feet **DESCRIPTION** 48 -48 Same as above, increase fine sand, no staining, strong odor **SS-18** 24/18 141 25-48-22 49 -49 Grout 49.0-51.0 50 --- -50 Same as above, decrease fine sand, increase gravel, trace clay 51 -51 2" Sch. 40 PVC riser Bentonite Seal -52 52-53 -53 SS-19 24/20 98 7-43-32 Same as above 54 --54 54.0-56.0 55 – -55 Sand Filter Pack 56 --- -56 2" Sch. 40 0.010-inch 57-1-57 -slotted PVC screen 58--58 F:\CLIENTS\SBI\SBI\02\SOIL BORING LOGS\HMW-31D.BOR 59 -- -59 SS-20 24/17 84.5 7-27-50 Same as above 59.0-61.0 60 - -60 61 - - 61 SS-21 24/17 8-34-50 Grey dense CLAY, trace gravel, trace sand, dry 61.0-62.0 End of boring at 62.0' 62 - -62 63 -11-30-2001

South Bend Area A Franklin & Sample South Bend, IN

SBI002

Date Started Date Completed

Logged by : Matt Young Reviewed by

**Drilling Contractor** 

: TopFlight : 4.25 ID HSA **Drilling Method** Sampling Method : Split Spoon : 94.0' Total Depth (ft.)

: 09/06/01

: 09/06/01

S. Water Level Date : S. Water Level (ft.)

LOG OF BORING HMW-32D

(Page 1 of 5)

G. Elev. (ft. USGS)

: Not Surveyed : 2020 / 100ppm Iso.

PID/FID Model PID/FID Calibration

: 100ppm Isobutylene

Drum Label ID

					S. W	ater L	evel (fl	i.) :			
Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples Sampled Int.  Lab Sample  DESCR	Water Le  _▼ Statio _▽ Durin	•	Well: HMW-32D Elev.:
7 001		တ္တ တွ	တ္တ တွ	П	Bic (6'	တိ	Ō	DEGUIN			
0 1-	- 0 1	HA-1/ 0.0-2.0		1.2				Asphalt to 3", crush Brown medium to fi silt, trace gravel, dr	ne SAND,		Surface
	2 3	HA-2/ 2.0-4.0		1.3				Same as above			Bentonite Seal
	-4 5	SS-3 4.0-6.0	23/20	2.0	10-44-50			Brown clayey SANI moist	), trace gra	avel,	
	6 7	SS-4 6.0-8.0	24/22	1.1	7-23-14			Same as above			
	-8 -9	SS-5 8.0-10.0	24/18	0.7	13-25-21			Same as above, bri in middle of spoon	ick fragmer	nt noted	2" Sch 40 PVC riser
	-10 -11	SS-6 10.0-12.0	24/14	2.5	10-22-18		<i>[]</i>	Light brown mediur trace gravel, trace s	n to coarse silt, moist	SAND,	color 2" Sch. 40 PVC riser
<b>[</b> ]	-12 -13		5/0		50			No recovery			
15-	-14 15	SS-7 14.0-16.0	24/14	2.4	10-31-32			Same as above			
	-16 17	SS-8 16.0-18.0	24/12	0.7	10-27-17			Same as above			
18-	18   	SS-9 18.0-20.0	24/20	3.1	6-18-12			Same as above			

12-03-2001 FACLIENTS/SBI/SBI002/SOIL BORING LOGS/HMW-32D.BOR

South Bend Area A Franklin & Sample South Bend, IN

SBI002

Date Started

: 09/06/01 Date Completed Logged by : Matt Young

: 09/06/01

: TopFlight : 4.25 ID HSA

: Split Spoon

: 94.0

Reviewed by

**Drilling Contractor Drilling Method** 

Sampling Method Total Depth (ft.)

S. Water Level Date S. Water Level (ft.)

LOG OF BORING HMW-32D

(Page 2 of 5)

G. Elev. (ft. USGS)

: Not Surveyed : 2020 / 100ppm Iso.

PID/FID Model PID/FID Calibration

: 100ppm Isobutylene

Drum Label ID

						J. W	alei Le	vei (ii	·/ ·					
	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples Sampled Int.  Lab Sample  DESCR	Water Lev  Static  During		Well: H Elev.:	HMW-32D	
	=	19 20 21	SS-10 20.0-22.0	24/16	3.4	9-26-22			Same as above			0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		
	=	22 - <b>-</b> 23	SS-11 22.0-24.0	24/12	1.9	6-35-23			Same as above, fevolay, wet	v gravel, tra	ace			
	=	24 25	SS-12 24.0-26.0	24/12	4.2	10-31-12			Same as above			0 0		
.'	-	26 27	SS-13 26.0-28.0	24/12	5.4	12-25-8			Same as above			0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		
		-28 29	SS-14 28.0-30.0	24/18	5.8	11-34-23			Same as above			0 0	Grout 2" Sch. 40 PVC	riser
œ		-30 31	SS-15 30.0-32.0	24/14	4.5	11-44-36			Same as above, tra increase silt, no cla	ace gravel, y				
NG LOGS\HMW-32D.BOR		-32 -33	SS-16 32.0-34.0	24/16	3.1	7-18-13			Same as above, de	ecrease silt				
SOIL BORING LO	34 – 35 –	-34 35	SS-17 34.0-36.0	24/14	8.9	5-29-98			Same as above				. d	
F.ICLIENTS\SBI\SBI002\SOIL BORI	36 - 37 -	-36 -37	SS-18 36.0-38.0	24/18	1618	8-40-23			Same as above, bloodor	ack staining	g, strong			
F:\CLIE	38-					L		ļ				<u> </u>	1-1	

12-03-2001

South Bend Area A Franklin & Sample South Bend, IN

SB1002

Date Started Date Completed

Logged by Reviewed by

**Drilling Contractor** Drilling Method

: TopFlight : 4.25 ID HSA Sampling Method : Split Spoon Total Depth (ft.) : 94.0'

: 09/06/01

: 09/06/01

: Matt Young

S. Water Level Date S. Water Level (ft.)

## LOG OF BORING HMW-32D

(Page 3 of 5)

G. Elev. (ft. USGS)

: Not Surveyed : 2020 / 100ppm Iso.

PID/FID Model PID/FID Calibration

: 100ppm Isobutylene

Drum Label ID

-								Soil Samples	Water Levels	
		ei _	al/ /ery	<u></u>				Sampled Int.	Static     During Drilling	
D4h	Court	Type	Interv Recov	udd) C	ount 3")	Samples	Log	Lab Sample		Well: HMW-32D Elev.:
Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil San	Graphic Log	DESCR	IPTION	
38-	-38	SS-19 38.0-40.0	24/12	1803	9-25-17	Ι /		Same as above		7 0 0
39	-39	38.0-40.0				X				0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
40-	-40	SS-20 40.0-42.0	24/12	1940	11-31-29			Same as above		70 0
41-	-41					X				
42-	-42	SS-21 42.0-44.0	24/12	553	7-33-26			Same as above, gr	ey staining	
43-	-43					IXI				
44-	-44	SS-22 44.0-46.0	24/12	812	10-41-26			Same as above		
45-	-45					$\ X\ $				
46-	-46	SS-23 46.0-48.0	24/12	350	6-40-50			Same as above		0 0 0
47-	- <del>4</del> 7					$\ X\ $				Grout - 2" Sch. 40 PVC riser
48-	-48	SS-24 48.0-50.0	24/16	346	13-31-20	$\left  \left\langle \cdot \right\rangle \right $		Same as above		
49-	<del>-</del> -49					$\ \chi\ $				
	-50	SS-25 50.0-52.0	24/16	222	8-36-36			Same as above		
51 -	-51	33.3 32.3				$\ \chi\ $				
PRING LOGS/HMW-32D.BOR 52 53 53 53 53 53 53 53 53 53 53 53 53 53	-52	SS-26 52.0-54.0	22/22	137	8-64-50			Same as above		
ອັດ   53 -	-53	02.0-04.0				$\ \mathbf{y}\ $				
NOS 54	-54	SS-27 54.0-56.0	9/6	73.4	38-50			Same as above, in	crease silt	
54 54 55 55 55 56 57 57 57 57 57 57 57 57 57 57 57 57 57	-55	54.0-56.0								
SBINSBIC	-56	SS-28	18/10	140	11-33-65			Same as above		
LENTS	}	SS-28 56.0-58.0	10,10		55 66					
링 57	-1		1		1	<u></u>	<u> </u>	_		

