NW0544

Floyd Snider McCarthy, Inc.
Strategy & Technical Solutions for Contaminated Properties
83 South King Street Suite 614 Seattle, Washington 98104 tel: 206.292.2078 fax: 206.682.7867

September 18, 2003

Mr. Ron Timm
Washington State Department of Ecology
3190 160th Avenue S.E.
Bellevue, WA 98008-5452

SUBJECT: RESULTS OF GROUNDWATER WELL INSTALLATION AND SAMPLING-SHOPS AT FIRST STREET, 100 108TH AVE NE, BELLEVUE WA

Dear Mr. Timm:

On behalf of Benenson Bellevue Associates II (Benenson), the owner of the above-referenced site, Floyd Snider McCarthy, Inc. (FSM) has prepared this letter to provide you with the results of the groundwater investigation conducted at the site.

BACKGROUND

During site redevelopment in 1994, perchloroethylene (PCE) was discovered in site soil. The PCE was attributed to releases from a former dry cleaning operation. PCE-impacted soil underlying the former dry cleaning facility was excavated to a depth of 15 feet. Subsequent sampling during the Remedial Investigation (Kennedy/Jenks, 1994) revealed the presence of PCE in soil below the excavated area and in soil beneath a stormwater manhole located within the site parking lot. In both locations PCE concentrations decreased significantly with depth but were consistently detected to the maximum depth sampled (90-100 feet below ground surface [bgs]). Concentrations at depth were typically less than 1 mg/kg. A soil vapor extraction (SVE) system was installed near the manhole and operated from 1996 until 2000. In 2002, three monitoring wells were installed at the site. The purpose of the wells was to assess groundwater quality near the former dry cleaning facility and storm manhole, and to obtain a preliminary determination of groundwater flow direction.

Groundwater was first encountered in sands lying approximately 100 feet bgs. Each well was screened across the upper 15 feet of saturated sands. Groundwater flow was calculated to be to the south-southwest with a moderate horizontal gradient of 3 feet vertical per 1000 feet horizontal.

The wells were sampled twice over a three-week period. PCE was detected in Wells MW-2 (located cross-gradient of the manhole) at 19 and 99 ug/L and in MW-3 (located downgradient of the former dry cleaners) at 21 and 51 ug/L (Figure 1). The MTCA Method A Cleanup level for PCE in groundwater is 5 ug/L. Other volatile organic compounds (VOCs) were also detected, but at concentrations less than applicable cleanup levels.

ADDITIONAL INVESTIGATION

The purpose of the additional investigation was to address the following data gaps as described in the work plan letter submitted to you May 15, 2003 (FSM 2003).

- **Better determine groundwater flow directions and seasonal variance** - Prior to this investigation, the three existing wells allowed only a rough estimate of groundwater flow direction at this site. Additional groundwater elevation monitoring points were deemed necessary to establish more accurate groundwater flow directions at the site.
- **Site Hydrogeology** - The PCE plume is apparently contained within a sand aquifer. However, basic information such as the thickness of this aquifer, the presence of intervening aquitards, and the aquifer's lateral continuity were not established during the initial investigation.
- **Evaluate the Presence of Dense Non-aqueous Phase Liquids (DNAPL)** - The concentration of PCE concentration at depth in the aquifer may indicate the possibility of DNAPL pools.

To evaluate the above data gaps, two borings were advanced at the site, in locations presumed to be hydrologically downgradient of existing Wells MW-2 and MW-3, which are in turn either downgradient or directly adjacent to PCE release areas. Figure 1 shows the locations of the original three borings and the two new borings. Driven spilt-spoons samples were obtained at 10-foot intervals until saturated soil conditions were observed, after which the sampling interval decreased to every 2.5 feet. Well MW-4 was advanced to a depth of 112.5 feet and Well MW-5 to a depth of 125 feet. The driller reported the beginning of "sand lock" of his augers at the base of each boring indicating deeper drilling was not possible using a hollow-stem auger. Clean tap water was added during drilling of each well to control sand heave. A Washington State Licensed Hydrogeologist (LHG) logged each soil sample. Copies of the soil logs for each boring are included as Attachment A.

Soil samples were screened for volatile organic vapors using a photo-ionization detector (PID). A subset of 12 samples, six from each boring, were submitted to CCI Analytical for analysis of halogenated VOCs by USEPA Method 8260.

Results of VOC Screening and Analyses

None of the samples showed PID readings greater than background levels. Samples from throughout the unsaturated and saturated zones were submitted for testing. VOCs were not reported in any of the 12 samples analyzed, including those at the base of each boring. Copies of the analytical reports are provided as Attachment B.

Hydrogeologic Conditions

The subsurface soils exhibited significant differences at depth in each boring. In Wells MW-4 and MW-5, very dense glacially deposited and compacted silty sands with some gravel were observed to a depth of approximately 60 feet in Well MW-4 and to depths of greater than 100

feet in Well MW-5. Similar results were observed in Wells MW-1, MW-2 and MW-3. Underlying the glacial deposits in Well MW-4 is a 20-foot thick sand deposit, underlain by 10 feet of sandy silt. The top of the water table aquifer was located under the silt at a depth of 90 feet in medium sand that was continuous to the base of the boring at 112 feet. No intervening aquitards were observed in this saturated interval.

In contrast, soils in Well MW-5 were comprised consistently of dense to very dense very silty fine sand with some gravel to a depth of 125 feet. Groundwater in MW-5 was first encountered during drilling at a depth between 92 and 102 feet. The sand aquifer observed at Well MW-4 was not observed in MW-5. No significant aquitards were noted in either boring.

