December 18, 2012

Mr. Michael MacCabe, P.E.
Senior Environmental Engineer
Division of Environmental Remediation
NYS Department of Environmental Conservation
625 Broadway, 12th Floor
Albany, NY 12233-7016

Re: **Site Conceptual Model & Remedial Alternatives Analysis Report**
Former Mobil Station #17-EMW
304 Columbia Street
Brooklyn, New York
NYSDEC Spill No. 89-04339

Dear Mr. MacCabe:

Groundwater & Environmental Services, Inc. (GES), on behalf of ExxonMobil Environmental Services Company (EMESC), has prepared this Site Conceptual Model (SCM) and Remedial Alternative Analysis (RAA) Report is to determine the extent and location of current hydrocarbon impacts and evaluate remedial options to meet Site-specific clean-up objectives as outlined in Section 4.0 of this SCM & RAA Report. A Site Map is included as **Figure 1**.

1.0 SITE CONCEPTUAL MODEL

Site Use

Based on available information, the Site has operated as a gasoline refueling station since at least 1989, but it is assumed that operation began prior to 1989 (limited data is available regarding historical Site use at the Site prior to 1989). In July 1989, Mobil Oil Corporation conducted an upgrade of the underground storage tank (UST) system at the Site. Twelve abandoned 550-gallon steel gasoline USTs, two 4,000-gallon USTs of unknown construction, and one 550-gallon steel used oil UST were removed from the Site. Three 4,000-gallon double-walled fiberglass gasoline USTs and one 1,000-gallon double-walled fiberglass used oil UST were installed during the upgrade.

NYSDEC Spill Number 89-04339 was assigned due to the petroleum-impacted soils encountered during the 1989 UST upgrade activities. In 1997, EMESC removed the upgraded USTs installed in 1989 as well as one 4,000-gallon, abandoned, single-walled steel gasoline tank, one pump island, all associated product and vent piping, and three hydraulic lifts.

Currently, the Site operates as an auto repair facility. The parcel contains a single-story concrete block building with three service bays located in the northeast portion of the property. An above-ground storage tank containing used oil is located to the east of the on-site building. Adjacent properties include residential properties containing basements and buildings with basements housing both commercial and residential dwellings located east of the Site on the north side of Woodhull Street. Public utilities servicing the Site include subsurface sewer, water, electric,

natural gas piping, and telephone lines. A map detailing pertinent Site features is provided as **Figure 1.**

Geology

Based on a review of available boring log data, non-native sediments (i.e. fill material) extend from grade to approximately 3 feet below ground surface (bgs). The fill material in these locations consists of a mixture of coarse sand and gravels as well as construction debris consisting of concrete and bricks. Native sediments are present below these zones of fill material and appear to consist generally of a silty sand layer from below the fill to approximately 8 feet to 9 feet bgs, a sandy silt layer below the silty sand layer which extends to between 22 feet and 24 feet bgs, and a silty sand layer below the sandy silt layer to at least 28 feet bgs, the total depth of exploration. Various heterogeneous deposits of cobbles were also observed across the Site. A Cross-Section Location Map is provided as **Figure 2** and Cross-Section A-A' generalizing the Site geology along the east side of Hamilton Avenue is provided as **Figure 3**.

Hydrogeology

Between February 2005 and September 2012, the average depth to water (DTW) at the Site was approximately 9.24 feet below the top of the well casing (TOC). During that time period, the water table fluctuated with an average rise of approximately 1.52 feet (max rise of 3.45 feet above the average DTW at MW-11) and an average fall of approximately 2.99 feet (max fall of 5.11 feet below the average DTW at MW-14). Historical groundwater monitoring data is provided in **Table 1**. Hydrographs depicting DTW over time are included as **Appendix A**.

Based on the historical DTW fluctuations, the vadose (unsaturated) zone has been identified from grade to approximately 7 feet bgs. The smear zone has been identified from approximately 7 feet to 12 feet bgs, and the saturated zone has been identified as starting at approximately 12 feet bgs.

The September 2012 groundwater gauging data indicates that groundwater flow is primarily to the southwest. This is consistent with historical groundwater flow directions at the Site. A map depicting the groundwater flow direction both historically (63 measurements) and as of September 2012 is provided as **Figure 4**.

Liquid-Phase Hydrocarbon (LPH) Impact

Historically, LPH has been detected on-site at one (1) monitoring well locations and at seven (7) off-site monitoring well locations. Based on available Site information, including historic groundwater flow maps, the former UST field directly south of the on-site building appears to have been the original source of the LPH presence at the Site.

Additional information on the LPH presence at each monitoring well is included below.

On-Site Monitoring Wells:

- **MW-7A**: LPH has only been observed at monitoring well MW-7A on June 16, 2011 and August 8, 2011. The maximum LPH thickness of 0.25 feet was observed on June 16, 2011 and the minimum thickness of 0.01 feet was observed on August 8, 2011.

Off-Site Monitoring Wells:

- **MW-1**: LPH has been consistently observed at monitoring well MW-1 from February 28, 2005 through March 16, 2012. The maximum LPH thickness observed at this well was 0.40 feet on June 16, 2011 and the most recent LPH thickness observed was 0.03 feet on March 16, 2012.
- **MW-2**: LPH has been consistently observed at monitoring well MW-2 from February 28, 2005 through September 7, 2012. The maximum LPH thickness observed at this well was 1.50 feet on June 16, 2011 and the most recent LPH thickness observed was 0.04 feet on September 9, 2012.
- **MW-11**: LPH has been observed intermittently at monitoring well MW-11 from September 8, 2005 through September 24, 2009. The maximum LPH thickness ever observed at this location was 0.08 feet on July 20, 2009 and the most recent thickness observed was 0.05 feet on September 24, 2009.
- **MW-13**: LPH was consistently observed at monitoring well MW-13 from February 28, 2005 through December 11, 2007, but has not been observed since that time. The maximum LPH thickness observed at this well was 2.17 feet on February 28, 2005 and the most recent thickness observed was 0.02 feet on December 11, 2007.
- **MW-14**: LPH was intermittently observed at monitoring well MW-14 from March 20, 2006 through December 11, 2007 but has not been observed since that time. The maximum LPH thickness observed at this well was 4.75 feet on December 7, 2006 and the most recent thickness observed was 0.05 feet on December 11, 2007.
- **MW-16**: LPH was intermittently observed at monitoring well MW-16 from December 7, 2006 through August 8, 2011 but has not been observed since that time. The maximum LPH thickness observed at this well was 8.72 feet on December 7, 2006 and the most recent thickness observed was 0.03 feet on August 8, 2011.
- **MW-17**: LPH has been recently observed at monitoring well MW-17 from June 16, 2011 through March 16, 2012. The maximum LPH thickness observed at this well was 0.07 feet on March 16, 2012.

Previous remedial efforts for the removal of LPH have included an enhanced fluid recovery (EFR) pilot test in 2004. Monthly EFR events were conducted at the Site during 2005 and 2006. The amount of fluid recovered during these events is unknown.

On June 22 and 23, 2010, approximately 1,680 gallons of a diluted Enviroclean surfactant solution was injected at MW-1, MW-2, MW- 3, MW-13, and MW-16 in order to address LPH observed at the Site prior to continuation of chemical injections. On June 24, 25, and 28, 2010, approximately 710 gallons of fluids were recovered during EFR events from the five injection wells.

There does not appear to be a correlation between the presence of LPH and historic groundwater fluctuations. Hydrographs depicting the presence of LPH over time in each monitoring well are provided in **Appendix A**. A map showing the historic maximum LPH thickness at the Site is provided as **Figure 5**.

Soil Quality

Based on historical soil analytical and field screening data, no vadose zone impacts have been observed at the Site. Soil impacts are documented primarily in the smear zone from approximately 8 feet to 12 feet bgs on-site, in the sidewalk surrounding the Site along Hamilton Avenue, and west across Hamilton Avenue from the Site at monitoring well MW-10. Some saturated impacts were historically observed off-site in the eastern sidewalk of Hamilton Avenue and at monitoring well MW-18 located east of the property along Columbia Avenue. **Figure 6** presents a map of historic soil sampling information from the Site. Soil analytical data from the 2012 Site investigation is summarized in **Table 2** and historic soil analytical data is summarized in **Table 3**.

The location of the majority of soil impacts in the smear zone is due to the shallow average DTW of 9.24 feet bgs at the Site. The leaking USTs documented by Spill No. 89-04339 would likely have been buried to approximately 8 feet bgs. Because the bottom of the USTs were likely contacting the water table during periods of high water table elevations, any product from the tanks would have immediately spread out horizontally across the surface of the water table and been spread vertically across the smear zone by water table fluctuations. Any vadose impacts from the leaking USTs were removed during the UST excavation activities at the Site.

The area of known smear zone soil impacts correlates to the area of known historic LPH presence with the exception of monitoring well MW-10 across Hamilton Avenue from the Site. Horizontally, in a northwest to southeast direction, soil impacts have been documented in the sidewalk along the western property boundary from soil boring SB-103 to monitoring well MW-16, approximately 92 linear feet. In a southwest to northeast direction, soil impacts have been documented from the west across Hamilton Avenue at monitoring well MW-10 to on-site monitoring well MW-14, approximately 138 linear feet.

The available soil analytical data was collected between 2003 and most recently in July 2012. Soil borings conducted in July 2012 represent current Site conditions. However, since the collection of all other available soil data from 2003 through 2006, significant remediation efforts have been conducted at the Site including surfactant injection and in-situ chemical oxidation (ISCO) events. Surfactant injections act to mobilize LPH from the soil and suspend it in the dissolved-phase such that it can be extracted from the subsurface via groundwater/total fluids pumping. ISCO acts to destroy both saturated adsorbed-, dissolved-, and liquid-phase hydrocarbons. Therefore, while soil samples collected along Hamilton Avenue are representative of current soil conditions at the Site, soil conditions on-site and along Columbia Street have likely decreased in concentration from the historic values presented in **Figure 6** due to the remedial activities which have occurred at the Site. A Site History detailing the historical investigations and remedial activities conducted at the Site is provided as **Appendix B**.

Groundwater Quality

Groundwater constituents of concern (COCs) at the Site consist primarily of benzene, toluene, ethylbenzene, and total xylenes (BTEX). Based upon the September 2012 groundwater analytical data, the remaining dissolved-phase BTEX plume is located directly west of the property in Hamilton Avenue, extending west across Hamilton Avenue to monitoring wells MW-8A and MW-10. Methyl tertiary butyl ether (MTBE) is not a primary COC at the Site, but elevated dissolved-phase concentrations of MTBE are located west across Hamilton Avenue at monitoring wells MW-8A and MW-10.

- Current dissolved-phase BTEX concentrations range from non-detect (ND) at two (2) monitoring wells (MW-5 and MW-9) to 7,292 micrograms per liter (µg/L) at monitoring well MW-10.
    - All on-site monitoring wells (MW-5, MW-7A, and MW-12) exhibited BTEX concentrations below 200 µg/L during the September 2012 groundwater sampling event.
    - Two (2) monitoring wells (MW-11 and MW-16) bordering the property in the sidewalk of Hamilton Avenue exhibited BTEX concentrations above 1,000 µg/L during the September 2012 groundwater sampling event.
    - Two (2) monitoring wells (MW-8A and MW-10) off-site across Hamilton Avenue exhibited BTEX concentrations above 1,000 µg/L during the September 2012 groundwater sampling event.
- Current dissolved-phase MTBE concentrations range from ND at ten (10) wells (MW-1, MW-3, MW-5, MW-7A, MW-12 through MW-14, and MW-16 through MW-18) to 777 µg/L (MW-10).
    - No monitoring wells exhibited MTBE concentrations above 1,000 µg/L during the September 2012 groundwater sampling event.

A map depicting the groundwater flow direction both historically (63 measurements) and as of September 2012 and the most recent groundwater analytical results is provided as **Figure 4**. Hydrographs depicting historical dissolved-phase BTEX and MTBE concentrations over time are provided in **Appendix A**.

2.0 SOURCE AREA EVALUATION

Based on available Site data and the SCM presented in Section 1.0, it is likely that the original source of hydrocarbon impacts to the subsurface at the Site were the former USTs located south of the on-site building which were removed in 1989. The highest historical total Spill Technology and Remediation Series (STARS) VOC concentration detected in subsurface soils at the site was in the smear zone at monitoring well MW-12, directly within the former UST source area.

The remaining source of hydrocarbon impact to groundwater at the Site is the impacted smear zone and saturated soils directly to the west of the Site in the sidewalk along Hamilton Avenue. Soil impacts above CP-51 standards were also historically observed on-site and along Columbia Avenue at monitoring wells MW-12, MW-14, and MW-18 and still show residual groundwater impacts.

LPH has only been observed during the past four quarters of groundwater monitoring at the following wells along Hamilton Avenue: monitoring wells MW-1, MW-2, and MW-17. LPH was also observed at monitoring well MW-7A located on-site in the vicinity of the UST source area in both June and August of 2011; however, groundwater concentrations at this well both before and after LPH was observed are low, less than 200 µg/L total BTEX. Therefore, the former UST area in the vicinity of MW-7 and MW-12 is not considered to be a continuing source to groundwater impacts.

Due to the continued LPH presence in monitoring wells along the western property boundary in the sidewalk along Hamilton Avenue, this area is considered the remaining source to groundwater

impacts at the Site. Dissolved-phase BTEX and MTBE concentrations at the Site are generally stable or decreasing over time. GES assumes that the dissolved-phase plume concentration decreases over time are due to naturally occurring biodegradation in the subsurface and due to prior in-situ chemical oxidation (ISCO) events conducted at the Site. Prior surfactant injection activities at the Site likely affected the mobility of the LPH along Hamilton Avenue and may have increased the solubility of BTEX constituents in the LPH leading to increases in dissolved-phase concentrations directly following surfactant injection activities. Dissolved-phase BTEX and MTBE reduction tables are included as **Table 4** and **5**, respectively.

3.0 PREVIOUS SITE REMEDIATION

3.1 Previous Site Remediation

A timeline of previous remedial activities at the Site is included below:

- 1989 - Excavation:
  - During UST system upgrade activities, approximately 500 tons of petroleum-impacted soils were excavated from the Site.

- 1997 - Excavation:
  - During UST system removal activities at the Site, approximately 235.06 tons of petroleum-impacted soils were excavated.

- March 22, 2004 – High vacuum dual-phase extraction (HVDPE)/Enhanced Fluid Recovery (EFR) pilot test:
  - Monitoring well MW-2 was utilized as the test extraction well during the HVDPE/EFR pilot test and extraction activities were conducted for 3 hours and 45 minutes utilizing a vacuum truck.
  - The extraction drop tube was positioned 2 feet below the DTW due to LPH presence in the well to prevent excessive smearing.
  - The groundwater capture zone was not measurable during the test (groundwater capture zone had a radius-of-influence (ROI) smaller than 11 feet).
  - The vacuum ROI during the HVDPE/EFR test was approximately 28 feet at an applied vacuum of 114 inches of water (i.w.) resulting in a vapor flow rate of approximately 109 standard cubic feet per minute (scfm).

- January 2005 through March 2006 – EFR Events:
  - During this period, EFR events were conducted on a monthly basis to recover LPH from monitoring wells at the Site.

- June 15- 16, 2009 – ISCO Pilot Test:
  - ISCO pilot testing activities were conducted which targeted areas both on-site near the former UST area and off-site in the sidewalk along Hamilton Avenue.
    - Injection wells IP-1 through IP-12 were utilized, targeting the interval of 10 feet to 17 feet bgs.
    - A total of 1,800 gallons of 10% sodium persulfate solution and 900 gallons of chelated iron catalyst were injected during the event.
  - Following the ISCO event, LPH continued to be present at monitoring well MW-2, LPH was observed following the event at three (3) well locations, a

94 - 97% reduction in total BTEX was observed at two (2) well locations, and an 11 - 39% reduction was observed at two (2) well locations. Total BTEX concentrations increases of 30 - 81% were observed at three (3) well locations.
    - Hydrographs are presented in **Appendix A** and show the dissolved-phase BTEX and MTBE trends at Site wells. Dissolved-phase BTEX and MTBE reduction tables are included as **Table 4** and **5**, respectively.

- June 22-25, 2010 – Surfactant Injection:
    - Surfactant injection activities occurred at monitoring wells MW-1, MW-2, MW-3, MW-13, and MW-16 on June 22-23, 2010.
        - A total of approximately 1,680 gallons of diluted Enviroclean surfactant solution was injected.
    - Fluid extraction was conducted at the same injection wells on June 24-25, 2010.
        - Approximately 710 total gallons of fluids were recovered from the same wells utilized for surfactant injection.
            - During this surfactant injection, only approximately 42% of the total volume of injected fluids was recovered during fluid extraction activities. Therefore, it is likely that the surfactant injection mobilized LPH into the dissolved-phase but was not recovered during the extraction events.

- July 26-28 and August 2-4, 2010 – Surfactant Injection:
    - Surfactant injection activities occurred at monitoring wells MW-1, MW-2, MW-3, MW-13, and MW-16 on July 26 and August 2, 2012.
        - A total of approximately 1,200 gallons of diluted Enviroclean surfactant solution was injected during the two (2) events.
    - Fluid extraction was conducted at the same injection wells on July 27-28 and August 3-4, 2012.
        - Approximately 836 total gallons of fluids were recovered from the injection wells.
            - During these surfactant injections, only approximately 70% of the volume of injected fluids was recovered during fluid extraction activities. Therefore, it is likely that the surfactant injection mobilized LPH into the dissolved-phase but was not recovered during the extraction events.
    - Following all three (3) surfactant injection and recovery events from June to August 2010, LPH was no longer observed at three (3) well locations and total BTEX concentrations increased from 32 - 1,482% at nine (9) well locations.
        - Hydrographs are presented in **Appendix A** and show the dissolved-phase BTEX and MTBE trends at Site wells. Dissolved-phase BTEX and MTBE reduction tables are included as **Table 4** and **5**, respectively.

- December 6-9, 2010 – ISCO Pilot Test:
    - ISCO pilot testing activities were conducted which targeted areas both on-site near the former UST area and off-site in the sidewalk along Hamilton Avenue.
        - Injection wells IP-1 through IP-12 were utilized, targeting the interval of 10 feet to 17 feet bgs.
        - A total of 4,800 gallons of 10% sodium persulfate solution and 2,400 gallons of chelated iron catalyst were injected during the event.

The average injection flow rate of the catalyst and oxidizer were 3.94 gallons per minute (gpm) and 4.20 gpm, respectively.

- Following the ISCO event, LPH continued to be present at monitoring well MW-1, LPH was observed following the event at monitoring well MW-2, LPH was no longer present following the event at monitoring well MW-16, a 72 - 99% reduction in total BTEX was observed at seven (7) well locations and a 20% reduction was observed at one (1) well location. A significant increase in total BTEX concentration, 24%, was only observed at monitoring well MW-10.
  - Hydrographs are presented in **Appendix A** and show the dissolved-phase BTEX and MTBE trends at Site wells. Dissolved-phase BTEX and MTBE reduction tables are included as **Table 4** and **5**, respectively.

- August 15-18, 2011 – ISCO Pilot Test:
  - ISCO pilot testing activities were conducted which targeted areas both on-site near the former UST area and off-site in the sidewalk along Hamilton Avenue.
    - Injection wells IP-1 through IP-12 were utilized, targeting the interval of 10 feet to 17 feet bgs.
    - A total of 4,800 gallons of 10% sodium persulfate solution and 2,400 gallons of chelated iron catalyst were injected during the event. The average injection flow rate of the catalyst and oxidizer were 4.77 gpm and 4.45 gpm, respectively.
    - Based on monitoring during the ISCO event, the ISCO ROI was approximately 7 to 8 feet.
  - Following the ISCO event, LPH continued to be present at four (4) well locations. LPH was no longer present following the event at monitoring well MW-16 and a 37 - 96% reduction in total BTEX was observed at seven (7) well locations.
    - Hydrographs are presented in **Appendix A** and show the dissolved-phase BTEX and MTBE trends at Site wells. Dissolved-phase BTEX and MTBE reduction tables are included as **Table 4** and **5**, respectively.

3.2 Evaluation of Previous Remedial Activities

UST system removal activities at the Site in 1989 and 2004 removed any vadose zone soil impacts during over-excavation activities and likely removed some smear zone impacts directly below the USTs. Results of the 2004 EFR pilot test indicated that EFR events could remove LPH from inside a well casing and could pull air through surrounding soils, possibly remediating smear zone soils surrounding the extraction well above the static water table elevation during events. However, the EFR pilot test indicated that there was no measurable groundwater capture zone when utilizing EFR to target LPH removal (only depressing the groundwater table in the extraction well by 2 feet). Therefore, EFR events at the Site conducted utilizing a vacuum truck will not effectively address LPH in the subsurface at any significant radius from the extraction well.

ISCO via sodium persulfate and iron catalyst injection remediates hydrocarbons utilizing sulfate radicals to oxidize hydrocarbon compounds and LPH. The ISCO reaction has the potential to mobilize LPH by eliminating the bonds which attracts the LPH to soil molecules, effectively desorbing the LPH from the soil matrix, and desorb hydrocarbon constituents from soil molecules by eliminating the bonds which attract the hydrocarbons to the soil. These reactions will increase the overall dissolved-phase concentration as COCs are transferred from the liquid- and adsorbed-phase into the dissolved-phase. ISCO reactions also directly target dissolved-phase hydrocarbons

and break down these compounds into byproducts of carbon dioxide and water. Because the ISCO process does not target any form of hydrocarbon over another, during any event you may see mobilization or destruction of LPH, increases in dissolved-phase hydrocarbons, or reductions in dissolved-phase hydrocarbons based on the specific distribution of impacts in the subsurface and the application of oxidants into the subsurface.

Surfactant injection followed by total fluids extraction from the subsurface is a remediation technique focused on increasing the solubility and mobility of LPH in the subsurface such that it can be recovered from the subsurface via pumping methods. Surfactants are molecules with a hydrophilic (water loving) and a hydrophobic (water averse) end which change the interfacial tension between LPH particles and the surrounding soil or groundwater. During surfactant injection, the surfactant molecules surround LPH in the subsurface soils and groundwater, effectively eliminating the tension holding the LPH to the soil or separating the LPH from the groundwater. When surfactant is applied to the subsurface at the correct concentration and volumes for subsurface conditions, the remaining LPH will break out into small droplets completely surrounded by surfactant molecules, creating micro-emulsion droplets. These micro-emulsion droplets are mobile in the subsurface matrix and flow with groundwater, increasing the LPH available for extraction via pumping methodologies. When the surfactant surrounding these droplets disperses, the increased surface area to volume ratio increases the solubility of BTEX and other hydrocarbon compounds in the LPH droplet leading to increased dissolved-phase hydrocarbon concentrations. Therefore, if all of the surfactant is not immediately recovered following the surfactant injections, the LPH plume will likely be mobilized and disperse over a greater area. Additionallu, an increase in dissolved-phase BTEX concentrations will be observed due to the increased solubility of hydrocarbon compounds from the LPH.

Both ISCO and surfactant injections at the Site appear to have mobilized and dispersed the LPH plume. Temporary increases in dissolved-phase concentrations of total BTEX were commonly observed following the first ISCO injection and the surfactant injections conducted at the Site. Currently, during the September 2012 groundwater sampling event, LPH was only present at one (1) monitoring well, MW-2, and total BTEX concentrations between December 2008 (prior to any injections on-site) and September 2012 have decreased in six (6) well locations. Two (2) well locations, monitoring wells MW-5 and MW-9, have consistently reported ND BTEX concentrations. Three monitoring well locations (MW-3, MW-13, and MW-16) along the eastern sidewalk of have shown an increase in BTEX concentrations between December 2008 and September 2012. The main increases in dissolved-phase BTEX concentrations at the Site have been observed off-site, west across Hamilton Avenue, at monitoring wells MW-8A and MW-10. It is likely that both the ISCO injections and the surfactant injections led to these increasing concentrations at the monitoring wells across Hamilton Avenue from the Site. Similarly, the only wells which currently have elevated concentrations of dissolved-phase MTBE are off-site monitoring wells MW-8A and MW-10. Hydrographs are presented in **Appendix A** and show the dissolved-phase BTEX and MTBE trends at Site wells. Dissolved-phase BTEX and MTBE reduction tables are included as **Table 4** and **5**, respectively.

4.0 SITE CLEAN-UP OBJECTIVES

Due to low dissolved-phase concentrations at all on-site monitoring wells and at monitoring well MW-18 along Columbia Avenue, GES recommends focusing on the remediation of LPH and impacted soils along the eastern side of Hamilton Avenue which are the remaining source of hydrocarbon impacts to groundwater at the Site. Although significant dissolved-phase impacts are present on the west side of Hamilton Avenue, the location of these monitoring wells close to the Battery Tunnel sunken roadway and the presence of significant numbers of utilities in the area makes remediation at these well locations impractical. Proposed specific remedial clean-up objectives for the Site are described below.

Focusing remedial actions in the sidewalk directly west of the property, Site-specific remedial clean-up objectives include:

- Removal of LPH from the site;
- Remediation of smear zone soils to approximately 12 feet bgs in the sidewalk on the eastern side of Hamilton Avenue;
- Remediation of impacted saturated soils to approximately 15 feet bgs in certain areas of the sidewalk on the eastern side of Hamilton Avenue; and,
- Demonstration of decreasing or stable dissolved-phase COC trends (post remediation) at all Site well locations to the east of Hamilton Avenue.

5.0 REMEDIAL TECHNOLOGY SCREENING

5.1 Technology Screening Evaluation

Various remediation technologies were screened in order to determine the most appropriate methods to remediate the liquid- and adsorbed-phase hydrocarbon impacts that remain in the subsurface in the Hamilton Avenue sidewalk along the western property boundary. To identify viable remedial technologies for the Site, the following characteristics were considered:

- DTW at the site ranges from approximately 7 feet to 12 feet bgs;
- Adsorbed-phase hydrocarbon impacts targeted for remediation occur primarily from 8 feet to 15 feet bgs along Hamilton Avenue;
- Subsurface conditions at the Site are generally homogeneous and adsorbed-phase impacts are present in both a silty sand and a sandy silt lithology; and,
- LPH has historically been observed at monitoring wells MW-1, MW-2, MW-7A, MW-11, MW-13, MW-14, MW-16, and MW-17 at various times and thicknesses during the Site history. During the most recent groundwater sampling event conducted on September 7, 2012, LPH was only present in monitoring well MW-2.

Considering the above-referenced characteristics, the SCM, and the Site-specific clean-up objectives presented in Section 4.0, the following remediation technologies were evaluated to determine the most effective strategy to address remaining liquid- and adsorbed-phase impacts at the Site: soil vapor extraction (SVE), air sparge (AS), vacuum-enhanced groundwater extraction (VEGE), total-phase extraction (TPE), bioremediation, ISCO, and excavation. Results of the technology screening evaluation are presented below.

5.1.1 SVE

SVE is a commonly utilized remediation technique for the treatment of contaminated soil in the vadose zone. SVE systems utilize blowers to apply vacuum at extraction wells, allowing for the recovery of soil vapors from unsaturated soils. As air moves through contaminated soils in the vadose zone, volatile organic compounds (VOCs), including absorbed- and adsorbed-phase hydrocarbons, are transferred into the vapor stream for recovery. SVE systems also promote aerobic bioremediation due to the introduction of oxygen into subsurface soils.

Overall, SVE systems are effective for compounds that have high vapor pressures (>1 millimeter of mercury) or that are aerobically biodegradable. However, utilizing SVE without groundwater pumping or air sparging is not effective for sites with significant impact in the saturated zone, shallow groundwater, or low permeability materials within the zone of interest.

Because there are no vadose zone impacts at the Site and both smear zone and saturated soils are targeted for remediation, SVE is not a feasible technology to meet Site-specific clean-up objectives.

5.1.2 AS

During air sparging, compressed air is injected into wells that are screened below the water table. Air bubbles travel upward and outward in the aquifer, resulting in the mass transfer of adsorbed and dissolved VOCs into the vapor stream. The sparged air stream becomes VOC laden as it travels upward toward the surface. Typically, air sparge systems are used in conjunction with SVE systems, so that the sparged vapors can be recovered for treatment. Air sparging also enhances aerobic biodegradation due to increased dissolved oxygen levels that are typically observed during air sparging. Air sparging is most effective at sites with volatile contaminants and a permeable aquifer matrix.

AS combined with SVE could appropriately address the saturated and smear zone impacts along the eastern side of Hamilton Avenue. However, AS is not an appropriate technology to address LPH and may even cause further mobilization and migration of the LPH plume. Therefore, AS is not a feasible technology to meet Site-specific clean-up objectives.

5.1.3 VEGE

VEGE systems extract groundwater, LPH, and soil vapors from the subsurface. This is accomplished by installing a submersible groundwater recovery pump (electric or pneumatic) in a recovery well. The recovery pump extracts groundwater and LPH at a desired flow rate, creating a groundwater cone of depression in the vicinity of the recovery well. An SVE system removes soil vapors from unsaturated soils, pulling air through the VOC-impacted soil and enhancing natural biological activity (bioremediation) by drawing atmospheric oxygen through the subsurface soils. The vacuum produced by an SVE system also increases the amount of liquid (groundwater and LPH) that travels into the recovery well due to the pressure gradient toward the recovery well. For sites with hydrocarbon impact in saturated soils, a VEGE system would expose the hydrocarbon-affected soils via groundwater pumping, allowing the SVE system to remediate the previously saturated impacted area.

VEGE technology would appropriately address remaining hydrocarbons at the Site. Dewatering the adsorbed-phase hydrocarbon impacts via groundwater extraction would allow for remediation

of adsorbed-phase mass via SVE and pumping of the LPH should act to minimize the LPH plume at the Site.

