The Village of Cold Spring

Putnam County, New York

FINAL

Site Investigation / Remedial Alternatives Report
Cold Spring Former Manufactured Gas Plant Site
Cold Spring, NY

NYSDEC ERP Site No. E3-40-026

October 2009

Dvirka
and
Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Dvirka and Bartilucci
CONSULTING ENGINEERS

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October 9, 2009

Mayor Seth Gallagher
Village of Cold Spring
85 Main Street
Cold Spring, NY 10516

Re: Environmental Restoration Project
Cold Spring Former MGP Site
Final Site Investigation/Remedial Alternatives Report
NYSDEC ERP Site No. E3-40-26
D&B No. 2820

Dear Mayor Gallagher:

Dvirka and Bartilucci Consulting Engineers (D&B) is pleased to provide you with two copies of the following final document for your records, entitled:

"Site Investigation/Remedial
Alternatives Report
Cold Spring Former MGP Site
Cold Spring, New York
October 2009"

This report addresses all comments presented to D&B by the New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH) concerning the draft report provided to these agencies in April 2009. In addition, copies of the final report has been mailed to the following project document repositories:

Village Hall
85 Main Street
Cold Spring, NY 10516

Butterfield Library
10 Morris Avenue
Cold Spring, NY 10516

NYSDEC, Region III Office
21 South Putt Corners Road
New Paltz, NY 12561

A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

As we discussed previously, D&B can meet with you to discuss this project at your convenience. If you have any questions and/or comments regarding the enclosed, please do not hesitate to contact me at (516) 364-9890, Ext. 3068.

Very truly yours,

Thomas P. Fox, P.G.
Vice President

TPF/jmy
Enclosures
cc: W. Ottaway (NYSDEC) – 1 copy, 1 CD
A. Perretta (NYSDOH) – 1 copy, 1 CD
R. Walka (D&B)
♦2820\TPF09LTR.DOC-02(R02)

SITE INVESTIGATION/
REMEDIAL ALTERNATIVES REPORT
COLD SPRING FORMER MANUFACTURED GAS PLANT SITE
COLD SPRING, NEW YORK

NYSDEC ERP SITE NO. E3-40-026

Prepared for:

VILLAGE OF COLD SPRING

Prepared by:

DVIRKA AND BARTILUCCI CONSULTING ENGINEERS
WOODBURY, NEW YORK

OCTOBER 2009

SITE INVESTIGATION/REMEDIAL ALTERNATIVES REPORT
COLD SPRING FORMER MANUFACTURED GAS PLANT SITE
COLD SPRING, NEW YORK

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EXECUTIVE SUMMARY

The Village of Cold Spring completed a Site Investigation and Remedial Alternatives analysis of the Cold Spring former Manufactured Gas Plant (MGP) site under the New York State Department of Environmental Conservation (NYSDEC) Environmental Restoration Program (ERP). This project was completed in accordance with the NYSDEC-approved Work Plan dated August 2008. The basic objectives of this project include:

- Identifying the nature and extent of contamination associated with the former MGP;
- Identifying the potential impacts of this contamination to human health and the environment; and
- Selecting appropriate remedial actions needed to address the site-related contamination.

This report provides a detailed description of the investigation scope, its findings and recommended remedial actions.

The site is owned by the Village of Cold Spring and is located at 5 New Street in the Village of Cold Spring, New York. The approximately 0.1-acre site is located immediately east of the Cold Spring Boat Club and approximately 250 feet east/southeast of the Hudson River. Historical background concerning the former MGP site is very limited, but it is assumed that the site was in operation from approximately 1868 to 1897. It is believed that the site was purchased by William and Gertrude Ladue in the early 20th century, who operated a lumber yard and supply depot on the waterfront. Between 1926 and 1928, the site was reorganized as part of the Cold Spring Lumber Company. The site was sold to the Village on October 3, 1967.

Based on the findings of the field investigation completed between September and November 2008, MGP tar and related chemical constituents have been identified in subsurface soil and groundwater within and downgradient (southwest) of the former MGP site. The most significant tar impacts are present to the south and southwest of the former gas holder in an area generally restricted to a Village of Cold Spring public parking lot and surrounding lawn areas.

Benzene, toluene, ethylbenzene and xylene (BTEX) and polycyclic aromatic hydrocarbons (PAHs) have been found at concentrations above NYSDEC unrestricted and commercial Soil Cleanup Objectives (SCOs) in this area. The MGP tar impacts do not appear to extend into adjacent residential properties located to the east. The most significant MGP tar impacts are located at least 2 feet below grade in the parking lot area and, therefore, direct exposure to this contamination is not expected under existing conditions. However, two surface soil samples collected from the southernmost portion of the Village parking lot were found to contain PAHs in excess of unrestricted and commercial SCOs.

MGP tar and related chemical constituents are present in subsurface soil extending from the former MGP site in a west/southwesterly direction consistent with the direction of groundwater flow. However, tar impacts are found at a minimum of 4 feet below grade in areas west of the Boat Club building and, therefore, direct exposure to these contaminants is not expected under current conditions. The vertical extent of tar impacts in downgradient areas appears to be limited to a maximum depth of 13 feet below grade. A low permeable clay unit present up to 20 feet thick in this area likely limits the vertical migration of the tar and tar-related contaminants. In general, BTEX and PAH concentrations are found at lower concentrations in these downgradient areas when compared to soil in the immediate vicinity of the former MGP.

BTEX and PAHs were detected in monitoring wells located downgradient (west to southwest) of the former MGP site at relatively low concentrations. Several contaminants exceeding NYSDEC groundwater standards were identified in the samples collected from monitoring wells GW-03 and GW-04. However, this groundwater is not utilized as a source of drinking water and direct exposure to these contaminants is not expected under current conditions. Based on a southwesterly flow of groundwater, it is likely that groundwater containing BTEX and PAHs will discharge to the Hudson River. However, sampling of river sediments performed by the NYSDEC did not identify these contaminants at significant concentrations.

Based on the data from the soil vapor intrusion study completed at the Cold Spring Boat Club building, underlying MGP-related contamination does not appear to be impacting the Boat Club’s indoor air via soil vapor intrusion.

Based on a detailed analysis of four different remedial alternatives, which is detailed in this report, it is recommended that the remediation of the Cold Spring former MGP site include the excavation of the most significant tar-impacted soil identified within the immediate vicinity of the former facility located west of the Cold Spring Boat Club building and within the Village of Cold Spring public parking lot. Excavation of this area would remove all remaining underground structures related to the former MGP site and would also remove contaminated surface soil found in the southern portion of the parking area. Using the information obtained during the site investigation, the estimated volume of contaminated soil to be excavated and disposed of off-site is approximately 3,300 cubic yards (in-place volume). The estimated volume is based on excavation of approximately 6,000 square feet to an average, but conservative, depth of approximately 15 feet below ground surface. After removal of this soil, clean fill from an off-site approved source would be used for backfilling the excavation.

Since only a portion of the MGP-impacted soil would be removed, engineering and institutional controls would be necessary under this recommendation. These institutional controls include establishment of an environmental easement, which would restrict any future use of the Village property to non-residential activities.

Although groundwater quality is expected to improve through the removal of contaminated soil and dewatering, some MGP-impacted soil would remain on the site and may continue to impact groundwater quality. Therefore, groundwater monitoring would also be included as part of this alternative. Monitoring would consist of periodic groundwater sampling to evaluate changes in groundwater contaminant concentrations and to ascertain the level of any natural attenuation which may occur. An operation, maintenance and monitoring plan that provides more detail regarding post-remediation monitoring would be prepared and submitted to NYSDEC for approval and would be included as part of the environmental easement for the site.

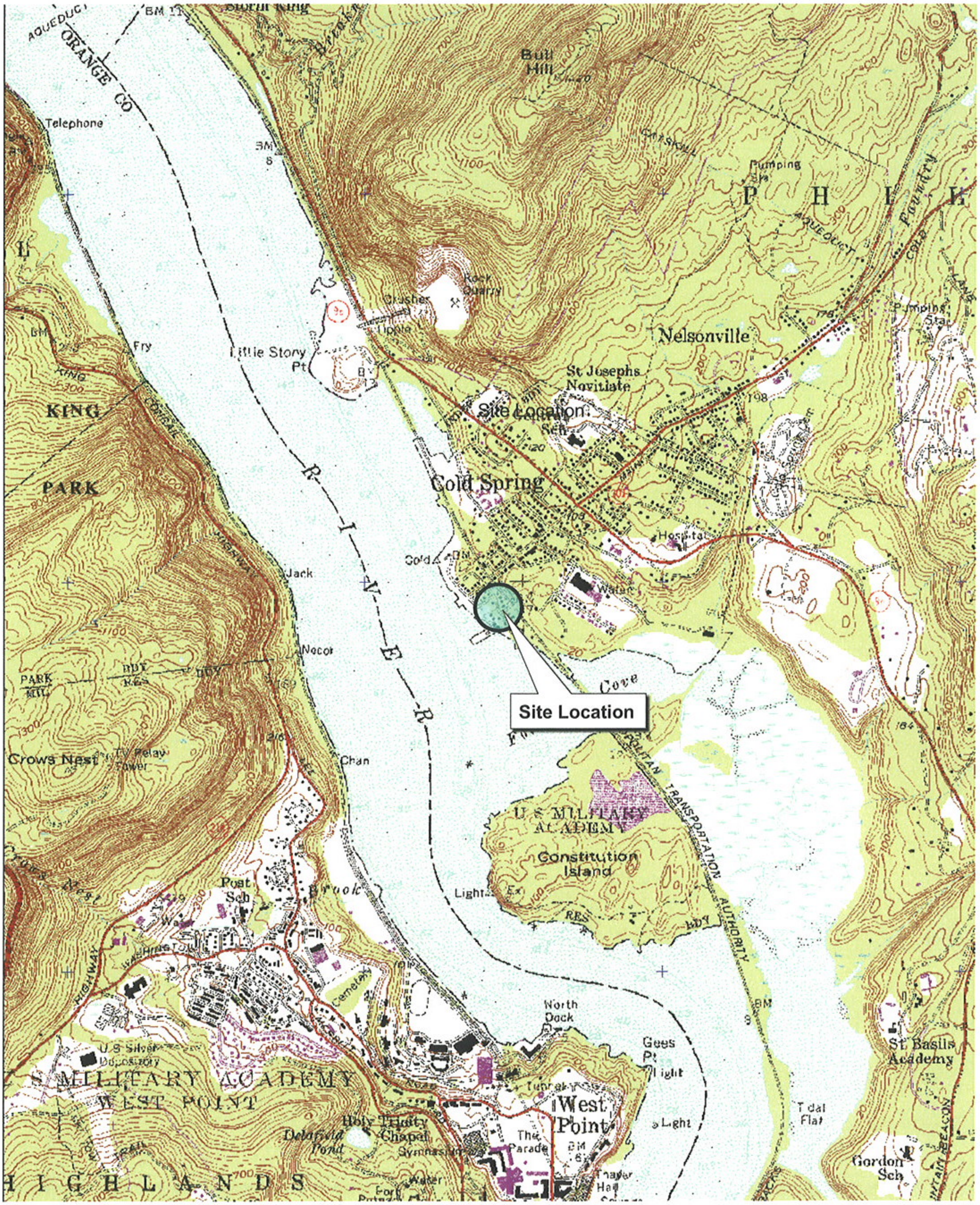
1.0 INTRODUCTION

1.1 Project Background

Under the New York State Department of Environmental Conservation (NYSDEC) Environmental Restoration Program (ERP), the Village of Cold Spring (the Village) undertook a Site Investigation/Remedial Alternatives analysis project at the Cold Spring former Manufactured Gas Plant (MGP) site, located in Cold Spring, New York (i.e., the Site). A site location map is provided as Figure 1-1. Under contract with the Village, Dvirka and Bartilucci Consulting Engineers (D&B) completed the Site Investigation from September 2008 through November 2008. The investigation was conducted in accordance with the NYSDEC approved August 2008 work plan, as modified by the NYSDEC and New York State Department of Health (NYSDOH) September 8, 2008 comment letter.

This Site Investigation/Remedial Alternatives (SI/RA) Report, which has been completed in accordance with the requirements set forth in the NYSDEC's ERP Procedures Handbook, as well as NYSDEC's DER-10, presents the following information:

- Background information regarding the former MGP site;
- A description of field investigation activities performed;
- Investigation/test results and data validation/usability evaluation;
- Identification and location of contaminants;
- Comparison of contaminant concentrations to standards, criteria and guidelines (SCGs);
- Assessment of potential contaminant migration pathways and potential impacts on human and environmental receptors/exposure assessment; and
- Conclusions regarding the significance of the findings.



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COLD SPRING FORMER MGP SITE
COLD SPRING, NEW YORK

SITE LOCATION MAP

FIGURE 1-1

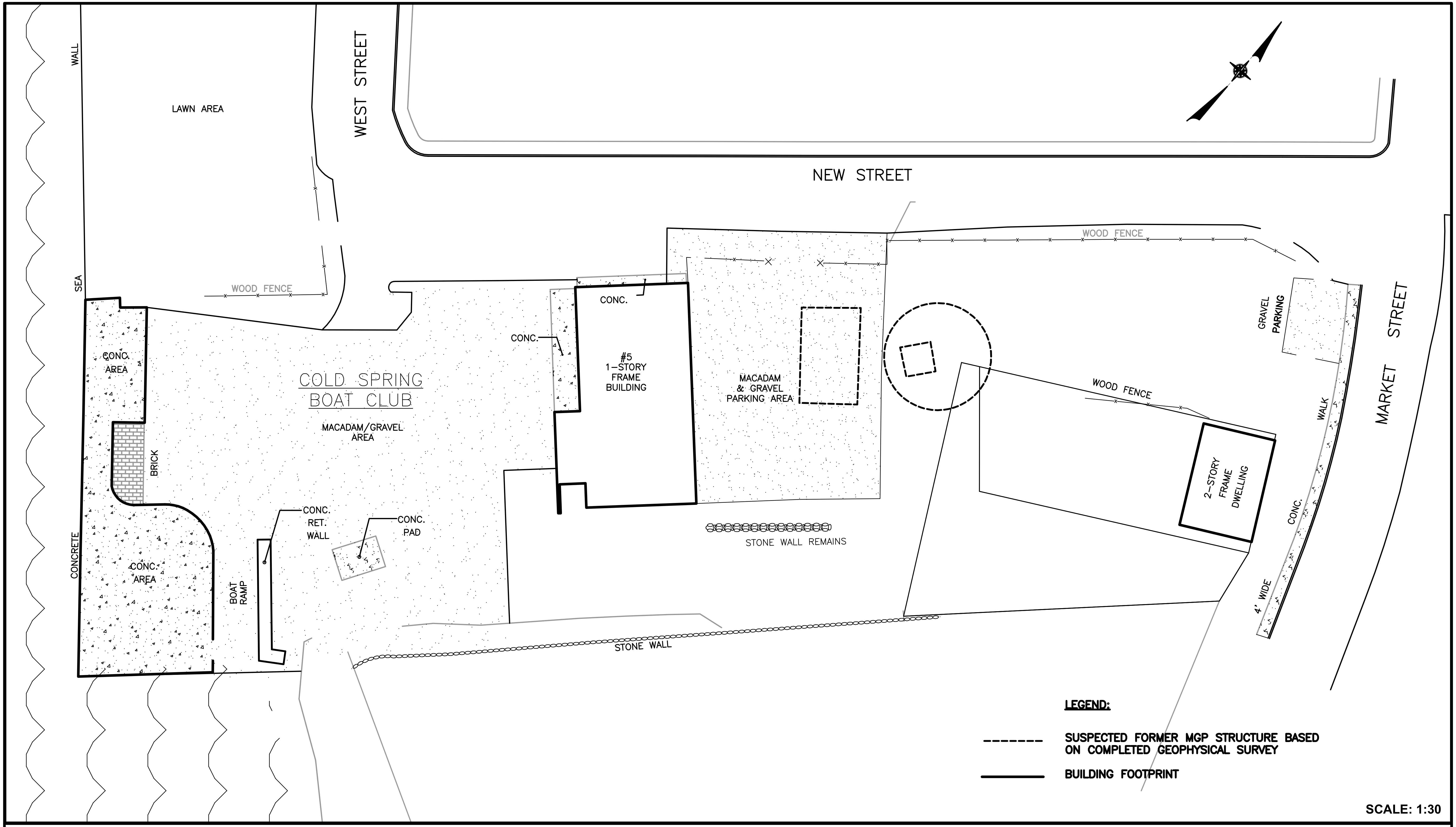
In addition, the SI/RA Report provides an analysis of potential remedial alternatives that could be utilized in the remediation of documented contamination along with recommendations for site remediation.

1.2 Site Description

The Cold Spring former MGP site is owned by the Village of Cold Spring and is located at 5 New Street in the Village of Cold Spring, New York (see Figure 1-1). The approximately 0.1-acre site is located immediately east of the Cold Spring Boat Club and approximately 250 feet east/southeast of the Hudson River. Residential properties are located to the north, south and east of the Site. The Site itself is currently a vacant lot used by the Village for overflow parking. A plan depicting the Site and surrounding areas is provided as Figure 1-2.

1.3 Site History

Based on currently available records, details concerning the history and operation of the former MGP appear to be very limited. A review of the Sanborn Fire Insurance maps provided in a NYSDEC report produced in 2005 identifies a MGP being located on the Site property in 1887. However, the MGP is no longer shown on the Sanborn map dated 1897. Furthermore, the 1887 map indicates the retort building being vacant at this time. Sanborn maps dated prior to 1887 are not available, but a map of Cold Spring Village dated 1868 provided in the NYSDEC report indicates the former MGP was present at this time. Based on this information, the MGP likely operated for less than 20 years and production ceased by 1897. In addition, based on the 1887 Sanborn map, it can be concluded that the former MGP operation was a rather small operation compared to most MGP facilities. Given the MGP operated as a coal carbonization plant based on its age and not as an oil/gas plant, which was common after 1900, it can be concluded that liquid petroleum feed stock was not stored or used at the Site.



VILLAGE OF COLD SPRING

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

COLD SPRING FORMER MGP SITE
SITE INVESTIGATION / REMEDIAL ALTERNATIVES REPORT
SITE PLAN

FIGURE 1-2

The Site has seen limited usage since operation as a MGP, primarily as a lumber storage area. It is believed that the Site was purchased by William and Gertrude Ladue in the early 20th century, who operated a lumber yard and supply depot on the waterfront. Between 1926 and 1928, the Site was reorganized as part of the Cold Spring Lumber Company. The Site was sold to the Village on October 3, 1967.

1.4 Previous Investigations

During an archeological investigation conducted in February 2005 across New Street to the west of the former MGP site, contamination consistent with coal tar was observed in a test pit. Subsequent reviews of historical documents indicated that a MGP had operated in the area. Accordingly, NYSDEC completed a Site Characterization Study of the former MGP site in 2005. Eleven soil borings were completed and five subsurface soil samples selected for analysis. Three of the borings were converted into monitoring wells. The locations of these previously completed borings and monitoring wells are depicted on the sample location map (Drawing 1), presented in Section 2.0 of this report.

Based on the review of the data provided in the NYSDEC report, coal tar impacts were observed in the immediate vicinity of the former MGP site as well as immediately downgradient (west) of the Site, as indicated by NYSDEC soil borings CS-5, 6, 8 and 9. While tar impacts were detected in the fill material, little contamination was observed in the underlying clay. In addition, the majority of the soil borings on the north side of New Street were found to only contain a slight odor and minor staining. While relatively low concentrations of select volatile organic compounds (VOCs) were detected in the soil samples selected for chemical analysis, groundwater samples collected from the three monitoring wells did not contain any VOCs.

1.5 Project Objectives and Remedial Action Objectives

The primary objectives of the Site Investigation/Remedial Alternatives analysis include:

- Fill data gaps associated with the 2005 NYSDEC Investigation;

- Characterize site-specific geology and hydrogeology and how these conditions could potentially influence contaminant migration;
- Determine the nature and extent of MGP source areas;
- Determine the extent of off-site migration of MGP contaminants including off-site properties;
- Identify migration pathways and potential human and ecological receptors; and
- Identify and select appropriate remedial actions to eliminate or mitigate impacts to potential human and ecological receptors.

Remedial action objectives are goals developed for the protection of human health and the environment. These objectives require an assessment of the contaminants and media of concern, migration pathways, exposure routes and potential receptors. Typically, remediation goals are established based on standards criteria and guidelines (SCGs) to protect human health and the environment. SCGs for the Site, developed as part of the Site Investigation scope of work, include Soil Cleanup Objectives (SCOs) for surface and subsurface soil as defined in the NYSDEC 6 NYCRR Part 375, including SCOs for unrestricted use and SCOs for the protection of human health based on commercial land uses. Groundwater SCGs include the NYSDEC Technical and Operation Guidance Series (TOGS) (1.1.1) Ambient Water Quality Standards and Guidance Values.

The Remedial Action Objectives (RAOs) of this report include the following:

- Prevent, to the extent practical, exposure of the community to site-related contaminants.
- Reduce contaminant mass through the removal of tar-impacted soil and below grade structures within the immediate vicinity of the former MGP.
- Mitigate migration of contaminants that could result in impacts to surface water (i.e., the Hudson River).
- Protect on-site workers and the surrounding community from exposure to site-related contaminants during the implementation of the remedy.

2.0 SITE CHARACTERIZATION SCOPE OF WORK

This section provides an overview of the field activities associated with the completed Site Investigation of the Cold Spring former MGP site. The Site Investigation was completed by D&B from September 2008 through November 2008 in accordance with the NYSDEC-approved work plan, dated August 2008, as modified by the NYSDEC and NYSDOH September 8, 2008 comment letter. In order to meet the objectives stated under Section 1.5, the following activities were completed:

- Geophysical survey
- Surface soil sampling
- Soil probe and subsurface soil sampling
- Monitoring well installation/sampling
- Vapor intrusion/indoor air sampling
- Site survey

In addition, surface water sediment sampling was conducted by the NYSDEC in October 2008 to assess potential impacts to the Hudson River. This sediment sampling is described in Section 2.7.

A completed sample location map is provided as Drawing 1, included in a map pocket at the end of this section of the report. Drawing 1 depicts the surveyed sampling locations. Additionally, Table 2-1 provides a summary of sample location rationale, sample depths and sample analysis.

2.1 Geophysical Survey

Prior to undertaking any intrusive activities, a 1-day geophysical survey of the former MGP site was conducted in order to verify the location and extent of any remaining former MGP

TABLE 2-1

Village of Cold Spring
Cold Spring Former Manufactured Gas Plant Site
Site Investigation

INVESTIGATION SCOPE SUMMARY

Investigation Method/Technology	Sample Point ID	Completion Depth Below Grade	Sample Depth Below Grade	Installation or Sample Date	No. of Samples Selected for Analysis	Analysis					Sample Point Objectives/Comments
						Full TCL/TAL Parameters [1]	BTEX [2]	PAH [3]	RCRA METALS [4]	CYANIDE [5]	
Surface Soil Samples	SS-01 through SS-06	2"	0-2"	10/20/2008	6	--	--	X	X	X	Determine if MGP-related contaminants are present in surface soil.
	SS-07 and SS-08	2"	0-2"	10/20/2008	2	--	--	X	X	X	Define background concentrations of MGP-related contaminants in surface soil.
Soil Probes	SB-01	15'	No Sample Collected	9/17/2008	0	--	--	--	--	--	Identify the presence of remaining below grade former MGP structures and the extent of residual tar.
	SB-02	15'	No Sample Collected	9/17/2008	0	--	--	--	--	--	Identify the presence of remaining below grade former MGP structures and the extent of residual tar.
	SB-03	7'	5-7'	9/17/2008	1	X	--	--	--	X	Identify the presence of remaining below grade former MGP structures and the extent of residual tar. Refusal at 7 ft.
	SB-04	15'	7-9'	9/17/2008	1	--	X	X	--	X	Identify the presence of remaining below grade former MGP structures and the extent of residual tar.
	SB-05	15'	No Sample Collected	9/17/2008	0	--	--	--	--	--	Define northwestern limits of tar impacts near former MGP structures
	SB-06	15'	7-9'	9/17/2008	1	--	X	X	--	X	Define northwestern limits of tar impacts near former MGP structures
	SB-07	15'	8-10'	9/17/2008	1	X	--	--	--	X	Identify the presence of remaining below grade former MGP structures and the extent of residual tar.
	SB-08	15'	4-6'	9/18/2008	1	--	X	X	--	X	Identify the extent of residual tar immediately southwest of the former MGP structures.
	SB-09	13'	7-9'	9/17/2008	1	--	X	X	--	X	Identify the extent of residual tar immediately south of the former MGP structures. Refusal at 13 ft.
	SB-10	8'	5-7'	9/17/2008	1	--	X	X	--	X	Identify the extent of residual tar south of the former MGP structures. Refusal at 8 ft.
	SB-11	17'	11-13'	9/16/2008	1	--	X	X	--	X	Identify the extent of residual tar downgradient (south) of the former MGP structures and define top of bedrock. Refusal at 17 ft.

TABLE 2-1

Village of Cold Spring
Cold Spring Former Manufactured Gas Plant Site
Site Investigation

INVESTIGATION SCOPE SUMMARY

Investigation Method/Technology	Sample Point ID	Completion Depth Below Grade	Sample Depth Below Grade	Installation or Sample Date	No. of Samples Selected for Analysis	Analysis					Sample Point Objectives/Comments
						Full TCL/TAL Parameters [1]	BTEX [2]	PAH [3]	RCRA METALS [4]	CYANIDE [5]	
Soil Probes (continued)	SB-12	33'	12-14'	9/16/2008	1	--	X	X	--	X	Identify the extent of residual tar downgradient (southwest) of the former MGP structures and define thickness of clay unit.
	SB-13	19'	11-13'	9/17/2008	1	--	X	X	--	X	Identify the extent of residual tar downgradient (south) of the former MGP structures and define top of bedrock. Refusal at 19 ft.
	SB-14	33'	13-15'	9/16/2008	1	--	X	X	--	X	Identify the extent of residual tar downgradient (south) of the former MGP structures and define thickness of clay unit.
	SB-15	33'	13-15'	9/17/2008	1	--	X	X	--	X	Identify the extent of residual tar downgradient (southwest) of the former MGP structures and define the thickness of clay unit.
	SB-16	13'	6-8'	9/18/2008	1	--	X	X	--	X	Identify the presence of remaining below grade former MGP structures and the extent of residual tar. Define top of bedrock. Refusal at 13 ft.
	SB-17	25'	12-14'	9/18/2008	1	--	X	X	--	X	Identify the extent of residual tar downgradient (southwest) of the former MGP structures and define thickness of clay unit.
	SB-18	14'	12-14'	9/19/2008	1	--	X	X	--	X	Identify the extent of residual tar downgradient (south) of the former MGP structures and define top of bedrock. Refusal at 14 ft.
	SB-19	9'	7-9'	9/19/2008	1	--	X	X	--	X	Identify the extent of residual tar downgradient (southwest) of the former MGP structures. Refusal at 9 ft.
	SB-20	5'	3-5'	10/20/2008	1	--	X	X	--	X	Identify the extent of residual tar south of the former MGP structures. Refusal at 5 ft.
	SB-21	3'	No Sample Collected	10/20/2008	0	--	--	--	--	--	Identify the extent of residual tar southeast of the former MGP structures. Refusal at 3 ft.
	SB-22	16'	14-16'	10/20/2008	1	--	X	X	--	X	Assess potential presence of MGP residuals at adjoining residential property.
	SB-23	18'	14-16'	10/20/2008	1	--	X	X	--	X	Assess potential presence of MGP residuals at adjoining residential property.
	SB-24	5'	No Sample Collected	10/20/2008	0	--	--	--	--	--	Identify the extent of residual tar south of the former MGP structures. Refusal at 5 ft.
	SB-25	3'	No Sample Collected	10/20/2008	0	--	--	--	--	--	Identify the extent of residual tar southeast of the former MGP structures. Refusal at 3 ft.

TABLE 2-1

Village of Cold Spring
Cold Spring Former Manufactured Gas Plant Site
Site Investigation

INVESTIGATION SCOPE SUMMARY

Investigation Method/Technology	Sample Point ID	Completion Depth Below Grade	Sample Depth Below Grade	Installation or Sample Date	No. of Samples Selected for Analysis	Analysis					Sample Point Objectives/Comments
						Full TCL/TAL Parameters[1]	BTEX[2]	PAH[3]	RCRA METALS[4]	CYANIDE[5]	
Groundwater Monitoring Wells	GW-01	12'	Water Table	10/2/2008	1	X	--	--	--	X	Define upgradient groundwater quality and determine groundwater flow directions.
	GW-02	12'	Water Table	10/2/2008	1	--	X	X	--	X	Define downgradient limits of groundwater contamination and determine groundwater flow directions.
	GW-03	12'	Water Table	10/2/2008	1	--	X	X	--	X	Define downgradient limits of groundwater contamination and determine groundwater flow directions.
	GW-04	12'	Water Table	10/2/2008	1	--	X	X	--	X	Define downgradient limits of groundwater contamination and determine groundwater flow directions.
	GW-05	12'	Water Table	10/2/2008	1	X	--	--	--	X	Define downgradient limits of groundwater contamination and determine groundwater flow directions.
	SB-22 (GW)	12'	Water Table	10/20/2008	1	--	X	X	--	X	Define groundwater quality at adjoining residential property.
	MW-01	6'	Water Table	10/2/2008	1	--	X	X	--	X	Define downgradient limits of groundwater contamination and determine groundwater flow directions.
Vapor/Indoor Air Samples	SG-01	1'	1'	11/19/2008	1	--	X	--	--	--	Determine VOC concentrations in soil gas below Boat Club building
	SG-02	1'	1'	11/19/2008	1	--	X	--	--	--	Determine VOC concentrations in soil gas below Boat Club building
	IA-01	N/A	N/A	11/19/2008	1	--	X	--	--	--	Determine VOC concentrations in indoor air soil at the Boat Club building.
	IA-02	N/A	N/A	11/19/2008	1	--	X	--	--	--	Determine VOC concentrations in indoor air soil at the Boat Club building.
	AA-01	N/A	N/A	11/19/2008	1	--	X	--	--	--	Determine VOC concentrations outside of Boat Club building to compare to indoor air concentrations.

Notes:

X: Sample selected for analysis.

--: Sample not selected for analysis.

[1] Analyses include Target Compound List (TCL) Volatile Organic Compounds by EPA Method 8260, TCL Semivolatile Organic Compounds by EPA Method 8270, Target Analyte List (TAL) metals by EPA Method 6000/7000 Series, Polychlorinated Biphenyls (PCBs) by EPA Method 8082 and cyanide by EPA Method 9012.

[2] Benzene, Toluene, Ethylbenzene and Xylene (BTEX) by EPA Method 8260. Vapor/Indoor Air Samples will be analyzed for VOCs and Naphthalene by EPA Method TO-15.

[3] Polycyclic Aromatic Hydrocarbons (PAH) by EPA Method 8270.

[4] Resource Conservation and Recovery Act (RCRA) metals by EPA Method 6000/7000 Series.

[5] Cyanide by EPA Method 9012.

subsurface structures, including the former gas holder and generating house foundations, as well as any filled areas. Hager Geoscience, Inc. performed the geophysical survey in September 2008, utilizing terrain conductivity and electromagnetic methods, along with ground penetrating radar (GPR).

The completed geophysical survey identified two below grade structures in the vicinity of the former MGP site which were staked and surveyed by D&B's survey subcontractor. The identified structures have been placed on the sample location map, provided as Drawing 1, and include a circular structure approximately 35 feet in diameter, believed to be the foundation for the former gas holder tank. The second structure located to the southwest of the former holder foundation is rectangular in shape, approximately 20 feet wide by 30 feet long. It is suspected that this below grade structure is the remains of the former MGP generator house foundation. Based on these findings, the soil probes completed within the former MGP site were adjusted accordingly.

2.2 Surface Soil Sampling

In order to verify that there are no MGP-related contaminants present in surface soil, a total of six surface soil samples (SS-01 through SS-06) were collected in the vicinity of the former MGP site for chemical analysis. Two additional surface soil samples (SS-07 and SS-08) were collected in areas sufficiently distant from the former MGP site to serve as background samples. The collected surface soil sample locations are depicted on Drawing 1.

Consistent with NYSDEC and NYSDOH requirements, the surface soil samples were collected at a depth of 0 to 2 inches below ground surface using a disposable polyethylene scoop. As summarized in Table 2-1, all samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) by USEPA Method 8270, RCRA metals by USEPA 6000/7000 series methods and cyanide by USEPA Method 9012. Analytical results are summarized in Appendix B, and discussed in Section 4.2.

2.3 Soil Probe and Subsurface Soil Sampling

A total of 25 soil probes were completed as part of the field investigation. The completed soil probe locations are depicted on Drawing 1. The soil probes were completed using direct push sampling techniques, i.e., Geoprobe. Soil samples were collected continuously from ground surface to the probe termination depth utilizing a decontaminated macro core soil sampler fitted with a disposable 4-foot acetate liner. During the advancement of each probe, each recovered soil sample was inspected and characterized by a geologist in accordance with the Unified Soil Classification System (USCS). Evidence of contamination, such as the presence of tar, NAPL and MGP-like odors, was documented. A photoionization detector (PID) was utilized to screen each sample for the presence of VOCs. All observations were recorded in the project field book. As summarized on Table 2-1, soil probes SB-01 through SB-19 were completed over a 4-day period between September 16 and 19, 2008. Under a second mobilization, soil probes SB-20 through SB-25 were completed on October 20, 2008. All boring logs are provided in Appendix A.

As shown on Drawing 1, the soil probes are grouped into three areas with the first group, SB-01 through SB-10, SB-16, SB-20, SB-21, SB-24 and SB-25, located within and in the vicinity of the former MGP structures. The majority of these soil probes are shallow, up to 15 feet deep, and were intended to define the limits of the former MGP structures and the extent of residual contamination present in this area. A secondary objective was to define the depth of bedrock in this area. As summarized in Table 2-1, nine soil samples were selected for chemical analysis during the advancement of the 15 probes, biased toward the areas with the highest PID readings or visual evidence of impacts such as the presence of tar. Two of the nine soil samples were selected for analysis of Target Compound List (TCL) VOCs by USEPA Method 8260, TCL semivolatile organic compounds (SVOCs) by USEPA Method 8270, Target Analyte List (TAL) metals by USEPA 6000/7000 Series Methods, polychlorinated biphenyls (PCBs) by USEPA Method 8082 and cyanide by USEPA Method 9012. The remaining samples were analyzed for benzene, toluene, ethylbenzene and xylene (BTEX) by USEPA Method 8260, PAHs by USEPA Method 8270 and cyanide by USEPA Method 9012. Note that some soil probe locations were adjusted based on the findings of the geophysical survey as described in Section 2.1.

The second group of probes, SB-11 through SB-15 and SB-17 through SB-19, was completed downgradient of the former MGP site in order to define the extent of tar migration as well as to define the thickness of the confining clay layer and/or top of bedrock. These 8 soil probes were completed to depths ranging from 9 feet to a maximum depth of 33 feet at SB-12, SB-14 and SB-15. A total of eight soil samples were selected for chemical analysis, biased toward the areas with the highest PID readings or visual evidence of impacts. As summarized in Table 2-1, all samples were analyzed for BTEX, PAHs and cyanide.

The third group of probes, SB-22 and SB-23, was completed on the residential property located immediately to the east of the former MGP site in order to assess the potential presence of MGP residuals in this area. The two probes were completed to depths of 16 feet and 18 feet, respectively. One soil sample was selected for chemical analysis from each probe. In addition, a groundwater sample was collected at SB-22 to define groundwater quality. The soil and groundwater samples were analyzed for BTEX, PAHs and cyanide.

All chemical data are summarized in Appendix B. Subsurface soil quality is discussed in Section 4.3 and groundwater quality is discussed in Section 4.4.

As indicated on the boring logs in Appendix A, NAPL saturated soil was observed at a depth of 7 to 9 feet in soil probe SB-04. A sample of this soil was collected for fingerprint analysis. The sample was submitted to META Environmental, Inc. for forensic hydrocarbon fingerprint analysis using Method MET 4007D to help determine the likely source of the NAPL. The results of the fingerprint analysis are discussed in Section 4.1 and the lab report is provided in Appendix F.

Upon completion, all soil probes were backfilled with any excess soil left over from the soil samples. However, visibly contaminated excess soil was placed in 55-gallon drums for characterization and proper off-site disposal, as discussed in Section 2.8. All boreholes completed in asphalt or concrete were patched with the appropriate material. All non-dedicated sampling equipment was decontaminated between sampling locations in accordance with the work plan. Soil probe locations were staked/marked and surveyed, as detailed in Section 2.9.

2.4 Monitoring Well Installation and Development

Following the soil sampling program, five shallow permanent groundwater monitoring wells (GW-01 through GW-05) were installed to characterize potential groundwater impacts. The well locations are depicted on Drawing 1.

The wells were installed in unconsolidated sediment using a Geoprobe track-mounted all-terrain vehicle (ATV) Model 6610 DT. Given the depth to groundwater is approximately 2 to 4 feet within the study area, all monitoring wells were installed to a depth of approximately 12 feet. Each well was completed with a 10 foot length of 2-inch PVC pre-packed well screen and a locking flush-mount manhole cover.

Each well was installed by advancing 3.5-inch outer diameter probe rods to the desired depth with a disposable drive point. After reaching the desired depth, the pre-assembled well screen and PVC riser pipe were installed inside the probe rods. After setting the well, the probe rods were retracted from the ground and a 1 to 2-foot layer of fine sand was placed above the pre-packed well screen prior to installing a 2-foot bentonite seal. A locking flush-mounted well cover was grouted in place to complete the well.

All installed monitoring wells were developed by pumping for 2 hours, or until the turbidity of the groundwater achieved a reading of 50 NTUs (nephelometric turbidity units) or less. Well development was supplemented by measurements of field parameters, including temperature, pH and specific conductance. Development continued until the field parameters stabilized for a minimum of three consecutive readings of 10 percent variability or less.

Drill cuttings were not generated with the use of the direct push well installation technique. Purge water generated during well development was placed in 55-gallon drums for characterization and proper off-site disposal, as discussed in Section 2.8. All non-dedicated sampling equipment was decontaminated between sampling locations in accordance with the work plan.

2.5 Monitoring Well Sampling and Water Level Measurements

A minimum of one week after well installation and development, the five newly installed monitoring wells, along with one existing NYSDEC well (MW-01), were sampled for chemical analysis.

Prior to sampling, each monitoring well was checked for an immiscible floating NAPL layer. Each well was opened, and the head space measured with a PID. An oil-water interface probe was carefully lowered into the well to check the depth of the water surface as well as for the presence and thickness of an immiscible NAPL layer.

Due to the relatively shallow nature of groundwater throughout the site, portable 12-volt low-flow bladder pumps with disposable tubing were used to purge and sample each well. Wells were sampled using low flow sampling techniques. During well purging, field instruments were utilized to measure pH, temperature, conductivity and dissolved oxygen. Detailed sampling procedures are discussed in the QA/QC Plan, included in the August 2008 work plan. After field parameters stabilized or the maximum purge volume was reached, the groundwater sample was collected and placed in laboratory-supplied sample bottles. All samples were labeled and placed in a cooler with bagged ice sufficient to cool the samples to 4°C.

As summarized in Table 2-1, two of the groundwater samples collected from the five monitoring wells installed as part of this project were analyzed for TCL VOCs by USEPA Method 8260, TCL SVOCs by USEPA Method 8270, TAL metals by USEPA 6000/7000 Series Methods, PCBs by USEPA Method 8082 and cyanide by USEPA Method 9012. The remaining samples collected from the newly installed wells and the existing NYSDEC monitoring well were analyzed for BTEX by USEPA Method 8260, PAHs by USEPA Method 8270 and cyanide by USEPA Method 9012. Analytical results are summarized in Appendix B, and discussed in Section 4.4.

Purge water generated during sampling was placed in 55-gallon drums for characterization and proper off-site disposal, as discussed in Section 2.8. All non-dedicated sampling equipment (e.g., oil-water interface probes) was decontaminated between sampling locations.

In addition to the initial water/NAPL measurements collected during the round of groundwater sampling, D&B collected three additional rounds of water/NAPL measurements from all monitoring wells. In addition, D&B set up a gauging stake on the shoreline of the Hudson River, which was surveyed along with all monitoring wells. The gauging stake was utilized by D&B in all rounds of water levels and helped determine groundwater flow directions and the interaction of shallow groundwater with the Hudson River.

2.6 Vapor Intrusion Sampling/Indoor Air Sampling

In order to determine if soil vapor intrusion is a potential exposure pathway for VOCs associated with the former MGP, two sub-slab soil vapor samples (SG-01 and SG-02) and two indoor air samples (IA-01 and IA-02) were collected from inside the Cold Spring Boat Club building. In addition, one outdoor ambient air sample (AA-01) was collected adjacent to the building. As depicted on Drawing 1, D&B collected the five samples at the Cold Spring Boat Club building, given the proximity of the building to the former MGP. All collected samples were analyzed for VOCs including naphthalene by USEPA Method TO-15. All sampling was performed on November 19, 2008, at which time the building heating system was in operation. All samples were collected over an 8-hour period. Table 2-1 summarizes the analysis of each sample. Analytical results are summarized in Appendix B, and discussed in Section 4.5. Further detail on sampling procedures is provided below.

Sub-Slab Soil Vapor Sampling

D&B collected the two sub-slab soil vapor samples from inside the Boat Club building through penetrations in the concrete slab. The sub-slab soil vapor probes were constructed as follows:

1. A 1-inch diameter hole was drilled approximately 1-inch into the concrete using an electric hammer drill. The hole was extended through the remaining thickness of the concrete slab using a 3/8-inch diameter drill bit. Once through the concrete, the hole was extended approximately 3 inches below the slab using either a drill bit or a steel probe rod.
2. A section of 3/8-inch O.D., 1/4 inch I.D. Teflon or Teflon-line polyethylene tubing was inserted into the bottom of the floor slab.
3. The annular space between the 1-inch diameter hole and the 3/8-inch O.D. tubing was sealed with bentonite.
4. The end of the tubing was plugged with a plastic cap or laboratory grade rubber stopper.
5. In accordance with the NYSDOH guidance document entitled, "Guidance for Evaluating Soil Vapor Intrusion in the State of New York," dated October 2006, a tracer gas (helium) was used to check the integrity of each sub-slab soil vapor probe after installation. D&B used the HDP-9900 Helium Pro manufactured by Radiodetection Dielectric Technologies as a helium detector in this process.
6. All sub-slab vapor samples were collected over an 8-hour period utilizing 6-liter SUMMA canisters.

Indoor Air Samples

D&B collected two indoor air samples from the Boat Club building, one inside the kitchen area and one in the garage area of the building. An indoor air quality questionnaire and building inventory was completed by D&B prior to sampling to evaluate the type of structure, floor layout and physical conditions of the buildings being studied and to identify and minimize conditions that may have affected or interfered with the testing. A complete inventory of all items and products used and stored in the building was performed, focusing on products that could contain VOCs such as gasoline operated equipment, unvented kerosene heaters, recent use of petroleum-based finishes or products containing petroleum distillates. A PID capable of reading in the part per billion (ppb) level was used to help evaluate potential interferences. Products that may contain VOCs were listed on the building inventory form along with PID readings obtained near the container. The completed questionnaire is provided as Appendix D. All indoor air samples were collected over an 8-hour period utilizing a 6-liter SUMMA canister.

Outdoor Ambient Air Sampling

D&B collected one outdoor ambient air sample adjacent to the north corner of the Boat Club building. The sample was collected on the same day as the sub-slab soil vapor and indoor air sampling at the Boat Club building over an 8-hour period utilizing 6-liter SUMMA canisters.

2.7 Surface Water and Surface Water Sediment Sampling

On October 17, 2008, the NYSDEC collected a total of six sediment samples from three locations on the Hudson River downgradient of the former MGP site in order to determine if tar and tar-related constituents observed in subsurface soil and, to a lesser degree, groundwater in the vicinity of the river have impacted river sediments. All three locations were accessed by the NYSDEC utilizing the Cold Spring Boat Club floating docks. The approximate location of each NYSDEC sediment sample point is shown on Drawing 1. At each location, sediment samples were collected through the advancement of a core barrel sampler. Up to two sediment samples, one at approximately 0 to 6 inches and one at approximately 6 to 12 inches below the river bottom, were collected at each location for VOC and SVOC analysis by USEPA Methods 8260 and 8270, respectively. A summary of the NYSDEC sediment investigation is provided as Appendix E and discussed further in Section 4.6.

2.8 Management of Investigation Derived Waste

Any soil recovered during the advancement of the Geoprobe soil borings that was not retained for chemical analysis was placed back in the borehole after the boring had been completed. However, if visibly impacted soil was generated and it could not be safely placed back into the borehole, it was temporarily containerized on-site in DOT-approved 55-gallon drums prior to characterization and proper off-site disposal. During well development and sampling, all purge water was containerized on-site in DOT-approved 55-gallon drums prior to characterization and proper off-site disposal.

The drums used to store any waste were sealed at the end of each workday and labeled with the date, the well or boring number(s), the type of waste (i.e., excess soil or purge water) and the name of a point-of-contact. Grab samples were collected from the drums containing soil or water in order to determine the most appropriate disposal method. The samples were analyzed for toxicity characteristic leaching procedure (TCLP) parameters and RCRA characteristics (ignitability, corrosivity and reactivity). All drums were labeled “pending analysis” until laboratory data was available. Once characterized, all drummed waste was removed from the Site and properly disposed of by Eastern Environmental Services, Inc. under subcontract to D&B.

2.9 Site Survey

At the completion of installation activities, the location and elevation of all completed sample points and monitoring wells, including any existing wells completed by the NYSDEC during their 2005 investigation, were surveyed by a New York State-licensed surveyor for placement on the base map. Two elevation measurements, including the elevation on the rim of the flush-mounted manhole and the elevation of the top of PVC well casing, were taken at each monitoring well location to assist in the determination of the shallow groundwater flow direction. The survey elevations were measured to an accuracy of 0.01 foot. All elevations were referenced to the North American Vertical Datum of 1988 (NAVD88) and horizontal locations were based upon the North American Datum of 1983, New York State Coordinate System.

2.10 Analytical and QA/QC Procedures

All chemical samples were analyzed by Chemtech Environmental Laboratory, a certified USEPA Contract Laboratory Program (CLP) and NYSDOH Environmental Laboratory

Approval Program (ELAP) laboratory. All analyses were conducted utilizing NYSDEC 6/00 Analytical Services Protocol (ASP) methods, or latest version, that are at least as stringent as USEPA CLP protocols. A NYSDEC ASP Category B data package was provided for all analyses. In accordance with USEPA guidance, samples were shipped daily to ensure that they were received at the laboratory no later than 48 hours after collection.

Quality assurance/quality control (QA/QC) samples that were collected as part of the Site Investigation included matrix spike (MS) and matrix spike duplicate (MSD) samples and trip blanks. The MS/MSD samples were collected at a frequency of one per twenty environmental samples for each sampled medium (soil and groundwater) per analytical parameter. Trip blanks were shipped to and from the field with the sample containers when VOC analyses were conducted on aqueous samples. Trip blanks consist of VOC vials filled at the laboratory with distilled, deionized water, which remained unopened in the field and are analyzed for VOCs only to provide an indication of potential sample contamination due to sample transport, preservation, storage and preparation procedures, as well as atmospheric conditions during transportation and time on-site. QA/QC procedures are described further in the site-specific QA/QC plan, provided in the August 2008 work plan.

2.11 Data Usability Summary Report

Surface soil, subsurface soil and groundwater samples, as well as two waste characterization samples, were collected in September and October 2008 in support of the Site Investigation of the Cold Spring former MGP site. Several samples were analyzed for VOCs, SVOCs, PCBs, TAL metals and cyanide, while others were analyzed for BTEX, PAHs and cyanide, depending on sample location. The two waste characterization samples were analyzed for TCLP parameters and RCRA characteristics (ignitability, corrosivity and reactivity).

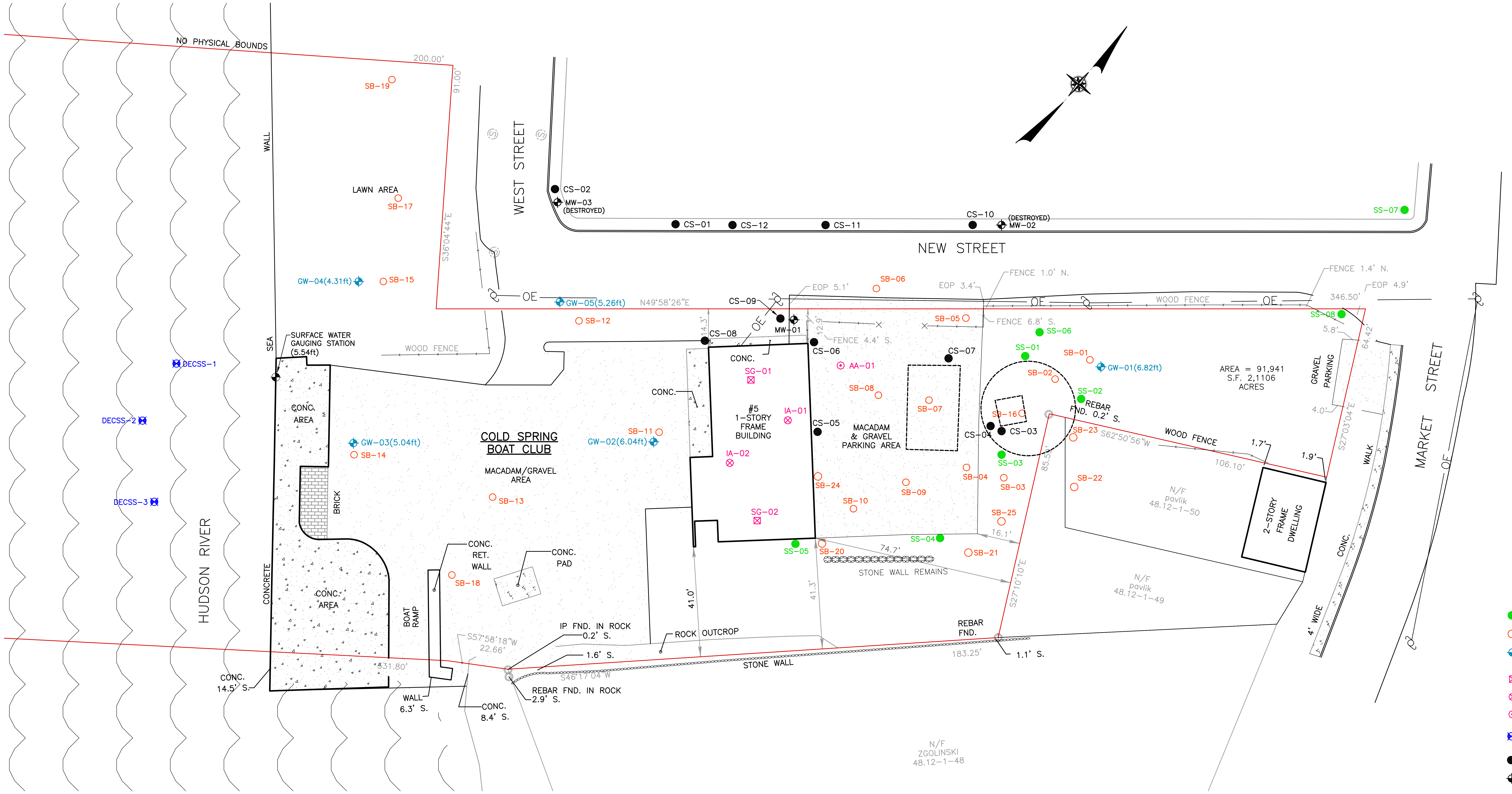
Sample analysis was performed by ChemTech Laboratories, a subcontractor to D&B, in accordance with NYSDEC 06/00 ASP requirements. The data packages, submitted by

ChemTech, have been reviewed for contract and method compliance to determine the usability of the sample results. The findings of the review process are summarized below.