After completion of the borings, 2-inch diameter PVC monitoring wells were installed. Each well was screened across the upper 20 feet of saturated soil. Each well was then developed in two stages. The first stage occurred immediately following well installation. A bailer was used to remove sand and approximately 15-20 gallons of turbid water from each well. One week following initial well development, the second stage occurred. A submersible pump was used to remove remaining turbidity and as much of the drilling water as practical. Promptly after pumping was initiated, the discharge water from MW-4 became clear. In contrast, the water pumped from MW-5 remained slightly turbid throughout pumping, due to the increased silt content of the formation at that location.

Groundwater Flow Direction

To evaluate the direction of groundwater flow at the site, the top of the PVC casing was surveyed in, using the existing well elevations as a benchmark. Static depth-to-groundwater readings were then collected from each well one-week following well development. Figure 1 displays the site wide groundwater elevation contours and Table 1 lists the depth to groundwater, well casing elevations, and calculated groundwater surface elevations. The contours indicate that groundwater flow at the site is to the south-southwest. The groundwater elevation at MW-4 is significantly lower than surrounding wells, indicating a steeper incline of the gradient at that location. This is likely due to local topography, which drops sharply in elevation south of Main Street. Based on this first round of groundwater elevation data, it appears that Well MW-4 is located directly downgradient of the storm sewer manhole, and MW-5 is located downgradient of the former dry cleaners.

The saturated sand unit observed at MW-4 appears to have much greater hydraulic conductivity as compared to the silty sand in MW-5. Both the steeper gradient and high hydraulic conductivity of the sand result in a greater aquifer transmissivity. The higher transmissivity results in a larger volume and more rapid flow of site groundwater at the location of MW-4, as compared to MW-5.

PCE CONCENTRATIONS

Groundwater samples were collected from all site wells except upgradient Well MW-1. As defined in the project the work plan, two methods of sample collection were used: passive diffusion bags (PDBs) and a submersible pump. The PDBs were used for sample collection at the upper and lower intervals of the 20-foot well screen in Wells MW-4 and MW-5. A PDB was

also set at the mid-screen elevation in Well MW-2, which contained the highest PCE concentration in 2002. Upgradient Wells MW-2 and MW-3 were constructed with only 10 feet of well screen, which were too short for the collection of two PDB depth interval samples. Therefore, the single PDB was set in each of these wells at mid-screen elevation. The PDBs were placed in the wells immediately after the second round of well development. The PDBs remained in place for the recommended two-week sampling period, after which they were removed from the well, the bags opened, and then the sample vials filled.

To compare the PDB to the submersible pump methodologies (which was used to collect the 2002 samples), a Redi-Flo submersible pump was lowered to the base of Wells MW-4 and MW-5 directly after the PDBs were pulled. A low-flow sampling rate of less than one liter per minute was used to purge the well. After 2-3 gallons of water was purged, the sample was collected. The water level in each well was monitored to ensure that minimal drawdown occurred during pumping. The pump and discharge hose were then decontaminated by purging with 10 gallons of municipal water. A blank sample was collected after one of the decontamination events. The samples were analyzed for halogenated VOCs using USEPA Method 8260.

Results

PCE was the only VOC detected in all of the well samples. Only chloroform was detected in the decontamination blank sample[1]. Figure 2 shows the sample results and Table 2 lists the PCE concentrations, including results of prior sampling. The PCE concentrations in the samples from the PDB were approximately twice the concentrations of the corresponding submersible pump samples. It is likely that this is a consequence of the pump drawing water from seams of both contaminated and uncontaminated waters, resulting a less concentrated sample. While the submersible pump samples are more representative of the overall PCE concentrations across a screened interval, the PDB samples are representative of the maximum concentrations within that interval, so should be considered conservative concentrations. The following observations are noted:

- Well MW-4: The PCE concentrations in both of the PDB samples were 9 ug/L indicating no PCE stratification with depth. The sample from the pump contained PCE at 4 ug/L.
- Well MW-2: The PCE in MW-2 as collected by PDB was 43 ug/L. The pumped sample contained 24 ug/L, which is approximately equivalent to the results obtained from the June 2002 pump sample, indicating no change in concentration over the past year.
- Well MW-3: The PCE concentration in MW-3 by PDB was 93 ug/L, which was also similar to results detected in 2002. If a pump sample was collected, a lower concentration would have been expected. This indicates that the PCE concentrations in this well have probably declined over the past year.

[1] Chloroform occurrence is due to the chlorination of municipal water.

- Well MW-5: The PCE concentration in MW-5 at the lower screen depth was 98 ug/L or approximately equivalent to that in upgradient well MW-3. A lower concentration of 40 ug/L was detected in the upper screen interval, indicating some stratification with depth.

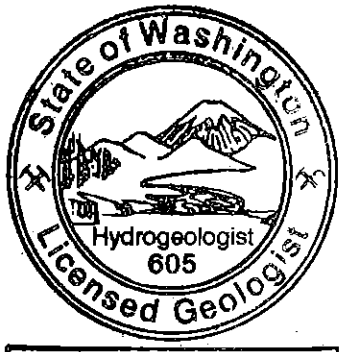
PRELIMINARY CONCLUSIONS

PCE concentrations in existing wells do not appear to have significantly changed in the past year. The concentration of PCE in Well MW-4, downgradient of the storm manhole, is close to the 5 ug/L cleanup level. PCE concentrations at Well MW-5, downgradient of the former dry cleaner facility, is approximately the same as in Well MW-3, located upgradient. The stratification of PCE with depth in MW-4 is likely a result of less contaminated groundwater near the top of the aquifer. The concentrations of PCE measured, while greater than the MTCA cleanup level are under 1/1000th of the solubility of PCE in water (150,000 ug/L). Therefore, they do not indicate NAPL in groundwater at this site.