South Bend Area A Franklin & Sample South Bend, IN

SBI002

Date Started

Date Completed : 09/06/01 Logged by : Matt Young

Reviewed by

**Drilling Contractor Drilling Method** Sampling Method

: TopFlight : 4.25 ID HSA : Split Spoon

: 09/06/01

: 94.0' Total Depth (ft.) S. Water Level Date

## LOG OF BORING HMW-32D

(Page 4 of 5)

G. Elev. (ft. USGS)

: Not Surveyed : 2020 / 100ppm Iso.

PID/FID Model PID/FID Calibration

: 100ppm Isobutylene

Drum Label ID

	·		- 051002			s. w	ater Le	evel (fi	t. <b>)</b> :				
				>					Soil Samples Sampled Int.	Water Lev <u>▼</u> Static	els		
	Depth in	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	Graphic Log	Lab Sample	During	Drilling	Well: HM\ Elev.:	W-32D
	Feet		Sam	Sam	PID	Blow (6"-1	Soil	Graj	DESCR	IPTION			
	57 <u> </u>	- <b>-</b> 57					M					0 0 0	
	58	-58	SS-29 58.0-60.0	22/18	119	17-67-50			Same as above			00 0	
	59	-59										7 B C	
		-60	SS-30 60.0-62.0	24/20	144	4-17-41			Same as above			70 10 10 10 10 10 10 10 10 10 10 10 10 10	
		-61	20.01	17110	404	0.00.04			Same as above, fe	w oilt			
	-	-62 -63	SS-31 62.0-64.0	17/12	184	9-26-61			Same as above, re	W SIIL			
`;		-64		17/0		14-39-50			No recovery			00	
		-65											
	66-	-66	SS-32 66.0-68.0	24/20	55.9	6-72-54			Same as above			00 1.5	— Grout — 2" Sch. 40 PVC riser
	67-	-67	00.0 00.0						Same as above, but trace clay	rown / no sta	ining,	0 . 0 . 0	—2 3dii. 40 F VO 11361
	68-	-68	SS-33 68.0-70.0	24/16	44.9	7-38-39			Same as above, no	o clay		0	
ĸ		-69					$\ X\ $					0 0 0	
W-32D.B(	70 -	-70 -	SS-34 70.0-72.0	24/18	65.3	4-18-41			Same as above			0 0	
OGS/HM	71 -	<del>-71</del>										0 0 0 0	
30RING L	72-	1 -72 - 72	SS-35 72.0-74.0	21/21	84.9	12-91-50			Same as above				
FACLIENTSASBISBI002/SOIL BORING LOGS/HMW-32D.BOR	73- 74-	-73 74	SS-36	23/19	69.7	19-72-50			Same as above			0 0 0	
(SBI\SBI	75-	-75	SS-36 74.0-76.0			.5.2.30						0 0	
CLIENTS	76-						//					0 0	
ű.													

12-03-2001

South Bend Area A Franklin & Sample South Bend, IN

SBI002

Date Started Date Completed : 09/06/01

: 09/06/01

: TopFlight : 4.25 ID HSA

: Split Spoon

: 94.0'

: Matt Young

Logged by

Reviewed by Drilling Contractor

Drilling Method Sampling Method Total Depth (ft.)

S. Water Level Date : S. Water Level (ft.) :

LOG OF BORING HMW-32D

(Page 5 of 5)

G. Elev. (ft. USGS) PID/FID Model

: Not Surveyed : 2020 / 100ppm Iso. : 100ppm Isobutylene

Drum Label ID

PID/FID Calibration

ŀ					5. W	ater Le	evei (i	t.) :		
Dep in Fee	Elev	- υ υ	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples Sampled Int.  Lab Sample  DESCR	Water Levels  ▼ Static  ▽ During Drilling	Well: HMW-32D Elev.:
7	676	SS-37	21/18	45.7	19-96-50			Same as above		
1	777	SS-37 76.0-78.0								
7	8 - 78	SS-38 78.0-80.0	22/18	29.9	12-62-50			Same as above		7 0 0 0
	9 -79		04/0		40 50 50			Brown SILT, wet	likely pand that	Grout
8	08- =0		21/0		13-53-50			No recovery, most l washed out	ikely saliu tilat	
1	-81									Silver and BVC stoor
8	2 = -82	SS-39 82.0-84.0	22/22	33.7	4-30-50			Brown silty SAND,	trace gravel, wet	2" Sch. 40 PVC riser
	3 <del>-</del> -83									
8	4 - 84	SS-40 84.0-86.0	16/15	21.5	15-16-50			Same as above		
8	35 -85	04.0 00.0						Grey SILT, moist		Bentonite Seal
8	36 <del>-‡</del> -86	SS-41 86.0-88.0	24/10	12.9	1-22-22	$\left  \right $		Grey silty SAND, tr	ace gravel wet	
8	37 - 87								<b>3</b>	
1	88 <del>.  </del> -88	SS-42 88.0-90.0	24/24	12.1	14-58-48			Same as above		
F.YCLIENTSISBIISBI002/SOIL BORING LOGS!HMW-32D.BOR	89-									Sand Filter Pack
MH% C	90 🕂 -90	SS-43 90.0-92.0	22/14	11.4	6-58-50	$\mathbb{H}$				2" Sch. 40 0.010-inch
RING LOG	91 = -91	55.0-52.0				$\ X\ $				slotted PVC screen
SOIL BOR	92 = -92	SS-44 92.0-94.0	24/12	12.6	13-56-50			Grey sandy SILT, o	dense / stiff, trace	
2002	93 🕂 -93									
TS\SBI\SB	94 = -94							End of boring at 94	.0'	
CIEN C	95									
Ĭ.	- 1									

& associates, inc. South Bend Area A Franklin & Sample

South Bend, IN

SBI002

12-03-2001

Date Started

: 08/14/01

: 08/14/01

: Mike Coonfare

: ProbeTech

: 4.25 HSA

: 31.6'

: Split Spoon

Date Completed

Logged by

Reviewed by Drilling Contractor

Drilling Method Sampling Method Total Depth (ft.)