All samples were analyzed within the method specified holding times and all Quality Assurance/Quality Control (QA/QC) requirements (i.e., calibrations, tunes, surrogate recoveries, area counts etc) were met.

Several samples required reanalysis at a secondary dilution due to compound concentrations exceeding the instrument calibration range. The results for the compounds which exceeded the calibration range in the initial analysis were taken from the diluted runs and included on the data summary tables.

No other problems were found with the sample results and all results are deemed usable for environmental assessment purposes as qualified above.



LEGEND:

● SS-01	SURFACE SOIL SAMPLE LOCATION
○ SB-01	SOIL BORING LOCATION
⊕ GW-01(6.82FT)	GROUNDWATER MONITORING WELL WITH TOP OF CASING IN FEET
☒ SG-01	SOIL GAS VAPOR PRODE
⊗ IA-01	INDOOR AIR SAMPLE
⊙ AA-01	AMBIENT AIR SAMPLE
⊗ DECSS-1	NYSDEC SURFACE WATER SEDIMENT SAMPLE LOCATION (OCTOBER 2008)
● CS-01	NYSDEC BORING COMPLETED IN 2005
⊕ MW-01	NYSDEC GROUNDWATER MONITORING WELL, COMPLETED IN 2005
-------	SUSPECTED FORMER MGP STRUCTURE BASED ON COMPLETED GEOPHYSICAL SURVEY
———	BUILDING FOOTPRINT
———	ESTIMATED SITE PROPERTY BOUNDARY

SOURCE: WILLIAM D. YOUNGBLOOD LAND SURVEYING P.C, SURVEY FOR THE VILLAGE OF COLD SPRING, DATED SEPTEMBER 11, 2008

NO.	DATE	REVISION	INT.

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Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

VILLAGE OF COLD SPRING

PUTNAM COUNTY **NEW YORK**

SITE INVESTIGATION / REMEDIAL ALTERNATIVES ANALYSIS
COLD SPRING FORMER MGP SITE

SAMPLE LOCATION MAP

PROJECT NO.: **2820**
DATE: **DECEMBER 2008**
SCALE: **1:20**
DRAWING NO.: 1

3.0 SITE GEOLOGY AND HYDROGEOLOGY

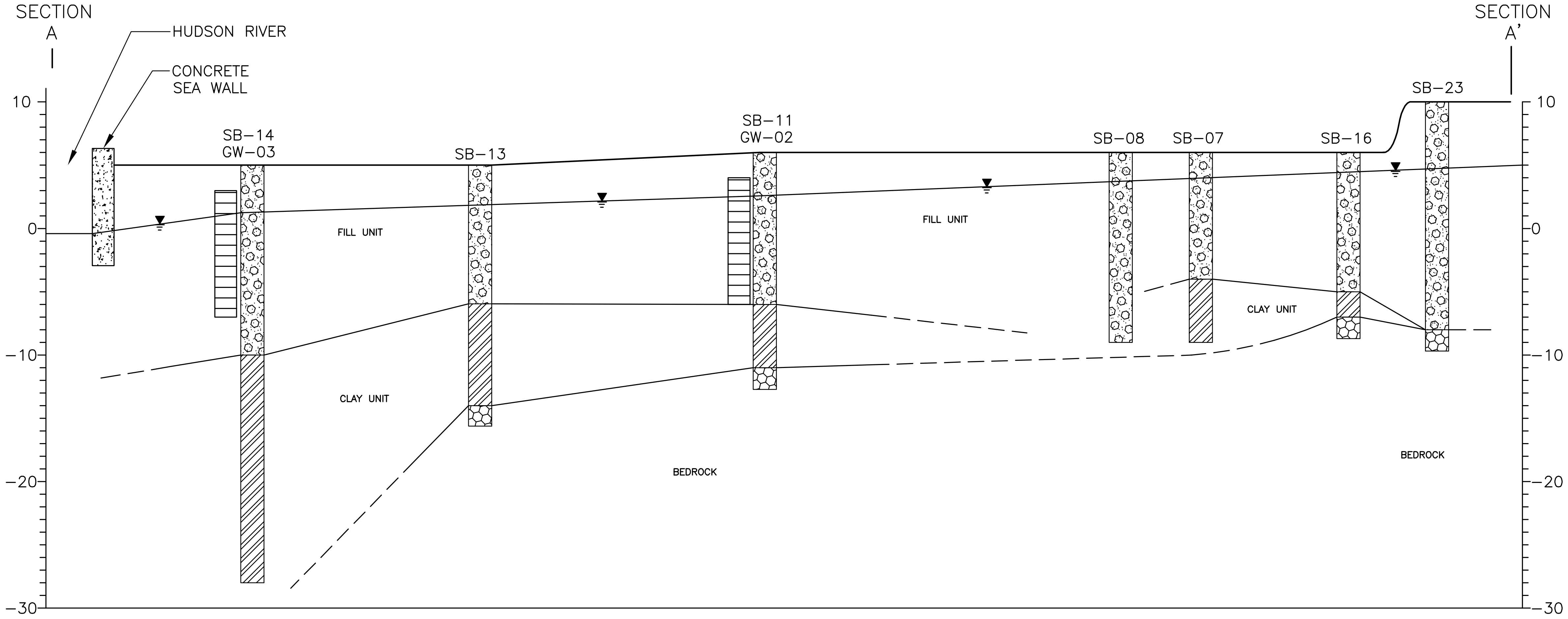
The following section presents the findings, as well as a discussion and interpretation of geologic and hydrogeologic data collected during the Site Investigation. Information utilized in support of this evaluation includes the following:

- Logs from completed soil probes and groundwater monitoring wells;
- Hydraulic head measurements from groundwater monitoring wells; and
- Geologic data obtained from previously completed site investigations, including the 2005 NYSDEC Site Characterization.

Based on the information described above, three geologic cross sections of the study area were generated, and are provided on Figures 3-1 and 3-2. Figure 3-1 presents east-west geologic cross section A-A’ which traverses the study area from the Hudson River through the Boat Club property and former MGP site, to SB-23 on the residential property to the east of the former MGP site. Figure 3-2 presents north-south geologic cross section B-B’ which traverses along the Hudson River and through the Boat Club property from SB-19 to SB-18. Figure 3-2 also presents north-south geologic cross section C-C’ which traverses the former MGP site from SB-06 along New Street to SB-21. The locations of borings and monitoring wells referenced in this section are shown on Drawing 1, and the logs are included in Appendix A.

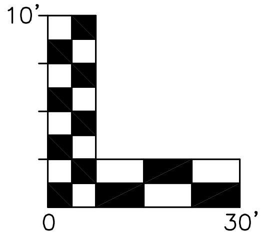
3.1 Site Stratigraphy

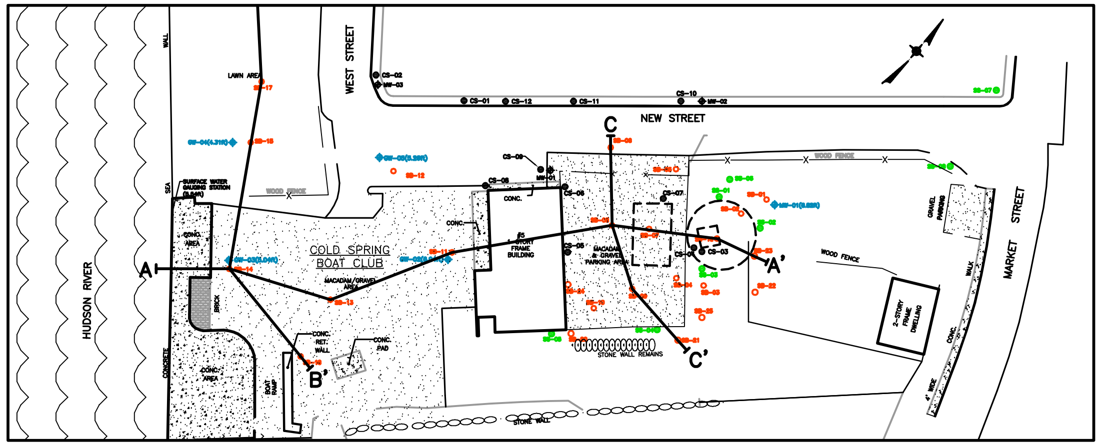
Based on the soil borings completed as part of this Site Investigation, as well as the previously completed NYSDEC investigation, the upper stratigraphic unit across the Site consists of sandy and/or gravelly fill material often containing significant quantities of anthropogenic materials such as brick, ash and coal. All former MGP structures are located within this fill. Beneath the fill exists a native Clay Unit. Shell fragments were encountered in many of the samples recovered from the clay. The Clay Unit, and sometimes the Fill Unit where the Clay Unit is not present, rests directly on weathered and unweathered bedrock. Based on these findings, the Site stratigraphy appears to be divided into the following geologic units:



LEGEND

- ▨ FILL AND/OR TOPSOIL
- ▨ CLAY
- ▨ BEDROCK
- ▯ SOIL BORING
- ☰ WELL SCREEN FOR MONITORING WELL
- ——— GROUND SURFACE
- ——— — — — STRATIGRAPHIC CONTACT, DASHED WHERE INFERRED
- ——▼— — — ELEVATION OF WATER TABLE GIVEN IN FEET ABOVE MEAN SEA LEVEL. DASHED WHERE INFERRED





KEY MAP
SHOWING CROSS-SECTION LINE

SCALE:1"=100'

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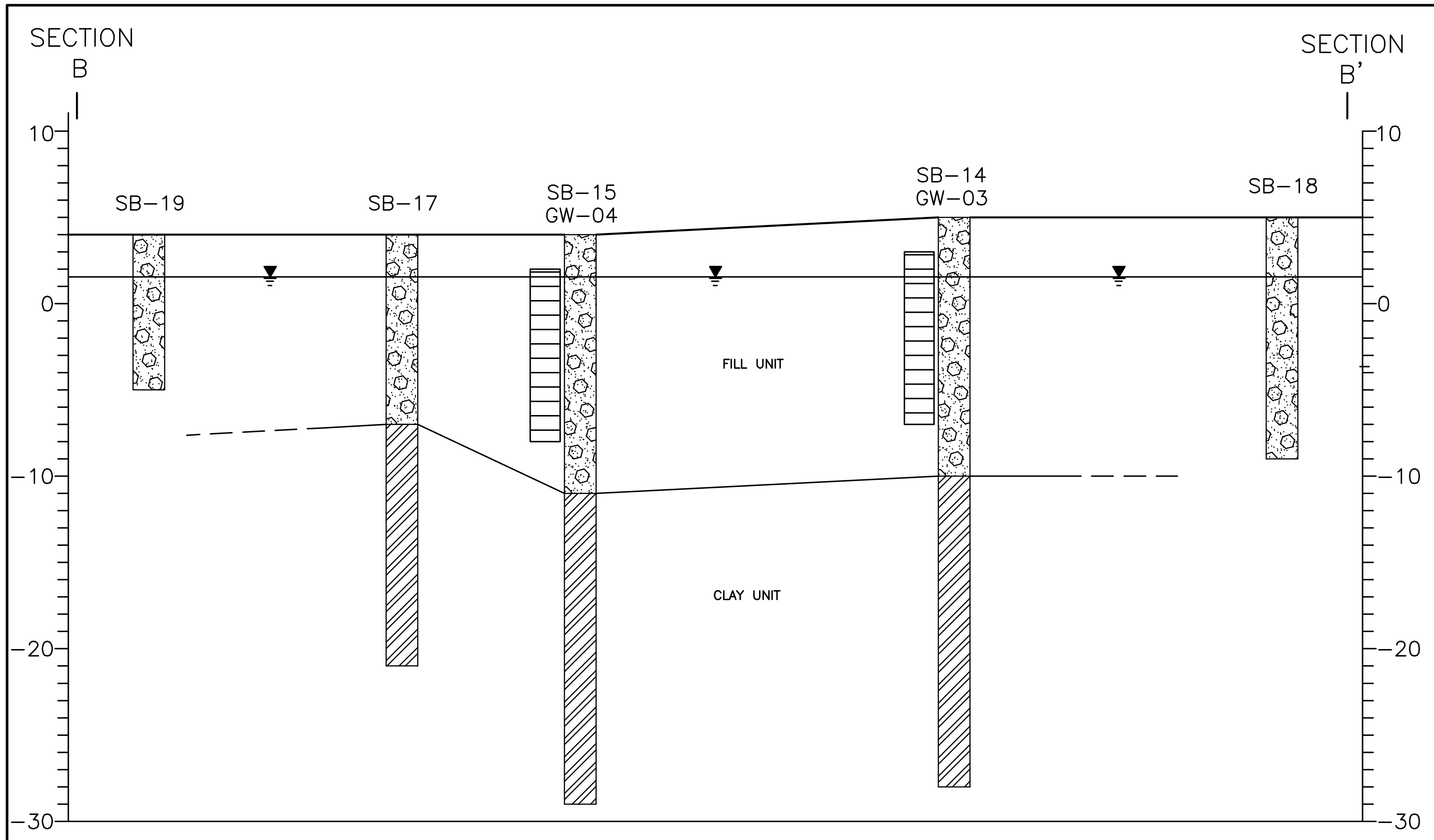
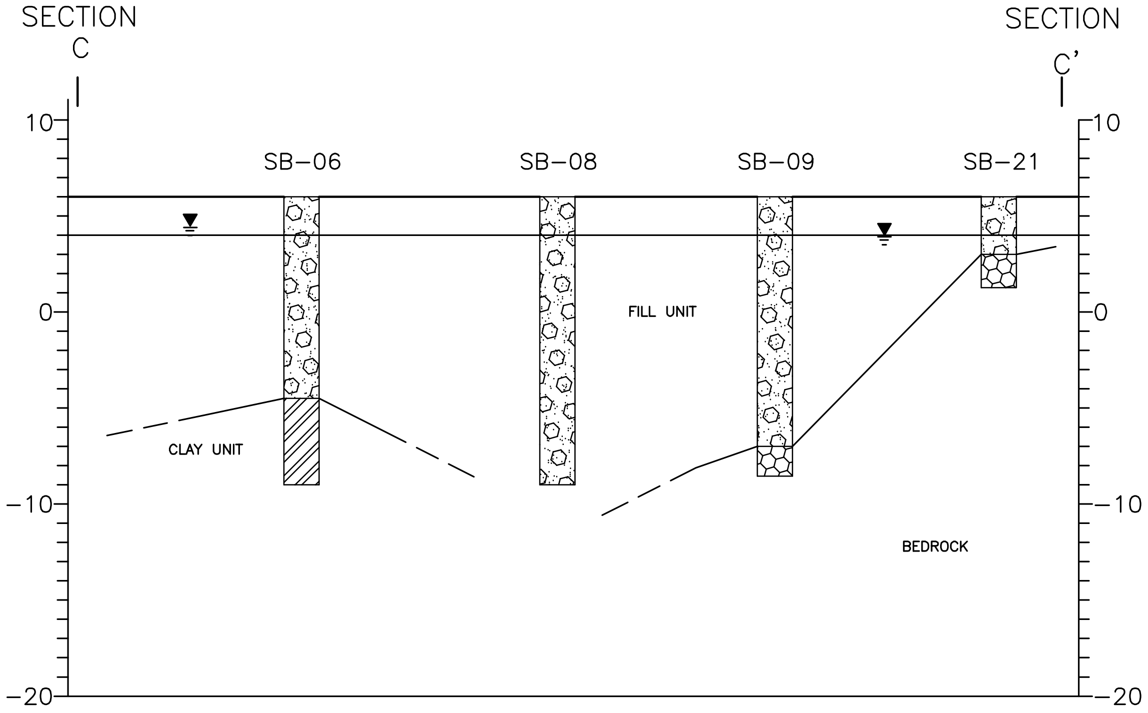
VILLAGE OF COLD SPRING
COLD SPRING FORMER MGP SITE
SITE INVESTIGATION/REMEDIAL ALTERNATIVES REPORT

EAST-WEST GEOLOGIC CROSS SECTION A-A'

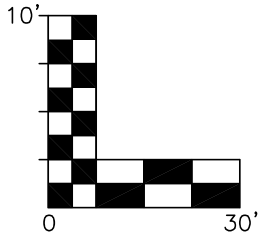
FIGURE 3-1

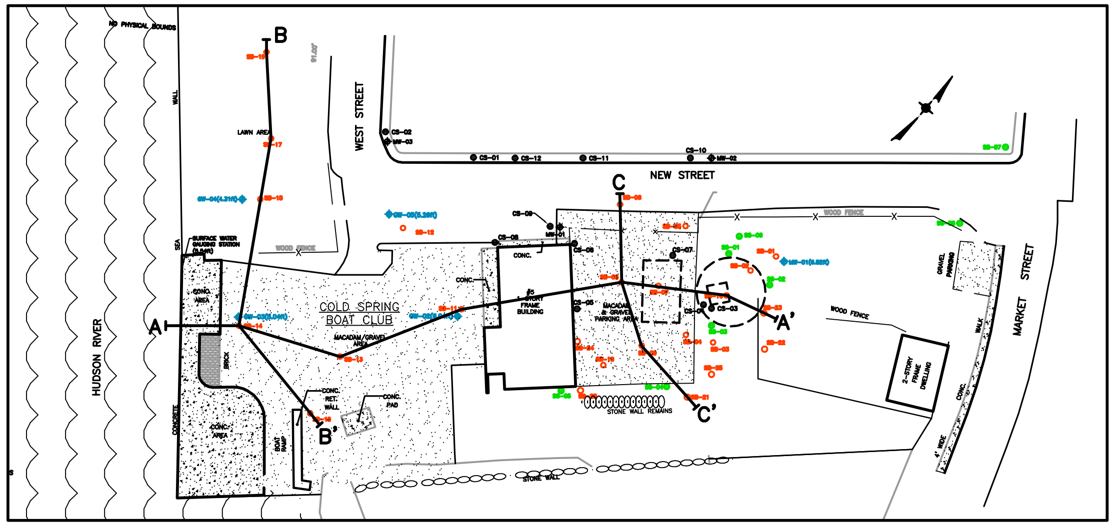




LEGEND

- ⛶ FILL AND/OR TOPSOIL
- ▨ CLAY
- ⛶ BEDROCK
- ▥ SOIL BORING
- ▤ WELL SCREEN FOR MONITORING WELL
- ——— GROUND SURFACE
- ——— — — — STRATIGRAPHIC CONTACT, DASHED WHERE INFERRED
- ———▼——— ELEVATION OF WATER TABLE GIVEN IN FEET ABOVE MEAN SEA LEVEL. DASHED WHERE INFERRED





KEY MAP
SHOWING CROSS−SECTION LINE

SCALE:1"=100'

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VILLAGE OF COLD SPRING
COLD SPRING FORMER MGP SITE
SITE INVESTIGATION/REMEDIAL ALTERNATIVES REPORT

NORTH-SOUTH GEOLOGIC CROSS SECTIONS B-B' AND C-C'

FIGURE 3-2

- Fill Unit
- Clay Unit
- Bedrock

The following presents additional discussion and detail concerning each unit.

3.1.1 Fill Unit

The Fill Unit, which directly underlies the Site and surrounding areas, typically consists of fine to coarse sand with significant amounts of gravel and anthropogenic materials such as brick, ash and coal. The Fill Unit also contains the subsurface remnants of MGP structures. Some silt and clay has been observed in many of the completed probes, especially in those completed on the Site itself. Overall, the Fill Unit is likely fairly permeable. The color of the fill is typically brown, but also gray and olive. As shown on the cross sections provided on Figures 3-1 and 3-2, the Fill Unit is generally 10 to 15 feet thick. However, the Fill Unit appears to be thicker than 15 feet at a number of probes located on the former MGP site, including SB-02, SB-04, SB-05 and SB-08. On the southern portion of the Site, where bedrock is shallowest, the unit is at its thinnest, with a minimum thickness of 3 feet at SB-21 and SB-25.

3.1.2 Clay Unit

Immediately below the fill generally exists a continuous Clay Unit. The Clay Unit generally consists of a soft gray to olive organic clay, often described as silty and containing peat and wood in some areas. In addition, numerous samples of the Clay Unit contained shell fragments typical of marine or aquatic environments. Note that the unit is sometimes reported as brown in color, especially in probes completed on the former MGP site. At its thickest, the Clay Unit appears to be in excess of 15 to 20 feet thick, especially in the vicinity of the Hudson River. The Clay Unit ranges in thickness from 2 feet at SB-16, located on the former MGP site, to more than 21 feet at SB-12, located downgradient of the Site. On the former MGP site, the Clay Unit was not fully penetrated in most soil probes, but is usually a minimum of 5 feet thick. In general, the Clay Unit increases in thickness in the direction of the Hudson River (west to southwest) following the contour of the bedrock.

Due to its thickness and clay-rich nature, the Clay Unit likely serves as an effective confining unit. However, the Clay Unit is generally not present in the southern portion of the former MGP site where bedrock is shallowest. At soil probes SB-03, SB-09, SB-10, SB-20, SB-21 and SB-25, the Fill Unit transitions directly to the bedrock with the Clay Unit being completely absent at depths generally less than 10 feet.

3.1.3 Bedrock

Underlying all the unconsolidated geologic units discussed above exists bedrock. Core samples of the bedrock were not collected. However, the project site is located in the Hudson Highlands physiographic province, which consists of a series of complexly folded and faulted metamorphic and igneous rocks. In the vicinity of the Site, the underlying bedrock is mapped as biotite-quartz-plagioclase gneiss with subordinate biogranitic gneiss, amphibolite and calcsilicate rock (Fisher, D.W. et. al. compilers, 1970 Geologic map of New York, New York State Geologic Map and Chart Series No. 15, Lower Hudson Sheet).

As indicated on the cross sections and boring logs, the bedrock surface is relatively shallow on the southern portion of the Site being located at a depth of only 3 feet below grade at probes SB-21 and SB-25. Directly south of the former MGP site exists a bedrock outcrop rising up to 40 feet above the area of the former MGP. This outcrop and associated hillside trends in a roughly east-west direction along the southern property line of the Cold Spring Boat Club.

The bedrock appears to dip steeply in the direction of the Hudson River (west to southwest) and dips to the northwest under the remainder of the former MGP site. Bedrock was not encountered at soil probes SB-14 and SB-15 located near the Hudson River, despite a completion depth of 33 feet. Note that refusal was encountered at SB-19 at a depth of 9 feet. However, given the location of this boring, it is unlikely that bedrock was encountered at this shallow depth. It is suspected that a former foundation or historical structure was encountered, given the soil sample did contain a small portion of brick.

Note that a thin discontinuous zone of weathered bedrock, generally consisting of a coarse gravel, was observed in some soil probes, including SB-09, SB-21 and SB-25.

3.2 Groundwater

As discussed in Section 2.5, a total of four rounds of water level measurements were collected from all accessible monitoring wells, including the five wells installed as part of the Site Investigation (GW-01 through GW-05) and the existing NYSDEC well (MW-1). In addition, a gauging station on the Hudson River was measured. The four rounds of water level measurements, with calculated water elevations, are summarized in Table 3-1. Figure 3-3 is a water table contour map generated using water level measurements from the November 19, 2008 round. Note that all wells are screened at the water table within the Fill Unit.

Based on a review of Table 3-1, groundwater is located approximately 2 to 4 feet below grade at and downgradient of the Site. Close to the Hudson River, groundwater has been measured at less than 2 feet below grade. Figure 3-3 indicates that shallow groundwater flow is to the southwest toward the Hudson River.

Based on observed variations in the water level at the surface water gauging station (see Table 3-1), there is an apparent maximum tidal range of approximately 4 feet in the Hudson River downgradient of the Site. Monitoring wells in the vicinity of the river also show an apparent tidal influence, including GW-02 through GW-05. The wells closest to the river (GW-03 and GW-04), show the greatest influence, with a tidal fluctuation of approximately 1.5 feet.

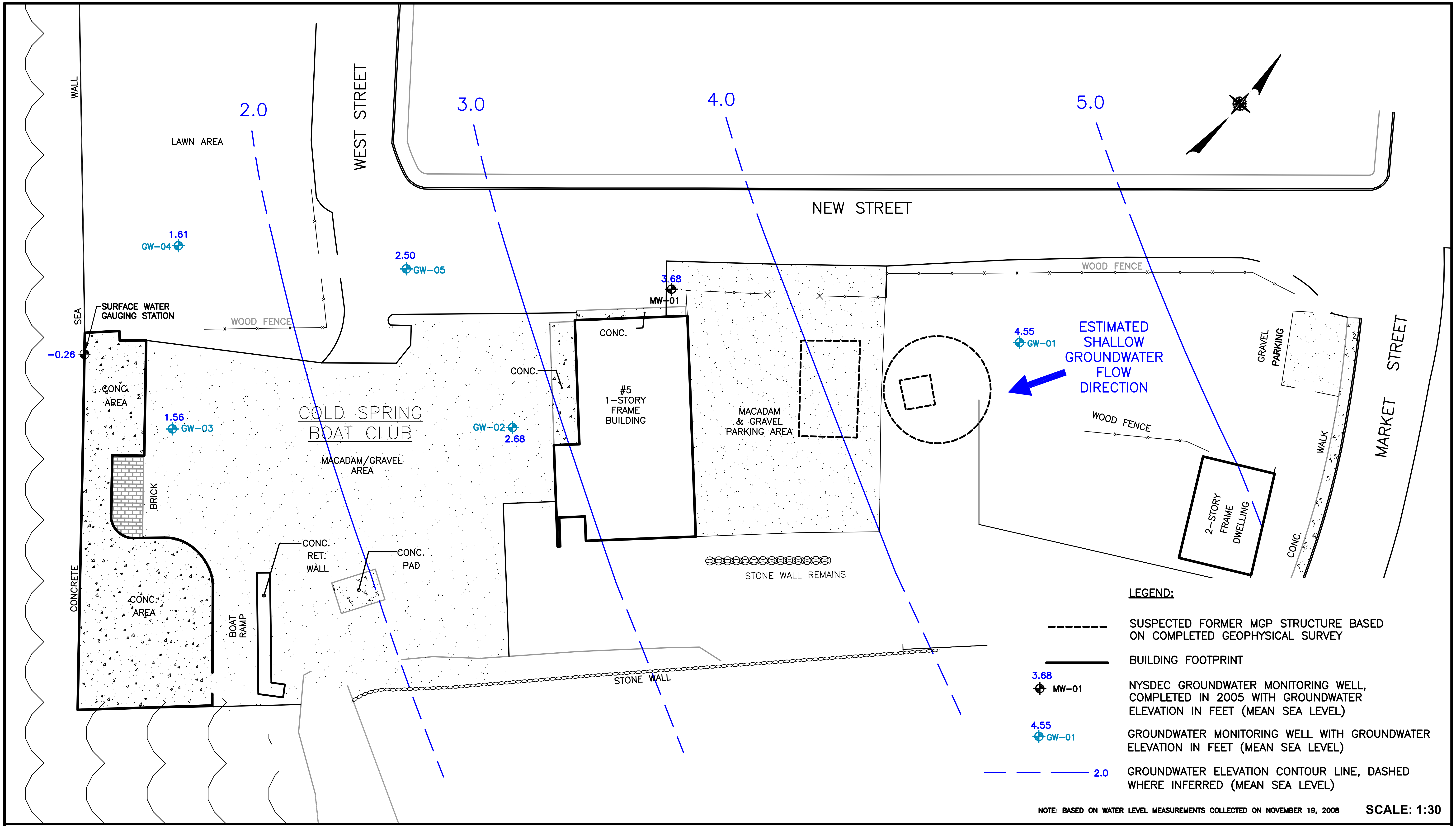
TABLE 3-1

Village of Cold Spring
Cold Spring Former Manufactured Gas Plant Site
Site Investigation

WATER LEVEL MEASUREMENTS AND GROUNDWATER ELEVATIONS

	September 22, 2008				October 2, 2008				October 20, 2008				November 19, 2008			
Well #	**TOC Elevation (ft msl)**	**Depth to Bottom (ft)**	**Depth to Water (ft)**	**Water Elevation (ft msl)**	**TOC Elevation (ft msl)**	**Depth to Bottom (ft)**	**Depth to Water (ft)**	**Water Elevation (ft msl)**	**TOC Elevation (ft msl)**	**Depth to Bottom (ft)**	**Depth to Water (ft)**	**Water Elevation (ft msl)**	**TOC Elevation (ft msl)**	**Depth to Bottom (ft)**	**Depth to Water (ft)**	**Water Elevation (ft msl)**
GW-01	6.82	12.12	2.58	4.24	6.82	12.13	2.64	4.18	6.82	12.13	2.61	4.21	6.82	12.13	2.27	4.55
GW-02	6.04	11.85	3.54	2.50	6.04	11.84	3.13	2.91	6.04	11.84	3.16	2.88	6.04	11.84	3.36	2.68
GW-03	5.04	12	3.51	1.53	5.04	12.02	3.01	2.03	5.04	12.02	1.75	3.29	5.04	12.02	3.48	1.56
GW-04	4.31	11.88	2.77	1.54	4.31	12	2.25	2.06	4.31	12	1.12	3.19	4.31	12	2.7	1.61
GW-05	5.26	11.89	2.92	2.34	5.26	11.7	2.48	2.78	5.26	11.7	2.36	2.90	5.26	11.7	2.76	2.50
MW-01	6.37	5.5	N/A	N/A	6.37	5.46	2.7	3.67	6.37	5.46	2.81	3.56	6.37	5.46	2.69	3.68
PIER BENCHMARK	5.54	N/A	5.65	-0.11	5.54	N/A	5.23	0.31	5.54	N/A	1.20	4.34	5.54	N/A	5.8	-0.26

NOTES:
Measurements collected in feet below top of casing
MSL: Mean Sea Level
TOC: Top of Well Casing
N/A: Not Measured



VILLAGE OF COLD SPRING

COLD SPRING FORMER MGP SITE
SITE INVESTIGATION / REMEDIAL ALTERNATIVES REPORT
GROUNDWATER CONTOUR MAP

Dvirka
and
Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

FIGURE 3-3

4.0 SITE CHARACTERIZATION FINDINGS

This section presents a detailed discussion of the results of the Site Investigation specific to the presence or absence of MGP tar impacts and related contaminants. In order to present a logical discussion of the data generated as part of this Site Investigation, the discussion has been organized into the following subsections:

- Extent of MGP Tar Impacts
- Surface Soil
- Subsurface Soil
- Groundwater
- Sub-Slab Vapor and Indoor Air
- Surface Water Sediment
- Exposure Assessment
- Summary of Conditions

Drawing 1, introduced in Section 2.0, graphically presents the locations of all samples collected as part of this investigation. Appendix B contains data tables summarizing the chemical data for all samples collected during the Site Investigation. Drawing 2, provided in a map pocket at the end of this section, summarizes all total BTEX and total PAH concentrations for surface soil, subsurface soil, groundwater and surface water sediment samples.

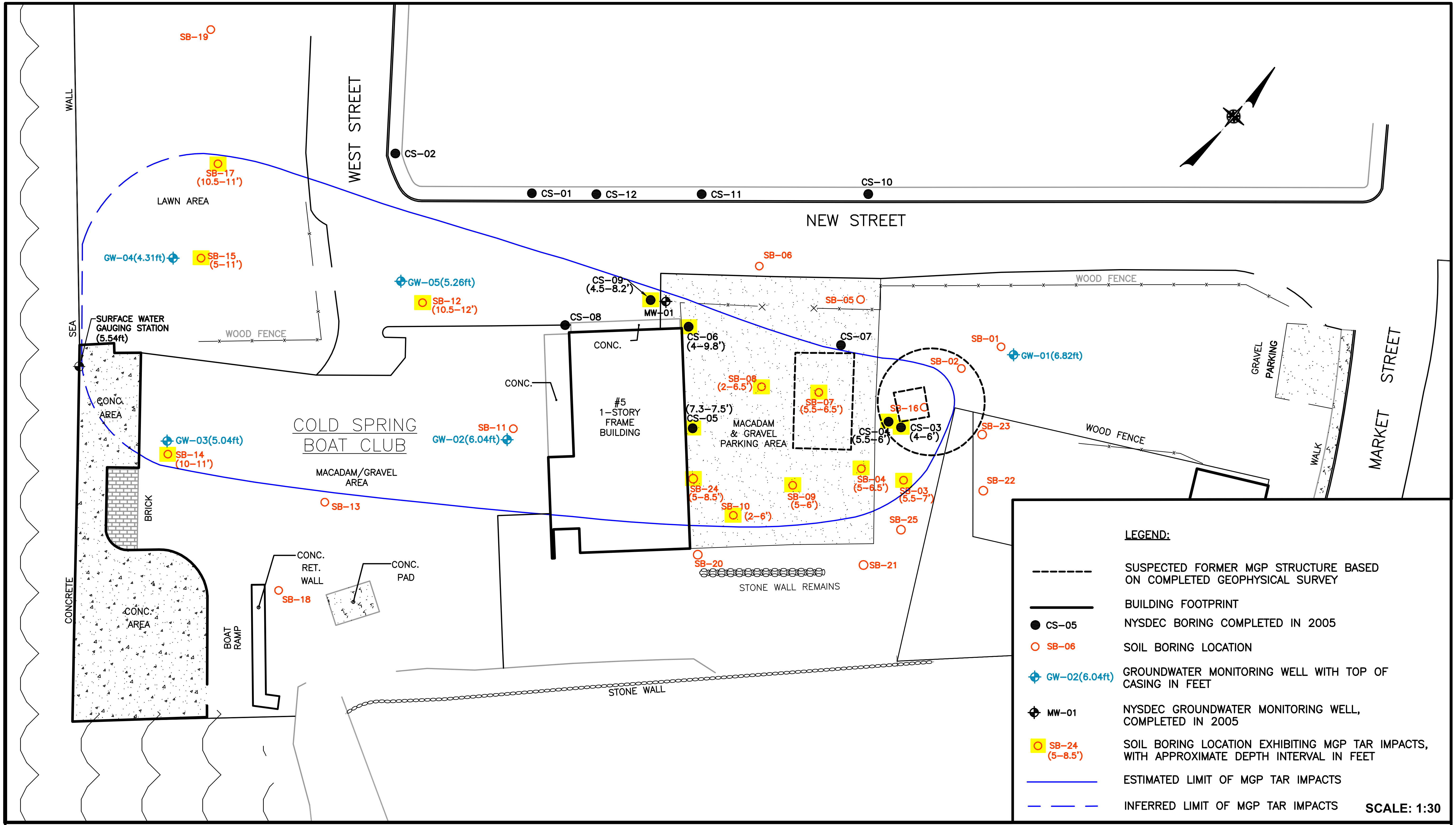
The assessment of the presence of chemical constituents of concern in the environment was performed utilizing sample analytical results and physical descriptions of recovered sample media. In addition, the analytical results of the investigation were compared to standards, criteria and guidelines (SCGs) to protect human health and the environment. SCGs for the site, developed as part of the Site Investigation scope of work, included Soil Cleanup Objectives (SCOs) for surface and subsurface soil as defined in the NYSDEC 6 NYCRR Part 375, including SCOs for unrestricted use and SCOs for the protection of human health based on commercial land uses. For groundwater, Class GA groundwater standards and guidance values (hereinafter referred to as Class GA Standards) provided in the NYSDEC Technical and Operation Guidance Series (TOGS) (1.1.1) were utilized as SCGs.

4.1 Extent of MGP Tar Impacts

The following is a discussion of the extent of MGP tar impacts in subsurface soil associated with the Cold Spring former MGP site based on the completed soil probes, the NYSDEC 2005 soil borings and water level/NAPL measurements collected from all monitoring wells between September and November 2008. In addition, one subsurface soil sample collected at SB-04 (7 to 9 feet) was submitted to META Environmental, Inc. for forensic hydrocarbon fingerprint analysis to determine the likely source of the tar. A copy of the META Environmental, Inc. lab report is provided in Appendix F.

Figure 4-1 provides the estimated extent of MGP tar impacts to subsurface soil based on all available soil data. As shown on Figure 4-1, the most extensive MGP tar impacts were encountered within and immediately downgradient of the former MGP site, with evidence of tar and/or heavy staining extending from approximately 2 feet to 12 feet below grade. At a number of probes, including SB-03 and SB-10, tar impacts extend to or within a foot of the soil/bedrock interface. Soil recovered from soil probes SB-04, SB-07, SB-08 and SB-10 exhibited the most significant evidence of tar, with maximum PID measurements at SB-04 and SB-10 of 1,976 ppm and 1,602 ppm, respectively. As discussed in Section 4.3, the highest BTEX and PAH concentrations identified during this investigation were from soil samples collected from SB-03, SB-04 and SB-10.

As shown on Figure 4-1, MGP tar impacts do not appear to extend beyond the easternmost rim of the former gas holder foundation defined by the completed geophysical investigation, with no physical evidence of impacts detected at SB-01, SB-02, SB-16, SB-22 and SB-23.



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VILLAGE OF COLD SPRING

COLD SPRING FORMER MGP SITE
SITE INVESTIGATION / REMEDIAL ALTERNATIVES REPORT
ESTIMATED EXTENT OF MGP TAR IMPACTS

FIGURE 4-1

Tar impacts extend downgradient of the former MGP in a west/southwesterly direction and include a portion of New Street, West Street and the Cold Spring Boat Club property. However, the vertical extent of tar impacts generally appears limited in these downgradient areas to a thickness of 1 to 6 feet. Furthermore, the impacts are found at depths of 5 to 12 feet below grade. PID measurements were also found to be considerably lower in these areas when compared to impacted soil in the vicinity of the former MGP. No evidence of tar or free-phase NAPL was detected in any groundwater monitoring wells located throughout the downgradient areas during the water/NAPL monitoring conducted between September and November 2008.

As summarized in Appendix F, the hydrocarbon fingerprint analysis performed on the soil sample collected from SB-04 confirmed the presence of MGP tar which has been subjected to moderate weathering. Based on the distribution of BTEX and PAH compounds, META Environmental, Inc. concluded that the tar was most characteristic of a carbureted water gas process. It is possible that the former MGP utilized this gas manufacturing process given it was widely used by the mid-1870’s and the MGP was operational by 1868.

4.2 Surface Soil

As summarized in Table 2-1, a total of 8 surface soil samples were collected for chemical analysis as part of the Site Investigation with SS-01 through SS-06 collected in the vicinity of the former MGP and SS-07 and SS-08 collected off-site to determine background conditions. All samples were analyzed for PAHs, RCRA metals and cyanide. All chemical data is presented in Tables 4-1 and 4-2 provided in Appendix B.

While not a part of this Site Investigation, four surface soil samples were collected for the Village of Cold Spring by Ira D. Conklin & Sons, Inc (ICS) in April 2005. A letter report summarizing the results of laboratory analysis of these samples is provided in Appendix C. The results of this 2005 sampling will help establish typical background conditions for surficial soil in and around the Village of Cold Spring. These surface soil samples were analyzed for VOCs by USEPA method 8260, SVOCs by USEPA method 8270 and RCRA metals. For purpose of discussion within this section, these samples are referred to as the ICS background samples.

PAH

As depicted on Drawing 2, total PAH concentrations in surface soil samples collected from the on-site locations ranged from 0.126 milligrams per kilograms (mg/kg) in SS-01 to a maximum of 364.1 mg/kg in SS-05 located by the southeast corner of the Cold Spring Boat Club building. The next highest total PAH concentration of 28.5 mg/kg was detected at SS-04, located approximately 55 feet northeast of SS-05. Total PAH concentrations in background soil samples SS-07 and SS-08 were found to be considerably lower at 0.82 to 3.20 mg/kg, respectively. In addition, the total PAH concentrations for the four ICS background samples ranged from 1.14 to 9.4 mg/kg.

Only SS-04 and SS-05 exhibited PAHs exceeding the unrestricted use SCOs and/or commercial use SCOs including:

- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Chrysene
- Dibenzo(a,h)anthracene (SS-05 only)
- Indeno(1,2,3-cd)pyrene

RCRA Metals and Cyanide

All surface soil samples exhibited one or more RCRA metals exceeding their respective unrestricted use SCOs, including background samples SS-07 and SS-08. Silver exceeded the unrestricted use SCO of 2 mg/kg in all eight surface soil samples, including SS-07 and SS-08. Background sample SS-08 had a concentration of 3.69 mg/kg, while the highest concentration was detected in SS-02 at 7.64 mg/kg. Cadmium, lead and mercury also exceeded the unrestricted use SCOs in SS-02, SS-05, and background sample SS-08. Only lead exceeded the unrestricted use SCO in SS-04 and background sample SS-07. Cadmium, lead and mercury have unrestricted use SCOs of 2.5, 63, and 0.18 mg/kg, respectively and were detected in background sample SS-08 at 2.78, 313, and 0.234 mg/kg, respectively. The highest concentrations of cadmium, lead, and mercury were detected in SS-05 at 4.4, 315, and 0.615 mg/kg, respectively. A review of the ICS background surface soil samples indicated the presence of a number of RCRA metals at elevated concentrations, including lead at 619 mg/kg and mercury at 2.27 mg/kg.

Cyanide was not detected in any of the eight surface soil samples.

4.3 Subsurface Soil

As summarized in Table 2-1, a total of 19 subsurface soil samples were collected for chemical analysis. Two subsurface soil samples, SB-03 (5-7 feet) and SB-07 (8-10 feet), located in the immediate vicinity of the former MGP structures, were selected for analysis of TCL VOCs, TCL SVOCs, TAL metals, PCBs and cyanide. The remaining 17 subsurface soil samples were analyzed for BTEX, PAHs and cyanide. The chemical data associated with the subsurface soil samples are provided in Tables 4-3 through 4-7.

VOCs and BTEX

In addition to BTEX compounds, the two samples selected for full TCL VOC analysis [SB-03 (5-7 feet) and SB-07 (8-10 feet)] also exhibited several additional VOCs, including 1-methylethyl-benzene, methylcyclohexane and styrene, to a maximum concentration of 87 mg/kg. However, commercial or unrestricted use SCOs have not been established for these VOCs.

Total BTEX concentrations in subsurface soil samples are depicted on Drawing 2. Eleven out of 19 subsurface soil samples exhibited detectible concentrations of BTEX with the highest concentrations found within and immediately downgradient of the former MGP, including:

- SB-03 (5-7 feet) with a total BTEX concentration of 1,286 mg/kg;
- SB-04 (7-9 feet) with a total BTEX concentration of 833 mg/kg; and
- SB-10 (5-7 feet) with a total BTEX concentration of 521 mg/kg.

As discussed in Section 4.1, this area also contained the most extensive tar impacts and elevated PID readings in subsurface soil.

As summarized in Table 4-3, benzene, ethylbenzene and toluene were detected at concentrations above the commercial and/or unrestricted use SCOs in the following samples:

- SB-03 (5-7 feet)
- SB-04 (7-9 feet)
- SB-07 (8-10 feet)

Ethylbenzene was detected at concentrations above the unrestricted use SCO of 1 mg/kg in the following samples:

- SB-12 (12-14 feet)
- SB-14 (13-15 feet)
- SB-15 (13-15 feet)
- SB-17 (12-14 feet)

In addition, ethylbenzene and toluene were detected at concentrations above the unrestricted use SCOs in the following sample:

- SB-10 (5-7 feet)

SVOCs and PAH

In addition to PAH compounds, the two samples selected for full TCL SVOC analysis [SB-03 (5-7 feet) and SB-07 (8-10 feet)] also exhibited several additional SVOCs, including bipheny1, carbazole, p-cresol and phenol. P-cresol and phenol exceeded the unrestricted use SCO of 0.33 mg/kg in SB-03 (5-7 feet). P-cresol and phenol were detected in SB-03 (5-7 feet) at 0.47 mg/kg and 0.62 mg/kg, respectively. Bipheny1 and carbazole do not have established commercial or unrestricted use SCOs.

As shown on Drawing 2, 17 out of the 19 subsurface soil samples exhibited detectible concentrations of PAHs with the highest concentrations found within and immediately downgradient of the former MGP, including:

- SB-04 (7-9 feet) with a total PAH concentration of 1,104.1 mg/kg; and
- SB-10 (5-7 feet) with a total PAH concentration of 2,698.7 mg/kg.

As discussed in Section 4.1, this area also contained the most extensive tar impacts and elevated PID readings in subsurface soil.

Total PAH concentrations were also found at relatively high concentrations in several samples collected downgradient of the former MGP and adjacent to the Hudson River, including:

- SB-14 (13-15 feet) with a total PAH concentration of 1,649.7 mg/kg; and
- SB-15 (13-15 feet) with a total PAH concentration of 738.9 mg/kg.

As summarized in Table 4-4, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene and chrysene were detected at concentrations above the commercial and/or unrestricted use SCOs in the following samples:

- SB-03 (5-7 feet) SB-04 (7-9 feet) SB-07 (8-10 feet)
- SB-08 (4-6 feet) SB-09 (7-9 feet) SB-10 (5-7 feet)
- SB-11 (11-13 feet) SB-12 (12-14 feet) SB-14 (13-15 feet)
- SB-15 (13-15 feet) SB-17 (12-14 feet) SB-20 (3-5 feet)

In addition, benzo(k)fluoranthene, indeno(1,2,3-cd)pyrene and dibenzo(a,h)anthracene were detected at concentrations above commercial and/or unrestricted use SCOs in the following samples:

- SB-03 (5-7 feet) SB-04 (7-9 feet) SB-08 (4-6 feet)
- SB-09 (7-9 feet) SB-10 (5-7 feet) SB-11 (11-13 feet)
- SB-12 (12-14 feet) SB-14 (13-15 feet) SB-15 (13-15 feet)
- SB-20 (3-5 feet)
- Only indeno(1,2,3-cd)pyrene in SB-07 (8-10 feet)
- Only benzo(k)fluoranthene in SB-17 (12-14 feet)

In addition, fluorene, acenaphthene, naphthalene, phenanthrene, pyrene and dibenzofuran were detected at concentrations above commercial and/or unrestricted use SCOs in the following samples:

- SB-04 (7-9 feet)
- SB-10 (5-7 feet)
- SB-14 (13-15 feet)
- Only naphthalene in SB-03 (5-7 feet) and SB-12 (12-14 feet),
- Only acenaphthene and naphthalene in SB-08 (4-6 feet)
- Only fluorene, naphthalene, phenanthrene, and dibenzofuran in SB-15 (13-15 feet)

In addition, fluoranthene was detected at a concentration above the unrestricted use SCO in the following sample:

- SB-10 (5-7 feet)

TAL Metals and Cyanide

Two subsurface soil samples, SB-03 (5-7 feet) and SB-07 (8-10 feet), were analyzed for all TAL metals. All 19 subsurface soil samples were analyzed for the presence of cyanide. Cyanide was not detected in 16 of the subsurface soil samples. TAL metals and cyanide were not detected above their respective SCOs.

PCBs

Two subsurface soil samples, SB-03 (5-7 feet) and SB-07 (8-10 feet), were analyzed for PCBs. PCBs were not detected in either sample.

4.4 Groundwater

As summarized in Table 2-1, a total of 5 monitoring wells (GW-01 through GW-05) were installed and sampled as part of the field investigation. Temporary well point SB-22 and one existing NYSDEC well (MW-01) were also sampled. GW-01 and SB-22 are located upgradient of the former MGP and MW-01 and GW-02 are located immediately downgradient (less than 100 feet) from the former MGP. Two monitoring wells, GW-01 and GW-05, were selected for analysis of TCL VOCs, TCL SVOCs, TAL metals, PCBs and cyanide. The remaining five groundwater samples were analyzed for BTEX, PAHs, and cyanide. The chemical data associated with the groundwater samples are provided in Tables 4-8 through 4-12.

VOCs and BTEX

In addition to BTEX compounds, the groundwater samples from GW-01 and GW-05 were selected for full TCL VOC analysis. Chloroform was detected in GW-01 below its Class GA groundwater standard. No other TCL VOCs were detected.

As depicted on Drawing 2, three out of the seven groundwater samples exhibited detectible concentrations of BTEX with the highest concentrations found downgradient of the former MGP and adjacent to the Hudson River, including:

- GW-04 with a total BTEX concentration of 26.3 micrograms per liter (ug/l);
- GW-03 with a total BTEX concentration of 5.9 ug/l; and
- GW-02 with a total BTEX concentration of 1.2 ug/l.

As summarized in Table 4-8, monitoring well GW-04 was the only sample that exhibited elevated concentrations of BTEX exceeding Class GA groundwater standards. Benzene, ethylbenzene, o-xylene, and m&p-xylene have Class GA groundwater standards of 1, 5, 5, and 5 ug/l, respectively and were detected in GW-04 at concentrations of 3.5, 8.7, 7 and 7.1 ug/l, respectively.

SVOCs and PAH

In addition to PAH compounds, the groundwater samples collected from GW-01 and GW-05 were selected for full TCL SVOC analysis. Benzaldehyde was detected in GW-01 at a concentration of 2.1 ug/l. Benzaldehyde does not have an established Class GA groundwater standard. No other TCL SVOCs were detected other than PAH compounds in GW-05.

As depicted on Drawing 2, four out of the seven groundwater samples exhibited detectible concentrations of PAHs with the highest concentrations found downgradient of the former MGP and adjacent to the Hudson River, including:

- GW-04 with a total PAH concentration of 78.1 ug/l; and
- GW-03 with a total PAH concentration of 41.2 ug/l.

As summarized in Table 4-9, the groundwater sample collected from monitoring well GW-04 exhibited concentrations of acenaphthene and naphthalene above their respective Class GA groundwater standards of 20 ug/l and 10 ug/l. The sample collected from monitoring well GW-03 exhibited a concentration of naphthalene above the Class GA groundwater standard. The highest concentrations were detected in GW-04 with acenaphthene detected at 29 ug/l and naphthalene detected at 19 ug/l.