Future work will involve quarterly collection of groundwater elevations to further define the year-round flow directions. After this is complete, additional samples (using only PDBs) will be taken to evaluate trends and the need and/or potential location of additional downgradient wells.

Sincerely yours,
Floyd Snider McCarthy, Inc.

Tom Colligan, L.H.G.
Senior Project Manager



Encl.: Attachment A Well Logs
Attachment B Analytical Results
Figure 1 Monitoring Well Locations and Groundwater Contour Map, July 2003
Figure 2 PCE Concentrations, July 2003
Table 1 Groundwater Monitoring Elevations
Table 2 PCE Concentrations in Groundwater Monitoring Wells
Copies: Leonard Kreppel, Benenson Capital, Tom Newlon, Stoel Rives

References:

Kennedy/Jenks Consultants. 1994. Remedial Investigation / Feasibility Study Report (Revised). The Shops at First Street Project Site. Bellevue, WA. November.

Table 1
Monitoring Well Elevation Summary for The Shops at First Street

	MW-1 TOC[1] - 153.9 ft Screen Interval[2]: 100-115		MW-2 TOC - 150.04 ft Screen Interval: 95-110		MW-3 TOC - 144.86 ft Screen Interval: 105-115		MW-4 TOC - 143.56 ft Screen Interval: 92-112		MW-5 TOC - 141.23 ft Screen Interval: 92-112	
Date	Depth to Water (ft)	Groundwater Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)
5/22/2002[3]	103.65	50.25	106.13	43.91	109.31	35.55	-	-	-	-
5/31/2002[3]	103.56	50.34	100.25	49.79	95.02	49.84	-	-	-	-
6/18/2002[3]	103.44	50.46	100.07	49.97	94.88	49.98	-	-	-	-
7/10/2003[4]	103.92	49.98	100.62	49.42	95.45	49.41	94.90	48.66	91.65	49.58
7/21/2003[4]	103.91	49.99	100.61	49.43	95.44	49.42	94.91	48.65	92.08	49.15
7/25/2003[4]	NM[5]	NM	100.54	49.50	NM	NM	94.92	48.64	92.10	49.13

Notes:

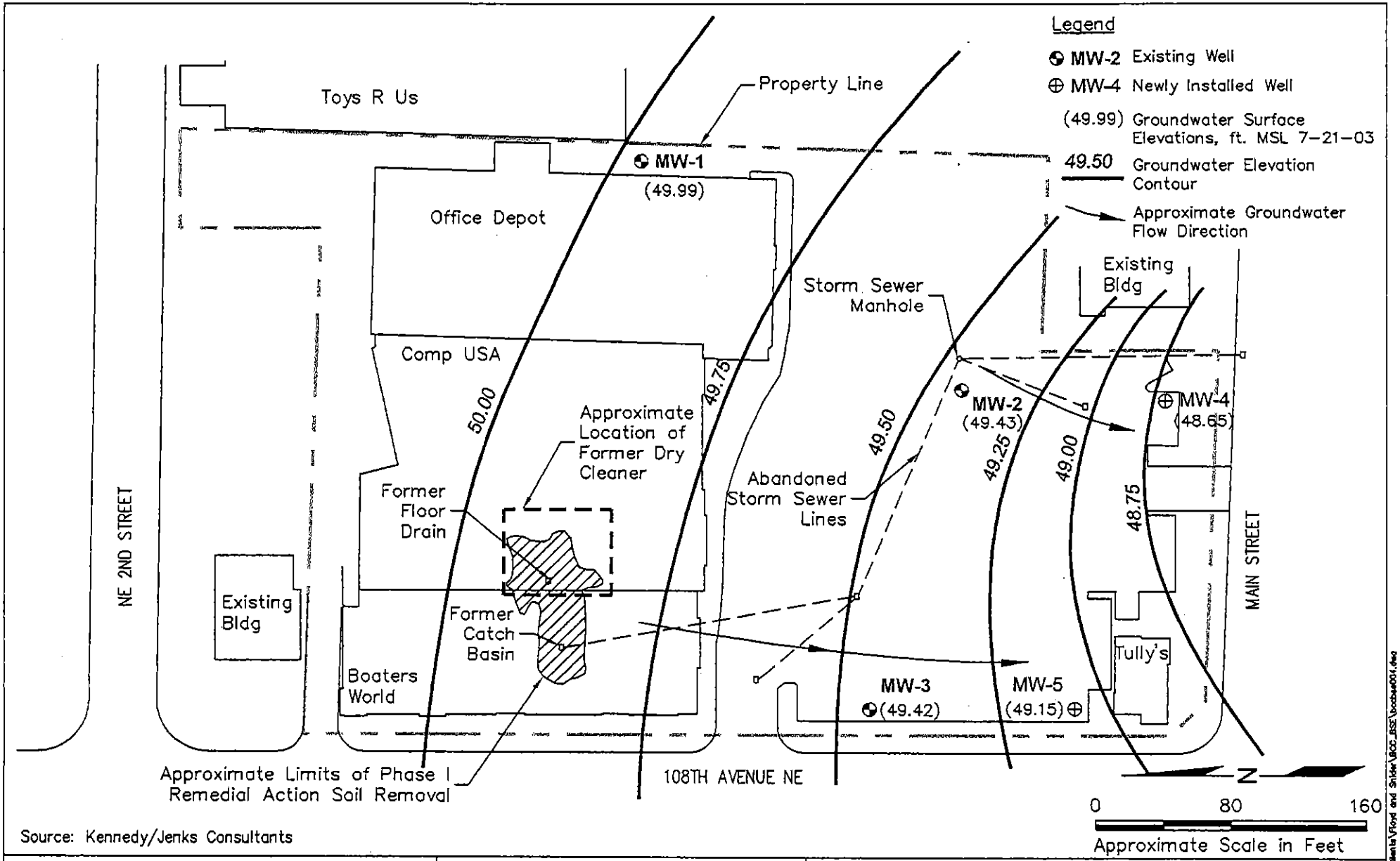
1. TOC = Top of Casing Elevation, feet above mean sea level.
2. Screen Interval: depth, ft., from top of casing.
3. Measured by Kennedy Jenks Consultants
4. Measured by Floyd Snider McCarthy, Inc.
5. NM = Not measured

