Division of Environmental Remediation

Remediation Report

Barker Chemical Site
Barker, Niagara County, New York
Site Number 932119

May 2015

New York State Department of Environmental Conservation
Region 9
270 Michigan Avenue
Buffalo, New York 14203

APPENDIX F

EXCAVATION WORK PLAN

1.0 OVERVIEW AND OBJECTIVES

The Former Barker Chemical Site is located at 8473 West Somerset Road in the Village of Barker, Town of Somerset, Niagara County, New York (Figure F 1). The total area of the property is approximately 10 acres. The Site is located in a mixed agricultural and residential setting, and is bordered to the north and east by woodlands, to the south by West Somerset Road and to the west by a vacant field (Figure F 2). Residences are located near the Site to the west, south and east, with eleven residences located within ¼ mile of the property. The property was formerly operated as a fungicide/herbicide manufacturing, warehousing and distribution facility by the Barker Chemical Corporation from 1930 to the early 1970s. The property has remained largely vacant since that time.

The Site was characterized by the NYSDEC during a Site Investigation completed in 2003 and a Supplemental Site Investigation completed in 2008. A Phase II Environmental Site Assessment was completed by LaBella Associates in 2012. The user should refer to these reports for more detail as needed.

The objective of this Excavation Work Plan (EWP) is to set guidelines for the management of contaminated soil and waste material encountered during any future excavation activities at the Site. This EWP addresses environmental concerns related to soil management and has been prepared by the New York State Department of Environmental Conservation (NYSDEC).

2.0 NATURE AND EXTENT OF CONTAMINATION

The only waste remaining at the Former Barker Chemical Site is associated with the Filled and South Lagoons (Figure F-2), although the waste in the South Lagoon was stabilized with Portland cement and weathered lime during the EPA removal action. A soil boring completed in the South Lagoon during the 2003 Site Investigation revealed, however, that the stabilization effort was incomplete; lagoon sludge contained crystallized sulfur and lime, and layers of gray white powder believed to be Portland cement. The waste material in the Filled Lagoon consists predominantly of very loose, coarse grained, lime waste that contains alternating layers of blue gray, yellow, orange brown, and whitish gray waste. This waste directly overlies a saturated, black sludge with blue green mottling.

Sulfur is the principle contaminant of concern in both the lime waste and sludge, with concentrations ranging from 10,000 to 352,000 mg/kg in the lime waste (Table F 1), and from 7,700 to 551,000 mg/kg in the sludge (Table F 2). The locations of the lime waste and sludge samples are shown on Figures F-3 and F-4, respectively.

The contaminants of concern for surface water consist primarily of metals, sulfate and sulfide, although low concentrations of several semivolatile organic compounds (SVOCs) and pesticides have been detected (Table F-3). The locations of the surface water samples are shown on Figure F-5. The primary metals of concern in surface water include aluminum, arsenic, beryllium, cobalt, iron, magnesium, manganese, and nickel. Several of these metals are EPA priority pollutant metals. USEPA priority pollutant metals are toxic metals for which technology based effluent limitations and guidelines are required by Federal law. The priority pollutant metals exceeding the NYSDEC surface water standards or guidance values include arsenic, beryllium and nickel (Table F-3). Sulfate and sulfide were also detected in surface water at the Former Barker Chemical Site at significant concentrations. Concentrations of sulfate ranged from 92,000 to 2,600,000 µg/L, and was detected in every sample (Table F-3). Concentrations of sulfide ranged from 400 to 3,200 µg/L, and was detected in 3 of 5 surface water samples (Table F-3).

Low pH surface water is also prevalent at the Former Barker Chemical Site. The locations of pH measurements are shown on Figure F-6. Surface water in the Central Drainage Ditch and Low pH Trough (pH 3, pH 4, pH 13 and pH 15) exhibited pH values ranging from 3.04 to 6.55 standard pH units (Table F-4). The lowest pH values were associated with location pH 15 (3.04 to 3.21 standard pH units), which was located in the Central Drainage Ditch near the Filled Lagoon and former Lime Waste Area (Figure F 6). Some of the lowest pH values measured at the Site were associated with the Ponded Water Area (pH 5 and pH 14), with pH values ranging from 3.15 to 3.75 standard pH units (Table F-4). The pH of surface water in the Eastern Boundary Ditch (pH 6 and pH 12) and North Lagoon (pH 7, pH 8, pH 9 and pH 11) had relatively neutral pH, ranging from 6.74 to 7.37 standard pH units for the Eastern Boundary Ditch, and from 6.90 to 7.49 standard pH units for the North Lagoon (Table F-4).

The contaminants of concern for groundwater consist primarily of volatile organic compounds (VOCs), metals, sulfate and sulfide. The locations of Site monitoring wells are shown on Figure F-7. The primary VOC contaminants of concern in groundwater include acetone,

benzene, 2 butanone, chlorobenzene, dichloroethane, dichloropropane, ethylbenzene, trimethylbenzene, and xylenes (Table F-5). The majority of these compounds were detected in monitoring well TPMW-3 (Table F-5), which is located near the former storage tank and spill area (Figure F-7).

Numerous metals were detected in the groundwater samples collected from the Site. Of these compounds, fifteen were detected at concentrations that exceeded the NYSDEC groundwater standards or guidance values. Ten of these metals are EPA priority pollutant metals. The priority pollutant metals exceeding the groundwater standards or guidance values include arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, and thallium (Table F-5).

Sulfate and sulfide were also detected in groundwater at the Former Barker Chemical Site at significant concentrations. Concentrations of sulfate ranged from 32,100 to 3,400,000 µg/L, and was detected in every sample (Table F-5). Concentrations of sulfide ranged from 43.0 to 2,470,000 µg/L, and was detected in 7 of 10 groundwater samples (Table F-5).

3.0 CONTEMPLATED USE

The Former Barker Chemical property has remained largely vacant since the early 1970s, and the property is now abandoned. Niagara County is interested in foreclosing on the property and having it redeveloped for commercial use.

4.0 PURPOSE AND DESCRIPTION OF THE SURFACE COVER SYSTEM

Following the stabilization of the South Lagoon during the EPA removal action, the area was capped with at least one foot of clay and one foot of topsoil within the original confines of the lagoon (Figure F-2). The cap was graded to promote surface water runoff into the Central Drainage Ditch and North Lagoon. The final cap was hydro seeded to provide a vegetative cover. The purpose of the surface cover system was to eliminate the potential for human contact with contaminated waste material in the South Lagoon and to eliminate the potential for contaminated runoff from the property. In addition, EPA placed topsoil within the confines of the Filled Lagoon area to enrich the existing soil (Figure F-2). This topsoil layer may provide some protection against direct contact exposures with waste in this lagoon, but is not a true surface cover system.

5.0 MANAGEMENT OF SOILS/WASTE AND MAINTENANCE OF THE COVER SYSTEM

The purpose of this section is to provide environmental guidelines for the management of contaminated soils and waste, and the maintenance of the cover system during any future intrusive work that generates excavated soil and/or waste or breaches the cover system. The Excavation Work Plan includes the following conditions:

- Any breach of the cover system, including for the purposes of construction or utilities work, must be replaced or repaired using an acceptable borrow source free of industrial and/or other potential sources of chemical or petroleum contamination. The repaired area must be covered with at least one foot of clay and one foot of topsoil, and reseeded to prevent erosion;

- Control of surface erosion and run-off from the property at all times, including during construction activities. This includes proper maintenance of the vegetative cover established on the property;

- Soil or waste excavated at the Site that will be removed from the property must be managed, characterized, and properly disposed of in accordance with NYSDEC regulations and directives;

- Soil or waste excavated at the Site may be reused as backfill material on-site provided it contains no visual or olfactory evidence of contamination, and it is placed beneath a surface cover system as described in Section 4.0;

- Any off-site fill material brought to the Site for backfilling and grading purposes shall be from an acceptable borrow source free of industrial and/or other potential sources of chemical or petroleum contamination. Off-site borrow sources should be subject to collection of one representative composite sample per source. The sample should be analyzed for Target Compound List (TCL) VOCs, TCL SVOCs, TCL pesticides, TCL PCBs, and Target Analyte List (TAL) metals plus cyanide. The soil will be acceptable for use as cover material provided that all parameters meet the NYSDEC recommended commercial soil cleanup objectives included in Part 375-6.7(d) for Imported Backfill;

- Prior to any construction activities, workers are to be notified of the Site conditions with clear instructions regarding how the work is to proceed. Invasive work performed at the property will be performed in accordance with all applicable local, state, and federal regulations to protect worker health and safety; and

- The Owner shall complete and submit to the NYSDEC an annual report by January 15th of each year. Such annual report shall certify that the surface cover system has been maintained, and that the conditions at the Site are protective of public health and the environment. If excavation work has been performed during the year covered by that Annual Report, the owner of the property shall include in the annual report a certification that all excavation work was performed in conformance with this Excavation Work Plan.

5.1 EXCAVATED AND STOCKPILED SOIL/FILL DISPOSAL

Soil or waste that is excavated as part of Site development that cannot be used as fill below the cover system or elsewhere on Site will be further characterized prior to transportation off-site for disposal at a permitted facility. For excavated soil or waste with visual evidence of contamination (i.e., staining or elevated PID measurements), one composite sample and a duplicate sample will be collected for each 100 cubic yards of stockpiled material. For excavated soil or waste that does not exhibit visual evidence of contamination but must be sent for off-site disposal, one composite sample and a duplicate sample will be collected for each 2,000 cubic yards of stockpiled material (a minimum of 1 sample will be collected for volumes less than 2,000 cubic yards).

The composite sample will be collected from five locations within each stockpile. A duplicate composite sample will also be collected. PID measurements will be recorded for each of the five individual locations. One grab sample will be collected from the individual location with the highest PID measurement. If none of the five individual samples exhibit PID readings, one location will be selected at random. The composite sample will be analyzed by a NYSDOH ELAP-certified laboratory for pH (EPA Method 9045C), TCL SVOCs, TCL pesticides, TCL PCBs, TAL metals, cyanide and sulfur. The grab sample will be analyzed for TCL VOCs. Other analyses may be required by the disposal facility.

Samples will be composited by placing equal portions of soil or waste from each of the five composite sample locations into a pre-cleaned, stainless steel (or Pyrex glass) mixing bowl. The soil or waste will be thoroughly homogenized using a stainless steel scoop or trowel and transferred to pre-cleaned jars provided by the laboratory. Sample jars will then be labeled and a chain-of-custody form will be prepared.

To potentially reduce off-site disposal requirements and costs, the owner or Site developer may also choose to characterize each stockpile individually.

If the analytical results indicate that concentrations exceed the standards for RCRA characteristics, the material will be considered a hazardous waste and must be properly disposed off-site at a permitted disposal facility within 90 days of excavation. If the analytical results indicate that the soil or waste is not a hazardous waste, the material will be properly disposed off-site at a non-hazardous waste facility. Stockpiled soil or waste cannot be transported on or off-site until the analytical results are received.