S. Water Level Date : S. Water Level (ft.)

**LOG OF BORING HMW-34S** 

(Page 1 of 2)

G. Elev. (ft. USGS) : Not Surveyed PID/FID Model

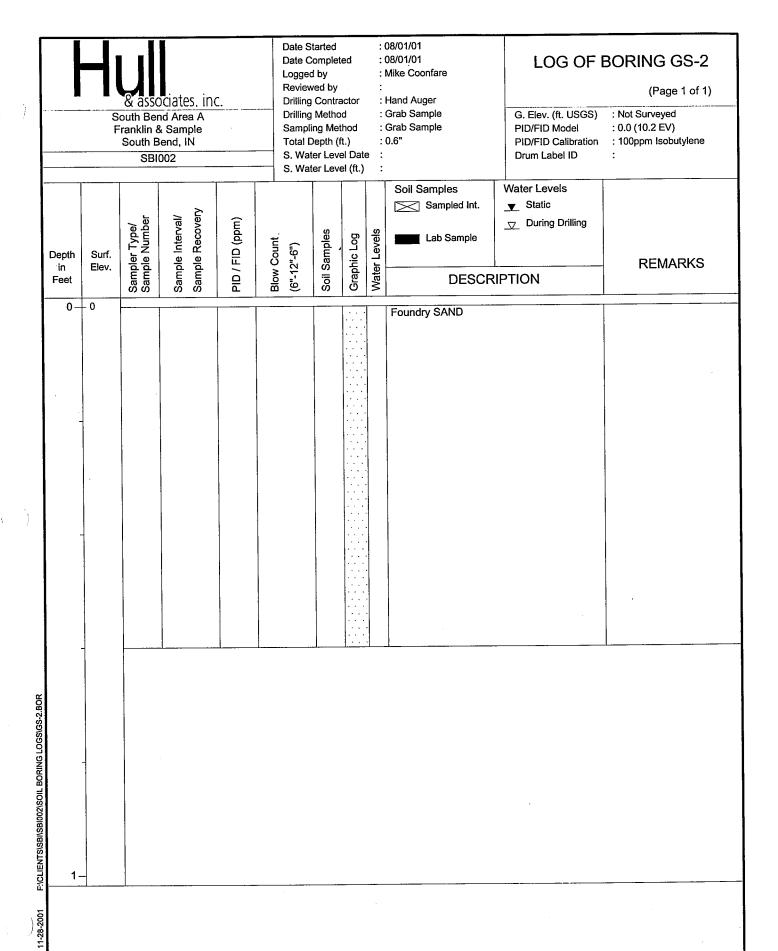
: 2020 / 100ppm Iso.

Drum Label ID

PID/FID Calibration : 100ppm Isobutylene

ľ						S. W	ater Le	vei (r	ι.) :			
	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Soil Samples  Sampled Int.  Lab Sample  DESCR	Water Le  ▼ Stati  □ Durin	c	Well: HMW-34S Elev.:
١	0_	- 0							L			
	1-		HA-1/ 0.0-1.0 HA-2/ 1.0-2.0		0.6 1.9		X		Brown fine SAND, s Same as above	some grave	el, moist	Surface Casing
	2	2	HA-3/ 2.0-3.0		3.0				Black fine SAND, s	ome grave	I, moist	<i>;</i> [2]
	3-	- <b>-</b> 3	HA-4/ 3.0-4.0		4.6				Brown fine SAND, moist	trace grave	el, very	
	4	-4	HA-5/ 4.0-5.0		0.7				Same as above			
	5-	5	SS-6 5.0-6.7	24/20	2.0	3-6-3			Same as above			
	6-	-6										
	-	-7 -8	SS-7 7.0-8.3	24/15	1.3	3-9-8			Same as above			Bentonite Seal
	8 <u>-</u> 9 <u>-</u>	-9 -9	SS-8 9.0-10.7	24/20	1.1	6-20-16			Light brown coarse gravel, moist	SAND, so	ome	Bentonite Seal 2" Sch. 40 PVC riser
OR	-	-10									-	
IMW-34S.B	11-	-11	SS-9 11.0-12.7	24/20	3.0	6-9-8			Same as above, tra	ace clay		
IG LOGS/H	12-	-12				- C 12			licht have a see	DAND		
OIL BORIN	13-	13	SS-10 13.0-14.3	24/15	1.9	5-8-10			Light brown coarse gravel, moist	SAND, SO	ome	
31002\S	14-	<u> </u>										
FICLIENTS\SB\SB\02\SO\L BORING LOGS\HMW-34S.BOR	15-	<b>15</b>	SS-11 15.0-16.7	24/20	0.6	7-17-14			Same as above			
CLE	16-					<u></u>	IV 1	<u>l:</u>	<u></u>		I	

: 08/14/01 **Date Started** : 08/14/01 **Date Completed** LOG OF BORING HMW-34S : Mike Coonfare Logged by Reviewed by (Page 2 of 2) **Drilling Contractor** : ProbeTech āssociates, inc. **Drilling Method** : 4.25 HSA South Bend Area A G. Elev. (ft. USGS) : Not Surveyed Franklin & Sample Sampling Method : Split Spoon PID/FID Model : 2020 / 100ppm Iso. : 31.6' South Bend, IN Total Depth (ft.) PID/FID Calibration : 100ppm Isobutylene S. Water Level Date SBI002 Drum Label ID S. Water Level (ft.) Soil Samples Water Levels Sampled Int. ▼ Static Sample Recovery Sample Interval/ Sample Number PID / FID (ppm) \_\_\_\_ During Drilling Sampler Type/ Soil Samples Lab Sample Well: HMW-34S Blow Count (6"-12"-6") Graphic Log Elev.: Surf. Depth in Elev. **DESCRIPTION** Feet - -16 16-17 - - 17 SS-12 17.0-18.3 24/15 2.0 6-16-11 Light brown coarse SAND and GRAVEL, moist Bentonite Seal ï 18 - - 18 2" Sch. 40 PVC riser SS-13 19.0-21.0 19 - - 19 24/24 2.5 6-14-6 Same as above, very moist 20 -20 SS-14 21.0-22.3 5-16-15 21 -21 24/15 3.0 Same as above 22 -22 23--23 SS-15 24/20 3.5 8-17-8 Same as above, saturated at 24.2' 23.0-24.7 24  $\nabla$ SS-16 25.0-26.3 24/15 3.1 3-4-3 Same as above 25--- -25 Sand Filter Pack 26 - - - 26 2" Sch. 40 0.010-inch slotted PVC screen FICLIENTSISBINSBI002\SOIL BORING LOGSIHMW-34S.BOR SS-17 27.0-27.4 27 - - 27 24/5 2.0 4-8-5 Same as above 28 -- -28 3-7-5 Same as above 29 – - **-2**9 SS-18 24/15 1.5 29.0-30.3 30 - - 30 End of boring at 31.6' 31 + -3132 12-03-2001



: 08/01/01 **Date Started Date Completed** : 08/01/01 LOG OF BORING GS-3 Logged by : Mike Coonfare Reviewed by (Page 1 of 1) : Hand Auger āssociates, inc. **Drilling Contractor** : Grab Sample South Bend Area A **Drilling Method** G. Elev. (ft. USGS) : Not Surveyed Sampling Method : Grab Sample Franklin & Sample PID/FID Model : 0.0 (10.2 EV) : 0.6" South Bend, IN Total Depth (ft.) PID/FID Calibration : 100ppm Isobutylene S. Water Level Date Drum Label ID SB1002 S. Water Level (ft.) Soil Samples Water Levels ▼ Static Sampled Int. Sample Recovery Sampler Type/ Sample Number Sample Interval/ PID / FID (ppm) During Drilling Soil Samples Water Levels Graphic Log Lab Sample Blow Count (6"-12"-6") Depth Surf. **REMARKS** in Elev. Feet **DESCRIPTION** 0 + 0 Foundry SAND F:\CLIENTS\SB\\SB\\OS\\SO\L BOR\\NG LOGS\\GS-3.BOR 1 -

: 08/09/01 **Date Started** : 08/09/01 **LOG OF BORING GB-1 Date Completed** Logged by : Mike Coonfare Reviewed by (Page 1 of 1) <u>& associates. inc.</u> **Drilling Contractor** : ProbeTech : Not Surveyed **Drilling Method** : Geoprobe G. Elev. (ft. USGS) South Bend Area A : Split Spoon : 0.0 (10.2 EV) Franklin & Sample Sampling Method PID/FID Model : 100ppm Isobutylene : 3.5 PID/FID Calibration Total Depth (ft.) South Bend, IN S. Water Level Date : Drum Label ID SB1002 S. Water Level (ft.) Soil Samples Water Levels ▼ Static Sampled Int. Sample Recovery Sampler Type/ Sample Number Sample Interval/ During Drilling PID / FID (ppm) Soil Samples Water Levels Graphic Log Lab Sample **Blow Count** (6"-12"-6") Depth Surf. **REMARKS** Elev. in **DESCRIPTION** Feet 0-- 0 GRAVEL, some cinder fill from 0.8 to 1.0' SS-1 24/12 5.1 0.0-1.0 -1 2-- -2 SS-2 24/18 5.1 Brown coarse SAND, trace gravel, very 2.0-3.5 F:/CLIENTS/SBI/SBI002/SOIL BORING LOGS/GB-1.BOR 3-4-3 End of boring at 3.5' 1-28-2001