TAL Metals and Cyanide

Due to the high turbidity of groundwater samples collected from the GW-01 and GW-05, TAL metals were analyzed for unfiltered (total) and filtered (dissolved phase) concentrations. As expected, the filtered groundwater samples generally exhibited lower metal concentrations than the corresponding unfiltered metal samples. It should be noted that with groundwater samples, filtered samples provide a more accurate measure of the actual metal concentrations when compared to unfiltered samples given the inherent turbidity of the groundwater samples.

The groundwater samples exhibited concentrations of iron, manganese and/or sodium which exceeded the Class GA groundwater standards. Iron exceeded the Class GA groundwater standards in both unfiltered and filtered samples for GW-01 and GW-05. Filtered iron has a Class GA groundwater standard of 300 ug/l and the highest concentration was detected in GW-05 at 2,370 ug/l. Manganese also exceeded the Class GA groundwater standard for both the unfiltered and filtered sample for GW-05. Filtered manganese has a Class GA groundwater standard of 300 ug/l and was detected in GW-05 at 1,320 ug/l. Sodium exceeded the Class GA groundwater standard in both total and filtered samples for GW-01 and GW-05. Filtered sodium has a Class GA groundwater standard of 20,000 ug/l and the highest concentration was detected in GW-05 at 169,000 ug/l.

All seven groundwater samples were analyzed for the presence of cyanide. Cyanide was not detected in five of the groundwater samples. Cyanide was detected in GW-02 and GW-03, but not at a concentration above the Class GA groundwater standard of 200 ug/l.

PCBs

Two groundwater samples, GW-01 and GW-05, were analyzed for PCBs. PCBs were not detected in either sample.

4.5 Sub-Slab Vapor and Indoor Air

As discussed in Section 2.6, a total of two indoor air, two sub-slab vapor and one outdoor ambient air sample were collected in order to determine if soil vapor intrusion of MGP-related contaminants is a potential concern within the Cold Spring Boat Club building. All chemical data associated with these samples are provided on Tables 4-13 and 4-14, in Appendix B. The results of the indoor and outdoor air analysis have been compared to the New York State Department of Health (NYSDOH) background indoor air data for fuel oil-heated homes (Table C1, 75th percentile), dated October 2006. Note that there are no relevant background guidance values for sub-slab air data. As part of the vapor intrusion investigation, D&B completed an inventory of chemicals and products stored in the Boat Club building that may contain VOCs and influence the indoor air test results.

A number of VOCs were detected in both sub-slab soil vapor samples (SG-01 and SG-02), including acetone, benzene, carbon disulfide, cyclohexane, 1,2,4-trimethylbenzene, heptane, m/p-xylene, methyl ethyl ketone (MEK), methylene chloride, n-hexane, O-dichlorobenzene, tetrachloroethylene, toluene and trichlorofluoromethane. With the exception of benzene, m/p-xylene, 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene, the above listed chemicals are not associated with MGP tar. In addition, acetone is a common laboratory contaminant.

The ambient air samples (IA-01 and IA-02) collected from within the Boat Club building were found to contain a number of VOCs, but carbon tetrachloride was the only compound detected above the NYSDOH background data. Several MGP-related VOCs were detected in the indoor air samples below the NYSDOH background data, including benzene, xylene and toluene. However, these compounds are also found in a wide variety of products such as gasoline and other petroleum distillates which are stored in the Boat Club building. Carbon tetrachloride is not associated with MGP tar, but is found in a wide range of consumer products, including cleaning fluids and aerosol propellants. The one ambient air sample (AA-01) collected outside the Boat Club building also exhibited carbon tetrachloride above the NYSDOH background data.

4.6 Surface Water Sediment

As discussed in Section 2.7, six surface water sediment samples (SS1S, SS1D, SS2S, SS2D, SS3S and SS3D) from three locations on the Hudson River downgradient of the former MGP site were collected for VOC and SVOC analysis by the NYSDEC in October 2008. A copy of the NYSDEC report is provided in Appendix E. VOCs and SVOCs were not detected above NYSDEC Technical Guidance for Screening Contaminated Sediments (revised on January 25, 1999).

The following VOCs were detected in the surface water sediment samples: acetone, chloroform and 2-butanone. None of these compounds are listed in the NYSDEC Technical Guidance for Screening Contaminated Sediments. In addition, acetone and chloroform were detected in the associated method blank and 2-butanone is a common laboratory contaminant.

The total BTEX concentrations were non-detect in all six surface water sediment samples. The total BTEX data is presented on Drawing 2.

The following SVOCs were detected in the surface water sediment samples: fluoranthene, pyrene, benzo(a)anthracene, chrysene, phenanthrene, benzo(b)fluoranthene, benzo(a)pyrene and benzo(g,h,i)perylene. Chrysene and benzo(g,h,i)perylene are not listed in the NYSDEC Technical Guidance for Screening Contaminated Sediments. The remaining compounds were detected at concentrations below the criteria. Benzo(a)anthracene, benzo(b)fluoranthene and benzo(a)pyrene have Human Health Bioaccumulation Sediment Criteria of 0.7 mg/kg. The highest concentration was detected in SS2D for benzo(a)anthracene at 0.27 mg/kg. Fluoranthene, pyrene and phenanthrene have Benthic Aquatic Life Chronic Toxicity Sediment Criteria of 1,020 mg/kg, 961 mg/kg, and 120 mg/kg, respectively. The highest concentration was detected in SS3D for pyrene at 0.5 mg/kg.

The total PAH concentrations ranged from non-detect in three surface water sediment samples to 2.38 mg/kg in SS3D. The total PAH data is presented on Drawing 2.

4.7 Exposure Assessment

The purpose of this exposure assessment is to determine how and when an individual might be exposed to contaminants of potential concern associated with the Cold Spring former MGP site. A contaminant of potential concern (COPC) is any chemical detected above the NYSDEC cleanup guidelines in a medium, which could produce adverse health effects under the right conditions of dose and exposure. For exposure to occur, there must be a complete "pathway of exposure" where a person can come into contact with COPCs. For a pathway to be complete, there must be: (1) a source or medium containing the COPCs; (2) a location where human contact can take place (i.e., an exposure point); and (3) a feasible means for the COPC to enter the person's body. The person who could come into contact with the COPC at an exposure point is called a "receptor." The ways in which the COPC can enter the body are called "routes of exposure." Ingestion (by mouth), dermal (contact with skin) and inhalation (breathing into the lungs) are the routes of exposure considered in this and other human health risk assessments. This assessment considers both current and potential future exposures.

As with any exposure assessment, it is not intended to predict disease outcome, but rather, is meant to be used as a tool to make decisions regarding the need for remediation or the institution of precautionary measures, such as limiting the affected area to non-residential land uses. Given the available information for this site, and keeping the purpose of the assessment in mind, the following evaluation for the Cold Spring former MGP site is qualitative in nature.

Consistent with the previous presentation of the environmental data, the exposure is presented by medium of interest.

Surface Soil

A number of contaminants were detected above the unrestricted SCOs in the six on-site surface soil samples, as well as the two background surface soil samples, including PAHs, lead, chromium, cadmium, mercury and silver. However, the background soil samples actually exhibited some of the highest metal concentrations, indicating the observed metal concentrations are typical of background soil concentrations within the vicinity of the former MGP and are not necessarily attributable to MGP-related contamination. The elevated metal concentrations detected in the ICS background surface soil samples further support this hypothesis.

PAHs detected in on-site surface soil samples SS-04 and SS-05 were found at concentrations well above background concentrations and above the NYSDEC unrestricted use SCOs. While PAHs are found in a wide range of materials, including asphalt and petroleum products, it is possible that the PAHs detected at these locations are, in part, from MGP tar. Both SS-04 and SS-05 were collected along the southern end of the parking area located to the east of the Cold Spring Boat Club building, which is accessible to the public. Therefore, there exists the potential for exposure to the PAHs by on-site receptors who may visit this area through dermal contact and inhalation of windblown dust. However, SS-04 and SS-05 represent a relatively small area containing elevated concentrations of PAHs.

Subsurface Soil

As detailed in Section 4.3, tar-impacted soil has been detected within the immediate vicinity of the former MGP site, with BTEX and PAHs exceeding the NYSDEC commercial use, as well as unrestricted use SCOs. As shown on Figure 4-1, tar-impacted soil is also present further downgradient of the former MGP site within the Cold Spring Boat Club property, a portion of New Street and the corner of New Street and West Street. However, at all boring locations, tar impacts were at depths of 2 feet or greater and, as a result, direct exposure of these contaminants will not occur under existing conditions. The only significant potential for exposure to the subsurface soil contaminants under current site conditions is for utility/construction workers who may need to complete excavations associated with the installation or repair of subsurface utilities in impacted areas. During such excavation activities, workers could be exposed to subsurface soil contaminants through several routes of exposure, including dermal contact and inhalation.

Groundwater

The completed groundwater sampling identified relatively low level contamination in the four groundwater monitoring wells located downgradient of the former MGP site. While several BTEX and PAH compounds were found to exceed NYSDEC Class GA groundwater standards, groundwater in the vicinity of the former MGP site is not used as a source of drinking water. According to available information, there are no known private or public groundwater supply wells within the Village of Cold Spring. The Village obtains its water supply from a reservoir located approximately 3 miles to the west of the Village. Therefore, the direct exposure to groundwater contaminants is not expected under current conditions. Similar to subsurface soil contaminants, utility construction workers who are required to perform excavation activities in areas downgradient of the former MGP site could be exposed to groundwater contaminants.

While groundwater containing BTEX and PAHs will discharge to the Hudson River, concentrations were found to be relatively low, and there is no evidence of free-phase NAPL or tar. Therefore, the natural flow of groundwater to the Hudson River is not expected to have an adverse impact to this resource. The surface water sediment sampling performed by the NYSDEC in the area of groundwater discharge has confirmed that significant impacts to the Hudson River have not occurred.

Indoor Air

The indoor vapor intrusion study performed at the Cold Spring Boat Club building determined that no MGP-related VOCs were present in indoor air above NYSDOH background concentrations. Several MGP-related VOCs were detected in the indoor air samples, but the presence of these compounds is likely the result of gasoline and other petroleum distillates being stored in the Boat Club building. Therefore, intrusion of MGP-related contaminants present in subsurface soil and groundwater into the Boat Club building is not considered a potential route of exposure.

Future Use and Potential Exposure Routes

Based on information provided by the Village of Cold Spring, there are no plans for the redevelopment of the Village parking lot or the Cold Spring Boat Club property. In addition, there are no major utility work or excavation activities planned for New Street or the corner of New Street and West Street. Therefore, site conditions are not expected to change in the foreseeable future. As discussed under Section 7.0, remedial actions are recommended to be completed, which will reduce the overall subsurface contaminant mass related to the former MGP site, as well as remove any identified potential routes of exposure related to surface soil located in the vicinity of the Village parking lot.

4.8 Summary of Conditions

This section provides a summary of the overall extent of contamination and potential routes of exposure associated with the Cold Spring former MGP site.

MGP tar and related chemical constituents have been identified in subsurface soil and groundwater within and downgradient (southwest) of the former MGP site. The most significant tar impacts are present to the south and southwest of the former gas holder in an area generally restricted to the Village public parking lot and surrounding lawn areas. BTEX and PAHs are found at concentrations above unrestricted and commercial SCOs in this area. The MGP tar impacts do not appear to extend into adjacent residential properties located to the east. The most significant MGP tar impacts are located at least 2 feet below grade in the parking lot area and, therefore, direct exposure to this contamination is not expected under existing conditions.

Two surface soil samples collected from the Village parking lot were found to contain PAHs in excess of unrestricted and commercial SCOs. While present in a wide range of materials including asphalt and other petroleum products, it is possible that the PAHs are associated with MGP tar. Given the shallow nature of the soil, these contaminants are potentially accessible to the public. Therefore, the presence of the PAHs in shallow soil represents a potential exposure pathway.

MGP tar and related chemical constituents are present in subsurface soil extending downgradient from the former MGP site in a west/southwesterly direction as shown on Figure 4-1. However, tar impacts are found at a minimum of 4 feet below grade in downgradient areas west of the Boat Club building and, therefore, direct exposure to these contaminants is not expected under current conditions. The vertical extent of tar impacts in downgradient areas appears to be limited to a maximum depth of 13 feet below grade. As discussed in Section 3.1.2, the low permeable clay unit present up to 20 feet thick in this area likely limits the vertical migration of tar. In general, BTEX and PAH concentrations are found at lower concentrations in these downgradient areas when compared to soil in the immediate vicinity of the former MGP. However, elevated levels of PAHs were detected in several downgradient soil borings including SB-14 and SB-15.

Evidence of free phase NAPL or tar was not detected in the monitoring wells located downgradient of the former MGP site. BTEX and PAHs were detected in these downgradient monitoring wells at relatively low concentrations. Several contaminants exceeding NYSDEC Class GA groundwater standards were identified in the samples collected from monitoring wells GW-03 and GW-04. However, this groundwater is not utilized as a source of drinking water and direct exposure to these contaminants is not expected under current conditions.

The soil vapor intrusion study completed at the Cold Spring Boat Club building indicates vapor intrusion of MGP-related contaminants present in soil and groundwater underlying the structure is not occurring and, therefore, is not considered a potential route of exposure.

Based on a southwesterly flow of groundwater, it is likely that groundwater containing BTEX and PAHs will discharge to the Hudson River. However, sampling of river sediments performed by the NYSDEC did not identify these contaminants at significant concentrations.

SB-19

Depth (ft.)	Total BTEX (mg/kg)	Total PAHs (mg/kg)
7-9	ND	5.561

SB-06

Depth (ft.)	Total BTEX (mg/kg)	Total PAHs (mg/kg)
7-9	ND	0.532

CS-06

Total BTEX (mg/kg)
2.015

MW-01

Total BTEX (ug/l)	Total PAHs (ug/l)
ND	ND

CS-01

Total BTEX (mg/kg)
0.499

GW-05

Total BTEX (ug/l)	Total PAHs (ug/l)
ND	30

CS-08

Total BTEX (ppm)
0.094

SB-17

Depth (ft.)	Total BTEX (mg/kg)	Total PAHs (mg/kg)
12-14	3.9	53.17

SB-15

Depth (ft.)	Total BTEX (mg/kg)	Total PAHs (mg/kg)
13-15	78	738.9

GW-04

Total BTEX (ug/l)	Total PAHs (ug/l)
26.3	78.1

DECSS-1

Depth (ft.)	Total BTEX (mg/kg)	Total PAHs (mg/kg)
0-.5'	ND	ND
1'2"-1'4"	ND	0.9

SB-12

Depth (ft.)	Total BTEX (mg/kg)	Total PAHs (mg/kg)
12-14	6.7	214.5

SB-11

Depth (ft.)	Total BTEX (mg/kg)	Total PAHs (mg/jkg)
11-13	ND	89.01

GW-03

Total BTEX (ug/l)	Total PAHs (ug/l)
5.9	41.2

DECSS-2

Depth (ft.)	Total BTEX (mg/kg)	Total PAHs (mg/kg)
0-.5'	ND	ND
1.5-2'	ND	2.09

SB-14

Depth (ft.)	Total BTEX (mg/kg)	Total PAHs (mg/kg)
13-15	3.23	1649.7

DECSS-3

Depth (ft.)	Total BTEX (mg/kg)	Total PAHs (mg/kg)
0-.5'	ND	ND
1'2"-1'4"	ND	2.38

SB-07

Depth (ft.)	Total BTEX (mg/kg)	Total PAHs (mg/kg)
8-10	38.3	51.59

CS-10

Total BTEX (mg/kg)
0.003

SS-01

Total PAHs (mg/kg)
0.1

SS-06

Total PAHs (mg/kg)
1.06

SS-07

Total PAHs (mg/kg)
0.82

SB-16

Depth (ft.)	Total BTEX (mg/kg)	Total PAHs (mg/kg)
6-8	ND	1.279

SS-08

TOTAL PAHs (mg/kg)
3.2

GW-01

Total BTEX (ug/l)	Total PAHs (ug/l)
ND	ND

SS-02

Total PAHs (mg/kg)
6.1

SB-23

Depth (ft.)	Total BTEX (mg/kg)	Total PAHs (mg/kg)
14-16	ND	ND

SB-22

Depth (ft.)	Total BTEX (mg/kg)	Total PAHs (mg/jkg)
14-16	ND	ND

SB-22 (GW)

Total BTEX (ug/l)	Total PAHs (ug/l)
ND	ND

GW-02

Total BTEX (ug/l)	Total PAHs (ug/l)
1.2	5.1

SB-18

Depth (ft.)	Total BTEX (mg/kg)	Total PAHs (mg/kg)
12-14	ND	1.37

SB-13

Depth (ft.)	Total BTEX (mg/kg)	Total PAHs (mg/kg)
11-13	1.61	9.788

SS-05

Total PAHs (mg/kg)
364.1

SB-20

Depth (ft.)	Total BTEX (mg/kg)	Total PAHs (mg/kg)
3-5	0.316	208.1

SB-10

Depth (ft.)	Total BTEX (mg/kg)	Total PAHs (mg/kg)
5-7	521	2698.7

SS-04

Total PAHs (mg/kg)
28.5

SB-09

Depth (ft.)	Total BTEX (ppm)	Total PAHs (ppm)
7-9	1.89	103.97

SB-08

Depth (ft.)	Total BTEX (mg/kg)	Total PAHs (mg/kg)
4-6	ND	332.4

SS-03

Total PAHs (mg/kg)
5.8

SB-03

Depth (ft.)	Total BTEX (mg/kg)	Total PAHs (mg/kg)
5-7	1286	136.49

SB-04

Depth (ft.)	Total BTEX (mg/kg)	Total PAHs (mg/kg)
7-9	833	1104.1

LEGEND:

● SS-01	SURFACE SOIL SAMPLE LOCATION
○ SB-01	SOIL BORING LOCATION
⊕ GW-01(6.82FT)	GROUNDWATER MONITORING WELL WITH TOP OF CASING IN FEET
⊗ DECSS-1	NYSDEC SURFACE WATER SEDIMENT SAMPLE LOCATION (OCTOBER 2008)
● CS-01	NYSDEC BORING COMPLETED IN 2005
⊕ MW-01	NYSDEC GROUNDWATER MONITORING WELL, COMPLETED IN 2005
--------	SUSPECTED FORMER MGP STRUCTURE BASED ON COMPLETED GEOPHYSICAL SURVEY
——	BUILDING FOOTPRINT

SB-03

Depth (ft.)	Total BTEX (mg/kg)	Total PAHs (mg/kg)
5-7	1286	136.49

SOIL BORING SAMPLE ID
TOTAL POLYCYCLIC AROMATIC HYDROCARBON CONCENTRATION IN MILLIGRAMS PER KILOGRAM
TOTAL BTEX CONCENTRATION IN MILLIGRAMS PER KILOGRAM
DEPTH OF SAMPLE COLLECTED

GW-05

Total BTEX (ug/l)	Total PAHs (ug/l)
ND	30

GROUNDWATER SAMPLE ID
TOTAL POLYCYCLIC AROMATIC HYDROCARBON CONCENTRATION IN MICROGRAMS PER LITER
TOTAL BTEX CONCENTRATION (NOT DETECTED)

SOURCE: WILLIAM D. YOUNGBLOOD LAND SURVEYING P.C, SURVEY FOR THE VILLAGE OF COLD SPRING, DATED SEPTEMBER 11, 2008

NO.	DATE	REVISION	INT.

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VILLAGE OF COLD SPRING

PUTNAM COUNTY NEW YORK

SITE INVESTIGATION / REMEDIAL ALTERNATIVES ANALYSIS REPORT COLD SPRING FORMER MGP SITE

BTEX AND PAH CONCENTRATIONS IN SOIL AND GROUNDWATER

PROJECT NO. 2820
DATE: DECEMBER 2008
SCALE: 1:20
DRAWING NO. 2

5.0 REMEDIAL TECHNOLOGY ASSESSMENT

5.1 Introduction

In general, response actions which satisfy remedial objectives for a site include institutional, isolation, containment, removal or treatment actions which will be developed into alternatives. In addition, New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation draft technical guidance for site investigation and remediation dated December 2002 (DER-10) requires the evaluation and comparison of a no-action alternative as well as a "pre-disposal conditions" alternative to the remaining alternatives. Each alternative for each media of concern are developed to satisfy the remedial actions objectives for the site or the specific area of concern. Technologies and process options, which are available commercially and have been demonstrated to be successful for remediating sites with similar contaminants of concern, are identified in the discussion below. The technologies which are not appropriate for the site due to site specific factors or constraints have not been included for further consideration.

Regarding the technologies selected for evaluation, it should be noted that various in situ treatment technologies requiring longer timeframes and offering less certain degrees of effectiveness were not considered applicable due to the existing and future use of the site. For example, in-situ chemical oxidation includes the injection of an oxidant into the subsurface to destroy the dissolved phase contaminants in groundwater. A limiting factor for this technology is that the oxidant is not as effective with residual non aqueous phase liquid. Since there is not a significant dissolved phase contaminant at this site, this technology will not be considered further.

Another example of an in-situ treatment technology is in-situ thermal desorption or in-situ thermal destruction. This technology relies on raising the temperature of the soils to decrease the viscosity of the tar material and therefore increase the recoverability of the tar through liquid extraction wells. A vacuum is also applied to the subsurface to recover any organic compounds volatilized during the heating process. Recovered tar material and vapors are either treated on-site or removed off-site. Since no significant pooling of manufactured gas plant (MGP) tar was documented at the site, this technology was not considered as technically viable.

The remedial technologies discussed below are considered potentially applicable with regard to remediation of the contaminated soil found at the site. Although separate remedial actions for groundwater impacts are not identified, groundwater extraction and treatment would be performed to dewater soil as necessary during excavation. Post-remediation groundwater monitoring is also included as a potentially viable institutional control.

5.2 No Action

The no-action alternative will be considered pursuant to DER-10 as described above. The no-action alternative will serve as a baseline to compare and evaluate the effectiveness of other actions. Under the no-action scenario, limited remedial response actions may be considered, including monitoring. Monitoring will consist of periodic groundwater sampling to evaluate changes over time in conditions at the site, and to ascertain the level of any natural attenuation which may occur or any increase in contamination which may necessitate further remedial action. Natural attenuation (under the no action alternative), as opposed to active remediation, relies on naturally occurring physical, chemical and biological processes (dilution, dispersion and degradation) to reduce contaminant concentration.

5.3 Institutional Controls

For alternatives where contaminated soil would remain on-site, institutional controls will be required to restrict use of the property and disturbances of the subsurface soil. An institutional control is any non-physical means of enforcing restriction on the use of a real property that limits human and environmental exposure, restricts the use of groundwater, provides notice to the potential owners, operators, or members of the public, or prevents actions that would interfere with the effectiveness of the remedial program. Types of institutional controls include implementation of an environmental easement that would require a soil management plan including notifications prior to ground intrusive activities, health and safety issues and an operations, maintenance and monitoring plan. Institutional controls can also include deed restrictions, discharge permits, site security (other than fencing), local permits, consent orders/decrees, zoning restrictions, groundwater use restrictions, condemnation of property and public health advisories. Institutional controls are potentially applicable to the site and will be considered further.

5.4 Excavation and Off-site Disposal

Excavation and off-site disposal would be an active remedial response action and would include removal of contaminated soil from the site and disposal of the contaminated soil at an off-site permitted landfill or treatment facility. Standard excavation equipment would be utilized to excavate contaminated soil. Excavated areas where the contaminated soil has been removed would be replaced with clean fill obtained from a permitted facility.

This technology is commercially available, can be implemented at the site and would allow for the achievement of remedial action objectives developed for the site. Since it would provide for removal of MGP impacted soils and disposal or treatment of the soil off-site, it would provide for protection to human health and the environment. Therefore this technology would be considered further.

5.5 In-situ Solidification

In-situ solidification involves mixing a binding reagent with the contaminated media or waste either in-situ or ex-situ. In-situ solidification has been used to treat both organic and inorganic contaminants. Cement-based mix designs are most commonly used however a variety of additives such as fly ash, hydrated lime, bentonite can also be used.

In-situ solidification can be implemented using large diameter augers, rake injectors or rotating mixing devices. Both rake injectors and rotating mixing devices can be attached to heavy equipment such as excavators and are generally used for shallow soils. For deeper soils large diameter augers, generally between 5 to 10 feet in diameter, capable of mixing to depths up to 30 to 40 feet below ground surface can be utilized. The augers are hollow stemmed and as the auger penetrates the soil a slurred reagent is pumped through the mixing shaft and exits through jets located on the auger flighting. The result of the mixing of the contaminated soil with the cement mixture is a monolithic solid that minimizes contaminant migration. Solidification converts contaminants into less soluble, mobile or toxic forms.

This technology is commercially available and may be completed in-situ and therefore may have fewer impacts to the site during implementation than excavation and off-site removal. This technology has been proven to be successful at remediating MGP impacted soil at other sites in New York State. Therefore, this technology will be considered for further evaluation.

5.6 Hydraulic Barrier Technologies

Although there is not a significant groundwater plume emanating from the source area, as discussed in Section 4.0, it appears as if the MGP tar material may have migrated from the source area toward the Hudson River. In an attempt to mitigate further migration of the MGP tar to the river, subsurface hydraulic barriers may be applicable to site remediation and achievement of the remedial action objectives for the site.

Low permeability subsurface walls can be constructed into a low permeability underlying material such as clay or competent bedrock which would serve as the lower confining barrier. The wall could consist of bentonite slurry with a thickness of about 3 feet, similar to the in situ solidification or it could be constructed of sheet pile walls. Both walls would need to be constructed to a depth of approximately 20 feet in the area of the Hudson River in order to provide a barrier between MGP impacted material and the Hudson River. MGP tar material migrating from the source area would be mitigated by the presence of the wall.

For the Cold Spring former MGP Site, the hydraulic barrier technologies achieve the same remedial action objectives as in-situ solidification with regard to mitigation of migration of contaminants to the Hudson River. However, in-situ solidification would provide the added benefit of solidification of a portion of the contaminant mass. Therefore, although potentially applicable, this technology will not be considered further in lieu of in-situ solidification.

5.7 Surface Barriers

Potentially applicable isolation/containment technologies include surface barriers, such as permeable covers and low permeability caps. These technologies are designed to prevent direct contact with contaminants from the area of concern, and do not provide any treatment for the isolates/contained contaminated soil. Various forms of surface barriers also significantly reduce the infiltration of precipitation into contaminated soil, and minimize surface runoff and contact with contaminated material. Low permeability caps have an advantage over permeable covers in that these technologies would limit infiltration in addition to mitigating direct contact with contaminated material. However, low permeability caps are more costly, require a sloped surface to promote runoff and may preclude/limit the future use of the capped area and require additional maintenance.

The majority of the site is currently covered with a macadam/gravel material or the boat yard building. Surface soil contamination is limited to an area on the southern portion of the parking area. Contaminated subsurface soil is greater than 2 feet below ground surface. Although there is potential for exposure to contaminated surface soil, the area of contamination is limited in extent. In addition, exposure to the contaminants in the subsurface will not occur under current site usage. Although placement of a surface barrier would prevent contact with the limited area of the contaminated surface soil along the south end of the parking area, it would not provide any additional protection for reducing contact with the contaminated subsurface soils and therefore this alternative will not be considered further.

5.8 Remedial Technology Assessment Summary

Based on the screening of remedial technologies, excavation and off-site disposal and in-situ solidification will be the only response actions that will be retained for further consideration, either as remedial alternatives in and of themselves or in combination to form alternatives. No action and institutional controls will also be evaluated further in combination with the response actions to form alternatives.

6.0 POTENTIAL REMEDIAL ALTERNATIVES EVALUATION

6.1 Introduction

Based on the preliminary evaluation of the remedial technologies discussed in Section 5.0, the technologies selected for further consideration were developed into potential remedial alternatives. The purpose of this section is to provide an engineering evaluation of potential remedial alternatives for the Cold Spring former Manufactured Gas Plant (MGP) site. The goal of this evaluation is to demonstrate how the selected remedy would be protective of human health and the environment. For the site, five remedial alternatives were developed for consideration:

- Alternative 1: No Action with Institutional Controls
- Alternative 2: Excavation and Off-site Disposal of all Soil exceeding Recommended Soil Cleanup Objectives (RSCOs)
- Alternative 3: Partial Excavation and Off-site Disposal with Institutional Controls
- Alternative 4: Partial Excavation and Off-Site Disposal with In-situ Solidification and Institutional Controls
- Alternative 5: In-Situ Solidification with Institutional Controls

The above alternatives have been evaluated against the following nine remedy selection factors in accordance with the requirements set forth in DER -10.

Conformance to Standards and Criteria

Conformance with applicable regulatory standards and criteria evaluates the alternatives against the federal and New York State standards and criteria identified for the site. This evaluation also considers the remedial action objectives developed for the site in Section 1.5. These standards are considered a minimum performance specification for each remedial alternative under consideration.

The following is a list of major SCGs that apply to the site:

- Technical and Operational Guidance Series - New York State Ambient Water Quality Standards and Guidance Values
- 6 NYCRR Part 364 - Waste Transporter Permits
- 6 NYCRR Part 370 - Hazardous Waste Management System
- 6 NYCRR Part 375 – Environmental Restoration Program
- 6 NYCRR Part 376 - Land Disposal Restrictions
- 29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response Standard
- 29 CFR Part 1926 - Safety and Health Regulations for Construction
- TAGM 4031 - Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites
- TAGM 4061 - Management of Coal Tar Waste and Coal Tar Contaminated Soils and Sediment from former Manufactured Gas Plants (MGPs)
- New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan
- NYSDEC Technical and Operation Guidance Series (TOGS) (1.1.1) Ambient Water Quality Standards and Guidance Values.
- NYSDEC Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants
- NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation December 2002
- NYSDEC Municipal Assistance for Environmental Restoration Projects Procedures Handbook – July 2004

<u>Overall Protectiveness of Public Health and the Environment</u>

Protection of health and the environment is evaluated on the basis of estimated reductions in the potential for both human and environmental exposure to contaminants for each remedial alternative. The evaluation focuses on whether a specific alternative achieves adequate protection under the conditions of the site's future use and how site risks are eliminated, reduced or controlled through treatment, engineering or institutional controls. An integral part of this evaluation is an assessment of long-term residual risks to be expected after remediation has been completed. Evaluation of the human health and environmental protection factor is generally based, in part, on the findings of the exposure assessment.

Short-Term Effectiveness and Impacts

Evaluation of short-term effectiveness and impacts of each alternative examines health and environmental risks likely to exist during the implementation of a particular remedial alternative. Principal factors for consideration include the expediency with which a particular alternative can be completed, potential impacts on the nearby community, on-site workers and environment, and mitigation measures for short-term risks required by a given alternative during the necessary implementation period.

Long-Term Effectiveness and Permanence

Examination of long-term impacts and effectiveness for each alternative requires an estimation of the degree of permanence afforded by each alternative. To this end, the anticipated service life of each alternative must be estimated, together with the estimated quantity and characterization of residual contamination remaining on-site at the end of this service life. The magnitude of residual risks must also be considered in terms of the amount and concentrations of contaminants remaining following implementation of a remedial action, considering the persistence, toxicity and mobility of these contaminants, and their propensity to bioaccumulate. This evaluation also includes the adequacy and reliability of controls required for the alternative, if required.

Reduction in Toxicity, Mobility and/or Volume of Contamination

Reduction in toxicity, mobility and/or volume of contamination is evaluated on the basis of the estimated quantity of contamination treated or destroyed, together with the estimated quantity of waste materials produced by the treatment process itself. Furthermore, this evaluation considers whether a particular alternative would achieve the irreversible destruction of contaminants, treatment of the contaminants or merely removal of contaminants for disposal elsewhere. Reduction of the mobility of the contaminants at the site is also considered in this evaluation.

Implementability

Evaluation of implementability examines the difficulty associated with the installation and/or operation of each alternative on-site and the proven or perceived reliability with which an alternative can achieve performance goals. The evaluation examines the potential need for future remedial action, the level of oversight required by regulatory agencies, the availability of certain technology resources required by each alternative and community acceptance of the alternative.

Cost

Cost evaluations presented in this document estimate the capital, and operation, monitoring and maintenance (OM&M) costs associated with each remedial alternative. From these estimates, a total present worth for each option is determined.

The following sections provide a more detailed description of the remedial alternatives.

6.2 Description of Remedial Alternatives

6.2.1 Alternative 1: No Action with Institutional Controls

The no-action alternative will be considered and serve as a baseline to compare and evaluate the effectiveness of other actions. Under the no-action scenario, limited remedial response actions may be considered, including monitoring of groundwater.

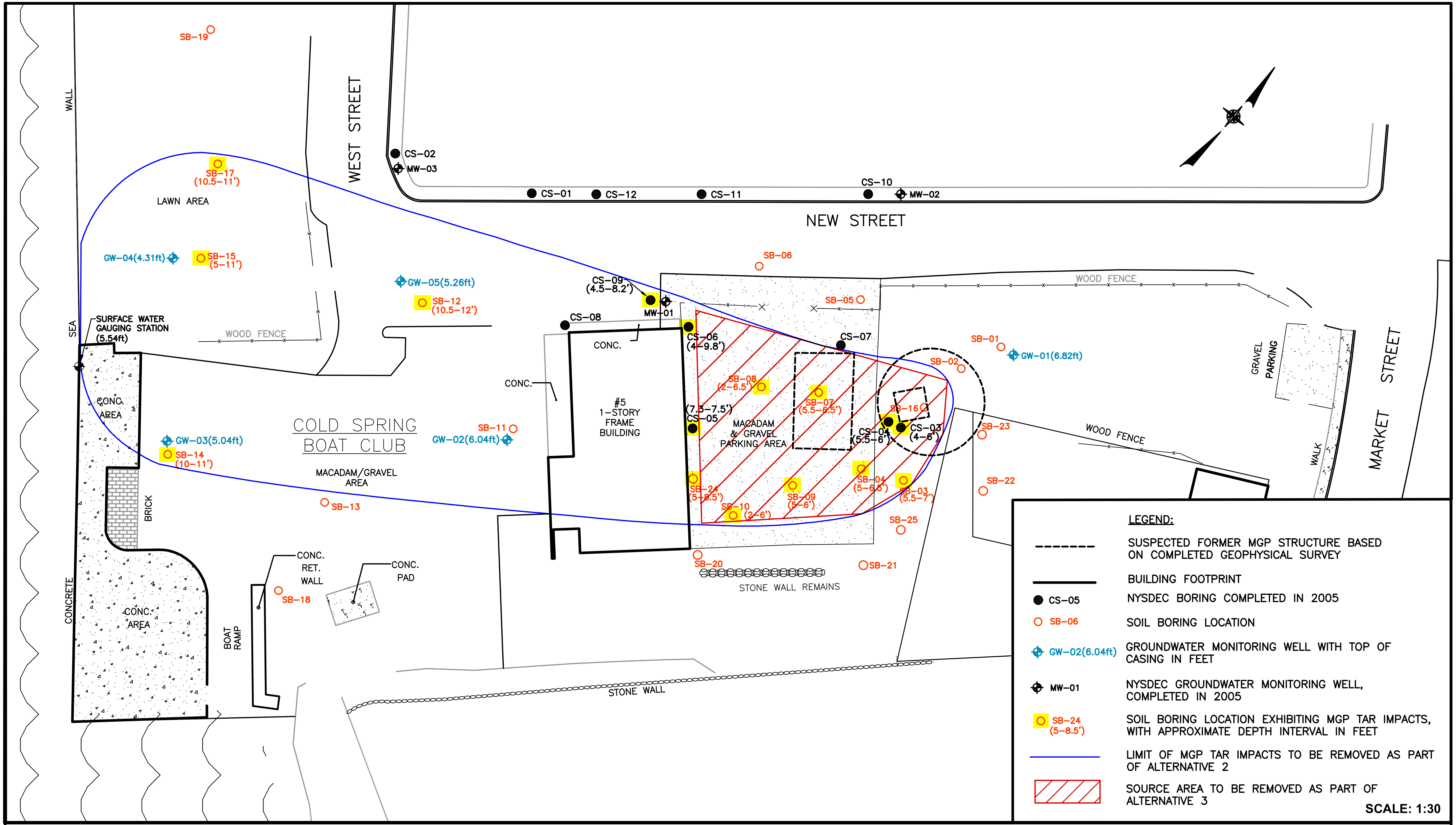
Since no contamination would be removed, institutional controls would be necessary under this alternative. These institutional controls include establishment of an environmental easement, which would:

1. Ensure appropriate future use/control of the site that would protect human health and the environment;
2. Include a restriction prohibiting use of groundwater to ensure there would not be any future exposures to groundwater;
3. Include required notifications prior to any ground-intrusive activities that may encounter contaminated materials (notification of NYSDEC and on-site workers would be required prior to excavating soil).
4. Include a soil management plan identifying requirements in the event of excavation, which would be included as part of the Operations, Maintenance and Monitoring (OM&M) Plan;
5. Include a Health and Safety Plan and Community Air Monitoring Plan for use during future ground-intrusive activities, which would be described in the OM&M Plan;
6. Include provision for groundwater monitoring, as discussed below, which would be described in the OM&M Plan;
7. Include an annual inspection program to ensure appropriate use of the site and minimize the potential for exposures, which would be included as part of the OM&M Plan; and
8. Include an annual certification program requiring the certification that the institutional and/or engineering controls are in place, have not been altered and are still effective, which would be described in the OM&M Plan.

Although groundwater quality is not expected to improve significantly over time under this alternative, groundwater monitoring would also be included as part of this alternative. Monitoring would consist of periodic groundwater sampling to evaluate changes in groundwater contaminant concentrations and to ascertain the level of any natural attenuation which may occur. Groundwater monitoring would involve quarterly sampling of one upgradient well and one downgradient well for 2 years. Subsequent to the first 2 years of monitoring, the groundwater data will be evaluated to determine future groundwater monitoring requirements. Groundwater samples would be analyzed for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs). An OM&M plan that provides more detail regarding post-remediation monitoring would be prepared and submitted to NYSDEC for approval and would be included as part of the environmental easement for the site. The OM&M Plan would be maintained on-site.

6.2.2 Alternative 2: Excavation and Off-Site Disposal

This alternative includes the excavation of all MGP-impacted soil, including the most extensive MGP tar-impacted soil encountered within and immediately downgradient of the “hot spot” area. With the exception of the “hot spot” area, a majority of the MGP-impacted soil is located in seams, some less than a foot in thickness, at depths up to 13 feet below ground surface. Contaminated surface soil within the parking area will also be removed as part of this alternative. Underground structures identified as part of the geophysical survey of the site will be removed as well. Therefore, in the area requiring excavation, non-impacted soil could be removed and staged for replacement in order to remove the contaminated soil. Based on the results of the site characterization, the estimated volume of contaminated soil requiring excavation is approximately 13,300 cubic yards (in-place volume). Of the 13,300 cy of soil to be excavated, approximately 5,700 cy of material may be MGP impacted. This conservative estimate assumes that the material under the Cold Spring Boat Club building has MGP-impacted soil from shallow depths to 15 feet below ground surface similar to the “hot spot” area and the remaining area has an average thickness of 5 feet of MGP-impacted soil. The estimated area of soil to be excavated for this alternative is shown on Figure 6-1.



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VILLAGE OF COLD SPRING

COLD SPRING FORMER MGP SITE
SITE INVESTIGATION / REMEDIAL ALTERNATIVES REPORT
SOIL EXCAVATION AND OFF-SITE DISPOSAL (ALTERNATIVES 2 AND 3)

FIGURE 6-1

In order to implement this technology, the Cold Spring Boat Club building and associated storage area, the Village parking area and portions of New Street and West Street would need to be demolished/removed in order to access the contaminated soil. Utilities located in New and West Street may need to be temporarily disconnected in order to access contaminated soil.

Once contaminated soil is removed from the site, clean fill from an off-site approved source would be used for backfilling the excavation. Fill would be approved by NYSDEC prior to placement.

Where appropriate, sheet piling would be installed to stabilize the excavation, as well as reduce the volume of groundwater entering the excavation. Since the depth to groundwater at the site is only a few feet below ground surface, groundwater will need to be extracted during excavation activities in order to dewater the excavation. Groundwater extracted during the dewatering process would be contained and disposed of off-site.

The potential for generation of vapors, odors and dust would exist during implementation of this alternative and, as a result, implementation of appropriate controls would be necessary. Air monitoring would be conducted during remediation activities in accordance with NYSDEC and NYSDOH requirements to protect the health and safety of on-site workers and the surrounding community. Odor/vapor and dust controls would be implemented in conformance with the construction contractor’s Health and Safety Plan and Community Air Monitoring Plan. Standard emission control techniques include:

- Installing gravel pads at vehicle egress points;
- Application of wetting agents to soil;
- Tarping/covering containers;
- Application of foam vapor suppressants to soil;
- Using spray misters; and
- Covering of stockpiled soil and inactive excavations.

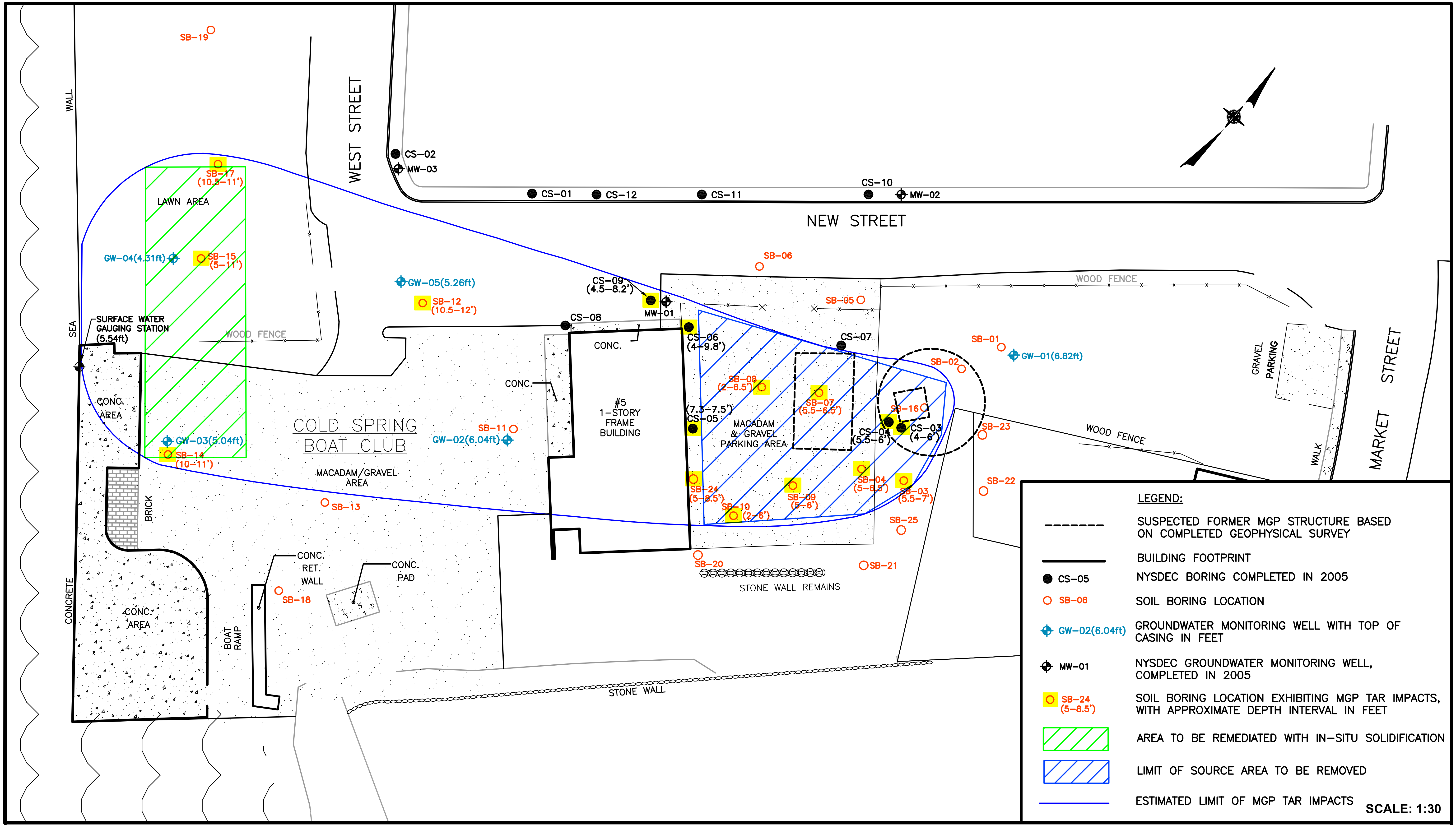
At the completion of the excavation, endpoint soil samples will be collected from the bottom of the excavation. The purpose of the sampling is to confirm that the contaminated soil has been removed from the site. Sampling frequency will follow NYSDEC DER-10 technical guidance.

Since all contaminated soil would be removed, institutional controls would not be required to restrict use of the property. Groundwater monitoring would also not be included in this alternative.

6.2.3 Alternative 3: Partial Excavation, Off-site Disposal with Institutional Controls

This alternative includes excavation of the “hot spot” source area where the most extensive MGP tar impacts were encountered within and immediately downgradient of the former MGP site. Soils in this area showed evidence of tar and/or heavy staining and tar odors extending from approximately 2 feet to 15 feet below grade. This “hot-spot” or source area is shown on Figure 6-1. As shown on Figure 6-1, this area is primarily limited to the Village parking area adjacent to the Cold Spring Boat Club. Excavation of this area would removal all remaining underground structures related to the former MGP site and would also remove contaminated surface soil found in the southern portion of the parking area. Using the information obtained during the site characterization, the estimated volume of contaminated soil to be excavated and disposed of off-site for this alternative is approximately 2,400 cubic yards (in-place volume). The estimated volume is based on excavation of approximately 4,300 square feet to an average depth of approximately 15 feet below ground surface. A conservative excavation depth of 15 feet was selected based on the review of available subsurface soil data, as well as information concerning the depth of the clay unit or bedrock in the area. Shallower excavation depths are expected on the south side of the excavation due to the presence of bedrock well above 15 feet.

Clean fill from an off-site approved source would be used for backfilling the excavation. Fill would be approved by NYSDEC prior to placement.



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VILLAGE OF COLD SPRING

COLD SPRING FORMER MGP SITE
SITE INVESTIGATION / REMEDIAL ALTERNATIVES REPORT
SOIL EXCAVATION AND OFF-SITE DISPOSAL AND IN-SITU SOLIDIFICATION (ALTERNATIVE 4)

FIGURE 6-2

Where appropriate, sheet piling would be installed around the excavation area and dewatering would be performed. Excavation sidewall stabilization would address implementation issues such as the proximity of the Cold Spring Boat Club building and the shallow depth to bedrock on the southern portion of the site. Extracted groundwater from the dewatering system would be contained and disposed of off-site. Vapor/odor emissions and dust controls would be employed, as necessary, based on the air monitoring program to protect the health and safety of workers and the surrounding community during remediation activities.

Since only a portion of the MGP-impacted soil would be removed, engineering and institutional controls would be necessary under Alternative 3. These institutional controls include establishment of an environmental easement, which would include the items listed in Alternative 1.

Although groundwater quality is expected to improve through the removal of contaminated soil and dewatering, MGP-impacted soil would remain on the site and may continue to impact groundwater quality. Therefore, groundwater monitoring would also be included as part of this alternative. Monitoring would consist of periodic groundwater sampling to evaluate changes in groundwater contaminant concentrations and to ascertain the level of any natural attenuation which may occur. Groundwater monitoring would involve quarterly sampling of one upgradient well and one downgradient well for 2 years. Subsequent to the first 2 years of monitoring, the groundwater data will be evaluated to determine future groundwater monitoring requirements. The first sampling round would be performed 6 months after remediation is completed. Groundwater samples would be analyzed for VOCs and SVOCs. An OM&M plan that provides more detail regarding post-remediation monitoring would be prepared and submitted to NYSDEC for approval and would be included as part of the environmental easement for the site. The OM&M Plan would be maintained on-site.

6.2.4 Alternative 4: Partial Excavation, Off-Site Disposal with In-situ Solidification

Similar to Alternative 3, this alternative includes the excavation of approximately 2,400 cubic yards of MGP-impacted soil from beneath the Village parking lot east of the Cold

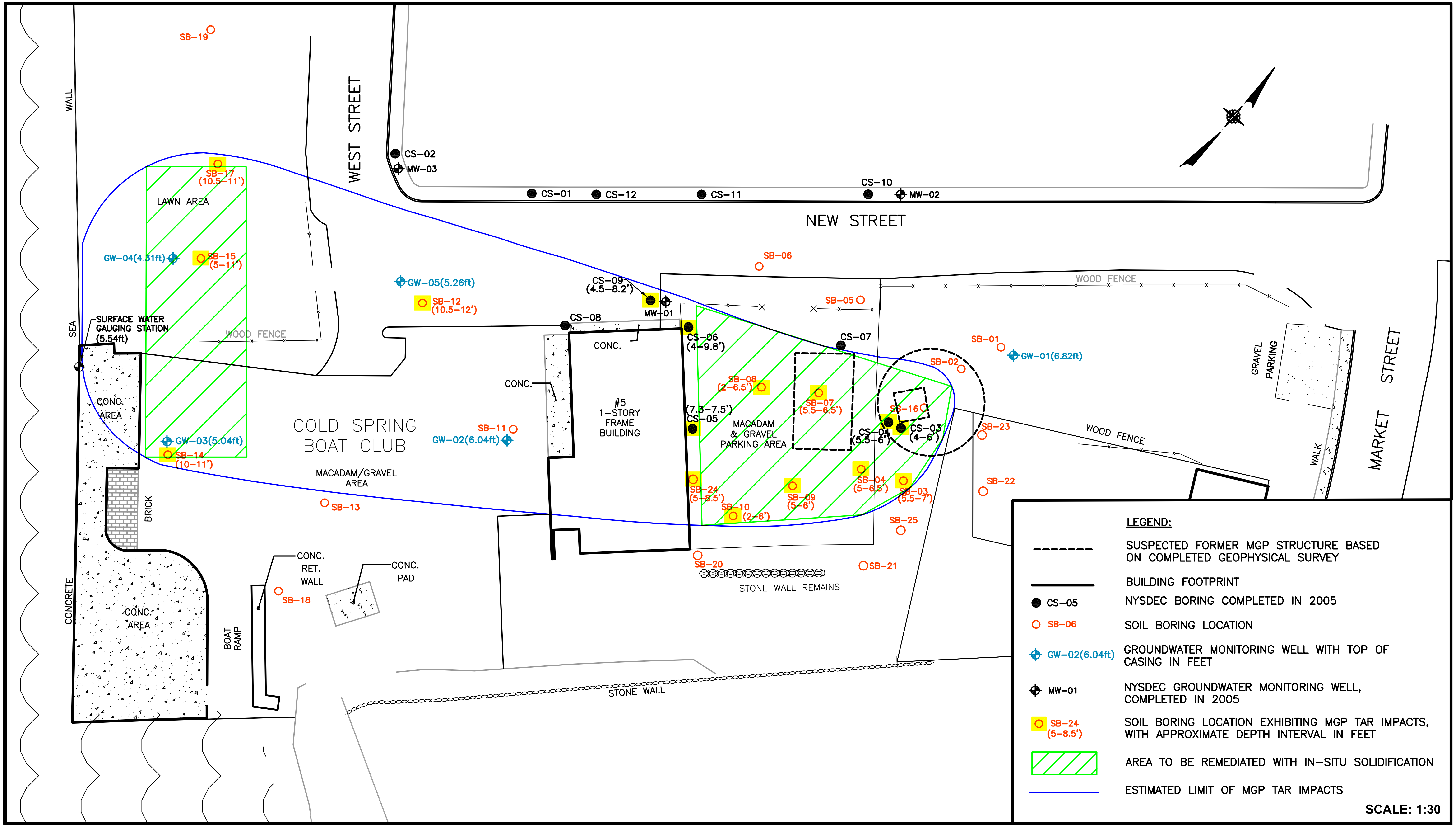
Spring Boat Club. This excavation would remove not only the “hot spot” or source area but would also remove all underground structures associated with the former MGP site, as well as the surface soil in the southern portion of the parking area, which showed elevated concentrations of contaminants.