5.2 SUBGRADE MATERIAL

Subgrade material used to backfill excavations or placed to increase Site grades or elevations shall meet the following criteria:

- Excavated on-site soil or waste that appears to be visually impacted shall be sampled and analyzed. If analytical results indicate that the contaminants, if any, are present at concentrations below the appropriate recommended soil cleanup objectives of Part 375, and also below 10,000 parts per million (ppm) sulfur, the soil or waste can be used as backfill on-site;

- Any off-site fill material brought to the Site for backfilling and grading purposes shall be from an acceptable borrow source free of industrial and/or other potential sources of chemical or petroleum contamination;

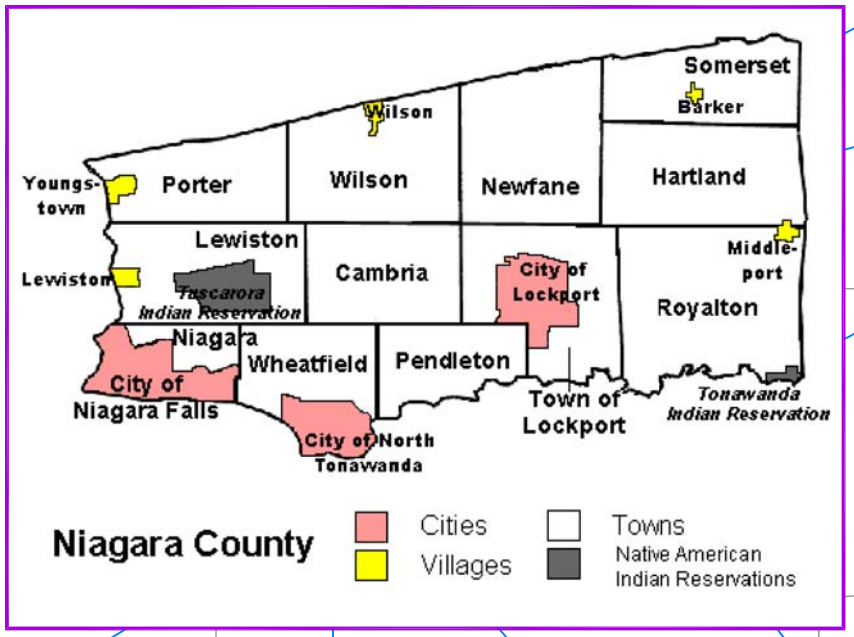
- Off-site soils intended for use as Site backfill cannot otherwise be defined as a solid waste in accordance with 6 NYCRR Part 360-1.2(a);

- If the contractor designates a source as virgin soil, it shall be further documented in writing to be native soil material from areas not having supported any known

prior industrial or commercial development or agricultural use;

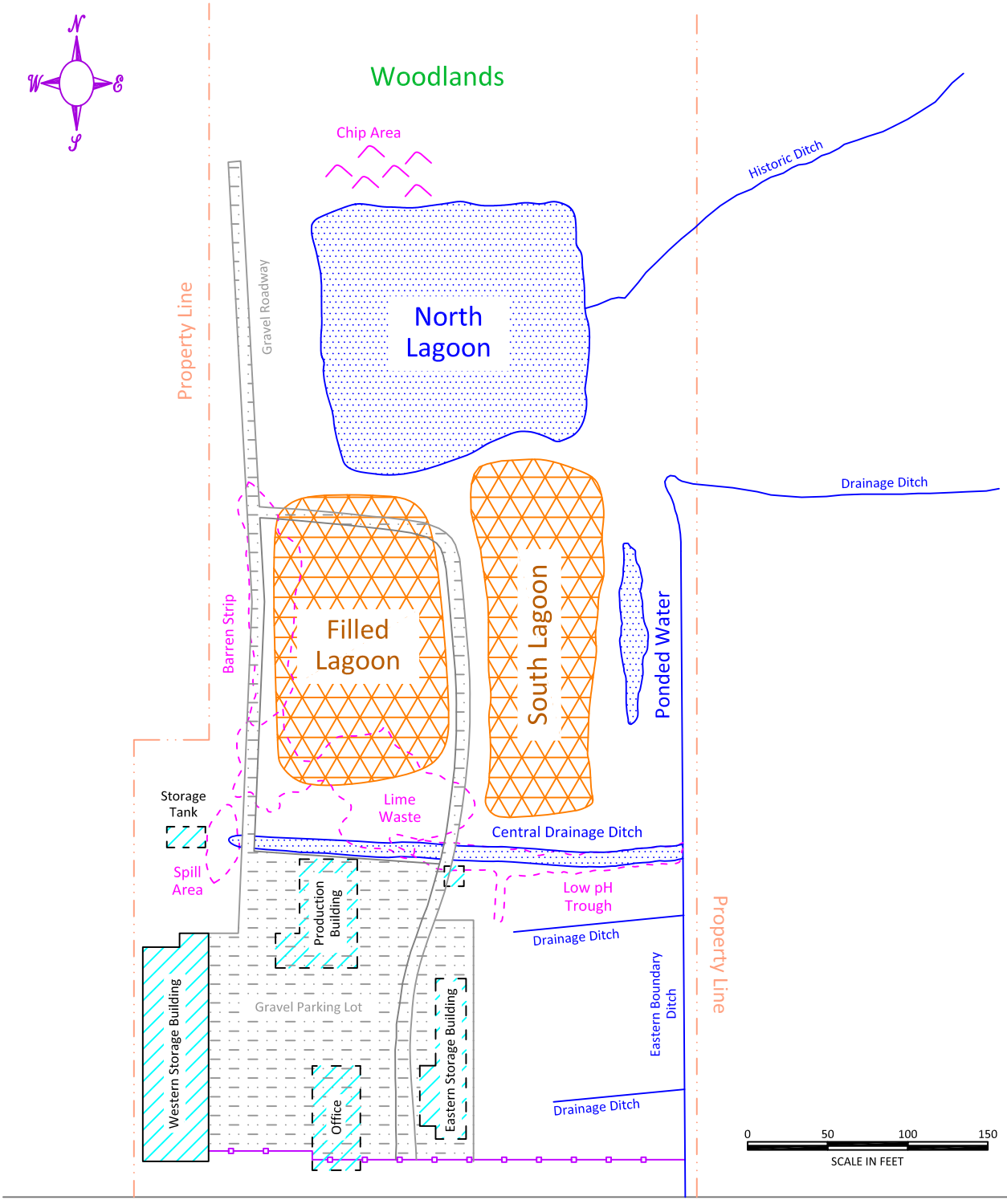
- Virgin soils shall be subject to the collection of one representative composite sample per source. The sample will be analyzed for TCL VOCs, TCL SVOCs, TCL pesticides, TCL PCBs, arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver, and cyanide. The soil will be acceptable for use as backfill provided that all parameters meet the appropriate recommended soil cleanup objectives of Part 375; and

- Non-virgin soils will be tested via collection of one composite sample per 500 cubic yards of material from each source area. If more than 1,000 cubic yards of soil are borrowed from a given off-site non-virgin soil source area and both samples of the first 1,000 cubic yards meet the appropriate recommended soil cleanup objectives of Part 375, the sample collection frequency will be reduced to one composite for every 2,500 cubic yards of additional soils from the same source, up to 5,000 cubic yards. For borrow sources greater than 5,000 cubic yards, sampling frequency may be reduced to one sample per 5,000 cubic yards, provided all earlier samples met the appropriate recommended soil cleanup objectives of Part 375.



SCALE DEPENDS ON FINAL PLOTTED SIZE

SITE LOCATION MAP	
DIVISION OF ENVIRONMENTAL REMEDIATION	
DATE: 08/14/03	DRAWING: Site Location Map.dwg
SITE NAME: BARKER CHEMICAL SITE	FIGURE F-1

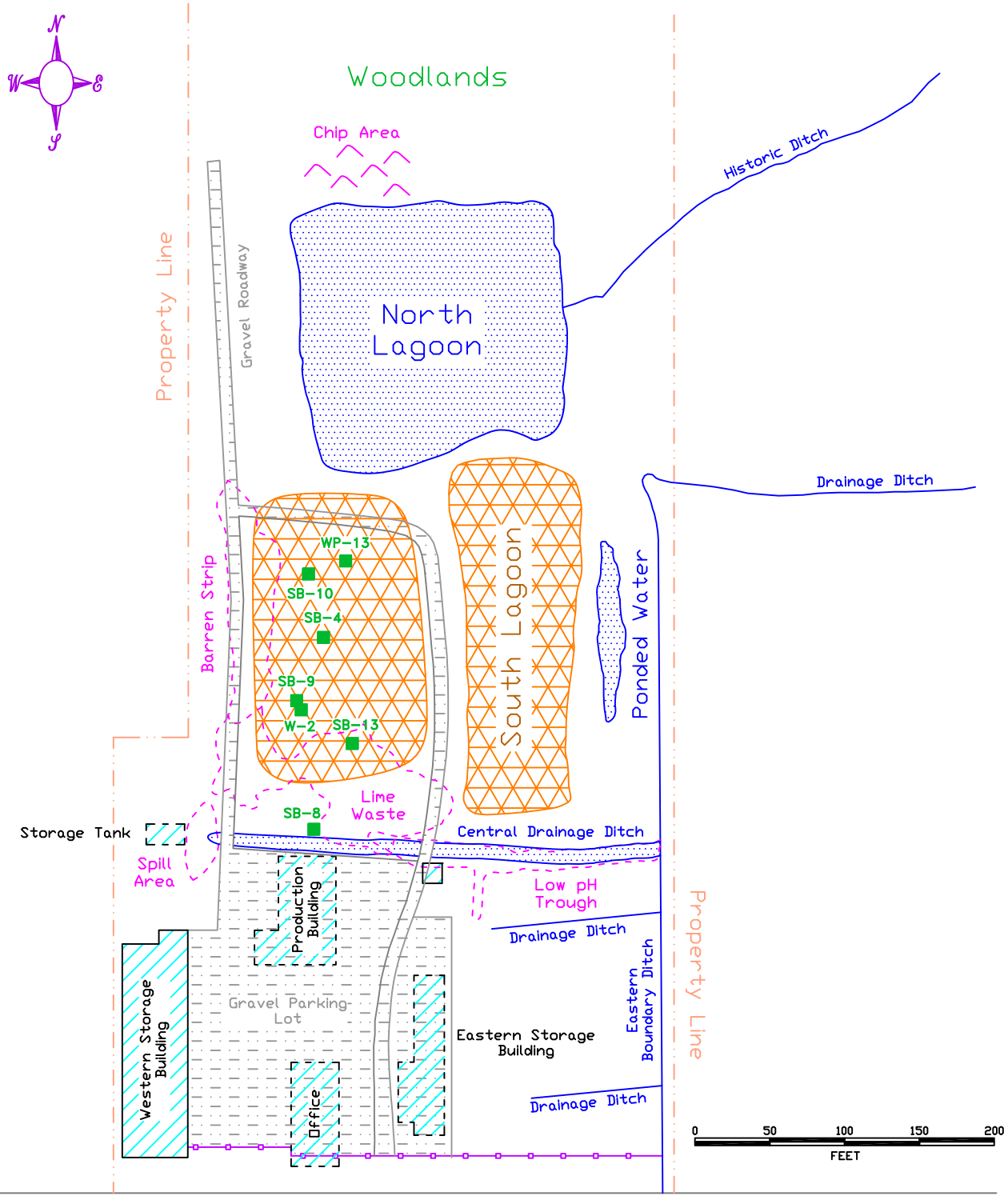


BARKER CHEMICAL SITE MAP

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 06/06/03 DRAWING: Barker.dwg