: 08/09/01 Date Started : 08/09/01 Date Completed **LOG OF BORING GB-2** : Mike Coonfare Logged by Reviewed by (Page 1 of 1) associates, inc. **Drilling Contractor** : ProbeTech **Drilling Method** : Geoprobe G. Elev. (ft. USGS) : Not Surveyed South Bend Area A Franklin & Sample Sampling Method : Split Spoon PID/FID Model : 0.0 (10.2 EV) : 100ppm Isobutylene : 4.0' PID/FID Calibration South Bend, IN Total Depth (ft.) S. Water Level Date : Drum Label ID SB1002 S. Water Level (ft.) Soil Samples Water Levels Sampled Int. ▼ Static Sample Recovery Sampler Type/ Sample Number Sample Interval/ During Drilling PID / FID (ppm) Soil Samples Water Levels Graphic Log Lab Sample **Blow Count** (6"-12"-6") Depth Surf. **REMARKS** Elev. in **DESCRIPTION** Feet 0-- 0 SAND and GRAVEL SS-1 24/20 7.9 8.0-0.0 SS-1 6.3 Cinder FILL 0.8-1.7 Top 5" is slough - -1 2--2 Cinder FILL SS-2 24/24 5.7 2.4-2.7 3.8 SS-2 Brown coarse SAND, trace gravel, very FICLIENTS\SBI\SBI002\SOIL BORING LOGS\GB-2.BOR 2.7-4.0 3 - - 3 End of boring at 4.0' 4 11-28-2001

**Date Started** : 08/08/01 : 08/08/01 LOG OF BORING GB-3 Date Completed : Mike Coonfare Logged by Reviewed by (Page 1 of 1) : ProbeTech **Drilling Contractor** & associates, inc. G. Elev. (ft. USGS) **Drilling Method** : Geoprobe : Not Surveyed South Bend Area A Sampling Method : Split Spoon PID/FID Model : 0.0 (10.2 EV) Franklin & Sample : 100ppm Isobutylene South Bend, IN Total Depth (ft.) : 4.0' PID/FID Calibration S. Water Level Date : SBI002 Drum Label ID S. Water Level (ft.) Soil Samples Water Levels ▼ Static Sampled Int. Sample Recovery Sampler Type/ Sample Number During Drilling Sample Interval/ PID / FID (ppm) Soil Samples Water Levels Lab Sample Graphic Log **Blow Count** (6"-12"-6") Surf. Depth **REMARKS** Elev. **DESCRIPTION** Feet 0-0 SAND and GRAVEL SS-1 24/24 6.2 0.0-0.5 Cinder FILL, trace gravel SS-1 8.3 0.5-2.0 1-2 - - 2 Silty SAND, some gravel, moist 24/24 SS-2 5.6 2.0-2.7 5.2 SS-2 Brown SAND, trace gravel, very moist FICLIENTSISBISBI002/SOIL BORING LOGSIGB-3.BOR 2.7-3.9 3-- **-**3 End of boring at 4.0' 4. 11-28-2001

: 08/08/01 Date Started Date Completed : 08/08/01 **LOG OF BORING GB-5** : Mike Coonfare Logged by Reviewed by (Page 1 of 1) & associates, inc. **Drilling Contractor** : ProbeTech Drilling Method : Geoprobe G. Elev. (ft. USGS) : Not Surveyed South Bend Area A : Split Spoon : 0.0 (10.2 EV) Sampling Method Franklin & Sample PID/FID Model : 5.0' South Bend, IN Total Depth (ft.) : 100ppm Isobutylene PID/FID Calibration S. Water Level Date Drum Label ID SBI002 S. Water Level (ft.) Soil Samples Water Levels ▼ Static Sampled Int. Sample Recovery Sampler Type/ Sample Number Sample Interval/ PID / FID (ppm) \_\_\_ During Drilling Soil Samples Water Levels Graphic Log Lab Sample Blow Count (6"-12"-6") Depth Surf. **REMARKS** Elev. in **DESCRIPTION** Feet 0 + 0Concrete 1 -8.8 SS-1 24/18 Dark brown SAND, trace gravel, moist 1.5-3.0 -2 -3 3. F.ICLIENTS\SBI\SBI002\SOIL BORING LOGS\GB-5.BOR SS-2 24/18 9.7 Same as above 3.5-5.0 End of boring at 5.0' 5-11-28-2001

: 08/08/01 Date Started : 08/08/01 Date Completed **LOG OF BORING GB-8** : Mike Coonfare Logged by Reviewed by (Page 1 of 1) & āssociates, inc. **Drilling Contractor** : ProbeTech **Drilling Method** : Geoprobe G. Elev. (ft. USGS) : Not Surveyed South Bend Area A Sampling Method : Split Spoon Franklin & Sample PID/FID Model : 0.0 (10.2 EV) South Bend, IN Total Depth (ft.) : 4.0' PID/FID Calibration : 100ppm Isobutylene S. Water Level Date Drum Label ID SB1002 S. Water Level (ft.) Soil Samples Water Levels Sampled Int. ▼ Static Sample Recovery Sampler Type/ Sample Number Sample Interval/ PID / FID (ppm) □ During Drilling Soil Samples Water Levels Graphic Log Lab Sample Blow Count (6"-12"-6") Depth Surf. **REMARKS** in Elev. Feet **DESCRIPTION** 0 + 0 Sandy SILT, trace gravel, rootlets SS-1 24/24 7.8 0.0-1.3 1---1 SS-2 10.9 Brown SAND, trace gravel, moist 1.3-2.0 2-- -2 **SS-3** 24/24 9.0 Same as above 2.0-3.0 F:\CLIENTS\SB\\SB\\SB\\OS\\SO\L BORING LOGS\\GB-8.BOR Light brown SAND, trace gravel, very moist - -3 SS-4 7.0 3-3.0-4.0 End of boring at 4.0' 4. 11-28-2001

: 08/09/01 **Date Started** Date Completed : 08/09/01 **LOG OF BORING GB-9** : Mike Coonfare Logged by Reviewed by (Page 1 of 1) & associates, inc. **Drilling Contractor** : ProbeTech **Drilling Method** : Geoprobe G. Elev. (ft. USGS) : Not Surveyed South Bend Area A : Split Spoon Sampling Method : 0.0 (10.2 EV) Franklin & Sample PID/FID Model : 4.0' South Bend, IN Total Depth (ft.) PID/FID Calibration : 100ppm Isobutylene S. Water Level Date Drum Label ID SBI002 S. Water Level (ft.) Soil Samples Water Levels Sampled Int. ▼ Static Sample Recovery Sampler Type/ Sample Number Sample Interval/ During Drilling PID / FID (ppm) Soil Samples Water Levels Graphic Log Lab Sample Blow Count (6"-12"-6") Depth Surf. **REMARKS** Elev. in **DESCRIPTION** Feet 0+0 Intermittent layers approx. 5" thick of SAND and GRAVEL and cinder fill. SS-1 24/24 1.7 0.0-2.0 1-2 -2 SS-2 24/24 0.6 Brown fine SAND with gravel, sand is lighter in color and more coarse in the bottom 2 inches (46-48") 2.0-4.0 FICLIENTS\SBI\SBI002\SOIL BORING LOGS\GB-9.BOR 3--3 End of boring at 4.0' 1-28-2001

