PROPOSED REMEDIAL ACTION PLAN
Sag Harbor MGP
Sag Harbor (V), Suffolk County, New York
Site No. 1-52-159

January 2006

Prepared by:

Division of Environmental Remediation
New York State Department of Environmental Conservation

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SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (NYSDEC), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for the Sag Harbor Manufactured Gas Plant. The presence of hazardous waste has created significant threats to human health and/or the environment that are addressed by this proposed remedy. As more fully described in Sections 3 and 5 of this document, the use of the site as a manufactured gas plant has resulted in the disposal of hazardous wastes, including benzene, toluene, ethylbenzene, and xylene (BTEX) and polycylic aromatic hydrocarbons (PAHs). These wastes have contaminated the surface soil, subsurface soil, soil vapor and groundwater at the site, and have resulted in:

- a significant threat to human health associated with potential exposure to surface soil, subsurface soil, soil vapor and groundwater.
- a significant environmental threat associated with the impacts of contaminants to surface soil, subsurface soil, and groundwater.

To eliminate or mitigate these threats, the NYSDEC proposes the following remedy:

- A remedial design program to provide the details necessary to implement the remedial program.
- Installation of an excavation support system; removal of the commercial building to the north of the property; excavation and off-site disposal of the top ten feet of contaminated soil; and backfilling of the excavated area with clean fill from an off-site source which has been approved by NYSDEC.
- Covering all vegetated areas with clean soil and all non-vegetated areas with either concrete or a paving system.
- Installation of several passive NAPL recovery wells.
- Development of a site management plan to address residual contamination, evaluate buildings for soil vapor impacts, address any use restrictions, and provide for the operation, maintenance, and monitoring of components of the remedy.
- Imposition of an institutional control in the form of an environmental easement.
- Periodic certification of the institutional and engineering controls.

The proposed remedy, discussed in detail in Section 8, is intended to attain the remediation goals identified for this site in Section 6. The remedy must conform with officially promulgated standards and criteria that are directly applicable, or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, criteria and guidance are hereafter called SCGs.

This Proposed Remedial Action Plan (PRAP) identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for this preference. The NYSDEC will select a final remedy for the site only after careful consideration of all comments received during the public comment period.

The NYSDEC has issued this PRAP as a component of the Citizen Participation Plan developed pursuant to the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375. This document is a summary of the information that can be found in greater detail in the June, 2002 Remedial Investigation (RI) Report, the December, 2003 Final RI report, the September 2005 Feasibility Study (FS), and other relevant documents. The public is encouraged to review the project documents, which are available at the following repositories:

John Jermain Public Library
Main St, corner of Jermain St
Sag Harbor, NY
Kevin Verbesey, Director
(631) 725-0049
Hours: Mon. - Sat. 10-5, Thurs. 10-9

NYSDEC Region 1 Headquarters
SUNY-Stony Brook
Stony Brook, NY 11790
Contact: Mr. Walter Parish
Regional Hazardous Waste Engineer
(631) 444-0241
Hours: Mon.-Fri. 9-5 (by appointment)

Douglas MacNeal
NYSDEC- 11th Floor
625 Broadway
Albany, NY 12233-7014
(518) 402-9564
Hours: Mon.-Fri. 8-4 (by appointment)

The NYSDEC seeks input from the community on all PRAPs. A public comment period has been set from January 13 to February 17, 2006 to provide an opportunity for public participation in the remedy selection process. A public availability session is scheduled for January 25 from 6 until 9 at the Pierson Middle-High School. A public meeting is also scheduled for February 6 at the Pierson Middle-High School beginning at 7.

At the meeting, the results of the RI/FS will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which verbal or written comments may be submitted on the PRAP. Written comments may also be sent to Mr. MacNeal at the above address through February 17.

The NYSDEC may modify the proposed remedy or select another of the alternatives presented in this PRAP, based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives identified here.