SITE: BARKER CHEMICAL SITE FIGURE F-2



LEGEND:

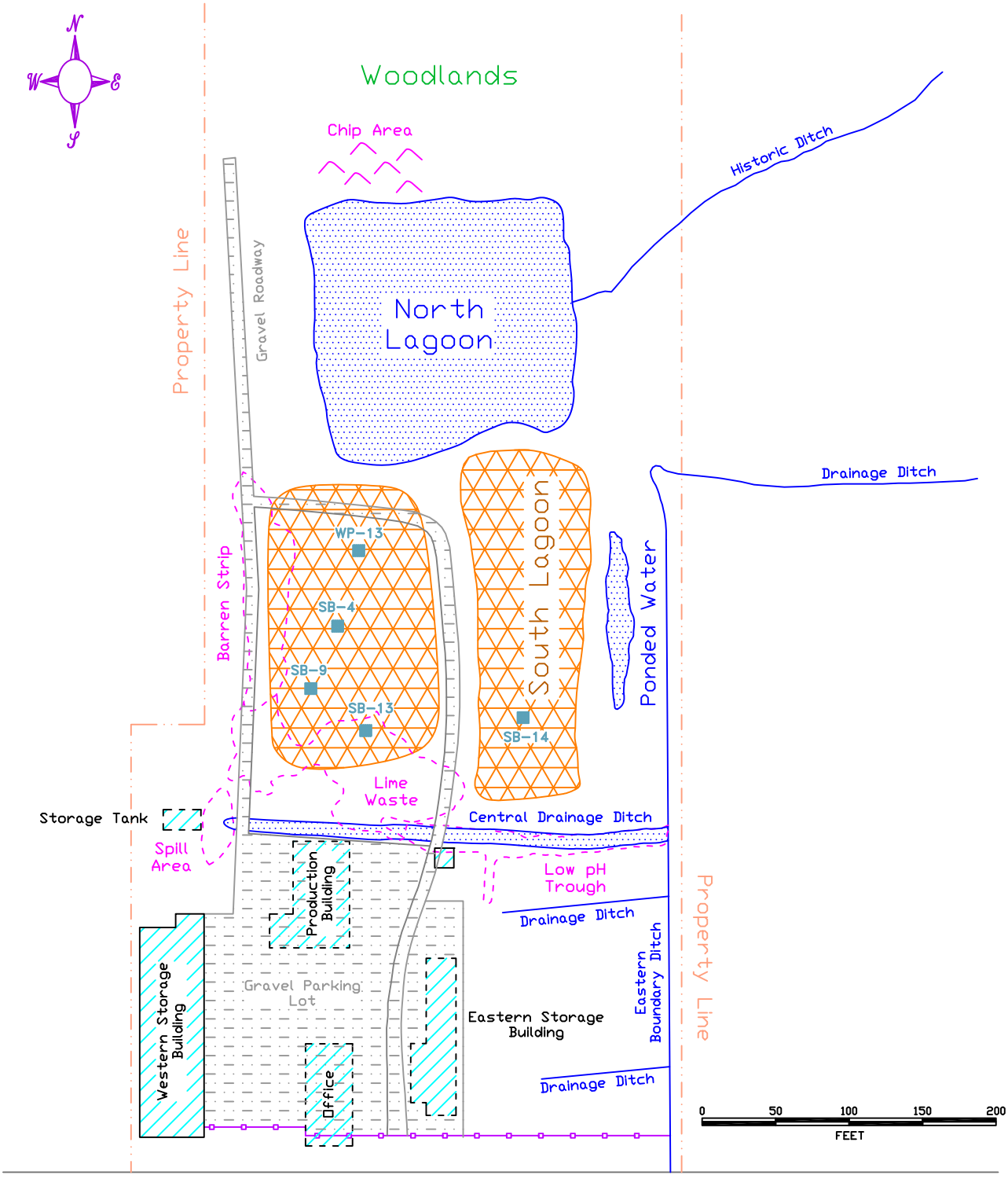
■ LIME WASTE SAMPLE LOCATION

LIME WASTE SAMPLE LOCATION MAP

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 12/24/08 DRAWING: Section 6.dwg

SITE: BARKER CHEMICAL SITE FIGURE F-3



LEGEND:

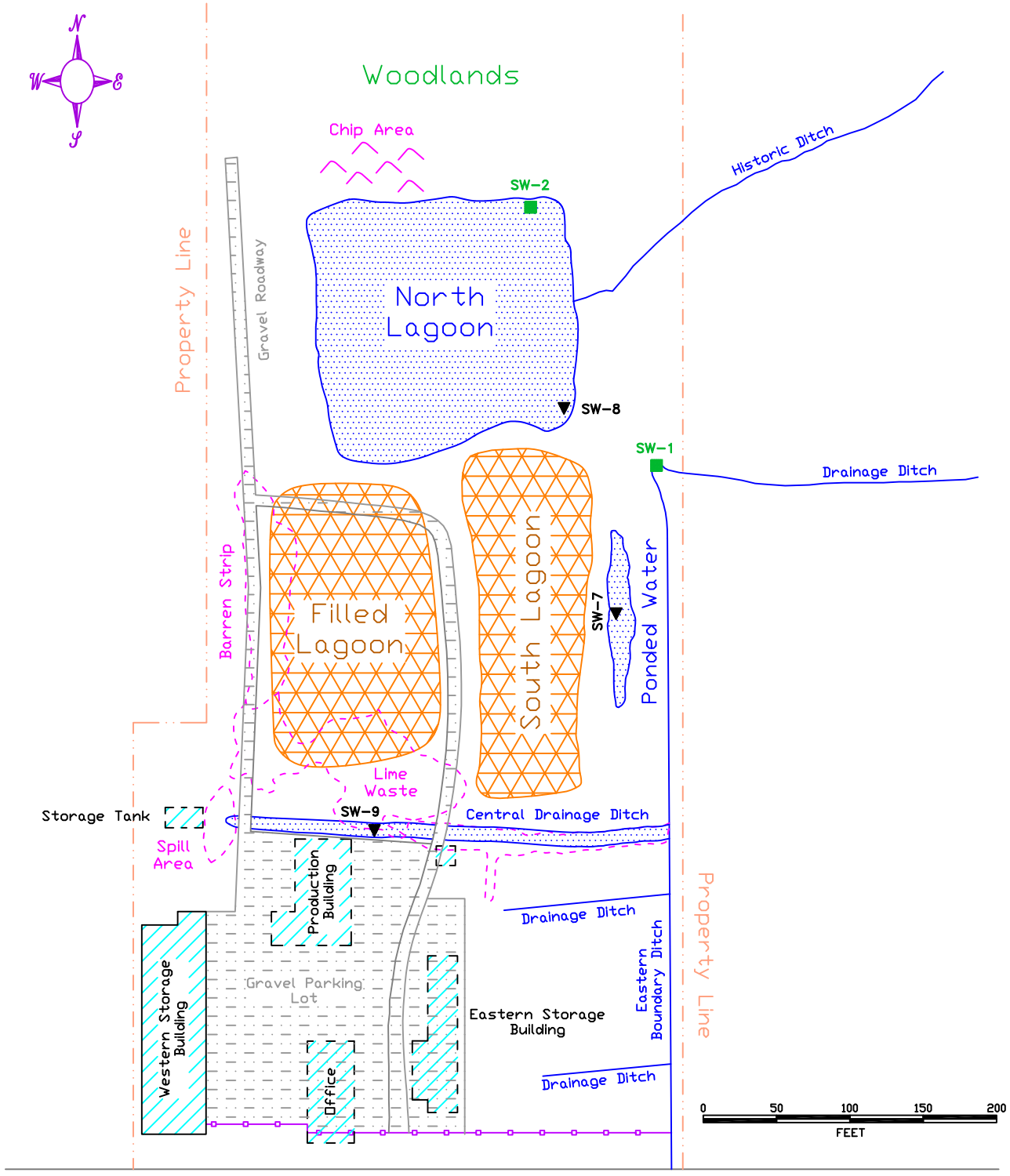
■ SLUDGE SAMPLE LOCATION

SLUDGE SAMPLE LOCATION MAP

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 12/24/08 DRAWING: Section 6.dwg

SITE: BARKER CHEMICAL SITE FIGURE F-4



LEGEND:

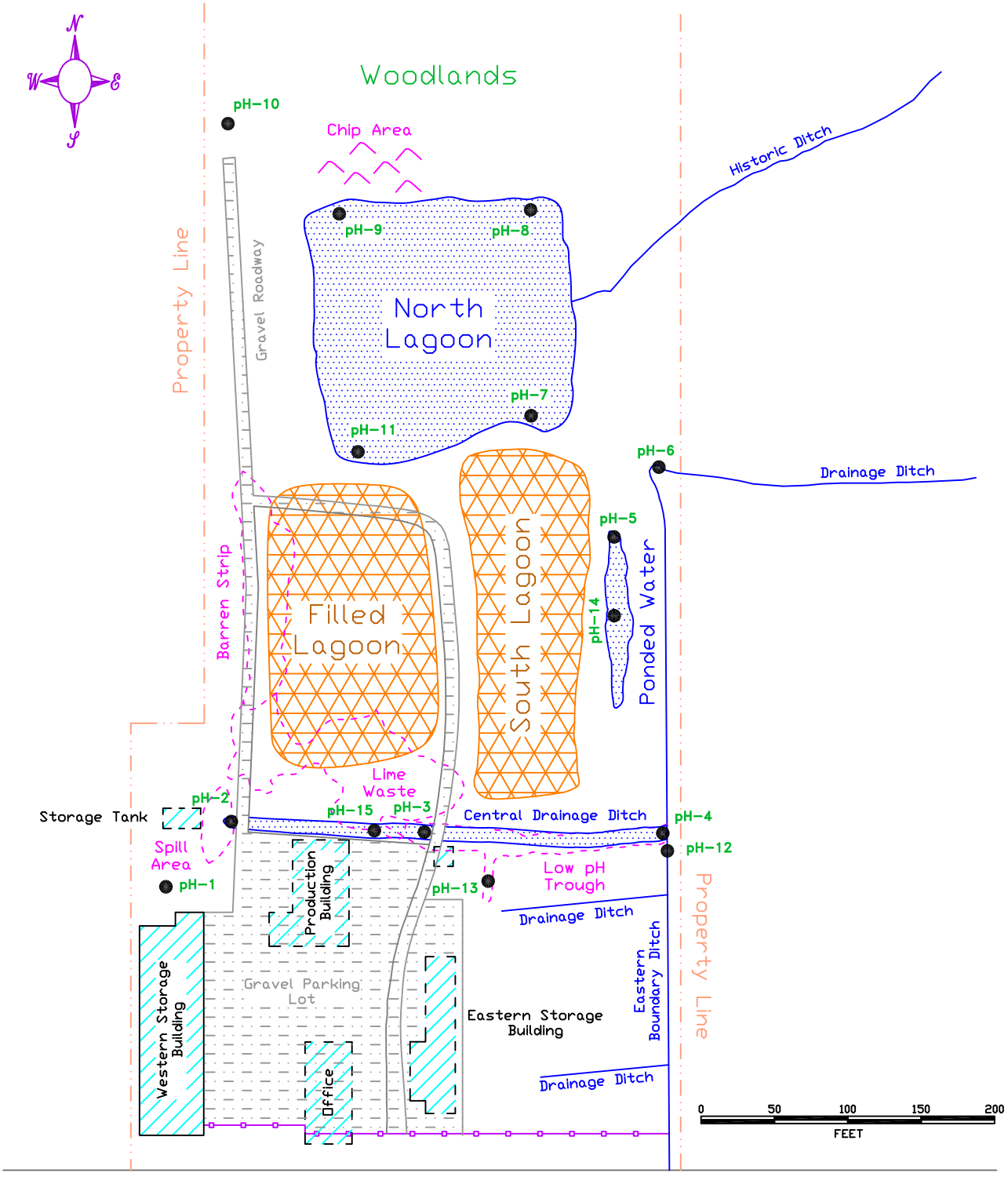
- ▼ 2008 Surface Water Sample (NYSDEC)
- ■ 2012 Surface Water Sample (LaBella)