As discussed above, appropriate excavation stabilization would be installed to stabilize the excavation, reduce the volume of groundwater entering the excavation and protect on-site structures. Extracted groundwater from the dewatering system would be contained and disposed of off-site.

Clean fill from an off-site approved source would be used for backfilling the excavation. Fill would be approved by NYSDEC prior to placement. Additionally, as discussed in the description of Alternative 3, vapor/odor emissions and dust controls would be employed and air monitoring would be conducted in accordance with NYSDEC and NYSDOH requirements to protect the health and safety of workers and the surrounding community during remediation activities.

In addition to the excavation and removal off-site of MGP-impacted soil from the Village’s parking area, as part of this alternative, in-situ solidification would be applied to an area of contaminated soil located on the western edge of the site (see Figure 6-3). In an attempt to further minimize migration of contaminants to the adjacent Hudson River, in-situ solidification would be applied to an area of approximately 3,200 square foot area. As described below, soil would be mixed in place with cement and associated additives to create a low permeability, high strength monolith which would immobilize contamination located in this area, as well as provide a barrier for further migration to the Hudson River.

As with the excavation, during the in-situ solidification mixing process, vapor and odor controls would be implemented. Air monitoring would be conducted to protect the health and safety of on-site workers, and the surrounding community.



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VILLAGE OF COLD SPRING

COLD SPRING FORMER MGP SITE
SITE INVESTIGATION / REMEDIAL ALTERNATIVES REPORT
IN-SITU SOLIDIFICATION (ALTERNATIVE 5)

FIGURE 6-3

Prior to implementation of the technology, evaluation of the necessary grout mix ratio required to satisfy project requirements would need to be determined. In addition, specific equipment operations, such as auger advancement rate through the soil, grout injection rate and the number of strokes necessary to produce a homogenous mixture, would need to be determined.

Endpoint soil sampling would be performed at the base of the excavation performed in the Village's parking area to confirm that the contaminated soil has been removed from this area. As discussed in Alternative 2, sampling frequency will follow NYSDEC DER-10.

Institutional controls, as described for Alternative 1, would also be required for this alternative, since contaminated soil would remain on-site. Additionally, as discussed for Alternative 1, groundwater monitoring would be performed for this alternative, and would include sampling of one upgradient and one downgradient monitoring wells for VOCs and SVOCs quarterly for 2 years. Subsequent to the first 2 years of monitoring, the groundwater data will be evaluated to determine future groundwater monitoring requirements. Sampling would commence 6 months after completion of remediation. An OM&M plan that provides more detail regarding post-remediation monitoring would be prepared and submitted to NYSDEC for approval and would be included as part of the environmental easement for the site. The OM&M Plan would be maintained at the site.

6.2.5 Alternative 5: In-Situ Solidification

This alternative would include the treatment of the "hot-spot" source area soil with in-situ solidification, as well as treating the area downgradient of the source area in close proximity to the Hudson River. As described in Alternative 3, the estimated volume of contaminated soil requiring treatment in the "hot-spot" source area is approximately 2,400 cubic yards (in-place volume). The estimated volume of contaminated soil downgradient of the source area to be treated with in-situ solidification is 1,900 cy. The horizontal and vertical limits of the areas to be treated are shown in Figure 6-3.

Prior to initiation of the soil mixing process, the foundations of the existing gas holders would require removal and disposal off-site. Once the existing subsurface foundations are excavated, they would be segregated from contaminated soil and disposed of off-site. All contaminated soil would be placed back in the excavation. Contaminated soil would be mixed in place with cement and associated additives to create a low permeability, high-strength monolith which would immobilize contamination.

During the mixing process, vapor and odor controls would be implemented. Air monitoring would be conducted to protect the health and safety of on-site workers and the surrounding community.

Prior to implementation of the technology, evaluation of the necessary grout mix ratio required to satisfy project requirements would need to be determined. In addition, specific equipment operations, such as auger advancement rate through the soil, grout injection rate and the number of strokes necessary to produce a homogenous mixture, would need to be determined.

As with the excavation, during the mixing process, vapor and odor controls would be implemented. Air monitoring would be conducted to protect the health and safety of on-site workers and the surrounding community.

Sampling would be performed at pre-established depths and locations within the solidified monoliths to evaluate the treatment after solidification has been completed. The samples would document that the contaminant mobility has been eliminated.

Institutional controls, as described for Alternative 1, would also be required for this alternative, since contaminated soil would remain on-site. Additionally, as discussed for Alternative 1, groundwater monitoring would be performed for this alternative. An OM&M plan that provides the detail regarding post-remediation monitoring would be included as part of the environmental easement for the site. The OM&M Plan would be maintained at the site.

6.3 Detailed Evaluation of Remedial Alternatives

Provided below is a comparative analysis of the remedial alternatives with respect to each of the evaluation criteria presented in Section 6.1.

6.3.1 Overall Protection of Human Health and the Environment

Based on the site characterization and the current and planned future use of the site, the only potential for future exposure to MGP contamination after implementation of Alternative 1 would be by utility/construction workers who could contact contaminated soil during excavation for installation or repair of subsurface utilities. Exposure to contaminated surface soil south of the Village parking lot would still be a concern. Implementation of this alternative is expected to reduce the potential for exposure of utility/construction workers to MGP-contaminated subsurface soil through the implementation of institutional controls, however, would not reduce the potential for exposure to existing surface soil contamination.

Excavation and off-site disposal of approximately 13,000 cubic yards of soil in Alternative 2 would be protective of human health and the environment through the removal of all potential exposure to contaminated soil. In addition, the groundwater extraction and treatment to be performed during the dewatering activities as part of the soil excavation would treat contaminated groundwater and thereby significantly reduce the potential for exposure to contaminated groundwater. It would also reduce the potential for migration of contaminated groundwater to the Hudson River.

As part of Alternative 3, a significant portion of the contaminated soil would be removed and replaced with clean fill, including contaminated surface soil found along the southern edge of the parking area. MGP-impacted soil in the “hot-spot” source area was encountered at shallow depths and could be accessible in the future by utility/construction workers. For the remaining portion of the site, the contaminated soil is not as accessible and is not considered a significant threat to human health and the environment. Therefore, removal of this soil as part of Alternative 3 would provide protection of human health and the environment. In addition, as part of this alternative, groundwater would be extracted and treated during excavation as part of the dewatering process. As described above, treatment of the groundwater would also reduce the potential for future exposure to contaminated groundwater. Although MGP-impacted soil would remain, implementation of institutional controls would protect future impacts by requiring monitoring and use of appropriate health and safety measures during any intrusive work that may contact this soil.

Alternative 4: Partial Excavation and Off-site Disposal of Soil with In-Situ Solidification and Institutional Controls along the shoreline of the Hudson River would be protective of public health and the environment through the removal of MGP-impacted soil from the site. As discussed for Alternative 3, the most accessible soil would be removed from the site and groundwater would be extracted and treated during implementation of this alternative as part of a dewatering process. In addition, performance of in-situ solidification along the waterfront would provide for treatment of contaminated soil in this area and provide further protection of migration of MGP impacts to the Hudson River. Through the removal of contaminated soil from the site, treatment of contaminated groundwater and reduction of migration of contaminants to the Hudson River, future exposures to site-related contaminants would be significantly reduced.

In-situ solidification, as part of Alternative 5, would be implemented in the “hot-spot” source area and along the shoreline of the Hudson River. Although in-situ solidification would inhibit further migration of contamination, as well as access to the contaminated soil in this area, it would not remove any contaminants off-site. Although immobilized, the contaminants would remain on-site.

All of the alternatives would provide some protection of public health and the environment. However, the removal of all of the contaminated soil at the site in Alternative 2 would provide the most protection to human health and the environment. The removal of the most accessible and highly contaminated material from the “hot spot” source area in Alternatives 3 and 4 and the implementation of institutional controls would preclude exposure to remaining MGP-impacted soil. Placement of in-situ solidification along the Hudson River in Alternative 4 would provide some reduction in migration of contaminants to the Hudson River.

Although contaminated soil would be immobilized in Alternative 5, it would not be removed from the site. Therefore, Alternative 2 would be the most protective of human health and the environment followed by Alternatives 4, 3, 5 and 1, respectively.

6.3.2 Conformance to Standards and Criteria

Presented below is an evaluation of conformance of the proposed alternatives with the Standards, Criteria and Guidance (SCGs) and Remedial Action Objectives (RAOs) developed for the site.

Alternative 1, no action with institutional controls, does not meet the SCGs for the site. The institutional controls including placement of an environmental easement on the site would allow the alternative to meet some of the RAOs for the site.

Alternative 2 would meet, to the extent practicable, the RAOs developed for the site, as well as the SCGs. All contaminated soil would be removed from the site and groundwater would be treated during dewatering for excavation purposes. Through the removal of MGP-impacted soil mitigation of migration of contaminants to the Hudson River would be addressed. During implementation of the alternative, on-site workers and the surrounding community would be protected from exposure to site-related contaminants through the implementation of quality control and health and safety measures that comply with the applicable SCGs. Disposal of contaminated material including soil, water and other wastes generated as part of implementation of the remedy would be completed in accordance with the appropriate regulations and in conformance with the applicable SCGs.

Similar to the discussion provided for Alternative 2, Alternative 3 – Partial Excavation and Off-site Disposal of Soil with Institutional Controls, would essentially meet the RAOs and SCGs for the site. In the area of the site where MGP-impacted soil is shallow and, therefore, potentially accessible, the MGP-impacted soil would be removed and groundwater would be extracted and treated during dewatering, as needed to perform excavation. Quality control and health and safety measures would be implemented during remedial activities to protect on-site workers and the surrounding community from exposure to site-related contaminants. Once implemented, the alternative would continue to conform with the RAOs and SCGs through the implementation of engineering and institutional controls that would protect potential future workers at the site and the community.

Alternative 4, which includes partial excavation, off-site disposal, in-situ solidification and institutional controls, would also meet the RAOs and SCGs for the site. “Hot-spot” removal of the most contaminated and most accessible MGP-impacted soil would essentially preclude future exposure to MGP-impacted soil. Groundwater extraction and treatment during dewatering would also provide reduction of contamination within groundwater at the site. The performance of in-situ solidification along the Hudson River would also immobilize contamination found in this area and potentially reduce migration of contamination to the Hudson River.

Alternative 5, in-situ solidification of the “hot-spot” area and the boundary with the Hudson River would immobilize contaminants in soil in the Village’s parking area. Immobilization of contaminants and emplacement of the institutional controls would allow for achievement of most of the RAOs; however, since contaminants will not be treated or removed from the site, this alternative would reduce contaminant mass.

In summary, although Alternative 2 is the only alternative that would completely conform to the SCGs and RAOs for the site, Alternatives 3 and 4 would remove a significant portion of the contaminated soil from the site, including contaminated surface soil and, therefore, would also be essentially compliant with RAOs and SCGs established for the site. Although Alternative 5 would essentially meet the RAOs for the site, it would not remove contaminant mass from the site. As stated above, Alternative 1 would not meet the RAOs or SCGs for the site.

6.3.3 Short-Term Effectiveness and Impacts

Alternative 1 would not have any impacts to the surrounding community and can be implemented immediately. However, this alternative would not be effective in the short term in reducing contaminant levels at the site.

It is estimated that excavation and removal of all contaminated soil at the site, under Alternative 2, could be completed in approximately 6.5 months. Prior to implementation of the remedial work, the Cold Spring Boat Yard building would require demolition in order to access contamination below the building. During implementation of this alternative, major impacts to the community would include increased truck traffic in the vicinity of the site, as well as construction-related noise. Access and use of New Street and West Street would also be disrupted. Underground utilities present in these roads that service nearby properties would also be temporarily disrupted. Off-site migration of contaminated soil from soil erosion or construction and hauling vehicles could also be a short-term impact to the community, as well as generation of odors, vapors and/or dust during excavation activities. Potential short-term impacts to on-site workers include exposure to contaminated material, vapors and dust, as well as construction-related risks associated with working with heavy equipment and excavation at significant depths.

Alternatives 2, 3 and 4 include measures that would be effective at reducing short-term exposure of the community and on-site workers to each of the above potential impacts. This alternative would include the implementation of a Community Air Monitoring Program and the use of engineering controls such as vapor/dust suppressants to minimize the potential for impacts from odors, vapors and dust. Temporary fencing and security during implementation of the alternative would restrict access to the site, further minimizing the potential for impacts to the community. Short-term exposure of remedial construction workers to odors, vapors and dust would also be minimized through the proper implementation of a construction Health and Safety Plan. Implementation of appropriate storm water management, soil erosion and sediment control techniques during construction would minimize the potential for migration of contaminated soil off-site. In addition, vehicles used to transport contaminated soil would be lined and tarped before departing the site and equipment contacting contaminated soil would be properly decontaminated prior to moving off-site, also minimizing the potential for off-site migration of contaminated soil and impacts to the community. The impacts to the community discussed above would be more significant with respect to Alternative 2, which is expected to take approximately 8 months to implement and is significantly longer than the 2 months estimated to complete Alternative 3 and the 3 months to complete Alternative 4, discussed below.

Alternatives 3 and 4 would have similar impacts as described for Alternative 2; however, these alternatives would not require the demolition of the existing building or excavation beneath New Street and West Street. In addition, since the volume of soil requiring removal is significantly less, the potential exposure for exposure to odors, dust or vapors is less and the truck traffic and noise impacts in the area of the site would be significantly less. Since Alternative 4 also includes in-situ solidification along the western edge of the site, more significant short-term impacts would be encountered for this alternative than Alternative 3.

Although implementation of in-situ solidification as part of Alternative 5 would be performed without extensive excavation, mixing of the soil may generate odors and vapors and will need to be controlled during implementation of the alternative. In addition, since all underground structures will require removal prior to performance of the solidification, some excavation will need to be performed and, therefore, similar impacts as described for Alternatives 2, 3 and 4 above will be encountered. Once completed, all of the alternatives will be effective immediately in removing/immobilizing contaminants that are mixed.

In summary, Alternatives 2, 3, 4 and 5 would be effective in the short term through the removal/immobilization of contaminated soil and the implementation of institutional controls. Implementation of engineering controls and appropriate health and safety measures would minimize the potential for short-term impacts. However, the potential for short-term impacts to the community and on-site workers during construction activities associated with Alternative 2 is much greater than with Alternatives 3, 4 and 5, due to the extensive remedial timeframe, volume of soil requiring removal and demolition of the existing boat club. Alternative 5 will also have more extensive short-term impacts than Alternatives 3 and 4 due to the excavation and removal of underground structures and mixing of soil. Since Alternative 4 will require mixing of soil near the Hudson River and removal of the “hot-spot” source area soil, Alternative 4 will have more short-term impacts than Alternative 3. Alternative 1 will have the least short-term impacts but will not be effective.

6.3.4 Long-Term Effectiveness and Permanence

No action with institutional controls would not be effective or permanent in the long term.

Excavation and removal of all MGP-impacted soil as part of Alternative 2 would be a long-term, permanent and effective remedial alternative. Removal of approximately 7,700 cubic yards of MGP-impacted soil provides a permanent alternative for the site, since the potential for exposure to this soil and potential future environmental impacts would be minimized. Reliance on long-term controls would not be required after implementation of Alternative 2.

Similarly, partial excavation and off-site disposal of accessible “hot-spot” source area soil in Alternative 3 with institutional controls would also be an effective, permanent alternative. Although some MGP-impacted soil would remain, it would be isolated from contact due to the depth of the remaining contamination, and the presence of existing buildings and pavement; therefore, the magnitude of remaining risk would be low. Establishment of institutional controls would also minimize the potential for long-term impacts to human health and the environment by controlling the potential for exposure to remaining contaminated media, making this an effective alternative. Alternative 4 would also be an effective, permanent alternative and would provide added effectiveness through the installation of the solidification barrier along the Hudson River thereby reducing the potential for impacts to the river.

Implementation of Alternative 5 would be an effective and permanent remedy for the contaminated soil treated as part of this alternative. It would immobilize MGP-impacted soil that is most accessible due to the shallow depth below grade. Although the technology has only been recently implemented at MGP sites, continued monitoring of projects completed more than

10 years ago indicate no sign of leaching of contaminants. Therefore, this remedy is expected to be permanent in the long-term.

Alternative 2 removes all MGP-impacted soil from the site and will not require the use of institutional controls; therefore, this alternative is the most effective and permanent in the long term. Since the potential for exposure to remaining MGP-impacted soil after implementation of Alternative 3 and 4 is minimal due to the depth of the MGP material and existing soil cover, pavement and buildings and institutional controls, Alternatives 3 and 4 would be equally permanent. Similarly, the effectiveness of these alternatives at reducing long term risk to human health and the environment would also be comparable. Since Alternative 5 does not remove the contamination from the site but immobilizes the contaminant, it would not be as permanent and effective in the long-term at reducing exposure. Alternative 1 would not be effective or permanent in the long term.

6.3.5 Reduction in Toxicity, Mobility and/or Volume of Contamination

Alternative 1, No Action, will not be effective at reducing the toxicity, mobility or volume of contaminants at the site, since natural attenuation is not expected to be effective in the foreseeable future.

Removal of approximately 7,700 cubic yards of MGP-impacted material as part of Alternative 2, along with groundwater extraction and treatment during the dewatering process, would significantly reduce the toxicity, mobility and volume of contamination at the site.

Similar to the discussion above, implementation of Alternatives 3 and 4 would reduce the toxicity, mobility and volume of contamination at the site through the excavation and removal of approximately 2,400 cubic yards of MGP-impacted soil and the extraction and treatment of groundwater during excavation of the soil. Treatment of a portion of the excavated soil by thermal desorption at an off-site facility would further reduce the toxicity of the soil. In-situ solidification of contaminated soil along the Hudson River as part of Alternative 4 would provide further reduction in the mobility of contaminants at the site.

In-situ solidification of the “hot-spot” source area of contaminated soil would reduce the mobility of the contamination in this area but would not reduce the toxicity or volume of the contamination.

Therefore, due to the significantly larger volume of soil that would be excavated and removed from the site under Alternative 2, as well as the larger volumes of groundwater that would be extracted and treated as part of excavation activities, Alternative 2 would be more effective than Alternatives 1, 3, 4 and 5 at reducing the toxicity, mobility and volume of contaminated soil and groundwater. Due to the additional reduction in mobility as part of Alternative 4, Alternative 4 would be more effective than Alternative 3. Alternative 5 would not be as effective as Alternatives 2, 3 and 4 at reducing the toxicity, mobility and volume of contaminated soil and groundwater. Alternative 1 will not be effective at reducing the toxicity, mobility or volume of the contaminants on-site.

6.3.6 Implementability

Alternative 1, No Action with Institutional Controls, can be easily implemented. Execution of the institutional controls for this alternative would require coordination with the property owner and NYSDEC. This coordination is also not expected to impact implementation of this alternative or any of the remaining alternatives with institutional controls. Therefore, this alternative is readily implementable.

Excavation and off-site disposal of all contaminated soil for Alternative 2, 3 and 4 can be completed with standard equipment. All necessary labor, equipment and supplies are readily available. It is not anticipated to be difficult to obtain the necessary permits associated with implementation of this alternative. Although all necessary labor, equipment and supplies are readily available for implementation of Alternative 2, implementation would be extremely difficult since it involves demolition the existing Cold Spring Boat Club building, excavation beneath Village streets (New and West) and impacts to or disruption of public utilities.

Sheeting or sloping of the excavation for Alternatives 2, 3 and 4 would be required and, due to the shallow depth to bedrock in some areas on-site, standard sheeting techniques may not be applicable. In addition, although dewatering would be required for all three alternatives, treatment and discharge of the treated groundwater will require coordination with the Village.

Therefore, implementation of Alternative 2 would be more difficult than implementation of Alternatives 3 and 4, respectively. Alternative 5, since it requires both excavation and implementation of in-situ solidification, would also be more difficult to implement than Alternatives 3 and 4, but easier to implement than Alternative 2. Alternative 1 would be the simplest alternative to implement.

6.3.7 Cost Effectiveness

Estimated capital costs and the estimated present worth of long-term (30-year) operation, maintenance and monitoring (OM&M) costs associated with each of the alternatives, are presented in Table 6-1. A detailed breakdown of each estimate is provided in Appendix G.

The following assumptions were utilized in the preparation of the cost estimates:

- Costs presented for Alternative 2 do not include costs for building demolition.
- Sheet piling would be installed around the perimeter of the entire area to be excavated.
- All costs (e.g., excavation, backfill, etc.) were estimated based on recent bids for remediation projects and Means Site Work Cost Data, experience in construction, with adjustment for hazardous waste site remediation, and recent communications with remedial contractors, material suppliers, waste transporters and disposal facilities. Note that these costs can vary dramatically over time based on numerous economic factors.
- The estimated present worth of operation, maintenance and monitoring is based on 30 years at 5 percent.
- A 25 percent contingency has been included.

Table 6-1

REMEDIAL WORK PLAN ALTERNATIVES COST SUMMARY

Alternative	**Estimated Capital Cost[1]**	**Estimated Present Worth[2] of Annual Operation Maintenance and Monitoring**	**Total Estimated Present Worth**
Alternative 1	$40,000	$120,000	$160,000
Alternative 2	$4,812,600	$0	$4,812,600
Alternative 3	$1,222,800	$160,000	$1,382,800
Alternative 4	$1,596,900	$160,000	$1,756,900
Alternative 5	$1,057,000	$160,000	$1,217,000

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[1] Including estimated engineering and administration fees and contingency.

[2] 30 years at 5% interest.

A more detailed list of explanations and assumptions which apply to the cost estimates is presented in Appendix G.

6.4 Recommended Remedial Alternative

Based on the evaluation of the remedial alternatives described above, excavation and removal of "hot-spot" soil and establishment of institutional controls, as discussed in Alternative 3, would be protective of human health and the environment, and meets the remedy selection criteria and is, therefore, the recommended alternative for this site. Although implementation of Alternative 2 provides for removal of a larger volume of contaminated soil, demolishing the Boat Yard building and extensive excavation beneath public roadways and disruption of utilities is not a viable option and is not necessary to achieve the stated remedial action objectives for the site. Although Alternative 4 would also meet the remedy selection criteria, the implementation of the in-situ solidification along the Hudson River would have more significant short-term impacts. Placement of the in-situ solidification in this area would attempt to provide a barrier to mitigate further migration of the MGP material. However, due to the absence of any current impact to the Hudson River and the presence of sea walls along the Hudson River which are likely already providing some mitigation of migration of contaminants, implementation of Alternative 4 is not recommended for this site. Since the majority of the MGP-impacted material is readily accessible for removal and off-site disposal, Alternative 5 where a majority of the MGP-impacted soil will remain on-site, although immobilized, is not recommended.

Appendix A

APPENDIX A

BORING LOGS

Dvirka and Bartilucci
CONSULTING ENGINEERS

Project No.:
Project Name: Cold Spring MGP

Boring No.: SB-01
Sheet 1 **of** 2
By: SS

Drilling Contractor: Zebra
Driller: Evan Moraitis
Drill Rig: Geoprobe 6600
Date Started: 9/17/08

Geologist: Scott Schmidt
Drilling Method: Geoprobe
Drive Hammer Weight: NA
Date Completed: 9/17/08

Boring Completion Depth: 15'
Ground Surface Elevation:
Boring Diameter: 2"

Depth (ft.)	**Soil Sample**			**Photo-Ionization Detector (ppm)**	**Sample Description**
	No.	**Type**	**Rec. (inches)**		
0' - 5'	1	MC	28	0.0	0-4" Dark Brown, SILT, trace fine-medium Sand, roots, dry 4-18" Dark Brown, fine-medium SAND, little fine-medium Gravel and Silt, dry. 18-24" Coarse GRAVEL 24-28" Light Brown, Sandy GRAVEL, Coarse-medium GRAVEL, w/some coarse-fine SAND, trace Silt, wet
5 - 10'	2	MC	51	0.0	0-12" Same as above, saturated groundwater 12-51" Light Brown, Clayey SILT, soft, trace fine-medium sub angular Gravel. Wet
10' - 15'	3	MC	40	0.0	0-4" Same as above. 4-10" Brown fine-coarse SAND, wet 10-21" Light Brown, SILT, trace fine-medium Sand, wet 21-27" Light Brown, fine-coarse SAND, little fine-coarse Gravel, trace Silt, wet 27-37" Brown Silty CLAY, soft, trace fine-medium Gravel, trace organics, wet 37-40" Brown SILT, trace fine-medium Sand, wet
					End of exploration at 15 ft. bgs

Sample Types:
HA = Hand Auger
MC = Macrocore

NOTES:
Groundwater at approximately 3 ft. bgs
No sample collected for laboratory analysis.

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CONSULTING ENGINEERS

Project No.:
Project Name: Cold Spring MGP

Boring No.: SB-02
Sheet 1 **of** 1
By: SS

Drilling Contractor: Zebra
Driller: Evan Moraitis
Drill Rig: Geoprobe 6600
Date Started: 9/17/08

Geologist: Scott Schmidt
Drilling Method: Geoprobe
Drive Hammer Weight: NA
Date Completed: 9/17/08

Boring Completion Depth: 15'
Ground Surface Elevation:
Boring Diameter: 2"

Depth (ft.)	**Soil Sample**			**Photo-Ionization Detector (ppm)**	**Sample Description**
	No.	**Type**	**Rec. (inches)**		
0' - 5'	1	MC	31	0.0	0-2" Topsoil, Dark Brown, SILT, trace fine Sand, roots, moist 2-8" Brown fine-medium SAND, trace fine Gravel and SILT, moist 8-19" Dark Brown and Black, fine-coarse SAND, little fine-coarse Gravel, trace Silt, moist, trace coal 19-26" Light Brown SILT, little fine-medium Sand, trace fine-coarse Gravel, wet 26-31" Brown coarse-fine SAND and Gravel, slight tar odor, brick, groundwater saturated
5' - 10'	2	MC	21	0.0	Light Brown, SILT, trace Clay, firm, trace fine-medium Gravel, groundwater wet
10' - 15'	3	MC	40	0.0	Brown fine-coarse SAND, trace fine-coarse Gravel, and Silt, saturated groundwater
					End of exploration at 15 ft. bgs.

Sample Types:
HA = Hand Auger
MC = Macrocore

NOTES:
Groundwater at approximately 3 ft. bgs.
No sample collected for laboratory analysis.

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Project No.:
Project Name: Cold Spring MGP

Boring No.: SB-03
Sheet 1 **of** 1
By: SS

Drilling Contractor: Zebra
Driller: Evan Moraitis
Drill Rig: Geoprobe 6600
Date Started: 9/17/08

Geologist: Scott Schmidt
Drilling Method: Geoprobe
Drive Hammer Weight: NA
Date Completed: 9/17/08

Boring Completion Depth: 7'
Ground Surface Elevation:
Boring Diameter: 2"

Depth (ft.)	Soil Sample			Photo-Ionization Detector (ppm)	Sample Description
	No.	Type	Rec. (inches)		
0' - 5'	1	MC	24	0.0	0-2" Topsoil, Dark Brown, medium to fine SAND, some Silt, moist, organics 2-16" Brown fine-coarse SAND, some Silt and fine-coarse Gravel, moist 16-24" Brown fine-medium SAND, faint tar odor, small brick, gw wet
5' - 7'	2	MC	10	343	0-8" Black-Green-Brown, fine-coarse SAND and Gravel, gw wet 8-10" Black-Green, SILT, some fine-medium Sand and Gravel, blebs, NAPL, Strong tar odor, dry
					End of exploration at 7 ft. bgs. Refusal at 7 ft., likely bedrock

Sample Types:
HA = Hand Auger
MC = Macrocore

NOTES:
Groundwater encountered at approximately 3 ft. bgs.
Sample at 5-7 ft. selected for laboratory analysis.
Refusal at 7 ft. bgs, likely bedrock.

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Project No.:
Project Name: Cold Spring MGP

Boring No.: SB-04
Sheet 1 **of** 1
By: SS

Drilling Contractor: Zebra
Driller: Evan Moraitis
Drill Rig: Geoprobe 6600
Date Started: 9/17/08

Geologist: Scott Schmidt
Drilling Method: Geoprobe
Drive Hammer Weight: NA
Date Completed: 9/17/08

Boring Completion Depth: 15'
Ground Surface Elevation:
Boring Diameter: 2"

Depth (ft.)	**Soil Sample**			**Photo-Ionization Detector (ppm)**	**Sample Description**
	No.	**Type**	**Rec. (inches)**		
0' - 5'	1	MC	30	0.0 0.0 0.0 5.7 7.0	0-2" Gray fine-medium GRAVEL and Sand 2-12" Light Brown fine-coarse SAND and Silt, little fine-coarse Gravel, trace coal and brick 12-30" Black, Olive fine-coarse SAND, some fine-coarse Gravel, gw wet-moist, faint tar odor, fill, bits of coal, trace blebs
5' - 10'	2	MC	30	1976 876 243 38.2 18.4	0-15" Black fine-coarse SAND and Gravel, trace Silt, strong tar odor, NAPL, blebs, saturated NAPL and gw 15-18" Coarse Gravel 18-30" Light Brown fine-coarse SAND, some coarse-fine Gravel, some Silt, tar odor, firm, moist
10' - 15'	3	MC	43	743 110 269 116 547 29.8 2.9	Light Brown fine-coarse SAND and coarse-fine Gravel, little Silt, gw wet, strong to moderate tar odor.
					End of exploration at 15 ft. bgs

Sample Types:
HA = Hand Auger
MC = Macrocore

NOTES:
Groundwater at approximately 4 ft. bgs
Soil Sample submitted for laboratory analysis between 7-9 ft. bgs.

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Project No.:
Project Name: Cold Spring MGP

Boring No.: SB-05
Sheet 1 **of** 1
By: SS

Drilling Contractor: Zebra
Driller: Evan Moraitis
Drill Rig: Geoprobe 6600
Date Started: 9/16/08

Geologist: Scott Schmidt
Drilling Method: Geoprobe
Drive Hammer Weight: NA
Date Completed: 9/16/08

Boring Completion Depth: 15'
Ground Surface Elevation:
Boring Diameter: 2"

Depth (ft.)	Soil Sample			Photo-Ionization Detector (ppm)	Sample Description
	No.	Type	Rec. (inches)		
0' - 5'	1	MC	32	0.0	0-4" Black coarse-medium SAND and Gravel, dry 4-27" Olive Brown, fine-medium SAND, w/ some fine-coarse Gravel and Silt, trace brick, moist to wet 27-32" Brown fine-coarse GRAVEL and Sand, trace Silt, bits of coal, oysters groundwater saturated
5' - 10'	2	MC	39	0.0	0-12" Light Brown fine-coarse SAND and Gravel, gw wet 12-22" Same as above, faint tar odor 22-39" Olive Grey fine-medium SAND, w/some Silt, soft, trace Gravel, wood at bottom of sample, groundwater wet
10' - 15'	3	MC	37	0.0	0-12" Same as above, trace organics, gw wet 12-37" Orange Brown, fine-coarse SAND and Gravel, loose, gw saturated
					End of exploration 15 bgs.

Sample Types:
HA = Hand Auger
MC = Macrocore

NOTES:
Groundwater encountered approximately 3 ft. bgs.
No sample collected for laboratory analysis.

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Project No.:
Project Name: Cold Spring MGP

Boring No.: SB-06
Sheet 1 **of** 1
By: SS

Drilling Contractor: Zebra
Driller: Evan Moraitis
Drill Rig: Geoprobe 6600
Date Started: 9/17/08

Geologist: Scott Schmidt
Drilling Method: Geoprobe
Drive Hammer Weight: NA
Date Completed: 9/17/08

Boring Completion Depth: 15'
Ground Surface Elevation:
Boring Diameter: 2"

Depth (ft.)	Soil Sample			Photo-Ionization Detector (ppm)	Sample Description
	No.	Type	Rec. (inches)		
0' - 5'	1	MC	42	0.0	0-4" Macadem 4-8" Brown coarse-fine SAND and fine-medium Gravel 8-24" Olive fine-coarse SAND some fine-coarse Gravel and Silt, moist 24-42" Olive fine-coarse SAND, some fine-medium Gravel and Silt, gw wet, faint odor, loose
5'-10'	2	MC	15	0.0	Olive Brown fine-coarse SAND with some fine-coarse Gravel, sub rounded, loose, gw wet
10'- 15'	3	MC	41	0.0	0-6" Olive fine-coarse SAND and Gravel, gw saturated 6-41" Olive Gray, Silty CLAY- Clayey SILT, soft-firm, faint organic odor, trace wood, peat, organics, moist
					End of Exploration at 15 ft. bgs

Sample Types:
HA = Hand Auger
MC = Macrocore

NOTES:
Groundwater encountered at approximately 3 ft. bgs. Sample selected between 7-9 ft. bgs for laboratory analysis.

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Project No.:
Project Name: Cold Spring MGP

Boring No.: SB-07
Sheet 1 **of** 1
By: SS

Drilling Contractor: Zebra
Driller: Evan Moraitis
Drill Rig: Geoprobe 6600
Date Started: 9/17/08

Geologist: Scott Schmidt
Drilling Method: Geoprobe
Drive Hammer Weight: NA
Date Completed: 9/17/08

Boring Completion Depth: 15'
Ground Surface Elevation:
Boring Diameter: 2"

Depth (ft.)	Soil Sample			Photo-Ionization Detector (ppm)	Sample Description
	No.	Type	Rec. (inches)		
0' - 5'	1	MC	26	0.0	0-2" Gray medium-coarse GRAVEL 2-26" Light Brown fine-medium SAND, some fine-coarse angular Gravel, little Silt, little Brick fill, loose, moist-wet, faint tar odor
5' – 10'	2	MC	26	0.0 9.0 40.6 26.8	0-8" Olive coarse-fine SAND and Gravels, loose, gw saturated 8-20" Black-Gray same as above, strong-moderate tar odor, blebs, sheen, loose, gw wet with NAPL 20-26" Olive fine-medium SAND, some Silt and fine-coarse Gravel, loose, gw wet, faint odor
10' - 15'	3	MC	35	0.0	0-24" Yellow-Brown, Clayey SILT-Silty CLAY, trace fine-medium Gravel and Sand, moist, firm 24-35" Light Brown Clayey SILT, plastic, trace fine Gravel, very soft, moist
					End of exploration at 15 ft. bgs.

Sample Types:
HA = Hand Auger
MC = Macrocore

NOTES:
Groundwater encountered at approximately 4 ft. bgs
Soil Sample selected between 8-10 ft. bgs for laboratory analysis.

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Project No.:
Project Name: Cold Spring MGP

Boring No.: SB-08
Sheet 1 **of** 1
By: SS

Drilling Contractor: Zebra
Driller: Evan Moraitis
Drill Rig: Geoprobe 6600
Date Started: 9/18/08

Geologist: Scott Schmidt
Drilling Method: Geoprobe
Drive Hammer Weight: NA
Date Completed: 9/18/08

Boring Completion Depth: 15'
Ground Surface Elevation:
Boring Diameter: 2"

Depth (ft.)	**Soil Sample**			**Photo-Ionization Detector (ppm)**	**Sample Description**
	No.	**Type**	**Rec. (inches)**		
0' - 5'	1	MC	26	2.5 3.7 3.9 12.1 260	0-2" Gray fine-medium GRAVEL 2-18" Brown-Black, fine-medium SAND, some fine-coarse Gravel, trace coal, firm, dry 18-24" Brown-Olive-Black same as above, sheen, tar odor, firm, moist 24-26" Black-Olive, fine-coarse SAND with some fine-coarse Gravel, strong tar odor, sheen, blebs, loose, gw wet Background PID 2.7 ppm
5' – 10'	2	MC	24	23.8 33.8 40.5 639	0-18" Gray coarse-fine SAND and Gravel, strong tar odor, blebs, sheen, loose, gw wet 18-24" Gray, coarse-fine SAND and Gravel, some Silt, strong tar odor, firm, gw wet.
10' - 15'	3	MC	38	17.2 7.1 13.0 4.2 4.3 3.7	0-6" Gray same as above, sheen, moderate tar odor, firm, gw wet 6-12" Olive-Gray, same as above, faint tar odor, firm, very moist 12-38" Light Brown, fine-coarse SAND and Gravel, little Silt, lose, wet-saturated gw, faint tar odor
					End of Exploration at 15 ft. bgs

Sample Types:
HA = Hand Auger
MC = Macrocore

NOTES:
Groundwater encountered at approximately 4 ft. bgs
Soil Sample selected between 4-6 ft. bgs for laboratory analysis.

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Project No.:
Project Name: Cold Spring MGP

Boring No.: SB-09
Sheet 1 **of** 1
By: SS

Drilling Contractor: Zebra
Driller: Evan Moraitis
Drill Rig: Geoprobe 6600
Date Started: 9/17/08

Geologist: Scott Schmidt
Drilling Method: Geoprobe
Drive Hammer Weight: NA
Date Completed: 9/17/08

Boring Completion Depth: 13'
Ground Surface Elevation:
Boring Diameter: 2"

Depth (ft.)	Soil Sample			Photo-Ionization Detector (ppm)	Sample Description
	No.	Type	Rec. (inches)		
0' - 5'	1	MC	26	2.9 3.0 3.5 3.2	0-1" Road base, medium Gravel 1-3" Gray, fine-medium SAND, little Silt, coal, moist 3-15" Brown fine-coarse SAND, little fine-medium Gravel, trace Silt, moist 15-20" Brown SAND, brick, mortar 20-24" fine-coarse GRAVEL, with some fine-coarse Sand, gw wet Background PID 0.9 ppm
5' - 10'	2	MC	24	19.2 50.1 15.2 38.8	0-12" Black, fine-coarse GRAVEL, some fine-coarse Sand, gw saturated, NAPL blebs, sheen, strong tar odor, trace organics 12-24" Olive Green fine-coarse SAND, some fine-coarse ravel, little Silt, firm, tar odor, gw wet
10' - 13'	3	MC	27	4.9 5.0 5.1 17.8	0-11" Olive Green, same as above, slight tar odor, very moist. 11-24" Green-Light Brown, fine-coarse SAND, some fine-coarse Gravel 24-27" Weathered bedrock
					End of exploration at 13ft. bgs. Refusal at 13 ft., likely bedrock.

Sample Types:
HA = Hand Auger
MC = Macrocore

NOTES:
Groundwater encountered at approximately 4 ft. bgs
Soil Sample selected between 7-9 ft. bgs for laboratory analysis.
Refusal at 13 ft. bgs, likely bedrock.

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Project No.:
Project Name: Cold Spring MGP

Boring No.: SB-10
Sheet 1 **of** 1
By: SS

Drilling Contractor: Zebra
Driller: Evan Moraitis
Drill Rig: Geoprobe 6600
Date Started: 9/17/08

Geologist: Scott Schmidt
Drilling Method: Geoprobe
Drive Hammer Weight: NA
Date Completed: 9/17/08

Boring Completion Depth: 8'
Ground Surface Elevation:
Boring Diameter: 2"

Depth (ft.)	**Soil Sample**			**Photo-Ionization Detector (ppm)**	**Sample Description**
	No.	**Type**	**Rec. (inches)**		
0' - 5'	1	MC	23	5.0 8.6 13.8 308	0-2" Dark Brown, medium-fine SAND, some medium-fine Gravel, trace Silt. 2-20" Brown fine- coarse SAND, some coarse-fine Gravel, trace Silt, moist. 20-23" Black, same as above, strong tar odor, blebs, sheen, groundwater wet
5' - 8'	2	MC	24	947 1602 201 28.8	0-12" Black, fine-coarse SAND and Gravel, groundwater saturated, strong tar odor, oil NAPL blebs, sheen. 12-24" Light Green, fine-coarse GRAVEL and Sand, strong tar odor, groundwater moist-dry.
					Refusal at Bedrock, end boring at 8 ft. bgs.

Sample Types:
HA = Hand Auger
MC = Macrocore

NOTES:
Groundwater at 5 ft. bgs
Refusal at bedrock, 8 ft. bgs.
Soil sample selected between 5-7 ft. bgs for laboratory analysis.

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Project No.:
Project Name: Cold Spring MGP

Boring No.: SB-11
Sheet 1 **of** 1
By: SS

Drilling Contractor: Zebra
Driller: Evan Moraitis
Drill Rig: Geoprobe 6600
Date Started: 9/16/08

Geologist: Scott Schmidt
Drilling Method: Geoprobe
Drive Hammer Weight: NA
Date Completed: 9/16/08

Boring Completion Depth: 17'
Ground Surface Elevation:
Boring Diameter: 2"

Depth (ft.)	Soil Sample			Photo-Ionization Detector (ppm)	Sample Description
	No.	Type	Rec. (inches)		
0' - 5'	1	MC	30	0.0 0.0 1.8 1.3 0.0	0"-2" Grey, medium-coarse GRAVEL, some Sand Brown, loose, dry 2"-12" Brown, medium-coarse SAND, some Gravel, loose, dry 12"-15" Black, coarse-fine SAND, little fine-coarse Gravel, loose, moist, fill, macadam 15"-30" Dark brown-gray, fine-coarse SAND, little sub-angular Gravel, moist to wet
5' - 10'	2	MC	17	0.0 0.0 0.7	0-10" Brown-olive green, coarse-medium SAND, some medium-fine Gravel, wet 10"-17" Black-dark gray, coarse-medium SAND, some medium-fine Gravel, slight odor, wet
10' - 15'	3	MC	47	0.0 2.4 2.8 0.0	0"-7" Brown, coarse-fine SAND and Gravel, saturated 7"-22" Orange, coarse-medium SAND and Gravel, slight odor, sheen 22"-32" Olive Gray Clayey SILT, trace fine angular Gravel, moist, soft 32"-37" Wood 37"-47" Olive Gray Silty CLAY, little medium-coarse Gravel, moist, soft
15' - 17'	4	MC	10	0.0	Olive Gray Silty CLAY, soft, moist, no odor, refusal, bedrock in spoon
					Refusal at bedrock, end of boring at 17 ft. bgs.

Sample Types:
HA = Hand Auger
MC = Macrocore

NOTES:
Refusal at bedrock, 17 ft. bgs.
Groundwater at approximately 3 ft.
Soil sample selected between 11-13 ft. bgs for laboratory analysis.

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Project No.:
Project Name: Cold Spring MGP

Boring No.: SB-12
Sheet 1 **of** 1
By: SS

Drilling Contractor: Zebra
Driller: Evan Moraitis
Drill Rig: Geoprobe 6600
Date Started: 9/16/08

Geologist: Scott Schmidt
Drilling Method: Geoprobe
Drive Hammer Weight: NA
Date Completed: 9/16/08

Boring Completion Depth: 33'
Ground Surface Elevation:
Boring Diameter: 2"

Depth (ft.)	Soil Sample			Photo-Ionization Detector (ppm)	Sample Description
	No.	Type	Rec. (inches)		
0' - 5'	1	MC	34	0.0	0"-4" Brown, medium-coarse SAND w/some gravel, bricks, loose, dry-wet
5' - 10'	2	MC	36	0.0 0.3 0.5 1.4 1.9 2.1	0-18": Brown, medium-fine SAND, some medium-fine gravel 18-24": Brown, medium-coarse GRAVEL, some medium-coarse sand, loose, wet
10'– 15'	3	MC	40	4.0 8.0 156 123 21.1 5.4 4.8	0-7" Brown/Gray coarse SAND with some Gravel, slight tar odor, gw wet 7-24" Black coarse to medium SAND and Gravel, strong tar odor, blebs, sheen, gw wet with blebs. 24-40" Olive CLAY, trace Silt and fine Gravel, moist, slight tar odor.
15' - 20'	4	MC	0	0.0	No Recovery, very soft
20' - 25'	5	MC	4	0.0	Olive, CLAY, little Silt, trace fine Gravel, very soft, moist.
25' - 33'	6	MC	24	0.0	Over drill to 33 ft. Olive, CLAY, trace Silt, little, Oyster Shell, soft, moist.
					End of exploration at 33 ft. bgs

Sample Types:
HA = Hand Auger
MC = Macrocore

NOTES:
Groundwater at approximately 3 ft. bgs.
Soil Sample selected between 12-14 ft. bgs for laboratory analysis.

Dvirka and Bartilucci CONSULTING ENGINEERS	**Project No.:** **Project Name:** Cold Spring MGP	**Boring No.: SB-13** **Sheet** 1 **of** 1 **By:** SS
Drilling Contractor: Zebra **Driller:** Evan Moraitis **Drill Rig:** Geoprobe 6600 **Date Started:** 9/16/08	**Geologist:** Scott Schmidt **Drilling Method:** Geoprobe **Drive Hammer Weight:** NA **Date Completed:** 9/16/08	**Boring Completion Depth:** 19' **Ground Surface Elevation:** **Boring Diameter:** 2"

Depth (ft.)	**Soil Sample**			**Photo-Ionization Detector (ppm)**	**Sample Description**
	No.	**Type**	**Rec. (inches)**		
0' - 5'	1	MC	33	0.0	0-2" Gray, medium GRAVEL 2-13" Gray/Brown, coarse-fine GRAVEL, little coarse-fine Sand, moist. 13-21" White, Dark Brown, Fill, brick, ash, bits of coal, Brown fine-coarse SAND, some fine-coarse Gravel, moist. 21-27" Dark Brown, fine-medium SAND, some coarse angular Gravel, little Silt, moist 27-33" Light Brown fine-coarse SAND and Gravel, trace Silt, gw wet
5' - 10'	2	MC	27	0.0	0-12" Red Brown coarse-fine SAND with some coarse-fine Gravel, gw saturated. 12-27" Grey fine-coarse GRAVEL with some fine- coarse Sand, gw saturated.
10' - 15'	3	MC	41	6.2 4.7 1.2 0.0 0.0	0-9" Brown/Gray coarse to fine SAND, some fine-medium Gravel, slight tar odor, gw wet 9-41" Olive CLAY, soft, little Silt, trace coarse Sand, slight tar odor, moist
15' - 19'	4	MC	29	0.0	0-22" Olive fine-coarse SAND and Gravel, little Clay, gw saturated, no odor 22-27" Black fine-medium SAND, some fine-medium Gravel, little Silt, organics, gw wet 27-29" Olive fine-coarse SAND and Gravel, little Clay, gw saturated.
					Refusal at bedrock, end boring at 19 ft. bgs.

Sample Types:
HA = Hand Auger
MC = Macrocore

NOTES:
Groundwater encountered at approximately 3 ft. bgs.
Soil Sample selected between 11-13 ft. bgs for laboratory analysis.
Refusal at bedrock 19 ft. bgs.

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CONSULTING ENGINEERS

Project No.:
Project Name: Cold Spring MGP

Boring No.: SB-14
Sheet 1 **of** 1
By: SS

Drilling Contractor: Zebra
Driller: Evan Moraitis
Drill Rig: Geoprobe 6600
Date Started: 9/16/08

Geologist: Scott Schmidt
Drilling Method: Geoprobe
Drive Hammer Weight: NA
Date Completed: 9/16/08

Boring Completion Depth: 30'
Ground Surface Elevation:
Boring Diameter: 2"

Depth (ft.)	**Soil Sample**			**Photo-Ionization Detector (ppm)**	**Sample Description**
	No.	**Type**	**Rec. (inches)**		
0' - 5'	1	MC	36	0.0	0-15" Light Brown fine-coarse SAND, some fine-coarse Gravel 15-30" Black-Gray-Brown, firm, fine-coarse SAND, little fine-coarse Gravel and Silt, glass, oyster shells, brick, dry
5' - 10'	2	MC	20	0.0 0.0 1.8 1.4	Black-Brown, fine-coarse SAND and Gravel, slight tar odor, oyster shells, pottery dishes, all fill, gw wet to saturated
10' - 15'	3	MC	12	156 13.8	0-8" Black, coarse-fine SAND and Gravel, peat, glass, fill, gw saturated with strong tar odor, NAPL blebs, sheen pockets. 8-12" Black-Gray, coarse-fine GRAVEL, some fine-medium Sand, gw saturated, tar odor
15' - 25'	4	MC	37	0.0	Original 15-20 ft., no recovery, pushed to 25 ft. Olive, Silty CLAY, trace fine-coarse sub angular Gravel, trace fragments of shell, slight organic odor, soft, moist
25' - 33'	5	MC	30	0.0	Over drill to 33 ft. Olive, Silty CLAY, trace fine Gravel, moist, soft
					End of exploration at 33 ft. bgs.

Sample Types:
HA = Hand Auger
MC = Macrocore

NOTES:
End of exploration at 33 ft. bgs
Soil Sample selected between 13-15 ft. bgs for laboratory analysis.
Groundwater at approximately 5 ft. bgs.