5.1.4 TPE

TPE systems use recovery wells to recover groundwater, soil vapors, and LPH through a single extraction drop tube installed within a recovery well. The drop tube is installed at each TPE recovery well to a pre-determined depth below the water table. The drop tube is connected to a high-vacuum blower through a subsurface piping network. The high-vacuum blower produces a vacuum up to 28 inches of mercury (inches of Hg) on each TPE well. The high vacuum which is created at the bottom of the drop tube removes groundwater, LPH, and soil vapors from each TPE well. The vapor that is drawn through the soil profile removes VOCs from the unsaturated soil pore spaces while drawing in clean air from non-impacted areas. This process volatilizes VOCs from the impacted soil and increases the amount of oxygen within the subsurface. TPE enhances the recovery of groundwater due to the high vacuum that increases the pressure gradient towards the TPE well.

TPE, like VEGE, would allow for the remediation of adsorbed VOCs from below the static water table via the simultaneous recovery of groundwater and soil vapors. TPE, when appropriately designed and applied, can also provide hydraulic control of the dissolved-phase plume. The main differences between VEGE and TPE systems is that VEGE systems have more capacity to process higher vapor and groundwater recovery rates and that TPE systems may be better suited for low-permeable, high-vacuum conditions. TPE systems may also be limited or ineffective at sites with deep groundwater or high groundwater yield conditions. Such conditions would require significant energy to extract fluids and may not effectively draw soil vapors from the zone of interest.

TPE would allow for remediation of liquid-, adsorbed-, and dissolved-phase hydrocarbons at the Site. The shallow DTW (approximately 9.24 feet bgs) and the lower permeability sandy silt lithology should allow TPE to be effectively implemented to meet Site-specific clean-up objectives.

5.1.5 Bioremediation and Monitored Natural Attenuation (MNA)

Biodegradation is a process in which naturally occurring microorganisms are utilized to metabolize hydrocarbons, transforming them into by-products of carbon dioxide and water. Natural biodegradation processes can be enhanced through the addition of oxygen, hydrocarbon degrading bacteria, and/or nutrients. Oxygen addition is achieved by injecting air into the aquifer at low flow rates. The air disperses through the water column increasing the total dissolved oxygen and facilitating aerobic biodegradation. The air injection rate is determined by the oxygen utilization factor. The utilization factor, which is based on stoichiometry, provides a ratio to compare the mass of oxygen consumed to the mass of dissolved hydrocarbon that is used in the biodegradation reactions. For benzene, the utilization factor is 3:1, that is, one gram of benzene requires three grams of oxygen for degradation.

Hydrocarbon degrading bacteria and/or nutrients can also be added to the aquifer by injecting a known solution of nutrients, bacteria, and water into existing monitoring wells at a controlled flow rate. As the solution is injected, it disperses through the aquifer, facilitating bacteria colony growth and enhancing natural hydrocarbon degradation. MNA is the process of monitoring

attenuation of dissolved-phase hydrocarbons via naturally occurring biodegradation processes in the subsurface.

Bioremediation via bacteria and nutrient injection and MNA are not currently appropriate technologies for the Site due to the presence of LPH which is not readily mitigated by these technologies. However, MNA may be an appropriate step in the regulatory closure process to monitor the dissolved-phase plume following active remediation.

5.1.6 ISCO

ISCO utilizes the injection of chemical additives to the subsurface either through direct-push injection or injection via permanent injection wells to oxidize hydrocarbons in the soil and groundwater. A variety of chemicals can be effective in an ISCO process and the appropriate chemicals are determined based on the COCs present at the site.

For sites where COCs are limited to BTEX, MTBE, and other petroleum derivatives, appropriate chemicals for oxidizing these COCs include hydrogen peroxide, ozone, and sodium persulfate. ISCO via hydrogen peroxide or sodium persulfate injection typically uses an injection pump to dispense a known volume and concentration of oxidant into the subsurface through injection points. Hydrogen peroxide will react with iron (naturally occurring or injected as ferrous sulfate) to form hydroxyl radicals:

$$H_2O_2 + C \rightarrow \ \cdot OH + OH^- + C^+$$

[C = Iron or Metal Catalyst; ・SUP> OH = Hydroxyl Radicals]

Ozone can be generated and injected to react with hydrogen peroxide to form additional hydroxyl radicals as well as direct oxidation via ozone, enhancing the advanced oxidation process:

$$2\ O_3 + H_2O_2 \rightarrow 2\ (\cdot OH) + 3\ O_2$$

Sodium persulfate can be dissolved into a solution and injected into the subsurface. However, sodium persulfate must be activated by either hydrogen peroxide to form both persulfate and hydroxyl radicals, or by iron to form sulfate radicals:

$$S_2O_8^{2-} + H_2O_2 \ \rightarrow 2\ (\cdot SO_4^-) + 2\ (\cdot OH)$$
$$S_2O_8^{2-} + Fe^{2+} \rightarrow \cdot SO_4^- + Fe^{3+} + SO_4^{2-}$$

The advanced oxidation process breaks down petroleum hydrocarbons in the groundwater and soil into end-products of carbon dioxide and water. Oxidant injection is viable even at sites with moderate to high levels of hydrocarbon impact in the groundwater and soil. Low pressure air injection can be utilized in conjunction with oxidant addition to aid in dispersing the oxidants and increasing the ROI at each injection point. This advanced oxidation process has also been proven to promote significant bioremediation, as an additional and secondary remediation technique, outside of the injection area due to significant increases in dissolved oxygen which typically occur (via oxygen/air injection).

ISCO is a potentially viable technology to address LPH and the adsorbed-phase impacts targeted for remediation at the Site. However, the relatively shallow DTW (approximately 9.24 feet bgs) at the Site and the remaining source area location in the sidewalk of Hamilton Avenue makes

ISCO an infeasible remedial option for continued implementation. During the private utility markout for the 2012 soil boring investigation, GES determined that a gas main buried approximately 6 feet bgs runs down Hamilton Avenue and runs along the sidewalk directly to the south of the Site, approximately 15 feet from injection points IP-8 through IP-11. The ISCO process can elevate the local water table (increasing the potential for oxidant to come in contact with utilities) and the oxidants utilized can negatively affect utilities by breaking down the utility piping/conduit, allowing the oxidant to directly interact with the utility. In this case, GES has determined that the health and safety hazards associated with the potential interaction between oxidants injected in the sidewalk along Hamilton Avenue and the gas main (i.e. a gas leak into the subsurface or an explosion) are too great to continue utilizing ISCO as a remedial approach in this area. Therefore, ISCO can no longer be utilized to meet Site-specific clean-up objectives.

5.1.7 Excavation

Excavation of hydrocarbon impacted soils is a common technique utilized for adsorbed-phase hydrocarbon remediation. Excavation provides for the immediate removal of adsorbed-phase hydrocarbons from the subsurface and has a short remediation lifecycle compared to other in-situ/ex-situ remedial treatment technologies. Implementation of excavation may be affected by numerous site factors including: subsurface and above-grade infrastructure, depth and location of adsorbed-phase hydrocarbon impact, soil conditions, and depth of the water table. Issues related to one or any combination of these factors may require advanced engineering controls (such as geotechnical evaluation of soils or shoring) or utilization of a combination of remedial technologies (possible ex-situ treatment of water evacuated from the excavation) which increase total remedial costs. These factors can also potentially prevent physical excavation in the adsorbed-phase source area rendering this technology infeasible.

Hydrocarbon impacted soils removed during excavation activities must either be transported off-site for disposal or treated via an ex-situ process prior to reuse or recycling. Excavation may not be an appropriate technology for use at sites with extensive areas of adsorbed-phase impacts due to soil disposal/ex-situ treatment costs, or at sites with extensive dissolved-phase hydrocarbon plumes because excavation does not address dissolved-phase hydrocarbon impacts.

Excavation of hydrocarbon impacted soils along Hamilton Avenue is a potentially viable technology to meet Site-specific clean-up goals. Excavation of the remaining LPH-impacted soils and adsorbed-phase impacts would immediately remove the remaining source to groundwater impacts at the Site. The area to be remediated is well defined and excavation would provide for a short remedial lifecycle.

5.2 Remediation Technology Assessment

The results of the technology screening evaluation for the Site indicate that VEGE, TPE, and excavation are potentially viable technologies for the remediation of remaining liquid- and adsorbed-phase hydrocarbon impacts in the eastern sidewalk of Hamilton Avenue. The adsorbed-phase impact areas which must be addressed occur from approximately 7 feet to 12 feet bgs and exist at greater depth ranges from approximately 12 feet to 15 feet bgs in select areas of the targeted remediation zone. These impacts must be targeted for treatment by the chosen remedial technology.

5.2.1 VEGE and TPE Technology Considerations

For VEGE or TPE to be utilized at the Site, the water table must be dewatered to approximately 15 feet bgs so that the adsorbed-phase impacts can be remediated via SVE. The primary difference between VEGE and TPE is the required groundwater extraction flow rate and the depths at which each technology can be implemented. TPE is generally only effective at sites with a DTW no greater than 20 feet and is more suited to low fluid extraction flow rates. VEGE is not limited by the DTW and can process high groundwater flow rates.

The Site is assumed to have a low groundwater extraction yield as evidenced by the 2004 EFR pilot test and the low volumes of liquid extracted following surfactant injections at the Site. Therefore, TPE appears to be more suitable than VEGE as a total fluids (vapor, LPH, and groundwater) extraction option for the Site. Implementation of TPE at the Site would require additional feasibility testing to determine the groundwater capture zone ROI required to depress the water table across the entire remaining source area to approximately 15 feet bgs. Feasibility testing would be followed by system design, system equipment purchase, possibly additional extraction well installation, and trenching to connect the recovery wells to the system equipment.

Implementation of TPE at the Site could potentially be hindered by negotiating access issues with the current property owner. A significant amount of space would be required on the property at the Site to house the treatment equipment, and trenching would need to be completed on the property to connect the remediation wells to the system, severely impacting the operations of the current on-site business. Implementation of TPE as a remedial approach for the Site would also have a remediation lifecycle of at least 5 years inclusive of pilot testing, system design, system installation, and system operation.

5.2.2 Excavation Considerations

Excavation at the Site would remove remaining LPH-impacted soils and smear zone soils in the remaining source area. Excavation acts as an immediate mitigation of the source by entirely removing it from the subsurface. The location of the remaining source area within the smear zone and partially in the saturated zone will require dewatering of the area prior to mechanical digging so that soils can effectively be removed from the excavation. The shallow lithology at the Site consisting of fill and silty sand is loose and excavation activities will be required to be completed inside of trench boxes so that the excavation does not collapse. The utility presence passing perpendicularly through the sidewalk in several areas will also require planning the excavation to avoid impacting these utilities.

Due to the utility presence across the remaining source area, some hydrocarbon-impacted soils, directly beneath the utilities, will be left in place following excavation. However, the total volume of soils in the source area which can not be excavated is small compared to the volume of impacted soils which will be removed during excavation. Therefore, the hydrocarbons remaining in the soils which will be left in place are not significant enough to continue to impact groundwater concentrations at the Site.

5.2.3 Technology Assessment Conclusions

TPE and excavation would both potentially remediate the remaining hydrocarbon impacts in the source area. The lifecycle of remediation with TPE and excavation are approximately 5 years and 1 year, respectively. Due to the shortened lifecycle of remediation and the physical removal of the source area, GES suggests implementing excavation as the remedial approach for the Site.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Remedial Approach

On-site soil impacts have previously been remediated at the Site via ISCO events. These remedial efforts have led to a lack of LPH presence in on-site wells since 2009 and reductions in dissolved-phase concentrations to below 1,000 µg/L total BTEX at on-site wells.

Therefore, the area which remains as a contributing source to groundwater impact at the Site is primarily the sidewalk along Hamilton Avenue, from approximately monitoring well MW-17, the northern most point in which historically contained LPH, to soil boring SB-107. GES recommends focusing remedial efforts on the removal of remaining LPH and impacted soils from approximately 7 feet to 12 feet bgs in this area. Excavation of these remaining source area soils will remove the primary source of hydrocarbon impacts to groundwater at the Site and the remaining dissolved-phase hydrocarbon plume should decrease in size and concentration over time due to natural attenuation processes. LPH was historically also observed south of soil boring SB-107 at monitoring well MW-16; however, due to the location of monitoring well MW-16 at the corner of the block and close to utilities, it is not feasible to excavate soils in this area.

Excavation activities in the remaining source area shall occur entirely in the sidewalk along the western property boundary. Due to significant utility presence in the sidewalk and the shallow DTW (approximately 9 feet bgs) at the Site, excavation will likely be conducted utilizing trench boxes to support the sides of the excavation. Dewatering activities are also anticipated to occur during the excavation activities and will likely be conducted utilizing a vacuum extraction truck. Dewatering will aid in excavation activities and will remove impacted groundwater from the dissolved-phase plume at the Site. All impacted soils which are removed during excavation activities will be transported off-site for disposal.

6.2 Remediation Implementation Schedule

A proposed schedule for implementation of the recommended remedial approach for the Site is included below.

Action/Task	Proposed Completion Date	Comments
Remedial Action Work Plan Submittal	Within 45 days of approval of this RAA	Submit a Remedial Action Work Plan to the NYSDEC describing excavation activities.
Execution of Proposed Remediation	Within 180 days of NYSDEC approval of the RAWP	Conduct proposed excavation activities.
Re-installation of Monitoring Wells	Within 30 days of Excavation	Install two (2) monitoring wells within the excavated area for plume monitoring.
Post-Remediation Groundwater Sampling	Within 60 days of Excavation	Conduct post-remediation groundwater sampling.
Remedial Action Completion Report	Within 120 days of Excavation	A Remedial Action Completion Report will be submitted summarizing the excavation and well installation activities, evaluate groundwater concentration trends, and propose next project steps.

If you have any questions or comments regarding the above, please contact Jessica Ferngren or Genevieve Kopil at (800) 360-9405, extensions 4333 and 4302, respectively.

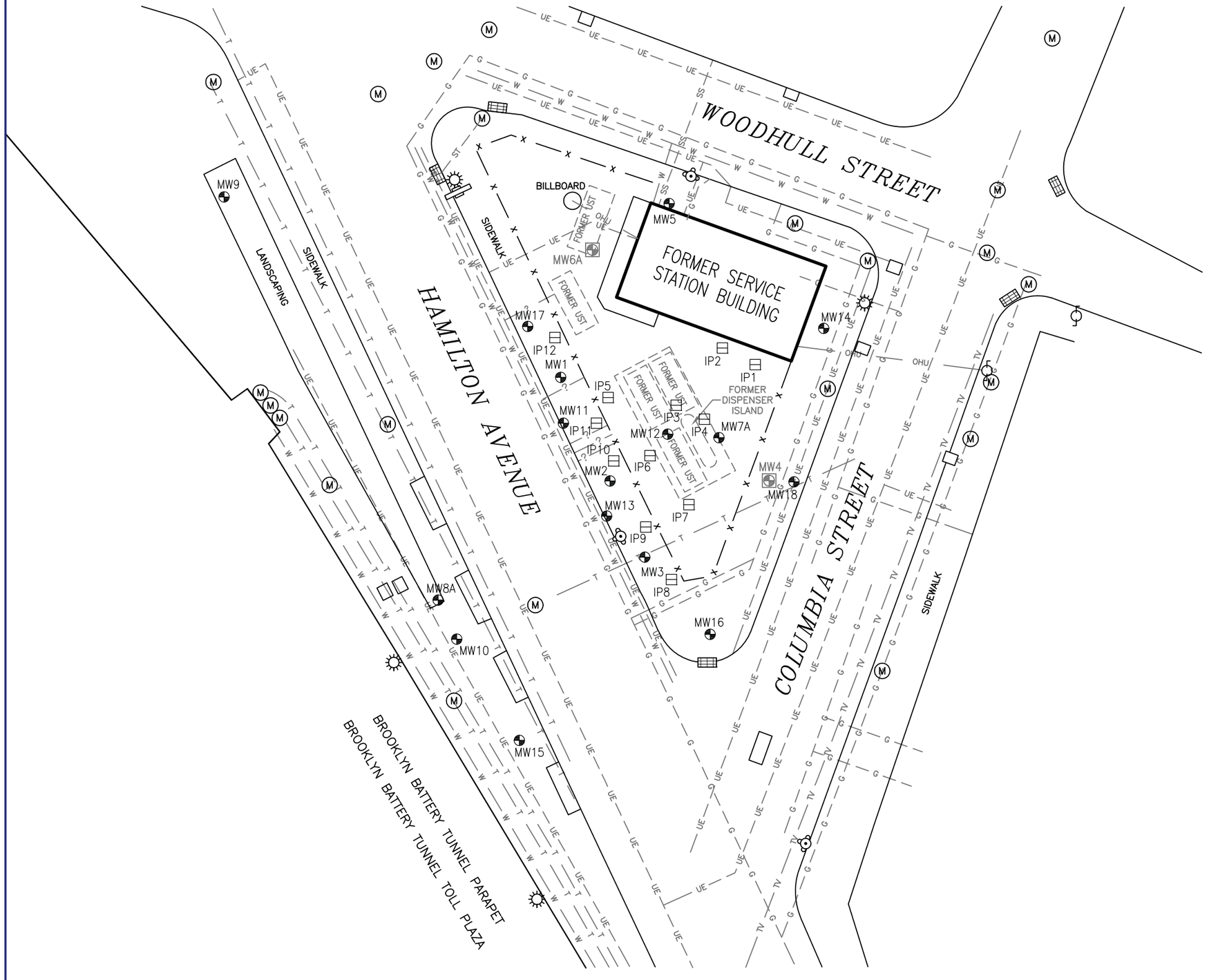
Respectfully Submitted,
Groundwater & Environmental Services, Inc.

Genevieve F. Kopil, P.E.
Staff Engineer

Jessica Ferngren
Senior Project Manager

Enclosures
cc: Laurie McCarthy, EMESC

FIGURES



LEGEND

- FENCE
- CATCH BASIN
- UTILITY MANHOLE
- UTILITY POLE
- LIGHT POLE
- FIRE HYDRANT
- MONITORING WELL
- ABANDONED/DESTROYED MONITORING WELL
- INJECTION POINT
- UNDERGROUND SANITARY SEWER LINE
- UNDERGROUND TELEVISION LINE
- UNDERGROUND TELEPHONE LINE
- UNDERGROUND ELECTRIC LINE
- UNDERGROUND WATER LINE
- UNDERGROUND GAS LINE

DRAFTED BY: W.G.S. (N.J.)	SITE MAP
CHECKED BY:	MOBIL SERVICE STATION 17-EMW 304 COLUMBIA STREET BROOKLYN, NEW YORK
REVIEWED BY:	Groundwater & Environmental Services, Inc. 70 JON BARRETT ROAD, SUITE B, PATTERSON, NY 12563
NORTH	SCALE IN FEET: 0 APPROXIMATE 30 / DATE: 8-7-12 / FIGURE: 1

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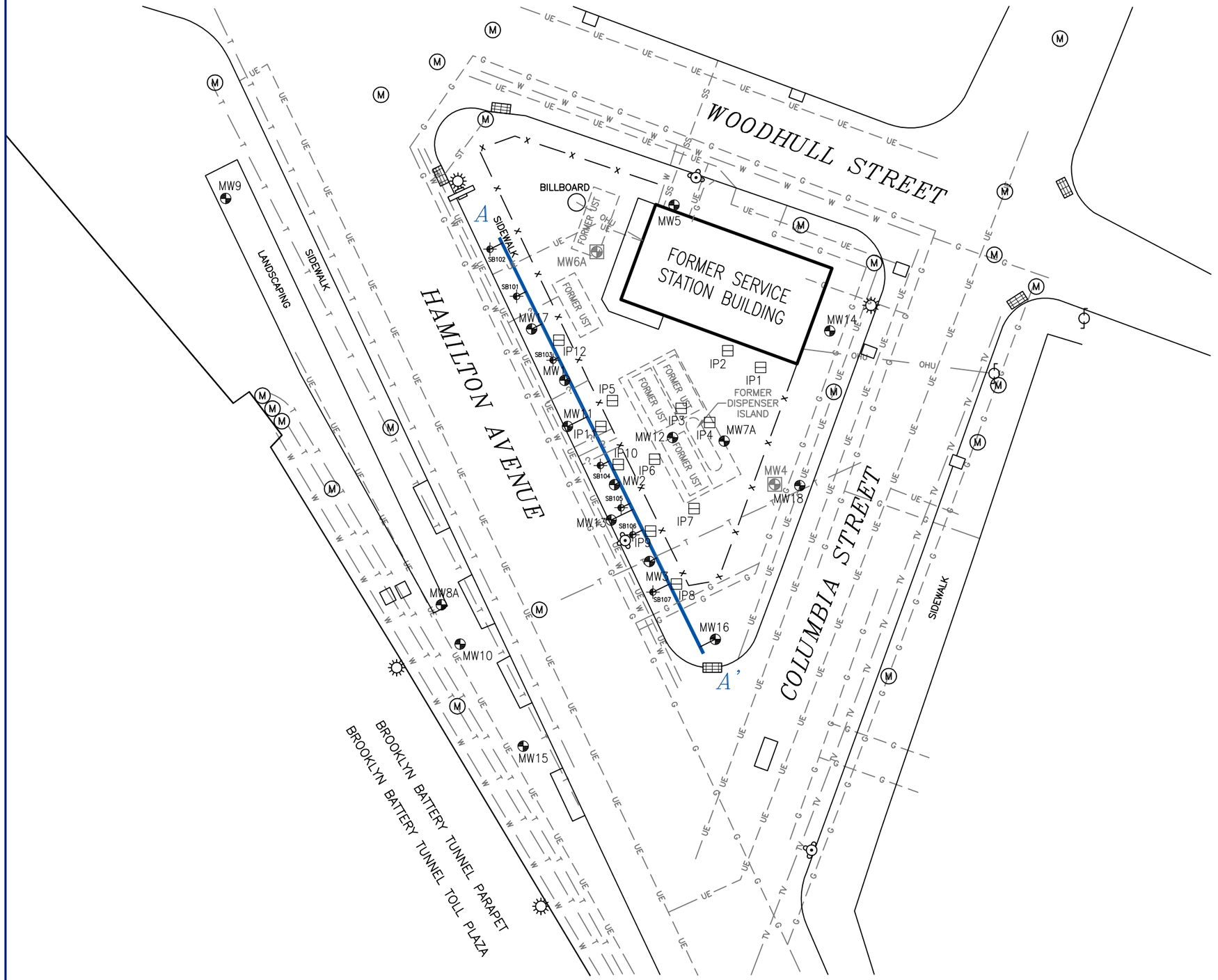

LEGEND

- FENCE
- CATCH BASIN
- UTILITY MANHOLE
- UTILITY POLE
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- ABANDONED/DESTROYED MONITORING WELL
- INJECTION POINT
- UNDERGROUND SANITARY SEWER LINE
- UNDERGROUND TELEVISION LINE
- UNDERGROUND TELEPHONE LINE
- UNDERGROUND ELECTRIC LINE
- UNDERGROUND WATER LINE
- UNDERGROUND GAS LINE
- SOIL BORING

DRAFTED BY: W.G.S. (N.J.)	CROSS SECTION LOCATION MAP
CHECKED BY:	MOBIL SERVICE STATION 17-EMW 304 COLUMBIA STREET BROOKLYN, NEW YORK
REVIEWED BY:	
NORTH	Groundwater & Environmental Services, Inc. 89 CABOT COURT, SUITE A, HAUPPAUGE, NEW YORK 11788
SCALE IN FEET: 0 APPROXIMATE 30	DATE: 9-26-12 / FIGURE: 2

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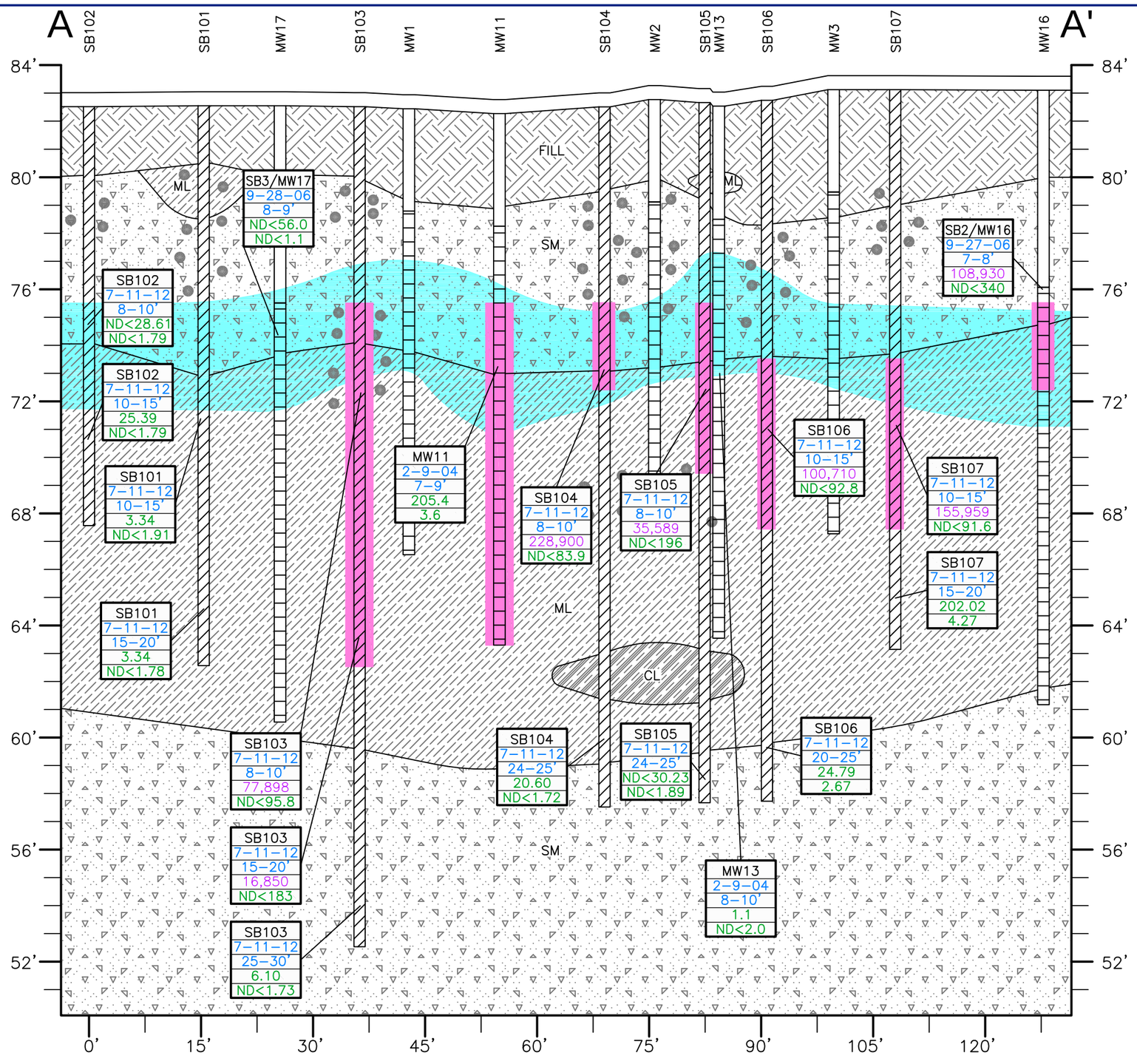

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LEGEND

RISER

SCREENED INTERVAL

SOIL BORING

MW13	SAMPLE IDENTIFICATION
3-5-07	SAMPLE DATE
65-70	SAMPLE DEPTH (feet)
21.1	TOTAL STARS LISTED VOCs (ug/kg)
337	MTBE CONCENTRATION (ug/kg)
ug/kg	MICROGRAMS PER KILOGRAM
MTBE	METHYL *tert* –BUTYL ETHER
VOCs	VOLATILE ORGANIC COMPOUNDS
ND<#	WHERE AN ANALYTE IS NOT DETECTED, A METHOD DETECTION LIMIT IS GIVEN
NYSDEC	NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
FILL	FILL MATERIAL
SM	SILTY SAND
ML	SANDY SILT
CL	CLAY
	ROCK FRAGMENTS, BOULDERS, LARGE GRAVEL
	WATER TABLE FLUCTUATION BASED ON HISTORICAL GW DATA
	APPROXIMATE EXTENT OF PETROLEUM IMPACTED SOIL ABOVE 500ppm

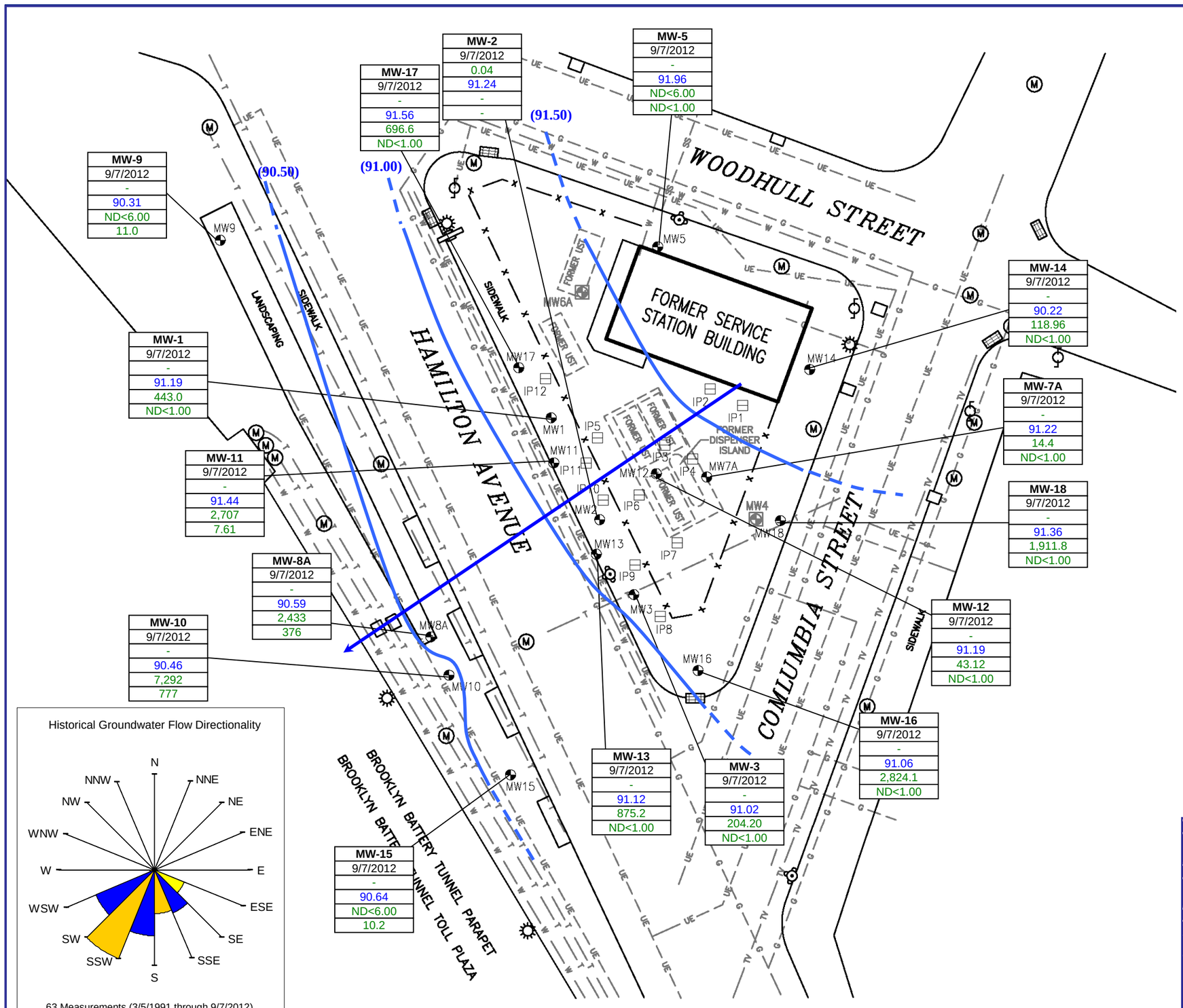
NOTES:

FOR MONITORING WELLS MW1, MW2, AND MW3 NO BORING LOGS WERE AVAILABLE AND THE MEASURED DEPTH TO BOTTOM WAS USED TO PLOT WELLS.