SURFACE WATER SAMPLE LOCATION MAP

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 03/31/15 DRAWING: Section 3.dwg

SITE: BARKER CHEMICAL SITE FIGURE F-5



LEGEND:

- pH MEASUREMENT LOCATION

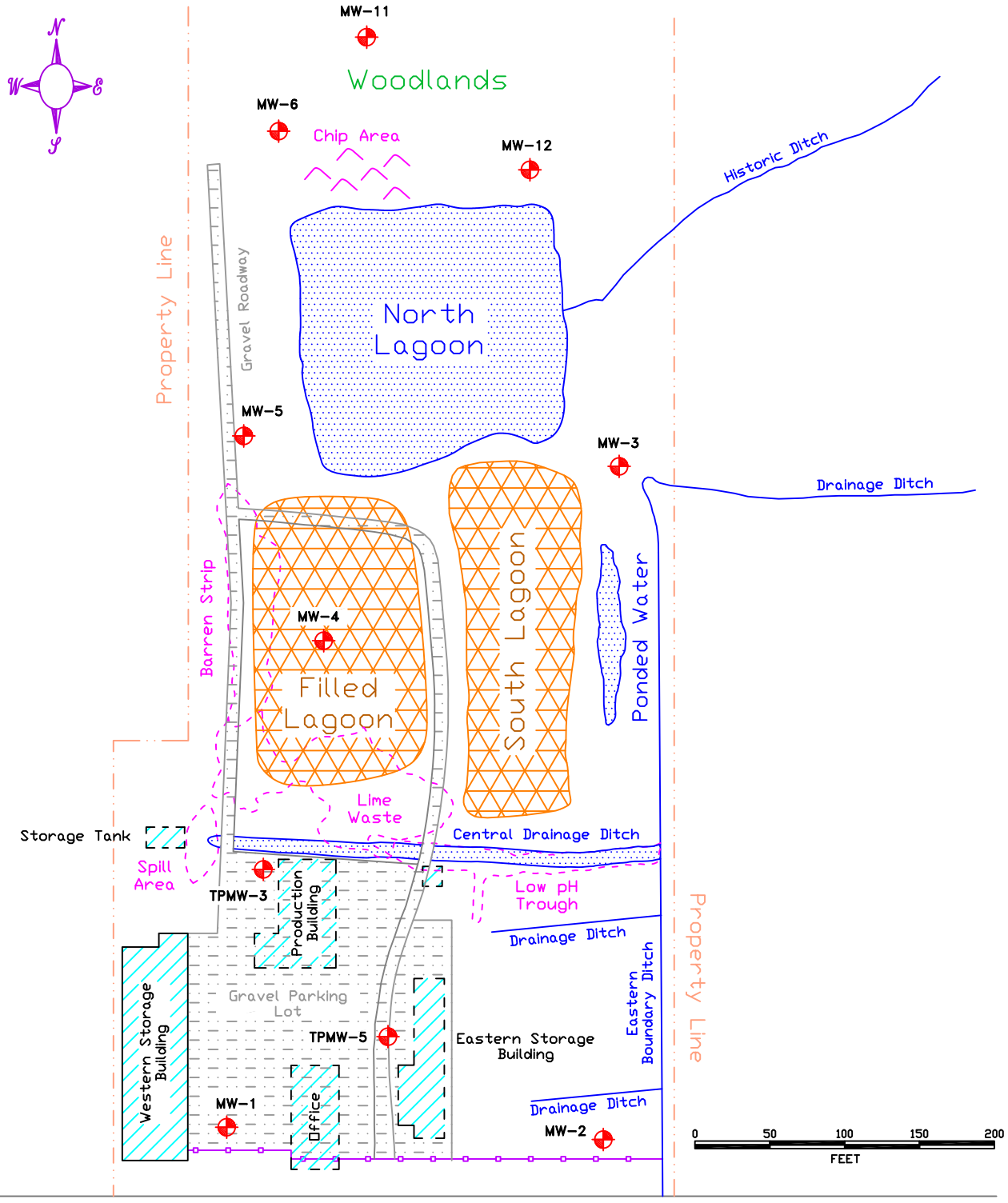
pH MEASUREMENT LOCATION MAP

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 05/05/08 | DRAWING: Section 3.dwg

SITE: BARKER CHEMICAL SITE

FIGURE F-6



LEGEND:

MONITORING WELL LOCATION

MONITORING WELL LOCATION MAP

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 03/31/15 DRAWING: Section 3.dwg

SITE: BARKER CHEMICAL SITE FIGURE F-7

Table F-1
Former Barker Chemical Site, Site No. 932119
Analytical Results for the Lime Waste Samples Collected from the Filled Lagoon

Sample Number Date Sampled Depth Interval (ft) Sample Location	NYSDEC Part 375 Unrestricted SCO *	NYSDEC Part 375 Commercial SCO *	W-2 12/17/99 2.0' Filled Lagoon	WP-13 06/21/00 0.0' - 2.4' Filled Lagoon	SB-4 05/21/03 0.0' - 4.0' Filled Lagoon	SB-8 05/21/03 0.0' - 4.0' Filled Lagoon	SB-9 05/21/03 0.0' - 4.0' Filled Lagoon	SB-10 05/21/03 0.0' - 4.0' Filled Lagoon	SB-13 05/21/03 3.5' - 5.0' Filled Lagoon
Semivolatile Organic Compounds (µg/kg or ppb)									
Butylbenzylphthalate	NS	NS			14 J			17 J	
4',5-Dihydroxy-7-methoxyflavone	NS	NS			120 J			220 J	
Di-n-butylphthalate	NS	NS			19 J			20 J	
Fluoranthene	100,000	500,000						21 J	
Phenanthrene	100,000	500,000						37 J	
Pyrene	100,000	500,000						21 J	
Pesticides (µg/kg or ppb)									
Aldrin	5.0	680.0			ND (25)	ND (12)		ND (28)	ND (1,100)
alpha-BHC	20.0	3,400			ND (25)	3.0 J		ND (28)	**280 J**
delta-BHC	40.0	500,000			ND (25)	2.4 J		ND (28)	**250 J**
gamma-BHC (Lindane)	100.0	9,200			ND (25)	3.9 J		ND (28)	ND (1,100)
Chlordane	94.0	24,000			ND (120)	ND (61)		ND (140)	ND (5,400)
4,4'-DDD	3.3	92,000			ND (50)	ND (24)		**5.6 J**	**5,400 J**
4,4'-DDE	3.3	62,000			ND (50)	ND (24)		**17 J**	**670 J**
4,4'-DDT	3.3	47,000			ND (50)	ND (24)		**5.8 J**	**21,000**
Dieldrin	5.0	1,400			ND (50)	ND (24)		ND (56)	ND (2,100)
Endosulfan (I)	2,400	200,000			ND (50)	ND (24)		ND (56)	ND (2,100)
Endosulfan (II)	2,400	200,000			ND (50)	ND (24)		ND (56)	ND (2,100)
Endrin	14.0	89,000			ND (50)	ND (24)		ND (56)	ND (2,100)
Endrin Ketone	NS	NS			ND (50)	3.0 J		ND (56)	180 J
Heptachlor	42.0	15,000			ND (25)	ND (12)		ND (28)	ND (1,100)
Methoxychlor	NS	NS			ND (250)	3.3 J		ND (280)	250 J
Herbicides (µg/kg or ppb)									
2,4-D	NS	NS		3.4 JBP	ND (1,200)	ND (1,200)		ND (1,400)	ND (1,100)
2,4,5-TP (Silvex)	3,800	500,000		1.8 JBP	ND (500)	ND (490)		ND (560)	ND (430)
2,4,5-T	NS	NS		2.0 JBP	ND (500)	ND (490)		ND (560)	ND (430)

Table F-1
Former Barker Chemical Site, Site No. 932119
Analytical Results for the Lime Waste Samples Collected from the Filled Lagoon

Sample Number Date Sampled Depth Interval (ft) Sample Location	NYSDEC Part 375 Unrestricted SCO *	NYSDEC Part 375 Commercial SCO *	W-2 12/17/99 2.0' Filled Lagoon	WP-13 06/21/00 0.0' - 2.4' Filled Lagoon	SB-4 05/21/03 0.0' - 4.0' Filled Lagoon	SB-8 05/21/03 0.0' - 4.0' Filled Lagoon	SB-9 05/21/03 0.0' - 4.0' Filled Lagoon	SB-10 05/21/03 0.0' - 4.0' Filled Lagoon	SB-13 05/21/03 3.5' - 5.0' Filled Lagoon
Metals (mg/kg or ppm)									
Aluminum	NS	10,000 ●	2,950 E	4,350					
Arsenic ■	13.0	16.0	**16.1 N**	3.7 N	3.9	11.6	3.6	4.7	12.5
Beryllium ■	7.2	590.0	ND (0.30)	0.15 B	0.22 B	0.03 B	0.18 B	0.19 B	0.10 B
Cadmium ■	2.5	9.3	ND (0.21)	ND (0.042)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	0.09 B
Chromium ■	30.0	1,500	4.0	5.8	4.5 E	2.2 E	3.6 E	3.2 E	3.6 E
Cobalt	NS	30 **	0.76 B	0.3 B	0.77 B	0.4 B	0.76 B	0.69 B	0.39 B
Copper ■	50.0	270.0	**52.3 E**	3.4 N	6.0 E	**143.0 E**	6.2 E	7.4 E	6.8 E
Cyanide	27.0	27.0	ND (1.6)						
Iron	NS	2,000 **	**3,270 E**	**3,450**					
Lead ■	63.0	1,000	33.1	5.7 N	2.6	6.3	15.0	7.0	61.8
Manganese	1,600	10,000	88.3 N	56.6 N					
Mercury ■	0.18	2.8	ND (0.15)	0.032 BN	ND (0.007)	ND (0.007)	ND (0.008)	ND (0.009)	ND (0.007)
Nickel ■	30.0	310.0	2.5 B	2.2	3.0 BE	1.8 BE	2.6 BE	2.5 BE	1.6 BE
Vanadium	NS	100 **	3.6 B	5.8	4.7 BE	1.3 BE	3.3 BE	4.3 BE	1.8 BE
Zinc ■	109.0	10,000	15.1 E	7.4	7.4 E	4.1 E	18.5 E	37.3 E	18.9 E
Miscellaneous Compounds (mg/kg or ppm)									
Sulfur	NS	NS		352,000	18,000	22,000	22,000	10,000	24,000
Boron	NS	NS		10.4	1.4 B	0.44 B	1.6 B	3.2	1.3 B
Leachable pH (pH units)	≤2; ≥12.5	NS	6.70		7.06	3.34		7.01	7.54

Notes:

* = 6 NYCRR Part 375: Environmental Remediation Programs, Unrestricted and Commercial Soil Cleanup Objectives, NYSDEC, 2006.