: 08/09/01 **Date Started** Date Completed : 08/09/01 LOG OF BORING GB-10 : Mike Coonfare Logged by Reviewed by (Page 1 of 1) associates. inc. **Drilling Contractor** : ProbeTech South Bend Area A Drilling Method : Geoprobe G. Elev. (ft. USGS) : Not Surveyed : 0.0 (10.2 EV) Sampling Method : Split Spoon PID/FID Model Franklin & Sample Total Depth (ft.) : 4.0' PID/FID Calibration : 100ppm Isobutylene South Bend, IN S. Water Level Date Drum Label ID SBI002 S. Water Level (ft.) Soil Samples Water Levels Sampled Int. ▼ Static Sample Recovery Sampler Type/ Sample Number Sample Interval/ During Drilling PID / FID (ppm) Soil Samples Water Levels Graphic Log Lab Sample **Blow Count** (6"-12"-6") Depth Surf. REMARKS Elev. in **DESCRIPTION** Feet 0 + 0SAND and GRAVEL, rootlets 24/24 5.4 SS-1 0.0-2.0 1 Dark brown SAND, some gravel intermittent layers of cinder fill approx. 0.5" thick Dark brown SAND, trace gravel, very moist, sand becomes lighter in color with increasing depth 2--2 SS-2 24/24 2.2 2.0-4.0 FICLIENTSISBINSBI002\SOIL BORING LOGS\GB-10.BOR 3--3 End of boring at 4.0' 4-1-28-200

Date Started : 08/10/01 **Date Completed** : 08/10/01 **LOG OF BORING GB-11** : Mike Coonfare Logged by Reviewed by (Page 1 of 1) **Drilling Contractor** : ProbeTech & associates, inc. G. Elev. (ft. USGS) : Not Surveyed : Geoprobe **Drilling Method** South Bend Area A : Split Spoon : 0.0 (10.2 EV) Sampling Method PID/FID Model Franklin & Sample Total Depth (ft.) : 3.5 PID/FID Calibration : 100ppm Isobutylene South Bend, IN S. Water Level Date Drum Label ID SB1002 S. Water Level (ft.) Water Levels Soil Samples ▼ Static Sampled Int. Sample Recovery Sampler Type/ Sample Number During Drilling Sample Interval/ PID / FID (ppm) Soil Samples Water Levels Graphic Log Lab Sample **Blow Count** (6"-12"-6") Surf. Depth **REMARKS** Elev. in **DESCRIPTION** Feet 0+0 Silty SAND, some gravel, very moist 24/18 3.6 SS-1 0.0-1.5 Cinder FILL Brown fine SAND, trace gravel, moist Same as above 2 -2 SS-2 24/18 2.6 2.0-3.5 FICLIENTSISBINSBI002\SOIL BORING LOGS\GB-11.BOR 3 + -3 End of boring at 3.5' 4-11-28-2001

: 08/09/01 **Date Started** : 08/09/01 **LOG OF BORING GB-12 Date Completed** Logged by : Mike Coonfare Reviewed by (Page 1 of 1) **Drilling Contractor** : ProbeTech & āssociates, inc. Drilling Method : Geoprobe G. Elev. (ft. USGS) : Not Surveyed South Bend Area A : Split Spoon : 0.0 (10.2 EV) Franklin & Sample Sampling Method PID/FID Model Total Depth (ft.) : 3.7' PID/FID Calibration : 100ppm Isobutylene South Bend, IN S. Water Level Date Drum Label ID SB1002 S. Water Level (ft.) Water Levels Soil Samples Sampled Int. ▼ Static Sample Recovery Sampler Type/ Sample Number Sample Interval/ PID / FID (ppm) During Drilling Soil Samples Water Levels Graphic Log Lab Sample **Blow Count** (6"-12"-6") Depth Surf. **REMARKS** in Elev. **DESCRIPTION** Feet 0-0 Brown SAND, trace gravel, rootlets SS-1 24/24 0.2 Cinder FILL 0.0-2.0 Brown SAND, trace gravel Cinder FILL 1-Brown coarse SAND, some gravel 24/20 Same as above SS-2 1.6 2--2 2.0-3.7 Cinder FILL FICLIENTS\SBI\SBI002\SOIL BORING LOGS\GB-12.BOR Dark brown fine SAND, trace gravel, very 3--3 End of boring at 3.7' 4

**Date Started** : 08/08/01 LOG OF BORING GB-13 : 08/08/01 Date Completed : Mike Coonfare Logged by Reviewed by (Page 1 of 1) & āssociates, inc. **Drilling Contractor** : ProbeTech : Not Surveyed G. Elev. (ft. USGS) **Drilling Method** : Geoprobe South Bend Area A : Split Spoon PID/FID Model : 0.0 (10.2 EV) Sampling Method Franklin & Sample South Bend, IN Total Depth (ft.) : 4.0' PID/FID Calibration : 100ppm Isobutylene S. Water Level Date Drum Label ID SB1002 S. Water Level (ft.) Water Levels Soil Samples ▼ Static Sampled Int. Sample Recovery Sampler Type/ Sample Number \_\_\_\_\_ During Drilling Sample Interval/ PID / FID (ppm) Water Levels Soil Samples Graphic Log Lab Sample **Blow Count** (6"-12"-6") Depth Surf. **REMARKS** Elev. in **DESCRIPTION** Feet 0 + 0SAND and GRAVEL 24/24 4.2 SS-1 Wood fragments 0.0-1.0 SAND and GRAVEL 7.2 SS-2 1-Black stained SAND with cinders, moist 1.0-2.0 Top 3" is slough 9.8 2 -- -2 SS-3 24/24 Brick and cinder FILL 2.0-2.8 F:\CLIENTS\SB\\SB\\02\SO\L BORING LOGS\GB-13.BOR 3 - -3 SS-4 12.3 Dark brown silty SAND, trace gravel, very 3.0-4.0 End of boring at 4.0' 4-11-28-2001

: 08/08/01 Date Started Date Completed : 08/08/01 LOG OF BORING GB-14 : Mike Coonfare Logged by Reviewed by (Page 1 of 1) & associates, inc. **Drilling Contractor** : ProbeTech : Not Surveyed South Bend Area A **Drilling Method** : Geoprobe G. Elev. (ft. USGS) : Split Spoon : 0.0 (10.2 EV) PID/FID Model Sampling Method Franklin & Sample : 5.0' PID/FID Calibration : 100ppm Isobutylene South Bend, IN Total Depth (ft.) S. Water Level Date Drum Label ID SBI002 S. Water Level (ft.) Soil Samples Water Levels ▼ Static Sampled Int. Sample Recovery Sampler Type/ Sample Number □ During Drilling Sample Interval/ PID / FID (ppm) Soil Samples Water Levels Graphic Log Lab Sample **Blow Count** (6"-12"-6") Surf. Depth **REMARKS** Elev. in **DESCRIPTION** Feet 0+0 Concrete **SS-1** 24/18 5.6 Silty SAND, trace clay, trace cinder, moist, dark brown 1.5-3.0 2 -2 -3 3-FICLIENTS\SBI\SBI002\SOIL BORING LOGS\GB-14.BOR Dark brown silty SAND, trace clay, moist, increasing sand content with depth SS-2 9.1 3.5-4.8 End of boring at 5.0' 5-1-28-2001