Table 2
PCE Concentrations in Groundwater Monitoring Wells

			PCE Concentrations, µg/L		
Well ID	**Sampling Method**	**Sampling Elevation[1]**	5/22/02[2]	6/18/02[2]	7/25/03[3]
MW-1	Submersible Pump	NA[4]	< 0.2	< 0.2	NS[5]
MW-2	Submersible Pump	NA / 47.54 (Mid-Screen)[6]	19	21	24
MW-2	PDB	47.54 (Mid-Screen)	-	-	43
MW-3	Submersible Pump	NA	99	51	-
MW-3	PDB	34.86 (Mid-Screen)	-	-	93
MW-4	Submersible Pump	41.56 (Mid-Screen)	-	-	4
MW-4	PDB	46.56 (Top of Screen)	-	-	9
MW-4	PDB	32.06 (Bottom of Screen)	-	-	9
MW-5	Submersible Pump	39.23 (Mid-Screen)	-	-	64
MW-5	PDB	47.23 (Top of Screen)	-	-	40
MW-5	PDB	32.73 (Bottom of Screen)	-	-	98

Notes:

1. Sampling Elevation, feet above mean sea level (MSL)
2. Sampled by Kennedy Jenks Consultants (KJC)
3. Sampled by Floyd Snider McCarthy, Inc. (FSM)
4. NA = Not available
5. NS = Not sampled
6. KJC's sample elevations are NA, FSM's sample elevation is 47.54 feet above MSL.



Source: Kennedy/Jenks Consultants

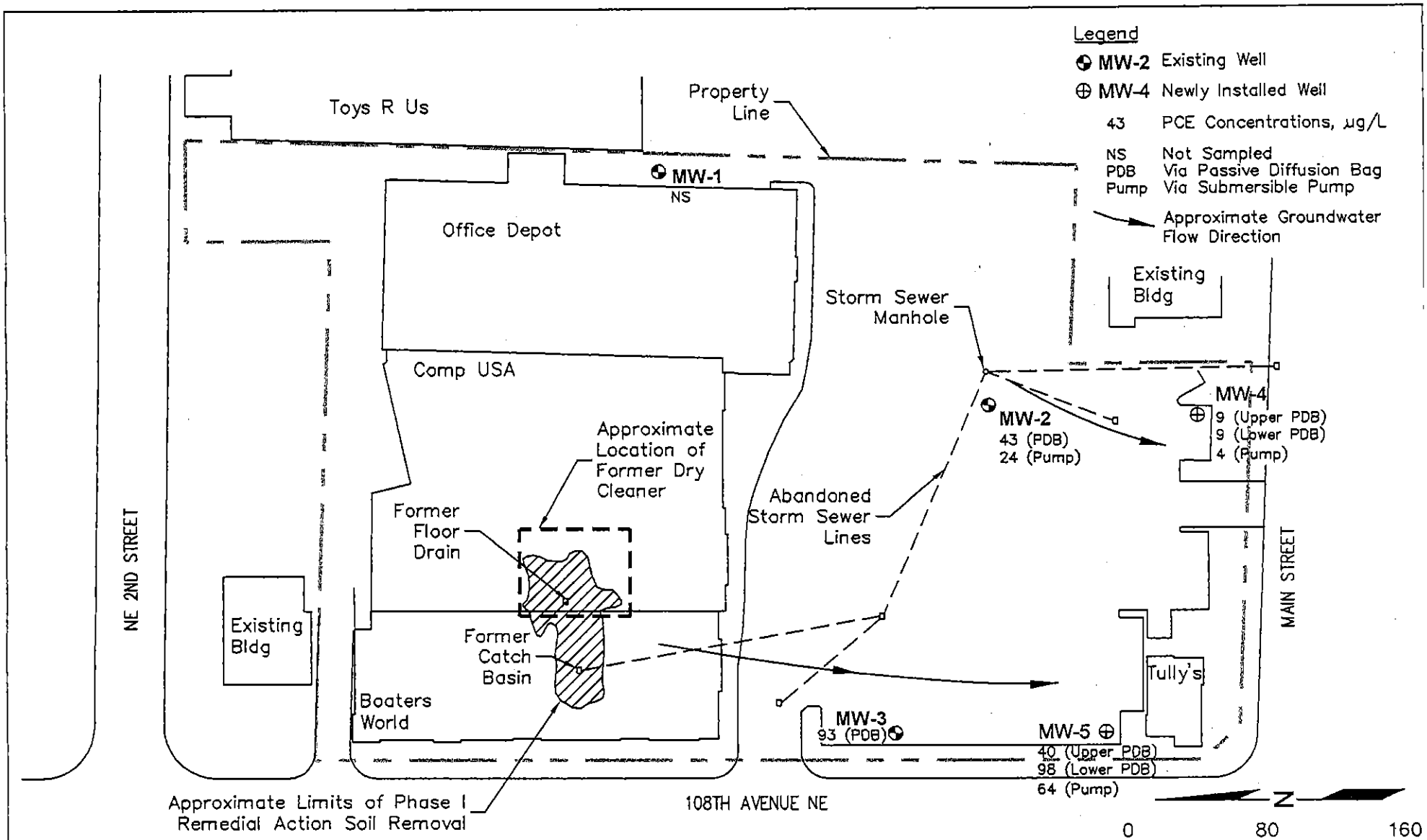
Floyd Snider McCarthy, Inc.
Strategy & Technical Solutions for Contaminated Properties