** = Residential soil cleanup objective from Commissioner's Policy CP-51 entitled "Soil Cleanup Guidance", NYSDEC, 2010.

● = Protection of ecological resources soil cleanup objective from Commissioner's Policy CP-51 entitled "Soil Cleanup Guidance", NYSDEC, 2010.

■ = Environmental Protection Agency priority pollutant metal.

B = Analyte detected in the associated blank and the sample (organics); Value is greater than or equal to the instrument detection limit, but less than the contract required detection limit (inorganics).

E = Estimated concentration due to the presence of interference.

J = Compound reported at an estimated concentration below the reporting limit.

Table F-1
Former Barker Chemical Site, Site No. 932119
Analytical Results for the Lime Waste Samples Collected from the Filled Lagoon

Notes (continued):

N = Spike sample recovery is not within the quality control limits.
ND = Indicates that the compound was not detected at the method detection limit specified in parentheses.
NS = No standard or guidance value available.
P = There is a >25% difference between the analytical results on two GC columns. The lower value is reported.
SCO = Soil cleanup objective.
Blanks = The sample was not analyzed for the associated compound.
Shaded = Result exceeds the 6 NYCRR Part 375 Unrestriced Use Objectives.
Shaded = Result exceeds the 6 NYCRR Part 375 Commercial Use Objectives.
Shaded = Result exceeds the Commissioner's Policy CP-51 Residential Use Objectives.
Shaded = Result exceeds the Commissioner's Policy CP-51 Protection of Ecological Resources Objectives.

Table F-2
Former Barker Chemical Site, Site No. 932119
Analytical Results for the Sludge Samples Collected from the Lagoons

Sample Number Date Sampled Depth Interval (ft) Sample Location	NYSDEC Part 375 Unrestricted SCO *	NYSDEC Part 375 Commercial SCO *	WP-13 06/21/00 2.4' - 3.2' Filled Lagoon	SB-4 05/21/03 4.0' - 8.0' Filled Lagoon	SB-9 05/21/03 4.0' - 8.0' Filled Lagoon	SB-13 05/21/03 5.0' - 6.0' Filled Lagoon	SB-14 05/22/03 4.0' - 7.0' South Lagoon
Semivolatile Organic Compounds (µg/kg or ppb)							
Naphthalene	12,000	500,000		10 J			
Pesticides (µg/kg or ppb)							
Aldrin	5.0	680.0		ND (19)			ND (14)
alpha-BHC	20.0	3,400		ND (19)			ND (14)
delta-BHC	40.0	500,000		ND (19)			ND (14)
gamma-BHC (Lindane)	100.0	9,200		ND (19)			ND (14)
Chlordane	94.0	24,000		ND (94)			ND (68)
4,4'-DDD	3.3	92,000		ND (38)			**3.8 J**
4,4'-DDE	3.3	62,000		ND (38)			**35.0**
4,4'-DDT	3.3	47,000		ND (38)			ND (27)
Dieldrin	5.0	1,400		ND (38)			ND (27)
Endosulfan (I)	2,400	200,000		ND (38)			ND (27)
Endosulfan (II)	2,400	200,000		ND (38)			ND (27)
Endrin	14.0	89,000		ND (38)			ND (27)
Endrin Ketone	NS	NS		ND (38)			ND (27)
Heptachlor	42.0	15,000		ND (19)			ND (14)
Methoxychlor	NS	NS		ND (190)			ND (140)
Herbicides (µg/kg or ppb)							
2,4-D	NS	NS	9.0 JB	ND (920)		ND (1,200)	ND (1,400)
2,4,5-TP (Silvex)	3,800	500,000	1.1 JBP	ND (370)		ND (480)	ND (550)
2,4,5-T	NS	NS	3.1 JBP	ND (370)		ND (480)	ND (550)

Table F-2
Former Barker Chemical Site, Site No. 932119
Analytical Results for the Sludge Samples Collected from the Lagoons

Sample Number Date Sampled Depth Interval (ft) Sample Location	NYSDEC Part 375 Unrestricted SCO *	NYSDEC Part 375 Commercial SCO *	WP-13 06/21/00 2.4' - 3.2' Filled Lagoon	SB-4 05/21/03 4.0' - 8.0' Filled Lagoon	SB-9 05/21/03 4.0' - 8.0' Filled Lagoon	SB-13 05/21/03 5.0' - 6.0' Filled Lagoon	SB-14 05/22/03 4.0' - 7.0' South Lagoon
Metals (mg/kg or ppm)							
Aluminum	NS	10,000 ●	1,960				
Arsenic ■	13.0	16.0	3.3 N	3.7	2.3	4.5	3.5
Beryllium ■	7.2	590.0	0.089 B	0.34 B	0.29 B	0.24 B	0.57 B
Cadmium ■	2.5	9.3	ND (0.045)	ND (0.04)	ND (0.04)	ND (0.05)	ND (0.05)
Chromium ■	30.0	1,500	2.4	11.0 E	9.3 E	7.4 E	21.0
Cobalt	NS	30 **	ND (0.1)	5.9 B	4.9 B	3.7 B	4.2 B
Copper ■	50.0	270.0	2.8 N	15.5 E	13.0 E	11.6 E	17.3
Iron	NS	2,000 **	1,770				
Lead ■	63.0	1,000	3.7 N	3.6	3.0	6.6	6.4
Manganese	1,600	10,000	146 N				
Mercury ■	0.18	2.8	0.031 BN	ND (0.006)	0.024	0.124	ND (0.008)
Nickel ■	30.0	310.0	1.9	10.6 E	9.5 E	8.0 E	11.7
Vanadium	NS	100 **	3.3	18.4 E	16.8 E	12.6 E	18.8
Zinc ■	109.0	10,000	7.0	25.2 E	23.5 E	24.8 E	39.6
Miscellaneous Compounds (mg/kg or ppm)							
Sulfur	NS	NS	551,000	8,200	7,700	23,000	22,000
Boron	NS	NS	14.6	2.5	4.5	3.0	13.5
Leachable pH (pH units)	≤2; ≥12.5	NS		9.65			

Notes:

* = 6 NYCRR Part 375: Environmental Remediation Programs, Unrestricted and Commercial Soil Cleanup Objectives, NYSDEC, 2006.

** = Residential soil cleanup objective from Commissioner's Policy CP-51 entitled "Soil Cleanup Guidance", NYSDEC, 2010.

● = Protection of ecological resources soil cleanup objective from Commissioner's Policy CP-51 entitled "Soil Cleanup Guidance", NYSDEC, 2010.

■ = Environmental Protection Agency priority pollutant metal.

B = Analyte detected in the associated blank and the sample (organics); Value is greater than or equal to the instrument detection limit, but less than the contract required detection limit (inorganics).

E = Estimated concentration due to the presence of interference.

J = Compound reported at an estimated concentration below the reporting limit.

Table F-2
Former Barker Chemical Site, Site No. 932119
Analytical Results for the Sludge Samples Collected from the Lagoons

Notes (continued):

N = Spike sample recovery is not within the quality control limits.
ND = Indicates that the compound was not detected at the method detection limit specified in parentheses.
NS = No standard or guidance value available.
P = There is a >25% difference between the analytical results on two GC columns. The lower value is reported.
SCO = Soil cleanup objective.
Blanks = The sample was not analyzed for the associated compound.
Shaded = Result exceeds the 6 NYCRR Part 375 Unrestriced Use Objectives.
Shaded = Result exceeds the 6 NYCRR Part 375 Commercial Use Objectives.
Shaded = Result exceeds the Commissioner's Policy CP-51 Residential Use Objectives.
Shaded = Result exceeds the Commissioner's Policy CP-51 Protection of Ecological Resources Objectives.

Table F-3
Former Barker Chemical Site, Site No. 932119
Analytical Results for Surface Water Samples Collected from the Site

Sample Number Date Sampled Sample Location	Surface Water Standard *	SW-7 04/30/08 Ponded Water	SW-8 05/01/08 North Lagoon	SW-2 06/13/12 North Lagoon	SW-9 04/30/08 Low Ph Trough	SW-1 06/13/12 Eastern Ditch
Volatile Organic Compounds (µg/L or ppb)						
Acetone	50 G	22.0	ND (5.0)	ND (5.0)	5.3	ND (5.0)
2-Butanone	50 G	2.6 J	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)
Carbon Disulfide	NS	2.2	ND (1.0)	ND (5.0)	0.63 J	ND (5.0)
Toluene	5.0	ND (1.0)	0.67 J	ND (5.0)	ND (1.0)	ND (5.0)
Semivolatile Organic Compounds (µg/L or ppb)						
Pentachlorophenol	1.0	ND (10.0)	ND (10.0)	ND (20.0)	**12.0**	ND (20.0)
Phenol	1.0	ND (5.0)	ND (5.0)	ND (10.0)	**5.0**	ND (10.0)
Pesticides (µg/L or ppb)						
Aldrin	0.002 G	ND (0.051)	ND (0.048)	ND (0.05)	ND (0.25)	ND (0.05)
alpha-BHC	0.01	ND (0.051)	ND (0.048)	ND (0.05)	**1.1**	ND (0.05)
beta-BHC	0.04	ND (0.051)	ND (0.048)	ND (0.05)	**0.19 J**	ND (0.05)
delta-BHC	0.04	ND (0.051)	ND (0.048)	ND (0.05)	**0.27**	ND (0.05)
gamma-BHC (Lindane)	0.05	ND (0.051)	0.025 J	ND (0.05)	**1.2**	ND (0.05)
Chlordane	0.05	0.026 J	ND (0.048)	ND (0.05)	ND (0.25)	ND (0.05)
4,4'-DDD	0.30	0.020 J	0.024 J	ND (0.10)	ND (0.25)	ND (0.10)
4,4'-DDE	0.20	0.018 J	0.030 J	ND (0.10)	0.11 J	ND (0.10)
4,4'-DDT	0.20	0.046 J	ND (0.048)	ND (0.10)	ND (0.25)	ND (0.10)
Dieldrin	0.002 G	**0.017 J**	ND (0.048)	ND (0.10)	**0.11 J**	ND (0.10)
Endosulfan (I)	0.009	ND (0.051)	ND (0.048)	ND (0.05)	ND (0.25)	ND (0.05)
Endosulfan (II)	0.009	ND (0.051)	ND (0.048)	ND (0.10)	**0.19 J**	ND (0.10)
Endrin	0.20	ND (0.051)	ND (0.048)	ND (0.10)	ND (0.25)	ND (0.10)
Endrin Ketone	5.0 G	ND (0.051)	0.0095 J	ND (0.10)	0.10 J	ND (0.10)
Heptachlor	0.04	0.028 J	0.014 J	ND (0.05)	**0.086 J**	ND (0.05)
Methoxychlor	35.0	ND (0.051)	ND (0.048)	ND (0.50)	ND (0.25)	ND (0.50)