PURPLE TEXT IN SOIL DATA BOXES INDICATES ONE OR MORE COMPOUNDS WERE DETECTED ABOVE THE NYSDEC CP-51 SOIL CLEANUP GUIDANCE.

DRAFTED BY: W.G.S. (N.J.)	CROSS-SECTION A-A'
CHECKED BY:	MOBIL SERVICE STATION 17-EMW 304 COLUMBIA STREET BROOKLYN, NEW YORK
REVIEWED BY:	Groundwater & Environmental Services, Inc. 89 CABOT COURT, SUITE A, HAUPPAUGE, NEW YORK 11788

SCALE IN FEET	DATE	FIGURE
HORIZONTAL 1" = 15' VERTICAL 1" = 4'	9-26-12	3



LEGEND

- FENCE
- CATCH BASIN
- UTILITY MANHOLE
- UTILITY POLE
- LIGHT POLE
- FIRE HYDRANT
- MONITORING WELL
- ABANDONED/DESTROYED MONITORING WELL
- INJECTION POINT
- SS — UNDERGROUND SANITARY SEWER LINE
- TV — UNDERGROUND TELEVISION LINE
- T — UNDERGROUND TELEPHONE LINE
- UE — UNDERGROUND ELECTRIC LINE
- W — UNDERGROUND WATER LINE
- G — UNDERGROUND GAS LINE

MW-1	WELL IDENTIFICATION
12/5/2011	SAMPLE DATE
91.76	GROUNDWATER ELEVATION (feet)
0.12	LPH THICKNESS
NS	TOTAL BTEX CONCENTRATION (µg/L)
NS	MTBE CONCENTRATION (µg/L)

LPH	LIQUID PHASE HYDROCARBONS
µg/L	MICROGRAMS PER LITER
BTEX	BENZENE, TOLUENE, ETHYLBENZENE AND TOTAL XYLENES
MTBE	METHYL *tert-* BUTYL ETHER
ND <#	WHERE AN ANALYTE IS NOT DETECTED. A METHOD DETECTION LIMIT IS GIVEN.
NS	NOT SAMPLED
ND	LPH NOT PRESENT
(91.00)	GROUNDWATER ELEVATION
	GROUNDWATER CONTOUR LINE (ft)
	INFERRED GROUNDWATER CONTOUR
	GROUNDWATER FLOW DIRECTION

NOTES: GROUNDWATER ELEVATIONS FOR WELLS WITH PRODUCT ARE ADJUSTED USING A SPECIFIC GRAVITY OF 0.75. MONITORING WELLS MW-10 AND MW-14 WERE NOT USED TO DETERMINE FLOW DIRECTION.

Historical Groundwater Flow Directionality

63 Measurements (3/5/1991 through 9/7/2012)

DRAFTED BY: MW (NY-E)

CHECKED BY: JF (NY-E)

REVIEWED BY:

NORTH

GROUNDWATER MONITORING MAP
September 7, 2012

Former Mobil Service Station 17-EMW (17-EMW)
304 Columbia Street
Brooklyn, New York

Groundwater & Environmental Services, Inc.
89 CABOT COURT, SUITE A, HAUPPAUGE, NEW YORK 11788

SCALE IN FEET	DATE	FIGURE
0 30	**9-26-2012**	**4**

LEGEND

- FENCE
- CHAIN LINK FENCE
- FORMER 1,000 GALLON FUEL OIL UST
- FORMER 1,000 GALLON WASTE OIL UST
- APPROXIMATE LOCATION OF (12) 550 GALLON USTs & OVER EXCAVATION LIMITS
- 1,000 GALLON UST (INSTALLED 1986)
- TREE
- LIGHT POLE
- MONITORING WELL
- SOIL VAPOR EXTRACTION WELL
- UNDERGROUND SANITARY SEWER LINE
- UNDERGROUND TELEPHONE LINE
- UNDERGROUND ELECTRIC LINE
- UNDERGROUND WATER LINE
- UNDERGROUND GAS LINE
- UNDERGROUND REMEDIATION PIPING

MW-14	WELL IDENTIFICATION
4.75	MAXIMUM LPH THICKNESS (feet)
12/7/2006	DATE MAXIMUM LPH DETECTED (feet)
6/8/2012	LAST GAUGING DATE
-	LPH THICKNESS DETECTED ON 6/8/2012 (feet)
-	DEPTH TO LPH (feet below top of well casing)

LPH	LIQUID PHASE HYDROCARBONS
-	NO LPH DETECTED
NSD	NO SURVEY DATA
NS	NOT SAMPLED

Historical LPH Thickness (feet)

- >0.01
- >0.10
- >1.00
- >5.00

Notes:

- A well ID shaded RED indicates that it is connected to the existing multiphase extraction (MPE) system.
- SHEEN indicates that LPH was detected; however, there was no measurable amount (less than 0.01feet).
- LPH has never been observed in wells without data boxes.

DRAFTED BY: M.J.W (NY-E)

CHECKED BY: J.F (NY-E)

REVIEWED BY: H.E.C (NY-E))

NORTH

HISTORICAL MAXIMUM LPH THICKNESS & CURRENT LPH THICKNESS

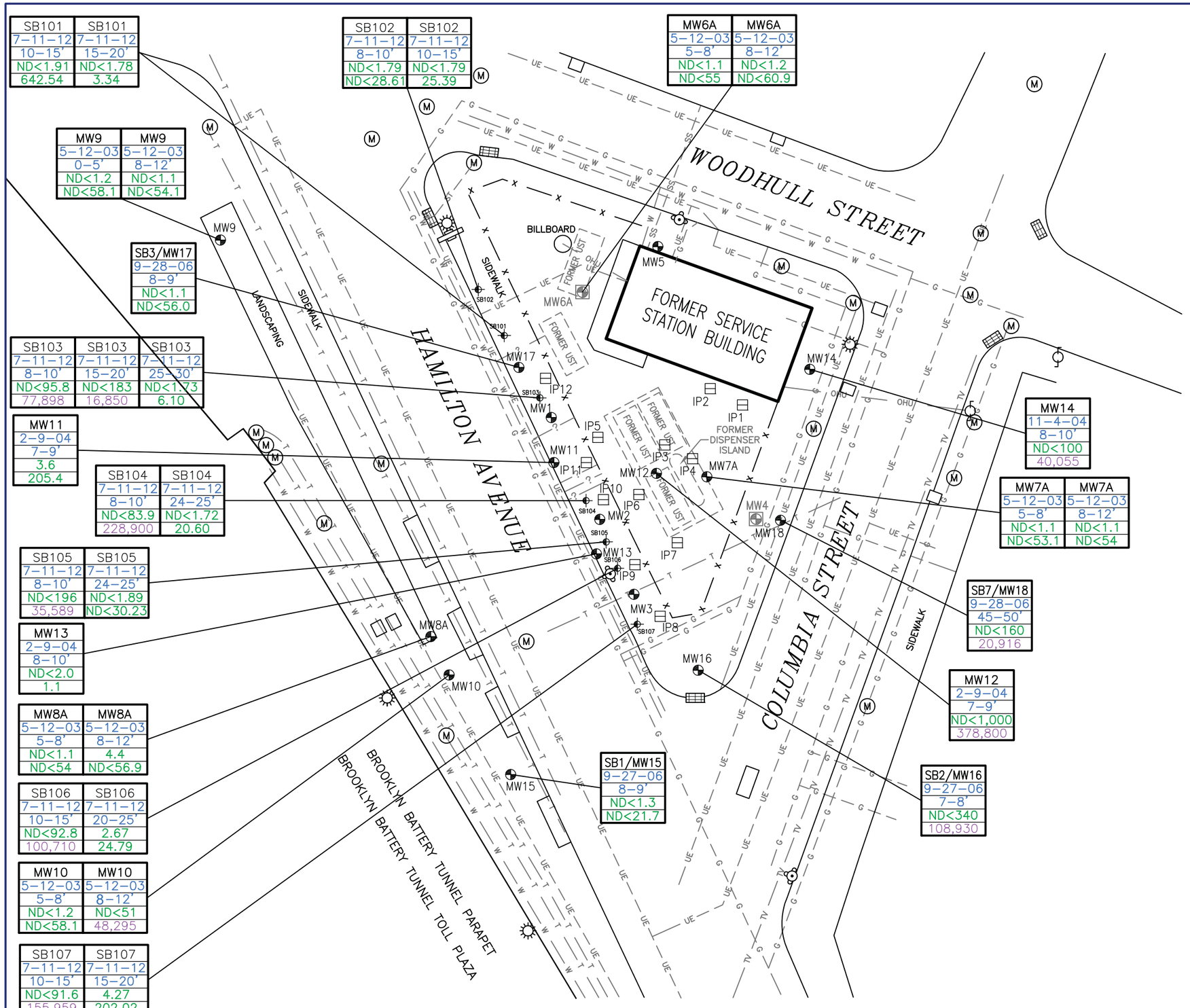
Former Mobil Service Station 17-EMW
304 Columbia Street
Brooklyn, New York

Groundwater & Environmental Services, Inc.
89 CABOT COURT, SUITE A, HAUPPAUGE, NEW YORK 11788

SCALE IN FEET: 0 — 40

DATE: **8/29/2012**

FIGURE: **5**



SB101	SB101
7–11–12	7–11–12
10–15'	15–20'
ND<1.91	ND<1.78
642.54	3.34

SB102	SB102
7–11–12	7–11–12
8–10'	10–15'
ND<1.79	ND<1.79
ND<28.61	25.39

MW6A	MW6A
5–12–03	5–12–03
5–8'	8–12'
ND<1.1	ND<1.2
ND<55	ND<60.9

MW9	MW9
5–12–03	5–12–03
0–5'	8–12'
ND<1.2	ND<1.1
ND<58.1	ND<54.1

SB3/MW17
9–28–06
8–9'
ND<1.1
ND<56.0

SB103	SB103	SB103
7–11–12	7–11–12	7–11–12
8–10'	15–20'	25–30'
ND<95.8	ND<183	ND<1.73
77,898	16,850	6.10

MW11
2–9–04
7–9'
3.6
205.4

SB104	SB104
7–11–12	7–11–12
8–10'	24–25'
ND<83.9	ND<1.72
228,900	20.60

SB105	SB105
7–11–12	7–11–12
8–10'	24–25'
ND<196	ND<1.89
35,589	ND<30.23

MW13
2–9–04
8–10'
ND<2.0
1.1

MW8A	MW8A
5–12–03	5–12–03
5–8'	8–12'
ND<1.1	4.4
ND<54	ND<56.9

SB106	SB106
7–11–12	7–11–12
10–15'	20–25'
ND<92.8	2.67
100,710	24.79

MW10	MW10
5–12–03	5–12–03
5–8'	8–12'
ND<1.2	ND<51
ND<58.1	48,295

SB107	SB107
7–11–12	7–11–12
10–15'	15–20'
ND<91.6	4.27
155,959	202.02

SB1/MW15
9–27–06
8–9'
ND<1.3
ND<21.7

SB2/MW16
9–27–06
7–8'
ND<340
108,930

SB7/MW18
9–28–06
45–50'
ND<160
20,916

MW12
2–9–04
7–9'
ND<1,000
378,800

MW14
11–4–04
8–10'
ND<100
40,055

MW7A	MW7A
5–12–03	5–12–03
5–8'	8–12'
ND<1.1	ND<1.1
ND<53.1	ND<54

LEGEND

- FENCE
- CATCH BASIN
- UTILITY MANHOLE
- UTILITY POLE
- LIGHT POLE
- FIRE HYDRANT
- MONITORING WELL
- ABANDONED/DESTROYED MONITORING WELL
- INJECTION POINT
- UNDERGROUND SANITARY SEWER LINE
- UNDERGROUND TELEVISION LINE
- UNDERGROUND TELEPHONE LINE
- UNDERGROUND ELECTRIC LINE
- UNDERGROUND WATER LINE
- UNDERGROUND GAS LINE
- SOIL BORING (JULY 11, 2012)

SB101
7–11–12
10–15'
ND<1.91
642.54

SAMPLE IDENTIFICATION
SAMPLE DATE
SAMPLE DEPTH (feet)
MTBE CONCENTRATION (ug/kg)
TOTAL STARS VOCs CONCENTRATION (ug/kg)

- ug/kg — MICROGRAMS PER KILOGRAM
- MTBE — METHYL *tert* –BUTYL ETHER
- VOCs — VOLATILE ORGANIC COMPOUNDS
- ND — NOT DETECTED
- <# — WHERE AN ANALYTE IS NOT DETECTED, A METHOD DETECTION LIMIT IS GIVEN

NOTE:

VALUE SHADED PURPLE INDICATES ONE OR MORE COMPOUNDS ARE ABOVE THE CURRENT CP–51 SCG (COMMISSIONER POLICY 51/SOIL CLEANUP GUIDANCE)

DRAFTED BY: W.G.S. (N.J.)
CHECKED BY:
REVIEWED BY:

HISTORIC SOIL ANALYTICAL DATA MAP

MOBIL SERVICE STATION 17–EMW
304 COLUMBIA STREET
BROOKLYN, NEW YORK

Groundwater & Environmental Services, Inc.
89 CABOT COURT, SUITE A, HAUPPAUGE, NEW YORK 11788

NORTH

SCALE IN FEET: 0 APPROXIMATE 30
DATE: 9–28–12
FIGURE: 6

M:\Graphics\0500-Long Island\ExxonMobil\Mobil\17-EMW Brooklyn\17-EMW Brooklyn SM.dwg, B-30, WShea

TABLES

Table 1

HISTORICAL GROUNDWATER MONITORING DATA

Former Mobil Station #17-EMW
304 Columbia Street
Brooklyn, New York

Monitoring Well	Date	Top of Casing (ft)	Depth to Water (ft)	GW Elevation (ft)	Depth to Product (ft)	Product Thickness (ft)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	Total BTEX (µg/L)	MTBE (µg/L)	Dissolved Oxygen (mg/L)
NYSDEC TOGS 1.1.1 GWQS							**1**	**5**	**5**	**5**	**NS**	**10**	**NS**
MW-1	02/28/2005	100.00	8.48	91.52	8.47	0.01	-	-	-	-	-	-	-
	06/06/2005		8.41	91.59	8.40	0.01	-	-	-	-	-	-	-
	09/08/2005		9.10	90.90	9.02	0.08	-	-	-	-	-	-	-
	12/29/2005		7.95	92.05	7.94	0.01	-	-	-	-	-	-	-
	03/20/2006		8.69	91.31	8.60	0.09	-	-	-	-	-	-	-
	06/07/2006		7.65	92.35	-	-	-	-	-	-	-	-	-
	09/14/2006		7.70	92.30	7.51	0.19	-	-	-	-	-	-	-
	12/07/2006		7.88	92.12	7.62	0.26	-	-	-	-	-	-	-
	03/29/2007		8.44	91.56	8.28	0.16	-	-	-	-	-	-	-
	09/19/2007		9.03	90.97	8.68	0.35	-	-	-	-	-	-	-
	12/11/2007		9.10	90.90	9.08	0.02	-	-	-	-	-	-	-
	03/13/2008		8.46	91.54	-	-	220	79.8	830	414	1,543.8	14.9	-
	06/06/2008		8.61	91.39	-	-	271	89.1	817	481	1,658.1	17.3	-
	12/30/2008		8.24	91.76	-	-	216	67.8	539	336	1,158.8	13.2	-
	03/16/2009		9.41	90.59	-	-	215	78.8	761	474	1,528.8	9	-
	06/08/2009		8.23	91.77	-	-	24	88.4	551	692	1,355.4	ND<5	-
	07/20/2009		8.48	91.52	8.20	0.28	-	-	-	-	-	-	-
	09/24/2009		9.12	90.88	8.98	0.14	-	-	-	-	-	-	-
	12/03/2009		8.96	91.04	8.86	0.10	-	-	-	-	-	-	-
	03/03/2010		7.98	92.02	-	-	109	75.2	948	293	1,425.2	3.6	0.68
	06/07/2010		8.31	91.69	8.27	0.04	-	-	-	-	-	-	-
	09/01/2010		9.36	90.64	-	-	89.3	86.5	1,010	405	1,590.8	ND<20	-
	12/03/2010		9.13	90.87	9.10	0.03	-	-	-	-	-	-	-
	03/29/2011		8.01	91.99	7.84	0.17	-	-	-	-	-	-	-
	06/16/2011		5.53	94.47	5.13	0.40	-	-	-	-	-	-	-
	08/08/2011		9.06	90.94	8.88	0.18	-	-	-	-	-	-	-
	09/19/2011		7.75	92.25	7.37	0.38	-	-	-	-	-	-	-
	12/05/2011		8.24	91.76	8.12	0.12	-	-	-	-	-	-	-
	03/16/2012		9.32	90.68	9.29	0.03	-	-	-	-	-	-	-
	06/08/2012		8.44	91.56	-	-	33.0	29.2	199	147	408.2	ND<1.00	-
MW-2	02/28/2005	100.16	8.78	91.38	8.77	0.01	-	-	-	-	-	-	-
	06/06/2005		8.66	91.50	8.65	0.01	-	-	-	-	-	-	-
	09/08/2005		9.87	90.29	9.62	0.25	-	-	-	-	-	-	-
	12/29/2005		8.26	91.90	8.25	0.01	-	-	-	-	-	-	-
	03/20/2006		8.96	91.20	8.88	0.08	-	-	-	-	-	-	-
	06/07/2006		7.73	92.43	-	-	-	-	-	-	-	-	-
	09/14/2006		7.90	92.26	7.58	0.32	-	-	-	-	-	-	-
	12/07/2006		8.20	91.96	7.80	0.40	-	-	-	-	-	-	-
	03/29/2007		8.81	91.35	8.72	0.09	-	-	-	-	-	-	-
	06/13/2007		8.15	92.01	7.72	0.43	-	-	-	-	-	-	-
	09/19/2007		9.18	90.98	8.68	0.50	-	-	-	-	-	-	-

Table 1

HISTORICAL GROUNDWATER MONITORING DATA

Former Mobil Station #17-EMW
304 Columbia Street
Brooklyn, New York

Monitoring Well	Date	Top of Casing (ft)	Depth to Water (ft)	GW Elevation (ft)	Depth to Product (ft)	Product Thickness (ft)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	Total BTEX (µg/L)	MTBE (µg/L)	Dissolved Oxygen (mg/L)
NYSDEC TOGS 1.1.1 GWQS							**1**	**5**	**5**	**5**	**NS**	**10**	**NS**
MW-2	12/11/2007		9.35	90.81	9.28	0.07	-	-	-	-	-	-	-
Con't	03/13/2008		8.77	91.39	-	-	204	18	130	109	461	ND<2	-
	06/06/2008		9.10	91.06	-	-	378	25	137	93.3	633.3	71	-
	12/30/2008		8.56	91.60	-	-	305	27	50	84.4	466.4	37	-
	03/16/2009		9.71	90.45	-	-	246	18	23	53.4	340.4	67	-
	06/08/2009		8.61	91.55	8.53	0.08	-	-	-	-	-	-	-
	07/20/2009		9.47	90.69	8.35	1.12	-	-	-	-	-	-	-
	09/24/2009		9.06	91.10	9.01	0.05	-	-	-	-	-	-	-
	12/03/2009		9.75	90.41	9.05	0.70	-	-	-	-	-	-	-
	03/03/2010		8.30	91.86	8.27	0.03	-	-	-	-	-	-	-
	06/07/2010		9.07	91.09	8.36	0.71	-	-	-	-	-	-	-
	09/01/2010		9.94	90.22	-	-	530	22	202	105	859	155	-
	12/03/2010		9.37	90.79	-	-	500	52.4	336	232	1,120.4	120	-
	03/29/2011		8.74	91.42	8.08	0.66	-	-	-	-	-	-	-
	06/16/2011		9.80	90.36	8.30	1.50	-	-	-	-	-	-	-
	08/08/2011		9.43	90.73	9.06	0.37	-	-	-	-	-	-	-
	09/19/2011		7.81	92.35	7.50	0.31	-	-	-	-	-	-	-
	12/05/2011		9.10	91.06	8.42	0.68	-	-	-	-	-	-	-
	03/16/2012		10.10	90.06	9.58	0.52	-	-	-	-	-	-	-
	06/08/2012		8.75	91.41	8.72	0.03	-	-	-	-	-	-	-
MW-3	02/28/2005	100.43	9.32	91.11	-	-	120	38.5	167	151	476.5	13.1	-
	06/06/2005		9.21	91.22	-	-	37.6	22.5	135	113	308.1	3.5	-
	09/08/2005		9.67	90.76	-	-	86	23.5	47.9	139	296.4	7.8	-
	12/29/2005		8.50	91.93	-	-	11.3	0.88 J	28.9	15.3	56.38	0.88 J	-
	03/20/2006		9.98	90.45	-	-	218	12.1	94.6	61.9	386.6	24.7	-
	06/07/2006		7.51	92.92	-	-	9.9	2.6	27.2	12.1	51.8	ND<1	-
	09/14/2006		7.57	92.86	-	-	17.8	ND<1	20.8	3.9	42.5	ND<1	-
	12/07/2006		7.90	92.53	-	-	10.4	ND<1	15.7	2	28.1	0.51 J	-
	03/29/2007		8.69	91.74	-	-	0.94 J	ND<1	5.1	1	7.04	ND<1	-
	06/13/2007		7.95	92.48	-	-	3.6	ND<1	6.8	0.52 J	10.92	ND<1	-
	09/19/2007		9.45	90.98	-	-	61.8	1.70	63.2	7.8	134.50	9.5	-
	12/11/2007		9.75	90.68	-	-	71.3	12.8	101	24.8	209.9	7.4	-
	03/13/2008		8.56	91.87	-	-	10.8	ND<1	3	0.72 J	14.52	ND<1	-
	06/06/2008		9.46	90.97	-	-	76.1	9.5	46.5	17.9	150.0	15	-
	12/30/2008		8.49	91.94	-	-	5.8	0.44 J	0.28 J	ND<1	6.52	0.53 J	-
	03/16/2009		10.02	90.41	-	-	113	13.5	6	20.8	153.3	20.2	-
	06/08/2009		8.33	92.10	-	-	1.7	ND<1	1.4	ND<1	3.1	ND<1	-
	07/20/2009		9.39	91.04	-	-	92	4	10.6	13.4	120.0	13.2	2.08
	09/24/2009		9.57	90.86	-	-	153	12.1	79.5	97.3	341.9	ND<1	0.64
	12/03/2009		9.60	90.83	-	-	92.7	8.4	90.4	79.1	270.6	3.1	0.64
	03/03/2010		8.18	92.25	-	-	0.27 J	ND<1	1.7	1.6	3.57	ND<1	0.71

Table 1

HISTORICAL GROUNDWATER MONITORING DATA

Former Mobil Station #17-EMW
304 Columbia Street
Brooklyn, New York

Monitoring Well	Date	Top of Casing (ft)	Depth to Water (ft)	GW Elevation (ft)	Depth to Product (ft)	Product Thickness (ft)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	Total BTEX (µg/L)	MTBE (µg/L)	Dissolved Oxygen (mg/L)
NYSDEC TOGS 1.1.1 GWQS							**1**	**5**	**5**	**5**	**NS**	**10**	**NS**
MW-3	06/07/2010		9.18	91.25	-	-	3	0.50 J	6.8	3.2	13.50	1.2	0.60
Con't	09/01/2010		10.66	89.77	-	-	49.3	28.8	164	170	412.1	25.8	0.52
	12/03/2010		9.58	90.85	-	-	3.9	2.7	30.9	26.5	64.0	ND<1	0.56
	03/29/2011		8.25	92.18	-	-	ND<1	ND<1	0.36 J	0.33 J	0.69	ND<1	1.39
	06/16/2011		8.90	91.53	-	-	2.8 J	2.1 J	49.5	31.2	85.6	ND<5	5.28
	08/08/2011		9.51	90.92	-	-	23.1	17.4	157	114	311.5	ND<1	0.76
	03/16/2012		9.97	90.46	-	-	25	43	867	386	1,321	ND<1	-
	06/08/2012		9.27	91.16	-	-	14.9	27.0	389	208	638.9	ND<1.00	-
MW-4	02/28/2005	100.05	9.02	91.03	-	-	50	2.6	11	25	88.6	ND<1	-
	06/06/2005		9.18	90.87	-	-	4.6	ND<1	0.49 J	ND<1	5.09	ND<1	-
	12/29/2005		8.54	91.51	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	ND<1	-
	03/20/2006		9.16	90.89	-	-	9.1	ND<1	0.62 J	0.59 J	10.31	ND<1	-
	06/07/2006		8.00	92.05	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	ND<1	-
	09/14/2006		WELL DESTROYED	-	-	-	-	-	-	-	-	-	-
MW-5	02/28/2005	101.15	8.47	92.68	-	-	0.86 J	ND<1	1.6	8.1	10.56	3.1	-
	06/06/2005		8.73	92.42	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	ND<1	-
	09/08/2005		-	-	-	-	ND<1	ND<1	4.7	7.3	12.0	ND<1	-
	12/29/2005		7.95	93.20	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	ND<1	-
	03/20/2006		8.63	92.52	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	ND<1	-
	06/07/2006		8.12	93.03	-	-	ND<1	ND<1	ND<1	0.65 J	0.65	ND<1	-
	12/07/2006		7.97	93.18	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	ND<1	-
	03/29/2007		8.10	93.05	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	ND<1	-
	06/13/2007		7.68	93.47	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	ND<1	-
	09/19/2007		8.96	92.19	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	ND<1	-
	12/11/2007		9.20	91.95	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	ND<1	-
	03/13/2008		8.56	92.59	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	ND<1	-
	06/06/2008		8.85	92.30	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	ND<1	-
	12/30/2008		8.09	93.06	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	ND<1	-
	03/16/2009		9.41	91.74	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	ND<1	-
	06/08/2009		8.40	92.75	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	ND<1	-
	07/20/2009		8.63	92.52	-	-	-	-	-	-	-	-	-
	09/24/2009		9.29	91.86	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	ND<1	0.75
	12/03/2009		9.00	92.15	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	ND<1	0.94
	03/03/2010		7.74	93.41	-	-	ND<1	ND<1	ND<1	0.35 J	0.35	ND<1	0.91
	06/07/2010		8.73	92.42	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	ND<1	1.51
	09/01/2010		9.61	91.54	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	ND<1	1.18
	12/03/2010		9.40	91.75	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	0.35 J	0.47
	03/29/2011		7.91	93.24	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	ND<1	1.41
	06/16/2011		8.60	92.55	-	-	ND<1	ND<1	ND<1	0.25 J	0.25	ND<1	1.41
	08/08/2011		9.17	91.98	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	1.3	4.76
	09/19/2011		7.64	93.51	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	ND<1	2