Comments will be summarized and addressed in the responsiveness summary section of the Record of Decision (ROD). The ROD is the NYSDEC's final selection of the remedy for this site.

SECTION 2: SITE LOCATION AND DESCRIPTION

The site occupies roughly 0.76 acres in the downtown section of the Village of Sag Harbor in Suffolk County. The site is adjacent to the intersection of Bridge Street and Long Island Avenue and is roughly 200 feet to the south of Sag Harbor Cove. The site's location is noted on Figure 1.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

From 1859 to 1930 the site was operated as a manufactured gas plant. The plant originally produced gas from coal or wood rosin and was switched to a water gas process in 1892. The by-products of gas production that either spilled, leaked, or were disposed on the site are the source of the contamination.

3.2: Remedial History

In 1997 a preliminary site assessment was performed on the MGP site and, as a result, the NYSDEC listed the site as a Class 2 site in the Registry of Inactive Hazardous Waste Disposal Sites in New York in 1998. A Class 2 site is a site where hazardous waste presents a significant threat to the public health or the environment and action is required. Following that listing, an Interim Remedial Measure (IRM) was performed to remove and cap historic piping that was present at the site to prevent migration of MGP by-products through these pipes.

Originally the site was part of the Sag Harbor Bridge Street Site (Site Number 1-52-126) which was listed as a Class 2 site in the Registry of Inactive Hazardous Waste Disposal Sites in New York in 1987. This occurred after an incident when Suffolk County Water Authority workers were exposed to tar during an excavation on Bridge Street. It was then delisted in 1995 because investigations had failed to find hazardous wastes on the Bridge Street Site as defined by the contemporary edition of 6 NYCRR Part 375.

SECTION 4: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The NYSDEC and KeySpan Corporation entered into a Consent Order on March 31, 1999. The Order obligates the responsible parties to implement a full remedial program.

SECTION 5: SITE CONTAMINATION

A remedial investigation/feasibility study (RI/FS) has been conducted to evaluate the alternatives for addressing the significant threats to human health and the environment.

5.1: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The RI was conducted between April 2000 and May 2004. The field activities and findings of the investigation are described in the RI report.

The following activities were conducted during the RI:

- Research of historical information;
- A survey of public and private water supply wells in the area around the site;

- Installation of 46 soil borings and 30 monitoring wells for analysis of soils and groundwater as well as physical properties of soil and hydrogeologic conditions;

- Multiple rounds of sampling of 32 new and existing monitoring wells;

- Collection of 29 surface soil samples for chemical analysis;

- Collection of 134 discrete groundwater samples using a direct push technique;

- Collection of 16 surface water samples;

- Collection of 18 aquatic sediment samples;

- Collection of 8 sediment pore water samples;

- Collection of 3 tap water samples;

- Collection of 4 storm water runoff samples;

- Collection of 13 soil vapor samples, 45 indoor air samples, and 27 outdoor air samples.

To determine whether the soil, groundwater, surface water, soil vapor, air and sediment contain contamination at levels of concern, data from the investigation were compared to the following SCGs:

- Groundwater, drinking water, and surface water SCGs are based on NYSDEC "Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code.

- Soil SCGs are based on the NYSDEC "Technical and Administrative Guidance Memorandum (TAGM) 4046; Determination of Soil Cleanup Objectives and Cleanup Levels".

- Sediment SCGs are based on the NYSDEC "Technical Guidance for Screening Contaminated Sediments."

- Indoor air SCGs are based on the New York State Department of Health Database summary of indoor and outdoor air sample results in control homes collected and analyzed by NYSDOH from 1989 through 1996.

Based on the RI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized below. More complete information can be found in the RI report.

5.1.1: Site Geology and Hydrogeology

The site is located in an area that was a marine wetland before being filled in the 1800s. Today, the ground surface stands a few feet above sea level, with the uppermost soil layer made up of material (sandy soils, brick fragments, ash, etc.) used to fill the original wetland. The peat, silt and clay deposits which formed the original wetland bottom are still present at depths of 8 to 12 feet below the ground surface. Below these lie several hundred feet of unconsolidated sands.