Table F-3
Former Barker Chemical Site, Site No. 932119
Analytical Results for Surface Water Samples Collected from the Site

Sample Number Date Sampled Sample Location	Surface Water Standard *	SW-7 04/30/08 Ponded Water	SW-8 05/01/08 North Lagoon	SW-2 06/13/12 North Lagoon	SW-9 04/30/08 Low Ph Trough	SW-1 06/13/12 Eastern Ditch
Metals (µg/L or ppb)						
Aluminum	100.0	**57,400 N**	**1,030 N**	**4,200**	**2,970 N**	**340.0**
Arsenic ■	50.0	14.4 N	ND (10.0)	4.3 B	**106 N**	ND (4.3)
Barium	1,000	15.3 N	56.8 N	56.9 B	61.1 N	93.1 B
Beryllium ■	3.0 G	**5.8 N**	ND (2.0)	ND (0.26)	ND (2.0)	ND (0.26)
Cadmium ■	5.0	1.6	ND (1.0)	ND (0.89)	ND (1.0)	ND (0.89)
Calcium	NS	281,000	91,100	81,400	291,000	95,800
Chromium ■	50.0	5.1 N	ND (4.0)	6.6 B	4.0 N	0.67 B
Cobalt	5.0	**92.3 N**	ND (4.0)	3.4 B	**6.9 N**	0.76 B
Copper ■	200.0	16.8 N	ND (10.0)	12.7 B	50.3 N	5.4 B
Iron	300.0	**104,000 N**	**1,520 N**	**6,490**	**17,900 N**	**1,090**
Lead ■	50.0	5.2 N	ND (5.0)	6.3 B	19.1 N	ND (4.2)
Magnesium	35,000	**68,200 E**	13,100 E	24,400	**102,000 E**	18,800
Manganese	300.0	**14,100 N**	**476 N**	**694.0**	**2,340 N**	**430.0**
Mercury ■	0.7	ND (0.2)	ND (0.2)	ND (0.028)	ND (0.2)	ND (0.028)
Nickel ■	100.0	**144 N**	ND (10.0)	8.2 B	16.4 N	1.5 B
Potassium	NS	3,630 EN	8,620 EN	4,500	6,820 EN	4,650
Silver ■	50.0	ND (3.0)	ND (3.0)	ND (6.9)	ND (3.0)	ND (6.9)
Sodium	NS	8,370	3,730	4,180	62,000	44,100
Vanadium	14.0	10.8 N	ND (5.0)	7.8 B	ND (5.0)	ND (1.1)
Zinc ■	2,000 G	260 N	11.1 N	41.8 B	99.3 N	7.6 B
Miscellaneous Compounds (µg/L or ppb)						
Sulfate	250,000	**2,600,000**	118,000	210,000	**1,270,000**	92,000
Sulfide	2.0	**1,200**	ND (1,000)	**400.0**	**3,200**	ND (30)
pH (Standard Units)	6.5-8.5	**3.30**	7.02	7.07	**3.21**	7.17

Notes:
* = NYSDEC Ambient Water Quality Standards and Guidance Values, June 1998.
■ = Environmental Protection Agency priority pollutant metal.

Table F-3
Former Barker Chemical Site, Site No. 932119
Analytical Results for Surface Water Samples Collected from the Site

Notes (continued):

B = Value is greater than or equal to the instrument detection limit, but less than the contract required detection limit (inorganics).
E = Estimated concentration due to the presence of interference.
G = Guidance value.
J = Compound reported at an estimated concentration below the reporting limit.
N = Spike sample recovery is not within the quality control limits.
ND = Indicates that the compound was not detected at the method detection limit specified in parentheses.
NS = No standard or guidance value available.
Shaded = Result equals or exceeds the NYSDEC surface water standards or guidance values.

Table F-4
Former Barker Chemical Site, Site No. 932119
Summary of pH and Temperature Measurements of Surface Water at the Site

Location Number	Date	pH	Temp (^{O}F)	Comments
Spill Area				
pH-1	04/16/08	6.81	49.1	
"	05/22/08	7.21	52.3	
"	06/25/08	NM	NM	not measured because location was dry
pH-2	04/16/08	6.77	52.9	
"	05/22/08	7.05	54.2	
"	06/25/08	NM	NM	not measured because location was dry
Central Drainage Ditch and Low pH Trough				
pH-15	04/30/08	3.21	68.2	
"	05/22/08	3.04	57.4	
"	06/25/08	NM	NM	not measured because location was dry
pH-3	04/16/08	5.91	55.6	
"	04/30/08	6.32	66.1	
"	05/22/08	6.53	NM	
"	06/25/08	NM	NM	not measured because location was dry
pH-13	04/16/08	5.72	48.7	
"	05/22/08	5.31	NM	
"	06/25/08	NM	NM	not measured because location was dry
pH-4	04/16/08	6.25	48.1	
"	05/22/08	6.55	NM	
"	06/25/08	NM	NM	not measured because location was dry
Ponded Water Area				
pH-5	04/16/08	3.39	49.0	
"	04/30/08	3.30	61.0	
"	05/22/08	3.48	NM	
"	06/25/08	3.18	NM	
pH-14	04/16/08	3.75	50.8	
"	04/30/08	3.30	61.0	
"	05/22/08	3.24	NM	
"	06/25/08	3.15	NM	
Eastern Boundary Ditch				
pH-6	04/16/08	7.31	48.4	
"	05/22/08	7.24	NM	
"	06/25/08	6.74	NM	
"	06/13/12	7.17	NM	
pH-12	04/16/08	7.16	50.2	
"	05/22/08	7.37	NM	
"	06/25/08	6.88	NM	

Table F-4
Former Barker Chemical Site, Site No. 932119
Summary of pH and Temperature Measurements of Surface Water at the Site

Location Number	Date	pH	Temp (^{O}F)	Comments
North Lagoon				
pH-7	04/16/08	7.01	52.1	
"	05/01/08	7.02	60.4	
"	05/22/08	7.32	NM	
"	06/25/08	7.20	NM	
"	06/13/12	7.26	NM	
pH-8	04/16/08	6.92	50.6	
"	05/22/08	7.49	NM	
"	06/25/08	6.90	NM	
"	06/13/12	7.07	NM	
pH-9	04/16/08	7.15	51.9	
"	05/22/08	7.37	NM	
"	06/25/08	7.01	NM	
pH-11	04/16/08	7.04	51.2	
"	05/22/08	7.27	NM	
"	06/25/08	7.18	NM	
"	06/13/12	7.36	NM	
Chip Area				
pH-10	04/16/08	5.92	49.3	
"	05/22/08	7.81	NM	
"	06/25/08	NM	NM	not measured because location was dry

Notes:
NM = Not measured.

Table F-5
Former Barker Chemical Site, Site No. 932119
Analytical Results for Groundwater Samples Collected from the Site

Sample Number Date Sampled Sample Location	Groundwater Standard *	MW-1 04/30/08 Well 1	MW-2 04/30/08 Well 2	MW-3 04/30/08 Well 3	MW-3 06/15/12 Well 3	MW-4 04/30/08 Well 4	MW-5 04/30/08 Well 5
Volatile Organic Compounds (µg/L or ppb)							
Acetone	50 G	ND (5.0)	ND (5.0)	**92.0**	NA	21.0	30.0
Benzene	1.0	ND (1.0)	ND (1.0)	0.87 J	"	ND (1.0)	ND (1.0)
2-Butanone	50 G	ND (5.0)	ND (5.0)	**59.0**	"	4.9 J	12.0
Carbon Disulfide	NS	ND (1.0)	ND (1.0)	93.0	"	15.0	1.5
Chlorobenzene	5.0	ND (1.0)	ND (1.0)	ND (1.0)	"	ND (1.0)	**6.5**
1,2-Dichloroethane	0.6	ND (1.0)	ND (1.0)	ND (1.0)	"	ND (1.0)	ND (1.0)
cis-1,2-Dichloroethene	5.0	ND (1.0)	0.77 J	0.50 J	"	ND (1.0)	ND (1.0)
1,2-Dichloropropane	5.0	ND (1.0)	ND (1.0)	ND (1.0)	"	ND (1.0)	ND (1.0)
Ethylbenzene	5.0	ND (1.0)	ND (1.0)	ND (1.0)	"	ND (1.0)	ND (1.0)
Isopropylbenzene	5.0	ND (1.0)	ND (1.0)	ND (1.0)	"	ND (1.0)	ND (1.0)
n-Propylbenzene	5.0	NA	NA	NA	"	NA	NA
Toluene	5.0	ND (1.0)	0.75 J	0.60 J	"	ND (1.0)	0.59 J
1,2,4-Trichlorobenzene	5.0 G	ND (1.0)	0.64 J	ND (1.0)	"	ND (1.0)	ND (1.0)
1,3,5-Trimethylbenzene	5.0	NA	NA	NA	"	NA	NA
1,2,4-Trimethylbenzene	5.0	NA	NA	NA	"	NA	NA
Xylene (Total)	5.0	ND (3.0)	ND (3.0)	ND (3.0)	"	ND (3.0)	ND (3.0)
Semivolatile Organic Compounds (µg/L or ppb)							
Acenaphthene	20 G	NA	NA	NA	NA	ND (5.0)	NA
Carbazole	NS	"	"	"	"	ND (5.0)	"
Dibenzofuran	NS	"	"	"	"	ND (5.0)	"
2,4-Dichlorophenol	5.0	"	"	"	"	ND (5.0)	"
Fluorene	50 G	"	"	"	"	ND (5.0)	"
2-Methylnaphthalene	NS	"	"	"	"	ND (5.0)	"
Naphthalene	10 G	"	"	"	"	ND (5.0)	"
Pentachlorophenol	1.0	"	"	"	"	ND (10.0)	"
Phenanthrene	50 G	"	"	"	"	ND (5.0)	"
Phenol	1.0	"	"	"	"	ND (5.0)	"

Table F-5
Former Barker Chemical Site, Site No. 932119
Analytical Results for Groundwater Samples Collected from the Site