Table 1

HISTORICAL GROUNDWATER MONITORING DATA

Former Mobil Station #17-EMW
304 Columbia Street
Brooklyn, New York

Monitoring Well	Date	Top of Casing (ft)	Depth to Water (ft)	GW Elevation (ft)	Depth to Product (ft)	Product Thickness (ft)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	Total BTEX (µg/L)	MTBE (µg/L)	Dissolved Oxygen (mg/L)
NYSDEC TOGS 1.1.1 GWQS							**1**	**5**	**5**	**5**	**NS**	**10**	**NS**
MW-5	12/05/2011		8.40	92.75	-	-	ND<0.22	ND<0.15	ND<0.21	ND<0.17	ND<0.75	ND<0.18	-
Con't	03/16/2012		9.37	91.78	-	-	ND<1	ND<1	ND<1	ND<3	ND<6	ND<1	-
	06/08/2012		8.60	92.55	-	-	ND<1.00	ND<1.00	ND<1.00	ND<3.00	ND<6.00	ND<1.00	-
MW-6A	02/28/2005	101.17	8.29	92.88	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	ND<1	-
	06/06/2005		WELL DESTROYED	-	-	-	-	-	-	-	-	-	-
MW-7A	02/28/2005	101.24	9.67	91.57	-	-	151	3.8	3	8.8	166.6	2.5	-
	06/06/2005		9.59	91.65	-	-	13	ND<1	ND<1	ND<1	13	ND<1	-
	12/29/2005		9.27	91.97	-	-	105	1	5.2	4	115.2	3.2	-
	03/20/2006		9.57	91.67	-	-	9.4	ND<1	ND<1	0.46 J	9.86	0.51 J	-
	06/07/2006		8.72	92.52	-	-	328	9.2	20	49	406.2	1.8	-
	09/14/2006		8.52	92.72	-	-	4.7	ND<1	0.35 J	ND<1	5.05	ND<1	-
	12/07/2006		8.75	92.49	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	ND<1	-
	03/29/2007		9.48	91.76	-	-	291	6	8.2	17	322.2	ND<1	-
	06/13/2007		8.56	92.68	-	-	448	18	28	53	547	2.4	-
	09/19/2007		9.55	91.69	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	ND<1	-
	12/11/2007		10.27	90.97	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	2.3	-
	03/13/2008		9.56	91.68	-	-	202	3.7	8.4	10	224.1	<2.0	-
	06/06/2008		9.74	91.50	-	-	4.5	ND<1	ND<1	ND<1	4.5	0.31 J	-
	12/30/2008		9.53	91.71	-	-	335	4.6	3.4	21	364.0	1.9	-
	03/16/2009		10.58	90.66	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	ND<1	-
	06/08/2009		9.52	91.72	-	-	30	ND<1	ND<1	ND<1	30	ND<1	-
	07/20/2009		8.98	92.26	-	-	1	ND<1	ND<1	ND<1	1	0.48 J	10
	09/24/2009		10.07	91.17	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	ND<1	0.52
	12/03/2009		10.11	91.13	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	0.52 J	0.62
	03/03/2010		9.41	91.83	-	-	145	2.9	5.5	5.6	159.0	1.2	0.64
	06/07/2010		9.36	91.88	-	-	0.36 J	ND<1	ND<1	ND<1	0.36	ND<1	2.37
	09/01/2010		10.50	90.74	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	ND<1	1.22
	12/03/2010		10.31	90.93	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	ND<1	1.2
	03/29/2011		8.87	92.37	-	-	1.7	ND<1	ND<1	ND<1	1.7	ND<1	-
	06/16/2011		9.55	91.69	9.30	0.25	-	-	-	-	-	-	-
	08/08/2011		9.99	91.25	9.98	0.01	-	-	-	-	-	-	-
	09/19/2011		INACCESSIBLE	-	-	-	-	-	-	-	-	-	-
	03/16/2012		10.48	90.76	-	-	107	1.31	3.55	ND<3	111.86	1.09	-
	06/08/2012		9.76	91.48	-	-	143	4.03	25.3	7.23	179.56	1.12	-
MW-8A	02/28/2005	100.59	10.02	90.57	-	-	1,430	369	1,020	3,180	5,999	4,720	-
	06/06/2005		9.48	91.11	-	-	1,660	391	1,150	3,960	7,161	3,980	-
	09/08/2005		10.02	90.57	-	-	2,030	447	1,200	3,880	7,557	3,640	-
	12/29/2005		9.18	91.41	-	-	434	49.3	216	675	1,374.3	250	-
	03/20/2006		9.87	90.72	-	-	2,060	467	1,220	4,040	7,787	4,730	-
	09/14/2006		8.74	91.85	-	-	2,170	510	1,380	4,320	8,380	2,370	-
	12/07/2006		8.62	91.97	-	-	1,660	430	1,350	4,570	8,010	1,980	-

Table 1

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Monitoring Well	Date	Top of Casing (ft)	Depth to Water (ft)	GW Elevation (ft)	Depth to Product (ft)	Product Thickness (ft)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	Total BTEX (µg/L)	MTBE (µg/L)	Dissolved Oxygen (mg/L)
NYSDEC TOGS 1.1.1 GWQS							**1**	**5**	**5**	**5**	**NS**	**10**	**NS**
MW-8A	03/29/2007		9.52	91.07	-	-	1,420	341	908	2,370	5,039	2,960	-
Con't	06/13/2007		8.55	92.04	-	-	444	155	694	1,770	3,063	380	-
	09/19/2007		9.36	91.23	-	-	1,090	267	915	2,570	4,842	1,160	-
	12/11/2007		10.13	90.46	-	-	1,530	305	1,090	3,420	6,345	1,570	-
	03/13/2008		9.69	90.90	-	-	1,580	315	1,140	3,430	6,465	1,850	-
	06/06/2008		9.35	91.24	-	-	1,230	280	1,070	2,610	5,190	806	-
	12/30/2008		9.17	91.42	-	-	82.5	21.3	131	237	471.8	22.6	-
	06/08/2009		9.18	91.41	-	-	292	64.9	348	616	1,320.9	129	-
	07/20/2009		9.10	91.49	-	-	292	72.8	324	525	1,213.8	149	1.63
	09/24/2009		10.79	89.80	-	-	984	223	909	2,320	4,436	542	1.56
	12/03/2009		9.75	90.84	-	-	1,030	235	1,060	2,240	4,565	452	0.70
	03/03/2010		9.25	91.34	-	-	691	177	762	2,070	3,700	185	0.58
	06/07/2010		9.17	91.42	-	-	1,020	213	869	2,060	4,162	766	1.02
	09/01/2010		10.18	90.41	-	-	1,520	291	1,070	3,030	5,911	939	0.97
	12/03/2010		10.00	90.59	-	-	942	253	745	1,900	3,840	555	0.91
	03/29/2011		9.46	91.13	-	-	1,070	227	831	1,860	3,988	418	0.39
	09/19/2011		8.26	92.33	-	-	779	157	533	1,060	2,529	298	1.37
	12/05/2011		9.20	91.39	-	-	1,540	222	682	1,530	3,974	637	-
	03/16/2012		10.07	90.52	-	-	2,220	386	1,410	5,250	9,266	1,100	-
	06/08/2012		9.84	90.75	-	-	808	111	434	1,200	2,553	983	10
MW-9	02/28/2005	100.10	9.45	90.65	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	1.8	-
	06/06/2005		9.38	90.72	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	1.1	-
	09/08/2005		10.01	90.09	-	-	ND<1	ND<1	0.73 J	2	2.73	7.3	-
	12/29/2005		8.88	91.22	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	16.7	-
	03/20/2006		9.65	90.45	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	9.8	-
	09/14/2006		8.93	91.17	-	-	0.93 J	ND<1	0.43 J	1.1	2.46	20.8	-
	12/07/2006		8.72	91.38	-	-	0.88 J	0.72 J	ND<1	3.6	5.20	45	-
	03/29/2007		9.09	91.01	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	46.8	-
	06/13/2007		8.64	91.46	-	-	4.9	1.7	ND<1	6.4	13.0	60	-
	09/19/2007		9.39	90.71	-	-	0.35 J	ND<1	ND<1	0.97 J	1.32	19.2	-
	12/11/2007		9.80	90.30	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	15.7	-
	03/13/2008		8.98	91.12	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	6.5	-
	06/06/2008		9.19	90.91	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	6.2	-
	12/30/2008		8.75	91.35	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	2.6	-
	07/20/2009		9.10	91.00	-	-	-	-	-	-	-	-	-
	09/24/2009		9.71	90.39	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	2.6	1.71
	12/03/2009		9.62	90.48	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	4.6	0.86
	03/03/2010		8.47	91.63	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	0.32 J	0.46
	06/07/2010		9.24	90.86	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	2.9	1.14
	09/01/2010		10.11	89.99	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	6.7	0.75
	12/03/2010		9.90	90.20	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	6.7	0.82

Table 1

HISTORICAL GROUNDWATER MONITORING DATA

Former Mobil Station #17-EMW
304 Columbia Street
Brooklyn, New York

Monitoring Well	Date	Top of Casing (ft)	Depth to Water (ft)	GW Elevation (ft)	Depth to Product (ft)	Product Thickness (ft)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	Total BTEX (µg/L)	MTBE (µg/L)	Dissolved Oxygen (mg/L)
NYSDEC TOGS 1.1.1 GWQS							**1**	**5**	**5**	**5**	**NS**	**10**	**NS**
MW-9	03/29/2011		9.04	91.06	-	-	ND<1	ND<1	ND<1	ND<1	ND<4	1.5	0.33
Con't	12/05/2011		9.20	90.90	-	-	ND<0.22	ND<0.15	ND<0.21	ND<.17	ND<0.75	10.1	-
	03/16/2012		10.33	89.77	-	-	ND<1	ND<1	ND<1	ND<3	ND<6	9.21	-
	06/08/2012		9.44	90.66	-	-	ND<1.00	ND<1.00	ND<1.00	ND<3.00	ND<6.00	12.6	-
MW-10	02/28/2005	100.50	9.94	90.56	-	-	5,040	763	1,520	7,160	14,483	10,300	-
	06/06/2005		9.03	91.47	-	-	823	97.6	298	1,390	2,608.6	1,560	-
	09/08/2005		9.90	90.60	-	-	2,780	331	1,000	3,840	7,951	5,030	-
	12/29/2005		8.90	91.60	-	-	754	192	942	1,900	3,788	833	-
	03/20/2006		9.54	90.96	-	-	6,220	803	1,640	6,970	15,633	10,500	-
	06/07/2006		9.01	91.49	-	-	4,580	459	1,150	4,290	10,479	6,210	-
	09/14/2006		8.58	91.92	-	-	4,900	625	1,520	5,930	12,975	6,740	-
	12/07/2006		8.52	91.98	-	-	3,070	504	2,030	7,360	12,964	1,410	-
	03/29/2007		9.40	91.10	-	-	7,050	1,180	3,550	11,900	23,680	6,820	-
	06/13/2007		8.42	92.08	-	-	1,450	231	909	2,980	5,570	466	-
	09/19/2007		9.22	91.28	-	-	3,380	445	1,400	4,500	9,725	1,310	-
	12/11/2007		11.03	89.47	-	-	3,030	411	1,360	4,010	8,811	1,750	-
	03/13/2008		9.56	90.94	-	-	4,270	530	1,520	5,160	11,480	2,470	-
	06/06/2008		9.25	91.25	-	-	3,080	414	1,510	4,450	9,454	1,260	-
	12/30/2008		9.05	91.45	-	-	903	115	649	1,500	3,167	213	-
	06/08/2009		8.97	91.53	-	-	1,110	143	658	1,440	3,351	166	-
	07/20/2009		8.98	91.52	-	-	1,050	157	593	1,250	3,050	97.1	1.47
	09/24/2009		9.59	90.91	-	-	2,390	374	1,490	3,210	7,464	315	1.53
	12/03/2009		9.55	90.95	-	-	3,380	673	3,900	3,990	11,943	698	0.52
	03/03/2010		9.25	91.25	-	-	3,450	440	1,400	3,440	8,730	1,810	1.21
	06/07/2010		9.02	91.48	-	-	3,210	403	1,260	2,760	7,633	1,380	1.27
	09/01/2010		10.00	90.50	-	-	4,870	485	1,830	4,040	11,225	1,580	2.1
	12/03/2010		9.80	90.70	-	-	3,950	496	1,510	3,180	9,136	ND<10	0.82
	03/29/2011		9.35	91.15	-	-	5,450	594	1,550	3,700	11,294	1,640	1.19
	06/16/2011		8.80	91.70	-	-	5,410	555	1,450	3,580	10,995	1,160	1.32
	08/08/2011		9.72	90.78	-	-	6,180	645	1,450	3,460	11,735	1,030	0.65
	09/19/2011		8.19	92.31	-	-	1,810	162	497	957	3,426	191	4.48
	12/05/2011		9.00	91.50	-	-	3,790	443	1,910	3,860	10,003	610	-
	03/16/2012		10.51	89.99	-	-	5,350	744	2,220	5,690	14,004	1,210	-
	06/08/2012		9.47	91.03	-	-	3,780	343	859	1,720	6,702	860	7
MW-11	02/28/2005	99.62	8.14	91.48	-	-	619	576	1,050	4,270	6,515	77	-
	06/06/2005		8.07	91.55	-	-	616	410	1,070	5,050	7,146	71	-
	09/08/2005		8.81	90.81	8.78	0.03	-	-	-	-	-	-	-
	12/29/2005		11.63	87.99	-	-	697	249	1,170	3,630	5,746	57	-
	03/20/2006		8.13	91.49	-	-	625	294	1,070	4,130	6,119	39	-
	06/07/2006		7.45	92.17	-	-	-	-	-	-	-	-	-
	09/14/2006		7.13	92.49	7.11	0.02	-	-	-	-	-	-	-

Table 1

HISTORICAL GROUNDWATER MONITORING DATA

Former Mobil Station #17-EMW
304 Columbia Street
Brooklyn, New York

Monitoring Well	Date	Top of Casing (ft)	Depth to Water (ft)	GW Elevation (ft)	Depth to Product (ft)	Product Thickness (ft)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	Total BTEX (µg/L)	MTBE (µg/L)	Dissolved Oxygen (mg/L)
NYSDEC TOGS 1.1.1 GWQS							**1**	**5**	**5**	**5**	**NS**	**10**	**NS**
MW-11	12/07/2006		7.30	92.32	7.28	0.02	-	-	-	-	-	-	-
Con't	03/29/2007		7.94	91.68	-	-	531	199	1,030	1,580	3,340	ND<10	-
	06/13/2007		7.18	92.44	-	-	438	125	738	935	2,236	32	-
	09/19/2007		8.11	91.51	-	-	718	231	1,050	1,800	3,799	36	-
	12/11/2007		8.70	90.92	8.68	0.02	-	-	-	-	-	-	-
	03/13/2008		8.20	91.42	-	-	336	153	860	1,530	2,879	ND<5	-
	06/06/2008		8.17	91.45	-	-	617	194	954	1,410	3,175	37	-
	12/30/2008		7.91	91.71	-	-	473	185	990	1,730	3,378	23.9	-
	03/16/2009		9.06	90.56	-	-	423	192	770	1,610	2,995	20.9	-
	06/08/2009		7.87	91.75	-	-	575	209	1,110	2,330	4,224	27.4	-
	07/20/2009		7.93	91.69	7.85	0.08	-	-	-	-	-	-	-
	09/24/2009		8.59	91.03	8.54	0.05	-	-	-	-	-	-	-
	12/03/2009		8.51	91.11	-	-	797	142	1,280	1,020	3,239	46.9	0.41
	03/03/2010		7.66	91.96	-	-	518	110	1,060	1,010	2,698	23.4	1.18
	06/07/2010		7.94	91.68	-	-	382	33.1	901	498	1,814.1	23.1	1.09
	09/01/2010		8.98	90.64	-	-	510	131	1,300	1,620	3,561	ND<100	0.88
	12/03/2010		8.71	90.91	-	-	513	206	911	1,560	3,190	11.3	0.68
	03/29/2011		7.45	92.17	-	-	68.3	7.60	199	234	508.90	3.20	2.15
	06/16/2011		7.71	91.91	-	-	148	23.3	293	315	779.3	2.80	4.32
	08/08/2011		8.54	91.08	-	-	308	48.5	380	385	1,121.5	7.90	2.72
	09/19/2011		6.98	92.64	-	-	57	12.3	162	171	402.3	1.40	1.27
	12/05/2011		7.81	91.81	-	-	144	52	304	455	955	4	-
	03/16/2012		8.98	90.64	-	-	637	149	794	1,580	3,160	12	-
	06/08/2012		8.14	91.48	-	-	492	161	611	1,090	2,354	9.70	-
MW-12	02/28/2005	100.85	9.38	91.47	-	-	127	6.6	50	57	240.6	24.8	-
	06/06/2005		9.17	91.68	-	-	250	8.2	29.2	51.4	338.8	129	-
	03/20/2006		9.17	91.68	-	-	229	9	35.5	50.2	323.7	26.6	-
	06/07/2006		8.68	92.17	-	-	470	17.4	81.1	86.8	655.3	96.7	-
	09/14/2006		8.13	92.72	-	-	476	14	42.9	63.2	596.1	55	-
	12/07/2006		8.37	92.48	-	-	225	7.3	5.1	22.5	259.9	29.4	-
	03/29/2007		9.16	91.69	-	-	193	3.7	4	12.5	213.2	44.3	-
	06/13/2007		8.28	92.57	-	-	274	8.3	5.8	24.7	312.8	86.5	-
	09/19/2007		9.16	91.69	-	-	285	6.2	4.2	20.5	315.9	33	-
	12/11/2007		9.90	90.95	-	-	249	5	4.2	17.6	275.8	31.6	-
	03/13/2008		9.21	91.64	-	-	172	3.6	11	14.4	201.0	ND<1	-
	06/06/2008		9.33	91.52	-	-	134	4.4	8.5	15.8	162.7	20.6	-
	12/30/2008		9.22	91.63	-	-	603	12.3	115	53.9	784.2	41	-
	03/16/2009		10.21	90.64	-	-	144	3.2	32.2	17.7	197.1	12.9	-
	06/08/2009		9.16	91.69	-	-	474	8.6	69.2	33.5	585.3	147	-
	07/20/2009		9.38	91.47	-	-	14.5	0.56 J	15.2	2.4	32.66	41.9	3.15
	09/24/2009		9.71	91.14	-	-	54.8	3.1	37.8	21.4	117.1	113	1.56

Table 1

HISTORICAL GROUNDWATER MONITORING DATA

Former Mobil Station #17-EMW
304 Columbia Street
Brooklyn, New York

Monitoring Well	Date	Top of Casing (ft)	Depth to Water (ft)	GW Elevation (ft)	Depth to Product (ft)	Product Thickness (ft)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	Total BTEX (µg/L)	MTBE (µg/L)	Dissolved Oxygen (mg/L)
NYSDEC TOGS 1.1.1 GWQS							**1**	**5**	**5**	**5**	**NS**	**10**	**NS**
MW-12	12/03/2009		9.75	91.10	-	-	120	3.9	52.7	28.5	205.1	88.4	1.44
Con't	03/03/2010		9.15	91.70	-	-	148	3.6	23.1	16.1	190.8	41.4	0.98
	06/07/2010		8.97	91.88	-	-	22.9	1.1	8.4	7.2	39.6	8.6	0.80
	09/01/2010		10.22	90.63	-	-	111	2.4	10.7	11.6	135.7	23	3.10
	12/03/2010		10.00	90.85	-	-	87	1.6	7.5	7	103.1	20.3	3.01
	03/29/2011		8.53	92.32	-	-	2.1	ND<1	0.34 J	0.32 J	2.76	6.7	0.47
	06/16/2011		8.90	91.95	-	-	3.5	0.36 J	0.72 J	1.3	5.88	8.9	4.17
	08/08/2011		9.70	91.15	-	-	24	1.4	3.5	6.6	35.5	32.5	2.23
	09/19/2011		8.39	92.46	-	-	2.8	0.35 J	2.4	3.2	8.75	ND<1	1.5
	03/16/2012		10.17	90.68	-	-	27	1.05	8.41	4.22	40.68	24	-
	06/08/2012		9.42	91.43	-	-	30.2	ND<1.00	4.87	ND<3.00	35.07	24.3	-
MW-13	02/28/2005	100.04	8.83	91.21	6.66	2.17	-	-	-	-	-	-	-
	06/06/2005		8.54	91.50	8.53	0.01	-	-	-	-	-	-	-
	09/08/2005		9.37	90.67	9.16	0.21	-	-	-	-	-	-	-
	12/29/2005		8.65	91.39	8.64	0.01	-	-	-	-	-	-	-
	03/20/2006		6.67	93.37	6.66	0.01	-	-	-	-	-	-	-
	06/07/2006		7.61	92.43	-	-	-	-	-	-	-	-	-
	09/14/2006		7.34	92.70	7.32	0.02	-	-	-	-	-	-	-
	12/07/2006		7.71	92.33	7.56	0.15	-	-	-	-	-	-	-
	03/29/2007		8.53	91.51	-	-	76.5	ND<5	ND<5	ND<5	76.5	9.3	-
	06/13/2007		7.55	92.49	-	-	56.1	2.6	172	56.9	287.6	11	-
	09/19/2007		8.53	91.51	8.51	0.02	-	-	-	-	-	-	-
	12/11/2007		9.30	90.74	9.28	0.02	-	-	-	-	-	-	-
	03/13/2008		8.58	91.46	-	-	179	6.1	303	74.7	562.8	13.3	-
	06/06/2008		8.70	91.34	-	-	245	10.2	354	95.8	705.0	20.8	-
	12/30/2008		8.37	91.67	-	-	226	20.3	394	136	776.3	12.3	-
	03/16/2009		9.76	90.28	-	-	270	22.8	423	135	850.8	11.9	-
	06/08/2009		8.24	91.80	-	-	68.6	6.2	129	36.8	240.6	11.7	-
	07/20/2009		8.31	91.73	-	-	39	7.9	300	88.6	435.5	15.9	1.98
	09/24/2009		9.01	91.03	-	-	115	4.1	295	44.1	458.2	10.8	0.74
	12/03/2009		8.96	91.08	-	-	219	7	295	53	574	13.6	1.03
	03/03/2010		7.90	92.14	-	-	31.8	2.3	109	18.5	161.6	4.8	0.59
	06/07/2010		8.33	91.71	-	-	21.2	1.7	149	19.9	191.8	18.6	0.94
	09/01/2010		9.44	90.60	-	-	541	120	884	1,490	3,035	16.9	0.81
	12/03/2010		9.13	90.91	-	-	321	114	685	1,240	2,360	ND<5	0.66
	03/29/2011		7.90	92.14	-	-	6	ND<1	8.7	5.2	19.9	3	1.08
	06/16/2011		5.30	94.74	-	-	31.5	2	62	34.4	129.9	10.5	3.23
	08/08/2011		9.04	91.00	-	-	212	40.6	260	284	796.6	3.1	7.89
	09/19/2011		7.36	92.68	-	-	12.3	2	174	57.5	245.8	1.3	8.73
	12/05/2011		8.25	91.79	-	-	20	1.8	110	44	175.8	3.4	-
	03/16/2012		9.44	90.60	-	-	194	56	505	294	1,049	1.71	-

Table 1

HISTORICAL GROUNDWATER MONITORING DATA

Former Mobil Station #17-EMW
304 Columbia Street
Brooklyn, New York

Monitoring Well	Date	Top of Casing (ft)	Depth to Water (ft)	GW Elevation (ft)	Depth to Product (ft)	Product Thickness (ft)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	Total BTEX (µg/L)	MTBE (µg/L)	Dissolved Oxygen (mg/L)
NYSDEC TOGS 1.1.1 GWQS							**1**	**5**	**5**	**5**	**NS**	**10**	**NS**
MW-13	06/08/2012		8.62	91.42	-	-	135	38.6	331	235	739.6	2.74	-
MW-14	02/28/2005	100.04	12.87	87.17	-	-	4.2	0.61 J	1.7	6.7	13.21	2.5	-
	06/06/2005		13.02	87.02	-	-	12.6	1	2.4	9.3	25.3	ND<1	-
	03/20/2006		13.03	87.01	12.53	0.50	-	-	-	-	-	-	-
	06/07/2006		8.19	91.85	8.12	0.07	-	-	-	-	-	-	-
	12/07/2006		13.30	86.74	8.55	4.75	-	-	-	-	-	-	-
	03/29/2007		10.52	89.52	-	-	118	4.8	1.4	11.3	135.5	ND<1	-
	06/13/2007		8.38	91.66	-	-	125	5.6	5.4	41.1	177.1	ND<1	-
	09/19/2007		10.08	89.96	-	-	121	5	4.1	31.3	161.4	ND<1	-
	12/11/2007		10.95	89.09	10.90	0.05	-	-	-	-	-	-	-
	03/13/2008		9.73	90.31	-	-	66.7	2.7	0.76 J	4.6	74.76	ND<1	-
	06/06/2008		10.05	89.99	-	-	95.5	3.6	1.3	5.8	106.2	ND<1	-
	12/30/2008		9.59	90.45	-	-	85.3	2.5	0.51 J	2.1	90.41	ND<1	-
	03/16/2009		10.44	89.60	-	-	101	4.1	0.77 J	4.3	110.17	ND<1	-
	06/08/2009		9.46	90.58	-	-	54.8	2.3	1.2	4.2	62.5	ND<1	-
	07/20/2009		9.30	90.74	-	-	51.6	1.3	0.58 J	2.3	55.78	ND<1	3.2
	09/24/2009		10.00	90.04	-	-	102	3.8	0.90 J	5.9	112.60	ND<1	0.69
	12/03/2009		9.81	90.23	-	-	147	4.3	1.1	4.6	157.0	ND<1	0.47
	03/03/2010		8.90	91.14	-	-	13.5	ND<1	ND<1	ND<1	13.5	ND<1	0.71
	06/07/2010		9.31	90.73	-	-	50.3	0.95 J	0.32 J	1.2	52.77	ND<1	0.59
	09/01/2010		10.36	89.68	-	-	139	3.4	1.2	3.7	147.3	ND<1	0.44
	12/03/2010		10.11	89.93	-	-	114	4	0.86 J	3.2	122.06	ND<1	0.39
	03/29/2011		8.60	91.44	-	-	12.7	ND<1	ND<1	ND<1	12.7	ND<1	1.89
	06/16/2011		9.20	90.84	-	-	41.4	0.55 J	0.27 J	0.53 J	42.75	ND<1	2.4
	08/08/2011		9.87	90.17	-	-	84.1	0.77 J	ND<1	ND<1	84.87	ND<1	2.42
	09/19/2011		8.22	91.82	-	-	3.8	ND<1	ND<1	ND<1	3.8	ND<1	1.08
	12/05/2011		9.19	90.85	-	-	64	0.39	0.22	0.60	65.21	ND<0.18	-
	03/16/2012		10.36	89.68	-	-	91	1.28	ND<1	ND<3	92.28	ND<1	-
	06/08/2012		9.62	90.42	-	-	74.8	ND<1.00	ND<1.00	ND<3.00	74.8	ND<1.00	-
MW-15	09/27/2006	100.47	10.72	89.75	-	-	616	21.1	21.7	64.4	723.2	425	-
	12/07/2006		9.29	91.18	-	-	522	16.6	8.2	54.5	601.3	114	-
	03/29/2007		9.81	90.66	-	-	389	14	5.9	30.7	439.6	59.5	-
	06/13/2007		8.99	91.48	-	-	924	26.7	6	56.8	1,013.5	191	-
	09/19/2007		9.72	90.75	-	-	747	16.6	3.5	34.1	801.2	104	-
	12/11/2007		10.29	90.18	-	-	800	15.1	2.8 J	40	857.9	119	-
	03/13/2008		9.85	90.62	-	-	662	6.4	2.9 J	15.2	686.5	83.4	-
	06/06/2008		9.63	90.84	-	-	509	5.6	1.2	12.7	528.5	81.1	-
	12/30/2008		9.50	90.97	-	-	164	1.9	0.58 J	4.6	171.08	16.8	-
	03/16/2009		10.69	89.78	-	-	540	5.8	1.2	9.5	556.5	57.2	-
	06/08/2009		9.45	91.02	-	-	141	ND<1	ND<1	1	142	14.8	-
	07/20/2009		9.33	91.14	-	-	80.7	1.2	0.93 J	3.7	86.53	19.1	1.46