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Project No.:
Project Name: Cold Spring MGP

Boring No.: SB-15
Sheet _1_ **of** _1_
By: SS

Drilling Contractor: Zebra
Driller: Evan Moraitis
Drill Rig: Geoprobe 6600
Date Started: 9/17/08

Geologist: Scott Schmidt
Drilling Method: Geoprobe
Drive Hammer Weight: NA
Date Completed: 9/17/08

Boring Completion Depth: 33'
Ground Surface Elevation:
Boring Diameter: 2"

Depth (ft.)	**Soil Sample**			**Photo-Ionization Detector (ppm)**	**Sample Description**
	No.	**Type**	**Rec. (inches)**		
0' - 5'	1	MC	34	1.9 5.3 9.0 14.7 21.3 18.5	0-3" Topsoil, Dark Brown, fine-medium SAND, some Silt, little medium-fine Gravel, dry 3-12" Brown-gray fine-coarse SAND, some Silt, little fine-coarse Gravel, dry 12-24" Olive-Brown fine-coarse SAND, some fine-coarse Gravel, little Silt, Ash, slight unknown odor, gw wet 24-34" Olive, fine-medium SAND, some fine-coarse Gravel, trace Silt, gw wet
5' – 10'	2	MC	32	21.4 28.9 15.2 14.8 23.3	Olive-Black fine-coarse SAND, some fine-coarse sub rounded Gravel, trace Silt, sheen, blebs, tar odor, gw wet to saturated Background PID 9.3 ppm
10' - 15'	3	MC	12	23.9 214	Black coarse-fine SAND, some coarse-fine Gravel, wood at end of spoon, strong tar odor, blebs, gw saturated
15' - 25'	4	MC	33	6.8 3.7 4.0 3.3 2.9	Olive Silty CLAY-Clayey SILT, soft, trace oyster shells, trace fine-medium Gravel, moist, organic odor Ambient PID 3.2 ppm
25' - 33'	5	MC	38	1.4 1.9 2.0 2.4 2.2 2.6	Same as above. Over drilled to 33 ft. bgs.
					End of exploration at 33 ft. bgs.

Sample Types:
HA = Hand Auger
MC = Macrocore

NOTES:
End of exploration at 33 ft. bgs, over drilled.
Groundwater encountered at approximately 3 ft. bgs.
Soil Sample selected between 13-15 ft. bgs for laboratory analysis.
PID sensitivity, readings varied.

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Project No.:
Project Name: Cold Spring MGP

Boring No.: SB-16
Sheet 1 **of** 1
By: SS

Drilling Contractor: Zebra
Driller: Evan Moraitis
Drill Rig: Geoprobe 6600
Date Started: 9/18/08

Geologist: Scott Schmidt
Drilling Method: Geoprobe
Drive Hammer Weight: NA
Date Completed: 9/18/08

Boring Completion Depth: 13'
Ground Surface Elevation:
Boring Diameter: 2"

Depth (ft.)	**Soil Sample**			**Photo-Ionization Detector (ppm)**	**Sample Description**
	No.	**Type**	**Rec. (inches)**		
0' - 5'	1	MC	22	1.3 1.3 1.7 2.2	0-2" Topsoil, Dark Brown, SILT and fine-medium SAND, roots, organics, moist 2-18" Brown, fine-medium SAND w/some Silt, little fine-coarse Gravel, firm, trace coal, dry 18-22" Light Brown, fine-coarse SAND, some Silt and coarse-medium Gravel, gw wet Background PID 1.5 ppm
5' - 10'	2	MC	42	3.7 3.9 2.1 2.2 2.3 2.0 1.9	0-5" Olive gray fine-coarse SAND, some fine-coarse Gravel, little Silt, gw saturated, sheen, faint tar odor 5-10" Olive gray, fine-coarse SAND and Gravel, some Silit, firm gw wet, faint tar odor 10-24" Tan, SILT, little fine-coarse Gravel, trace fine-coarse Sand and Clay, firm, gw wet 24-42" Orange Brown, SILT and medium-fine Sand, wet, no odor Background PID 2.3
10' - 13'	3	MC	22	1.8 1.2 0.8 1.1	0-11" Brown fine-coarse SAND, trace Silt and fine-medium Gravel, gw wet 11-22" Light Brown CLAY, little fine-coarse Sand and fine-coarse Gravel, gw saturated, soft
					Refusal at bedrock, end boring at 13 ft. bgs.

Sample Types:
HA = Hand Auger
MC = Macrocore

NOTES:
Groundwater at approximately 4 ft. bgs
Refusal at bedrock, 13 ft. bgs.
Soil Sample selected between 6-8 ft. bgs for laboratory analysis.

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Project No.:
Project Name: Cold Spring MGP

Boring No.: SB-17
Sheet 1 **of** 1
By: SS

Drilling Contractor: Zebra
Driller: Evan Moraitis
Drill Rig: Geoprobe 6600
Date Started: 9/18/08

Geologist: Scott Schmidt
Drilling Method: Geoprobe
Drive Hammer Weight: NA
Date Completed: 9/18/08

Boring Completion Depth: 25'
Ground Surface Elevation:
Boring Diameter: 2"

Depth (ft.)	Soil Sample			Photo-Ionization Detector (ppm)	Sample Description
	No.	Type	Rec. (inches)		
0' - 5'	1	MC	24	0.8 0.9 1.8 1.9	0-3" Topsoil, Dark Brown, fine-medium SAND, little Silt, roots, moist 3-18" Brown, fine-medium SAND and Gravel, trace Silt, fill, brick, moist 18-24" Olive, fine-medium SAND, some fine-coarse Gravel, little Silt, firm moist, faint tar odor Background PID 0.6 ppm
5' – 10'	2	MC	33	1.8 1.4 2.1 1.3 1.8	0-9" Dark Olive, fine-coarse SAND and Gravel, trace Silt, gw saturated 9-24" Tan/Olive, fine-medium SAN D, some Silt and coarse-fine Gravel, soft, gw saturated 24-33" Olive, coarse-fine SAND and Gravel, fain tar odor, gw saturated
10' - 15'	3	MC	33	1.8 114 24.2 14.7 4.3	0-5" Same as above 5-12" Dark Olive, same as above, blebs, sheen, strong tar odor, gw saturated 12-18" Dark Olive/Gray, Clay SILT, Silt CLAY, faint tar odor, moist 24-33" Olive, same as above, faint tar odor
15' - 25'	4	MC	20	2.1 2.3 2.4	Same as above, faint organic odor Background PID 1.3 ppm
					End of exploration at 25 ft. bgs

Sample Types:
HA = Hand Auger
MC = Macrocore

NOTES:
Groundwater at approximately 5 ft. bgs
Soil Sample selected between 12-14 ft. bgs for laboratory analysis.

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Project No.:
Project Name: Cold Spring MGP

Boring No.: SB-18
Sheet 1 **of** 1
By: MSF

Drilling Contractor: Zebra
Driller: Evan Moraitis
Drill Rig: Geoprobe 6600
Date Started: 09/19/08

Geologist: Jon Dahlgren
Drilling Method: Geoprobe
Drive Hammer Weight: NA
Date Completed: 09/19/08

Boring Completion Depth: 12’
Ground Surface Elevation:
Boring Diameter: 2”

Depth (ft.)	**Soil Sample**			**Photo-Ionization Detector (ppm)**	**Sample Description**
	No.	**Type**	**Rec. (inches)**		
0'-5'	1	MC	28	0.4 (0-6”) 0.4 (6-12”) 0.7 (12-18”) 0.8 (18-28”)	0-6” Topsoil, Brown, sandy SILT. Fill. Moist 6-24” Brown to gray, silty SAND and gravel. Fill. Moist. 24-28” Silt and Sand with black wood and gravel. Fill. Moist.
5’-10’	2	MC	24	0.2 (0-6”) 0.3 (6-12”) 0.2 (12-18”) 0.3 (18-24”)	Grey, SAND with gravel. Fill. GW-Saturated.
10’-14’	3	MC	21	0.2 (0-6”) 0.8 (6-12”) 1.4 (12-18”) 1.5 (18-21”)	Brown to Grey, medium to course SAND with silt and gravel, pieces of glass and brick observed. Fill. GW-Saturated. Light sheen observed lat 3” of gravel/rock.
					Refusal at 14 ft. bgs

Sample Types:
HA = Hand Auger
MC = Macrocore

NOTES:
Refusal encountered at 14 ft. bgs
Groundwater encountered at 5 ft. bgs
Soil sample selected between 12-14 ft. bgs for laboratory analysis.
PID sensitivity, readings varied.

Dvirka and Bartilucci CONSULTING ENGINEERS	**Project No.:** **Project Name:** Cold Spring MGP	**Boring No.: SB-19** **Sheet** 1 **of** 1 **By:** MSF
Drilling Contractor: Zebra **Driller:** Evan Moraitis **Drill Rig:** Geoprobe 6600 **Date Started:** 09/19/08	**Geologist:** Jon Dahlgren **Drilling Method:** Geoprobe **Drive Hammer Weight:** NA **Date Completed:** 09/19/08	**Boring Completion Depth:** 10' **Ground Surface Elevation:** **Boring Diameter:** 2"

Depth (ft.)	**Soil Sample**			**Photo-Ionization Detector (ppm)**	**Sample Description**
	No.	**Type**	**Rec. (inches)**		
0'-5'	1	MC	32	0 (0-6") 0 (6-12") 0.3 (12-18") 0.4 (18-24") 0.3 (24-32")	Brown and grey, silty SAND and gravel with rock and brick. Loose. Moist. GW-wet at tip.
5'-10'	2	MC	24	0.1 (0-6") 0.3 (6-12") 0.3 (6-24")	Brown to grey, silty, sandy, gravel. Brick observed in soil. Loose. GW-wet.
					Refusal at 9.0 ft. bgs

Sample Types:
HA = Hand Auger
MC = Macrocore

NOTES:
Refusal encountered at 9 ft. bgs
Groundwater encountered at 4.5 ft. bgs
Soil sample selected between 7.0-9.0 ft. bgs for laboratory analysis.
PID sensitivity, readings varied.

Dvirka and Bartilucci
CONSULTING ENGINEERS

Project No.:
Project Name: Cold Spring MGP

Boring No.: SB-20
Sheet 1 **of** 1
By: SS

Drilling Contractor: Zebra
Driller: Evan Moraitis
Drill Rig: Geoprobe 54 DT
Date Started: 10/20/08

Geologist: Scott Schmidt
Drilling Method: Geoprobe
Drive Hammer Weight: NA
Date Completed: 10/20/08

Boring Completion Depth: 5'
Ground Surface Elevation:
Boring Diameter: 2"

Depth (ft.)	Soil Sample			Photo-Ionization Detector (ppm)	Sample Description
	No.	Type	Rec. (inches)		
0' - 4'	1	MC	34	0.0	0-26" Brown, Dark Brown, medium-fine SAND and Silt, dry, organics, fill, glass, brick, clay, coal 26-34" Light Brown, fine-medium SAND and Silt, some coarse-fine Gravel, faint tar odor, dry
4' - 5'	2	MC	12	0.0	Light Brown, fine-medium SAND and Silt, some coarse-fine Gravel, moist
					Refusal at bedrock, end boring at 5 ft. bgs.

Sample Types:
HA = Hand Auger
MC = Macrocore

NOTES:
Groundwater not encountered
Soil Sample selected between 3-5 ft. bgs for laboratory analysis.

Dvirka and Bartilucci CONSULTING ENGINEERS	**Project No.:** **Project Name:** Cold Spring MGP	**Boring No.: SB-21** **Sheet** 1 **of** 1 **By:** SS
Drilling Contractor: Zebra **Driller:** Ethank Plank **Drill Rig:** Geoprobe 54 DT **Date Started:** 10/20/08	**Geologist:** Scott Schmidt **Drilling Method:** Geoprobe **Drive Hammer Weight:** NA **Date Completed:** 10/20/08	**Boring Completion Depth:** 3' **Ground Surface Elevation:** **Boring Diameter:** 2"

Depth (ft.)	**Soil Sample**			**Photo-Ionization Detector (ppm)**	**Sample Description**
	No.	**Type**	**Rec. (inches)**		
0' - 3'	1	MC	21	0.0	0-13" Brown, fine-coarse SAND and Gravel, dry 13-21" Grey, coarse GRAVEL, trace medium-coarse Sand, weathered bedrock, slight tar odor, dry
					Refusal at bedrock, end boring at 3 ft. bgs.

Sample Types:
HA = Hand Auger
MC = Macrocore

NOTES:
Groundwater not encountered
Samples not collected for laboratory analysis.

Dvirka and Bartilucci
CONSULTING ENGINEERS

Project No.:
Project Name: Cold Spring MGP

Boring No.: SB-22
Sheet 1 **of** 1
By: SS

Drilling Contractor: Zebra
Driller: Ethan Plank
Drill Rig: Geoprobe 54 DT
Date Started: 10/20/08

Geologist: Scott Schmidt
Drilling Method: Geoprobe
Drive Hammer Weight: NA
Date Completed: 10/20/08

Boring Completion Depth: 16'
Ground Surface Elevation:
Boring Diameter: 2"

Depth (ft.)	Soil Sample			Photo-Ionization Detector (ppm)	Sample Description
	No.	Type	Rec. (inches)		
0' - 4'	1	MC	25	0.0	0-8" Dark Brown, SILT and fine-medium Sand, trace fine Gravel, organics, dry 8-13" Brown, coarse GRAVEL, trace Sand 13-25" Brown fine-medium SAND and Silt, little fine-coarse Gravel, dry
4' - 8'	2	MC	36	0.0	0-29" Light Brown, SILT, trace fine-medium Sand, trace roots, dry 29-36" Light Brown, SILT, some fine Sand, banded, moist
8' - 12'	3	MC	36	0.0	0-12" Light Brown, fine-coarse SAND, some medium-fine Gravel, gw wet 12-20" Light Brown, SILT, soft, gw saturated 20-36" Light Brown, fine-coarse SAND, little coarse-fine Gravel, trace Silt, moist
12' - 16'	4	MC	32	0.0	0-9" Olive, coarse-fine GRAVEL and fine-coarse Sand, gw wet, organic odor 9-32" Brown, fine-coarse SAND, some coarse-fine Gravel, moist, firm
					End of exploration at 16 ft. bgs.

Sample Types:
HA = Hand Auger
MC = Macrocore

NOTES:
Groundwater encountered at 8 ft. bgs
Soil Sample selected between 14-16 ft. bgs for laboratory analysis.
Groundwater sample collected for laboratory analysis at SB-22-GW

Dvirka and Bartilucci CONSULTING ENGINEERS	**Project No.:** **Project Name:** Cold Spring MGP	**Boring No.: SB-23** **Sheet** 1 **of** 1 **By:** SS
Drilling Contractor: Zebra **Driller:** Ethan Plank **Drill Rig:** Geoprobe 54 DT **Date Started:** 10/20/08	**Geologist:** Scott Schmidt **Drilling Method:** Geoprobe **Drive Hammer Weight:** NA **Date Completed:** 10/20/08	**Boring Completion Depth:** 18' **Ground Surface Elevation:** **Boring Diameter:** 2"

Depth (ft.)	**Soil Sample**			**Photo-Ionization Detector (ppm)**	**Sample Description**
	No.	**Type**	**Rec. (inches)**		
0' - 4'	1	MC	27	0.0	0-15" Dark Brown fine-medium SAND, some Silt, trace fine-medium Gravel, root systems, dry 15-20" Dark Brown fine-coarse SAND, little coarse-medium Gravel 20-27" Light Brown fine-medium SAND, little fine-medium Gravel, trace Silt, dry
4' - 8'	2	MC	30	0.0	0-26" Light Brown fine-medium SAND, little coarse-fine Gravel, trace Silt, loose, dry 26-30" Dark Brown-Brown SILT, fine-medium Sand, coal seam, musty odor
8' - 12'	3	MC	40	0.0	0-5" Light Brown fine-coarse SAND, some fine-medium Gravel, dry 5-18" Light Brown, SILT, trace fine Sand, soft, gw wet 18-24" Brown fine-coarse SAND, and Silt, gw saturated 24-40" Light Brown SILT, little Clay, soft-firm, trace medium-fine Sand, gw wet
12' - 16'	4	MC	40	0.0	Brown-light Brown, SILT, little fine-coarse SAND, trace fine-medium Gravel, loose, gw wet
16' - 18'	5	MC	8	0.0	Light Brown fine-coarse SAND and Gravel, moist, loose
					Refusal at bedrock, end boring at 18 ft. bgs.

Sample Types:
HA = Hand Auger
MC = Macrocore

NOTES:
Groundwater encountered at approximately 9 ft. bgs
Soil Sample selected between 14-16 ft. bgs for laboratory analysis.

Dvirka and Bartilucci CONSULTING ENGINEERS	**Project No.:** **Project Name:** Cold Spring MGP	**Boring No.: SB-24** **Sheet** 1 **of** 1 **By:** SS
Drilling Contractor: Zebra **Driller:** Ethan Plank **Drill Rig:** Geoprobe 54 DT **Date Started:** 10/20/08	**Geologist:** Scott Schmidt **Drilling Method:** Geoprobe **Drive Hammer Weight:** NA **Date Completed:** 10/20/08	**Boring Completion Depth:** 12' **Ground Surface Elevation:** **Boring Diameter:** 2"

Depth (ft.)	**Soil Sample**			**Photo-Ionization Detector (ppm)**	**Sample Description**
	No.	**Type**	**Rec. (inches)**		
0'- 4'	1	MC	27	0.0	0-18" Brown- lack, fine-coarse SAND, little fine-coarse Gravel, red brick, firm, dry 18-27" Dark Brown fine-coarse SAND, some fine-coarse Gravel, trace coal, loose, moist-wet
4' - 8'	2	MC	20	0.0 7.8 25.8 17.8	0-15" Olive-Brown, fine-coarse Sand, little Silt, little coarse-fine Gravel, moist, loose, brick, coal, moderate tar odor 15-20" Black SILT, saturated gw, NAPL Blebs, sheen strong tar odor
8' - 12'	3	MC	35	22.2 8.5 5.8 1.5 1.1	0-6" Same as above, gw saturated 6-12" Dark Brown, fine-medium SAND, some fine-medium Gravel, trace Silt, gw wet, strong tar odor, loose 12-35" Brown Clayey fine-medium SAND, some coarse Gravel, slight tar odor
					End of exploration at 12 ft. bgs

Sample Types: HA = Hand Auger MC = Macrocore	**NOTES:** Groundwater encountered at approximately 7 ft. bgs. No sample collected for laboratory analysis.

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Project No.:
Project Name: Cold Spring MGP

Boring No.: SB-25
Sheet 1 **of** 1
By: SS

Drilling Contractor: Zebra
Driller: Ethan Plank
Drill Rig: Geoprobe 54 DT
Date Started: 10/20/08

Geologist: Scott Schmidt
Drilling Method: Geoprobe
Drive Hammer Weight: NA
Date Completed: 10/20/08

Boring Completion Depth: 3’
Ground Surface Elevation:
Boring Diameter: 2”

Depth (ft.)	Soil Sample			Photo-Ionization Detector (ppm)	Sample Description
	No.	Type	Rec. (inches)		
0' - 3'	1	MC	20	0.0	0-10” Brown, fine-medium SAND, Silt, little fine-coarse Gravel, dry 10-20” Weathered bedrock, coarse GRAVEL, firm, dry
					Refusal at bedrock, end boring at 3 ft. bgs.

Sample Types:
HA = Hand Auger
MC = Macrocore

NOTES:
Groundwater not encountered.
No sample collected for laboratory analysis.

Appendix B

APPENDIX B

CHEMICAL DATA TABLES

TABLE 4-1
COLD SPRING FORMER MGP SITE
SURFACE SOIL SAMPLE RESULTS
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)

CONSTITUENT Units in ug/kg		SITE	SS-01	SS-02	SS-03	SS-04
		SAMPLE ID	SS-01	SS-02	SS-03	SS-04
		DATE	10/20/2008	10/20/2008	10/20/2008	10/20/2008
	Commerical Use SCOs	Part 375 Unrestricted Use SCOs				
2-Methylnaphthalene	NA	NA	<9.5	<56	<52	<200
Acenaphthene	500000	20000	<7.3	<43	<40	<150
Acenaphthylene	500000	100000	<4.9	<29	<27	<100
Anthracene	500000	100000	<11	<67	<62	<240
Benzo(a)anthracene	5600	1000	<8.1	510 J	480 J	2500 J
Benzo(a)pyrene	1000	1000	<9.9	540 J	590 J	***2800 J***
Benzo(b)fluoranthene	5600	1000	43 J	790 J	830 J	3700 J
Benzo(ghi)perylene	500000	NA	<24	410 J	530 J	2100 J
Benzo(k)fluoranthene	56000	800	<15	220 J	260 J	1100 J
Chrysene	56000	1000	<6.3	670 J	570 J	3000 J
Dibenzo(a,h)anthracene	560	330	<25	<150	<130	<520
Dibenzofuran	350000	7000	<10	<61	<57	<220
Fluoranthene	500000	100000	42 J	1100 J	890 J	4700 J
Fluorene	500000	30000	<9.1	<53	<49	<190
Indeno(1,2,3-cd)pyrene	5600	500	<8.5	330 J	390 J	1800 J
Naphthalene	500000	12000	<8.1	<48	<44	<170
Phenanthrene	500000	100000	<10	520 J	370 J	2000 J
Pyrene	500000	100000	41 J	1000 J	880 J	4800 J
Total PAHs	NA	NA	126	6090	5790	28500

ug/kg	Micrograms per kilogram.
SCO	Soil Cleanup Objective.
NA	None available.
▨	Result exceed Unrestricted SCO.
Bolded	Result exceed both SCO.
J	Estimated value.
D	Detected in secondary dilution.

TABLE 4-1
COLD SPRING FORMER MGP SITE
SURFACE SOIL SAMPLE RESULTS
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)

CONSTITUENT		SITE	SS-05	SS-06	SS-07	SS-08
Units in ug/kg		SAMPLE ID	SS-05	SS-06	SS-07	SS-08
		DATE	10/20/2008	10/20/2008	10/20/2008	10/20/2008
	Commerical Use SCOs	Part 375 Unrestricted Use SCOs				
2-Methylnaphthalene	NA	NA	1300 J	<51	<200	<230
Acenaphthene	500000	20000	2300 J	<39	<160	<180
Acenaphthylene	500000	100000	4900 J	<27	<100	<120
Anthracene	500000	100000	5100 J	<61	<240	<270
Benzo(a)anthracene	5600	1000	***27000***	<44	<170	<200
Benzo(a)pyrene	1000	1000	***28000***	<54	<210	<240
Benzo(b)fluoranthene	5600	1000	***39000***	270 J	<520	900 J
Benzo(ghi)perylene	500000	NA	23000	<130	<520	<590
Benzo(k)fluoranthene	56000	800	12000	<83	<330	<370
Chrysene	56000	1000	36000	220 J	<130	<150
Dibenzo(a,h)anthracene	560	330	***4200 J***	<130	<530	<600
Dibenzofuran	350000	7000	2700 J	<56	<220	<250
Fluoranthene	500000	100000	70000 D	290 J	820 J	1200 J
Fluorene	500000	30000	2900 J	<49	<190	<220
Indeno(1,2,3-cd)pyrene	5600	500	***22000***	<46	<180	<210
Naphthalene	500000	12000	1700 J	<44	<170	<200
Phenanthrene	500000	100000	36000	<57	<220	<250
Pyrene	500000	100000	62000 D	280 J	<160	1100 J
Total PAHs	NA	NA	364100	1060	820	3200

ug/kg	Micrograms per kilogram.
SCO	Soil Cleanup Objective.
NA	None available.
▨	Result exceed Unrestricted SCO.
Bolded	Result exceed both SCO.
J	Estimated value.
D	Detected in secondary dilution.

TABLE 4-2
COLD SPRING FORMER MGP SITE
SURFACE SOIL SAMPLE RESULTS
RCRA METALS AND CYANIDE

CONSTITUENT Units in mg/kg		SITE	SS-01	SS-02	SS-03	SS-04	SS-05	SS-06	SS-07	SS-08
		SAMPLE ID	SS-01	SS-02	SS-03	SS-04	SS-05	SS-06	SS-07	SS-08
		DATE	10/20/2008	10/20/2008	10/20/2008	10/20/2008	10/20/2008	10/20/2008	10/20/2008	10/20/2008
	Commerical Use SCOs	Part 375 Unrestricted Use SCOs								
Arsenic	16	13	0.693	3.92	1.99	3.88	4.94	3.04	2.32	4.59
Barium	400	350	24.6	59.9	42.3	45.2	102	52.7	46.2	80.1
Cadmium	9.3	2.5	1.29	3.43	1.27	1.43	4.4	1.44	1.45	2.78
Chromium	1500	30	5.81	16.3	8.04	10	19.2	11.8	10.4	12.7
Lead	1000	63	15.3	252	47.5	86.6	315	52.5	80.5	313
Mercury	2.8	0.18	0.011	0.196	0.073	0.084	0.615	0.084	0.107	0.234
Selenium	1500	3.9	<0.672	<0.797	<0.741	<0.708	<0.805	<0.723	<0.722	<0.825
Silver	1500	2	2.92	7.64	2.67	3.64	4.59	3.17	2.69	3.69
Cyanide	27	27	<0.511	<0.602	<0.556	<0.531	<0.604	<0.549	<0.542	<0.619

mg/kg	Milligrams per kilogram.
SCO	Soil Cleanup Objective.
▨	Result exceed Unrestricted SCO.

TABLE 4-3
COLD SPRING FORMER MGP SITE
SUBSURFACE SOIL SAMPLE RESULTS
BTEX AND TCL VOLATILE ORGANIC COMPOUNDS (VOCS)

		SITE	SB-03	SB-04	SB-06	SB-07
CONSTITUENT		SAMPLE ID	SB-03(5-7)	SB-04(7-9)	SB-06(7-9)	SB-07(8-10)
Units in ug/kg		DEPTH IN FBLS	5-7	7-9	7-9	8-10
		DATE	9/17/2008	9/17/2008	9/17/2008	9/17/2008
	Commerical Use SCOs	Part 375 Unrestricted Use SCOs				
Benzene	44000	60	***56000***	26000	<4.0	900
Ethylbenzene	390000	1000	240000 D	160000 D	<4.4	7600
Toluene	500000	700	410000 D	260000 D	<4.8	8400
o-Xylene	NA	NA	160000 D	97000	<4.2	5400
m & p-Xylene	NA	NA	420000 D	290000	<10	16000
Total BTEX	NA	NA	1286000	833000	0	38300
1,1,1-Trichloroethane	500000	680	<220	--	--	<65
1,1,2,2-Tetrachloroethane	NA	NA	<210	--	--	<62
1,1,2-Trichloroethane	NA	NA	<180	--	--	<53
1,1-Dichloroethane	240000	270	<280	--	--	<80
1,1-Dichloroethylene	500000	330	<390	--	--	<110
1,1-Dichloropropene	NA	NA	<110	--	--	<33
1,2,4-Trichlorobenzene	NA	NA	<220	--	--	<65
1,2-Dichloroethane	30000	20	<240	--	--	<68
1,2-Dichloropropane	NA	NA	<260	--	--	<77
2-Hexanone	NA	NA	<1000	--	--	<290
Acetone	500000	50	<1200	--	--	<360
Benzene, 1-methylethyl-	NA	NA	87000	--	--	2800
Bromodichloromethane	NA	NA	<130	--	--	<38
Bromoform	NA	NA	<250	--	--	<73
Carbon disulfide	NA	NA	<110	--	--	<33
Carbon tetrachloride	22000	760	<160	--	--	<45
Chlorobenzene	500000	1100	<160	--	--	<47
Chloroethane	NA	NA	<460	--	--	<130
Chloroform	350000	370	<260	--	--	<75
cis-1,2-Dichloroethylene	500000	250	<410	--	--	<120
cis-1,3-Dichloropropene	NA	NA	<170	--	--	<48
Cyclohexane	NA	NA	<330	--	--	<95
DBCP	NA	NA	<330	--	--	<97
Dibromochloromethane	NA	NA	<130	--	--	<38
Dichlorodifluoromethane	NA	NA	<510	--	--	<150
EDB	NA	NA	<150	--	--	<43

See next page for footnotes.

TABLE 4-3
COLD SPRING FORMER MGP SITE
SUBSURFACE SOIL SAMPLE RESULTS
BTEX AND TCL VOLATILE ORGANIC COMPOUNDS (VOCS)

		SITE	SB-03	SB-04	SB-06	SB-07
CONSTITUENT		SAMPLE ID	SB-03(5-7)	SB-04(7-9)	SB-06(7-9)	SB-07(8-10)
Units in ug/kg		DEPTH IN FBLS	5-7	7-9	7-9	8-10
		DATE	9/17/2008	9/17/2008	9/17/2008	9/17/2008
	Commerical Use SCOs	Part 375 Unrestricted Use SCOs				
Ethene, 1,2-dichloro-, (E)-	500000	190	<250	--	--	<73
Freon 113	NA	NA	<350	--	--	<100
m-Dichlorobenzene	280000	2400	<160	--	--	<47
Methyl Acetate	NA	NA	<260	--	--	<75
Methyl bromide	NA	NA	<790	--	--	<230
Methyl chloride	NA	NA	<210	--	--	<62
Methyl ethyl ketone	500000	120	<1100	--	--	<320
Methyl isobutylketone	NA	NA	<1000	--	--	<290
Methylcyclohexane	NA	NA	8400	--	--	<78
Methylene chloride	500000	50	<220	--	--	<63
Methyltert-butylether	500000	930	<130	--	--	<38
o-Dichlorobenzene	500000	1100	<230	--	--	<67
p-Dichlorobenzene	130000	1800	<130	--	--	<37
Styrene	NA	NA	54000	--	--	1600
Tetrachloroethylene	150000	1300	<560	--	--	<160
trans-1,3-Dichloropropene	NA	NA	<180	--	--	<52
Trichloroethylene	200000	470	<200	--	--	<57
Trichlorofluoromethane	NA	NA	<300	--	--	<88
Vinyl chloride	13000	20	<170	--	--	<50
TOTAL VOCS	NA	NA	1435400	--	--	42700

ug/kg	Micrograms per kilogram.
SCO	Soil Cleanup Objective.
FBLS	Feet below land surface.
NA	None available.
--	Not analyzed.
▨	Result exceed Unrestricted SCO.
J	Estimated value.
D	Detected at secondary dilution.
E	Detected above calibration range.

TABLE 4-3
COLD SPRING FORMER MGP SITE
SUBSURFACE SOIL SAMPLE RESULTS
BTEX AND TCL VOLATILE ORGANIC COMPOUNDS (VOCS)

		SITE	SB-08	SB-09	SB-10	SB-11
CONSTITUENT		SAMPLE ID	SB-8(4-6)	SB-09(7-9)	SB-10(5-7)	SB-11(11-13)
Units in ug/kg		DEPTH IN FBLS	4-6	7-9	5-7	11-13
		DATE	9/18/2008	9/17/2008	9/17/2008	9/16/2008
	Commerical Use SCOs	Part 375 Unrestricted Use SCOs				
Benzene	44000	60	<250	<53	<250	<49
Ethylbenzene	390000	1000	<36	650 J	330000 D	<7.0
Toluene	500000	700	<120	<24	53000	<22
o-Xylene	NA	NA	<120	540 J	78000	<22
m & p-Xylene	NA	NA	<340	700 J	200000	<66
Total BTEX	NA	NA	0	1890	521000	0

ug/kg	Micrograms per kilogram.
SCO	Soil Cleanup Objective.
FBLS	Feet below land surface.
NA	None available.
--	Not analyzed.
▨	Result exceed Unrestricted SCO.
Bolded	Result exceed both SCO.
J	Estimated value.
D	Detected at secondary dilution.

TABLE 4-3
COLD SPRING FORMER MGP SITE
SUBSURFACE SOIL SAMPLE RESULTS
BTEX AND TCL VOLATILE ORGANIC COMPOUNDS (VOCS)

		SITE	SB-12	SB-13	SB-14	SB-15
CONSTITUENT		SAMPLE ID	SB-12(12-14)	SB-13(11-13)	SB-14(13-15)	SB-15(13-15)
Units in ug/kg		DEPTH IN FBLS	12-14	11-13	13-15	13-15
		DATE	9/16/2008	9/16/2008	9/16/2008	9/17/2008
	Commerical Use SCOs	Part 375 Unrestricted Use SCOs				
Benzene	44000	60	<260	<5.4	<250	<500
Ethylbenzene	390000	1000	3000 J	720	1400 J	30000
Toluene	500000	700	<120	<6.6	<120	<230
o-Xylene	NA	NA	2800 J	540	1100 J	16000
m & p-Xylene	NA	NA	900 J	350	730 J	32000
Total BTEX	NA	NA	6700	1610	3230	78000

ug/kg	Micrograms per kilogram.
SCO	Soil Cleanup Objective.
FBLS	Feet below land surface.
NA	None available.
--	Not analyzed.
▨	Result exceed Unrestricted SCO.
J	Estimated value.
D	Detected at secondary dilution.
E	Detected above calibration range.

TABLE 4-3
COLD SPRING FORMER MGP SITE
SUBSURFACE SOIL SAMPLE RESULTS
BTEX AND TCL VOLATILE ORGANIC COMPOUNDS (VOCS)

		SITE	SB-16	SB-17	SB-18	SB-19
CONSTITUENT		SAMPLE ID	SB-16(6-8)	SB-17(12-14)	SB-18(12-14)	SB-19(7-9)
Units in ug/kg		DEPTH IN FBLS	6-8	12-14	12-14	7-9
		DATE	9/18/2008	9/18/2008	9/19/2008	9/19/2008
	Commerical Use SCOs	Part 375 Unrestricted Use SCOs				
Benzene	44000	60	<4.3	<56	<3.9	<4.3
Ethylbenzene	390000	1000	<4.8	1700	<4.4	<4.8
Toluene	500000	700	<5.2	<26	<4.8	<5.3
o-Xylene	NA	NA	<4.5	1100	<4.1	<4.6
m & p-Xylene	NA	NA	<11	1100 J	<10	<11
Total BTEX	NA	NA	0	3900	0	0

ug/kg	Micrograms per kilogram.
SCO	Soil Cleanup Objective.
FBLS	Feet below land surface.
NA	None available.
--	Not analyzed.
▨	Result exceed Unrestricted SCO.
J	Estimated value.
D	Detected at secondary dilution.
E	Detected above calibration range.

TABLE 4-3
COLD SPRING FORMER MGP SITE
SUBSURFACE SOIL SAMPLE RESULTS
BTEX AND TCL VOLATILE ORGANIC COMPOUNDS (VOCS)

CONSTITUENT Units in ug/kg		SITE SAMPLE ID DEPTH IN FBLS DATE	SB-20 SB-20[3-5] 3-5 10/20/2008	SB-22 SB-22[14-16] 14-16 10/20/2008	SB-23 SB-23[14-16] 14-16 10/20/2008
	Commerical Use SCOs	Part 375 Unrestricted Use SCOs			
Benzene	44000	60	<4.0	<3.9	<4.4
Ethylbenzene	390000	1000	26 J	<4.3	<4.9
Toluene	500000	700	<4.9	<4.8	<5.4
o-Xylene	NA	NA	120	<4.1	<4.6
m & p-Xylene	NA	NA	170	<10	<11
Total BTEX	NA	NA	316	0	0

ug/kg	Micrograms per kilogram.
SCO	Soil Cleanup Objective.
FBLS	Feet below land surface.
NA	None available.
--	Not analyzed.
▨	Result exceed Unrestricted SCO.
J	Estimated value.
D	Detected at secondary dilution.
E	Detected above calibration range.

TABLE 4-4
COLD SPRING FORMER MGP SITE
SUBSURFACE SOIL SAMPLE RESULTS
PAHS AND TCL SEMIVOLATILE ORGANIC COMPOUNDS (VOCS)

		SITE	SB-03	SB-04	SB-06	SB-07
CONSTITUENT		SAMPLE ID	SB-03(5-7)	SB-04(7-9)	SB-06(7-9)	SB-07(8-10)
Units in ug/kg		DEPTH IN FBLS	5-7	7-9	7-9	8-10
		DATE	9/17/2008	9/17/2008	9/17/2008	9/17/2008
	Commerical Use SCOs	Part 375 Unrestricted Use SCOs				
2-Methylnaphthalene	NA	NA	16000	110000 D	81 J	1200 J
Acenaphthene	500000	20000	2800 J	22000	<7.8	2100 J
Acenaphthylene	500000	100000	5900	34000	<5.3	1500 J
Anthracene	500000	100000	5700	43000	37 J	2800 J
Benzo(a)anthracene	5600	1000	4000	***48000 D***	<8.7	2900 J
Benzo(a)pyrene	1000	1000	***3300 J***	***49000 D***	<11	***2000 J***
Benzo(b)fluoranthene	5600	1000	3500 J	***38000***	<26	1900 J
Benzo(ghi)perylene	500000	NA	1900 J	40000	<26	1100 J
Benzo(k)fluoranthene	56000	800	1000 J	12000	<17	720 J
Chrysene	56000	1000	3800	54000 D	<6.7	2600 J
Dibenzo(a,h)anthracene	560	330	420 J	***8100***	<27	<320
Dibenzofuran	350000	7000	2400 J	13000	<11	910 J
Fluoranthene	500000	100000	7300	63000 D	49 J	5100
Fluorene	500000	30000	5300	37000	<9.8	2800 J
Indeno(1,2,3-cd)pyrene	5600	500	1300 J	***23000***	<9.2	660 J
Naphthalene	500000	12000	33000 D	220000 D	130 J	2400 J
Phenanthrene	500000	100000	25000 D	170000 D	160 J	13000
Pyrene	500000	100000	9600	120000 D	75 J	6900
Total PAHs	NA	NA	132220	1104100	532	50590
2,2-oxyblis (1-chloropropane)	NA	NA	<160	--	--	<180
2,4,5-Trichlorophenol	NA	NA	<110	--	--	<130
2,4,6-Trichlorophenol	NA	NA	<88	--	--	<100
2,4-Dichlorophenol	NA	NA	<90	--	--	<100
2,4-Dimethylphenol	NA	NA	<110	--	--	<130
2,4-Dinitrophenol	NA	NA	<200	--	--	<230
2,4-Dinitrotoluene	NA	NA	<130	--	--	<150
2,6-Dinitrotoluene	NA	NA	<140	--	--	<160
2-Chloronaphthalene	NA	NA	<92	--	--	<110
2-Chlorophenol	NA	NA	<100	--	--	<120
3,3-Dichlorobenzidine	NA	NA	<290	--	--	<330
4,6-Dinitro-o-cresol	NA	NA	<510	--	--	<590
4-Bromophenyl-phenylether	NA	NA	<170	--	--	<200
4-Chlorophenylphenyl ether	NA	NA	<140	--	--	<170

See last page for footnotes.

TABLE 4-4
COLD SPRING FORMER MGP SITE
SUBSURFACE SOIL SAMPLE RESULTS
PAHS AND TCL SEMIVOLATILE ORGANIC COMPOUNDS (VOCS)

		SITE	SB-03	SB-04	SB-06	SB-07
CONSTITUENT		SAMPLE ID	SB-03(5-7)	SB-04(7-9)	SB-06(7-9)	SB-07(8-10)
Units in ug/kg		DEPTH IN FBLS	5-7	7-9	7-9	8-10
		DATE	9/17/2008	9/17/2008	9/17/2008	9/17/2008
	Commerical Use SCOs	Part 375 Unrestricted Use SCOs				
Acetophenone	NA	NA	<110	--	--	<130
Atrazine	NA	NA	<270	--	--	<310
Benzaldehyde	NA	NA	<130	--	--	<150
Biphenyl	NA	NA	2300 J	--	--	1000 J
Bis(2-chloroethoxy)methane	NA	NA	<87	--	--	<100
Bis(2-chloroethyl)ether	NA	NA	<50	--	--	<57
Bis(2-ethylhexyl)phthalate	NA	NA	<150	--	--	<170
Butyl benzyl phthalate	NA	NA	<240	--	--	<280
Caprolactam	NA	NA	<460	--	--	<530
Carbazole	NA	NA	880 J	--	--	<340
Diethyl phthalate	NA	NA	<130	--	--	<150
Dimethyl phthalate	NA	NA	<110	--	--	<130
Di-n-butyl phthalate	NA	NA	<180	--	--	<210
Di-n-octyl phthalate	NA	NA	<130	--	--	<150
Hexachlorobenzene	6000	330	<110	--	--	<130
Hexachlorobutadiene	NA	NA	<150	--	--	<180
Hexachlorocyclopentadiene	NA	NA	<190	--	--	<230
Hexachloroethane	NA	NA	<120	--	--	<140
Isophorone	NA	NA	<120	--	--	<140
m-Nitroaniline	NA	NA	<250	--	--	<290
Nitrobenzene	NA	NA	<89	--	--	<100
N-Nitrosodiphenylamine	NA	NA	<290	--	--	<330
N-Nitrosodipropylamine	NA	NA	<140	--	--	<160
o-Cresol	500000	330	<100	--	--	<120
o-Nitroaniline	NA	NA	<180	--	--	<210
o-Nitrophenol	NA	NA	<140	--	--	<160
p-Chloroaniline	NA	NA	<250	--	--	<290
p-Chloro-m-cresol	NA	NA	<110	--	--	<130
PCP	6700	800	<430	--	--	<500
p-Cresol	500000	330	470 J	--	--	<130
p-Nitroaniline	NA	NA	<300	--	--	<350
p-Nitrophenol	NA	NA	<230	--	--	<260
Phenol	500000	330	620 J	--	--	<120
Total SVOCs	NA	NA	136490	--	--	51590

See last page for footnotes.

TABLE 4-4
COLD SPRING FORMER MGP SITE
SUBSURFACE SOIL SAMPLE RESULTS
PAHS AND TCL SEMIVOLATILE ORGANIC COMPOUNDS (VOCS)

		SITE	SB-08	SB-09	SB-10	SB-11
CONSTITUENT		SAMPLE ID	SB-8(4-6)	SB-09(7-9)	SB-10(5-7)	SB-11(11-13)
Units in ug/kg		DEPTH IN FBLS	4-6	7-9	5-7	11-13
		DATE	9/18/2008	9/17/2008	9/17/2008	9/16/2008
	Commerical Use SCOs	Part 375 Unrestricted Use SCOs				
2-Methylnaphthalene	NA	NA	27000	<110	400000 D	<100
Acenaphthene	500000	20000	22000	4300	94000 D	5500
Acenaphthylene	500000	100000	4100	4100	34000	1600 J
Anthracene	500000	100000	19000	7200	94000 D	5300
Benzo(a)anthracene	5600	1000	***20000***	***5400***	***79000 D***	***6400***
Benzo(a)pyrene	1000	1000	***14000***	***4100***	***61000 D***	***4600***
Benzo(b)fluoranthene	5600	1000	***12000***	***3600 J***	***45000 D***	***4300***
Benzo(ghi)perylene	500000	NA	3300 J	2100 J	39000	2100 J
Benzo(k)fluoranthene	56000	800	3100 J	1400 J	13000	1900 J
Chrysene	56000	1000	18000	5100	***74000 D***	5400
Dibenzo(a,h)anthracene	560	330	***1300 J***	460 J	***8700***	510 J
Dibenzofuran	350000	7000	1700 J	1700 J	8000	1600 J
Fluoranthene	500000	100000	23000	9600	110000 D	12000
Fluorene	500000	30000	15000	6100	84000 D	5500
Indeno(1,2,3-cd)pyrene	5600	500	1900 J	1400 J	***25000***	1600 J
Naphthalene	500000	12000	25000	410 J	***1000000 D***	700 J
Phenanthrene	500000	100000	76000 D	33000 D	330000 D	16000
Pyrene	500000	100000	46000 D	14000	200000 D	14000
Total PAHs	NA	NA	332400	103970	2698700	89010

See last page for footnotes.

TABLE 4-4
COLD SPRING FORMER MGP SITE
SUBSURFACE SOIL SAMPLE RESULTS
PAHS AND TCL SEMIVOLATILE ORGANIC COMPOUNDS (VOCS)

		SITE	SB-12	SB-13	SB-14	SB-15
CONSTITUENT		SAMPLE ID	SB-12(12-14)	SB-13(11-13)	SB-14(13-15)	SB-15(13-15)
Units in ug/kg		DEPTH IN FBLS	12-14	11-13	13-15	13-15
		DATE	9/16/2008	9/16/2008	9/16/2008	9/17/2008
	Commerical Use SCOs	Part 375 Unrestricted Use SCOs				
2-Methylnaphthalene	NA	NA	8000	550	210000 D	67000 D
Acenaphthene	500000	20000	15000	520	140000 D	8000 DJ
Acenaphthylene	500000	100000	2100 J	77 J	15000	7800
Anthracene	500000	100000	12000	440 J	78000 D	44000
Benzo(a)anthracene	5600	1000	***13000***	250 J	***53000 D***	***32000***
Benzo(a)pyrene	1000	1000	***9800***	140 J	***36000***	***23000***
Benzo(b)fluoranthene	5600	1000	***7400***	130 J	***34000***	***21000***
Benzo(ghi)perylene	500000	NA	5300	<37	16000	11000
Benzo(k)fluoranthene	56000	800	3100 J	61 J	13000	7800
Chrysene	56000	1000	13000	230 J	47000 D	30000
Dibenzo(a,h)anthracene	560	330	***1100 J***	<37	***4700 J***	***3200 J***
Dibenzofuran	350000	7000	3500 J	190 J	33000	18000
Fluoranthene	500000	100000	18000	630	100000 D	58000 D
Fluorene	500000	30000	12000	410 J	86000 D	43000
Indeno(1,2,3-cd)pyrene	5600	500	3200 J	<13	***14000***	***9100***
Naphthalene	500000	12000	14000	4000 D	350000 D	130000 D
Phenanthrene	500000	100000	45000 D	1500	310000 D	160000 D
Pyrene	500000	100000	29000 D	660	110000 D	66000 D
Total PAHs	NA	NA	214500	9788	1649700	738900

See last page for footnotes.

TABLE 4-4
COLD SPRING FORMER MGP SITE
SUBSURFACE SOIL SAMPLE RESULTS
PAHS AND TCL SEMIVOLATILE ORGANIC COMPOUNDS (VOCS)

		SITE	SB-16	SB-17	SB-18	SB-19
CONSTITUENT		SAMPLE ID	SB-16(6-8)	SB-17(12-14)	SB-18(12-14)	SB-19(7-9)
Units in ug/kg		DEPTH IN FBLS	6-8	12-14	12-14	7-9
		DATE	9/18/2008	9/18/2008	9/19/2008	9/19/2008
	Commerical Use SCOs	Part 375 Unrestricted Use SCOs				
2-Methylnaphthalene	NA	NA	<11	4700 D	<10	<11
Acenaphthene	500000	20000	<8.5	4500 D	72 J	87 J
Acenaphthylene	500000	100000	<5.8	460	<5.4	<5.7
Anthracene	500000	100000	62 J	2900	<12	92 J
Benzo(a)anthracene	5600	1000	120 J	2700	180 J	620
Benzo(a)pyrene	1000	1000	100 J	***1900***	150 J	740
Benzo(b)fluoranthene	5600	1000	83 J	2200	160 J	640
Benzo(ghi)perylene	500000	NA	49 J	350 J	51 J	330 J
Benzo(k)fluoranthene	56000	800	<18	830	70 J	190 J
Chrysene	56000	1000	120 J	2400	180 J	700
Dibenzo(a,h)anthracene	560	330	<29	160 J	<27	110 J
Dibenzofuran	350000	7000	<12	980	<11	<12
Fluoranthene	500000	100000	220 J	4500 D	180 J	420
Fluorene	500000	30000	65 J	2300	<9.9	<11
Indeno(1,2,3-cd)pyrene	5600	500	40 J	190 J	54 J	150 J
Naphthalene	500000	12000	<9.5	6400 D	<8.8	62 J
Phenanthrene	500000	100000	120 J	10000 D	53 J	470
Pyrene	500000	100000	300 J	5700 D	220 J	950
Total PAHs	NA	NA	1279	53170	1370	5561

See last page for footnotes.

TABLE 4-4
COLD SPRING FORMER MGP SITE
SUBSURFACE SOIL SAMPLE RESULTS
PAHS AND TCL SEMIVOLATILE ORGANIC COMPOUNDS (VOCS)

CONSTITUENT Units in ug/kg			SB-20	SB-22	SB-23
		SITE	SB-20	SB-22	SB-23
		SAMPLE ID	SB-20[3-5]	SB-22[14-16]	SB-23[14-16]
		DEPTH IN FBLS	3-5	14-16	14-16
		DATE	10/20/2008	10/20/2008	10/20/2008
	Commerical Use SCOs	Part 375 Unrestricted Use SCOs			
2-Methylnaphthalene	NA	NA	2200 J	<10	<11
Acenaphthene	500000	20000	<160	<7.8	<8.7
Acenaphthylene	500000	100000	16000	<5.3	<5.9
Anthracene	500000	100000	4400 J	<12	<14
Benzo(a)anthracene	5600	1000	***20000***	<8.6	<9.7
Benzo(a)pyrene	1000	1000	***22000***	<11	<12
Benzo(b)fluoranthene	5600	1000	***21000***	<26	<29
Benzo(ghi)perylene	500000	NA	15000	<26	<29
Benzo(k)fluoranthene	56000	800	5400 J	<16	<18
Chrysene	56000	1000	23000	<6.7	<7.5
Dibenzo(a,h)anthracene	560	330	***4400 J***	<26	<30
Dibenzofuran	350000	7000	<230	<11	<12
Fluoranthene	500000	100000	17000	<8.7	<9.8
Fluorene	500000	30000	<200	<9.7	<11
Indeno(1,2,3-cd)pyrene	5600	500	***13000***	<9.1	<10
Naphthalene	500000	12000	3000 J	<8.7	<9.7
Phenanthrene	500000	100000	6700 J	<11	<13
Pyrene	500000	100000	35000	<7.8	<8.8
Total PAHs	NA	NA	208100	0	0

ug/kg	Micrograms per kilogram.
SCO	Soil Cleanup Objective.
FBLS	Feet below land surface.
NA	None available.
--	Not analyzed.
▨	Result exceed Unrestricted SCO.
Bolded	Result exceed both SCO.
J	Estimated value.
D	Detected at secondary dilution.

TABLE 4-5
COLD SPRING FORMER MGP SITE
SUBSURFACE SOIL SAMPLE RESULTS
TARGET ANALYTE LIST (TAL) METALS

CONSTITUENT Units in mg/kg		SITE	SB-03	SB-07
		SAMPLE ID	SB-03(5-7)	SB-07(8-10)
		DEPTH IN FBLS	5-7	8-10
		DATE	9/17/2008	9/17/2008
	Commerical Use SCOs	Part 375 Unrestricted Use SCOs		
Aluminum	NA	NA	8190	10100
Antimony	NA	NA	<0.447	<0.515
Arsenic	16	13	4.54	2.81
Barium	400	350	60.3	58.4
Beryllium	590	7.2	0.353	0.416
Cadmium	9.3	2.5	0.64	0.747
Calcium	NA	NA	52600	4960
Chromium	1500	30	8.91	15.8
Cobalt	NA	NA	4.99	10
Copper	270	50	14.2	24.5
Iron	NA	NA	15700	24200
Lead	1000	63	39.5	48.1
Magnesium	NA	NA	11700	5910
Manganese	10000	1600	529	275
Mercury	2.8	0.18	0.065	0.026
Nickel	310	30	9.84	18.6
Potassium	NA	NA	750	1600
Selenium	1500	3.9	<0.632	<0.728
Silver	1500	2	<0.162	<0.186
Sodium	NA	NA	627	140
Thallium	NA	NA	<0.763	<0.879
Vanadium	NA	NA	13.6	20.6
Zinc	10000	109	80.8	57.5

mg/kg	Milligrams per kilogram.
SCO	Soil Cleanup Objective.
FBLS	Feet below land surface.
NA	None available.