The peat, silt, and clay layers are important because they are far less permeable than the predominantly sandy soils above and below. Groundwater and other liquids do not readily move through the peat, sand, and clay. In most areas, this has had the effect of limiting the degree to which MGP tar can move downward through the subsurface. However, these deposits are absent in some portions of the site, and

MGP tar has moved downward into the underlying sands in these areas.

The water table at the site is very shallow. The depth to groundwater varies from about 6 inches to about 18 inches below grade. This high groundwater level leads to localized ponding during heavy rains. The groundwater is tidally influenced, but consistently flows in a northerly or northwesterly direction. The groundwater is brackish and discharges to Sag Harbor Cove.

5.1.2: <u>Nature of Contamination</u>

As described in the RI report, many soil, groundwater, ambient and indoor air, and sediment samples were collected to characterize the nature and extent of contamination. As summarized in Table 1, the main categories of contaminants that exceed their SCGs are volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs).

The principal human health and environmental risks posed by this site relate to the widespread distribution of MGP (coal) tar throughout the site and surrounding area. Understanding the physical and chemical behavior of coal tar is essential to proper characterization and clean up. The tar at this site does not have the sticky, viscous consistency of other materials commonly labeled as "tar." Instead, the coal tar found at this site has the consistency of motor oil, and is consequently able to move about as a liquid through the subsurface.

MGP tar belongs to a group of organic contaminants known as dense non-aqueous phase liquids, commonly abbreviated as DNAPLs. DNAPLs do not readily dissolve in water and tend to sink to the bottom of water bodies and aquifers. When released into the subsurface, these liquids can spread out in complex directions that may or may not be the same direction as groundwater flow. MGP tar is an unusual DNAPL, in that its density is only slightly greater than water. Although MGP tar does tend to sink, the relatively slight difference in density between tar and water makes this sinking effect somewhat unpredictable.

Two classes of chemical compounds contained in the tar are of concern:

Benzene, toluene, ethylbenzene, and xylenes (collectively known as the BTEX compounds) are volatile organic compounds, which are also commonly found in unleaded gasoline, paint thinners and other solvents. They are somewhat soluble in water; consequently, groundwater which comes into contact with MGP tar often becomes contaminated with these compounds. This contaminated groundwater is then free to move away from the site along with the ordinary groundwater flow through the subsurface.

The second class of compounds are known as polycyclic aromatic hydrocarbons, commonly abbreviated as PAH. This is a large group of semi-volatile organic compounds, with several hundred different individuals known to exist. They are far less soluble than the BTEX compounds, and consequently are far less likely to cause groundwater contamination. They are also far less likely to be digested by soil bacteria, and thus are very persistent in the environment. The United States Environmental Protection Agency has identified 17 of the PAHs as hazardous materials, and these are the ones used to define the extent of PAH contamination at this site.

An inorganic contaminant of concern is cyanide. Cyanide, bound to iron to form ferric-ferro- cyanide, is a component of some MGP tars. While it is not dangerous in its bound form, certain conditions can release free cyanide, causing an exposure risk both for humans and the environment.

5.1.3: <u>Extent of Contamination</u>

This section describes the findings of the investigation for all environmental media that were investigated.

Chemical concentrations are reported in parts per billion (ppb) for water, parts per million (ppm) for waste, soil, and sediment, and micrograms per cubic meter ($\mu g/m^3$) for air samples. For comparison purposes, where applicable, SCGs are provided for each medium.

Table 1 summarizes the degree of contamination for the contaminants of concern in surface soil, subsurface soil, groundwater, indoor air, surface water, soil vapor, and sediment and compares the data with the SCGs for the site. The locations of all the samples are noted on Figure 2. The following are the media which were investigated and a summary of the findings of the investigation.