Sample Number Date Sampled Sample Location	Groundwater Standard *	MW-1 04/30/08 Well 1	MW-2 04/30/08 Well 2	MW-3 04/30/08 Well 3	MW-3 06/15/12 Well 3	MW-4 04/30/08 Well 4	MW-5 04/30/08 Well 5
Pesticides (µg/L or ppb)							
Aldrin	ND	ND (0.051)	ND (0.077)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
alpha-BHC	0.01	ND (0.051)	ND (0.077)	**0.029 J**	ND (0.050)	ND (0.050)	ND (0.050)
beta-BHC	0.04	ND (0.051)	ND (0.077)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
delta-BHC	0.04	ND (0.051)	ND (0.077)	0.025 J	ND (0.050)	ND (0.050)	ND (0.050)
gamma-BHC (Lindane)	0.05	ND (0.051)	ND (0.077)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
Chlordane	0.05	0.039 J	0.025 J	0.030 J	ND (0.050)	0.038 J	0.029 J
4,4'-DDD	0.3	0.022 J	ND (0.077)	ND (0.050)	ND (0.10)	ND (0.050)	0.024 J
4,4'-DDE	0.2	0.043 J	ND (0.077)	ND (0.050)	ND (0.10)	ND (0.050)	0.028 J
4,4'-DDT	0.2	ND (0.051)	ND (0.077)	ND (0.050)	ND (0.10)	ND (0.050)	ND (0.050)
Dieldrin	0.004	ND (0.051)	ND (0.077)	ND (0.050)	ND (0.10)	ND (0.050)	**0.028 J**
Endosulfan (I)	NS	ND (0.051)	ND (0.077)	ND (0.050)	ND (0.050)	0.032 J	ND (0.050)
Endosulfan (II)	NS	ND (0.051)	ND (0.077)	ND (0.050)	ND (0.10)	ND (0.050)	ND (0.050)
Endrin	ND	ND (0.051)	ND (0.077)	ND (0.050)	ND (0.10)	ND (0.050)	ND (0.050)
Endrin Ketone	5.0	ND (0.051)	ND (0.077)	ND (0.050)	ND (0.10)	0.011 J	ND (0.050)
Heptachlor	0.04	ND (0.051)	ND (0.077)	0.020 J	ND (0.050)	0.016 J	ND (0.050)
Heptachlor Epoxide	0.03	0.016 J	ND (0.077)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
Methoxychlor	35.0	ND (0.051)	ND (0.077)	ND (0.050)	ND (0.50)	ND (0.050)	ND (0.050)
Metals (µg/L or ppb)							
Aluminum	NS	33,000 N	64,600 N	5,460 N	NA	586 N	90,300 N
Antimony ■	3.0	ND (100)	ND (100)	ND (20.0)	"	ND (20.0)	ND (20.0)
Arsenic ■	25.0	10.9 N	**31.1 N**	**365 N**	"	10.4 N	**65.2 N**
Barium	1,000	482 N	798 N	234 N	"	107 N	**1,090 N**
Beryllium ■	3.0 G	ND (2.0)	2.7 N	**3.8 N**	"	ND (2.0)	**6.2 N**
Cadmium ■	5.0	2.2	1.8	ND (20.0)	"	ND (1.0)	ND (1.0)
Calcium	NS	238,000	508,000	6,870,000	"	663,000	4,500,000
Chromium ■	50.0	**96.6 N**	**106 N**	11.8 N	"	ND (4.0)	**149 N**
Cobalt	NS	ND (4.0)	33.0 N	ND (4.0)	"	ND (4.0)	72.1 N

Table F-5
Former Barker Chemical Site, Site No. 932119
Analytical Results for Groundwater Samples Collected from the Site
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Sample Number Date Sampled Sample Location	Groundwater Standard *	MW-1 04/30/08 Well 1	MW-2 04/30/08 Well 2	MW-3 04/30/08 Well 3	MW-3 06/15/12 Well 3	MW-4 04/30/08 Well 4	MW-5 04/30/08 Well 5
Metals (continued)							
Copper ■	200.0	85.8 N	141 N	ND (10.0)	NA	ND (10.0)	**218 N**
Iron	500.0	**39,900 N**	**102,000 N**	**9,140 N**	"	**13,800 N**	**165,000 N**
Lead ■	25.0	**25.8 N**	**29.4 N**	ND (100)	"	ND (5.0)	**45.5 N**
Magnesium	35,000 G	**66,900 E**	**65,600 E**	**189,000 E**	"	**315,000 E**	**376,000 E**
Manganese	300.0	**11,300 N**	**8,080 N**	**540 N**	"	**2,470 N**	**13,500 N**
Mercury ■	0.7	ND (0.2)	ND (0.2)	ND (1.2)	"	ND (0.2)	ND (0.4)
Nickel ■	100.0	74.8 N	97.4 N	ND (10.0)	"	ND (10.0)	**141 N**
Potassium	NS	11,700 EN	21,000 EN	7,790 EN	"	6,550 EN	31,300 EN
Selenium ■	10.0	ND (15.0)	ND (15.0)	ND (15.0)	"	ND (15.0)	ND (15.0)
Silver ■	50.0	ND (3.0)	ND (3.0)	12.4 N	"	ND (3.0)	5.6 N
Sodium	20,000	**50,400**	19,700	**78,500**	"	12,800	**139,000**
Thallium ■	0.5 G	ND (100)	ND (100)	ND (20.0)	"	ND (20.0)	ND (20.0)
Vanadium	NS	53.0 N	132 N	17.9 N	"	ND (5.0)	207 N
Zinc ■	2,000 G	476.0 N	319 N	ND (200)	"	ND (10.0)	319 N
Miscellaneous Compounds (µg/L or ppb)							
Sulfate	250,000	**434,000**	32,100	**1,210,000**	NA	**1,450,000**	**1,660,000**
Sulfide	50 G	ND (1,000)	ND (1,000)	**2,470,000**	"	**46,000**	**1,590,000**
pH (Standard Units)	6.5-8.5	7.09	7.57	7.63	6.47	7.85	6.53

Table F-5
Former Barker Chemical Site, Site No. 932119
Analytical Results for Groundwater Samples Collected from the Site

Sample Number **Date Sampled** **Sample Location**	**Groundwater Standard ***	**MW-5** **06/15/12** **Well 5**	**MW-6** **04/30/08** **Well 6**	**MW-12** **04/30/08** **Well 12**	**TPMW-3** **06/15/12** **Temp Well 3**	**TPMW-5** **06/15/12** **Temp Well 5**	
Volatile Organic Compounds (µg/L or ppb)							
Acetone	50 G	NA	7.4	4.0 J	ND (5.0)	3.0 J	
Benzene	1.0	"	ND (1.0)	ND (1.0)	**1.2 J**	ND (5.0)	
2-Butanone	50 G	"	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	
Carbon Disulfide	NS	"	ND (1.0)	ND (1.0)	14.0	ND (5.0)	
Chlorobenzene	5.0	"	ND (1.0)	ND (1.0)	ND (5.0)	ND (5.0)	
1,2-Dichloroethane	0.6	"	ND (1.0)	ND (1.0)	**2.7 J**	ND (5.0)	
cis-1,2-Dichloroethene	5.0	"	ND (1.0)	ND (1.0)	ND (5.0)	ND (5.0)	
1,2-Dichloropropane	5.0	"	ND (1.0)	ND (1.0)	**13.0**	ND (5.0)	
Ethylbenzene	5.0	"	ND (1.0)	ND (1.0)	**34.0**	ND (5.0)	
Isopropylbenzene	5.0	"	ND (1.0)	ND (1.0)	1.0 J	ND (5.0)	
n-Propylbenzene	5.0	"	NA	NA	2.4 J	ND (5.0)	
Toluene	5.0	"	ND (1.0)	ND (1.0)	ND (5.0)	ND (5.0)	
1,2,4-Trichlorobenzene	5.0 G	"	ND (1.0)	ND (1.0)	ND (5.0)	ND (5.0)	
1,3,5-Trimethylbenzene	5.0	"	NA	NA	**5.4**	ND (5.0)	
1,2,4-Trimethylbenzene	5.0	"	NA	NA	**19.0**	ND (5.0)	
Xylene (Total)	5.0	"	ND (3.0)	ND (3.0)	**31.2**	ND (5.0)	
Semivolatile Organic Compounds (µg/L or ppb)							
Acenaphthene	20 G	NA	NA	NA	6.0 J	ND (10.0)	
Carbazole	NS	"	"	"	2.3 J	ND (10.0)	
Dibenzofuran	NS	"	"	"	2.9 J	ND (10.0)	
2,4-Dichlorophenol	5.0	"	"	"	1.9 J	ND (10.0)	
Fluorene	50 G	"	"	"	2.5 J	ND (10.0)	
2-Methylnaphthalene	NS	"	"	"	13.0	ND (10.0)	
Naphthalene	10 G	"	"	"	**190 E**	ND (10.0)	
Pentachlorophenol	1.0	"	"	"	ND (20.0)	ND (20.0)	
Phenanthrene	50 G	"	"	"	2.2 J	ND (10.0)	
Phenol	1.0	"	"	"	ND (10.0)	ND (10.0)	

Table F-5
Former Barker Chemical Site, Site No. 932119
Analytical Results for Groundwater Samples Collected from the Site

Sample Number **Date Sampled** **Sample Location**	**Groundwater Standard ***	**MW-5** **06/15/12** **Well 5**	**MW-6** **04/30/08** **Well 6**	**MW-12** **04/30/08** **Well 12**	**TPMW-3** **06/15/12** **Temp Well 3**	**TPMW-5** **06/15/12** **Temp Well 5**	
Pesticides (µg/L or ppb)							
Aldrin	ND	ND (0.050)	ND (0.047)	ND (0.050)	ND (0.050)	ND (0.050)	
alpha-BHC	0.01	ND (0.050)	ND (0.047)	ND (0.050)	**0.10 P**	ND (0.050)	
beta-BHC	0.04	ND (0.050)	ND (0.047)	ND (0.050)	ND (0.050)	ND (0.050)	
delta-BHC	0.04	ND (0.050)	ND (0.047)	ND (0.050)	ND (0.050)	ND (0.050)	
gamma-BHC (Lindane)	0.05	ND (0.050)	ND (0.047)	ND (0.050)	ND (0.050)	ND (0.050)	
Chlordane	0.05	ND (0.050)	0.040 J	ND (0.050)	ND (0.050)	ND (0.050)	
4,4'-DDD	0.3	ND (0.10)	0.022 J	ND (0.050)	0.25	ND (0.10)	
4,4'-DDE	0.2	ND (0.10)	0.034 J	ND (0.050)	ND (0.10)	ND (0.10)	
4,4'-DDT	0.2	ND (0.10)	ND (0.047)	ND (0.050)	ND (0.10)	ND (0.10)	
Dieldrin	0.004	ND (0.10)	**0.032 J**	ND (0.050)	ND (0.10)	ND (0.10)	
Endosulfan (I)	NS	ND (0.050)	ND (0.047)	ND (0.050)	ND (0.050)	ND (0.050)	
Endosulfan (II)	NS	ND (0.10)	0.029 J	ND (0.050)	0.18 P	ND (0.10)	
Endrin	ND	ND (0.10)	ND (0.047)	ND (0.050)	ND (0.10)	ND (0.10)	
Endrin Ketone	5.0	ND (0.10)	ND (0.047)	ND (0.050)	ND (0.10)	ND (0.10)	
Heptachlor	0.04	ND (0.050)	ND (0.047)	ND (0.050)	ND (0.050)	ND (0.050)	
Heptachlor Epoxide	0.03	ND (0.050)	ND (0.047)	ND (0.050)	**0.11**	ND (0.050)	
Methoxychlor	35.0	ND (0.50)	ND (0.047)	ND (0.050)	ND (0.50)	ND (0.50)	
Metals (µg/L or ppb)							
Aluminum	NS	275,000	62,100 N	269,000 N	236,000	32,100	
Antimony ■	3.0	ND (9.3)	ND (20.0)	ND (20.0)	ND (9.3)	ND (9.3)	
Arsenic ■	25.0	**202.0**	20.5 N	**82.1 N**	**103.0**	**90.4**	
Barium	1,000	**2,120**	569 N	**2,700 N**	782.0	779.0	
Beryllium ■	3.0 G	**9.6**	**3.5 N**	**11.7 N**	**12.7**	1.6 B	
Cadmium ■	5.0	2.6 B	2.1	ND (1.0)	**21.4**	ND (0.89)	
Calcium	NS	576,000	1,160,000	1,620,000	655,000	714,000	
Chromium ■	50.0	**460.0**	**89.9 N**	**435 N**	**247.0**	**68.0**	
Cobalt	NS	216.0	14.4 N	178 N	61.8	34.4 B	