Table 1

HISTORICAL GROUNDWATER MONITORING DATA

Former Mobil Station #17-EMW
304 Columbia Street
Brooklyn, New York

Monitoring Well	Date	Top of Casing (ft)	Depth to Water (ft)	GW Elevation (ft)	Depth to Product (ft)	Product Thickness (ft)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	Total BTEX (µg/L)	MTBE (µg/L)	Dissolved Oxygen (mg/L)
NYSDEC TOGS 1.1.1 GWQS							**1**	**5**	**5**	**5**	**NS**	**10**	**NS**
MW-15	09/24/2009		9.91	90.56	-	-	162	3.9	7.3	8.6	181.8	74.5	1.11
Con't	12/03/2009		9.98	90.49	-	-	432	8.6	7.3	17.4	465.3	52.2	0.77
	03/03/2010		9.41	91.06	-	-	606	6.4	8.1	18.5	639.0	99.2	0.81
	06/07/2010		9.42	91.05	-	-	200	3.6	6.2	6.3	216.1	24.7	1.08
	09/01/2010		10.06	90.41	-	-	194	3.6	2.8	5.3	205.7	101	1.61
	12/03/2010		12.20	88.27	-	-	405	7.6	6.9	13.7	433.2	93.3	0.72
	03/29/2011		9.52	90.95	-	-	119	0.86 J	ND<1	0.89 J	120.75	26.8	0.34
	06/16/2011		9.34	91.13	-	-	8	ND<1	ND<1	ND<1	8	3.4	0.90
	08/08/2011		9.93	90.54	-	-	81.1	2.3	0.85 J	4.2	88.45	45.1	0.93
	09/19/2011		8.49	91.98	-	-	43.2	1.5	0.94 J	4.6	50.24	25.8	0.81
	12/05/2011		9.40	91.07	-	-	5	ND<0.15	ND<0.21	0.51	5.51	5.4	-
	03/16/2012		10.57	89.90	-	-	31	ND<1	ND<1	ND<3	31	58	-
	06/08/2012		9.67	90.80	-	-	3.89	ND<1.00	ND<1.00	ND<3.00	3.89	8.11	-
MW-16	09/27/2006	100.42	11.90	88.52	-	-	1,600	159	1,220	2,520	5,499	2.3 J	-
	12/07/2006		18.97	81.45	10.25	8.72	-	-	-	-	-	-	-
	03/29/2007		11.36	89.06	-	-	2,320	87.1	430	1,110	3,947.1	ND<20	-
	06/13/2007		10.82	89.60	10.68	0.14	-	-	-	-	-	-	-
	09/19/2007		10.98	89.44	10.76	0.22	-	-	-	-	-	-	-
	12/11/2007		9.80	90.62	9.77	0.03	-	-	-	-	-	-	-
	03/13/2008		10.89	89.53	-	-	1,200	34.1	146	303	1,683.1	ND<10	-
	06/06/2008		10.06	90.36	-	-	1,350	49.6	225	394	2,018.6	16.1	-
	12/30/2008		9.66	90.76	-	-	958	59.8	393	662	2,072.8	7.7	-
	03/16/2009		10.70	89.72	-	-	1,320	44	141	222	1,727	3.7	-
	06/08/2009		9.64	90.78	-	-	2,830	158	667	1,010	4,665	ND<20	-
	07/20/2009		9.56	90.86	9.47	0.09	-	-	-	-	-	-	-
	09/24/2009		9.96	90.46	9.80	0.16	-	-	-	-	-	-	-
	12/03/2009		9.85	90.57	9.76	0.09	-	-	-	-	-	-	-
	03/03/2010		8.90	91.52	-	-	940	104	1,070	2,020	4,134	3.5 J	0.71
	06/07/2010		9.28	91.14	9.00	0.28	-	-	-	-	-	-	-
	09/01/2010		10.21	90.21	-	-	2,590	131	492	828	4,041	ND<20	-
	12/03/2010		9.67	90.75	9.66	0.01	-	-	-	-	-	-	-
	03/29/2011		8.45	91.97	-	-	312	26.3	284	319	941.3	ND<2.5	1.37
	06/16/2011		8.75	91.67	-	-	1,490	76.6	433	634	2,633.6	ND<10	1.89
	08/08/2011		9.44	90.98	9.41	0.03	-	-	-	-	-	-	-
	09/19/2011		7.89	92.53	-	-	68.3	4.1	59.9	77.1	209.4	ND<1	1.12
	12/05/2011		8.77	91.65	-	-	655	26	237	246	1,164	ND<0.37	-
	03/16/2012		9.96	90.46	-	-	1,400	59	157	342	1,958	ND<1	-
	06/08/2012		9.22	91.20	-	-	1,310	49.2	157	229	1,745.2	ND<1.00	-
MW-17	09/28/2006	100.05	10.59	89.46	-	-	4.8	64.2	378	1,420	1,867.0	202	-
	12/07/2006		10.90	89.15	-	-	19.9	97.6	335	1,090	1,542.5	29.8	-
	03/29/2007		10.18	89.87	-	-	15.4	145	432	1,300	1,892.4	19.4	-

Table 1

HISTORICAL GROUNDWATER MONITORING DATA

Former Mobil Station #17-EMW
304 Columbia Street
Brooklyn, New York

Monitoring Well	Date	Top of Casing (ft)	Depth to Water (ft)	GW Elevation (ft)	Depth to Product (ft)	Product Thickness (ft)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	Total BTEX (µg/L)	MTBE (µg/L)	Dissolved Oxygen (mg/L)
NYSDEC TOGS 1.1.1 GWQS							**1**	**5**	**5**	**5**	**NS**	**10**	**NS**
MW-17	06/13/2007		9.55	90.50	-	-	11.1	76.9	228	695	1,011.0	21.3	-
Con't	09/19/2007		9.71	90.34	-	-	11.4	69.3	252	665	997.7	13.6	-
	12/11/2007		10.17	89.88	-	-	4.8	32.9	148	386	571.7	4.3	-
	03/13/2008		9.17	90.88	-	-	20.4	143	695	2,160	3,018.4	8.2	-
	06/06/2008		9.03	91.02	-	-	2.6	14.2	63.7	178	258.5	3.4	-
	12/30/2008		8.51	91.54	-	-	18.1	60.3	421	418	917.4	2.3	-
	03/16/2009		9.42	90.63	-	-	3.8	20.4	134	184	342.2	2.1	-
	06/08/2009		8.19	91.86	-	-	244	80.1	773	439	1,536.1	7.7	-
	07/20/2009		8.23	91.82	-	-	27.4	145	726	1,100	1,998.4	1.7	1.88
	09/24/2009		8.93	91.12	-	-	10.6	47.7	324	369	751.3	ND<1	0.86
	12/03/2009		8.91	91.14	-	-	32.7	161	854	1,170	2,217.7	1.7 J	0.58
	03/03/2010		8.02	92.03	-	-	7.5	37.7	225	289	559.2	1.4 J	0.91
	06/07/2010		8.33	91.72	-	-	7.6	35	259	274	575.6	0.83 J	0.62
	09/01/2010		9.01	91.04	-	-	16.3	91.3	716	675	1,498.6	ND<2	1.04
	12/03/2010		8.80	91.25	-	-	19.8	103	757	881	1,760.8	ND<1	0.97
	03/29/2011		7.83	92.22	-	-	6.3	14.7	166	90.9	277.9	1.2 J	-
	06/16/2011		7.96	92.09	7.90	0.06	-	-	-	-	-	-	-
	08/08/2011		8.62	91.43	8.58	0.04	-	-	-	-	-	-	-
	09/19/2011		7.12	92.93	7.11	0.01	-	-	-	-	-	-	-
	12/05/2011		7.86	92.19	-	-	9.3	43	230	209	491.3	1	-
	03/16/2012		9.40	90.65	9.33	0.07	-	-	-	-	-	-	-
	06/08/2012		8.49	91.56	-	-	23.7	78.4	402	239	743.1	ND<1.00	-
MW-18	09/28/2006	101.41	12.54	88.87	-	-	1,470	137	499	1,160	3,266	5.8	-
	12/07/2006		12.76	88.65	-	-	2,490	210	518	1,820	5,038	ND<10	-
	03/29/2007		12.33	89.08	-	-	2,190	170	510	1,100	3,970	ND<20	-
	06/13/2007		11.10	90.31	-	-	2,400	296	1,040	3,360	7,096	ND<10	-
	09/19/2007		12.02	89.39	-	-	1,820	114	397	951	3,282	ND<2.5	-
	12/11/2007		13.40	88.01	-	-	1,670	63.6	241	439	2,413.6	ND<5	-
	03/13/2008		13.12	88.29	-	-	1,770	94.2	399	649	2,912.2	ND<10	-
	06/06/2008		13.24	88.17	-	-	2,410	156	746	1,220	4,532	ND<10	-
	12/30/2008		12.58	88.83	-	-	1,970	80.4	319	620	2,989.4	ND<5	-
	03/16/2009		12.85	88.56	-	-	1,850	79.7	254	417	2,600.7	ND<5	-
	06/08/2009		12.51	88.90	-	-	1,680	79.8	302	480	2,541.8	ND<10	-
	07/20/2009		12.65	88.76	-	-	1,570	83.7	301	537	2,491.7	ND<10	1.62
	09/24/2009		12.96	88.45	-	-	1,010	48.8	131	363	1,552.8	ND<1	0.63
	12/03/2009		12.76	88.65	-	-	1,380	57.2	355	720	2,512.2	ND<5	0.50
	03/03/2010		11.90	89.51	-	-	1,790	80.6	400	548	2,818.6	ND<10	0.49
	06/07/2010		12.47	88.94	-	-	1,630	103	502	548	2,783	ND<5	0.51
	09/01/2010		12.83	88.58	-	-	2,580	102	347	637	3,666	ND<20	0.40
	12/03/2010		12.87	88.54	-	-	1,020	39.4	119	175	1,353.4	ND<10	0.39
	03/29/2011		10.46	90.95	-	-	746	34.7	137	163	1,080.7	ND<5	1.39

Table 1

HISTORICAL GROUNDWATER MONITORING DATA

Former Mobil Station #17-EMW
304 Columbia Street
Brooklyn, New York

Monitoring Well	Date	Top of Casing (ft)	Depth to Water (ft)	GW Elevation (ft)	Depth to Product (ft)	Product Thickness (ft)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	Total BTEX (µg/L)	MTBE (µg/L)	Dissolved Oxygen (mg/L)
NYSDEC TOGS 1.1.1 GWQS							**1**	**5**	**5**	**5**	**NS**	**10**	**NS**
MW-18	06/16/2011		11.00	90.41	-	-	2,180	123	548	738	3,589	ND<10	1.47
Con't	08/08/2011		10.71	90.70	-	-	2,440	104	261	374	3,179	ND<10	7.53
	09/19/2011		10.34	91.07	-	-	1,200	64.8	318	425	2,007.8	ND<5	1.02
	12/05/2011		9.9	91.51	-	-	1,620	65	287	345	2,317	ND<0.92	-
	03/16/2012		10.66	90.75	-	-	1,740	101	1,310	1,510	4,661	ND<1	-
	06/08/2012		9.83	91.58	-	-	153	11.9	109	137	410.9	ND<1.00	-

Notes:

NYSDEC TOGS 1.1.1 GWQS	= TOGS (1.1.1) Ambient Water Quality Standards Guidance Values and Groundwater Effluent Limitations, amended April 2000.
-	= Not analyzed or measured
BRL	= Below laboratory reporting limit
BTEX	= Benzene, toluene, ethylbenzene and total xylenes
CNL	= Could not locate
ft	= Feet
GWQS	= Ground Water Quality Standard
J	= Estimated value
mg/L	= Milligrams/liter
MTBE	= Methyl tertiary-butyl ether
ND<#	= Not detected. Where an analyte is not detected, a reporting limit is given.
NS	= No standard
NSD	= No survey data
Shaded cells	= Above regulatory limits
ug/L	= Micrograms/liter
VOCs	= Volatile organic compounds

Table 2

2012 SOIL BORING ANALYTICAL DATA

Former Mobil Station #17-EMW
304 Columbia Street
Brooklyn, New York

Soil Sample ID	Date	Depth (ft)	Benzene (µg/kg)	Toluene (µg/kg)	Ethyl-benzene (µg/kg)	Total Xylenes (µg/kg)	Total BTEX (µg/kg)	MTBE (µg/kg)	Isopropyl Benzene (µg/kg)	Naphthalene (µg/kg)	1,2,4-Trimethylbenzene (µg/kg)	1,3,5-Trimethyl benzene (µg/kg)	n-Butylbenzene (µg/kg)	n-propylbenzene (µg/kg)	p-Isopropyl toluene (µg/kg)	sec-Butylbenzene (µg/kg)	tert-Butylbenzene (µg/kg)	Total STARS Listed VOCs (µg/kg)
NYS CP-51 Soil Cleanup Levels			**60**	**700**	**1,000**	**260**	**NS**	**930**	**2,300**	**12,000**	**3,600**	**8,400**	**12,000**	**3,900**	**10,000**	**11,000**	**5,900**	**NS**
SB101 (10-15)	07/11/2012	10-15	4.34	ND<1.91	39.6	133	176.94	ND<1.91	67.6	43.7	68.4	31.3	64.1	123	39.4	25	3.1	642.54
SB101 (15-20)	07/11/2012	15-20	ND<1.78	ND<1.78	3.34	ND<4.45	3.34	ND<1.78	ND<1.78	ND<4.45	ND<1.78	ND<1.78	ND<1.78	ND<1.78	ND<1.78	ND<1.78	ND<1.78	3.34
SB102 (8-10)	07/11/2012	8-10	ND<1.79	ND<1.79	ND<1.79	ND<4.46	ND<9.83	ND<1.79	ND<1.79	ND<4.46	ND<1.79	ND<1.79	ND<1.79	ND<1.79	ND<1.79	ND<1.79	ND<1.79	ND<28.61
SB102 (10-15)	07/11/2012	10-15	ND<1.79	ND<1.79	4.56	13.3	17.86	ND<1.79	ND<1.79	ND<4.47	5.58	1.95	ND<1.79	ND<1.79	ND<1.79	ND<1.79	ND<1.79	25.39
SB103 (8-10)	07/11/2012	8-10	ND<95.8	298	14,900	12,500	27,698	ND<95.8	5,590	8,660	12,600	2,890	5,010	9,000	3,080	1,570	1,800	77,898
SB103 (15-20)	07/11/2012	15-20	ND<183	ND<183	2,570	4,610	7,180	ND<183	552	1,070	4,800	1,500	626	870	252	ND<183	ND<183	16,850
SB103 (25-30)	07/11/2012	25-30	ND<1.73	ND<1.73	ND<1.73	ND<4.33	ND<9.52	ND<1.73	ND<1.73	ND<4.33	3.98	ND<1.73	2.12	ND<1.73	ND<1.73	ND<1.73	ND<1.73	6.10
SB104 (8-10)	07/11/2012	8-10	4,490	3,070	140	51,200	58,900	ND<83.9	9,110	19,300	75,800	32,700	11,000	16,200	3,770	2,120	ND<83.9	228,900
SB104 (24-25)	07/11/2012	24-25	ND<1.72	ND<1.72	3.43	12.2	15.63	ND<1.72	ND<1.72	ND<4.31	7.2	2.58	ND<1.72	2.39	ND<1.72	ND<1.72	ND<1.72	20.60
SB105 (8-10)	07/11/2012	8-10	204	ND<196	3,640	2,770	6,614	ND<196	4,250	2,580	1,090	725	4,980	12,300	1,220	1,830	ND<196	35,589
SB105 (24-25)	07/11/2012	24-25	ND<1.89	ND<1.89	ND<1.89	ND<4.72	ND<10.39	ND<1.89	ND<1.89	ND<4.72	ND<1.89	ND<1.89	ND<1.89	ND<1.89	ND<1.89	ND<1.89	ND<1.89	ND<30.23
SB106 (10-15)	07/11/2012	10-15	ND<92.8	ND<92.8	14,300	29,200	43,500	ND<92.8	2,980	6,360	24,800	11,600	4,150	5,330	1,370	620	ND<92.8	100,710
SB106 (20-25)	07/11/2012	20-25	ND<1.76	ND<1.76	3.67	5.92	9.59	2.67	ND<1.76	ND<4.39	7.1	4.21	2.01	1.88	ND<1.76	ND<1.76	ND<1.76	24.79
SB107 (10-15)	07/11/2012	10-15	113	266	39,400	30,100	69,879	ND<91.6	7,950	13,600	19,100	21,600	8,140	11,000	3,220	1,470	ND<91.6	155,959
SB107 (15-20)	07/11/2012	15-20	4.91	ND<1.88	84.8	20.2	109.91	4.27	17.9	20.2	ND<1.88	9.49	11.2	23.8	6.07	3.45	ND<1.88	202.02

Notes:

-	= No Data
*	= Total VOC Concentration excluding MTBE
µg/kg	= Micrograms/kilogram
CP-51 SCG	= Commissioner Policy 51/ Soil Cleanup Guidance, effective October 21, 2010
ND	= Not detected
NS	= No Standard
Shade	= One or more compounds are above the CP-51 SCG
VOCs	= Volatile Organic Compounds

Table 3

HISTORICAL SOIL ANALYTICAL DATA

Former Mobil Station # 17-EMW
304 Columbia Street
Brooklyn, New York

Compound	CP-51 SCG	Sample ID											
		SB-1/MW-15 (8-9')	SB-2/MW-16 (7-8')	SB-3/MW-17 (8-9')	SB-7/MW-18 (45-50')	SB-8 (8-10')	MW-10 (5-8')	MW-10 (8-12')	MW-11 (7-9')	MW-12 (7-9')	MW-13 (8-10')	MW-14 (8-10')	SB-20 (8-12)
Date		**9/27/2006**		**9/28/2006**		**9/27/2006**	**5/12/2003**		**2/9/2004**			**11/4/2004**	**7/23/2002**
Laboratory Analytical Method		**EPA Method 8260B STARS List**											
Benzene	**60**	ND<1.3	314 J	ND<1.1	239	952	ND<1.2	165	8.9	2,900	ND<2.0	120	ND<8.3
Toluene	**700**	ND<1.3	241 J	ND<1.1	ND<160	319	ND<1.2	ND<51.0	20.2	70,500	ND<2.0	170	ND<8.3
Ethylbenzene	**1000**	ND<1.3	10,700	ND<1.1	505	1,450	ND<1.2	5,950	2.7	1,800	ND<2.0	ND<100	95.4
Total Xylenes	**260**	ND<2.5	19,800	ND<2.3	850	18,300	ND<2.3	7,080	66.3	100,000	ND<2.0	945	424
Total BTEX	**NS**	ND<6.4	31,100	ND<5.6	1,594	21,000	ND<5.9	13,195	98.1	175,200	ND<8.0	1,235	519
MTBE	**930**	ND<1.3	ND<340	ND<1.1	ND<160	ND<68.0	ND<1.2	ND<51	3.6	ND<1,000	ND<2.0	ND<100	ND<8.3
n-Butylbenzene	**12,000**	ND<6.3	6,730	ND<5.6	2,890	3,420	ND<5.8	3,190	7.0	17,900	ND<2.0	5,200	-
sec-Butylbenzene	**11,000**	ND<6.3	2,920	ND<5.6	1,350	1,210	ND<5.8	1,480	2.2	4,450	ND<2.0	2,360	-
tert-Butylbenzene	**5,900**	ND<6.3	ND<1,700	ND<5.6	ND<820	ND<340	ND<5.8	ND<250	ND<2.0	ND<1,000	ND<2.0	ND<100	-
Isopropylbenzene	**2,300**	ND<6.3	8,470	ND<5.6	2,850	3,160	ND<5.8	3,870	6.7	12,600	ND<2.0	4,170	-
p-Isopropylbenzene	**10,000**	ND<6.3	1,480 J	ND<5.6	516 J	1,600	ND<5.8	2,990	1.9 J	3,850	ND<2.0	-	-
Naphthalene	**12,000**	ND<6.3	10,800	ND<5.6	1,480	8,150	ND<5.8	3,480	25.7	33,700	ND<2.0	1,760	-
n-Propylbenzene	**3,900**	ND<6.3	25,100	ND<5.6	9,960	7,030	ND<5.8	8,380	15.3	40,200	ND<2.0	15,600	-
1,2,4-Trimethylbenzene	**3,600**	ND<6.3	13,500	ND<5.6	ND<820	53,700	ND<5.8	5,030	34.4	57,000	1.1 J	7,650	-
1,3,5-Trimethylbenzene	**8,400**	ND<6.3	8,830	ND<5.6	276 J	18,500	ND<5.8	6,680	14.1	33,900	ND<2.0	2,080	-
Total STARS LISTED VOCs (µg/kg)*	**NS**	ND<21.7	108,930	ND<56.0	20,916	117,770	ND<58.1	48,295	205.4	378,800	1.1	40,055	519

Notes:

CP-51 SCG	= Commissioner Policy 51/ Soil Cleanup Guidance, effective October 21, 2010
*	= Total VOC Concentration excluding MTBE
VOCs	= Volatile Organic Compounds
µg/kg	= Micrograms/kilogram
-	= No Data
ND	= Not detected
NS	= No Standard
	= One or more compounds are above the CP-51 SCG

Table 3

HISTORICAL SOIL ANALYTICAL DATA

Former Mobil Station # 17-EMW
304 Columbia Street
Brooklyn, New York

Compound	CP-51 SCG	Sample ID														
		MW-6A (5-8')	MW-6A (8-12')	MW-7A (5-8')	MW-7A (8-12')	MW-8A (5-8')	MW-8A (8-12')	MW-9 (0-5')	MW-9 (8-12')	SB-1 (5-10')	SB-1 (10-15')	SB-2 (4-9')	SB-2 (9-14')	SB-4 (5-10')	SB-7 (5-9')	SB-7 (9-13')
Date		**5/12/2003**								**7/30/2002**		**7/24/2002**			**7/22/2002**	
Laboratory Analytical Method		**EPA Method 8260B STARS List**														
Benzene	**60**	ND<1.1	ND<1.2	ND<1.1	ND<1.1	ND<1.1	ND<1.1	ND<1.2	ND<1.1	ND<1.3	ND<1.3	ND<1.4	187	ND<1.1	ND<1.5	ND<1.4
Toluene	**700**	ND<1.1	ND<1.2	ND<1.1	ND<1.1	ND<1.1	ND<1.1	ND<1.2	ND<1.1	4.0	1.5	ND<1.4	ND<150	5.2	ND<1.5	ND<1.4
Ethylbenzene	**1000**	ND<1.1	ND<1.2	ND<1.1	ND<1.1	ND<1.1	ND<1.1	ND<1.2	ND<1.1	2.7	ND<1.3	ND<1.4	2530	4.9	ND<1.5	ND<1.4
Total Xylenes	**260**	ND<2.2	ND<2.4	ND<2.1	ND<2.1	ND<2.2	ND<2.3	ND<2.3	ND<2.2	10.2	1.7 J	ND<2.8	5640	30.2	ND<3.0	12.2
Total BTEX	**NS**	ND<5.5	ND<6.0	ND<5.4	ND<5.4	ND<5.5	ND<5.6	ND<5.9	ND<5.5	16.9	4.7	ND<7.0	8,357	41.9	3.6	12.2
MTBE	**930**	ND<1.1	ND<1.2	ND<1.1	ND<1.1	ND<1.1	4.4	ND<1.2	ND<1.1	ND<1.3	1.5	ND<1.4	ND<150	1.6	3.6	ND<1.4
n-Butylbenzene	**12,000**	ND<5.5	ND<6.1	ND<5.3	ND<5.4	ND<5.4	ND<5.7	ND<5.8	ND<5.4	-	-	-	-	-	-	-
sec-Butylbenzene	**11,000**	ND<5.5	ND<6.1	ND<5.3	ND<5.4	ND<5.4	ND<5.7	ND<5.8	ND<5.4	-	-	-	-	-	-	-
tert-Butylbenzene	**5,900**	ND<5.5	ND<6.1	ND<5.3	ND<5.4	ND<5.4	ND<5.7	ND<5.8	ND<5.4	-	-	-	-	-	-	-
Isopropylbenzene	**2,300**	ND<5.5	ND<6.1	ND<5.3	ND<5.4	ND<5.4	ND<5.7	ND<5.8	ND<5.4	-	-	-	-	-	-	-
p-Isopropylbenzene	**10,000**	ND<5.5	ND<6.1	ND<5.3	ND<5.4	ND<5.4	ND<5.7	ND<5.8	ND<5.4	-	-	-	-	-	-	-
Naphthalene	**12,000**	ND<5.5	ND<6.1	ND<5.3	ND<5.4	ND<5.4	ND<5.7	ND<5.8	ND<5.4	-	-	-	-	-	-	-
n-Propylbenzene	**3,900**	ND<5.5	ND<6.1	ND<5.3	ND<5.4	ND<5.4	ND<5.7	ND<5.8	ND<5.4	-	-	-	-	-	-	-
1,2,4-Trimethylbenzene	**3,600**	ND<5.5	ND<6.1	ND<5.3	ND<5.4	ND<5.4	ND<5.7	ND<5.8	ND<5.4	-	-	-	-	-	-	-
1,3,5-Trimethylbenzene	**8,400**	ND<5.5	ND<6.1	ND<5.3	ND<5.4	ND<5.4	ND<5.7	ND<5.8	ND<5.4	-	-	-	-	-	-	-
Total STARS LISTED VOCs (µg/kg)*	**NS**	ND<55	ND<60.9	ND<53.1	ND<54	ND<54	ND<56.9	ND<58.1	ND<54.1	16.9	4.7	ND<7.0	8,357	41.9	3.6	12.2

Notes:

CP-51 SCG	= Commissioner Policy 51/ Soil Cleanup Guidance, effective October 21, 2010
*	= Total VOC Concentration excluding MTBE
VOCs	= Volatile Organic Compounds
µg/kg	= Micrograms/kilogram
-	= No Data
ND	= Not detected
NS	= No Standard
	= One or more compounds are above the CP-51 SCG

Table 3

HISTORICAL SOIL ANALYTICAL DATA

Former Mobil Station # 17-EMW
304 Columbia Street
Brooklyn, New York

Compound	CP-51 SCG	Sample ID																		
		SB-8 (4-8')	SB-8 (8-12')	SB-11 (6')	SB-11 (9')	SB-12 (5-10')	SB-12 (10-15')	SB-13 (5-10')	SB-14 (5-8')	SB-14 (8-12')	SB-15 (4-8')	SB-15 (8-12')	SB-16 (4-8')	SB-16 (8-12')	SB-17 (5-7')	SB-17 (10-12')	SB-18 (5-7')	SB-18 (10-15')	SB-19 (4-8')	SB-19 (8-12')	SB-20 (4-8')
Date		**7/23/2002**		**7/26/2002**					**7/24/2002**		**7/23/2002**		**7/26/2002**					**7/24/2002**		**7/23/2002**	
Laboratory Analytical Method		**EPA Method 8260B STARS List**																			
Benzene	**60**	ND<1.2	ND<140	ND<1.4	17.6	ND<280	2,300	ND<11	403	300	ND<1.2	ND<8.6	ND<140	198	ND<1.4	525	715	4,290	ND<1.4	ND<6.3	ND<1.4
Toluene	**700**	ND<1.2	ND<140	14.0	ND<1.6	443	10,900	227	1,310	2,440	2.2	22.5	ND<140	216	ND<1.4	ND<340	ND<150	ND<150	ND<1.4	ND<6.3	ND<1.4
Ethylbenzene	**1000**	ND<1.2	451	9.7	68	23,100	59,400	2,430	27,200	20,900	ND<1.2	ND<8.6	ND<140	4,720	ND<1.4	6180	833	86300 b	ND<1.4	ND<6.3	ND<1.4
Total Xylenes	**260**	ND<2.4	821	64.0	200	101,000	436,000	9,620	50,300	56,500	9.4	436	ND<270	17,900	8.8	26100	16,890	27,500	ND<2.7	ND<13	ND<2.7
Total BTEX	**NS**	ND<6.0	1,272	89.0	327.3	124,543	508,600	11,928	79,213	80,140	11.6	459	10.2	23,034	8.8	32,805	3,238	88,188	ND<6.9	ND<31.9	ND<6.9
MTBE	**930**	ND<1.2	ND<140	1.3 J	41.4	ND<280	ND<290	11.4	ND<150	ND<130	ND<1.2	ND<8.6	ND<140	ND<140	ND<1.4	ND<340	ND<150	ND<150	ND<1.4	ND<6.30	ND<1.4
n-Butylbenzene	**12,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
sec-Butylbenzene	**11,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
tert-Butylbenzene	**5,900**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Isopropylbenzene	**2,300**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
p-Isopropylbenzene	**10,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	**12,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
n-Propylbenzene	**3,900**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trimethylbenzene	**3,600**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3,5-Trimethylbenzene	**8,400**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total STARS LISTED VOCs (µg/kg)*	**NS**	ND<6.0	1,272	89.0	327.3	124,543	508,600	11,928.4	79,213	80,140	11.6	458.5	89.0	23,034	8.8	32,805	3,238	88,188	ND<6.9	ND<31.9	ND<6.9

Notes:

CP-51 SCG	= Commissioner Policy 51/ Soil Cleanup Guidance, effective October 21, 2010
*	= Total VOC Concentration excluding MTBE
VOCs	= Volatile Organic Compounds
µg/kg	= Micrograms/kilogram
-	= No Data
ND	= Not detected
NS	= No Standard
	= One or more compounds are above the CP-51 SCG