: 08/07/01 Date Started Date Completed : 08/07/01 **LOG OF BORING GB-15** : Mike Coonfare Logged by Reviewed by (Page 1 of 1) āssociates, inc. **Drilling Contractor** : ProbeTech **Drilling Method** : Geoprobe G. Elev. (ft. USGS) : Not Surveyed South Bend Area A : Split Spoon : 0.0 (10.2 EV) PID/FID Model Franklin & Sample Sampling Method : 4.0' PID/FID Calibration : 100ppm Isobutylene South Bend, IN Total Depth (ft.) S. Water Level Date Drum Label ID SB1002 S. Water Level (ft.) Soil Samples Water Levels Sampled Int. ▼ Static Sample Recovery Sampler Type/ Sample Number Sample Interval/ During Drilling PID / FID (ppm) Soil Samples Water Levels Lab Sample Graphic Log **Blow Count** (6"-12"-6") Depth Surf. REMARKS Elev. in **DESCRIPTION** Feet 0 + 0Black SAND, some gravel, trace cinder 24/24 2.5 SS-1 0.0-1.0 SS-2 3.9 1 -- -1 Cinder FILL 1.0-2.0 Black sandy CLAY, slight petro odor - **-**2 **SS-3** 24/24 10.3 Same as above 2-2.0-2.7 SS-4 11.9 Brown SAND, trace gravel F:/CLIENTS\SBI\SBI002\SOIL BORING LOGS\GB-15.BOR 2.7-4.0 3 -- -3 End of boring at 4.0' 11-28-2001

Date Started : 08/02/01 **Date Completed** : 08/02/01 LOG OF BORING GB-16 : Mike Coonfare Logged by Reviewed by (Page 1 of 1) **Drilling Contractor** : ProbeTech & associates, inc. : Not Surveyed : Geoprobe G. Elev. (ft. USGS) **Drilling Method** South Bend Area A : 0.0 (10.2 EV) Sampling Method : Split Spoon PID/FID Model Franklin & Sample South Bend, IN Total Depth (ft.) : 4.0' PID/FID Calibration : 100ppm Isobutylene S. Water Level Date Drum Label ID SBI002 S. Water Level (ft.) Water Levels Soil Samples ▼ Static Sampled Int. Sample Recovery Sampler Type/ Sample Number During Drilling Sample Interval/ PID / FID (ppm) Soil Samples Water Levels Graphic Log Lab Sample Blow Count (6"-12"-6") Depth Surf. **REMARKS** Elev. in **DESCRIPTION** Feet 0+0 Cinder FILL, some silt and sand, rootlets SS-1 24/24 16.0 0.0-0.7 SS-2 19.4 Dark brown SAND, trace gravel, moist 0.8-2.0 1-Same as above 2 -2 SS-3 19.4 2.0-3.0 F:\CLIENTS\SB\\SB\\02\SO\\L BORING LOGS\\GB-16.BOR Light brown SAND, trace gravel, moist 19.8 **SS-4** 3 - -3 3.0-4.0 End of boring at 4.0' 4-11-28-2001

: 08/07/01 **Date Started** : 08/07/01 LOG OF BORING GB-17 **Date Completed** : Mike Coonfare Logged by Reviewed by (Page 1 of 1) **Drilling Contractor** : ProbeTech associates, inc. **Drilling Method** : Geoprobe G. Elev. (ft. USGS) : Not Surveyed South Bend Area A : 0.0 (10.2 EV) : Split Spoon PID/FID Model Franklin & Sample Sampling Method PID/FID Calibration : 100ppm Isobutylene : 4.0' Total Depth (ft.) South Bend, IN S. Water Level Date Drum Label ID SB1002 S. Water Level (ft.) Soil Samples Water Levels Sampled Int. ▼ Static Sample Recovery Sampler Type/ Sample Number \_\_\_\_ During Drilling Sample Interval/ PID / FID (ppm) Soil Samples Water Levels Lab Sample Graphic Log **Blow Count** (6"-12"-6") Depth Surf. REMARKS Elev. in **DESCRIPTION** Feet 0-0 Cinder FILL, trace gravel 24/24 15.9 SS-1 0.0-1.5 SS-2 14.5 Dark brown SAND, trace gravel, moist 1.5-2.0 SS-3 24/24 18.7 Same as above 2---2 2.0-2.5 Light brown fine SAND, trace gravel, moist SS-4 15.2 2.5-4.0 FACLIENTS\SBI\SBI002\SOIL BORING LOGS\GB-17.BOR 3--3 End of boring at 4.0' 4-11-28-2001

: 08/08/01 Date Started : 08/08/01 Date Completed **LOG OF BORING GB-19** : Mike Coonfare Logged by Reviewed by (Page 1 of 1) **Drilling Contractor** : ProbeTech & associates, inc. **Drilling Method** : Geoprobe G. Elev. (ft. USGS) : Not Surveyed South Bend Area A : 0.0 (10.2 EV) : Split Spoon PID/FID Model Franklin & Sample Sampling Method : 100ppm Isobutylene South Bend, IN : 4.0' PID/FID Calibration Total Depth (ft.) S. Water Level Date Drum Label ID SB1002 S. Water Level (ft.) Soil Samples Water Levels Sampled Int. ▼ Static Sample Recovery Sampler Type/ Sample Number \_\_\_\_\_ During Drilling Sample Interval/ PID / FID (ppm) Soil Samples Water Levels Graphic Log Lab Sample Blow Count (6"-12"-6") Depth Surf. **REMARKS** Elev. in **DESCRIPTION** Feet 0+0 Cinder FILL, trace gravel SS-1 24/24 3.0 0.0-1.0 SS-2 1.1 Sandy SILT, some clay, trace gravel, moist 1.0-2.0 -2 SS-3 24/24 7.1 2-Light brown SAND, trace gravel, moist 2.0-3.0 FICLIENTS\SBI\SBI002\SOIL BORING LOGS\GB-19.BOR Same as above 6.7 SS-4 3----3 3.0-4.0 End of boring at 4.0' 4 -11-28-2001

: 08/07/01 **Date Started** : 08/07/01 **LOG OF BORING GB-28 Date Completed** : Mike Coonfare Logged by Reviewed by (Page 1 of 1) **Drilling Contractor** : ProbeTech & associates, inc. **Drilling Method** : Geoprobe G. Elev. (ft. USGS) : Not Surveyed South Bend Area A : Split Spoon : 0.0 (10.2 EV) PID/FID Model Franklin & Sample Sampling Method : 3.7' : 100ppm Isobutylene PID/FID Calibration South Bend, IN Total Depth (ft.) S. Water Level Date Drum Label ID SBI002 S. Water Level (ft.) Soil Samples Water Levels Sampled Int. ▼ Static Sample Recovery Sampler Type/ Sample Number During Drilling Sample Interval/ PID / FID (ppm) Soil Samples Water Levels Graphic Log Lab Sample **Blow Count** (6"-12"-6") Depth Surf. REMARKS Elev. in **DESCRIPTION** Feet 0+0 Light brown fine SAND with gravel 24/24 24.0 SS-1 0.0-1.8 GRAVEL 1-Brown fine SAND, some cinder fill from 1.0 to 1.2', trace clay GRAVEL 15.0 SS-2 Black stained SAND with gravel, no odor, trace clay 1.8-2.0 Same as above SS-3 24/20 24.7 2--2 2.0-2.3 Light brown fine SAND, some gravel, moist 22.7 SS-4 2.3-3.7 FICLIENTS\SBI\SBI002\SOIL BORING LOGS\GB-28.BOR 3--3 End of boring at 3.7' 11-28-2001