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TABLE 4-6
COLD SPRING FORMER MGP SITE
SUBSURFACE SOIL SAMPLE RESULTS
CYANIDE

SITE	SAMPLE ID	DEPTH IN FBLS	DATE			Cyanide Units in mg/kg
				Commerical Use SCOs	Part 375 Unrestricted Use SCOs	
SB-03	SB-03(5-7)	5-7	9/17/2008	27	27	8.52
SB-04	SB-04(7-9)	7-9	9/17/2008	27	27	4.69
SB-06	SB-06(7-9)	7-9	9/17/2008	27	27	<0.549
SB-07	SB-07(8-10)	8-10	9/17/2008	27	27	<0.666
SB-08	SB-8(4-6)	4-6	9/18/2008	27	27	<0.579
SB-09	SB-09(7-9)	7-9	9/17/2008	27	27	<0.609
SB-10	SB-10(5-7)	5-7	9/17/2008	27	27	0.858
SB-11	SB-11(11-13)	11-13	9/16/2008	27	27	<0.559
SB-12	SB-12(12-14)	12-14	9/16/2008	27	27	<0.597
SB-13	SB-13(11-13)	11-13	9/16/2008	27	27	<0.773
SB-14	SB-14(13-15)	13-15	9/16/2008	27	27	<0.582
SB-15	SB-15(13-15)	13-15	9/17/2008	27	27	<0.566
SB-16	SB-16(6-8)	6-8	9/18/2008	27	27	<0.598
SB-17	SB-17(12-14)	12-14	9/18/2008	27	27	<0.638
SB-18	SB-18(12-14)	12-14	9/19/2008	27	27	<0.555
SB-19	SB-19(7-9)	7-9	9/19/2008	27	27	<0.593
SB-20	SB-20[3-5]	3-5	10/20/2008	27	27	<0.559
SB-22	SB-22[14-16]	14-16	10/20/2008	27	27	<0.546
SB-23	SB-23[14-16]	14-16	10/20/2008	27	27	<0.611

mg/kg	Milligrams per kilogram.
SCO	Soil Cleanup Objective.
FBLS	Feet below land surface.

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TABLE 4-7
COLD SPRING FORMER MGP SITE
SUBSURFACE SOIL SAMPLE RESULTS
POLYCHLORINATED BIPHENYLS (PCBS)

		SITE	SB-03	SB-07
CONSTITUENT		SAMPLE ID	SB-03(5-7)	SB-07(8-10)
Units in ug/kg		DEPTH IN FBLS	5-7	8-10
		DATE	9/17/2008	9/17/2008
	Commerical Use SCOs	Part 375 Unrestricted Use SCOs		
Aroclor 1016	NA	NA	<4.3	<5.0
Aroclor 1221	NA	NA	<5.2	<6.1
Aroclor 1232	NA	NA	<5.5	<6.4
Aroclor 1242	NA	NA	<2.4	<2.8
Aroclor 1248	NA	NA	<5.3	<6.1
Aroclor 1254	NA	NA	<5.4	<6.2
Aroclor 1260	NA	NA	<4.3	<5.0
Total PCBs (subsurface soil)	1000	100	0	0

ug/kg	Micrograms per kilogram.
SCO	Soil Cleanup Objective.
FBLS	Feet below land surface.

Y:_HazWaste\2820 (Cold Spring)\GIS Excel Reports\sb 4-3 to 4-7.XLS\sb-pcbs-4-7

TABLE 4-8
COLD SPRING FORMER MGP SITE
GROUNDWATER SAMPLE RESULTS
BTEX AND TCL VOLATILE ORGANIC COMPOUNDS (VOCS)

CONSTITUENT	SITE	GW-01	GW-02	GW-03	GW-04
	SAMPLE ID	GW-01	GW-02	GW-03	GW-04
Units in ug/l	DATE	10/2/2008	10/2/2008	10/2/2008	10/2/2008
	NYSDEC TOGS (Class GA)				
Benzene	1	<0.52	<0.52	<0.52	3.5
Ethylbenzene	5	<0.50	<0.50	2.1 J	8.7
Toluene	5	<0.51	<0.51	<0.51	<0.51
o-Xylene	5	<0.51	1.2	1.6	7
m & p-Xylene	5	<0.97	<0.97	2.2	7.1
Total BTEX	NA	0	1.2	5.9	26.3
1,1,1-Trichloroethane	5	<0.46	--	--	--
1,1,2,2-Tetrachloroethane	5	<0.49	--	--	--
1,1,2-Trichloroethane	1	<0.52	--	--	--
1,1-Dichloroethane	5	<0.55	--	--	--
1,1-Dichloroethylene	5	<0.55	--	--	--
1,2,4-Trichlorobenzene	5	<0.41	--	--	--
1,2-Dichloroethane	0.6	<0.38	--	--	--
1,2-Dichloropropane	1	<0.56	--	--	--
2-Hexanone	50	<2.9	--	--	--
Acetone	50	<2.7	--	--	--
Benzene, 1-methylethyl-	5	<0.44	--	--	--
Bromodichloromethane	50	<0.59	--	--	--
Bromoform	50	<0.42	--	--	--
Carbon disulfide	60	<0.51	--	--	--
Carbon tetrachloride	5	<0.49	--	--	--
Chlorobenzene	5	<0.50	--	--	--
Chloroethane	5	<0.49	--	--	--
Chloroform	7	2.2	--	--	--
cis-1,2-Dichloroethylene	5	<0.53	--	--	--
cis-1,3-Dichloropropene	0.4	<0.54	--	--	--
Cyclohexane	NA	<0.37	--	--	--
DBCP	0.04	<0.45	--	--	--
Dibromochloromethane	50	<0.45	--	--	--
Dichlorodifluoromethane	5	<0.43	--	--	--
EDB	0.0006	<0.56	--	--	--

ug/l	Micrograms per liter.
--	Not analyzed.
NA	None available.
▨	Result exceed TOGS.
J	Estimated value.

TABLE 4-8
COLD SPRING FORMER MGP SITE
GROUNDWATER SAMPLE RESULTS
BTEX AND TCL VOLATILE ORGANIC COMPOUNDS (VOCS)

	SITE	GW-01	GW-02	GW-03	GW-04
CONSTITUENT	SAMPLE ID	GW-01	GW-02	GW-03	GW-04
Units in ug/l	DATE	10/2/2008	10/2/2008	10/2/2008	10/2/2008
	NYSDEC TOGS (Class GA)				
Ethene, 1,2-dichloro-, (E)-	5	<0.57	--	--	--
Freon 113	NA	<0.35	--	--	--
m-Dichlorobenzene	3	<0.45	--	--	--
Methyl Acetate	NA	<0.92	--	--	--
Methyl bromide	5	<0.63	--	--	--
Methyl chloride	5	<0.38	--	--	--
Methyl ethyl ketone	50	<4.6	--	--	--
Methyl isobutylketone (MIBK)	NA	<2.7	--	--	--
Methylcyclohexane	NA	<0.43	--	--	--
Methylene chloride	5	<0.52	--	--	--
Methyltert-butylether	10	<0.50	--	--	--
o-Dichlorobenzene	3	<0.48	--	--	--
p-Dichlorobenzene	3	<0.43	--	--	--
Styrene	5	<0.48	--	--	--
Tetrachloroethylene	5	<0.68	--	--	--
trans-1,3-Dichloropropene	0.4	<0.44	--	--	--
Trichloroethylene	5	<0.56	--	--	--
Trichlorofluoromethane	5	<0.40	--	--	--
Vinyl chloride	2	<0.46	--	--	--
TOTAL VOCS	NA	2.2	--	--	--

ug/l	Micrograms per liter.
--	Not analyzed.
NA	None available.
▨	Result exceed TOGS.
J	Estimated value.

TABLE 4-8
COLD SPRING FORMER MGP SITE
GROUNDWATER SAMPLE RESULTS
BTEX AND TCL VOLATILE ORGANIC COMPOUNDS (VOCS)

	SITE	GW-05	MW-01	SB-22
CONSTITUENT	SAMPLE ID	GW-05	MW-1	SB-22-GW
Units in ug/l	DATE	10/2/2008	10/2/2008	10/20/2008
	NYSDEC TOGS (Class GA)			
Benzene	1	<0.52	<0.52	<0.52
Ethylbenzene	5	<0.50	<0.50	<0.50
Toluene	5	<0.51	<0.51	<0.51
o-Xylene	5	<0.51	<0.51	<0.51
m & p-Xylene	5	<0.97	<0.97	<0.97
Total BTEX	NA	0	0	0
1,1,1-Trichloroethane	5	<0.46	--	--
1,1,2,2-Tetrachloroethane	5	<0.49	--	--
1,1,2-Trichloroethane	1	<0.52	--	--
1,1-Dichloroethane	5	<0.55	--	--
1,1-Dichloroethylene	5	<0.55	--	--
1,2,4-Trichlorobenzene	5	<0.41	--	--
1,2-Dichloroethane	0.6	<0.38	--	--
1,2-Dichloropropane	1	<0.56	--	--
2-Hexanone	50	<2.9	--	--
Acetone	50	<2.7	--	--
Benzene, 1-methylethyl-	5	<0.44	--	--
Bromodichloromethane	50	<0.59	--	--
Bromoform	50	<0.42	--	--
Carbon disulfide	60	<0.51	--	--
Carbon tetrachloride	5	<0.49	--	--
Chlorobenzene	5	<0.50	--	--
Chloroethane	5	<0.49	--	--
Chloroform	7	<0.46	--	--
cis-1,2-Dichloroethylene	5	<0.53	--	--
cis-1,3-Dichloropropene	0.4	<0.54	--	--
Cyclohexane	NA	<0.37	--	--
DBCP	0.04	<0.45	--	--
Dibromochloromethane	50	<0.45	--	--
Dichlorodifluoromethane	5	<0.43	--	--
EDB	0.0006	<0.56	--	--

ug/l	Micrograms per liter.
--	Not analyzed.
NA	None available.
▨	Result exceed TOGS.
J	Estimated value.

TABLE 4-8
COLD SPRING FORMER MGP SITE
GROUNDWATER SAMPLE RESULTS
BTEX AND TCL VOLATILE ORGANIC COMPOUNDS (VOCS)

	SITE	GW-05	MW-01	SB-22
CONSTITUENT	SAMPLE ID	GW-05	MW-1	SB-22-GW
Units in ug/l	DATE	10/2/2008	10/2/2008	10/20/2008
	NYSDEC TOGS (Class GA)			
Ethene, 1,2-dichloro-, (E)-	5	<0.57	--	--
Freon 113	NA	<0.35	--	--
m-Dichlorobenzene	3	<0.45	--	--
Methyl Acetate	NA	<0.92	--	--
Methyl bromide	5	<0.63	--	--
Methyl chloride	5	<0.38	--	--
Methyl ethyl ketone	50	<4.6	--	--
Methyl isobutylketone (MIBK)	NA	<2.7	--	--
Methylcyclohexane	NA	<0.43	--	--
Methylene chloride	5	<0.52	--	--
Methyltert-butylether	10	<0.50	--	--
o-Dichlorobenzene	3	<0.48	--	--
p-Dichlorobenzene	3	<0.43	--	--
Styrene	5	<0.48	--	--
Tetrachloroethylene	5	<0.68	--	--
trans-1,3-Dichloropropene	0.4	<0.44	--	--
Trichloroethylene	5	<0.56	--	--
Trichlorofluoromethane	5	<0.40	--	--
Vinyl chloride	2	<0.46	--	--
TOTAL VOCS	NA	0	--	--

ug/l	Micrograms per liter.
--	Not analyzed.
NA	None available.
▨	Result exceed TOGS.
J	Estimated value.

TABLE 4-9
COLD SPRING FORMER MGP SITE
GROUNDWATER SAMPLE RESULTS
PAHS AND TCL SEMIVOLATILE ORGANIC COMPOUNDS (VOCS)

	SITE	GW-01	GW-02	GW-03	GW-04	GW-05
CONSTITUENT	SAMPLE ID	GW-01	GW-02	GW-03	GW-04	GW-05
Units in ug/l	DATE	10/2/2008	10/2/2008	10/2/2008	10/2/2008	10/2/2008
	NYSDEC TOGS (Class GA)					
2-Methylnaphthalene	NA	<0.370	<0.380	3.2 J	7.2 J	<0.370
Acenaphthene	20	<0.320	3.8 J	20	29	15
Acenaphthylene	NA	<0.350	<0.360	<0.360	<0.360	<0.350
Anthracene	50	<1.4	<1.4	<1.4	2.1 J	<1.4
Benzo(a)anthracene	0.002	<1.3	<1.3	<1.3	<1.3	<1.3
Benzo(a)pyrene	0	<0.220	<0.220	<0.220	<0.230	<0.220
Benzo(b)fluoranthene	0.002	<0.430	<0.440	<0.440	<0.440	<0.430
Benzo(ghi)perylene	NA	<0.390	<0.400	<0.400	<0.400	<0.390
Benzo(k)fluoranthene	0.002	<0.300	<0.310	<0.310	<0.310	<0.300
Chrysene	0.002	<0.260	<0.270	<0.270	<0.270	<0.260
Dibenzo(a,h)anthracene	NA	<0.540	<0.550	<0.550	<0.560	<0.540
Dibenzofuran	NA	<0.310	<0.320	<0.320	2.4 J	<0.310
Fluoranthene	50	<0.200	<0.200	1.2 J	1.4 J	1.6 J
Fluorene	50	<0.280	1.3 J	1.7 J	6.5 J	1.6 J
Indeno(1,2,3-cd)pyrene	0.002	<0.660	<0.670	<0.670	<0.680	<0.660
Naphthalene	10	<0.280	<0.290	12	19	3.9 J
Phenanthrene	50	<1.4	<1.4	3.1 J	8.9 J	4.4 J
Pyrene	50	<1.4	<1.4	<1.4	1.6 J	3.5 J
Total PAHs	NA	0	5.1	41.2	78.1	30
2,2-oxyblis (1-chloropropane)	NA	<0.270	--	--	--	<0.270
2,4,5-Trichlorophenol	1	<0.380	--	--	--	<0.380
2,4,6-Trichlorophenol	1	<0.350	--	--	--	<0.350
2,4-Dichlorophenol	5	<0.340	--	--	--	<0.340
2,4-Dimethylphenol	50	<0.760	--	--	--	<0.760
2,4-Dinitrophenol	10	<0.640	--	--	--	<0.640
2,4-Dinitrotoluene	5	<0.340	--	--	--	<0.340
2,6-Dinitrotoluene	5	<0.350	--	--	--	<0.350
2-Chloronaphthalene	10	<0.230	--	--	--	<0.230
2-Chlorophenol	1	<0.330	--	--	--	<0.330
3,3-Dichlorobenzidine	5	<1.1	--	--	--	<1.1
4,6-Dinitro-o-cresol	NA	<0.290	--	--	--	<0.290
4-Bromophenyl-phenylether	NA	<1.4	--	--	--	<1.4
4-Chlorophenylphenyl ether	NA	<0.290	--	--	--	<0.290
Acetophenone	NA	<0.370	--	--	--	<0.370

See last page for footnotes.

TABLE 4-9
COLD SPRING FORMER MGP SITE
GROUNDWATER SAMPLE RESULTS
PAHS AND TCL SEMIVOLATILE ORGANIC COMPOUNDS (VOCS)

CONSTITUENT Units in ug/l	SITE SAMPLE ID DATE	GW-01 GW-01 10/2/2008	GW-02 GW-02 10/2/2008	GW-03 GW-03 10/2/2008	GW-04 GW-04 10/2/2008	GW-05 GW-05 10/2/2008
	NYSDEC TOGS (Class GA)					
Atrazine	NA	<0.370	--	--	--	<0.370
Benzaldehyde	NA	2.1 J	--	--	--	<0.270
Biphenyl	NA	<0.320	--	--	--	<0.320
Bis(2-chloroethoxy)methane	5	<0.330	--	--	--	<0.330
Bis(2-chloroethyl)ether	1	<0.280	--	--	--	<0.280
Bis(2-ethylhexyl)phthalate	5	<1.3	--	--	--	<1.3
Butyl benzyl phthalate	50	<0.420	--	--	--	<0.420
Caprolactam	NA	<1.5	--	--	--	<1.5
Carbazole	NA	<0.240	--	--	--	<0.240
Diethyl phthalate	50	<0.320	--	--	--	<0.320
Dimethyl phthalate	50	<0.270	--	--	--	<0.270
Di-n-butyl phthalate	50	<5.9	--	--	--	<5.9
Di-n-octyl phthalate	50	<0.260	--	--	--	<0.260
Hexachlorobenzene	0.04	<0.270	--	--	--	<0.270
Hexachlorobutadiene	0.5	<0.390	--	--	--	<0.390
Hexachlorocyclopentadiene	5	<0.560	--	--	--	<0.560
Hexachloroethane	5	<0.230	--	--	--	<0.230
Isophorone	50	<0.260	--	--	--	<0.260
m-Nitroaniline	5	<0.350	--	--	--	<0.350
Nitrobenzene	0.4	<0.330	--	--	--	<0.330
N-Nitrosodiphenylamine	50	<0.350	--	--	--	<0.350
N-Nitrosodipropylamine	NA	<0.340	--	--	--	<0.340
o-Cresol	1	<0.360	--	--	--	<0.360
o-Nitroaniline	5	<0.250	--	--	--	<0.250
o-Nitrophenol	1	<0.280	--	--	--	<0.280
p-Chloroaniline	5	<0.920	--	--	--	<0.920
p-Chloro-m-cresol	1	<0.220	--	--	--	<0.220
PCP	1	<0.520	--	--	--	<0.520
p-Cresol	1	<0.390	--	--	--	<0.390
p-Nitroaniline	5	<0.360	--	--	--	<0.360
p-Nitrophenol	1	<1.7	--	--	--	<1.7
Phenol	1	<0.550	--	--	--	<0.550
Total SVOCs	NA	2.1	--	--	--	30

See last page for footnotes.

TABLE 4-9
COLD SPRING FORMER MGP SITE
GROUNDWATER SAMPLE RESULTS
PAHS AND TCL SEMIVOLATILE ORGANIC COMPOUNDS (VOCS)

CONSTITUENT Units in ug/l	SITE SAMPLE ID DATE	MW-01 MW-1 10/2/2008	SB-22 SB-22-GW 10/20/2008
	NYSDEC TOGS (Class GA)		
2-Methylnaphthalene	NA	<0.380	<0.380
Acenaphthene	20	<0.330	<0.330
Acenaphthylene	NA	<0.360	<0.360
Anthracene	50	<1.4	<1.4
Benzo(a)anthracene	0.002	<1.3	<1.3
Benzo(a)pyrene	0	<0.220	<0.220
Benzo(b)fluoranthene	0.002	<0.440	<0.440
Benzo(ghi)perylene	NA	<0.400	<0.400
Benzo(k)fluoranthene	0.002	<0.310	<0.310
Chrysene	0.002	<0.270	<0.270
Dibenzo(a,h)anthracene	NA	<0.550	<0.550
Dibenzofuran	NA	<0.320	<0.320
Fluoranthene	50	<0.200	<0.200
Fluorene	50	<0.290	<0.290
Indeno(1,2,3-cd)pyrene	0.002	<0.670	<0.670
Naphthalene	10	<0.290	<0.290
Phenanthrene	50	<1.4	<1.4
Pyrene	50	<1.4	<1.4
Total PAHs	NA	0	0

ug/l	Micrograms per liter.
--	Not analyzed.
NA	None available.
▨	Result exceed TOGS.
J	Estimated value.

TABLE 4-10
COLD SPRING FORMER MGP SITE
GROUNDWATER SAMPLE RESULTS
TARGET ANALYTE LIST (TAL) METALS

CONSTITUENT	SITE	GW-01	GW-01	GW-05	GW-05
Units in ug/l	SAMPLE ID	GW-01	GW-01	GW-05	GW-05
	DATE	10/2/2008	10/2/2008	10/2/2008	10/2/2008
	TYPE	Filtered	Unfiltered	Filtered	Unfiltered
	NYSDEC TOGS (Class GA)				
Aluminum	NA	360	2020	331	1060
Antimony	3	<9.500	<9.500	<9.500	<9.500
Arsenic	25	<5.400	<5.400	<5.400	<5.400
Barium	1000	36.1 J	42.6 J	86.8	98.1
Beryllium	3	<0.300	<0.300	<0.300	<0.300
Cadmium	5	<0.900	<0.900	<0.900	<0.900
Calcium	NA	69400	63600	88300	86200
Chromium	50	<1.400	2.520 J	<1.400	1.430 J
Cobalt	NA	<2.500	<2.500	<2.500	<2.500
Copper	200	<3.700	6.660 J	5.420 J	5.050 J
Iron	300	462	3840	2370	5340
Lead	25	9.26	6.74	19.2	13.8
Magnesium	35000	16000	14500	17200	16300
Manganese	300	62.5	118	1320	1430
Mercury	0.7	<0.06	<0.06	<0.06	<0.06
Nickel	100	<4.900	<4.900	<4.900	<4.900
Potassium	NA	4580	4470	6660	6660
Selenium	10	<4.500	<4.500	<4.500	<4.500
Silver	50	<1.700	<1.700	<1.700	<1.700
Sodium	20000	103000	99100	169000	169000
Thallium	0.5	<3.100	<3.100	<3.100	<3.100
Vanadium	NA	<4.100	<4.100	<4.100	<4.100
Zinc	2000	8.530 J	18.0 J	8.790 J	14.8 J

ug/l	Micrograms per liter.
NA	None available.
▨	Result exceed TOGS.
J	Estimated value.

TABLE 4-11
COLD SPRING FORMER MGP SITE
GROUNDWATER SAMPLE RESULTS
CYANIDE

SITE	SAMPLE ID	DATE	NYSDEC TOGS (Class GA)	Cyanide Units in mg/l
GW-01	GW-01	10/2/2008	0.2	<0.01
GW-02	GW-02	10/2/2008	0.2	0.016
GW-03	GW-03	10/2/2008	0.2	0.011
GW-04	GW-04	10/2/2008	0.2	<0.01
GW-05	GW-05	10/2/2008	0.2	<0.01
MW-01	MW-1	10/2/2008	0.2	<0.01
SB-22	SB-22-GW	10/20/2008	0.2	<0.010

mg/l	Milligrams per liter.

TABLE 4-12
COLD SPRING FORMER MGP SITE
GROUNDWATER SAMPLE RESULTS
POLYCHLORINATED BIPHENYLS (PCBS)

CONSTITUENT Units in ug/l	SITE SAMPLE ID DATE	GW-01 GW-01 10/2/2008	GW-05 GW-05 10/2/2008
	NYSDEC TOGS (Class GA)		
Aroclor 1016	0.1	<0.195	<0.153
Aroclor 1221	0.1	<0.155	<0.122
Aroclor 1232	0.1	<0.158	<0.124
Aroclor 1242	0.1	<0.100	<0.079
Aroclor 1248	0.1	<0.138	<0.109
Aroclor 1254	0.1	<0.190	<0.149
Aroclor 1260	0.1	<0.1200	<0.0960

ug/l Micrograms per liter.

TABLE 4-13
COLD SPRING FORMER MGP SITE
AIR SAMPLE RESULTS
VOLATILE ORGANIC COMPOUNDS (VOCS)

	SITE	AA-01	IA-01	IA-02
CONSTITUENT	SAMPLE ID	AA-01	IA-01	IA-02
Units in ug/m3	DATE	11/19/2008	11/19/2008	11/19/2008
	NYSDOH * Background Data			
1,1,1-Trichloroethane	1.1	<0.022	<0.022	<0.022
1,1,2,2-Tetrachloroethane	0.25	<0.024	<0.024	<0.024
1,1,2-Trichloroethane	0.25	<0.044	<0.044	<0.044
1,1-Dichloroethane	0.25	<0.024	<0.024	<0.024
1,1-Dichloroethylene	0.25	<0.025	<0.025	<0.025
1,2,4-Trichlorobenzene	0.25	<0.035	<0.035	<0.035
1,2-Dichloroethane	0.25	<0.050	<0.050	<0.050
1,2-Dichloropropane	0.25	<0.048	<0.048	<0.048
1,3-Butadiene	NA	<0.036	<0.036	<0.036
1,4-Dioxane	NA	<0.046	<0.046	<0.046
2,2,4-Trimethylpentane	NA	<0.025	<0.025	<0.025
4-Ethyltoluene	NA	<0.026	<0.026	<0.026
Acetone	52	6.65	13.85	8.03
Allyl chloride	NA	<0.061	<0.061	<0.061
Benzene	5.9	<0.044	0.61	0.51
Benzene, 1,2,4-trimethyl	4.3	0.79	2.46	1.92
Benzene, 1,3,5-trimethyl-	1.7	<0.035	0.54	<0.035
Bromodichloromethane	NA	<0.050	<0.050	<0.050
Bromoform	NA	<0.015	<0.015	<0.015
Carbon disulfide	NA	<0.015	<0.015	<0.015
Carbon tetrachloride	0.6	0.63	0.44	0.63
Chlorobenzene	0.25	<0.026	<0.026	<0.026
Chloroethane	0.25	<0.017	<0.017	<0.017
Chloroform	0.5	<0.031	<0.031	<0.031
cis-1,2-Dichloroethylene	0.25	<0.035	<0.035	<0.035
cis-1,3-Dichloropropene	0.25	<0.050	<0.050	<0.050
Cryofluorane	NA	<0.022	<0.022	<0.022
Cyclohexane	2.6	<0.012	<0.012	<0.012
Dibromochloromethane	NA	<0.026	<0.026	<0.026
Dichlorodifluoromethane	4.1	2.87	2.42	2.72
EDB	0.25	<0.100	<0.100	<0.100
trans-1,2-Dichloroethylene	NA	<0.031	<0.031	<0.031
Ethylbenzene	2.8	<0.018	0.52	<0.018
Freon 113	1.1	<0.026	<0.026	0.77 J

See next page for footnotes.

TABLE 4-13
COLD SPRING FORMER MGP SITE
AIR SAMPLE RESULTS
VOLATILE ORGANIC COMPOUNDS (VOCS)

	SITE	AA-01	IA-01	IA-02
CONSTITUENT	SAMPLE ID	AA-01	IA-01	IA-02
Units in ug/m3	DATE	11/19/2008	11/19/2008	11/19/2008
	NYSDOH * Background Data			
Heptane	NA	<0.024	<0.024	<0.024
Hexachlorobutadiene	0.25	<0.022	<0.022	<0.022
m/p-xylene	NA	<0.043	2.74	1.09
m-Dichlorobenzene	0.25	<0.017	<0.017	<0.017
Methyl bromide	0.25	<0.024	<0.024	<0.024
Methyl chloride	1.8	1.12	0.93	1.12
Methyl ethyl ketone	7.3	0.47	3.36	0.8
Methyl isobutylketone	0.9	<0.050	<0.050	<0.050
Methylene chloride	6.6	1.22	3.93	2.36
Methylmethacrylate	0.25	<0.063	<0.063	<0.063
Methyltert-butylether	5.6	<0.017	<0.017	<0.017
Naphthalene	NA	<0.1	<0.1	<0.1
n-Hexane	5.9	<0.026	1.13	0.99
o-Chlorotoluene	NA	<0.038	<0.038	<0.038
o-Dichlorobenzene	0.25	<0.022	<0.022	<0.022
o-Xylene	3.1	<0.024	1	0.43 J
p-Dichlorobenzene	0.5	<0.025	<0.025	<0.025
Styrene	0.6	<0.062	<0.062	<0.062
tert-Butyl alcohol	NA	<0.079	<0.079	<0.079
Tetrachloroethylene	1.1	<0.040	<0.040	<0.040
Tetrahydrofuran	0.4	<0.084	<0.084	<0.084
Toluene	25	<0.048	1.43	0.72
trans-1,3-Dichloropropene	0.25	<0.057	<0.057	<0.057
Trichloroethylene	0.25	<0.040	<0.040	<0.040
Trichlorofluoromethane	5.4	1.74	1.46	1.8
Vinyl bromide	NA	<0.024	<0.024	<0.024
Vinyl chloride	0.25	<0.024	<0.024	<0.024
Sum of Constituents	NA	15.49	36.82	23.89

ug/m3	Micrograms per meter cubed.
NA	None available.
▨	Result exceed Standard.
J	Estimated value.
*	NYSDOH Indoor Air VOC Study, Fuel Oil heated homes, 75th percentile results.

TABLE 4-14
COLD SPRING FORMER MGP SITE
SUBSLAB AIR SAMPLE RESULTS
VOLATILE ORGANIC COMPOUNDS (VOCS)

	SITE	SG-01	SG-02
CONSTITUENT	SAMPLE ID	SG-01	SG-02
Units in ug/m3	DATE	11/19/2008	11/19/2008
1,1,1-Trichloroethane		2.02	<0.022
1,1,2,2-Tetrachloroethane		<0.024	<0.024
1,1,2-Trichloroethane		<0.044	<0.044
1,1-Dichloroethane		<0.024	<0.024
1,1-Dichloroethylene		<0.025	<0.025
1,2,4-Trichlorobenzene		<0.035	<0.035
1,2-Dichloroethane		<0.050	<0.050
1,2-Dichloropropane		<0.048	<0.048
1,3-Butadiene		<0.036	<0.036
1,4-Dioxane		<0.046	<0.046
2,2,4-Trimethylpentane		<0.025	<0.025
4-Ethyltoluene		<0.026	<0.026
Acetone		34.11	63.42 D
Allyl chloride		<0.061	<0.061
Benzene		1.82	2.36
Benzene, 1,2,4-trimethyl		1.33	10.57
Benzene, 1,3,5-trimethyl-		<0.035	3.83
Bromodichloromethane		<0.050	<0.050
Bromoform		<0.015	<0.015
Carbon disulfide		2.06	1
Carbon tetrachloride		<0.017	0.44
Chlorobenzene		<0.026	<0.026
Chloroethane		<0.017	<0.017
Chloroform		<0.031	<0.031
cis-1,2-Dichloroethylene		<0.035	<0.035
cis-1,3-Dichloropropene		<0.050	<0.050
Cryofluorane		<0.022	<0.022
Cyclohexane		1.27	0.72
Dibromochloromethane		<0.026	<0.026
Dichlorodifluoromethane		<0.017	3.07
EDB		<0.100	<0.100
trans-1,2-Dichloroethylene		<0.031	<0.031
Ethylbenzene		<0.018	0.56
Freon 113		12.57	<0.026

See next page for footnotes.

TABLE 4-14
COLD SPRING FORMER MGP SITE
SUBSLAB AIR SAMPLE RESULTS
VOLATILE ORGANIC COMPOUNDS (VOCS)

CONSTITUENT Units in ug/m3	SITE SAMPLE ID DATE	SG-01 SG-01 11/19/2008	SG-02 SG-02 11/19/2008
Heptane		0.82	2.13
Hexachlorobutadiene		<0.022	<0.022
m/p-xylene		0.74	3.34
m-Dichlorobenzene		<0.017	<0.017
Methyl bromide		<0.024	<0.024
Methyl chloride		<0.025	0.81
Methyl ethyl ketone		6.28	15.66
Methyl isobutylketone		<0.050	0.94
Methylene chloride		1.35	1.08
Methylmethacrylate		<0.063	<0.063
Methyltert-butylether		<0.017	<0.017
Naphthalene		<0.1	<0.1
n-Hexane		1.41	2.08
o-Chlorotoluene		<0.038	<0.038
o-Dichlorobenzene		0.78	0.78
o-Xylene		<0.024	1.13
p-Dichlorobenzene		0.96	<0.025
Styrene		<0.062	<0.062
tert-Butyl alcohol		<0.079	0.58
Tetrachloroethylene		1.9	0.81
Tetrahydrofuran		<0.084	<0.084
Toluene		4.18	8.78
trans-1,3-Dichloropropene		<0.057	<0.057
Trichloroethylene		<0.040	<0.040
Trichlorofluoromethane		14.27	1.74
Vinyl bromide		<0.024	<0.024
Vinyl chloride		<0.024	<0.024
Sum of Constituents		87.87	125.83

ug/m3	Micrograms per meter cubed.
NA	None available.
J	Estimated value.

Appendix C

APPENDIX C

IRA D. CONKLIN & SONS, INC.
APRIL 12, 2005
SURFACE SOIL SAMPLE REPORT

IraConklin.com

IRA D. CONKLIN & SONS, INC.

Corporate Headquarters
94 Stewart Avenue · PO Box 7457 · Newburgh, NY 12550
(845) 561-1512 · Fax (845) 561-1798

April 12, 2005

Village of Cold Spring
Attn: Mr. Greg Phillips
85 Main Street
Cold Spring, NY

Dear Mr. Phillips:

Attached are the laboratory results of the soil samples obtained on April 8, 2005 from the four (4) locations affected by recent flood event. The results shown are compared to the NYSDEC Recommended Soil Cleanup Objectives.

The samples obtained were non-detect for all volatile organic compounds analyzed (Table 1).

TABLE 1

Volatile Organic Compounds (USEPA Method 8260)

Compound	Recommended Soil Clean-up Objectives (ppm)	10 New St. (ppm)	11 Main St. (ppm)	7 Main St. (ppm)	8 Main St. (ppm)
1,2,4-Trimethylbenzene	10	ND	ND	ND	ND
1,3,5-Trimethylbenzene	3.3	ND	ND	ND	ND
Benzene	0.06	ND	ND	ND	ND
Ethylbenzene	5.5	ND	ND	ND	ND
Isopropylbenzene	2.3	ND	ND	ND	ND
Methyl-tert-butyl-ether	0.12	ND	ND	ND	ND
Naphthalene	13	ND	ND	ND	ND
n-Butylbenzene	10	ND	ND	ND	ND
n-Propylbenzene	3.7	ND	ND	ND	ND
o-Xylene	1.2	ND	ND	ND	ND
p-&m-Xylene	1.2	ND	ND	ND	ND
p-Isopropyltoluene	10	ND	ND	ND	ND
sec-Butylbenzene	10	ND	ND	ND	ND
tert-Butylbenzene	10	ND	ND	ND	ND
Toluene	1.5	ND	ND	ND	ND
Total Xylenes	1.2	ND	ND	ND	ND

Note:
NA = Value not available
ND =Compound non-detect
* = Value in excess of guidance value
Guidance Values are TAGM #4046 (1994)

The soil samples obtained from the four locations did contain several positive results for semi-volatile organic compounds with several in excess of the NYSDEC Allowable Soil Concentrations and/or the Recommended Soil Cleanup Objectives (Table 2).

TABLE 2

Semi-Volatile Organic Compounds (USEPA *Method* 8270)

Compound	Recommended Soil Cleanup Objective (ppm)	Allowable Soil Concentration (ppm)	10 New St	11 Main St	7 Main St	9 Main St
2-Methylnaphthalene	364	0.364	ND	ND	ND	ND
Acenaphthene	50	0.9	ND	ND	ND	ND
Acenapthylene	50	0.41	ND	ND	ND	ND
Anthracene	50	7	ND	ND	ND	ND
Benzo(a)anthracene	0.224	0.03	0.72*	0.4*	1.2*	0.98*
Benzo(a)pyrene	0.061	0.11	0.5	ND	0.88*	0.57*
Benzo(b)fluoranthene	0.22	0.011	ND	0.35*	1.5*	0.85*
Benzo(g,h,i)perylene	50	8	ND	ND	0.37	ND
Benzo(k)fluoranthene	0.22	0.011	ND	ND	0.63*	ND
Chrysene	0.4	0.0004	0.65*	0.39*	1.5*	0.89*
Dibenz(a,h)anthracene	0.0143	1.650	ND	ND	ND	ND
Dibenzofuran	6.2	0.1	ND	ND	ND	ND
Fluoranthene	50	19	ND	ND	1.4	0.98
Fluorene	50	3.5	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	3.2	0.032	ND	ND	0.34*	ND
Naphthalene	13	0.13	ND	ND	ND	ND
Phenanthrene	50	2.2	ND	ND	0.38	ND
Pyrene	50	6.65	0.52	ND	1.2	0.7

Note:
NA = Value not available
ND =Compound non-detect
* = Value in excess of guidance value
Guidance Values are TAGM #4046 (1994)

The metal analysis of the soil samples obtained did indicate levels of several metals in excess of the NYSDEC Recommended Soil Cleanup Objectives and/or the Eastern US Background levels (Table 3).

Table 3
RCRA Metals

Metal	Recommended Soil Cleanup Objective (ppm)	Eastern US Background (ppm)	11 Main St. (ppm)	7 Main St. (ppm)	9 Main St. (ppm)	10 New St. (ppm)
Silver	SB	NA	< 0.50	< 0.50	< 0.50	< 0.50
Arsenic	7.5 or SB	3-12**	11.4*	7.31	5.62	6.87
Barium	300 or SB	15-600	152	268	275	226
Cadmium	1 or SB	0.1-1	1.49*	1.86*	1.87*	1.79*
Chromium	10 or SB	1.5-4	28.4*	17.6*	21.6*	18.5*
Mercury - Soil	0.1	.001-.2	1.11*	1.25*	2.27*	1.49*
Lead	SB	***	443	506	619	490
Selenium	2 or SB	0.1-3.9	< 2.5	< 2.5	< 2.5	< 2.5

Note:

* Value in excess of guidance value

** NYS Background Levels

*** Background levels for lead vary widely. Average levels in undeveloped, rural areas may range from 4-61 ppm. Average background levels in metropolitan or suburban areas or near highways are much higher and typically range from 200-500 ppm.

Guidance Values are TAGM #4046 (1994)

In order to determine if the confirmed soil contamination present at the locations sampled is a result of the recent flood event or if it is indicative of normal background soil concentrations for the area, Ira D. Conklin & Sons, Inc. (IDC) recommends the following:

- Sampling of adjacent soils that were not affected by the recent flood event to determine background concentrations for the area.
- Sampling of the river water/sediment in the area to determine the concentrations present.

Once the results of this sampling are obtained a comparison to the initial results can be made to determine the origin of the contamination. If you would like to schedule this sampling, please contact the undersigned so that the proper arrangements can be made.

Sincerely,

Ira D. Conklin & Sons, Inc.

Erin Reilly
Environmental Project Manager

Stacey Smit
Environmental Division Manager

Appendix D

APPENDIX D

NYSDOH INDOOR AIR QUALITY QUESTIONNAIRE

NEW YORK STATE DEPARTMENT OF HEALTH
INDOOR AIR QUALITY QUESTIONNAIRE AND BUILDING INVENTORY
CENTER FOR ENVIRONMENTAL HEALTH

This form must be completed for each residence involved in indoor air testing.

Preparer's Name Keith Robins Date/Time Prepared 11/19/08 (1100-1130)

Preparer's Affiliation Dvirka + Bartilucci Phone No. (516) 364-9890

Purpose of Investigation Soil Vapor/Ambient air investigation and sampling

1. OCCUPANT: Ray Ruckel (Director) and Charlie Marando (member)

Interviewed: [✓ Y] / N

Last Name: — First Name: —

Address: Box 318, Cold Spring, NY

County: Putnam

Home Phone: — Office Phone: (845)-265-2465

Number of Occupants/persons at this location 25 Age of Occupants average = 45
average retired age = 65

2. OWNER OR LANDLORD: (Check if same as occupant X)

Interviewed: Y / N

Last Name: First Name:

Address:

County:

Home Phone: Office Phone:

3. BUILDING CHARACTERISTICS

Type of Building: (Circle appropriate response)

Residential School Commercial/Multi-use
Industrial Church [✓ Other:] boat/storage shed, kitchen, bathroom facility,

If the property is residential, type? (Circle appropriate response)

Ranch
Raised Ranch
Cape Cod
Duplex
Modular
2-Family
Split Level
Contemporary
Apartment House
Log Home
3-Family
Colonial
Mobile Home
Townhouses/Condos
Other:__________

If multiple units, how many? ________

If the property is commercial, type?

Business Type(s) Cold Spring Boat club

Does it include residences (i.e., multi-use)? Y / [✓ N] If yes, how many? ______

Other characteristics:

Number of floors 1 with storage loft in garage Building age 1968

Is the building insulated? [✓ Y] / N How air tight? Tight / [✓ Average] / Not Tight

Only Kitchen & Bathrooms

4. AIRFLOW

Use air current tubes or tracer smoke to evaluate airflow patterns and qualitatively describe:

Airflow between floors

NA

Airflow near source

NA

Outdoor air infiltration

(1) overstove hood Fan (1) Garage (1) large vent
(1) women Exhaust Fan in bathroom
(1) men Exhaust Fan in bathroom

Infiltration into air ducts

5. BASEMENT AND CONSTRUCTION CHARACTERISTICS (Circle all that apply)

a. Above grade construction: [✓ wood frame] concrete stone brick

b. Basement type: NA full crawlspace slab other ________

c. Basement floor: NA concrete dirt stone other ________

d. Basement floor: NA uncovered covered covered with ______________

e. Concrete floor: unsealed [✓ sealed] sealed with tile in kitchen/bathroom/hallway

f. Foundation walls: [✓ poured] block stone other ________

g. Foundation walls: NA unsealed sealed sealed with ______________

h. The basement is: NA wet damp dry moldy

i. The basement is: NA finished unfinished partially finished

j. Sump present? Y / [✓ N]

k. Water in sump? Y / N / [✓ not applicable]

Basement/Lowest level depth below grade: NA (feet)

Identify potential soil vapor entry points and approximate size (e.g., cracks, utility ports, drains)

Trace amount of surface crakes in garage storage area

6. HEATING, VENTING and AIR CONDITIONING (Circle all that apply)

Type of heating system(s) used in this building: (circle all that apply – note primary)

Kitchen — [✓ Hot air circulation]	Heat pump	Hot water baseboard
Space Heaters	Stream radiation	Radiant floor
Bathroom — [✓ Electric baseboard]	Wood stove	Outdoor wood boiler Other ________

The primary type of fuel used is:

Natural Gas	Fuel Oil	Kerosene
Electric	[✓ Propane]	Solar
Wood	Coal	

Domestic hot water tank fueled by: Electric, 30 gallons

Boiler/furnace located in: Basement Outdoors Main Floor Other NONE

Air conditioning: Central Air Window units Open Windows [✓ None]

Are there air distribution ducts present? [✓ Y] / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints. Indicate the locations on the floor plan diagram.

All Exhaust fans run upstairs above Kitchen ceiling
and outside - Condition appears to be in good condition
based on visible look in loft
(2) exhaust fans ~~at~~ in Kitchen / which go into loft over Kitchen

7. OCCUPANCY

Is basement/lowest level occupied? Full-time Occasionally Seldom Almost Never

Level	**General Use of Each Floor (e.g., familyroom, bedroom, laundry, workshop, storage)**
Basement	NONE
1st Floor	up to 25 people on average
2nd Floor	Not used / storage equipment / vent duct work
3rd Floor	NA
4th Floor	NA

8. FACTORS THAT MAY INFLUENCE INDOOR AIR QUALITY

a. Is there an attached garage? Attached Shed for Storage Y / [✓ N]

b. Does the garage have a separate heating unit? Y / [✓ N] / NA

c. Are petroleum-powered machines or vehicles stored in the garage (e.g., lawnmower, atv, car) Y / [✓ N] / NA Please specify________________

d. Has the building ever had a fire? Y / [✓ N] When?________________

e. Is a kerosene or unvented gas space heater present? Y / [✓ N] Where?________________

f. Is there a workshop or hobby/craft area? [✓ Y] / N Where & Type?________________

g. Is there smoking in the building? Y / [✓ N] How frequently?________________

h. Have cleaning products been used recently? [✓ Y] / N When & Type? Bleach, Clorox, Ammonia, Air freshener in bathrooms

i. Have cosmetic products been used recently? Y / [✓ N] When & Type? Household wax

j. Has painting/staining been done in the last 6 months? [✓ Y] / N Where & When? painted bathrooms within 6 months

k. Is there new carpet, drapes or other textiles? Y / [✓ N] Where & When? ____________

l. Have air fresheners been used recently? [✓ Y] / N When & Type? In bathrooms / Glad

m. Is there a kitchen exhaust fan? [✓ Y] / N If yes, where vented? outside East side of Bld

n. Is there a bathroom exhaust fan? [✓ Y] / N If yes, where vented? outside / to roof

o. Is there a clothes dryer? Y / [✓ N] If yes, is it vented outside? Y / N

p. Has there been a pesticide application? [✓ Y] N When & Type? Can of bug spray

Are there odors in the building? Y / [✓ N]
If yes, please describe: ______________________________

Do any of the building occupants use solvents at work? Y / [✓ N]
(e.g., chemical manufacturing or laboratory, auto mechanic or auto body shop, painting, fuel oil delivery, boiler mechanic, pesticide application, cosmetologist

If yes, what types of solvents are used? NONE, possibly painting outside (spray cans)

If yes, are their clothes washed at work? — NA Y / N

Do any of the building occupants regularly use or work at a dry-cleaning service? (Circle appropriate response)

Yes, use dry-cleaning regularly (weekly)
Yes, use dry-cleaning infrequently (monthly or less)
Yes, work at a dry-cleaning service
[✓ No]
Unknown

Is there a radon mitigation system for the building/structure? Y / [✓ N] Date of Installation: ____________
Is the system active or passive? Active/Passive

9. WATER AND SEWAGE

Water Supply: [✓ Public Water] Drilled Well Driven Well Dug Well Other: _______

Sewage Disposal: [✓ Public Sewer] Septic Tank Leach Field Dry Well Other: _______

10. RELOCATION INFORMATION (for oil spill residential emergency)

a. Provide reasons why relocation is recommended: NA

~~**b. Residents choose to:** remain in home relocate to friends/family relocate to hotel/motel~~

c. Responsibility for costs associated with reimbursement explained? Y / N NA

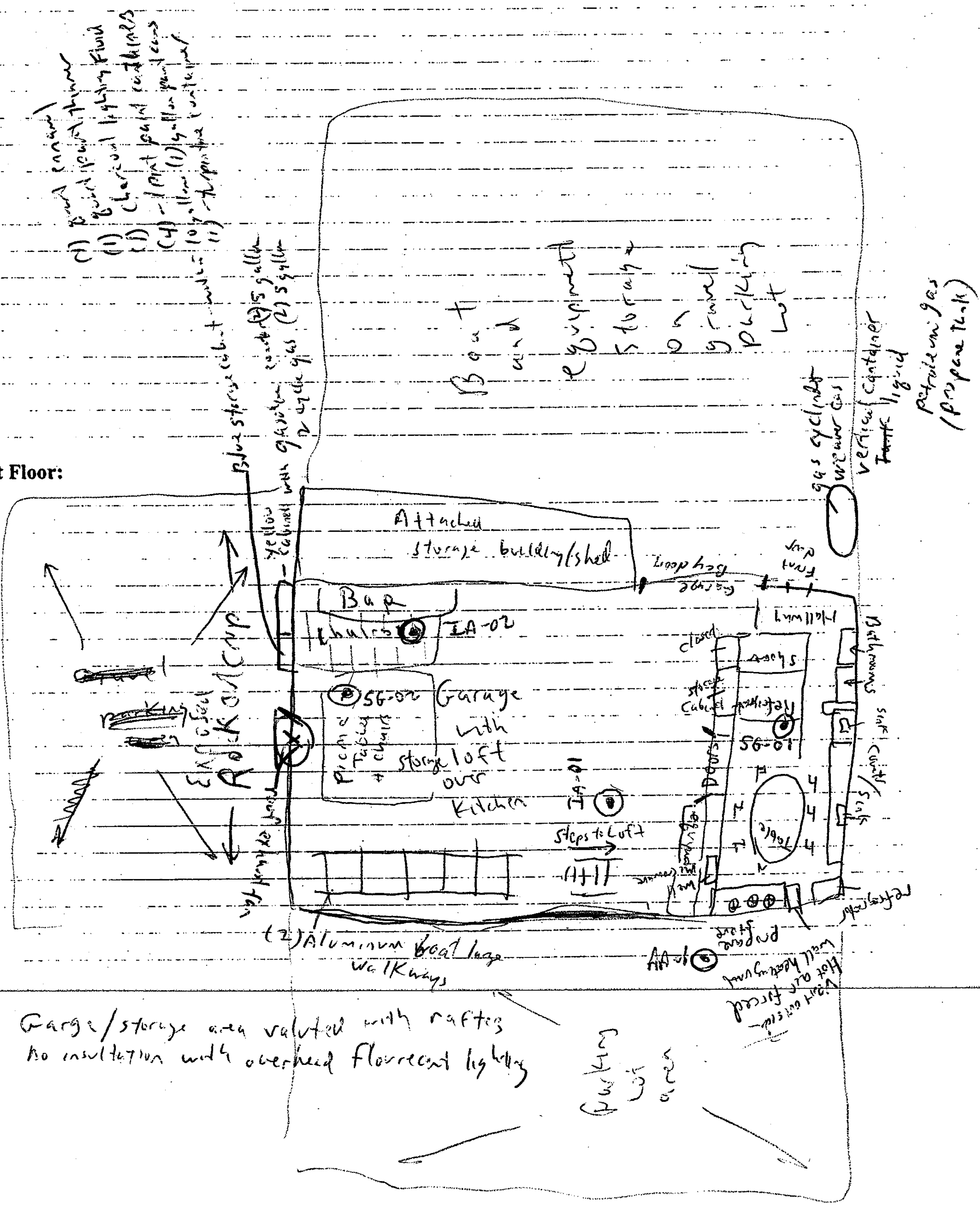
d. Relocation package provided and explained to residents? Y / N NA

11. FLOOR PLANS

Draw a plan view sketch of the basement and first floor of the building. Indicate air sampling locations, possible indoor air pollution sources and PID meter readings. If the building does not have a basement, please note.