Table F-5
Former Barker Chemical Site, Site No. 932119
Analytical Results for Groundwater Samples Collected from the Site

Sample Number Date Sampled Sample Location	Groundwater Standard *	MW-5 06/15/12 Well 5	MW-6 04/30/08 Well 6	MW-12 04/30/08 Well 12	TPMW-3 06/15/12 Temp Well 3	TPMW-5 06/15/12 Temp Well 5	
Metals (continued)							
Copper ■	200.0	**953.0**	112 N	**467 N**	**868.0**	**299.0**	
Iron	500.0	**617,000**	**83,000 N**	**381,000 N**	**892,000**	**59,400**	
Lead ■	25.0	**127.0**	**27.4 N**	**107 N**	**125.0**	292.0	
Magnesium	35,000 G	**666,000**	**272,000 E**	**213,000 E**	**185,000**	**150,000**	
Manganese	300.0	**29,200**	**4,610 N**	**16,400 N**	**25,200**	**8,230**	
Mercury ■	0.7	**1.7**	**0.99**	**2.5**	**0.81**	0.24	
Nickel ■	100.0	466.0	75.8 N	**388 N**	**158.0**	59.7	
Potassium	NS	28,800	16,700 EN	43,200 EN	49,600	11,000	
Selenium ■	10.0	**45.8**	ND (15.0)	ND (15.0)	**15.7 B**	ND (12.0)	
Silver ■	50.0	ND (6.9)	ND (3.0)	ND (3.0)	ND (6.9)	ND (6.9)	
Sodium	20,000	**159,000**	**102,000**	10,200	**31,900**	19,700	
Thallium ■	0.5 G	**27.9**	ND (200)	ND (200)	**26.0**	**7.5 B**	
Vanadium	NS	508.0	107 N	497 N	371.0	63.5	
Zinc ■	2,000 G	954.0	194 N	959 N	1,140	233.0	
Miscellaneous Compounds (µg/L or ppb)							
Sulfate	250,000	**1,700,000**	**2,570,000**	**1,650,000**	**3,400,000**	**520,000**	
Sulfide	50 G	43.0	ND (1,000)	**1,200**	**2,100**	**530.0**	
pH (Standard Units)	6.5-8.5	6.63	7.29	7.07	5.69	7.04	

Notes:
* = NYSDEC Ambient Water Quality Standards and Guidance Values, June 1998.
■ = Environmental Protection Agency priority pollutant metal.
B = Value is greater than or equal to the instrument detection limit, but less than the contract required detection limit (inorganics).
E = Estimated concentration due to the presence of interference.
G = Guidance value.
J = Compound reported at an estimated concentration below the reporting limit.
N = Spike sample recovery is not within the quality control limits.
NA = Not analyzed.
ND = Indicates that the compound was not detected at the method detection limit specified in parentheses.

Table F-5
Former Barker Chemical Site, Site No. 932119
Analytical Results for Groundwater Samples Collected from the Site

Notes (continued):

NS = No standard or guidance value available.

Blanks = The sample was not analyzed for the associated compound.

Shaded = Result equals or exceeds the NYSDEC surface water standards or guidance values.

APPENDIX G

SITE PHOTOGRAPHS

SITE CLEARING

Figure G-1. Photo showing vegetation across the southeastern portion of the Site prior to clearing. Photo taken by Glenn May on April 26, 2013. View looking east.

Figure G-2. Photo showing vegetation clearing across the southwestern portion of the Site. Photo taken by David Steiner on June 18, 2013. View looking north.

Figure G-3. Photo showing vegetation clearing across the southwestern portion of the Site. Photo taken by David Steiner on June 18, 2013. View looking north.

Figure G-4. Photo showing cleared vegetation across the southeastern portion of the Site. Photo taken by David Steiner on June 20, 2013. View looking east.

Figure G-5. Photo showing cleared vegetation along the Western Storage Building. Photo taken by David Steiner on June 20, 2013. View looking south.

Figure G-6. Photo showing cleared vegetation across the southern portion of the Site. Photo taken by David Steiner on June 20, 2013. View looking southeast.

Figure G-7. Photo showing cleared vegetation across the southeastern portion of the Site. Photo taken by David Steiner on June 20, 2013. View looking northeast.

SUBSURFACE INVESTIGATION

Figure G-8. Photo showing lime waste in a soil boring completed at the Site. Photo taken by Glenn May on July 10, 2013.

Figure G-9. Photo showing black sludge in a soil boring completed at the Site. Photo taken by Glenn May on August 6, 2013.

Figure G-10. Photo showing native silty clay in a soil boring completed at the Site. Photo taken by Glenn May on July 16, 2013.

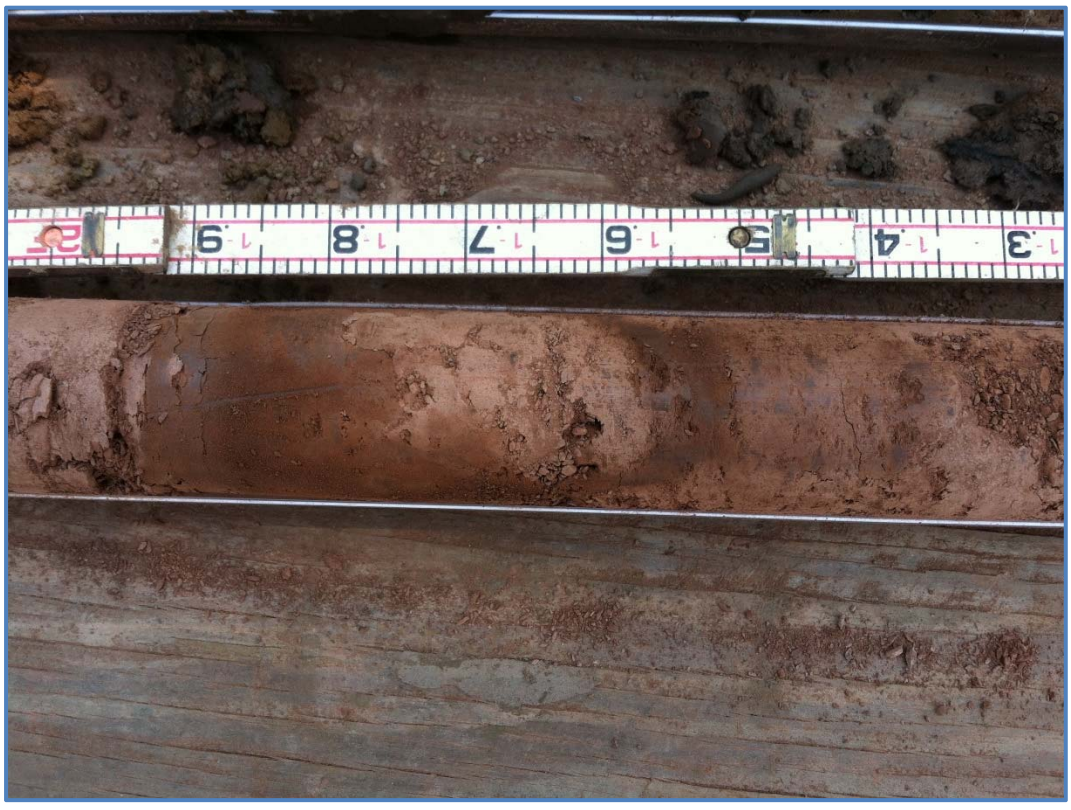

Figure G-11. Photo showing a close-up of the native silty clay at the Site. Photo taken by Glenn May on July 16, 2013.

Figure G-12. Photo showing mottling in native silty clay in a soil boring completed at the Site. Photo taken by Glenn May on August 5, 2013.

Figure G-13. Photo showing water bubbling in a completed soil boring. This water eventually rose to the surface. Photo taken by Glenn May on July 12, 2013.

SITE REMEDIATION

Figure G-14. Photo showing the start of excavation activities at grid B4. Photo taken by Empire personnel on February 26, 2014. View looking east.

Figure G-15. Photo showing the completed excavation at grid B4. Photo taken by Empire personnel on February 26, 2014. View looking northeast.

Figure G-16. Photo showing the completed excavation at grids B3 and B4. Photo taken by Empire personnel on February 27, 2014. View looking south.

Figure G-17. Photo showing the completed excavation at grid A6. Photo taken by Empire personnel on March 3, 2014. View looking east-northeast.

Figure G-18. Photo showing the completed excavation along row C. Photo taken by Empire personnel on March 3, 2014. View looking east.

Figure G-19. Photo showing partial backfilling of the excavation. Photo taken by Empire personnel on March 6, 2014. View looking west.

Figure G-20. Photo showing the completed excavation at grid G0 and the undesignated grid. Photo taken by Empire personnel on March 11, 2014. View looking southeast.

Figure G-21. Photo showing the completed excavation at grids F1 and E2. Photo taken by Empire personnel on March 11, 2014. View looking northeast.

Figure G-22. Photo showing completed backfilling of the excavation. Photo taken by Empire personnel on March 21, 2014. View looking southwest.

Figure G-23. Photo showing completed backfilling of the excavation. Photo taken by Empire personnel on March 21, 2014. View looking east.

Figure G-24. Photo showing completed backfilling of the excavation. Photo taken by Empire personnel on March 21, 2014. View looking east.

Figure G-25. Photo showing completed backfilling of the excavation. Photo taken by Empire personnel on March 21, 2014. View looking southwest.