Benenson Bellevue Associates II
Shops at First Street
Bellevue, Washington

Figure 1

Monitoring Well Locations and Groundwater Contour Map, July 2003

DWG NAME: G:\projects\Clients\Floyd and Snider\BOC_BSF\bocbse001.dwg



Source: Kennedy/Jenks Consultants

Floyd Snider McCarthy, Inc.
Strategy & Technical Solutions for Contaminated Properties

Benenson Bellevue Associates II
Shops at First Street
Bellevue, Washington

Figure 2
PCE Concentrations
July 2003

Well Log MW-5

Floyd Snider McCarthy, Inc.
Strategy and Technical Solutions for Contaminated Properties

Floyd Snider McCarthy, Inc.

Well MW-5 Date July 1, 2003 Sheet 1 of 3

Job Shops at First Street Job No. BCC-BSE-0007

Logged By Tom Cammarata Weather Clear

Drilled By Holt Drilling

Drill Type/Method 4" ID Hollow Stem Auger

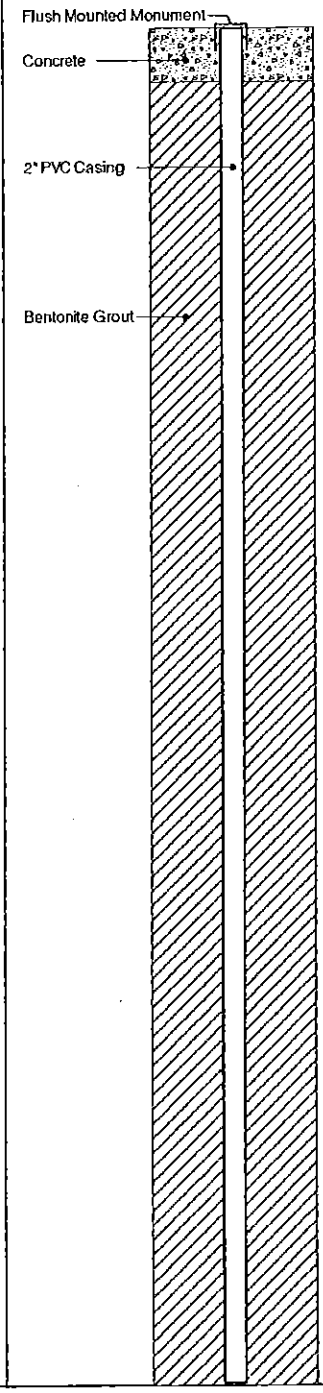
Sampling Method Split Spoon 3" Diameter, 300 lb Hammer

Obs. Well Install. Yes No

Bottom of Well 125 Feet ATD Water Level Depth 102 Feet [Nd]

SAMPLE ID	PID (ppm)	DEPTH From	DEPTH To	SAMPLE RECOVERY (FT)	Penetration Resistance	USCS Symbol	DESCRIPTION: Den., moist, color, minor, MAJOR CONSTITUENT, NON-SOIL SUBSTANCES: Odor, staining, sheen, scrap, slag, etc.
							Asphalt surface (parking stall)
MW-5/12.5'	0.1	12.5	14	1.5'	33 50/4	GM	Light-brown, very silty, fine to coarse GRAVEL, dry, very dense(FILL)
MW-5/22.5'	0.1	22.5	24	1.5'	34 50/5	ML	Light-brown, trace fine gravel, fine sandy SILT, dry, very dense (NATIVE)
MW-5/32.5'	0.1	32.5	34	1.5'	40 50/5	SM	Light-brown, trace fine gravel, very silty, fine SAND, dry, very dense
MW-5/42.5'	0.1	42.5	44	1.5'	50/5	SM	Olive-gray, fine gravelly, very silty fine SAND, dry very dense