: 08/07/01 **Date Started** : 08/07/01 **LOG OF BORING GB-29 Date Completed** : Mike Coonfare Logged by Reviewed by (Page 1 of 1) **Drilling Contractor** : ProbeTech & āssociates, inc. **Drilling Method** : Geoprobe G. Elev. (ft. USGS) : Not Surveyed South Bend Area A : 0.0 (10.2 EV) Sampling Method : Split Spoon PID/FID Model Franklin & Sample : 3.5' : 100ppm Isobutylene South Bend, IN Total Depth (ft.) PID/FID Calibration S. Water Level Date Drum Label ID SBI002 S. Water Level (ft.) Water Levels Soil Samples Sampled Int. ▼ Static Sample Recovery Sampler Type/ Sample Number Sample Interval/ During Drilling PID / FID (ppm) Soil Samples Water Levels Graphic Log Lab Sample Blow Count (6"-12"-6") Surf. Depth **REMARKS** in Elev. **DESCRIPTION** Feet 0 0 Grey SAND and GRAVEL SS-1 24/15 10.3 0.0 - 0.6SS-2 8.1 Black stained SAND, some clay, trace gravel, moist, slight petro odor 0.7-1.3 1 -24/18 7.6 Same as above SS-3 2. -2 2.0-2.6 SS-4 4.3 Light brown fine SAND, some gravel, moist 2.6-3.5 FICLIENTS\SBI\SBI\002\SOIL BORING LOGS\GB-29.BOR 3. -3 End of boring at 3.5' 4 11-28-2001

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	Depth in Feet	Surf. Elev.	Sampler Type/ Sample Number	Sample Interval/ Sample Recovery	PID / FID (ppm)	Blow Count (6"-12"-6")	Soil Samples	Graphic Log	Water Levels	Soil Samples Sampled Int.	Water Levels  ▼ Static  ▽ During Drilling	REMARKS
	0	- 0	SS-1 0.0-1.3	24/24	9.5					Cinder FILL with wood f to 0.7 feet, creosote odd	ragments from 0.2	
()	1-	- <b>-1</b>	SS-2 1.3-2.0		2.8					Silty clay FILL, some samoist  Light brown fine SAND,		
	2- -	- <b>-</b> 2	SS-3 2.0-3.7	24/20	1.0					Same as above		
F.ICLIENTSISBIISBI002ISOIL BORING LOGSIGB-31.BOR	3	3								End of boring at 3.7'	·	
F:\CLIENTS\SBNSB1002\	4-				.							

: 08/08/01 Date Started Date Completed : 08/08/01 **LOG OF BORING GB-32** : Mike Coonfare Logged by Reviewed by (Page 1 of 1) **Drilling Contractor** : ProbeTech āssociates, inc. **Drilling Method** : Geoprobe G. Elev. (ft. USGS) : Not Surveyed South Bend Area A : Split Spoon : 0.0 (10.2 EV) PID/FID Model Franklin & Sample Sampling Method : 2.8 PID/FID Calibration : 100ppm Isobutylene South Bend, IN Total Depth (ft.) S. Water Level Date : Drum Label ID SBI002 S. Water Level (ft.) Soil Samples Water Levels Sampled Int. ▼ Static Sample Recovery Sampler Type/ Sample Number Sample Interval/ During Drilling PID / FID (ppm) Soil Samples Water Levels Graphic Log Lab Sample **Blow Count** (6"-12"-6") Surf. Depth REMARKS · Elev. in **DESCRIPTION** Feet 0+0Gravel and cinder FILL, wood fragments. SS-1 24/24 7.4 0.0-1.3 SS-2 4.1 Silty SAND, trace clay and gravel, saturated at 1.3 to 1.4' 1.3-2.0 Top 1.3' is slough Brown SAND, trace gravel, moist 2--2 SS-3 24/24 3.5 FICLIENTS\SBI\SBI002\SOIL BORING LOGS\GB-32.BOR 2.0-2.8 End of boring at 2.8' 3-11-28-2001

: 08/07/01 **Date Started** Date Completed : 08/07/01 **LOG OF BORING GB-33** : Mike Coonfare Logged by Reviewed by (Page 1 of 1) & associates, inc. **Drilling Contractor** : ProbeTech G. Elev. (ft. USGS) : Geoprobe South Bend Area A **Drilling Method** : Not Surveyed Sampling Method : Split Spoon PID/FID Model : 0.0 (10.2 EV) Franklin & Sample South Bend, IN : 4.0' Total Depth (ft.) PID/FID Calibration : 100ppm Isobutylene S. Water Level Date Drum Label ID SB1002 S. Water Level (ft.) Water Levels Soil Samples ▼ Static Sampled Int. Sample Recovery Sampler Type/ Sample Number Sample Interval/ \_\_\_\_ During Drilling PID / FID (ppm) Water Levels Soil Samples Graphic Log Lab Sample Blow Count (6"-12"-6") Depth Surf. **REMARKS** Elev. **DESCRIPTION** Feet 0+0 Brown SAND, trace gravel and cinder 24/24 SS-1 4.3 0.0-1.0 SS-2 4.5 1-Cinder FILL, trace gravel 1.0-2.0 24/24 2-SS-3 0.3 - -2 Sandy CLAY, trace cinder, moist 2.0-2.8 F:\CLIENTS\SB\\SB\02\SO\\L BORING LOGS\GB-33.BOR SS-4 0.1 Brown SAND, trace cinder and gravel, slight staining (black) and petro odor 2.8-4.0 3 -3 End of boring at 4.0' 11-28-2001

: 08/07/01 **Date Started** : 08/07/01 LOG OF BORING GB-34 **Date Completed** : Mike Coonfare Logged by Reviewed by (Page 1 of 1) & associates, inc. **Drilling Contractor** : ProbeTech **Drilling Method** : Geoprobe G. Elev. (ft. USGS) : Not Surveyed South Bend Area A Franklin & Sample Sampling Method : Split Spoon PID/FID Model : 0.0 (10.2 EV) : 2.0' South Bend, IN Total Depth (ft.) PID/FID Calibration : 100ppm Isobutylene S. Water Level Date Drum Label ID SBI002 S. Water Level (ft.) Water Levels Soil Samples Sampled Int. ▼ Static Sample Recovery Sampler Type/ Sample Number Sample Interval/ During Drilling PID / FID (ppm) Soil Samples Water Levels Lab Sample Graphic Log Blow Count (6"-12"-6") Depth Surf. **REMARKS** Elev. in **DESCRIPTION** Feet 0+0 Asphalt Cinder FILL, some gravel, trace sand and silt, wood fragments from 1.3 to 1.4' (likely RR tre, creosote odor) 0.0 SS-1 24/17 0.0-1.4 24/24 - -1 1 -Light brown SAND, trace gravel, moist F:\CLIENTS\SB\\SB\\OS\\SO\\LBOR\\\GLOGS\\GB-34.BOR End of boring at 2.0' 2-

: 08/07/01 **Date Started** : 08/07/01 **Date Completed LOG OF BORING GB-35** Logged by : Mike Coonfare Reviewed by (Page 1 of 1) & associates, inc. **Drilling Contractor** : ProbeTech : Geoprobe **Drilling Method** G. Elev. (ft. USGS) : Not Surveyed South Bend Area A : Split Spoon PID/FID Model Sampling Method : 0.0 (10.2 EV) Franklin & Sample : 3.7' South Bend, IN Total Depth (ft.) PID/FID Calibration : 100ppm Isobutylene S. Water Level Date Drum Label ID SB1002 S. Water Level (ft.) Water Levels Soil Samples Sampled Int. ▼ Static Sample Recovery Sampler Type/ Sample Number Sample Interval/ During Drilling PID / FID (ppm) Soil Samples Water Levels Graphic Log Lab Sample Blow Count (6"-12"-6") Depth Surf. **REMARKS** Elev. in **DESCRIPTION** Feet  $0 + \overline{0}$ Silty SAND, some gravel, rootlets SS-1 24/24 6.4 0.0-1.5 Black silty SAND, trace gravel, moist, slight petro odor 1-SS-2 8.6 Brown clayey SILT, trace sand and gravel 1.5-2.0 Same as above 2--2 **SS-3** 24/20 7.7 Brown fine SAND, trace gravel, moist 2.2-2.5 Light brown fine SAND, trace gravel, very SS-4 5.6 2.5-3.7 F:\CLIENTS\SB\\SB\02\SO\L BORING LOGS\GB-35.BOR 3 - 3 End of boring at 3.7' 1-28-2001