Table 3

HISTORICAL SOIL ANALYTICAL DATA

Former Mobil Station # 17-EMW
304 Columbia Street
Brooklyn, New York

Compound	CP-51 SCG	Sample ID											
		SB-10 (10-15')	SB-10 (15-19')	SB-11 (5-10')	SB-11 (10-15')	SB-11 (15-20')	SB-11 (20-25')	SB-12 (10-15')	SB-12 (15-20')	SB-13 (10-15')	SB-14 (5-10')	SB-14 (10-15')	SB-14 (20-25')
Date		**2/19/2008**											
Laboratory Analytical Method		**EPA Method 8260B STARS List**											
Benzene	**60**	ND<3.6	ND<1.4	ND<4.7	188	2.9	ND<1.4	164	5.4	30.4	4.8	513	2.1
Toluene	**700**	ND<3.6	ND<1.4	2.5 J	91.5	3.7	ND<1.4	340	ND<1.5	14.4	2.4	132	ND<1.2
Ethylbenzene	**1000**	7.9	ND<1.4	5.7	6,170	186	8.9	11,400	1.0 J	19.2	10.5	2,290	0.72 J
Total Xylenes	**260**	57.2	ND<2.8	17.0	3,890	65.9	3.0	23,200	2.1 J	427	38.0	9,220	ND<2.8
Total BTEX	**NS**	65.1	ND<7.0	25.2	10,340	258.5	11.9	35,100	8.5	491	55.7	12,160	2.82
MTBE	**930**	ND<3.6	ND<1.4	ND<4.7	ND<65.0	7.9	11.4	ND<62.0	ND<1.5	13.1	ND<1.3	ND<63.0	ND<1.2
n-Butylbenzene	**12,000**	ND<18.0	ND<6.9	51.3	5,920	22.8	ND<6.9	2,830	ND<7.7	ND<35.0	37.9	4,740	ND<6.0
sec-Butylbenzene	**11,000**	52.0	ND<6.9	81.9	1,560	14.3	ND<6.9	712	ND<7.7	135	68.8	1,280	ND<6.0
tert-Butylbenzene	**5,900**	ND<18.0	ND<6.9	ND<23.0	ND<320	ND<14.0	ND<6.9	ND<310	ND<7.7	ND<35.0	ND<6.4	ND<320	ND<6.0
Isopropylbenzene	**2,300**	87.7	ND<6.9	164	5,880	79.2	3.1 J	3,260	ND<7.7	313	184	4,380	ND<6.0
p-Isopropylbenzene	**10,000**	60.5	ND<6.9	19.2 J	1,780	26.9	ND<6.9	1,180	ND<7.7	88.5	ND<6.4	287 J	ND<6.0
Naphthalene	**12,000**	45.7	ND<6.9	ND<23.0	3,300	ND<14.0	ND<6.9	7,690	ND<7.7	65.8	ND<6.4	5,750	ND<6.0
n-Propylbenzene	**3,900**	140	ND<6.9	284	11,300	102	5.0 J	5,600	ND<7.7	734	436	12,100	1.5 J
1,2,4-Trimethylbenzene	**3,600**	522	1.5 J	15.4 J	1,130	4.7 J	ND<6.9	31,100	ND<7.7	1,660	21.1	11,000	2.4 J
1,3,5-Trimethylbenzene	**8,400**	184	ND<6.9	ND<23.0	4,480	ND<14.0	ND<6.9	9,750	ND<7.7	1,120	ND<6.4	3,940	1.9 J
Total STARS LISTED VOCs (µg/kg)*	**NS**	1,157	1.5	641	45,690	508.4	20.0	97,222	8.5	4,607.3	803.5	55,637	8.62

Notes:

CP-51 SCG	= Commissioner Policy 51/ Soil Cleanup Guidance, effective October 21, 2010
*	= Total VOC Concentration excluding MTBE
VOCs	= Volatile Organic Compounds
µg/kg	= Micrograms/kilogram
-	= No Data
ND	= Not detected
NS	= No Standard
	= One or more compounds are above the CP-51 SCG

Table 4

DISSOLVED TOTAL BTEX CONCENTRATION REDUCTION

Former Mobil Station #17-EMW
304 Columbia Street
Brooklyn, New York

Well ID	Dissolved BTEX Concentrations (µg/L)																				Total BTEX % Reduction Since December 2008
	12/30/08	03/16/09	06/08/09	June 15-16, 2009 - ISCO Pilot Test: 1,800 gallons of 10% sodium persulfate and 900 gallons of iron catalyst inejcted.	07/20/09	09/24/09	12/03/09	03/03/10	06/07/10	Surfactant Injection and Fluid Recovery Events: June 22-25, July 26-28, and August 2-4, 2010 2,880 gallons of surfactant injected and 1,546 gallons of fluids recovered.	09/01/10	12/03/10	December 6-9, 2010 - ISCO Pilot Test: 4,800 gallons of 10% sodium persulfate and 2,400 gallons of iron catalyst inejcted.	03/29/11	06/16/11	08/08/11	August 15-18, 2011 - ISCO Pilot Test: 4,800 gallons of 10% sodium persulfate and 2,400 gallons of iron catalyst inejcted.	09/19/11	12/05/11	03/16/12	06/08/12	09/07/12	
MW-1	1,158.8	1,528.8	1,355.4		LPH	LPH	LPH	1,425.2	LPH		1,590.8	LPH		LPH	LPH	LPH		LPH	LPH	LPH	408.2	443.0	**62%**
MW-2	466.4	340.4	LPH		LPH	LPH	LPH	LPH	LPH		859	1,120.4		LPH	LPH	LPH		LPH	LPH	LPH	LPH	LPH	**LPH Still Present**
MW-3	6.52	153.3	3.1		120	341.9	270.6	3.57	13.5		412.1	64		0.69	85.6	311.5		-	-	1,321	638.9	204.2	**-3032%**
MW-5	ND<4	ND<4	ND<4		-	ND<4	ND<4	0.35	ND<4		ND<4	ND<4		ND<4	0.25	ND<4		ND<4	ND<0.75	ND<6	ND<6.00	ND<6.00	**Stable, Below Standard**
MW-7A	364	ND<4	30		1	ND<4	ND<4	159	0.36		ND<4	ND<4		1.7	LPH	LPH		LPH	-	111.86	179.56	14.4	**96%**
MW-8A	471.8	-	1,320.9		1,213.8	4,436	4,565	3,700	4,162		5,911	3,840		3,988	-	-		2,529	3,974	9,266	2,553	2,433	**-441% Increasing Off-site**
MW-9	ND<4	-	-		-	ND<4	ND<4	ND<4	ND<4		ND<4	ND<4		ND<4	-	-		-	ND<0.75	ND<6	ND<6.00	ND<6.00	**Stable, Below Standard**
MW-10	3,167	-	3,351		3,050	7,464	11,943	8,730	7,633		11,225	9,136		11,294	10,995	11,735		3,426	10,003	14,004	6,702	7,292	**-112% Increasing Off-site**
MW-11	3,378	2,995	4,224		LPH	LPH	3,239	2,698	1,814.1		3,561	3,190		508.9	779.3	1,121.5		402.3	955	3,160	2,354	2,707	**20%**
MW-12	784.2	197.1	585.3		32.66	117.1	205.1	190.8	39.6		135.7	103.1		2.76	5.88	35.5		8.75	-	40.68	35.07	43.12	**95%**
MW-13	776.3	850.8	240.6		435.5	458.2	574	161.6	191.8		3,035	2,360		19.9	129.9	796.6		245.8	175.8	1,049	739.6	875.2	**-13%**
MW-14	90.41	110.17	62.5		55.78	112.6	157	13.5	52.77		147.3	122.06		12.7	42.75	84.87		3.8	65.21	92.28	74.8	118.96	**-32%**
MW-15	171.08	556.5	142		86.53	181.8	465.3	639	216.1		205.7	433.2		120.75	8	88.45		50.24	5.51	31	3.89	ND<6.00	**Stable, Below Standard**
MW-16	2,072.8	1,727	4,665		LPH	LPH	LPH	4,134	LPH		4,041	LPH		941.3	2,633.6	LPH		209.4	1,164	1,958	1,745	2,824.1	**-36%**
MW-17	917.4	342.2	1,536.1		1,998.4	751.3	2,217.7	559.2	575.6		1,498.6	1,760.8		277.9	LPH	LPH		LPH	491.3	LPH	743.1	277.9	**70%**
MW-18	2,989.4	2,600.7	2,541.8		2,491.7	1,552.8	2,512.2	2,818.6	2,783		3,666	1,353.4		1,080.7	3,589	3,179		2,007.8	2,317	4,661	410.9	1,911.8	**36%**

Notes:

BTEX = Benzene, toluene, ethylbenzene and total xylenes
µg/L = Micrograms/liter
NM = Not measured or sampled

ISCO = In-situ chemical oxidation
ND<# = Not detected (# is the reporting limit or the method detection limit)
LPH = Liquid-phase hydrocarbons present, no sample collected

$$\% \text{ Reduction} = \frac{(\text{Initial Concentration} - \text{Final Concentration})}{\text{Initial Concentration}} \mid 100$$

Table 5

DISSOLVED MTBE CONCENTRATION REDUCTION

Former Exxon Mobil Station #17-EMW
304 Columbia Street
Brooklyn, New York

Well ID	Dissolved MtBE Concentrations (µg/L)																				Total MTBE % Reduction Since December 2008
	12/30/08	03/16/09	06/08/09	June 15-16, 2009 - ISCO Pilot Test: 1,800 gallons of 10% sodium persulfate and 900 gallons of iron catalyst inejcted.	07/20/09	09/24/09	12/03/09	03/03/10	06/07/10	Surfactant Injection and Fluid Recovery Events: June 22-25, July 26-28, and August 2-4, 2010 2,880 gallons of surfactant injected and 1,546 gallons of fluids recovered.	09/01/10	12/03/10	December 6-9, 2010 - ISCO Pilot Test: 4,800 gallons of 10% sodium persulfate and 2,400 gallons of iron catalyst inejcted.	03/29/11	06/16/11	08/08/11	August 15-18, 2011 - ISCO Pilot Test: 4,800 gallons of 10% sodium persulfate and 2,400 gallons of iron catalyst inejcted.	09/19/11	12/05/11	03/16/12	06/08/12	09/07/12	
MW-1	13.2	9	ND<5		LPH	LPH	LPH	3.6	LPH		ND<20	LPH		LPH	LPH	LPH		LPH	LPH	LPH	ND<1.00	ND<1.00	**100%**
MW-2	37	67	LPH		LPH	LPH	LPH	LPH	LPH		155	120		LPH	LPH	LPH		LPH	LPH	LPH	LPH	LPH	**LPH Still Present**
MW-3	0.53 J	20.2	ND<1		13.2	ND<1	3.1	ND<1	1.2		25.8	ND<1		ND<1	ND<5	ND<1		-	-	ND<1	ND<1.00	ND<1.00	**Stable, Below Standard**
MW-5	ND<1	ND<1	ND<1		-	ND<1	ND<1	ND<1	ND<1		ND<1	0.35 J		ND<1	ND<1	1.3		ND<1	ND<0.18	ND<1	ND<1.00	ND<1.00	**Stable, Below Standard**
MW-7A	1.9	ND<1	ND<1		0.48 J	ND<1	0.52 J	1.2	ND<1		ND<1	ND<1		ND<1	LPH	LPH		LPH	-	1.09	1.12	ND<1.00	**100%**
MW-8A	22.6	-	129		149	542	452	185	766		939	555		418	-	-		298	637	1,100	983	376	**-1,564% Increasing Off-site**
MW-9	2.6	-	-		-	2.6	4.6	0.32 J	2.9		6.7	6.7		1.5	-	-		-	10.1	9.21	12.6	11	**-323%**
MW-10	213	-	166		97	315	698	1,810	1,380		1,580	ND<10		1,640	1,160	1,030		191	610	1,210	860	777	**-265% Increasing Off-site**
MW-11	23.9	20.9	27		LPH	LPH	47	23.4	23.1		ND<100	11.3		3.2	2.8	7.9		1.4	4	12	9.7	7.61	**68%**
MW-12	41	12.9	147		41.9	113	88.4	41.4	8.6		23	20.3		6.7	8.9	32.5		ND<1	-	24	24.3	ND<1.00	**100%**
MW-13	12.3	11.9	11.7		15.9	10.8	13.6	4.8	18.6		16.9	ND<5		3	10.5	3.1		1.3	3.4	2	2.74	ND<1.00	**100%**
MW-14	ND<1	ND<1	ND<1		ND<1	ND<1	ND<1	ND<1	ND<1		ND<1	ND<1		ND<1	ND<1	ND<1		ND<1	ND<0.18	ND<1	ND<1.00	ND<1.00	**Stable, Below Standard**
MW-15	16.8	57.2	14.8		19.1	74.5	52.2	99.2	24.7		101	93.3		26.8	3.4	45.1		25.8	5.4	58	8.11	10.2	**39%**
MW-16	7.7	3.7	ND<20		LPH	LPH	LPH	3.5 J	LPH		ND<20	LPH		ND<2.5	ND<10	LPH		ND<1	ND<0.37	ND<1	ND<1.00	ND<1.00	**Stable, Below Standard**
MW-17	2.3	2.1	7.7		1.7	ND<1	1.7 J	1.4 J	0.83 J		ND<2	ND<1		1.2 J	LPH	LPH		LPH	1	LPH	ND<1.00	ND<1.00	**Stable, Below Standard**
MW-18	ND<5	ND<5	ND<10		ND<10	ND<1	ND<5	ND<10	ND<5		ND<20	ND<10		ND<5	ND<10	ND<10		ND<5	ND<0.92	ND<1	ND<1.00	ND<1.00	**Stable, Below Standard**

Notes:

µg/L = Micrograms/liter
MtBE = Methyl tert-butyl ether
J = Estimated value
LPH = Liquid-phase hydrocarbons present, no sample collected

ISCO = In-situ chemical oxidation
NM = Not measured or sampled
ND<# = Not detected (# is the reporting limit or the method detection limit)

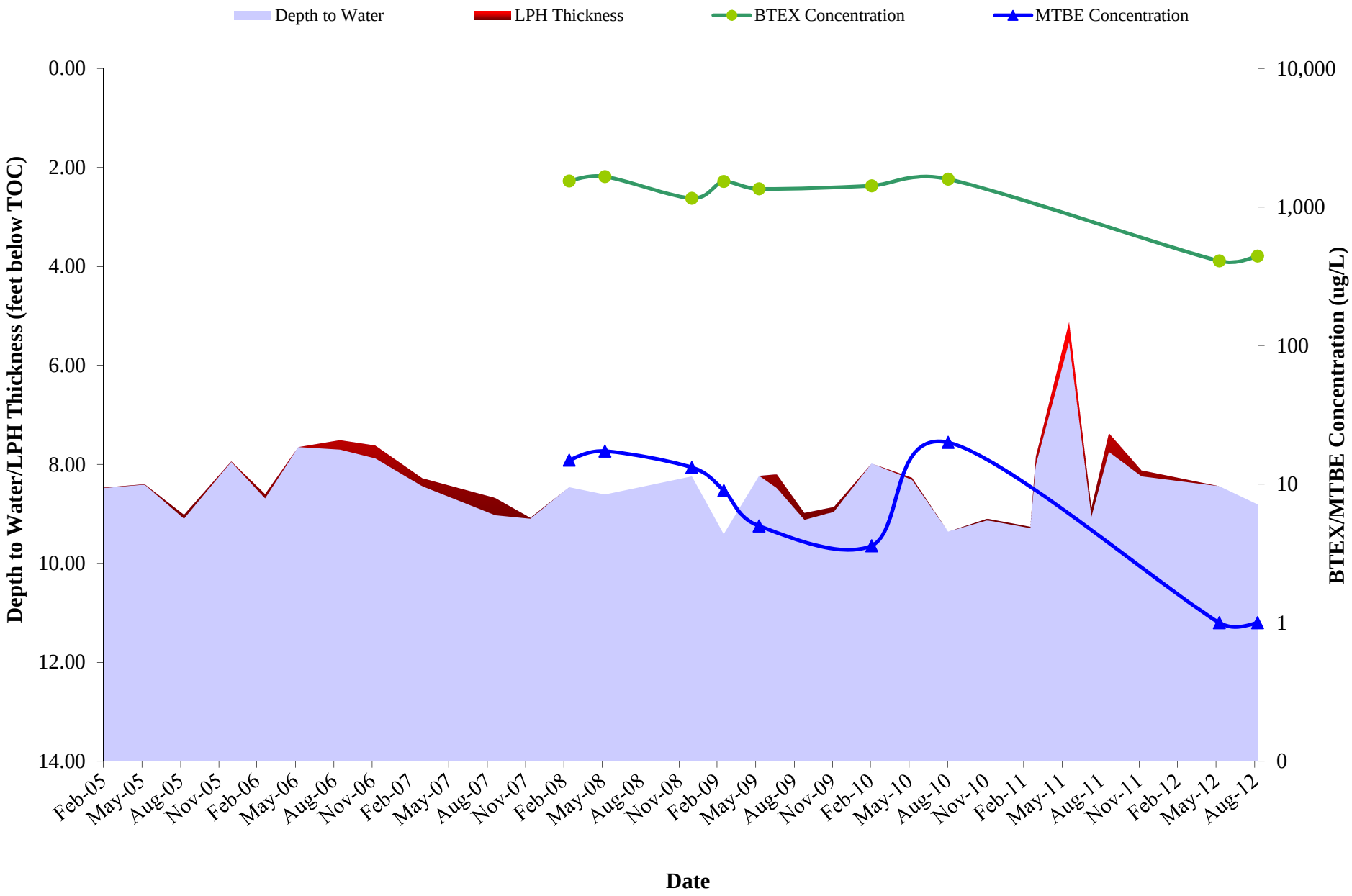
$$\% \text{ Reduction} = \frac{(\text{Initial Concentration} - \text{Final Concentration})}{\text{Initial Concentration}} \left| \begin{array}{c} 100 \\ \\ \end{array} \right.$$

APPENDIX A

DEPTH TO WATER/LPH THICKNESS & BTEX/MTBE CONCENTRATION with TIME in MW-1

Former Mobil 17-EMW (17-EMW)

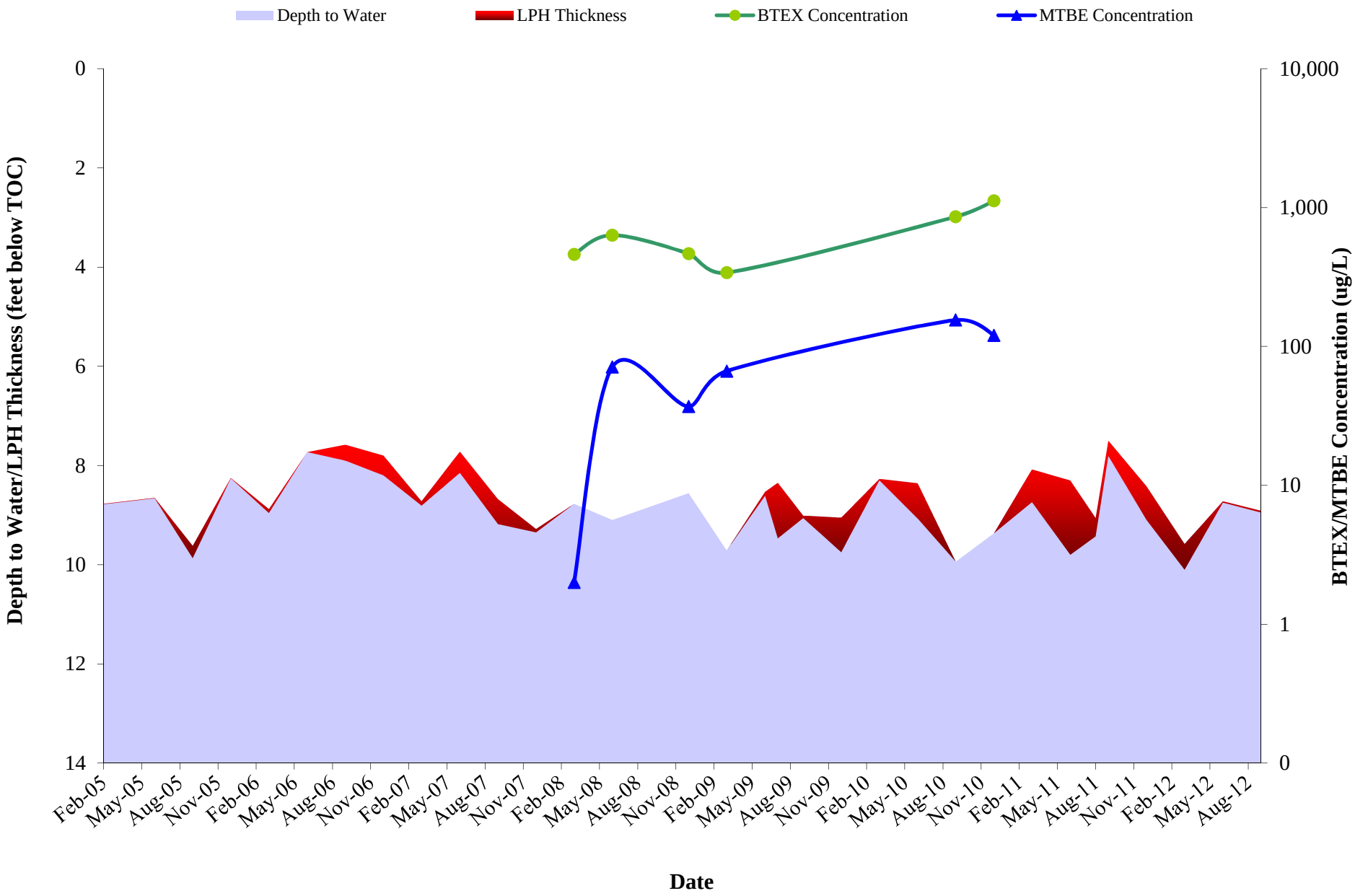
304 Columbia Street, Brooklyn, New York



DEPTH TO WATER/LPH THICKNESS & BTEX/MTBE CONCENTRATION with TIME in MW-2

Former Mobil 17-EMW (17-EMW)

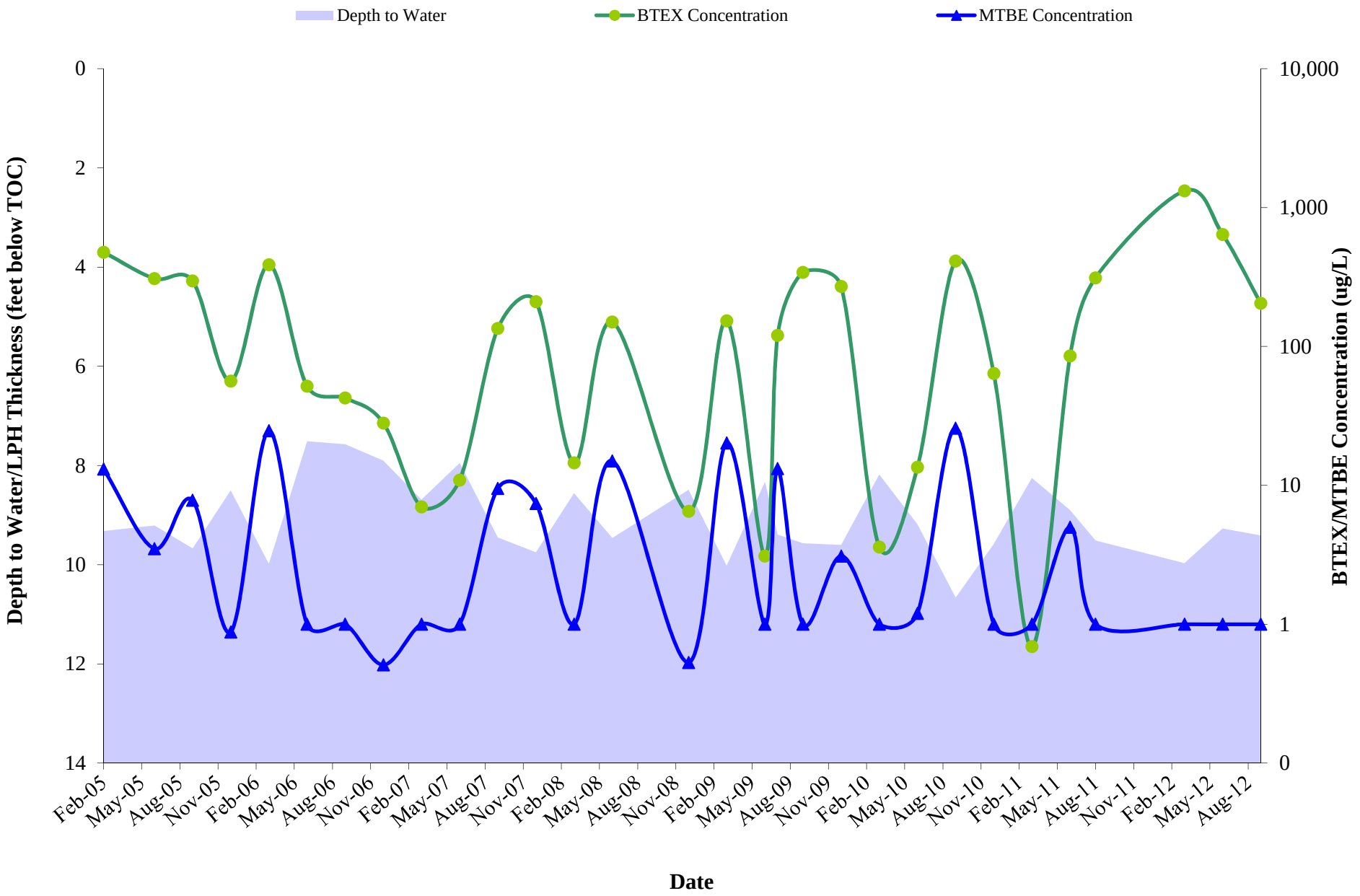
304 Columbia Street, Brooklyn, New York



DEPTH TO WATER/BTEX/MTBE CONCENTRATION with TIME in MW-3

Former Mobil 17-EMW (17-EMW)

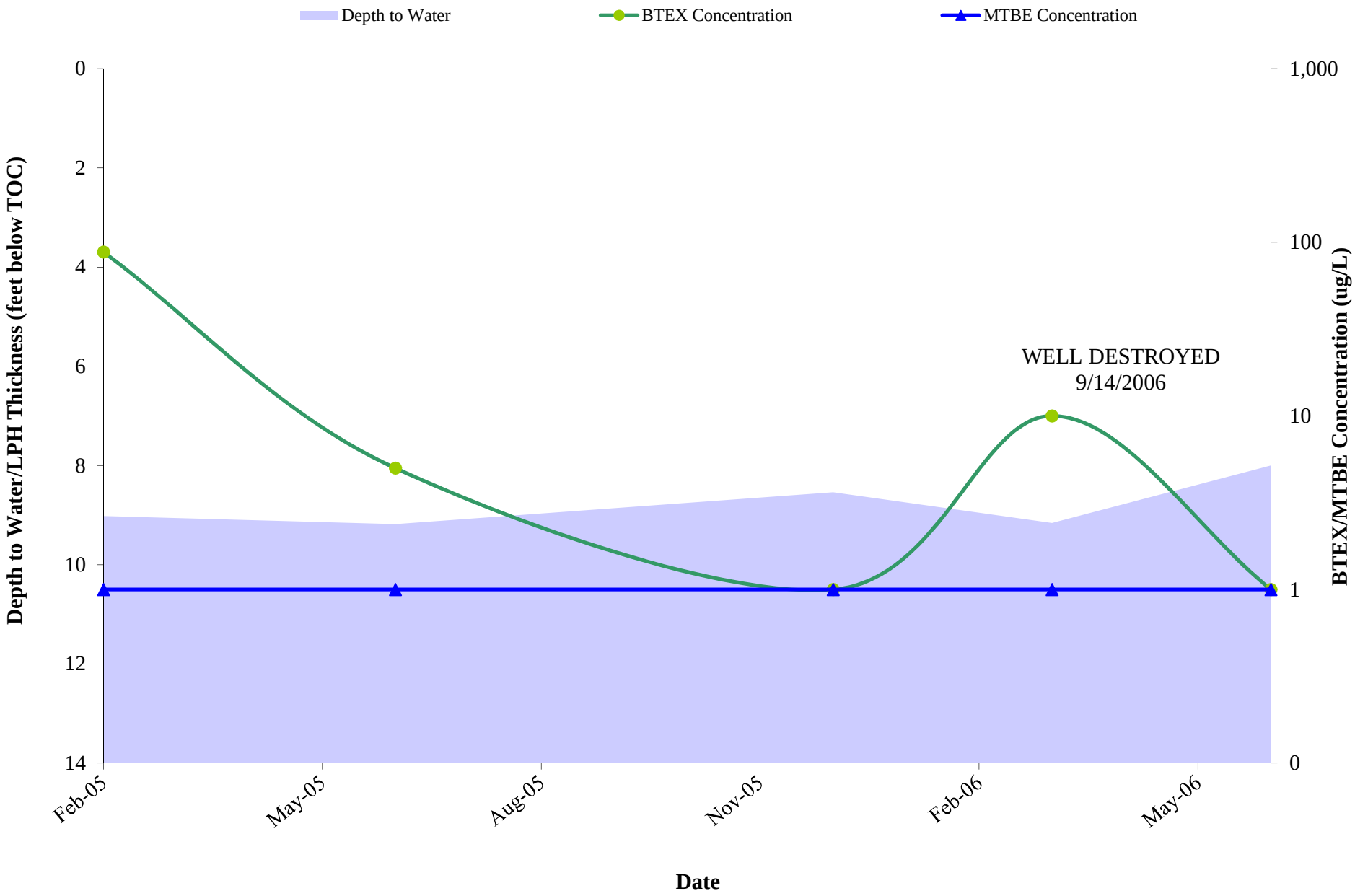
304 Columbia Street, Brooklyn, New York



DEPTH TO WATER/BTEX/MTBE CONCENTRATION with TIME in MW-4 (Destroyed)

Former Mobil 17-EMW (17-EMW)