Basement:

First Floor:

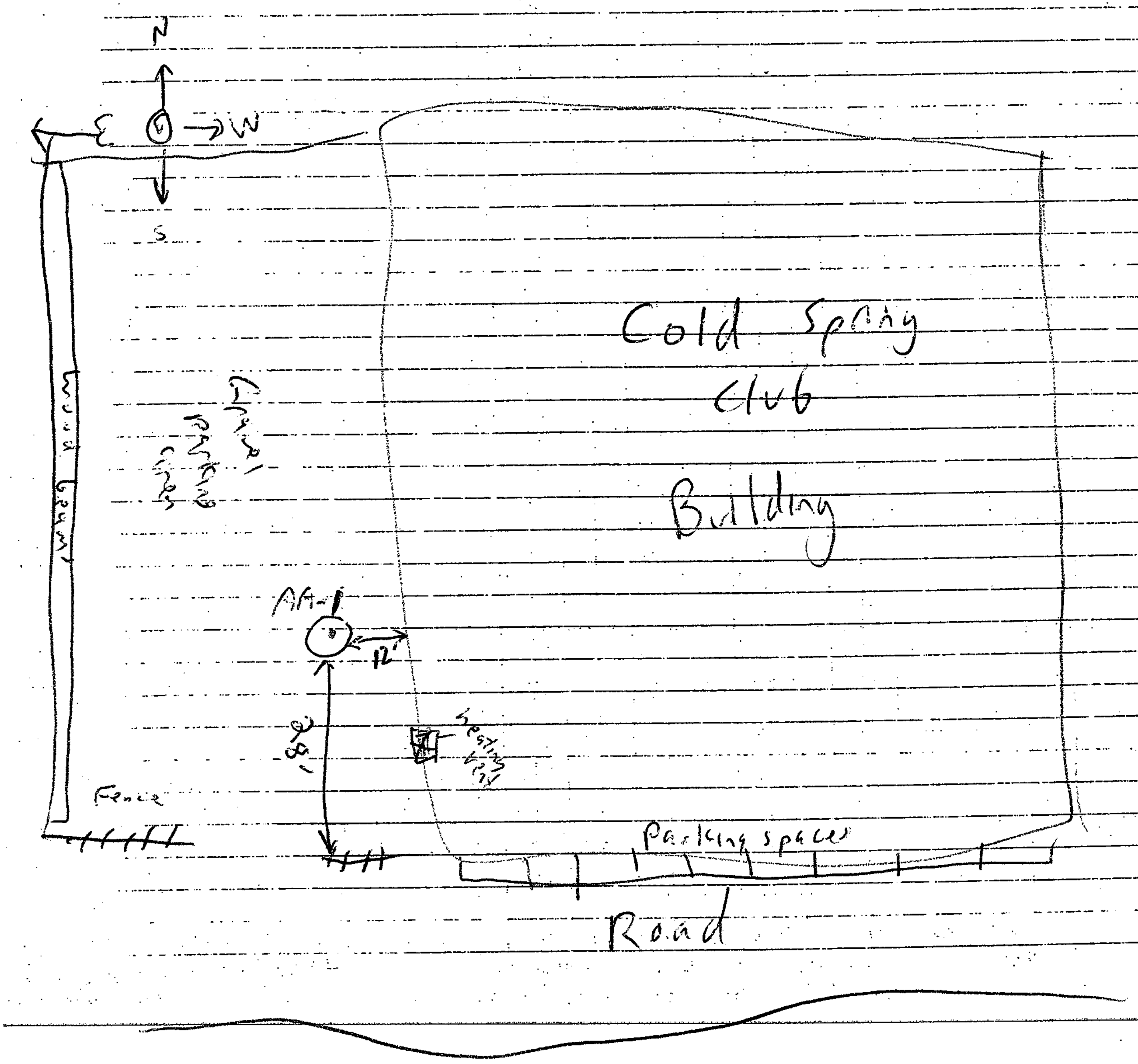


Garge/storage area valuted with rafters no insultation with overhead florrecent lighting

12. OUTDOOR PLOT

Draw a sketch of the area surrounding the building being sampled. If applicable, provide information on spill locations, potential air contamination sources (industries, gas stations, repair shops, landfills, etc.), outdoor air sampling location(s) and PID meter readings.

Also indicate compass direction, wind direction and speed during sampling, the locations of the well and septic system, if applicable, and a qualifying statement to help locate the site on a topographic map.



Page 1 of 2

13. PRODUCT INVENTORY FORM

Make & Model of field instrument used: MinRAE ppb (Pine Environmental)

List specific products found in the residence that have the potential to affect indoor air quality.

Location	Product Description	Size (units)	Condition*	Chemical Ingredients	Field Instrument Reading (units)	Photo** Y / N
Kitchen cabinet/storage	Valvoline (2) cycle oil	(2) 16 oz	Good/used	Valvoline out board (2) cycle oil - Marine oil	0.0	yes
Kitchen cabinet/storage	Brake cleaner Gunk	(1) 20 oz	Good/used	Gunk - Brake Cleaner	0.0	yes
Kitchen	Propane stove	Large	Good	propane	0.0	yes
Garage	Small motor for pressure washer	small	Good	Gasoline powered	0.0	no
Garage	Barbeque	medium	Good	propane tank	0.0	no
Kitchen cabinet	cabinet/coffee maker	Small	Good/used	Comet bleach	Initial reading 0 ppb	yes
Kitchen cabinet	Kingsford lighting fluid	2 qt	Good/used	Kingsford lighting fluid	[illegible]80 ppm	yes
Kitchen	30 gallon hot water heater	30 gallon	new good	GE model - Propane	0.0	yes
Kitchen	Comet/Bleach powder	21 oz	OK/used	Comet	0.0	yes
Kitchen	Zep Power House wax spray	6.5 oz	OK	Isopropyl alcohol, n-Butane monoethanolamine Ethyle glycol ether	0.0	yes
Kitchen	Stainless steel cleaner (sprayway)	15 oz	OK/used	white mineral oil, Methyle acetate Isoparaffinic Hydrocarbon mineral spirits acetone propane	0.0	yes
exterior yellow cabinet	5L container, 40:1 chainsaw gas	5L	~~good~~ Used	gasoline + 2-stroke oil in 40:1 ratio	0.0	Y
exterior yellow cabinet	gas container/jug	5 gallon	Used	gasoline/empty	0.0	Y
exterior yellow cabinet	three gas containers	10 gallon	Used	gasoline/empty	0.0	Y
exterior, S. side	boat metal fuel tank	≈15 gallon	Used	gasoline, 3/4 ths full	0.0	Y
exterior, south side	15 cans paint + enamel	≈20 gallons	Used	paints & enamels	0.0	Y
exterior south side	3 cans paint thinner/turpentine	≈1.5 gallons	Used		0.0	Y
exterior south side	trans fluid (Dexron 3)	1 qt	Used		0.0	Y

* Describe the condition of the product containers as **Unopened (UO), Used (U),** or **Deteriorated (D)**

** Photographs of the **front and back** of product containers can replace the handwritten list of chemical ingredients. However, the photographs must be of good quality and ingredient labels must be legible.

page 2 of 2

13. PRODUCT INVENTORY FORM

Make & Model of field instrument used: PPB MiniRAE (Pine Environmental)

List specific products found in the residence that have the potential to affect indoor air quality.

Location	Product Description	Size (units)	Condition*	Chemical Ingredients	Field Instrument Reading (units)	Photo ** Y / N
Adj shop shed	Chainprotectant/Lube	32oz	used	molybdenum disulfide,	0.0 ppb	Yes
Adj-shop shed	Prestone antifreeze,	1gallon	used	ethylene glycol, diethylene glycol,	0.0 ppb	Yes
Adj shop shed	trans. fluid (Dexron III)	3Qts	used		0.0 ppb	Yes
Adj shop shed	2-stroke engine oil	300mL	used		0.0 ppb	Yes
Adj. Shop shed	Sta-bil fuel stabilizer	1Qt	used	2-propanol,	0.0 ppb	Yes
Adj shop shed	Mercury -50°F antifreeze	1gallon	used	propylene-glycol	199 ppb	Yes
Adj-shop sheep	clorox bleach	1gallon	used		0.0 ppb	Yes
Adj shop shed	muriatic acid, concrete etcher	1gallon	used	aqueous hydrogen chloride	0.0 ppb	Yes
Adj-shop-shed	paint, arisol cans	36oz	used	toluene, acetone, xylene	42 ppb	Yes
Adj-shop shed	pressurized CO_2,	4lbs	used	high pressure CO_2 in wielding-style metal containers	0.0 ppb	Yes
Adj-shop shed	5-gal bucket paint/primer	5gal	used		0.0 ppb	Yes
Adj-shop-shed	oxygen/acetylene tanks	4 ox. 4 acet.	used	wielding gasses in typizal metal contaners	0.0 ppb	Yes
Adj-shop-shed	pine soap	5gal	used		0.0 ppb	Yes
Adj-shop-shed	Propain tanks	8sm. tanks	used		0.0 ppb	Yes
Adj-shop shed	various fuel containers	15gal.	used	empty	0.0 ppb	Yes
Adj shop shed	2 small boat fuel tanks	20gal.	used	gasoline	0.1 ppb	Yes
Adj-shop-shed	3-"ABC" type fire extinguishers		Used		0.0 ppb	Yes
Adj-shop shed	pennzoil "Hydra trans" tractor fluid	5gal.	used		0.0 ppb	Yes

* Describe the condition of the product containers as **Unopened (UO), Used (U), or Deteriorated (D)**

** Photographs of the **front and back** of product containers can replace the handwritten list of chemical ingredients. However, the photographs must be of good quality and ingredient labels must be legible.

Appendix E

APPENDIX E

NYSDEC SEDIMENT INVESTIGATION SUMMARY
OCTOBER 2008

Sediment investigation

Cold Spring Former MGP Site

Site Number E340026

Village of Cold Spring, Putnam County, NY

On October 17th representatives from the NYSDEC collected sediment samples at 3 locations in the Hudson River adjacent to the Cold Spring Former MGP site. These locations are provided on the attached Figure 1.

Sediment cores were advanced to an elevation of -6.54 to -7.28. The adjacent soil boring (ground surface elevation +5.04) found coal tar to be present at a depth of 10 feet (elevation -5 feet). Therefore, the sediment cores were advanced to the depth where coal tar was observed in the adjacent soil boring. No visible evidence of site related contamination was observed in the sediment cores.

Two samples were collected from each location. These samples were analyzed for volatile and semi-volatile organic chemicals. No MGP related volatile organic chemicals were observed. The semi-volatile organic chemicals of concern are the polycyclic organic hydrocarbons (PAHs). No PAHs were detected at concentrations above the laboratory detection limit in the shallow sediment (0-6"). In the deeper sediment samples (from 1'2" to 2' below the top of sediment) total PAH concentrations ranged from 0.9 to 2.38 ppm. These levels are below typical background, and do not appear to be associated with the site.

No visible impacts and no measurable amounts of MGP related chemicals were observed in the sediments.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

INSPECTOR'S DAILY REPORT

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Site Code: E340026 T & A Code: 62688 I.R. #:101708
Site Name: Cold Spring Former MGP
DEC Project Manager: William Ottaway
Location: Cold Spring Boat Club / Marina Docks to the West of the site, Town of Cold Spring
Weather : AM: Partly Cloudy, Breezy, Mid 50's. PM: Sunny, High 50's
Date: October 17, 2008 **Work Level:** D (*) C ( )

Type of Work: Sediment Push Cores, Sediment Sampling, and Survey

Onsite: Liz Lukowski, William Ottaway

Survey measurements*:
GW-4: 5.09'
North Side of Marina Gate: 4.16'
Dock: 7.08'
Level: 4.30'
* *Height measurements are relative to level, see xy locations on map.*

SS-1:

Top of Sediment: 5.32', -7.00 to level
Recovery[1]: 3' 5$^{5/8}$" (change 1.68')

0'-1' - soft, mucky, medium brown-gray silt
1'-1'3" – silty sand, trace fine gravel, *lightly stained*
1'3" - 3' 5 5/8" – medium brown clayey silt, slightly plastic, denser

Samples[2]:
SS1S – 0"-6" (@1050)
SS1D - 1'2" -1' 3$^{1/2}$" (@1055)

SS-2a:

Top of Sediment: 5.73', -7.00 to level
Recovery: 2' 10" (change 1.27')

0'-7" - soft, mucky, medium brown-gray silt with slight organic odor
7"-2' – soft, silt, some fine sand, trace shell fragments

2'-2'10" – medium brown clayey silt, slightly plastic, denser
No impacts noted.

Samples:
SS2AS – 0"-6" (@1319)
SS2AD - 1'6"- 2' (@1319)

<u>SS-3:</u>

Top of Sediment: 6.06, -7.00 to level
Recovery: 2' 10" (change .94')

0'-8" - soft, mucky, medium brown silt
8"-1'10" – gray-brown silt, trace fine-med grained sand. Trace leaves and organics. trace coal fragment @ 1'5"
1'10" – 2' 10" – gray- brown clayey silt, slightly plastic, denser
No impacts noted.

Samples:
SS1S – 0"-6" (@1050)
SS1D - 1'2" – 1' $3^{1/2}$" (@1055)

[1] Sediment Cores were hand driven to refusal
[2] Samples analyzed for VOCs and SVOCs

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Elizabeth Lukowski : 11/14/08

New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau A
625 Broadway, 11th Floor
Albany, New York 12233-7015
Phone: (518) 402-9625 • **Fax:** (518) 402-9020 / (518) 402-9627
Website: www.dec.ny.gov

Alexander B. Grannis
Commissioner

Division of Environmental Remediation Laboratory Analytical Report

The case narrative and analytical reports - Volatiles - for the Cold Spring MGP site are attached.

Case Narrative

Site Name: Cold Spring MGP Date received: 10/17/08

For sample delivery group(s): 291-04

The initial calibration that these samples were run under had three target analytes - Bromomethane, Chloroethane, and Trichlorofluoromethane - exceeding the calibration criteria that is associated with this analytical method. However, none of these analytes were detected in any of the samples associated with this initial calibration run.

All other QA/QC associated with these samples were within acceptable method criteria, except that one target mass in the volatile tune - Mass 75 - exceeded the upper limit for the relative abundance. It was determined, however, that this did not effect either the qualitative or quantitative results for these samples.

Acetone and Chloroform were detected in the method blank associated with these samples at 4ug/KG and 2ug/Kg, respectively. All reported hits for either of these analytes will be qualified with a 'B'. And would like to note that both hexane and methyl cyclopentane were detected as TIC's in the method blank associated with these samples. It is possible that all four of these analytes are from instrument contamination.

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Field ID: **SS1S**

Site Name: Cold Spring MGP Contract:

Site Code: 340026 Case No.: SAS No.: SDG No.: 291-04

Matrix: (soil/water) SOIL Lab Sample ID: 308-291-032

Sample wt/vol: 4.4 (g/ml) G Lab File ID: 08C1832.D

Level: (low/med) LOW Date Received: 10/17/2008

% Moisture: not dec. 56.3 Date Analyzed: 10/23/2008

GC Column: rtx-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	UG/KG	Q
75-71-8	Dichlorodifluoromethane	26	U
75-87-3	Chloromethane	26	U
75-01-4	Vinyl Chloride	26	U
74-83-9	Bromomethane	26	U
75-00-3	Chloroethane	26	U
75-69-4	Trichlorofluromethane	26	U
75-35-4	1,1-Dichloroethene	26	U
75-15-0	Carbon Disulfide	26	U
67-64-1	Acetone	42	B
75-09-2	Methylene Chloride	26	U
540-59-0	trans 1,2-Dichloroethene	26	U
1634-04-4	Methyl-tert butyl ether	26	U
75-34-4	1,1-Dichloroethane	26	U
108-05-4	Vinyl Acetate	26	U
540-59-0	cis 1,2-Dichloroethene	26	U
78-93-3	2-Butanone	26	U
67-66-3	Chloroform	4	JB
71-55-6	1,1,1-Trichloroethane	26	U
56-23-5	Carbon Tetrachloride	26	U
71-43-2	Benzene	26	U
107-06-2	1,2-Dichloroethane	26	U
79-01-6	Trichloroethene	26	U
78-87-5	1,2-Dichloropropane	26	U
75-27-4	Bromodichloromethane	26	U
10061-01-5	cis-1,3-Dichloropropene	26	U
108-10-1	4-Methyl-2-pentanone	26	U
108-88-3	Toluene	26	U
10061-02-6	trans-1,3-Dichloropropene	26	U
79-00-5	1,1,2-Trichloroethane	26	U
127-18-4	Tetrachloroethene	26	U
591-78-6	2-Hexanone	26	U
124-48-1	Dibromochloromethane	26	U
108-90-7	Chlorobenzene	26	U
100-41-4	Ethylbenzene	26	U
1330-20-7	m,p-Xylenes	26	U
1330-20-7	o-Xylene	26	U
100-42-5	Styrene	26	U
75-25-2	Bromoform	26	U
79-34-5	1,1,2,2,-Tetrachloroethane	26	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field ID:

SS1S

Site Name: Cold Spring MGP Contract:

Site Code: 340026 Case No.: SAS No.: SDG No.: 291-04

Matrix: (soil/water) SOIL Lab Sample ID: 308-291-032

Sample wt/vol: 4.4 (g/ml) G Lab File ID: 08C1832.D

Level: (low/med) LOW Date Received: 10/17/2008

% Moisture: not dec. 56.3 Date Analyzed: 10/23/2008

GC Column: rtx-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/KG	Q
95-49-8	2-Chlorotoluene	26	U
106-43-4	4-Chlorotoluene	26	U
541-73-1	1,3-Dichlorobenzene	26	U
106-46-7	1,4-Dichlorobenzene	26	U
95-50-1	1,2-Dichlorobenzene	26	U
120-82-1	1,2,4-Trichlorobenzene	26	U
87-61-6	1,2,3-Trichlorobenzene	26	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Field ID: **SS1S**

Site Name: Cold Spring MGP Contract: ______

Site Code: 340026 Case No.: ______ SAS No.: ______ SDG No.: 291-04

Matrix: (soil/water) SOIL Lab Sample ID: 308-291-032

Sample wt/vol: 4.4 (g/ml) G Lab File ID: 08C1832.D

Level: (low/med) LOW Date Received: 10/17/2008

% Moisture: not dec. 56.3 Date Analyzed: 10/23/2008

GC Column: rtx-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: 1 (uL) Soil Aliquot Volume: 1 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 1

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q
1. 000110-54-3	Hexane	10.04	410	JN

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field ID: **SS1D**

Site Name: Cold Spring MGP Contract:

Site Code: 340026 Case No.: SAS No.: SDG No.: 291-04

Matrix: (soil/water) SOIL Lab Sample ID: 308-291-031

Sample wt/vol: 5.2 (g/ml) G Lab File ID: 08C1831.D

Level: (low/med) LOW Date Received: 10/17/2008

% Moisture: not dec. 43.1 Date Analyzed: 10/23/2008

GC Column: rtx-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	17	U
75-87-3	Chloromethane	17	U
75-01-4	Vinyl Chloride	17	U
74-83-9	Bromomethane	17	U
75-00-3	Chloroethane	17	U
75-69-4	Trichlorofluromethane	17	U
75-35-4	1,1-Dichloroethene	17	U
75-15-0	Carbon Disulfide	17	U
67-64-1	Acetone	37	B
75-09-2	Methylene Chloride	17	U
540-59-0	trans 1,2-Dichloroethene	17	U
1634-04-4	Methyl-tert butyl ether	17	U
75-34-4	1,1-Dichloroethane	17	U
108-05-4	Vinyl Acetate	17	U
540-59-0	cis 1,2-Dichloroethene	17	U
78-93-3	2-Butanone	6	J
67-66-3	Chloroform	3	JB
71-55-6	1,1,1-Trichloroethane	17	U
56-23-5	Carbon Tetrachloride	17	U
71-43-2	Benzene	17	U
107-06-2	1,2-Dichloroethane	17	U
79-01-6	Trichloroethene	17	U
78-87-5	1,2-Dichloropropane	17	U
75-27-4	Bromodichloromethane	17	U
10061-01-5	cis-1,3-Dichloropropene	17	U
108-10-1	4-Methyl-2-pentanone	17	U
108-88-3	Toluene	17	U
10061-02-6	trans-1,3-Dichloropropene	17	U
79-00-5	1,1,2-Trichloroethane	17	U
127-18-4	Tetrachloroethene	17	U
591-78-6	2-Hexanone	17	U
124-48-1	Dibromochloromethane	17	U
108-90-7	Chlorobenzene	17	U
100-41-4	Ethylbenzene	17	U
1330-20-7	m,p-Xylenes	17	U
1330-20-7	o-Xylene	17	U
100-42-5	Styrene	17	U
75-25-2	Bromoform	17	U
79-34-5	1,1,2,2,-Tetrachloroethane	17	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field ID:

SS1D

Site Name: Cold Spring MGP

Contract:

Site Code: 340026

Case No.:

SAS No.:

SDG No.: 291-04

Matrix: (soil/water) SOIL

Lab Sample ID: 308-291-031

Sample wt/vol: 5.2 (g/ml) G

Lab File ID: 08C1831.D

Level: (low/med) LOW

Date Received: 10/17/2008

% Moisture: not dec. 43.1

Date Analyzed: 10/23/2008

GC Column: rtx-624 ID: 0.25 (mm)

Dilution Factor: 1.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
95-49-8	2-Chlorotoluene	17	U
106-43-4	4-Chlorotoluene	17	U
541-73-1	1,3-Dichlorobenzene	17	U
106-46-7	1,4-Dichlorobenzene	17	U
95-50-1	1,2-Dichlorobenzene	17	U
120-82-1	1,2,4-Trichlorobenzene	17	U
87-61-6	1,2,3-Trichlorobenzene	17	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Field ID: **SS1D**

Site Name: Cold Spring MGP Contract: ____

Site Code: 340026 Case No.: ____ SAS No.: ____ SDG No.: 291-04

Matrix: (soil/water) SOIL Lab Sample ID: 308-291-031

Sample wt/vol: 5.2 (g/ml) G Lab File ID: 08C1831.D

Level: (low/med) LOW Date Received: 10/17/2008

% Moisture: not dec. 43.1 Date Analyzed: 10/23/2008

GC Column: rtx-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: 1 (uL) Soil Aliquot Volume: 1 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 1

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q
1. 000110-54-3	Hexane	10.03	150	JN

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field ID:

SS2AS

Site Name: Cold Spring MGP Contract:

Site Code: 340026 Case No.: SAS No.: SDG No.: 291-04

Matrix: (soil/water) SOIL Lab Sample ID: 308-291-030

Sample wt/vol: 5.9 (g/ml) G Lab File ID: 08C1830.D

Level: (low/med) LOW Date Received: 10/17/2008

% Moisture: not dec. 57.2 Date Analyzed: 10/23/2008

GC Column: rtx-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	20	U
75-87-3	Chloromethane	20	U
75-01-4	Vinyl Chloride	20	U
74-83-9	Bromomethane	20	U
75-00-3	Chloroethane	20	U
75-69-4	Trichlorofluromethane	20	U
75-35-4	1,1-Dichloroethene	20	U
75-15-0	Carbon Disulfide	20	U
67-64-1	Acetone	53	B
75-09-2	Methylene Chloride	20	U
540-59-0	trans 1,2-Dichloroethene	20	U
1634-04-4	Methyl-tert butyl ether	20	U
75-34-4	1,1-Dichloroethane	20	U
108-05-4	Vinyl Acetate	20	U
540-59-0	cis 1,2-Dichloroethene	20	U
78-93-3	2-Butanone	11	J
67-66-3	Chloroform	3	JB
71-55-6	1,1,1-Trichloroethane	20	U
56-23-5	Carbon Tetrachloride	20	U
71-43-2	Benzene	20	U
107-06-2	1,2-Dichloroethane	20	U
79-01-6	Trichloroethene	20	U
78-87-5	1,2-Dichloropropane	20	U
75-27-4	Bromodichloromethane	20	U
10061-01-5	cis-1,3-Dichloropropene	20	U
108-10-1	4-Methyl-2-pentanone	20	U
108-88-3	Toluene	20	U
10061-02-6	trans-1,3-Dichloropropene	20	U
79-00-5	1,1,2-Trichloroethane	20	U
127-18-4	Tetrachloroethene	20	U
591-78-6	2-Hexanone	20	U
124-48-1	Dibromochloromethane	20	U
108-90-7	Chlorobenzene	20	U
100-41-4	Ethylbenzene	20	U
1330-20-7	m,p-Xylenes	20	U
1330-20-7	o-Xylene	20	U
100-42-5	Styrene	20	U
75-25-2	Bromoform	20	U
79-34-5	1,1,2,2,-Tetrachloroethane	20	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field ID:

SS2AS

Site Name: Cold Spring MGP　Contract: ______

Site Code: 340026　Case No.: ______　SAS No.: ______　SDG No.: 291-04

Matrix: (soil/water) SOIL　Lab Sample ID: 308-291-030

Sample wt/vol: 5.9 (g/ml) G　Lab File ID: 08C1830.D

Level: (low/med) LOW　Date Received: 10/17/2008

% Moisture: not dec. 57.2　Date Analyzed: 10/23/2008

GC Column: rtx-624 ID: 0.25 (mm)　Dilution Factor: 1.0

Soil Extract Volume: ______ (uL)　Soil Aliquot Volume: ______ (uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
95-49-8	2-Chlorotoluene	20	U
106-43-4	4-Chlorotoluene	20	U
541-73-1	1,3-Dichlorobenzene	20	U
106-46-7	1,4-Dichlorobenzene	20	U
95-50-1	1,2-Dichlorobenzene	20	U
120-82-1	1,2,4-Trichlorobenzene	20	U
87-61-6	1,2,3-Trichlorobenzene	20	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Field ID: **SS2AS**

Site Name: Cold Spring MGP Contract:

Site Code: 340026 Case No.: SAS No.: SDG No.: 291-04

Matrix: (soil/water) SOIL Lab Sample ID: 308-291-030

Sample wt/vol: 5.9 (g/ml) G Lab File ID: 08C1830.D

Level: (low/med) LOW Date Received: 10/17/2008

% Moisture: not dec. 57.2 Date Analyzed: 10/23/2008

GC Column: rtx-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: 1 (uL) Soil Aliquot Volume: 1 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 1

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q
1. 000110-54-3	Hexane	10.05	99	JN

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Field ID:
SS2AD

Site Name: Cold Spring MGP Contract:

Site Code: 340026 Case No.: SAS No.: SDG No.: 291-04

Matrix: (soil/water) SOIL Lab Sample ID: 308-291-029

Sample wt/vol: 4.7 (g/ml) G Lab File ID: 08C1829.D

Level: (low/med) LOW Date Received: 10/17/2008

% Moisture: not dec. 41.5 Date Analyzed: 10/23/2008

GC Column: rtx-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	18	U
75-87-3	Chloromethane	18	U
75-01-4	Vinyl Chloride	18	U
74-83-9	Bromomethane	18	U
75-00-3	Chloroethane	18	U
75-69-4	Trichloroflurometħane	18	U
75-35-4	1,1-Dichloroethene	18	U
75-15-0	Carbon Disulfide	18	U
67-64-1	Acetone	41	B
75-09-2	Methylene Chloride	18	U
540-59-0	trans 1,2-Dichloroethene	18	U
1634-04-4	Methyl-tert butyl ether	18	U
75-34-4	1,1-Dichloroethane	18	U
108-05-4	Vinyl Acetate	18	U
540-59-0	cis 1,2-Dichloroethene	18	U
78-93-3	2-Butanone	9	J
67-66-3	Chloroform	3	JB
71-55-6	1,1,1-Trichloroethane	18	U
56-23-5	Carbon Tetrachloride	18	U
71-43-2	Benzene	18	U
107-06-2	1,2-Dichloroethane	18	U
79-01-6	Trichloroethene	18	U
78-87-5	1,2-Dichloropropane	18	U
75-27-4	Bromodichloromethane	18	U
10061-01-5	cis-1,3-Dichloropropene	18	U
108-10-1	4-Methyl-2-pentanone	18	U
108-88-3	Toluene	18	U
10061-02-6	trans-1,3-Dichloropropene	18	U
79-00-5	1,1,2-Trichloroethane	18	U
127-18-4	Tetrachloroethene	18	U
591-78-6	2-Hexanone	18	U
124-48-1	Dibromochloromethane	18	U
108-90-7	Chlorobenzene	18	U
100-41-4	Ethylbenzene	18	U
1330-20-7	m,p-Xylenes	18	U
1330-20-7	o-Xylene	18	U
100-42-5	Styrene	18	U
75-25-2	Bromoform	18	U
79-34-5	1,1,2,2,-Tetrachloroethane	18	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field ID:

SS2AD

Site Name: Cold Spring MGP Contract: ______

Site Code: 340026 Case No.: ______ SAS No.: ______ SDG No.: 291-04

Matrix: (soil/water) SOIL Lab Sample ID: 308-291-029

Sample wt/vol: 4.7 (g/ml) G Lab File ID: 08C1829.D

Level: (low/med) LOW Date Received: 10/17/2008

% Moisture: not dec. 41.5 Date Analyzed: 10/23/2008

GC Column: rtx-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
95-49-8	2-Chlorotoluene	18	U
106-43-4	4-Chlorotoluene	18	U
541-73-1	1,3-Dichlorobenzene	18	U
106-46-7	1,4-Dichlorobenzene	18	U
95-50-1	1,2-Dichlorobenzene	18	U
120-82-1	1,2,4-Trichlorobenzene	18	U
87-61-6	1,2,3-Trichlorobenzene	18	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Field ID: **SS2AD**

Site Name: Cold Spring MGP　Contract: ______

Site Code: 340026　Case No.: ______　SAS No.: ______　SDG No.: 291-04

Matrix: (soil/water) SOIL　Lab Sample ID: 308-291-029

Sample wt/vol: 4.7 (g/ml) G　Lab File ID: 08C1829.D

Level: (low/med) LOW　Date Received: 10/17/2008

% Moisture: not dec. 41.5　Date Analyzed: 10/23/2008

GC Column: rtx-624 ID: 0.25 (mm)　Dilution Factor: 1.0

Soil Extract Volume: 1 (uL)　Soil Aliquot Volume: 1 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 1

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q
1. 000110-54-3	Hexane	10.03	240	JN

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field ID: **SS3S**

Site Name: Cold Spring MGP Contract:

Site Code: 340026 Case No.: SAS No.: SDG No.: 291-04

Matrix: (soil/water) SOIL Lab Sample ID: 308-291-028

Sample wt/vol: 5.4 (g/ml) G Lab File ID: 08C1828.D

Level: (low/med) LOW Date Received: 10/17/2008

% Moisture: not dec. 56.4 Date Analyzed: 10/23/2008

GC Column: rtx-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	21	U
75-87-3	Chloromethane	21	U
75-01-4	Vinyl Chloride	21	U
74-83-9	Bromomethane	21	U
75-00-3	Chloroethane	21	U
75-69-4	Trichlorofluromethane	21	U
75-35-4	1,1-Dichloroethene	21	U
75-15-0	Carbon Disulfide	21	U
67-64-1	Acetone	18	JB
75-09-2	Methylene Chloride	21	U
540-59-0	trans 1,2-Dichloroethene	21	U
1634-04-4	Methyl-tert butyl ether	21	U
75-34-4	1,1-Dichloroethane	21	U
108-05-4	Vinyl Acetate	21	U
540-59-0	cis 1,2-Dichloroethene	21	U
78-93-3	2-Butanone	21	U
67-66-3	Chloroform	4	JB
71-55-6	1,1,1-Trichloroethane	21	U
56-23-5	Carbon Tetrachloride	21	U
71-43-2	Benzene	21	U
107-06-2	1,2-Dichloroethane	21	U
79-01-6	Trichloroethene	21	U
78-87-5	1,2-Dichloropropane	21	U
75-27-4	Bromodichloromethane	21	U
10061-01-5	cis-1,3-Dichloropropene	21	U
108-10-1	4-Methyl-2-pentanone	21	U
108-88-3	Toluene	21	U
10061-02-6	trans-1,3-Dichloropropene	21	U
79-00-5	1,1,2-Trichloroethane	21	U
127-18-4	Tetrachloroethene	21	U
591-78-6	2-Hexanone	21	U
124-48-1	Dibromochloromethane	21	U
108-90-7	Chlorobenzene	21	U
100-41-4	Ethylbenzene	21	U
1330-20-7	m,p-Xylenes	21	U
1330-20-7	o-Xylene	21	U
100-42-5	Styrene	21	U
75-25-2	Bromoform	21	U
79-34-5	1,1,2,2,-Tetrachloroethane	21	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field ID: **SS3S**

Site Name: Cold Spring MGP Contract: ____

Site Code: 340026 Case No.: ____ SAS No.: ____ SDG No.: 291-04

Matrix: (soil/water) SOIL Lab Sample ID: 308-291-028

Sample wt/vol: 5.4 (g/ml) G Lab File ID: 08C1828.D

Level: (low/med) LOW Date Received: 10/17/2008

% Moisture: not dec. 56.4 Date Analyzed: 10/23/2008

GC Column: rtx-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: ____ (uL) Soil Aliquot Volume: ____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
95-49-8	2-Chlorotoluene	21	U
106-43-4	4-Chlorotoluene	21	U
541-73-1	1,3-Dichlorobenzene	21	U
106-46-7	1,4-Dichlorobenzene	21	U
95-50-1	1,2-Dichlorobenzene	21	U
120-82-1	1,2,4-Trichlorobenzene	21	U
87-61-6	1,2,3-Trichlorobenzene	21	U

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Field ID:

SS3S

Site Name: Cold Spring MGP Contract:

Site Code: 340026 Case No.: SAS No.: SDG No.: 291-04

Matrix: (soil/water) SOIL Lab Sample ID: 308-291-028

Sample wt/vol: 5.4 (g/ml) G Lab File ID: 08C1828.D

Level: (low/med) LOW Date Received: 10/17/2008

% Moisture: not dec. 56.4 Date Analyzed: 10/23/2008

GC Column: rtx-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: 1 (uL) Soil Aliquot Volume: 1 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 2

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q
1. 110	Hexane	10.04	5200	J
2. 96	Cyclopentane, methyl-	11.35	100	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field ID: **SS3D**

Site Name: Cold Spring MGP   Contract:

Site Code: 340026   Case No.:   SAS No.:   SDG No.: 291-04

Matrix: (soil/water) SOIL   Lab Sample ID: 308-291-027

Sample wt/vol: 4.9 (g/ml) G   Lab File ID: 08C1827.D

Level: (low/med) LOW   Date Received: 10/17/2008

% Moisture: not dec. 48.4   Date Analyzed: 10/23/2008

GC Column: rtx-624 ID: 0.25 (mm)   Dilution Factor: 1.0

Soil Extract Volume: (uL)   Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	20	U
75-87-3	Chloromethane	20	U
75-01-4	Vinyl Chloride	20	U
74-83-9	Bromomethane	20	U
75-00-3	Chloroethane	20	U
75-69-4	TrichloroflurometHane	20	U
75-35-4	1,1-Dichloroethene	20	U
75-15-0	Carbon Disulfide	20	U
67-64-1	Acetone	26	B
75-09-2	Methylene Chloride	20	U
540-59-0	trans 1,2-Dichloroethene	20	U
1634-04-4	Methyl-tert butyl ether	20	U
75-34-4	1,1-Dichloroethane	20	U
108-05-4	Vinyl Acetate	20	U
540-59-0	cis 1,2-Dichloroethene	20	U
78-93-3	2-Butanone	20	U
67-66-3	Chloroform	4	JB
71-55-6	1,1,1-Trichloroethane	20	U
56-23-5	Carbon Tetrachloride	20	U
71-43-2	Benzene	20	U
107-06-2	1,2-Dichloroethane	20	U
79-01-6	Trichloroethene	20	U
78-87-5	1,2-Dichloropropane	20	U
75-27-4	Bromodichloromethane	20	U
10061-01-5	cis-1,3-Dichloropropene	20	U
108-10-1	4-Methyl-2-pentanone	20	U
108-88-3	Toluene	20	U
10061-02-6	trans-1,3-Dichloropropene	20	U
79-00-5	1,1,2-Trichloroethane	20	U
127-18-4	Tetrachloroethene	20	U
591-78-6	2-Hexanone	20	U
124-48-1	Dibromochloromethane	20	U
108-90-7	Chlorobenzene	20	U
100-41-4	Ethylbenzene	20	U
1330-20-7	m,p-Xylenes	20	U
1330-20-7	o-Xylene	20	U
100-42-5	Styrene	20	U
75-25-2	Bromoform	20	U
79-34-5	1,1,2,2,-Tetrachloroethane	20	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field ID:

SS3D

Site Name: Cold Spring MGP Contract: ______

Site Code: 340026 Case No.: ______ SAS No.: ______ SDG No.: 291-04

Matrix: (soil/water) SOIL Lab Sample ID: 308-291-027

Sample wt/vol: 4.9 (g/ml) G Lab File ID: 08C1827.D

Level: (low/med) LOW Date Received: 10/17/2008

% Moisture: not dec. 48.4 Date Analyzed: 10/23/2008

GC Column: rtx-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
95-49-8	2-Chlorotoluene	20	U
106-43-4	4-Chlorotoluene	20	U
541-73-1	1,3-Dichlorobenzene	20	U
106-46-7	1,4-Dichlorobenzene	20	U
95-50-1	1,2-Dichlorobenzene	20	U
120-82-1	1,2,4-Trichlorobenzene	20	U
87-61-6	1,2,3-Trichlorobenzene	20	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Field ID:

SS3D

Site Name: Cold Spring MGP

Contract:

Site Code: 340026

Case No.:

SAS No.:

SDG No.: 291-04

Matrix: (soil/water) SOIL

Lab Sample ID: 308-291-027

Sample wt/vol: 4.9 (g/ml) G

Lab File ID: 08C1827.D

Level: (low/med) LOW

Date Received: 10/17/2008

% Moisture: not dec. 48.4

Date Analyzed: 10/23/2008

GC Column: rtx-624 ID: 0.25 (mm)

Dilution Factor: 1.0

Soil Extract Volume: 1 (uL)

Soil Aliquot Volume: 1 (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

Number TICs found: 2

CAS NO.	COMPOUND NAME	RT	EST. CONC.	Q
1. 110	Hexane	10.02	160	J
2. 000096-37-7	Cyclopentane, methyl-	11.35	22	JN

New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau A
625 Broadway, 11th Floor
Albany, New York 12233-7015
Phone: (518) 402-9625 • **Fax:** (518) 402-9020 / (518) 402-9627
Website: www.dec.ny.gov

Alexander B. Grannis
Commissioner

Division of Environmental Remediation Laboratory Analytical Report

The case narrative and analytical reports - Semi-volatiles - for the Cold Spring MGP site are attached.

Case Narrative

Site Name: Cold Springs Date received: 10/17/08

For sample delivery group(s): 291-04

For samples - 308-291-027, ...028, ...029, ...030, and ...031:

The calibration verification that these sample were run under had one analyte - 2-methyl-4,6-dinitrophenol - exceeding the calibration verification criteria associated with this method. However, this compound was not detected in any of the samples associated with this calibration verification run.

All other QA/QC associated with these samples were within acceptable method criteria, except that two target masses in the check tune - Mass 275 and Mass 442 - exceeded the upper limit for relative abundance. It was determined, however, that this did not effect either the qualitative or quantitative results for these samples.

For sample - 308-291-032:

The calibration verification that this sample was run under had one analyte - hexachlorocyclopentadiene - exceeding the calibration verification criteria associated with this method. However, this compound was not detected in this sample.

All other QA/QC associated with this sample were within acceptable method criteria, except that one target mass in the check tune - Mass 275 - exceeded the upper limit for relative abundance. It was determined, however, that this did not effect either the qualitative or quantitative results for this sample.

1B

Field ID Number.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SS1S

Site Name: Cold Spring MGP Contract:

Site Code: 340026 Case No.: SAS No.: SDG No.: 291-04

Matrix: (soil/water) SOIL Lab Sample ID: 308-291-032

Sample wt/vol: 19.94 (g/ml) G Lab File ID: 08F1405.D

Level: (low/med) LOW Date Received: 10/17/2008

% Moisture: 56.3 decanted:(Y/N) N Date Extracted: 10/20/2008

Concentrated Extract Volume: 2000 (uL) Date Analyzed: 10/22/2008

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	phenol	2300	U
95-57-8	2-chlorophenol	2300	U
111-44-4	bis(2-chloroethyl)ether	2300	U
541-73-1	1,3-dichlorobenzene	2300	U
106-46-7	1,4-dichlorobenzene	2300	U
95-50-1	1,2-dichlorobenzene	2300	U
100-51-6	benzyl alcohol	2300	U
108-60-1	bis(2-chloroisopropyl)ether	2300	U
95-48-7	2-methylphenol	2300	U
67-72-1	Hexachloroethane	2300	U
621-64-7	N-nitros-di-n-propylamine	2300	U
106-44-5	4-methylphenol	2300	U
98-95-3	Nitrobenzene	2300	U
78-59-1	Isophorone	2300	U
88-75-5	2-nitrophenol	2300	U
105-67-9	2,4-dimethylphenol	2300	U
111-91-1	bis(2-chloroethoxy)methane	2300	U
120-83-2	2,4-dichlorophenol	2300	U
120-82-1	1,2,4-Trichlorobenzene	2300	U
91-20-3	Naphthalene	2300	U
106-47-8	4-chloroaniline	2300	U
87-68-3	Hexachlorobutadiene	2300	U
59-50-7	4-chloro-3-methylphenol	2300	U
91-57-6	2-Methylnaphthalene	2300	U
77-47-4	Hexachlorocyclopentadiene	2300	U
88-06-2	2,4,6-trichlorophenol	2300	U
95-95-4	2,4,5-trichlorophenol	2300	U
91-58-7	2-chloronaphthalene	2300	U
88-74-4	2-nitroaniline	4600	U
208-96-8	acenaphthylene	2300	U
131-11-3	dimethylphthalate	2300	U
606-20-2	2,6-Dinitrotoluene	2300	U
83-32-9	acenaphthene	2300	U
99-09-2	3-nitroaniline	4600	U
132-64-9	Dibenzofuran	2300	U
100-02-7	4-nitrophenol	4600	U
121-14-2	2,4-Dinitrotoluene	2300	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Field ID Number.

SS1S

Site Name: Cold Spring MGP Contract:

Site Code: 340026 Case No.: SAS No.: SDG No.: 291-04

Matrix: (soil/water) SOIL Lab Sample ID: 308-291-032

Sample wt/vol: 19.94 (g/ml) G Lab File ID: 08F1405.D

Level: (low/med) LOW Date Received: 10/17/2008

% Moisture: 56.3 decanted:(Y/N) N Date Extracted: 10/20/2008

Concentrated Extract Volume: 2000 (uL) Date Analyzed: 10/22/2008

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
86-73-7	fluorene	2300	U
7005-72-3	4-chlorophenyl phenyl ether	2300	U
84-66-2	Diethyl phthalate	2300	U
100-01-6	4-nitroaniline	4600	U
534-52-1	2-methyl-4,6-dinitrophenol	4600	U
86-30-6	N-nitrosodiphenylamine	2300	U
101-55-3	4-bromophenyl phenyl ether	2300	U
118-74-1	Hexachlorobenzene	2300	U
87-86-5	pentachlorophenol	4600	U
85-01-8	phenanthrene	2300	U
120-12-7	anthracene	2300	U
86-74-8	Carbazole	2300	U
84-74-2	di-n-butyl phthalate	2300	U
206-44-0	fluoranthene	2300	U
129-00-0	pyrene	2300	U
85-68-7	butyl benzyl phthalate	2300	U
56-55-3	benzo(a)anthracene	2300	U
218-01-9	chrysene	2300	U
91-94-1	3,3'-dichlorobenzidine	2300	U
117-81-7	bis(2-ethylhexyl)phthalate	2300	U
117-84-0	di-n-octyl phthalate	2300	U
205-99-2	benzo(b)fluoranthene	2300	U
207-08-9	benzo(k)fluoranthene	2300	U
50-32-8	benzo(a)pyrene	2300	U
193-39-5	indeno(1,2,3-cd)pyrene	2300	U
53-70-3	dibenzo(a,h)anthracene	2300	U
191-24-2	benzo(g,h,i)perylene	2300	U

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Field ID Number.

SS1S

Site Name: Cold Spring MGP Contract:

Site Code: 340026 Case No.: SAS No.: SDG No.: 291-04

Matrix: (soil/water) SOIL Lab Sample ID: 308-291-032

Sample wt/vol: 19.94 (g/ml) G Lab File ID: 08F1405.D

Level: (low/med) LOW Date Received: 10/17/2008

% Moisture: 56.3 decanted: (Y/N) N Date Extracted: 10/20/2008

Concentrated Extract Volume: 2000 (uL) Date Analyzed: 10/22/2008

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH:

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Field ID Number.

SS1D

Site Name: Cold Spring MGP Contract:

Site Code: 340026 Case No.: SAS No.: SDG No.: 291-04

Matrix: (soil/water) SOIL Lab Sample ID: 308-291-031

Sample wt/vol: 20.07 (g/ml) G Lab File ID: 08F1397.D

Level: (low/med) LOW Date Received: 10/17/2008

% Moisture: 43.1 decanted:(Y/N) N Date Extracted: 10/20/2008

Concentrated Extract Volume: 2000 (uL) Date Analyzed: 10/21/2008

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	phenol	1700	U
95-57-8	2-chlorophenol	1700	U
111-44-4	bis(2-chloroethyl)ether	1700	U
541-73-1	1,3-dichlorobenzene	1700	U
106-46-7	1,4-dichlorobenzene	1700	U
95-50-1	1,2-dichlorobenzene	1700	U
100-51-6	benzyl alcohol	1700	U
108-60-1	bis(2-chloroisopropyl)ether	1700	U
95-48-7	2-methylphenol	1700	U
67-72-1	Hexachloroethane	1700	U
621-64-7	N-nitros-di-n-propylamine	1700	U
106-44-5	4-methylphenol	1700	U
98-95-3	Nitrobenzene	1700	U
78-59-1	Isophorone	1700	U
88-75-5	2-nitrophenol	1700	U
105-67-9	2,4-dimethylphenol	1700	U
111-91-1	bis(2-chloroethoxy)methane	1700	U
120-83-2	2,4-dichlorophenol	1700	U
120-82-1	1,2,4-Trichlorobenzene	1700	U
91-20-3	Naphthalene	1700	U
106-47-8	4-chloroaniline	1700	U
87-68-3	Hexachlorobutadiene	1700	U
59-50-7	4-chloro-3-methylphenol	1700	U
91-57-6	2-Methylnaphthalene	1700	U
77-47-4	Hexachlorocyclopentadiene	1700	U
88-06-2	2,4,6-trichlorophenol	1700	U
95-95-4	2,4,5-trichlorophenol	1700	U
91-58-7	2-chloronaphthalene	1700	U
88-74-4	2-nitroaniline	3500	U
208-96-8	acenaphthylene	1700	U
131-11-3	dimethylphthalate	1700	U
606-20-2	2,6-Dinitrotoluene	1700	U
83-32-9	acenaphthene	1700	U
99-09-2	3-nitroaniline	3500	U
132-64-9	Dibenzofuran	1700	U
100-02-7	4-nitrophenol	3500	U
121-14-2	2,4-Dinitrotoluene	1700	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Field ID Number.

SS1D

Site Name: Cold Spring MGP Contract:

Site Code: 340026 Case No.: SAS No.: SDG No.: 291-04

Matrix: (soil/water) SOIL Lab Sample ID: 308-291-031

Sample wt/vol: 20.07 (g/ml) G Lab File ID: 08F1397.D

Level: (low/med) LOW Date Received: 10/17/2008

% Moisture: 43.1 decanted:(Y/N) N Date Extracted: 10/20/2008

Concentrated Extract Volume: 2000 (uL) Date Analyzed: 10/21/2008

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
86-73-7	fluorene	1700	U
7005-72-3	4-chlorophenyl phenyl ether	1700	U
84-66-2	Diethyl phthalate	1700	U
100-01-6	4-nitroaniline	3500	U
534-52-1	2-methyl-4,6-dinitrophenol	3500	U
86-30-6	N-nitrosodiphenylamine	1700	U
101-55-3	4-bromophenyl phenyl ether	1700	U
118-74-1	Hexachlorobenzene	1700	U
87-86-5	pentachlorophenol	3500	U
85-01-8	phenanthrene	1700	U
120-12-7	anthracene	1700	U
86-74-8	Carbazole	1700	U
84-74-2	di-n-butyl phthalate	1700	U
206-44-0	fluoranthene	240	J
129-00-0	pyrene	310	J
85-68-7	butyl benzyl phthalate	1700	U
56-55-3	benzo(a)anthracene	170	J
218-01-9	chrysene	180	J
91-94-1	3,3'-dichlorobenzidine	1700	U
117-81-7	bis(2-ethylhexyl)phthalate	1700	U
117-84-0	di-n-octyl phthalate	1700	U
205-99-2	benzo(b)fluoranthene	1700	U
207-08-9	benzo(k)fluoranthene	1700	U
50-32-8	benzo(a)pyrene	1700	U
193-39-5	indeno(1,2,3-cd)pyrene	1700	U
53-70-3	dibenzo(a,h)anthracene	1700	U
191-24-2	benzo(g,h,i)perylene	1700	U

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Field ID Number.

SS1D

Site Name: Cold Spring MGP Contract: ________

Site Code: 340026 Case No.: ________ SAS No.: ________ SDG No.: 291-04

Matrix: (soil/water) SOIL Lab Sample ID: 308-291-031

Sample wt/vol: 20.07 (g/ml) G Lab File ID: 08F1397.D

Level: (low/med) LOW Date Received: 10/17/2008

% Moisture: 43.1 decanted: (Y/N) N Date Extracted: 10/20/2008

Concentrated Extract Volume: 2000 (uL) Date Analyzed: 10/21/2008

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: ________

CONCENTRATION UNITS:

Number TICs found: 0 (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Field ID Number.