Well Construction Log



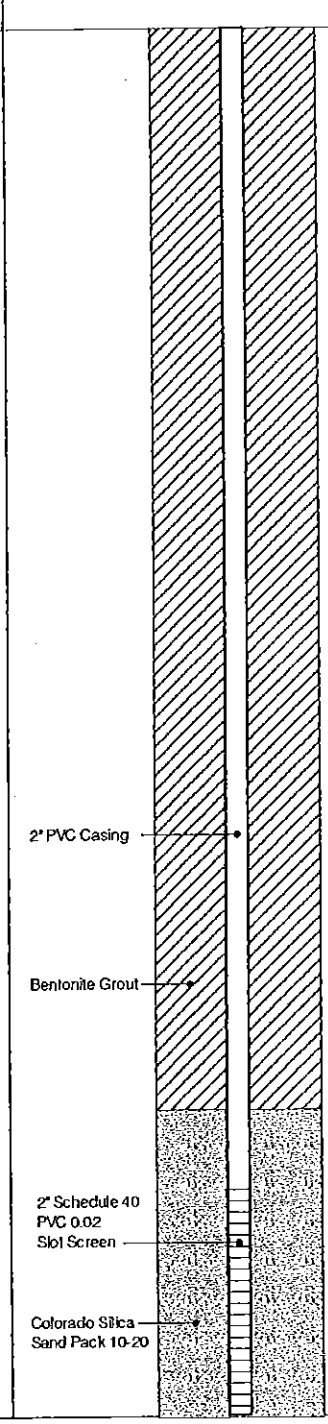
Well Log MW-5

Floyd Snider McCarthy, Inc.
Strategy and Technical Solutions for Contaminated Properties

Floyd Snider McCarthy, Inc.
Well MW-5 Date Jul7 1, 2003 Sheet 2 of 3
Job Shops at First Street Job No. BCC-BSE-0007
Logged By Tom Cammarata Weather Clear
Drilled By Holt Drilling
Drill Type/Method 4" ID Hollow Stem Auger
Sampling Method Split Spoon 3" Diameter, 300 lb Hammer
Obs. Well Install. Yes No Bottom of Well 125 Feet ATD Water Level Depth 102 Feet No

SAMPLE ID	PID (ppm)	DEPTH From	DEPTH To	SAMPLE RECOVERY (FT)	Penetration Resistance	USCS Symbol	DESCRIPTION: Den., moist, color, minor, MAJOR CONSTITUENT NON-SOIL SUBSTANCES: Odor, staining, sheen, scrap, slag, etc.
MW-5/52.5'	0.1	52.5	54	1.5'	45 50/4	ML	Gray to olive-gray, slightly clayey SILT, dry, very dense (TILL)
MW-5/62.5'	0.1	62.5	64	1.5'	50/3		No recovery, started drilling with water, very slow drilling from 50' to 60'
MW-5/72.5'	0.1	72.5	74	1.5'	50/6	SM	Gray to olive-gray, fine, trace gravelly, very silty, fine SAND, dry, very dense
MW-5/82.5'	0.1	82.5	84	1.5'	22 28 45	SM	Olive-gray, silty, very silty, fine SAND, wet, dense (perched zone?)
MW-5/92.5'	0.1	92.5	94	1.5'	22 34 50/5		Gray, slightly clayey, very silty, fine SAND, damp, very dense to dense

Well Construction Log



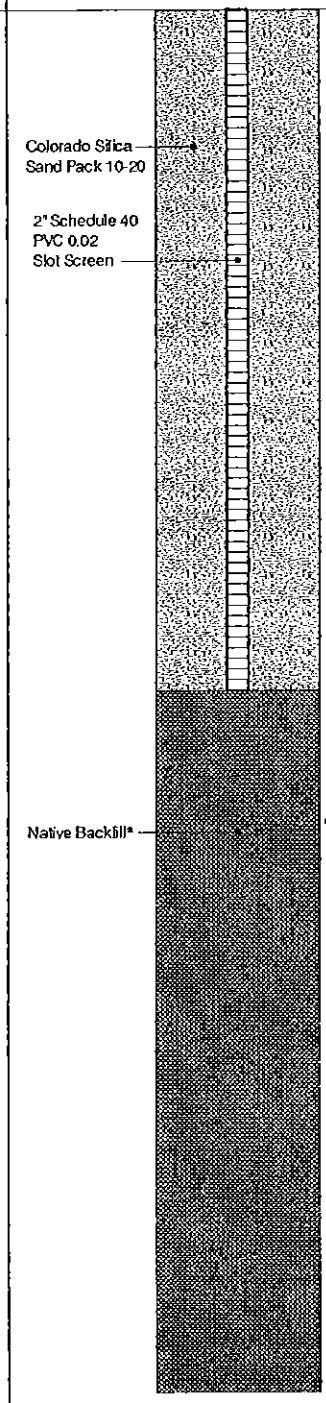
Well Log MW-5

Floyd Snider McCarthy, Inc.
Strategy and Technical Solutions for Contaminated Properties

Floyd Snider McCarthy, Inc.
Well MW-5 Date Jul7 1, 2003 Sheet 3 of 3
Job Shops at First Street Job No. BCC-BSE-0007
Logged By Tom Cammarata Weather Clear
Drilled By Holt Drilling
Drill Type/Method 4" ID Hollow Stem Auger
Sampling Method Split Spoon 3" Diameter, 300 lb Hammer
Obs. Well Install. Yes No Bottom of Well 125 Feet ATD Water Level Depth 102 Feet No