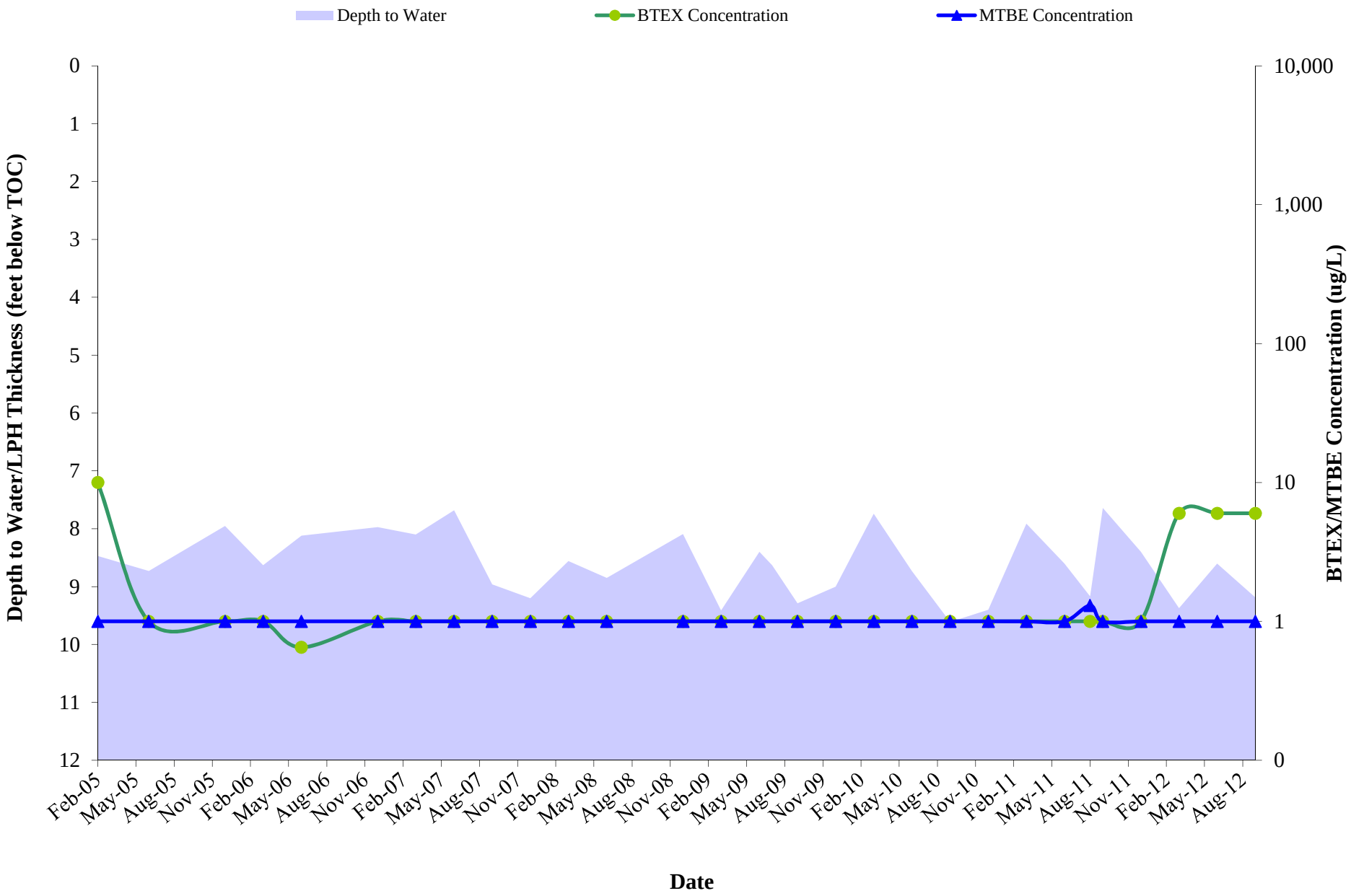
304 Columbia Street, Brooklyn, New York



DEPTH TO WATER/BTEX/MTBE CONCENTRATION with TIME in MW-5

Former Mobil 17-EMW (17-EMW)

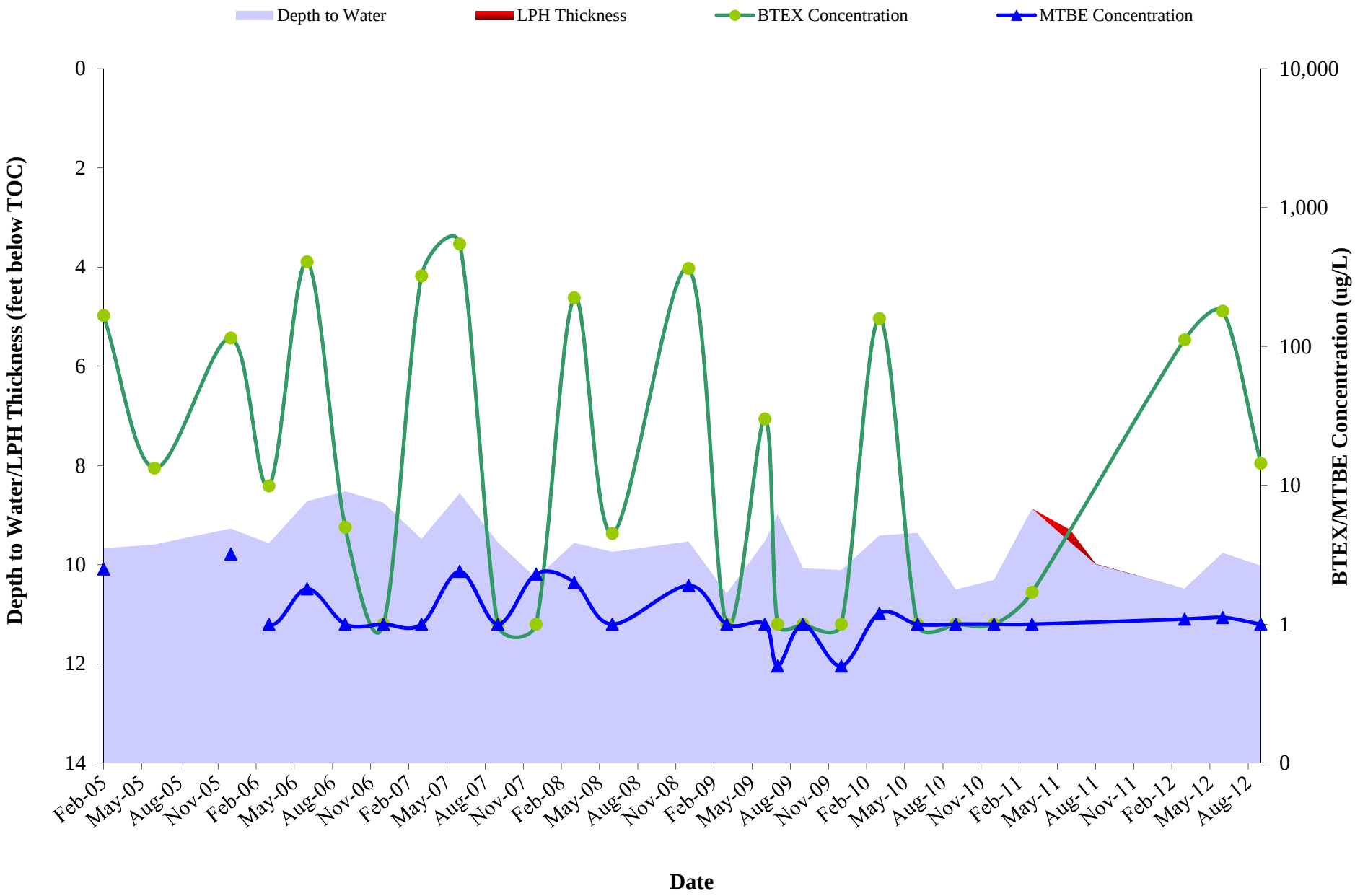
304 Columbia Street, Brooklyn, New York



DEPTH TO WATER/LPH THICKNESS & BTEX/MTBE CONCENTRATION with TIME in MW-7A

Former Mobil 17-EMW (17-EMW)

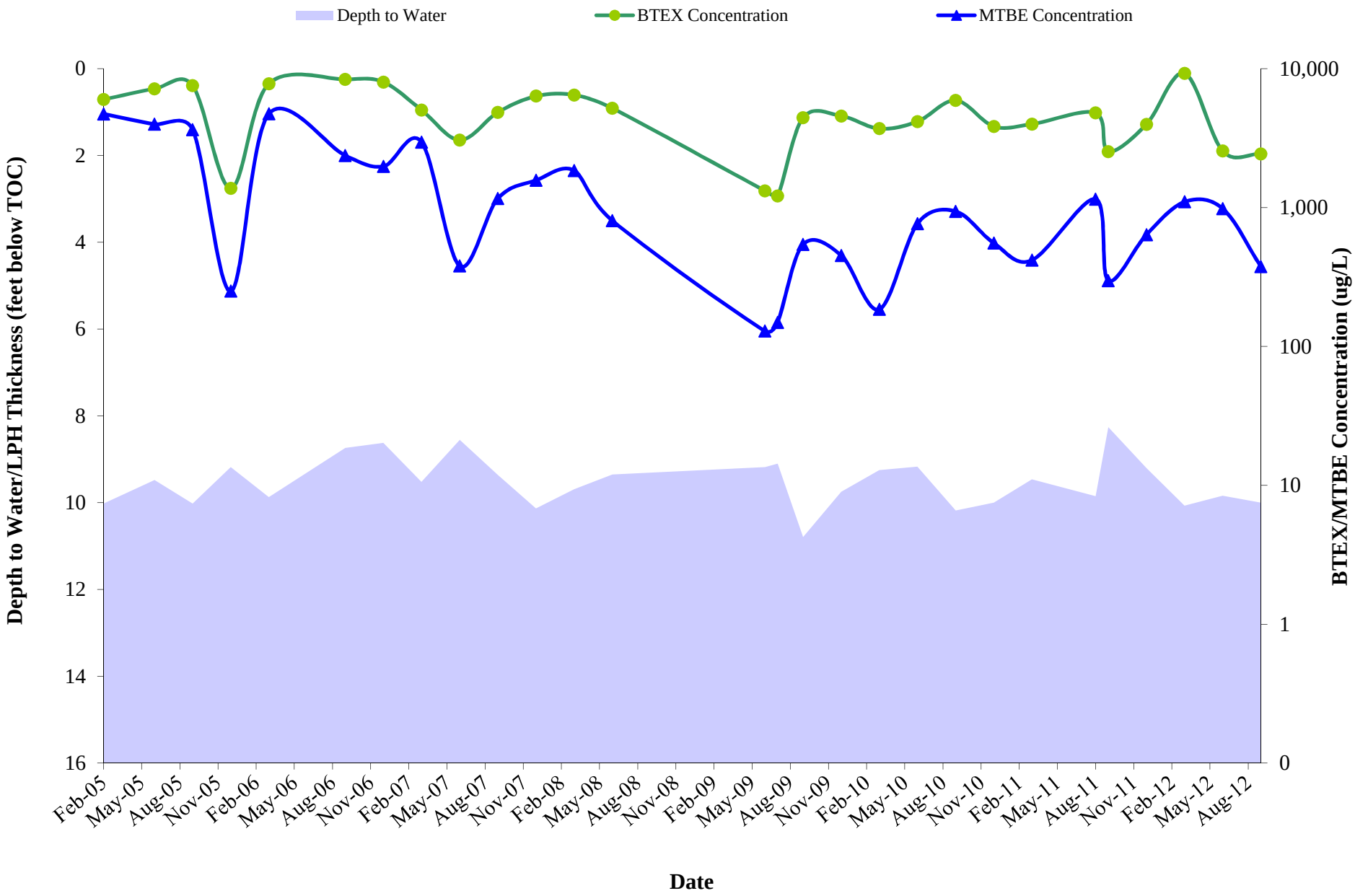
304 Columbia Street, Brooklyn, New York



DEPTH TO WATER/BTEX/MTBE CONCENTRATION with TIME in MW-8A

Former Mobil 17-EMW (17-EMW)

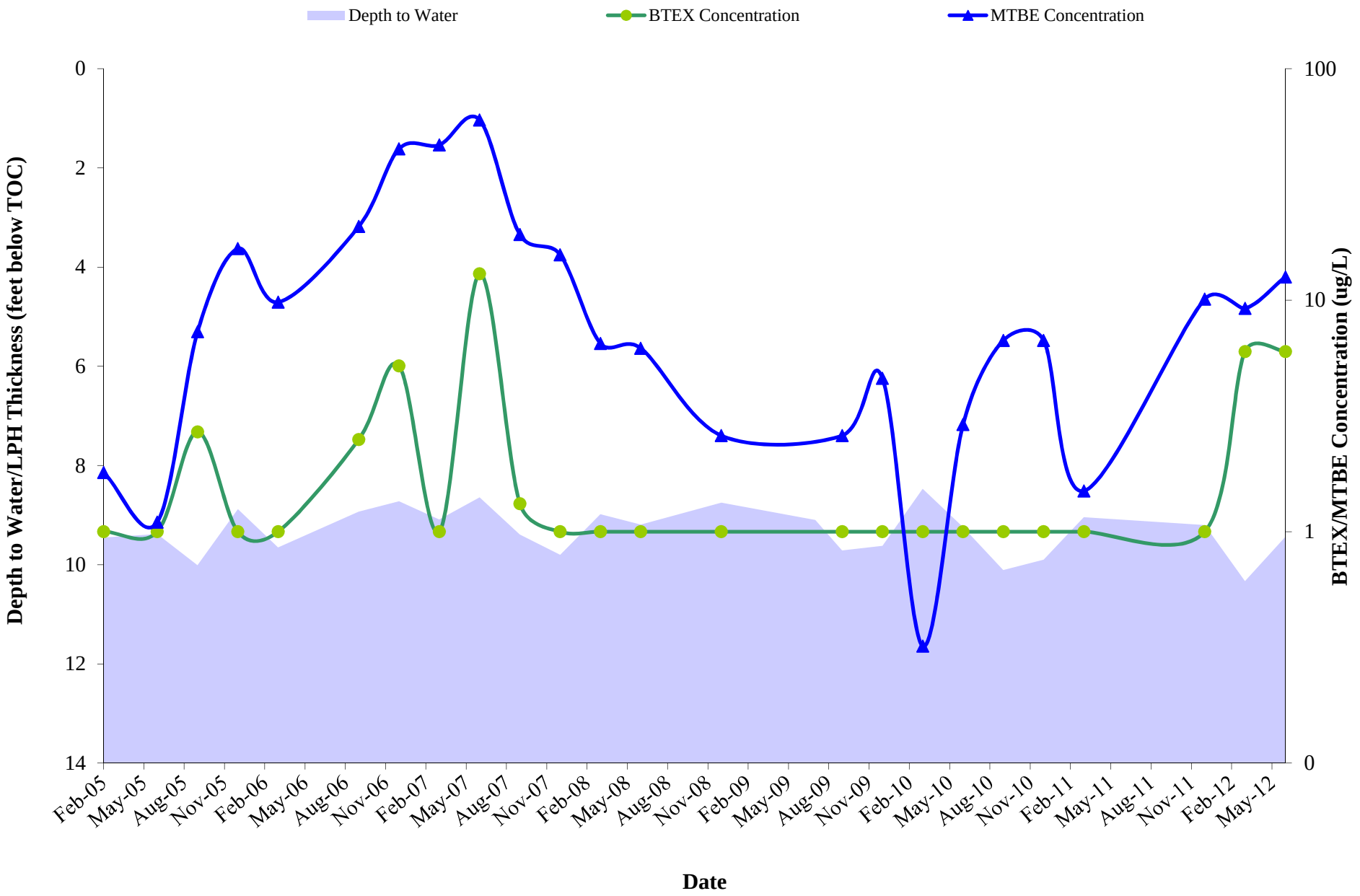
304 Columbia Street, Brooklyn, New York



DEPTH TO WATER/BTEX/MTBE CONCENTRATION with TIME in MW-9

Former Mobil 17-EMW (17-EMW)

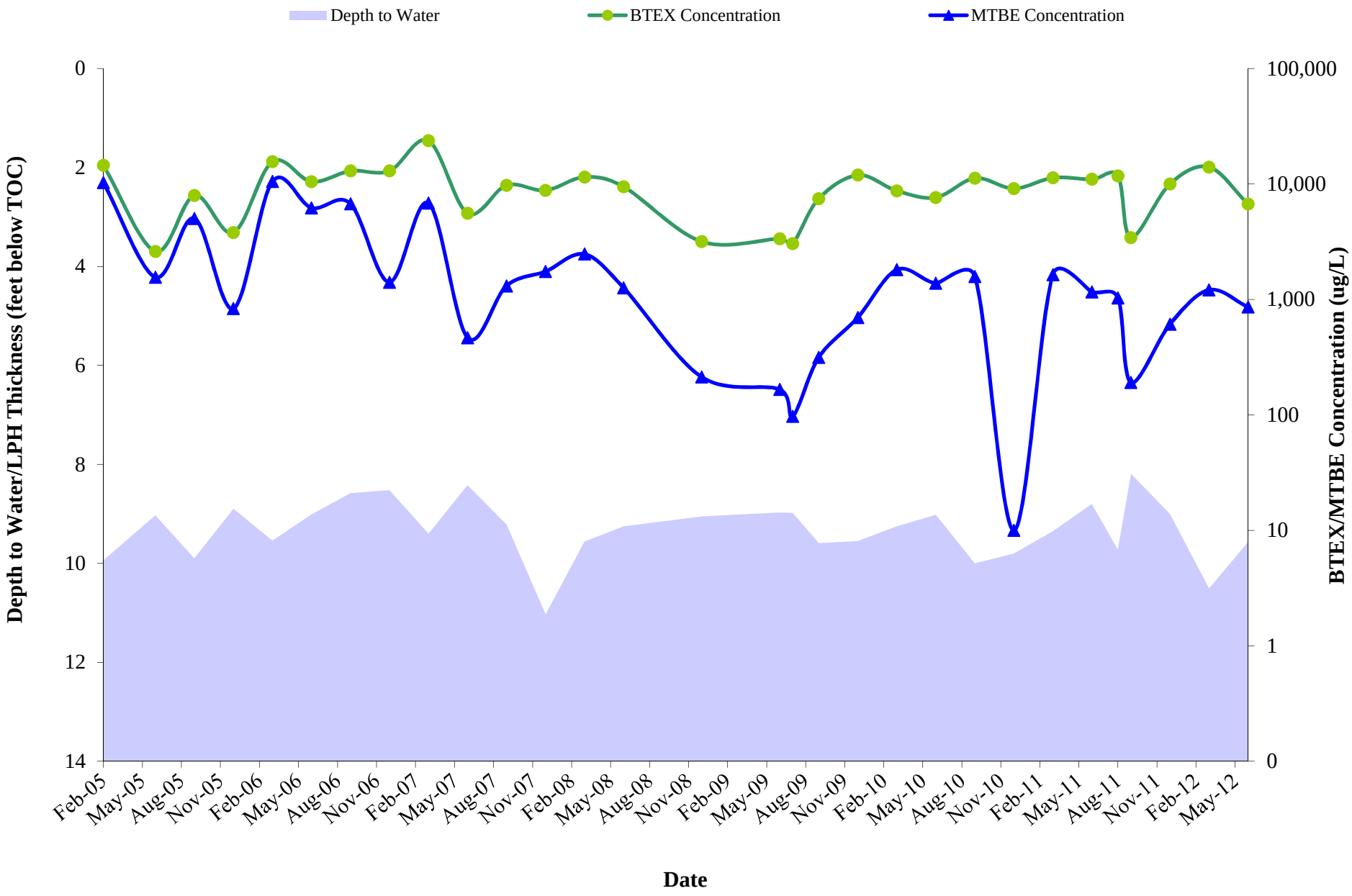
304 Columbia Street, Brooklyn, New York



DEPTH TO WATER/LPH THICKNESS & BTEX/MTBE CONCENTRATION with TIME in MW-10

Former Mobil 17-EMW (17-EMW)

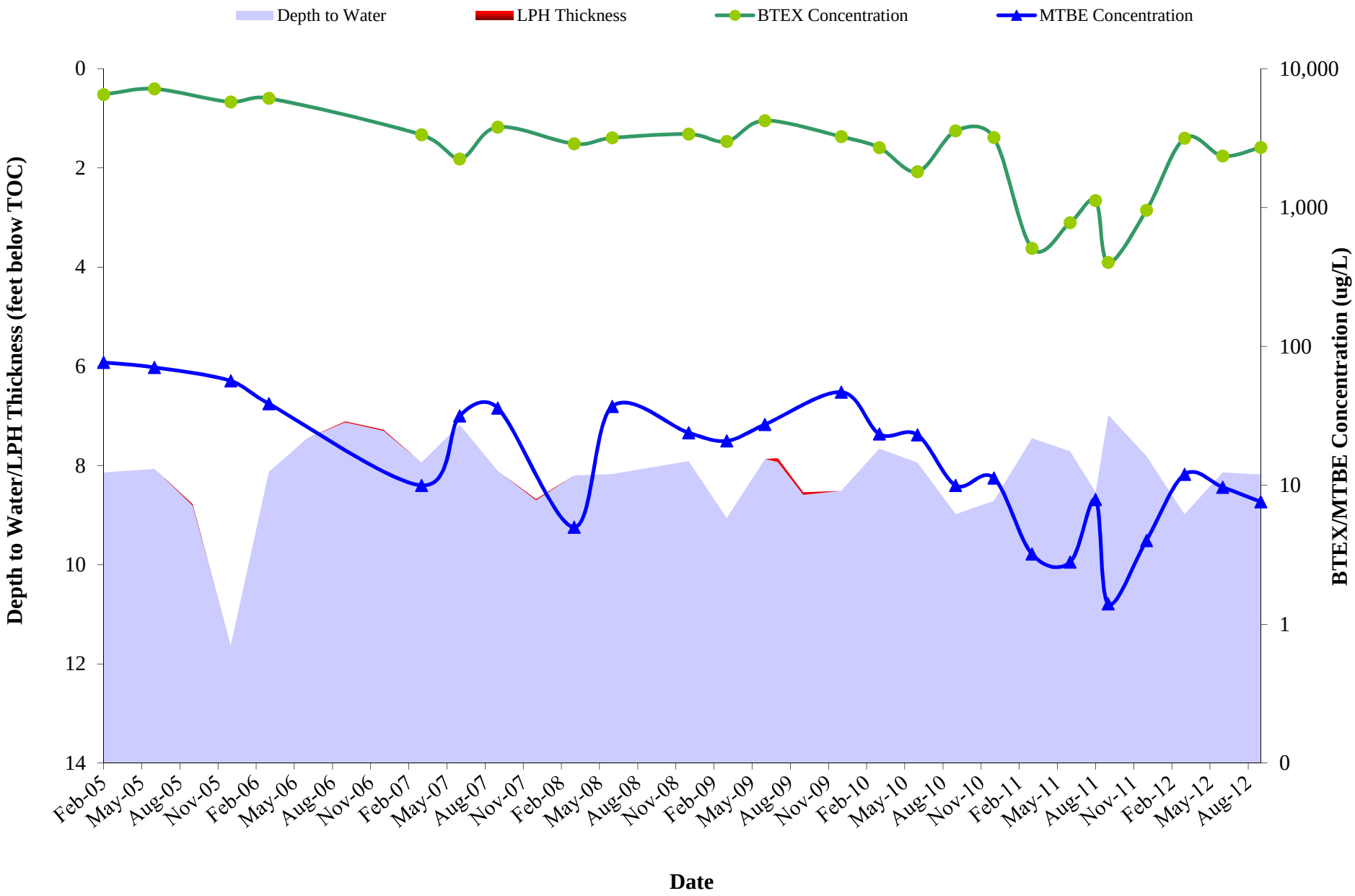
304 Columbia Street, Brooklyn, New York



DEPTH TO WATER/LPH THICKNESS & BTEX/MTBE CONCENTRATION with TIME in MW-11

Former Mobil 17-EMW (17-EMW)

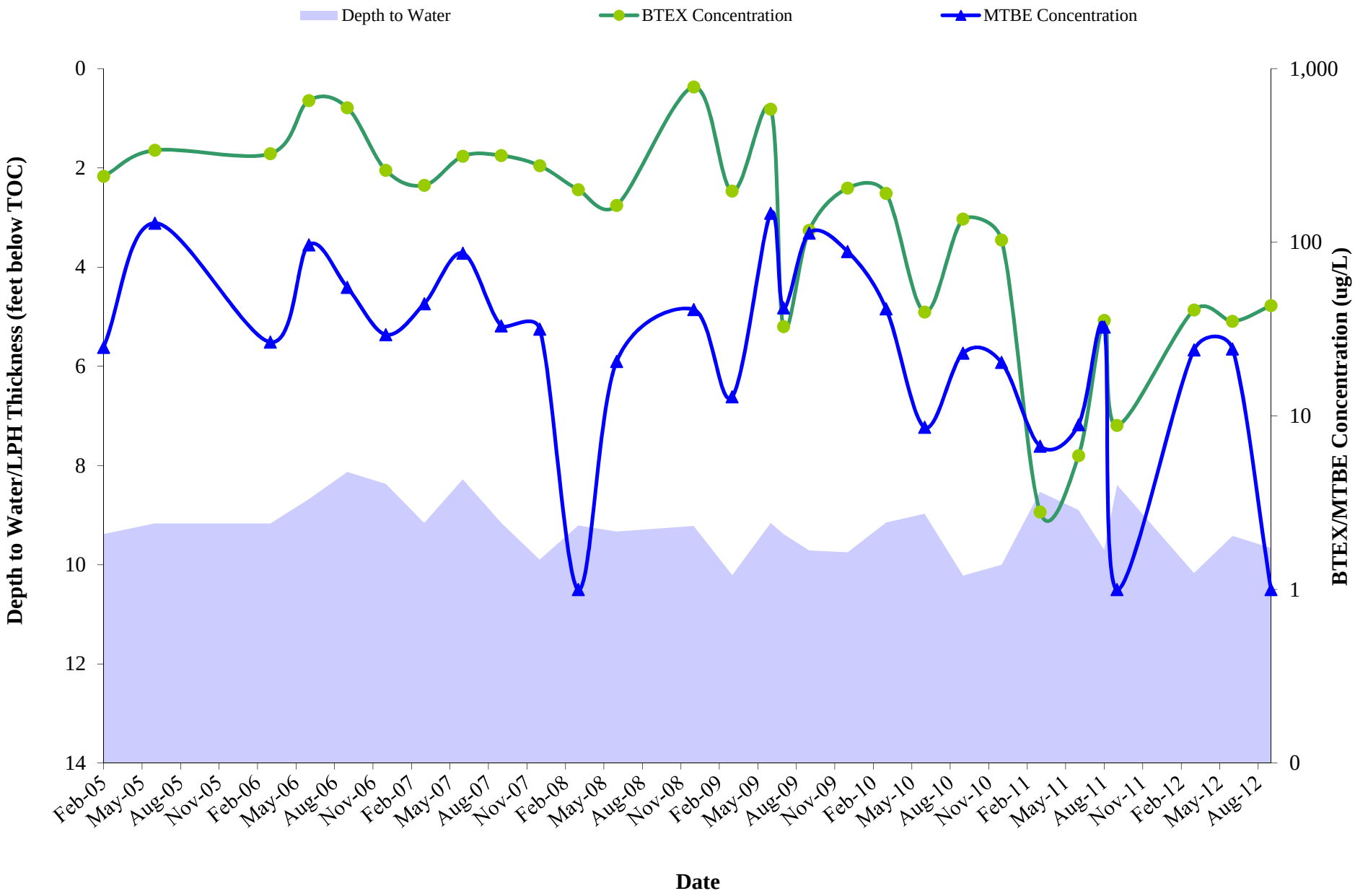
304 Columbia Street, Brooklyn, New York



DEPTH TO WATER/BTEX/MTBE CONCENTRATION with TIME in MW-12

Former Mobil 17-EMW (17-EMW)

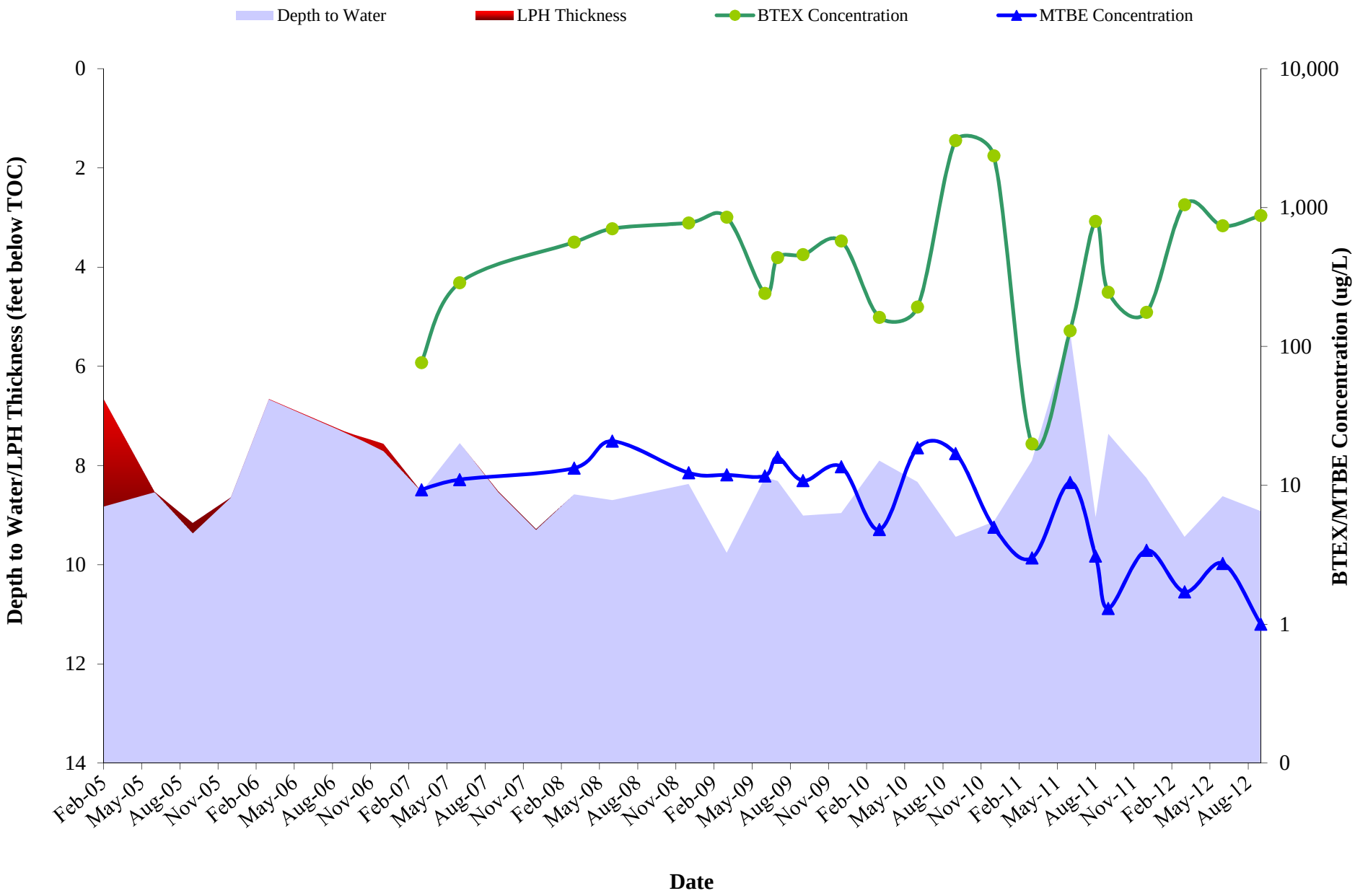
304 Columbia Street, Brooklyn, New York



DEPTH TO WATER/LPH THICKNESS & BTEX/MTBE CONCENTRATION with TIME in MW-13

Former Mobil 17-EMW (17-EMW)