SS2AS

Site Name: Cold Spring MGP Contract:

Site Code: 340026 Case No.: SAS No.: SDG No.: 291-04

Matrix: (soil/water) SOIL Lab Sample ID: 308-291-030

Sample wt/vol: 20.03 (g/ml) G Lab File ID: 08F1396.D

Level: (low/med) LOW Date Received: 10/17/2008

% Moisture: 57.2 decanted:(Y/N) N Date Extracted: 10/20/2008

Concentrated Extract Volume: 2000 (uL) Date Analyzed: 10/21/2008

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	phenol	2300	U
95-57-8	2-chlorophenol	2300	U
111-44-4	bis(2-chloroethyl)ether	2300	U
541-73-1	1,3-dichlorobenzene	2300	U
106-46-7	1,4-dichlorobenzene	2300	U
95-50-1	1,2-dichlorobenzene	2300	U
100-51-6	benzyl alcohol	2300	U
108-60-1	bis(2-chloroisopropyl)ether	2300	U
95-48-7	2-methylphenol	2300	U
67-72-1	Hexachloroethane	2300	U
621-64-7	N-nitros-di-n-propylamine	2300	U
106-44-5	4-methylphenol	2300	U
98-95-3	Nitrobenzene	2300	U
78-59-1	Isophorone	2300	U
88-75-5	2-nitrophenol	2300	U
105-67-9	2,4-dimethylphenol	2300	U
111-91-1	bis(2-chloroethoxy)methane	2300	U
120-83-2	2,4-dichlorophenol	2300	U
120-82-1	1,2,4-Trichlorobenzene	2300	U
91-20-3	Naphthalene	2300	U
106-47-8	4-chloroaniline	2300	U
87-68-3	Hexachlorobutadiene	2300	U
59-50-7	4-chloro-3-methylphenol	2300	U
91-57-6	2-Methylnaphthalene	2300	U
77-47-4	Hexachlorocyclopentadiene	2300	U
88-06-2	2,4,6-trichlorophenol	2300	U
95-95-4	2,4,5-trichlorophenol	2300	U
91-58-7	2-chloronaphthalene	2300	U
88-74-4	2-nitroaniline	4600	U
208-96-8	acenaphthylene	2300	U
131-11-3	dimethylphthalate	2300	U
606-20-2	2,6-Dinitrotoluene	2300	U
83-32-9	acenaphthene	2300	U
99-09-2	3-nitroaniline	4600	U
132-64-9	Dibenzofuran	2300	U
100-02-7	4-nitrophenol	4600	U
121-14-2	2,4-Dinitrotoluene	2300	U

1C

Field ID Number.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SS2AS

Site Name: Cold Spring MGP Contract: __________

Site Code: 340026 Case No.: ________ SAS No.: ______ SDG No.: 291-04

Matrix: (soil/water) SOIL Lab Sample ID: 308-291-030

Sample wt/vol: 20.03 (g/ml) G Lab File ID: 08F1396.D

Level: (low/med) LOW Date Received: 10/17/2008

% Moisture: 57.2 decanted:(Y/N) N Date Extracted: 10/20/2008

Concentrated Extract Volume: 2000 (uL) Date Analyzed: 10/21/2008

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: ______

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
86-73-7	fluorene	2300	U
7005-72-3	4-chlorophenyl phenyl ether	2300	U
84-66-2	Diethyl phthalate	2300	U
100-01-6	4-nitroaniline	4600	U
534-52-1	2-methyl-4,6-dinitrophenol	4600	U
86-30-6	N-nitrosodiphenylamine	2300	U
101-55-3	4-bromophenyl phenyl ether	2300	U
118-74-1	Hexachlorobenzene	2300	U
87-86-5	pentachlorophenol	4600	U
85-01-8	phenanthrene	2300	U
120-12-7	anthracene	2300	U
86-74-8	Carbazole	2300	U
84-74-2	di-n-butyl phthalate	2300	U
206-44-0	fluoranthene	2300	U
129-00-0	pyrene	2300	U
85-68-7	butyl benzyl phthalate	2300	U
56-55-3	benzo(a)anthracene	2300	U
218-01-9	chrysene	2300	U
91-94-1	3,3'-dichlorobenzidine	2300	U
117-81-7	bis(2-ethylhexyl)phthalate	2300	U
117-84-0	di-n-octyl phthalate	2300	U
205-99-2	benzo(b)fluoranthene	2300	U
207-08-9	benzo(k)fluoranthene	2300	U
50-32-8	benzo(a)pyrene	2300	U
193-39-5	indeno(1,2,3-cd)pyrene	2300	U
53-70-3	dibenzo(a,h)anthracene	2300	U
191-24-2	benzo(g,h,i)perylene	2300	U

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Field ID Number.

SS2AS

Site Name: Cold Spring MGP Contract:

Site Code: 340026 Case No.: SAS No.: SDG No.: 291-04

Matrix: (soil/water) SOIL Lab Sample ID: 308-291-030

Sample wt/vol: 20.03 (g/ml) G Lab File ID: 08F1396.D

Level: (low/med) LOW Date Received: 10/17/2008

% Moisture: 57.2 decanted: (Y/N) N Date Extracted: 10/20/2008

Concentrated Extract Volume: 2000 (uL) Date Analyzed: 10/21/2008

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH:

Number TICs found: 0 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Field ID Number.

SS2AD

Site Name: Cold Spring MGP
Contract:
Site Code: 340026
Case No.:
SAS No.:
SDG No.: 291-04
Matrix: (soil/water) SOIL
Lab Sample ID: 308-291-029
Sample wt/vol: 19.91 (g/ml) G
Lab File ID: 08F1394.D
Level: (low/med) LOW
Date Received: 10/17/2008
% Moisture: 41.5
decanted:(Y/N) N
Date Extracted: 10/20/2008
Concentrated Extract Volume: 2000 (uL)
Date Analyzed: 10/21/2008
Injection Volume: 2.0 (uL)
Dilution Factor: 1.0
GPC Cleanup: (Y/N) Y
pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	phenol	1700	U
95-57-8	2-chlorophenol	1700	U
111-44-4	bis(2-chloroethyl)ether	1700	U
541-73-1	1,3-dichlorobenzene	1700	U
106-46-7	1,4-dichlorobenzene	1700	U
95-50-1	1,2-dichlorobenzene	1700	U
100-51-6	benzyl alcohol	1700	U
108-60-1	bis(2-chloroisopropyl)ether	1700	U
95-48-7	2-methylphenol	1700	U
67-72-1	Hexachloroethane	1700	U
621-64-7	N-nitros-di-n-propylamine	1700	U
106-44-5	4-methylphenol	1700	U
98-95-3	Nitrobenzene	1700	U
78-59-1	Isophorone	1700	U
88-75-5	2-nitrophenol	1700	U
105-67-9	2,4-dimethylphenol	1700	U
111-91-1	bis(2-chloroethoxy)methane	1700	U
120-83-2	2,4-dichlorophenol	1700	U
120-82-1	1,2,4-Trichlorobenzene	1700	U
91-20-3	Naphthalene	1700	U
106-47-8	4-chloroaniline	1700	U
87-68-3	Hexachlorobutadiene	1700	U
59-50-7	4-chloro-3-methylphenol	1700	U
91-57-6	2-Methylnaphthalene	1700	U
77-47-4	Hexachlorocyclopentadiene	1700	U
88-06-2	2,4,6-trichlorophenol	1700	U
95-95-4	2,4,5-trichlorophenol	1700	U
91-58-7	2-chloronaphthalene	1700	U
88-74-4	2-nitroaniline	3500	U
208-96-8	acenaphthylene	1700	U
131-11-3	dimethylphthalate	1700	U
606-20-2	2,6-Dinitrotoluene	1700	U
83-32-9	acenaphthene	1700	U
99-09-2	3-nitroaniline	3500	U
132-64-9	Dibenzofuran	1700	U
100-02-7	4-nitrophenol	3500	U
121-14-2	2,4-Dinitrotoluene	1700	U

1C

Field ID Number.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SS2AD

Site Name: Cold Spring MGP Contract: ____

Site Code: 340026 Case No.: ____ SAS No.: ____ SDG No.: 291-04

Matrix: (soil/water) SOIL Lab Sample ID: 308-291-029

Sample wt/vol: 19.91 (g/ml) G Lab File ID: 08F1394.D

Level: (low/med) LOW Date Received: 10/17/2008

% Moisture: 41.5 decanted:(Y/N) N Date Extracted: 10/20/2008

Concentrated Extract Volume: 2000 (uL) Date Analyzed: 10/21/2008

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: ____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
86-73-7	fluorene	1700	U
7005-72-3	4-chlorophenyl phenyl ether	1700	U
84-66-2	Diethyl phthalate	1700	U
100-01-6	4-nitroaniline	3500	U
534-52-1	2-methyl-4,6-dinitrophenol	3500	U
86-30-6	N-nitrosodiphenylamine	1700	U
101-55-3	4-bromophenyl phenyl ether	1700	U
118-74-1	Hexachlorobenzene	1700	U
87-86-5	pentachlorophenol	3500	U
85-01-8	phenanthrene	250	J
120-12-7	anthracene	1700	U
86-74-8	Carbazole	1700	U
84-74-2	di-n-butyl phthalate	1700	U
206-44-0	fluoranthene	410	J
129-00-0	pyrene	440	J
85-68-7	butyl benzyl phthalate	1700	U
56-55-3	benzo(a)anthracene	270	J
218-01-9	chrysene	280	J
91-94-1	3,3'-dichlorobenzidine	1700	U
117-81-7	bis(2-ethylhexyl)phthalate	1700	U
117-84-0	di-n-octyl phthalate	1700	U
205-99-2	benzo(b)fluoranthene	240	J
207-08-9	benzo(k)fluoranthene	1700	U
50-32-8	benzo(a)pyrene	200	J
193-39-5	indeno(1,2,3-cd)pyrene	1700	U
53-70-3	dibenzo(a,h)anthracene	1700	U
191-24-2	benzo(g,h,i)perylene	1700	U

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Field ID Number.

SS2AD

Site Name: Cold Spring MGP
Contract:
Site Code: 340026
Case No.:
SAS No.:
SDG No.: 291-04
Matrix: (soil/water) SOIL
Lab Sample ID: 308-291-029
Sample wt/vol: 19.91 (g/ml) G
Lab File ID: 08F1394.D
Level: (low/med) LOW
Date Received: 10/17/2008
% Moisture: 41.5 decanted: (Y/N) N
Date Extracted: 10/20/2008
Concentrated Extract Volume: 2000 (uL)
Date Analyzed: 10/21/2008
Injection Volume: 2.0 (uL)
Dilution Factor: 1.0
GPC Cleanup: (Y/N) Y pH:

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1B

Field ID Number.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SS3S

Site Name: Cold Spring MGP Contract:

Site Code: 340026 Case No.: SAS No.: SDG No.: 291-04

Matrix: (soil/water) SOIL Lab Sample ID: 308-291-028

Sample wt/vol: 20.04 (g/ml) G Lab File ID: 08F1393.D

Level: (low/med) LOW Date Received: 10/17/2008

% Moisture: 56.4 decanted:(Y/N) N Date Extracted: 10/20/2008

Concentrated Extract Volume: 2000 (uL) Date Analyzed: 10/21/2008

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	phenol	2300	U
95-57-8	2-chlorophenol	2300	U
111-44-4	bis(2-chloroethyl)ether	2300	U
541-73-1	1,3-dichlorobenzene	2300	U
106-46-7	1,4-dichlorobenzene	2300	U
95-50-1	1,2-dichlorobenzene	2300	U
100-51-6	benzyl alcohol	2300	U
108-60-1	bis(2-chloroisopropyl)ether	2300	U
95-48-7	2-methylphenol	2300	U
67-72-1	Hexachloroethane	2300	U
621-64-7	N-nitros-di-n-propylamine	2300	U
106-44-5	4-methylphenol	2300	U
98-95-3	Nitrobenzene	2300	U
78-59-1	Isophorone	2300	U
88-75-5	2-nitrophenol	2300	U
105-67-9	2,4-dimethylphenol	2300	U
111-91-1	bis(2-chloroethoxy)methane	2300	U
120-83-2	2,4-dichlorophenol	2300	U
120-82-1	1,2,4-Trichlorobenzene	2300	U
91-20-3	Naphthalene	2300	U
106-47-8	4-chloroaniline	2300	U
87-68-3	Hexachlorobutadiene	2300	U
59-50-7	4-chloro-3-methylphenol	2300	U
91-57-6	2-Methylnaphthalene	2300	U
77-47-4	Hexachlorocyclopentadiene	2300	U
88-06-2	2,4,6-trichlorophenol	2300	U
95-95-4	2,4,5-trichlorophenol	2300	U
91-58-7	2-chloronaphthalene	2300	U
88-74-4	2-nitroaniline	4500	U
208-96-8	acenaphthylene	2300	U
131-11-3	dimethylphthalate	2300	U
606-20-2	2,6-Dinitrotoluene	2300	U
83-32-9	acenaphthene	2300	U
99-09-2	3-nitroaniline	4500	U
132-64-9	Dibenzofuran	2300	U
100-02-7	4-nitrophenol	4500	U
121-14-2	2,4-Dinitrotoluene	2300	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Field ID Number.

SS3S

Site Name: Cold Spring MGP Contract:
Site Code: 340026 Case No.: SAS No.: SDG No.: 291-04
Matrix: (soil/water) SOIL Lab Sample ID: 308-291-028
Sample wt/vol: 20.04 (g/ml) G Lab File ID: 08F1393.D
Level: (low/med) LOW Date Received: 10/17/2008
% Moisture: 56.4 decanted:(Y/N) N Date Extracted: 10/20/2008
Concentrated Extract Volume: 2000 (uL) Date Analyzed: 10/21/2008
Injection Volume: 2.0 (uL) Dilution Factor: 1.0
GPC Cleanup: (Y/N) Y pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
86-73-7	fluorene	2300	U
7005-72-3	4-chlorophenyl phenyl ether	2300	U
84-66-2	Diethyl phthalate	2300	U
100-01-6	4-nitroaniline	4500	U
534-52-1	2-methyl-4,6-dinitrophenol	4500	U
86-30-6	N-nitrosodiphenylamine	2300	U
101-55-3	4-bromophenyl phenyl ether	2300	U
118-74-1	Hexachlorobenzene	2300	U
87-86-5	pentachlorophenol	4500	U
85-01-8	phenanthrene	2300	U
120-12-7	anthracene	2300	U
86-74-8	Carbazole	2300	U
84-74-2	di-n-butyl phthalate	2300	U
206-44-0	fluoranthene	2300	U
129-00-0	pyrene	2300	U
85-68-7	butyl benzyl phthalate	2300	U
56-55-3	benzo(a)anthracene	2300	U
218-01-9	chrysene	2300	U
91-94-1	3,3'-dichlorobenzidine	2300	U
117-81-7	bis(2-ethylhexyl)phthalate	2300	U
117-84-0	di-n-octyl phthalate	2300	U
205-99-2	benzo(b)fluoranthene	2300	U
207-08-9	benzo(k)fluoranthene	2300	U
50-32-8	benzo(a)pyrene	2300	U
193-39-5	indeno(1,2,3-cd)pyrene	2300	U
53-70-3	dibenzo(a,h)anthracene	2300	U
191-24-2	benzo(g,h,i)perylene	2300	U

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Field ID Number.

SS3S

Site Name: Cold Spring MGP Contract:

Site Code: 340026 Case No.: SAS No.: SDG No.: 291-04

Matrix: (soil/water) SOIL Lab Sample ID: 308-291-028

Sample wt/vol: 20.04 (g/ml) G Lab File ID: 08F1393.D

Level: (low/med) LOW Date Received: 10/17/2008

% Moisture: 56.4 decanted: (Y/N) N Date Extracted: 10/20/2008

Concentrated Extract Volume: 2000 (uL) Date Analyzed: 10/21/2008

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH:

CONCENTRATION UNITS:

Number TICs found: 0 (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1B

Field ID Number.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SS3D

Site Name: Cold Spring MGP Contract:

Site Code: 340026 Case No.: SAS No.: SDG No.: 291-04

Matrix: (soil/water) SOIL Lab Sample ID: 308-291-027

Sample wt/vol: 19.9 (g/ml) G Lab File ID: 08F1392.D

Level: (low/med) LOW Date Received: 10/17/2008

% Moisture: 48.4 decanted:(Y/N) N Date Extracted: 10/20/2008

Concentrated Extract Volume: 2000 (uL) Date Analyzed: 10/21/2008

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	phenol	1900	U
95-57-8	2-chlorophenol	1900	U
111-44-4	bis(2-chloroethyl)ether	1900	U
541-73-1	1,3-dichlorobenzene	1900	U
106-46-7	1,4-dichlorobenzene	1900	U
95-50-1	1,2-dichlorobenzene	1900	U
100-51-6	benzyl alcohol	1900	U
108-60-1	bis(2-chloroisopropyl)ether	1900	U
95-48-7	2-methylphenol	1900	U
67-72-1	Hexachloroethane	1900	U
621-64-7	N-nitros-di-n-propylamine	1900	U
106-44-5	4-methylphenol	1900	U
98-95-3	Nitrobenzene	1900	U
78-59-1	Isophorone	1900	U
88-75-5	2-nitrophenol	1900	U
105-67-9	2,4-dimethylphenol	1900	U
111-91-1	bis(2-chloroethoxy)methane	1900	U
120-83-2	2,4-dichlorophenol	1900	U
120-82-1	1,2,4-Trichlorobenzene	1900	U
91-20-3	Naphthalene	1900	U
106-47-8	4-chloroaniline	1900	U
87-68-3	Hexachlorobutadiene	1900	U
59-50-7	4-chloro-3-methylphenol	1900	U
91-57-6	2-Methylnaphthalene	1900	U
77-47-4	Hexachlorocyclopentadiene	1900	U
88-06-2	2,4,6-trichlorophenol	1900	U
95-95-4	2,4,5-trichlorophenol	1900	U
91-58-7	2-chloronaphthalene	1900	U
88-74-4	2-nitroaniline	3900	U
208-96-8	acenaphthylene	1900	U
131-11-3	dimethylphthalate	1900	U
606-20-2	2,6-Dinitrotoluene	1900	U
83-32-9	acenaphthene	1900	U
99-09-2	3-nitroaniline	3900	U
132-64-9	Dibenzofuran	1900	U
100-02-7	4-nitrophenol	3900	U
121-14-2	2,4-Dinitrotoluene	1900	U

1C

Field ID Number.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SS3D

Site Name: Cold Spring MGP Contract:

Site Code: 340026 Case No.: SAS No.: SDG No.: 291-04

Matrix: (soil/water) SOIL

Lab Sample ID: 308-291-027

Sample wt/vol: 19.9 (g/ml) G

Lab File ID: 08F1392.D

Level: (low/med) LOW

Date Received: 10/17/2008

% Moisture: 48.4 decanted:(Y/N) N

Date Extracted: 10/20/2008

Concentrated Extract Volume: 2000 (uL)

Date Analyzed: 10/21/2008

Injection Volume: 2.0 (uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
86-73-7	fluorene	1900	U
7005-72-3	4-chlorophenyl phenyl ether	1900	U
84-66-2	Diethyl phthalate	1900	U
100-01-6	4-nitroaniline	3900	U
534-52-1	2-methyl-4,6-dinitrophenol	3900	U
86-30-6	N-nitrosodiphenylamine	1900	U
101-55-3	4-bromophenyl phenyl ether	1900	U
118-74-1	Hexachlorobenzene	1900	U
87-86-5	pentachlorophenol	3900	U
85-01-8	phenanthrene	270	J
120-12-7	anthracene	1900	U
86-74-8	Carbazole	1900	U
84-74-2	di-n-butyl phthalate	1900	U
206-44-0	fluoranthene	450	J
129-00-0	pyrene	500	J
85-68-7	butyl benzyl phthalate	1900	U
56-55-3	benzo(a)anthracene	240	J
218-01-9	chrysene	270	J
91-94-1	3,3'-dichlorobenzidine	1900	U
117-81-7	bis(2-ethylhexyl)phthalate	1900	U
117-84-0	di-n-octyl phthalate	1900	U
205-99-2	benzo(b)fluoranthene	240	J
207-08-9	benzo(k)fluoranthene	1900	U
50-32-8	benzo(a)pyrene	200	J
193-39-5	indeno(1,2,3-cd)pyrene	1900	U
53-70-3	dibenzo(a,h)anthracene	1900	U
191-24-2	benzo(g,h,i)perylene	210	J

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

Field ID Number.

SS3D

Site Name: Cold Spring MGP Contract:

Site Code: 340026 Case No.: SAS No.: SDG No.: 291-04

Matrix: (soil/water) SOIL Lab Sample ID: 308-291-027

Sample wt/vol: 19.9 (g/ml) G Lab File ID: 08F1392.D

Level: (low/med) LOW Date Received: 10/17/2008

% Moisture: 48.4 decanted: (Y/N) N Date Extracted: 10/20/2008

Concentrated Extract Volume: 2000 (uL) Date Analyzed: 10/21/2008

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH:

CONCENTRATION UNITS:

Number TICs found: 1 (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 000541-02-6	Cyclopentasiloxane, decamethyl-	12.88	580	JN

Cold Spring Former MGP Site Sediment Investigation Figure 1

Appendix F

APPENDIX F

META ENVIRONMENTAL, INC.
HYDROCARBON FINGERPRINT REPORT
OCTOBER 15, 2008

META Environmental, Inc.

49 Clarendon Street
Watertown, MA 02472
TEL: (617) 923-4662
FAX: (617) 923-4610
www.metaenv.com

October 15, 2008

Tom Fox
Dvirka & Bartilucci
330 Crossways Park Drive
Woodbury, NY 10516

RE: Cold Spring MGP: SDG# DB080920

Dear Mr. Fox:

This package contains the analytical results from one soil sample received on September 20, 2008 by META Environmental, Inc. (META) from Dvirka & Bartilucci.

Methods

The sample was prepared by solvent extraction (EPA 3570) using dichloromethane (DCM). The extract was spiked with internal standard and analyzed by gas chromatography with a flame ionization detector (GC/FID) for petroleum fingerprinting (EPA 8100 mod.) Sample *SB-04* was extracted and analyzed in duplicate.

Fingerprinting Results

SB-04

Sample *SB-04* contained a pyrogenic substance. The pattern of PAHs, especially the presence of monocyclic aromatic hydrocarbons (MAHs) including benzene, toluene, ethylbenzene, xylenes (collectively known as BTEX), the high relative concentration of naphthalene, and the ratio of fluoranthene to pyrene indicate that the pyrogenic material in this sample is derived from tar, likely from a manufactured gas plant (MGP) that utilized a carbureted water gas (CWG) process. The elevated concentrations of 3-, 4-, and 5-ring PAHs relative to lower molecular weight PAHs suggests that the tar-like material in the sample had been subject to moderate weathering.

The duplicate of this sample showed similar characteristics, however sample *SB-04* did demonstrate some heterogeneity as the relative concentration of naphthalene to other PAH's varied between the sample and it's duplicate.

META can perform additional analyses to further characterize these samples if dictated by the project objectives. Please contact me if you have any questions about these data or would like META to perform additional analyses.

Sincerely,

James A Roush

James Roush,
Environmental Chemist

Attachments:
Chain of Custody
Laboratory Login Forms
GC/FID Chromatograms

References

1. Mauro, D.M., "Chemical Source Attribution at Former MGP Sites," EPRI Technical Report 1000728, December 2000.

2. "Chemical Fingerprinting of Hydrocarbons," in: Introduction to Environmental Forensics. B.L. Murphy and R.D. Morrison editors, Academic Press, San Diego, CA 2002.

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~~110 S. Hill Street~~
~~South Bend, IN 46617~~
~~(800) 332-4345~~
~~fax (574) 233-8207~~

Meta Environmental
49 Clarendon St.
Watertown MA 02472

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Order # ______

www.ul.com/water

Shaded area for lab use only

CHAIN OF CUSTODY RECORD

Page ____ of ____

REPORT TO: Tom Fox
Dvirka & Bartilucci
330 Crossroads Park Dr
Woodbury NY 10516

BILL TO: SAME

SAMPLER (Signature):

COMPLIANCE MONITORING: Yes ☐ No ☐

STATE (of sample origin): NY

PWS ID#:

POPULATION SERVED:

SOURCE WATER:

PROJECT NAME: Cold Spring MGP D07008

PO#:

	LAB Number	COLLECTION DATE	COLLECTION TIME	AM	PM	SAMPLING SITE	TEST NAME	SAMPLE REMARKS	CHLORINATED YES	CHLORINATED NO	# OF CONTAINERS	MATRIX CODE	TURNAROUND TIME
1		9-17	1530		X	SB-04	Hydrocarbon Fingerprint MET 4007D	D3080920-01			1	Soil	Std
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													

RELINQUISHED BY:(Signature)	DATE	TIME	RECEIVED BY:(Signature)	DATE	TIME
	9/19	5:00 AM [✓ PM]		9/20	10:00 [✓ AM] PM
RELINQUISHED BY:(Signature)	DATE	TIME AM PM	RECEIVED BY:(Signature)	DATE	TIME AM PM
RELINQUISHED BY:(Signature)	DATE	TIME AM PM	RECEIVED FOR LABORATORY BY:	DATE	TIME AM PM

LAB RESERVES THE RIGHT TO RETURN UNUSED PORTIONS OF NON-AQUEOUS SAMPLES TO CLIENT

LAB COMMENTS:

CONDITIONS UPON RECEIPT (check one) Temperature:
X Iced Wet/Blue 18 °C Ambient ____ °C Upon Receipt 4.7 °C NA

MATRIX CODES:
DW-DRINKING WATER
RW-REAGENT WATER
GW-GROUND WATER
EW-EXPOSURE WATER
SW-SURFACE WATER
PW-POOL WATER
WW-WASTE WATER

TURN-AROUND TIME (TAT) - SURCHARGES

SW = Standard Written: (15 working days)	0%	IV* = Immediate Verbal: (3 working days)	100%
RV* = Rush Verbal: (5 Working days)	50%	IW* =Immediate Written: (3 working days)	125%
RW* = Rush Written: (5 working days)	75%	SP* = Weekend, Holiday	CALL
		STAT* = Less than 48 hours	CALL

*-Please call, Expedited service not available for all testing

Samples received unannounced with less than 48 hours holding time remaining may be subject to additional charges

Shipping
UL-SBN-SHIP-F-002-06
Effective Date:
8/30/2006

Sample analysis will be provided according to the standard UL GSA/Water Services Terms, which are available upon request. Any other terms proposed by Customer are deemed material alterations and are rejected unless expressly agreed to in writing by UL

META Environmental, Inc.

Sample Receipt Log

Lab ID	Field ID	Matrix	Prep Method	Cleanup Method	Analysis Method	Date Sampled	Date Received	Project #	Container	Comments	Client Name	Project Name
DB080920-01	SB-04	Soil	2508		4007	9/17/2008	9/20/2008	D07008-60	1 x 4 oz jar		Dvirka and Bartilucci	Cold Spring MGP

Logged By:

Date: 9/20/08

Reviewed By:

Date: 9/23/08

META Environmental, Inc.

Sample Receipt Checklist

Receipt date: 9/20/08

Login date: 9/20/08

Login personnel:

Client Information:.

Company Name: Dvirka + Bartillucci

Project Manager: Tom Fox

Project Name: Cold Spring MGP D07008

Shipping Information:

How were samples received? [✓ UPS] FedEx DHL Other:

Number of coolers: 1

Internal temperature of coolers: 4.7°C

Was ice present? [✓ Yes] / No

Note: if cooler is outside the 2-6° range, META's project manager should be notified.

Documentation:

Was a Chain of Custody present? [✓ Yes] No

Was it signed? [✓ Yes] / No

Was all project information present on the COC? [✓ Yes] / No

Was a bill of lading or shipping label retained? Yes / [✓ No]

Sample Information:

Number of sample containers: 1

Does this match the COC? [✓ Yes] / No

Were all sample containers Intact? [✓ Yes] / No

If no, list samples and problems:

Note: if samples are damaged, META's project manager should be notified.

For aqueous 40ml Voas; was headspace present? Yes / No / [✓ NA]

Comments:

Custodian:

Project Manager:

Thomas Fox

From: James Roush [jroush@metaenv.com]
Sent: Wednesday, October 15, 2008 1:59 PM
To: tfox@db-eng.com
Cc: Dave Mauro
Subject: Cold Spring MGP report

Tom,

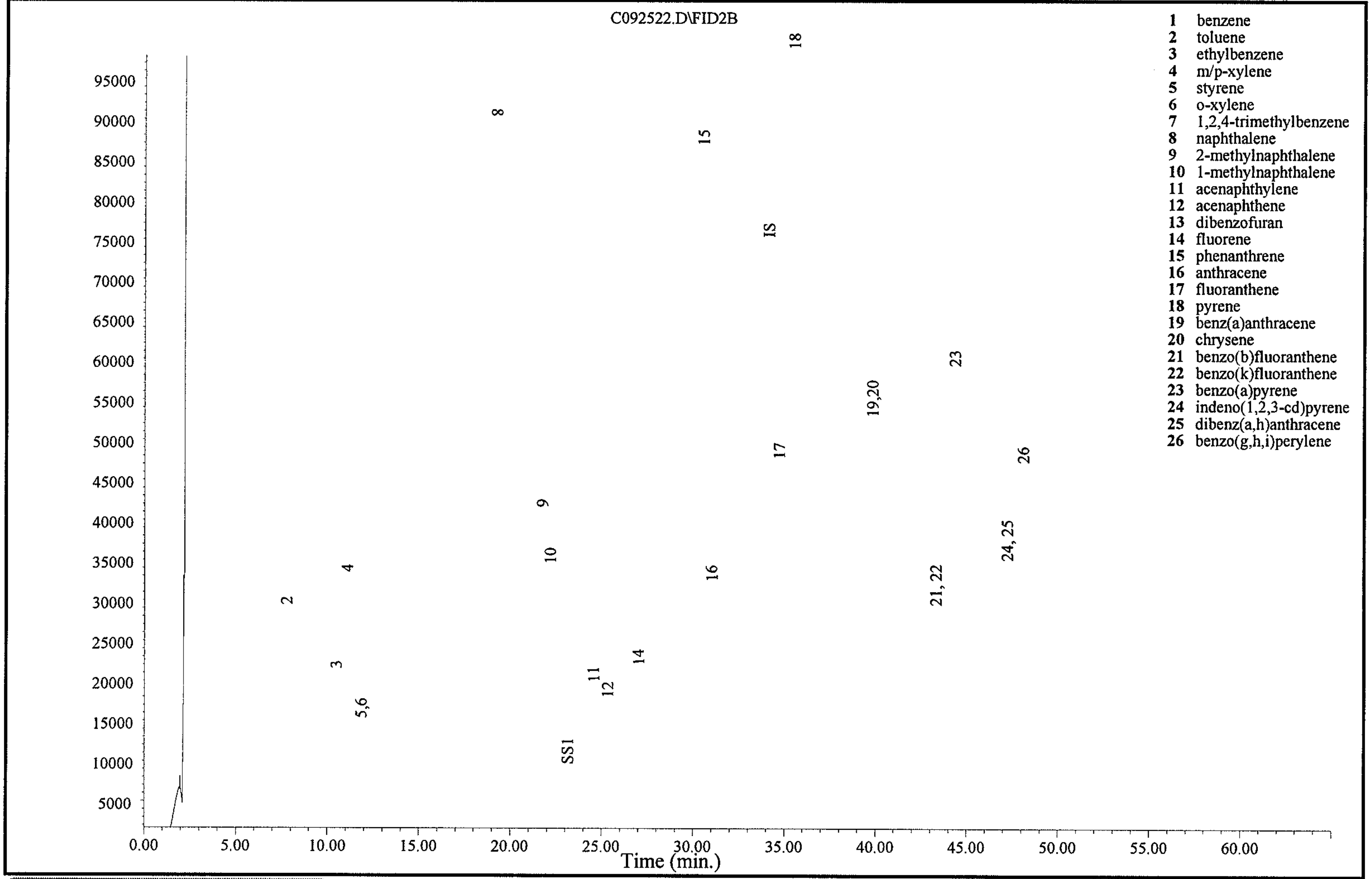
I have attached the Cold Spring MGP report for one sample received on September 20, 2008. Please let us know if you have any questions about the report, and I apologize for the delay in getting this to you.

Regards,

James

James Roush
Environmental Scientist
META Environmental, Inc.
49 Clarendon St.
Watertown, MA 02472
617-923-4662 x137
617-923-4610 - fax
www.metaenv.com

GC/FID Fingerprint



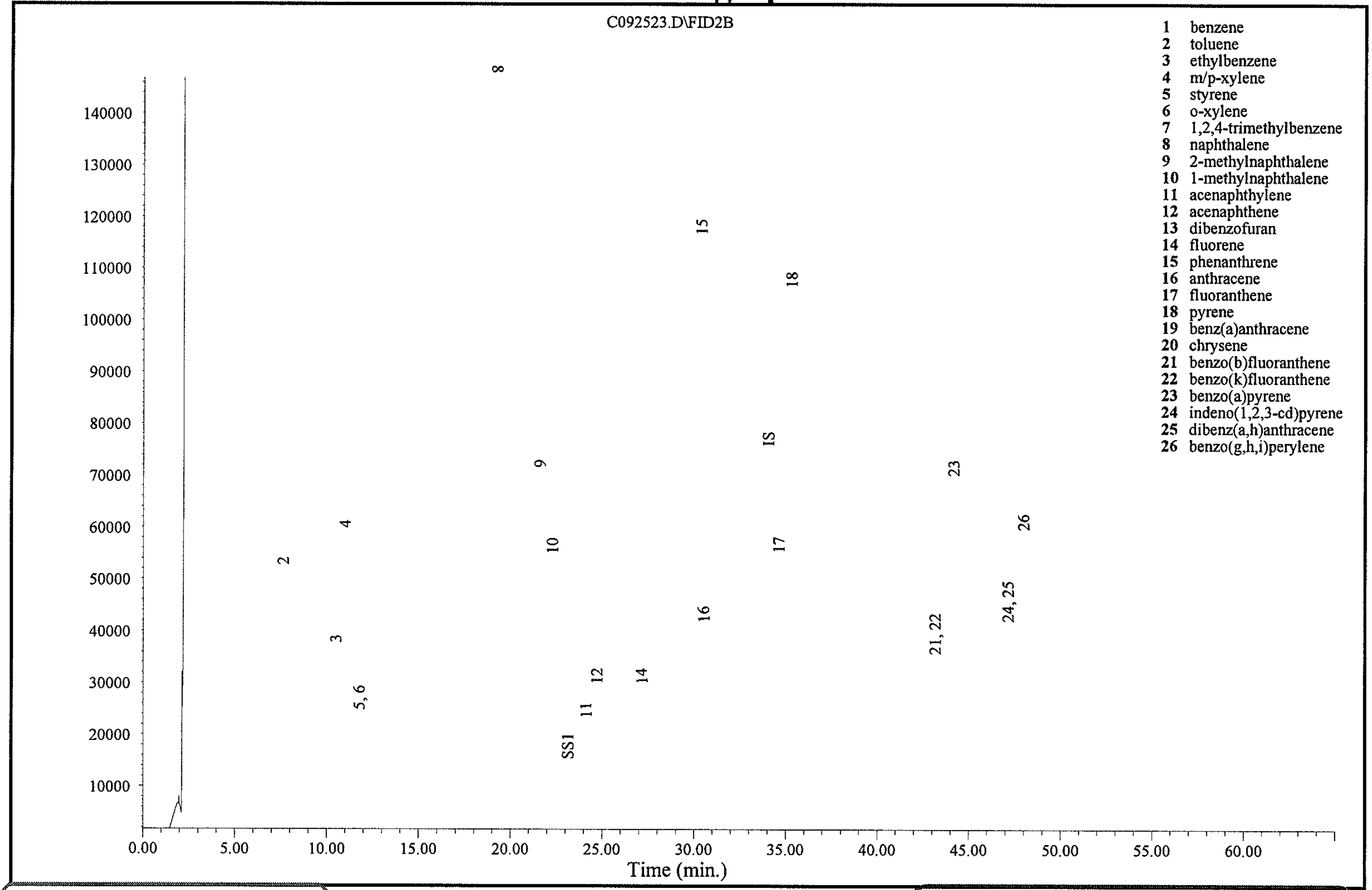
Extraction Date: 09/24/2008
Analysis Date: 09/26/2008

IS – 5a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

Field ID:	**SB-04**
Laboratory ID:	DB080920-01-D
Method:	EPA 8100M

META

GC/FID Fingerprint



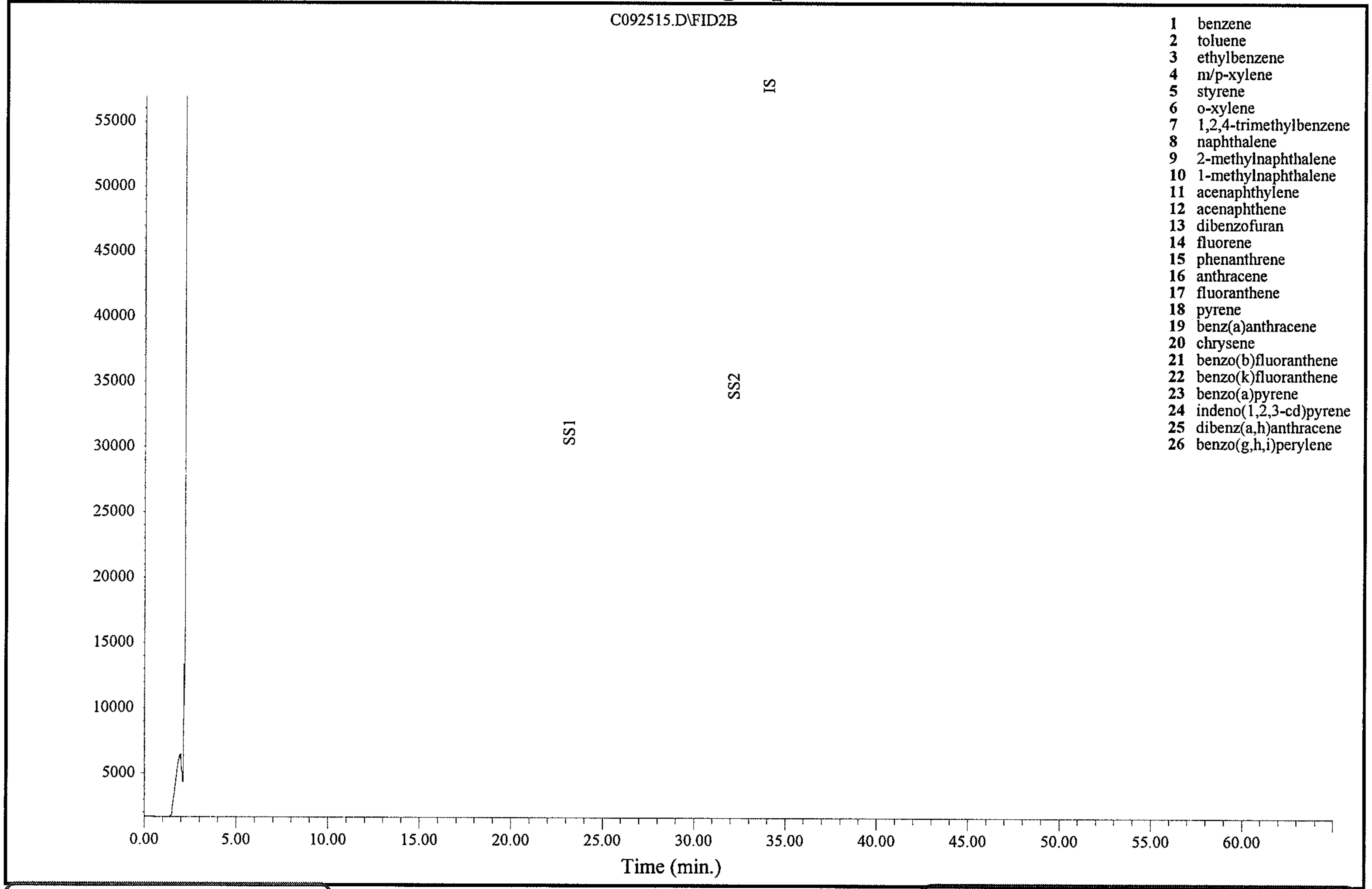
Extraction Date: 09/24/2008
Analysis Date: 09/26/2008

IS – 5a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

Field ID:	**SB-04**
Laboratory ID:	DB080920-01DUP-D
Method:	EPA 8100M

META

GC/FID Fingerprint



Extraction Date: 09/24/2008
Analysis Date: 09/26/2008

IS – 5a-androstane
SS1 – 2-fluorobiphenyl
SS2 – o-terphenyl

Field ID:	**Soil Blank**
Laboratory ID:	QC080924-SB-1
Method:	EPA 8100M

META

Appendix G

APPENDIX G

REMEDIAL ALTERNATIVE COST ESTIMATES

TABLE G-1
COLD SPRING FORMER MANUFACTURED GAS PLANT SITE
ALTERNATIVE 1 - NO ACTION WITH INSTITUTIONAL CONTROLS

COST ESTIMATE

Item	Estimated Quantity	Units	Estimated Unit Cost	Estimated Total
ANNUAL OPERATING, MONITORING AND MAINTENANCE (OM&M) COSTS				
Annual Inspections/Certifications				
Inspection	1	Mandays	$800	$800
Annual Certification	2	Mandays	$800	$1,600
Estimated Annual Costs				$2,400
Present Worth of Annual Inspections (30 yrs, i=5%)				**$40,000**
Groundwater Monitoring (Costs Per Event)				
Groundwater Sampling	2	Mandays	$500	$1,000
Purge Water Disposal	4	Drums	$200	$800
Equipment, Materials and Supplies	1	LS	$1,000	$1,000
Sample Analysis	4	Samples	$500	$2,000
Reporting	2	Mandays	$500	$1,000
Estimated Per Event Monitoring Costs				$5,800
Present Worth of Annual Groundwater Monitoring (30 yrs, i=5%)				**$120,000**
TOTAL ESTIMATED OM&M COST				**$160,000**
ALTERNATIVE 1 - TOTAL ESTIMATED COSTS				**$160,000**

TABLE G-2
COLD SPRING FORMER MANUFACTURED GAS PLANT SITE

ALTERNATIVE 2 - EXCAVATION AND OFF-SITE DISPOSAL

COST ESTIMATE

Item	Estimated Quantity	Units	Estimated Unit Cost	Estimated Total
CAPITAL COSTS				
Mobilization/Demobilization	1	LS	$150,000.00	$150,000
Site Trailer and Utilities	1	LS	$17,000.00	$17,000
Emission Controls				
Application of Foam for Vapor Suppression	1	LS	$25,000.00	$25,000
Excavation of Contaminated Soil				
Pre-characterization Sampling	9	Each	$900.00	$8,100
Sheeting/Stabilization for Excavation	12,750	SQ FT	$20.00	$255,000
Soil Excavation	13,300	CY	$20.00	$266,000
Health and Safety During Remediation	90	Days	$800.00	$72,000
Transportation and Disposal of MGP Contaminated Soil	10,100	TON	$77.00	$778,000
Transportation and Disposal of Non - MGP Contaminated Soil	13,800	TON	$44.00	$607,000
Dewatering Extraction, Storage and Disposal	600,000	Gallons	$1.00	$600,000
Endpoint Sampling	65	Each	$300.00	$19,500
Backfill				
Buy/Haul/Place General Fill	13,300	CY	$20.00	$266,000
Community Air Monitoring Program	1	LS	$145,000	$145,000
Contingency Allowance (25%)				$802,000
Engineering and Admin. Fees (25%)				$802,000
ALTERNATIVE 2 - TOTAL ESTIMATED CAPITAL COST				**$4,812,600**

TABLE G-3

COLD SPRING FORMER MANUFACTURED GAS PLANT SITE

ALTERNATIVE 3 - PARTIAL EXCAVATION, OFF-SITE DISPOSAL WITH INSTITUTIONAL CONTROLS
COST ESTIMATE

Item	Estimated Quantity	Units	Estimated Unit Cost	Estimated Total
CAPITAL COSTS				
Mobilization/Demobilization	1	LS	$40,000.00	$40,000
Site Trailer and Utilities	1	LS	$10,000.00	$10,000
Emission Controls				
Application of Foam for Vapor Suppression	1	LS	$8,000.00	$8,000
Excavation of Contaminated Soil				
Pre-characterization Sampling	2	Each	$900.00	$1,800
Sheeting/Stabilization for Excavation	5,360	SQ FT	$20.00	$107,000
Soil Excavation	2,400	CY	$20.00	$48,000
Health and Safety During Remediation	30	Days	$800.00	$24,000
Transportation and Disposal of Soil	4,200	TON	$77.00	$323,000
Dewatering Extraction, Storage and Disposal	150,000	Gallons	$1.00	$150,000
Endpoint Sampling	20	Each	$300.00	$6,000
Backfill				
Buy/Haul/Place General Fill	2,400	CY	$20.00	$48,000
Community Air Monitoring Program	1	LS	$49,000	$49,000
Contingency Allowance (25%)				$204,000
Engineering and Admin. Fees (25%)				$204,000
ALTERNATIVE 3 TOTAL ESTIMATED COSTS				**$1,222,800**

TABLE G-3

COLD SPRING FORMER MANUFACTURED GAS PLANT SITE
ALTERNATIVE 3 - PARTIAL EXCAVATION, OFF-SITE DISPOSAL WITH INSTITUTIONAL CONTROLS
COST ESTIMATE

Item	Estimated Quantity	Units	Estimated Unit Cost	Estimated Total
ANNUAL OPERATING, MONITORING AND MAINTENANCE (OM&M) COSTS				
Annual Inspections/Certifications				
Inspection	1	Mandays	$800	$800
Annual Certification	2	Mandays	$800	$1,600
Estimated Annual Costs				$2,400
Present Worth of Annual Inspections (30 yrs, i=5%)				**$40,000**
Groundwater Monitoring (Costs Per Event)				
Groundwater Sampling	2	Mandays	$500	$1,000
Purge Water Disposal	4	Drums	$200	$800
Equipment, Materials and Supplies	1	LS	$1,000	$1,000
Sample Analysis	4	Samples	$500	$2,000
Reporting	2	Mandays	$500	$1,000
Estimated Per Event Monitoring Costs				$5,800
Present Worth of Annual Groundwater Monitoring (30 yrs, i=5%)				**$120,000**
TOTAL ESTIMATED OM&M COST				**$160,000**
ALTERNATIVE 3 - TOTAL ESTIMATED COSTS				**$1,382,800**

TABLE G-4

COLD SPRING FORMER MANUFACTURED GAS PLANT SITE
ALTERNATIVE 4 - PARTIAL EXCAVATION, OFF-SITE DISPOSAL WITH IN-SITU SOLIDIFICATION AND INSTITUTIONAL CONTROLS

COST ESTIMATE

Item	Estimated Quantity	Units	Estimated Unit Cost	Estimated Total
CAPITAL COSTS				
Mobilization/Demobilization	1	LS	$50,000.00	$50,000
Site Trailer and Utilities	1	LS	$47,000.00	$47,000
Emission Controls				
Application of Foam for Vapor Suppression	1	LS	$13,000.00	$13,000
Excavation of Contaminated Soil				
Pre-characterization Sampling	2	Each	$900.00	$900
Sheeting/Stabilization for Excavation	5,360	SQ FT	$20.00	$107,000
Soil Excavation	2,400	CY	$20.00	$48,000
Health and Safety During Remediation	30	Days	$800.00	$24,000
Transportation and Disposal of Soil	4,200	TON	$77.00	$323,000
Dewatering Extraction, Storage and Disposal	150,000	Gallons	$1.00	$150,000
Endpoint Sampling	20	Each	$300.00	$6,000
Backfill				
Buy/Haul/Place General Fill	2,400	CY	$20.00	$48,000
Community Air Monitoring Program	1	LS	$97,000	$97,000
In-situ Solidification				
In-situ Solidification of area near the river	1,400	CY	$85.00	$119,000
Off-site disposal of "swell material"	420	CY	$77.00	$32,000
	Estimated Capital Cost			**$1,064,900**
Contingency and Engineering Fees				
Contingency Allowance (25%)				$266,000
Engineering and Admin. Fees (25%)				$266,000
Estimated Contingency and Engineering Fees				$532,000
TOTAL ESTIMATED CAPITAL COST				**$1,596,900**

TABLE G-4

COLD SPRING FORMER MANUFACTURED GAS PLANT SITE
ALTERNATIVE 4 - PARTIAL EXCAVATION, OFF-SITE DISPOSAL WITH IN-SITU SOLIDIFICATION AND INSTITUTIONAL CONTROLS
COST ESTIMATE (continued)

Item	Estimated Quantity	Units	Estimated Unit Cost	Estimated Total
ANNUAL OPERATING, MONITORING AND MAINTENANCE (OM&M) COSTS				
Annual Inspections/Certifications				
Inspection	1	Mandays	$800	$800
Annual Certification	2	Mandays	$800	$1,600
Estimated Annual Costs				$2,400
Present Worth of Annual Inspections (30 yrs, i=5%)				**$40,000**
Groundwater Monitoring (Costs Per Event)				
Groundwater Sampling	2	Mandays	$500	$1,000
Purge Water Disposal	4	Drums	$200	$800
Equipment, Materials and Supplies	1	LS	$1,000	$1,000
Sample Analysis	4	Samples	$500	$2,000
Reporting	2	Mandays	$500	$1,000
Estimated Per Event Monitoring Costs				$5,800
Present Worth of Annual Groundwater Monitoring (30 yrs, i=5%)				**$120,000**
TOTAL ESTIMATED OM&M COST				**$160,000**
ALTERNATIVE 4 - TOTAL ESTIMATED COSTS				**$1,756,900**

TABLE G-5

COLD SPRING FORMER MANUFACTURED GAS PLANT SITE
ALTERNATIVE 5 - IN-SITU SOLIDIFICATION
WITH INSTITUTIONAL CONTROLS
COST ESTIMATE

Item	Estimated Quantity	Units	Estimated Unit Cost	Estimated Total
CAPITAL COSTS				
Mobilization/Demobilization	1	LS	$30,000.00	$30,000
Site Trailer and Utilities	1	LS	$11,000.00	$11,000
Emission Controls				
Application of Foam for Vapor Suppression	1	LS	$9,000.00	$9,000
Excavation/Treatment of Contaminated Soil				
Soil Excavation (to below frost line)	800	CY	$20.00	$16,000
Health and Safety During Remediation	60	Days	$800.00	$48,000
Subsurface Structure Removal	200	CY	$20.00	$4,000
Transportation and Disposal of Soil	1,260	TON	$77.00	$97,000
Transportation and Disposal of Gas Underground Structures	360	TON	$77.00	$28,000
In-situ Solidification of hot-spot area	1,900	CY	$85.00	$162,000
Off-site disposal of "swell material"	570	CY	$44.00	$25,000
In-situ Solidification of area near the river	1,400	CY	$85.00	$119,000
Off-site disposal of "swell material"	420	CY	$44.00	$18,000
Documentation Sampling	1	LS	$25,000.00	$25,000
Backfill				
Buy/Haul/Place General Fill	800	CY	$20.00	$16,000
Community Air Monitoring Program	1	LS	$97,000	$97,000
Contingency Allowance (25%)				$176,000
Engineering and Admin. Fees (25%)				$176,000
ALTERNATIVE 5 TOTAL ESTIMATED COSTS				$1,057,000

TABLE G-5

COLD SPRING FORMER MANUFACTURED GAS PLANT SITE
ALTERNATIVE 5 - IN-SITU SOLIDIFICATION
WITH INSTITUTIONAL CONTROLS

COST ESTIMATE (continued)

Item	Estimated Quantity	Units	Estimated Unit Cost	Estimated Total
ANNUAL OPERATING, MONITORING AND MAINTENANCE (OM&M) COSTS				
Annual Inspections/Certifications				
Inspection	1	Mandays	$800	$800
Annual Certification	2	Mandays	$800	$1,600
Estimated Annual Costs				$2,400
Present Worth of Annual Inspections (30 yrs, i=5%)				**$40,000**
Groundwater Monitoring (Costs Per Event)				
Groundwater Sampling	2	Mandays	$500	$1,000
Purge Water Disposal	4	Drums	$200	$800
Equipment, Materials and Supplies	1	LS	$1,000	$1,000
Sample Analysis	4	Samples	$500	$2,000
Reporting	2	Mandays	$500	$1,000
Estimated Per Event Monitoring Costs				$5,800
Present Worth of Annual Groundwater Monitoring (30 yrs, i=5%)				**$120,000**
TOTAL ESTIMATED OM&M COST				**$160,000**
ALTERNATIVE 5 - TOTAL ESTIMATED COSTS				**$1,217,000**