SAMPLE ID	PID (ppm)	DEPTH From	DEPTH To	SAMPLE RECOVERY (FT)	0	Penetration Resistance	USCS Symbol	DESCRIPTION: Den., moist, color, minor, MAJOR CONSTITUENT, NON-SOIL SUBSTANCES: Odor, staining, sheen, scrap, slag, etc.
					100			
					101			
					102		▽	
MW-5/102.5'	0.1	102.5	104	1.5'	103	50/5	SM	Olive-gray, slightly fine to gravelly, silty fine SAND, wet, very dense
					104			
MW-5/105'	0.1	105	106.5	1.5'	105	50/5	SM	Olive-gray, slightly silty to very silty, slightly fine to gravelly fine SAND, wet, very dense
					106			
					107			
MW-5/107.5'	0.1	107.5	109	1.5'	108	24 33	SM	Olive-gray, slightly silty to trace silt, slightly fine, gravelly fine SAND, wet, dense to very dense
					109	50/5		
MW-5/110'	0.1	110	111.5	1.5'	110	36 50/4	SM	Olive-gray, slightly silty, fine SAND, wet, very dense
					111			
					112			
MW-5/112.5'	0.1	112.5	114	1.5'	113	38 36	SM	Olive-gray, trace silt to slightly silty, fine SAND, wet, dense to very dense
					114	50/6		
					115			
MW-5/115'	0.1	115	116.5	1.5'	116	18 31 42	SM	Olive-gray, slightly silty to trace silty, fine SAND, wet, dense
					117			
MW-5/117.5'	0.1	117.5	119	1.5'	118	7 12	SM	Olive-gray, trace silt, slightly silty, fine SAND, wet, medium dense
					119	18		
					120	50/6		
MW-5/120'	0.1	120	121.5	1.5'	121		SM	Olive-gray, trace silt, to slightly silty, fine SAND, wet, dense
					122			
MW-5/122.5'	0.1	122.5	124	1.5'	123	32 50/5	SM	Olive-gray, trace silt, to slightly silty, fine SAND, wet, dense
					124			
					125	28		
MW-5/125'	0.1	125	126.5	1.5'	126	39 50/5	SM	Olive-gray, trace silt, to slightly silty, fine SAND, wet, dense

Well Construction Log



*Note: Well casing pulled up from 125' to 112' during installation

Well Log MW-4

Floyd Snider McCarthy, Inc.
Strategy and Technical Solutions for Contaminated Properties

Floyd Snider McCarthy, Inc.

Well MW-4 Date June 30, 2003 Sheet 3 of 3

Job Shops at First Street Job No. BCC-BSE

Logged By Tom Colligan/Tom Cammarata Weather Cloudy, Cool, 70s

Drilled By Holt Drilling

Drill Type/Method 4" ID Hollow Stem Auger

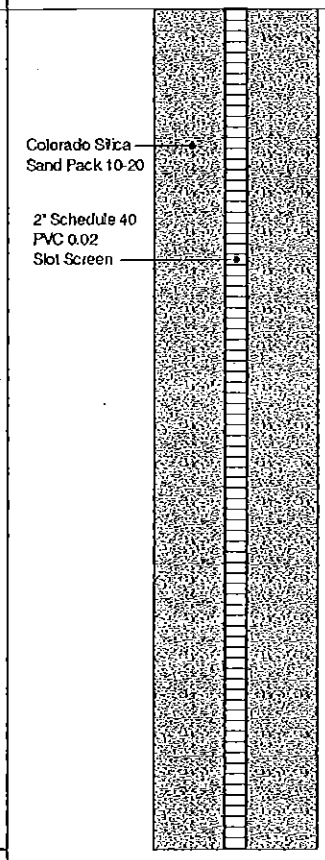
Sampling Method Split Spoon 3" Diameter, 300 lb Hammer

Obs. Well Install. [X] Yes [ ] No

Bottom of Well 112 Feet ATD Water Level Depth 92 Feet [No]

SAMPLE ID	PID (ppm)	DEPTH From	DEPTH To	SAMPLE RECOVERY (FT)	Penetration Resistance	USCS Symbol	DESCRIPTION: Den., moist, color, minor, MAJOR CONSTITUENT NON-SOIL SUBSTANCES: Odor, staining, sheen, scrap, slag, etc.
MW-4/100'	0.1	100	100.5	6"	50/5	SP	Olive-gray, slightly silty to trace silt, slightly fine gravelly, fine SAND, wet, very dense
							adding water to control heave
MW-4/102.5'	0.2	102.5	104	1.5'	50/6	SP	Olive-gray, slightly silty to silty fine SAND, trace fine to coarse gravel, wet, dense
MW-4/105'	0.1	105	106.5	1.5'	29 50/3	SP	Olive-gray, slightly silty to silty, trace fine to gravelly fine SAND, wet, dense
MW-4/107.5'	0.1	107.5	109	1.5'	30 50/5	SP	Olive-gray, slightly silty to silty, fine SAND, wet, dense
MW-4/110'	0.2	110	111.5	1.5'	32 50/3	SP	1st 7" olive-gray, very dense, slightly silty, fine SAND, wet, dense, over 3" of olive-gray, coarse SAND, wet, dense
							Stopped drilling at 112' due to sand locking up augers, install well.