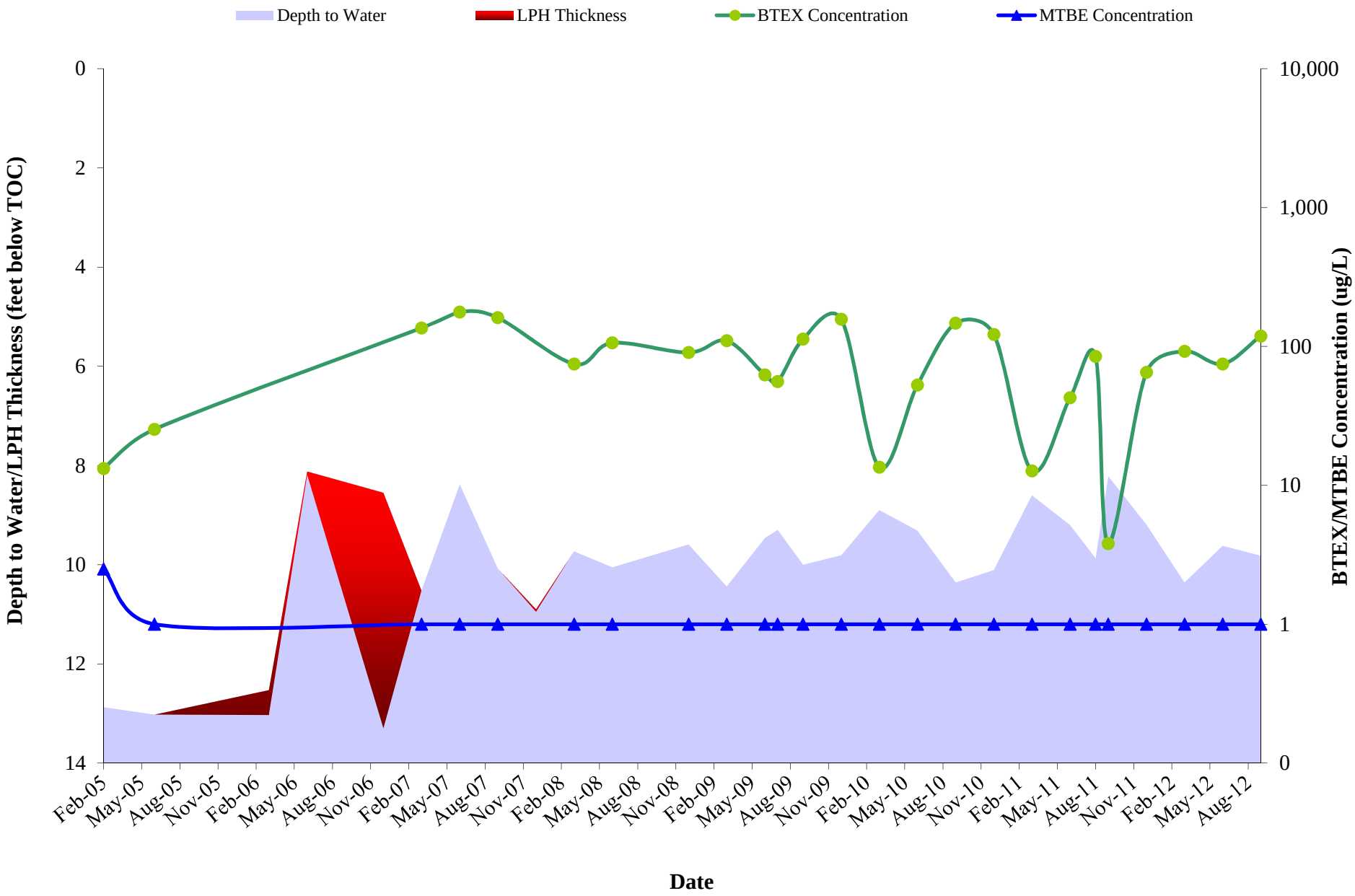
304 Columbia Street, Brooklyn, New York



DEPTH TO WATER/LPH THICKNESS & BTEX/MTBE CONCENTRATION with TIME in MW-14

Former Mobil 17-EMW (17-EMW)

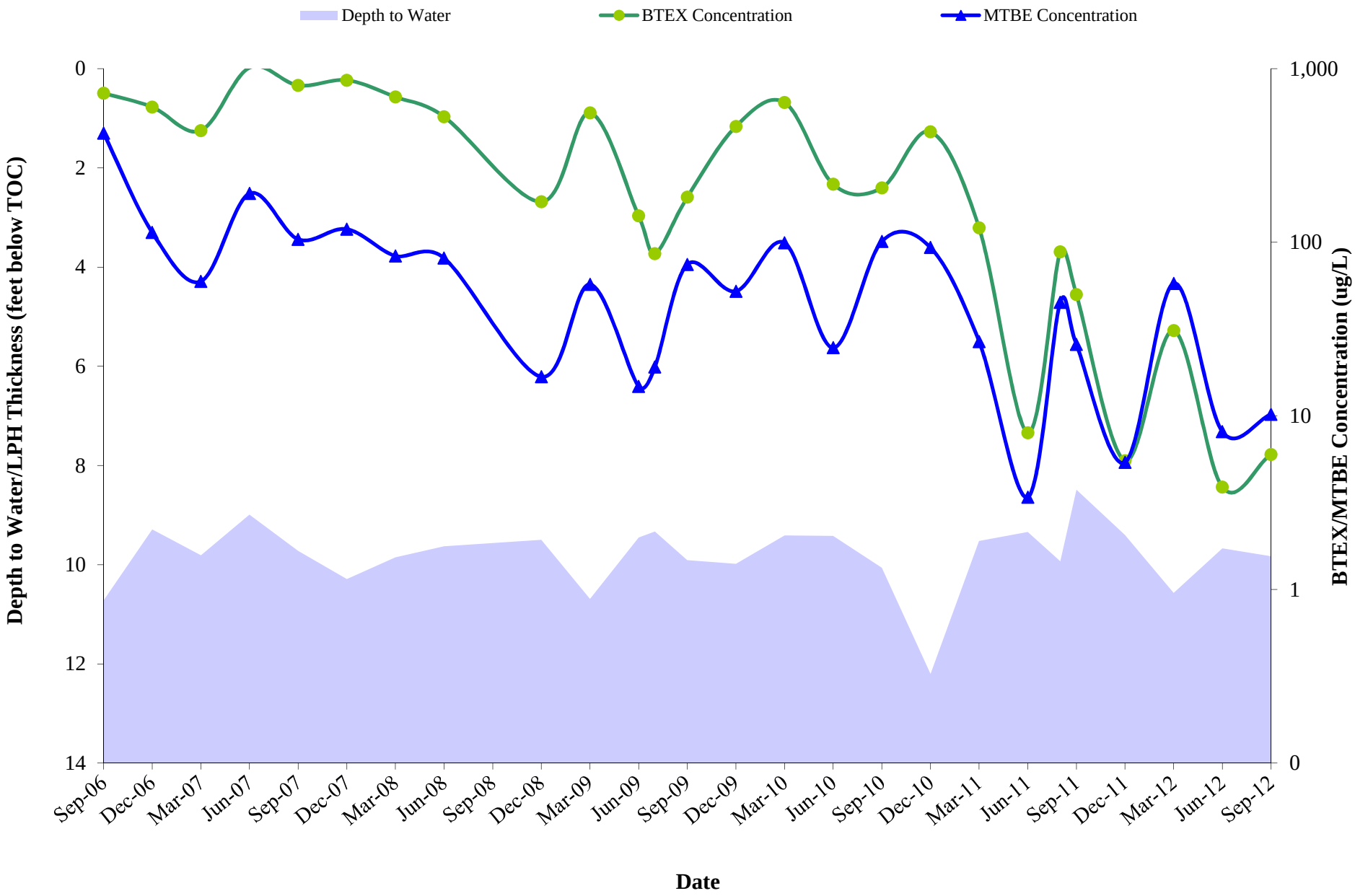
304 Columbia Street, Brooklyn, New York



DEPTH TO WATER/BTEX/MTBE CONCENTRATION with TIME in MW-15

Former Mobil 17-EMW (17-EMW)

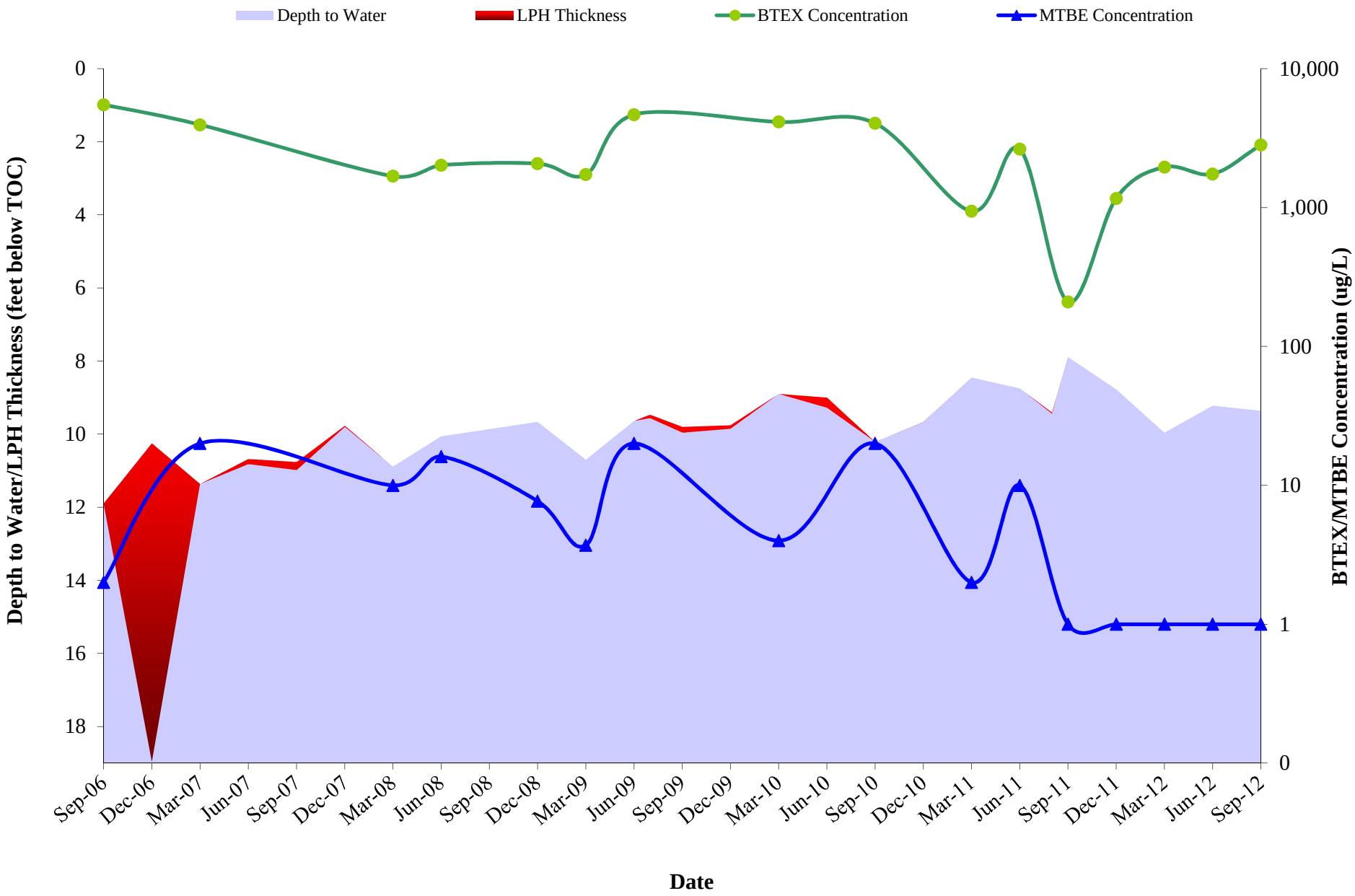
304 Columbia Street, Brooklyn, New York



DEPTH TO WATER/LPH THICKNESS & BTEX/MTBE CONCENTRATION with TIME in MW-16

Former Mobil 17-EMW (17-EMW)

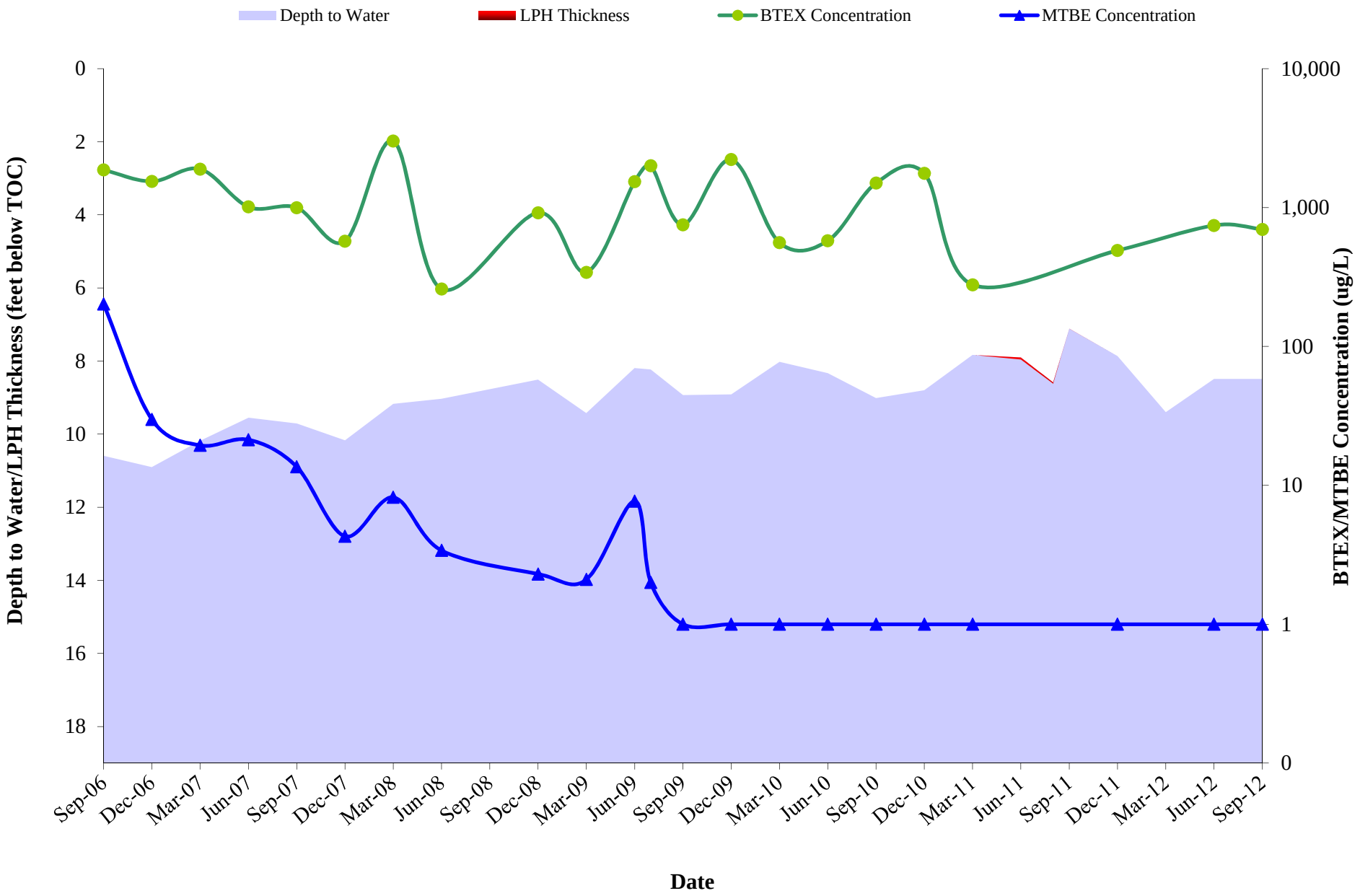
304 Columbia Street, Brooklyn, New York



DEPTH TO WATER/LPH THICKNESS & BTEX/MTBE CONCENTRATION with TIME in MW-17

Former Mobil 17-EMW (17-EMW)

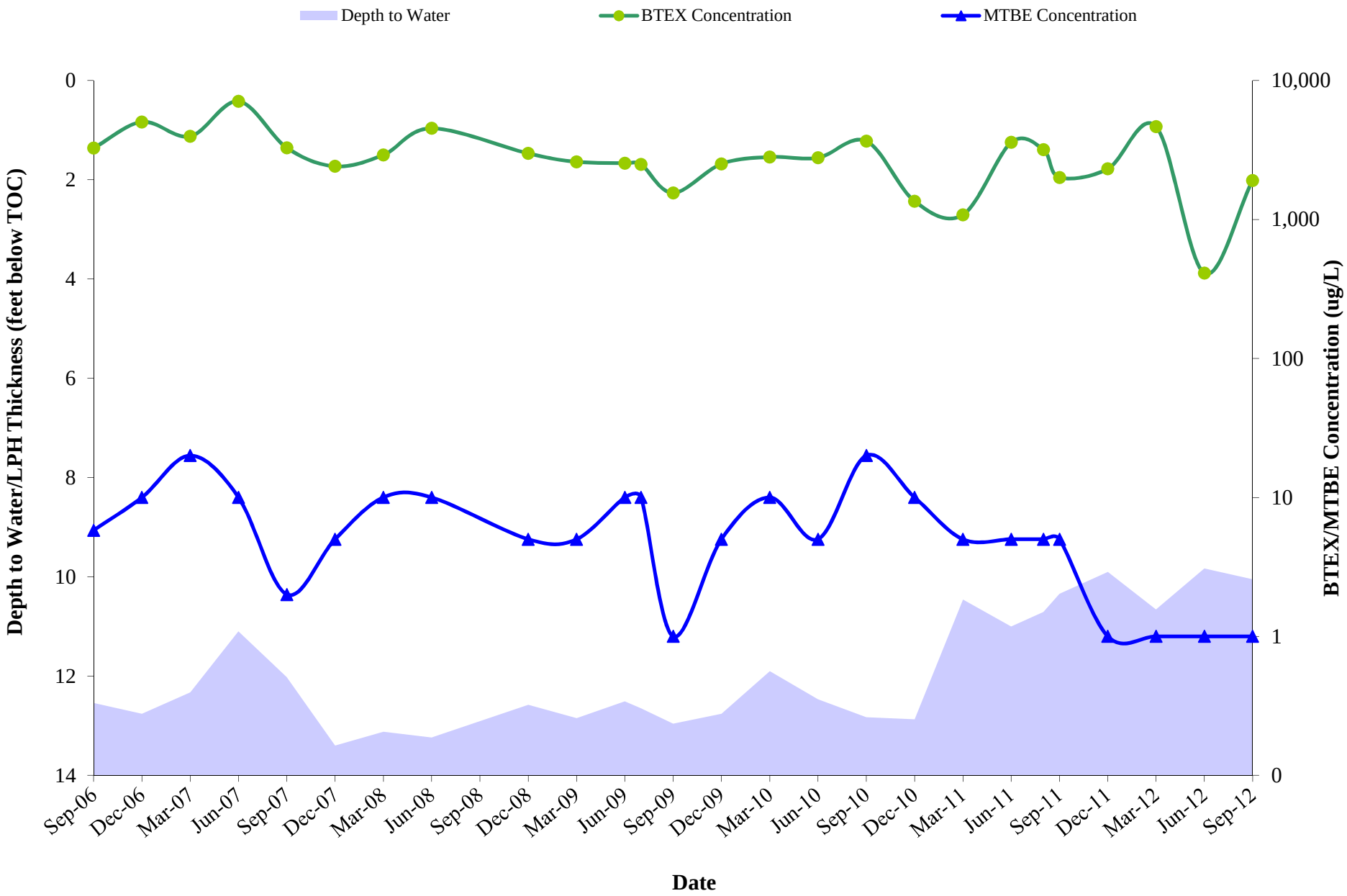
304 Columbia Street, Brooklyn, New York



DEPTH TO WATER/BTEX/MTBE CONCENTRATION with TIME in MW-18

Former Mobil 17-EMW (17-EMW)

304 Columbia Street, Brooklyn, New York



APPENDIX B

SITE HISTORY

Former Mobil Station #17-EMW
304 Columbia Street
Brooklyn, New York

The site is currently an automobile repair facility. There are currently three (3) closed New York State Department of Environmental Conservation (NYSDEC) spills associated with the site:

- NYSDEC Spill #93-12498 was opened on January 24, 1994 in response to a tank test failure. The spill was closed on May 14, 2003.

- NYSDEC Spill #05-02047 was opened on May 19, 2005 in response to a used oil spill. The spill was closed on April 26, 2010.

- NYSDEC Spill #06-10200 was opened on December 7, 2006 in response to an unknown spill event. The spill was closed on April 26, 2010.

There is one (1) active NYSDEC spill associated with the site:

- NYSDEC Spill #89-04339 was opened on August 1, 1989 during UST removal activities. The spill remains open.

The active spill, along with historical site investigation and remediation activities conducted at the site has been summarized below.

- July 1989 –A tank removal and replacement was conducted on behalf of Mobil Oil Corporation. 15 underground storage tanks (USTs) were removed from the site and four new USTs were installed. Petroleum-impacted soil and liquid phase hydrocarbons (LPH) were discovered during tank removal activities. Approximately 650 tons of petroleum-impacted soil was exvacated and disposed of at a state certified landfill.

- July 25, 1989 – A site assessment was conducted at the site. Five (5) monitoring wells were installed (W-1 through W-5). Liquid phase hydrocarbons were present in W-2 and W-3.

- August 1, 1989 – Spill number 89-04339 was assigned to the site by the New York State Department of Environmental Conservation.

- December 1996 – A subsurface investigation prior to site divestment, which included the installation of three (3) Geoprobe soil borings.

- April 22 through 25, 1997 – Site divestment activities included the removal of one (1) 1,000 gallon waste oil UST, one (1) 4,000 gallon, abandoned, single-walled steel gasoline tank, two (2) 4,000 gallon, double-walled gasoline fiberglass tanks, one (1) 4,000 gallon, double-walled fiberglass, abandoned gasoline tank, one(1) pump island, all associated piping and three (3) hydraulic lifts. Approximately 235.06 tons of petroleum-contaminated soil was excavated and disposed of at a state certified landfill. Seven (7) on-site monitoring wells were destroyed during tank closure activities and site renovations.

- March 25 and April 6, 1998 – A subsurface investigation was conducted which included the installation of four (4) groundwater monitoring wells were installed (MW-1 through MW-3 and MW-5).

- October 11, 1999 – An Environmental Site Assessment was conducted and included the installation of five (5) soil borings to varying depths from 8 to 34 feet below ground surface (B-1 through B-5).

- May 10 and 15, 2002 – A site investigation work plan was submitted for proposed delineation and included the installation of ten on-site soil borings and four off-site soil borings (along north side of Hamilton Avenue) using a Geoprobe to 16 feet below ground surface with groundwater sampling.

- June 24, 2002 – NYSDEC approved the site investigation plans and proposed schedules submitted on May 10 and 15, 2002. The NYSDEC requested four additional borings along Columbia Street and two additional borings along Woodhull Street. The NYSDEC requested a sensitive receptor survey (SRS) and UST investigation of the former tank field to evaluate existence and/or proper abandonment of 1,000-gallon USTs from 1997.

- July 22 through 26, 2002 – A subsurface investigation was conducted and included six (6) on-site soil borings (SB-1, 2, 4, 7, 8, and 9) and ten (10) off-site soil borings (SB-11 through SB-20).

- December 2, 2002 – A Subsurface Investigation Report (SIR) was submitted to the NYSDEC for fieldwork completed in July 2002. Recommendations were made for additional off-site borings/monitoring wells along Hamilton Avenue.

- February 10, 2003 – Site visit between the NYSDEC and ExxonMobil to discuss proposed monitoring well locations.

- February 21, 2003 – A revised proposed monitoring well/soil boring location map in regards to site discussion on February 10, 2003 to the NYSDEC via email.

- March 20, 2003 – Letter received from NYSDEC to ExxonMobil approving the on- and off-site borings and monitoring wells submitted on a revised map dated February 21, 2003.

- May 12, 2003 – A subsurface investigation was conducted which included the installation of five (5) monitoring wells.

- September 16, 2003 – A Corrective Action Plan (CAP) was submitted which included a proposed pilot test and future remedial plan.

- September 25, 2003 – The NYSDEC requested the CAP be expanded to include details on the pilot test and possible installation of additional wells.

- November 18, 2003 – Letter from the NYSDEC approving the amended CAP.

- February 9, 2004 – A subsurface investigation was conducted which included the installation of three (3) soil borings which were completed as monitoring wells (MW-11 through MW-13).

- February 27, 2004 – A high vacuum dual-phase extraction (HVDPE)/enhanced fluid recovery (EFR) event was conducted. During the event, preliminary data was collected to conduct an HVDPE/EFR pilot test.

- November 4, 2004 – A supplemental subsurface investigationwas conducted in which one (1) soil boring was installed and completed as a monitoring well (MW-14).

- January 2005 through March 2006 – Enhanced fluid recovery events (EFR) were conducted on a monthly basis. A passive bailer was installed in monitoring well (MW-14) on September 23, 2005. Monitoring wells MW-6, MW-7, and MW-8 were destroyed during construction activities and MW-6A was destroyed in March 2005 during construction for a billboard sign.

- June 2008 – Subsurface investigation was conducted to further evaluate current soil and groundwater hydrocarbon concentrations for additional on- and off-site delineation.

- June 15 through 16, 2009 – Chemical oxidation injections were performed where approximately 1,800 gallons of sodium persulfate and 2,700 gallons of ISOTEC's patented catalyst were injected into twelve injection points located on site.

- June 22 and 23, 2010 - Approximately 1,680 gallons of a diluted Enviroclean surfactant solution was injected at MW-1, MW-2, MW-3, MW-13, and MW-16 in order to address LPH observed at the site prior to continuation of chemical injections. On June 24, 25, and 28, 2010, approximately 710 gallons of fluids were recovered during EFR events from the five injection wells.

- July 26 through 28 and August 2 through 4, 2010 – Surfactant injection and recovery events were performed. A diluted Enviroclean surfactant solution was injected at MW-1 through MW-3, MW-13, and MW-16. Approximately 836 gallons of fluids were recovered during EFR events from the five injection wells.

- December 6 through 9, 2010 –An In-Situ Chemical Oxidation (ISCO) pilot test was conducted targeting off-siteareas within the eastern sidewalk along Hamilton Avenue and onsite areas within the former gasoline UST area. Twelve injection points were installed. A total of 7,200 gallons of sodium persulfate (at approximately 10.0% concentration) activated with chelated iron catalyst (ASP), including 2,400 gallons of catalystand 4,800 gallons of oxidizer, were injected.

- August 15 and August 18, 2011 – An ISCO event was conducted targeting off-site areas within the eastern sidewalk along Hamilton Avenue and on-site areas within the former gasoline underground storage tank (UST) area. A total of 7,200 gallons of Activated Sodium Persulfate (ASP), including 2,400 gallons of catalyst and 4,800 gallons of oxidizer, were injected.

- July 9 through 11, 2012- A Limited Off-Site Investigation was conducted within the eastern sidewalk along Hamilton Avenue to delineate soil impacts. Vertical Delineation: Soil analytical data results reported concentrations of STARS list compounds above CP-51 soil cleanup levels ranging from 8 to 20 feet below ground surface. Groundwater was encountered between 7 and 10 feet below ground surface within the recently advanced boring locations. This is evidence of a saturated smear zone that exists below the eastern sidewalk of Hamilton Avenue. Horizontal Delineation: Soil analytical data results reported concentrations of STARS list compounds above CP-51 soil cleanup levels within soil borings SB103 through SB107. Soil borings could not be completed south of SB107 due to underground utility obstructions. MW-17, located north of SB103, has contained measurable LPH within the last year. Horizontal delineation of soil impacts extend from SB101 south to MW-16 where increases of BTEX and MTBE have been reported in groundwater within the last year.