: 08/10/01 Date Started : 08/10/01 LOG OF BORING GB-36 **Date Completed** : Mike Coonfare Logged by Reviewed by (Page 1 of 1) & associates, inc. **Drilling Contractor** : ProbeTech G. Elev. (ft. USGS) South Bend Area A **Drilling Method** : Geoprobe : Not Surveyed : Split Spoon : 0.0 (10.2 EV) Sampling Method PID/FID Model Franklin & Sample : 4.0' PID/FID Calibration : 100ppm Isobutylene South Bend, IN Total Depth (ft.) S. Water Level Date Drum Label ID SB1002 S. Water Level (ft.) Water Levels Soil Samples Sampled Int. ▼ Static Sample Recovery Sample Interval/ \_\_\_\_ During Drilling PID / FID (ppm) Soil Samples Water Levels Graphic Log Lab Sample Blow Count (6"-12"-6") Depth Surf. **REMARKS** Elev. in **DESCRIPTION** Feet 0 + 0 Silty SAND, trace gravel, trace clay, moist SS-1 24/24 3.2 0.0-2.0 SS-2 24/24 2-3.8 Brown fine SAND, trace gravel, moist 2.0-3.6 F:\CLIENTS\SB\\SB\\02\SO\\LBOR\\\GLOGS\\CB-36.BOR 3 - - 3 Brown coarse SAND, trace gravel, moist End of boring at 4.0'

**Date Started** : 08/08/01 : 08/08/01 **Date Completed** LOG OF BORING SB-5 : Mike Coonfare Logged by Reviewed by (Page 1 of 1) **Drilling Contractor** : ProbeTech & āssociates, inc. **Drilling Method** : Geoprobe G. Elev. (ft. USGS) : Not Surveyed South Bend Area A : Split Spoon : 0.0 (10.2 EV) Sampling Method PID/FID Model Franklin & Sample South Bend, IN Total Depth (ft.) : 17.7' PID/FID Calibration : 100ppm Isobutylene S. Water Level Date Drum Label ID SBI002 S. Water Level (ft.) Water Levels Soil Samples ▼ Static Sampled Int. Sample Recovery Sample Interval/ Sample Number During Drilling PID / FID (ppm) Sampler Type/ Soil Samples Water Levels Graphic Log Lab Sample Blow Count (6"-12"-6") Surf. Depth REMARKS Elev. **DESCRIPTION** Feet  $0 \rightarrow 0$ Brown silty SAND, trace gravel, rootlets 24/24 4.7 1-11.0 Brown SAND and GRAVEL Same as above 1.5-2.0 SS-3 2.0-2.3 24/24 7.6 Light brown SAND, trace gravel, moist 9.6 3--3 SS-5 4.0-5.3 Same as above 24/15 7.7 5--5 Same as above, slightly more gravel SS-6 6.0-7.7 24/20 11.1 6 -6 7-7 SS-7 8.0-9.7 Same as above, less gravel 24/20 9.5 -8 8 9 -9 SS-8 10.0-11.7 24/20 9.3 Light brown SAND, very moist 10 - -10 11 7-11 SS-9 12.0-13.7 9.0 Light brown SAND, trace gravel, very 12-24/20 - -12 F:\CLIENTS\SB\\SB\\OS\\SO\\LBORING LOGS\SB-5.BOR 13-- -13 SS-10 14.0-15.7 14 24/20 8.0 Same as above - -14 15-7-15 **16** <del>-</del> -16 24/20 Same as above SS-11 16.0-17.7 17 -17 End of boring at 17.7'

18-

11-30-2001

: 08/15/01 Date Started Date Completed : 08/15/01 LOG OF BORING SB-7 Logged by : Mike Coonfare Reviewed by (Page 1 of 1) : ProbeTech & associates, inc. Drilling Contractor G. Elev. (ft. USGS) South Bend Area A **Drilling Method** : Geoprobe : Not Surveyed : Split Spoon Sampling Method PID/FID Model : 0.0 (10.2 EV) Franklin & Sample South Bend, IN Total Depth (ft.) : 4.0' PID/FID Calibration : 100ppm Isobutylene S. Water Level Date Drum Label ID SBI002 S. Water Level (ft.) Water Levels Soil Samples Sampled Int. ▼ Static Sample Recovery Sample Interval/ Sample Number PID / FID (ppm) During Drilling Sampler Type/ Soil Samples Water Levels Blow Count (6"-12"-6") Graphic Log Lab Sample Depth Surf. **REMARKS** Elev. in **DESCRIPTION** Feet 0 + 0SAND and GRAVEL SS-1 24/24 2.8 0.0-2.0 Cinder FILL 1-Light brown coarse SAND, trace gravel, moist Same as above 2-SS-2 24/24 2.9 -2 2.0-4.0 3-- -3 End of boring at 4.0'

: 08/15/01 **Date Started** : 08/15/01 LOG OF BORING SB-8 **Date Completed** : Mike Coonfare Logged by Reviewed by (Page 1 of 1) & associates, inc. **Drilling Contractor** : ProbeTech **Drilling Method** : Geoprobe G. Elev. (ft. USGS) : Not Surveyed South Bend Area A Franklin & Sample South Bend, IN : Split Spoon : 0.0 (10.2 EV) Sampling Method PID/FID Model Total Depth (ft.) : 6.0' PID/FID Calibration : 100ppm Isobutylene S. Water Level Date : Drum Label ID SB1002 S. Water Level (ft.) Soil Samples Water Levels Static Sampled Int. Sample Recovery Sample Interval/ □ During Drilling Sample Number PID / FID (ppm) Sampler Type/ Soil Samples Water Levels Blow Count (6"-12"-6") Graphic Log Lab Sample Surf. Depth REMARKS. Elev. **DESCRIPTION** Feet 0 0 SAND and GRAVEL SS-1 0.0-2.0 24/24 2.4 Cinder FILL -1 1-Clayey SAND, some gravel (fill), moist SS-2 2.0-4.0 24/24 2.4 Brown coarse SAND, trace gravel, moist, slight staining at 3.8' 2. -2 3--3 Same as above, no staining SS-3 4.0-6.0 24/24 4.4 F:\CLIENTS\SB\\SB\02\SO\L BOR\NG LOGS\SB-8.BOR 5--5 End of boring at 6.0' 6-

: 08/15/01 **Date Started** : 08/15/01 LOG OF BORING SB-9 **Date Completed** : Mike Coonfare Logged by Reviewed by (Page 1 of 1) : ProbeTech **Drilling Contractor** & āssociates, inc. **Drilling Method** : Geoprobe G. Elev. (ft. USGS) : Not Surveyed South Bend Area A Franklin & Sample Sampling Method : Split Spoon PID/FID Model : 0.0 (10.2 EV) : 100ppm Isobutylene : 6.0' PID/FID Calibration South Bend, IN Total Depth (ft.) S. Water Level Date Drum Label ID SBI002 S. Water Level (ft.) Soil Samples Water Levels ▼ Static Sampled Int. Sample Recovery Sample Interval/ Sample Number PID / FID (ppm) During Drilling Sampler Type/ Soil Samples Water Levels Blow Count (6"-12"-6") Graphic Log Lab Sample Surf. Depth **REMARKS** in Elev. **DESCRIPTION** Feet  $0 \downarrow 0$ Silty SAND, some gravel, rootlets, moist SS-1 0.0-2.0 24/24 5.4 Cinder FILL Brown fine SAND, some gravel Same as above, staining (black) from 3.6 to 3.8' SS-2 2.0-4.0 24/24 4.9 -2 3--3 Brown coarse SAND, trace gravel, moist (appears natne) SS-3 4.0-6.0 24/24 4.3 FICLIENTS\SBI\SBI002\SOIL BORING LOGS\SB-9.BOR 5-- -5 End of boring at 6.0' 6-