Well Construction Log



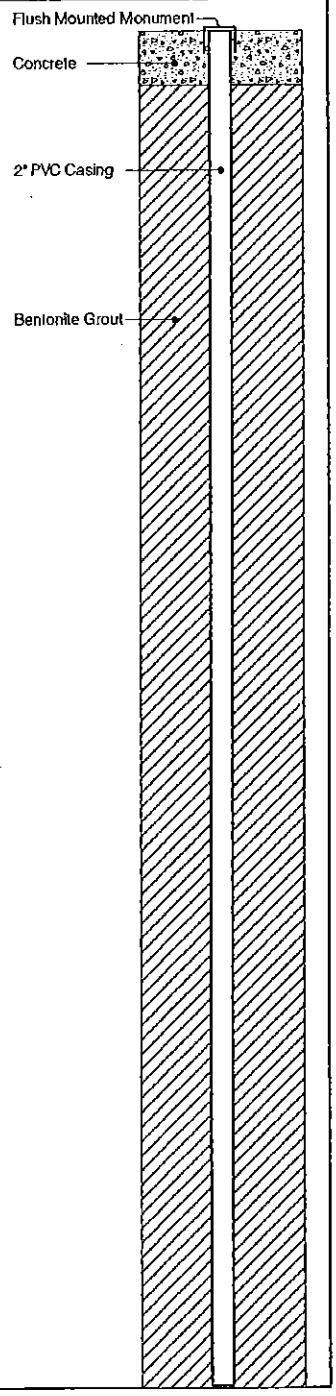
Well Log MW-4

Floyd Snider McCarthy, Inc.
Strategy and Technical Solutions for Contaminated Properties

Floyd Snider McCarthy, Inc.
Well MW-4 Date June 30, 2003 Sheet 1 of 3
Job Shops at First Street Job No. BCC-BSE
Logged By Tom Colligan/Tom Cammarata Weather Cloudy, Cool, 70s
Drilled By Holt Drilling
Drill Type/Method 4" ID Hollow Stem Auger
Sampling Method Split Spoon 3" Diameter, 300 lb Hammer
Obs. Well Install. [X] Yes [ ] No
Bottom of Well 112 Feet ATD Water Level Depth 92 Feet [No]

SAMPLE ID	PID (ppm)	DEPTH From	DEPTH To	SAMPLE RECOVERY (FT)	0	Penetration Resistance	USCS Symbol	DESCRIPTION: Den., moist, color, minor, MAJOR CONSTITUENT, NON-SOIL SUBSTANCES: Odor, staining, sheen, scrap, slag, etc.
					0			Asphalt surface (parking stall) — Logged by Tom Colligan
								Brown gravelly SAND and SILT, moist, dense
								Note: No split spoon samples collected for first 20 feet. Logged from cuttings
					5			
							SM-GM	
					10			
					15			
					20			
MW-4/22'	0.1	22	22.5	6" [X]		50	SM-GM	Brown silty very fine SAND with GRAVEL to silty, very fine SANDY GRAVEL, dense, moist (GLACIALLY COMPACTED?)
					25			
					30			
MW-4/32'	0.1	32	32.5	6" [X]		50	SM-GM	Brown, gravelly very fine silty SAND to silty sandy GRAVEL, dense, moist (GLACIALLY COMPACTED?)
					35			
					40			Driller reports wetness in augers at 40' Perched GW Zone?
MW-4/42'	0.1	42	43	12" [X]		50/6	SM-GM	Brown, gravelly, very fine sandy SILT to silty, gravelly, very fine SAND, dense to very dense: 43' sample appears "moist", not wet, but soil moist to wet from 42' to 42.5' (GLACIALLY COMPACTED?)
					45			
					50			

Well Construction Log



Well Log MW-4

Floyd Snider McCarthy, Inc.
Strategy and Technical Solutions for Contaminated Properties

Floyd Snider McCarthy, Inc.

Well MW-4 Date June 30, 2003 Sheet 2 of 3

Job Shops at First Street Job No. BCC-BSE

Logged By Tom Colligan/Tom Cammarata Weather Cloudy, Cool, 70s

Drilled By Holt Drilling

Drill Type/Method 4" ID Hollow Stem Auger

Sampling Method Split Spoon 3" Diameter, 300 lb Hammer

Obs. Well Install. [Yes] [No]

Bottom of Well 112 Feet ATD Water Level Depth 92 Feet [No]

SAMPLE ID	PID (ppm)	DEPTH From	DEPTH To	SAMPLE RECOVERY (FT)	Penetration Resistance	USCS Symbol	DESCRIPTION: Den., moist, color, minor, MAJOR CONSTITUENT. NON-SOIL SUBSTANCES: Odor, staining, sheen, scrap, slag, etc.
MW-4/52'	0.1	52	52.5	6"	50/6	SM-GM	Brown, gravelly, silty SAND to sandy, silty GRAVEL, dense to very dense
MW-4/62'	0.4	62	62.5	8"	50/6	SP	Gray-brown, silty, very fine to medium SAND with some silt, loose to medium dense (fluvial?)
MW-4/72'	0.1	72	73	12"	50/6	SP	Whitish grey, very fine to medium SAND, trace silt, loose, dry
							Easier drilling
MW-4/82'	0.1	82	83.5	1.5'	14 27 24	ML	Greenish brown, sandy SILT with trace gravel, moist to very moist, stiff
							Plug tip wet at 90' - reduce sampling interval to every 2.5'
MW-4/92'	0.3	92	93.5	1.5'	12 18 34	SP	Olive-gray, dense, trace silt, trace fine to gravelly, fine SAND, damp to wet (Logged by Tom Cammarata)
MW-4/94.5'	0.1	94.5	96	1.5'	18 27 37		Olive-gray, dense, trace silt, fine SAND, damp to wet
MW-4/97'	0.1	97	98.5	1.5'	28 50/5		Olive-gray, dense, slightly silty, fine SAND, wet

Well Construction Log