Waste Materials

The waste material associated with this site is coal tar. Coal tar has migrated to a depth of roughly 8-10 feet below the ground surface. At this level, it encountered a layer of peat, silt and clay which it could not readily penetrate, and spread laterally on top of this layer beneath the MGP site. It has also spread beyond the site boundaries, roughly 50 feet to the south and 80 feet to the north, where it is now found beneath a row of retail stores.

Near the center of the MGP site, the peat, silt and clay layer is absent, and the MGP tar has spread downward much further, to a total depth of roughly 90 feet. No deep penetration of tar has been found beyond the limits of the MGP site.

The tar now appears to be in a steady state, in which the overall limits of the tar migration should not change unless site conditions change significantly. However, within the area of tar contamination, some pockets of pooled, mobile tar may exist. This pooled tar can enter wells which are drilled nearby and could enter future excavations as well. The extent of the MGP tar contamination is shown on Figures 3 and 4. This material requires remediation, as it acts as a source for soil and groundwater contamination.

Surface Soil

Surface soil samples were collected from the upper 0-2 or 0-6 inches across the site, as well as off-site. All samples were analyzed for SVOCs, metals and cyanide. The off-site samples were also analyzed for VOCs.

Contaminated surface soil represents a potential exposure route through ingestion, dermal contact, or the breathing of dust or vapors coming from the surface soil. Although BTEX was detected in the off-site samples, all of the detections were below the New York State Recommended Soil Cleanup Objectives from Technical Administrative Guidance Memorandum 4046 (TAGM 4046).

PAHs were found in the majority of the surface soil samples across the site and in some off-site areas. The maximum detections of PAHs were, in the majority of samples, above the individual SCGs. The highest total PAHs in surface soil was 950 ppm and was found in the historic location of the southeastern gas holder.

Cyanide was identified in both on-site and off-site samples, with the maximum concentration found onsite in the location of the former gas holders. The cyanide is not above guidance levels and is, most likely, a constituent of the coal tar.

Subsurface Soil

PAH and BTEX contamination of subsurface soils was detected in several areas, with the highest contaminant concentrations found in areas where visible tar contamination was present. Thus, the highest levels of soil contamination are found in the shallow subsurface soils (generally less than 8 feet below the ground surface) in the eastern portion of the MGP site. Outside of the zones of tar contamination, PAH and BTEX concentrations decrease rapidly. Individual BTEX concentrations ranged from not detectable to 500 ppm, and PAH concentrations ranged from not detectable to 1,700 ppm.

Cyanide was detected in only a few subsurface samples, at low levels. The highest value, 4.8 ppm, was found in an area of shallow visible tar contamination, which also contained high levels of PAH and BTEX.

The contaminants in the subsurface are an environmental concern as they are a potential source of groundwater contamination.

Groundwater

Both PAH and BTEX compounds are found in on-site and off-site groundwater, with the highest contaminant levels found at shallow depths, in close proximity to the MGP tar. Groundwater flow direction is north toward Sag Harbor Cove.

BTEX compounds were found in the majority of the groundwater samples, both on site and off site. Benzene was the individual compound detected most frequently, and at the highest concentration, with values ranging from non detect to 8,700 ppb.
PAH compounds are less soluble than BTEX, but due to the extensive distribution of MGP tar, they were detected in most groundwater samples as well. Naphthalene is the PAH compound detected most frequently, and at the highest concentration, with values ranging from non-detect to 79,000 ppb.

The extent of groundwater contamination is shown on Figure 5.

Surface Water

Surface water and groundwater seep samples were collected. The only site-related contaminant detected was xylene at a concentration of 1 ppb in one of the 31 surface water samples, which is far below the SCG for xylene of 19 ppb.

Sediments

The sediments in Sag Harbor Cove were sampled for BTEX and PAHs. None of the samples indicate an impact from the MGP. The low levels of BTEX and PAH which were detected were distributed randomly across the survey area, which suggests that they represent general background conditions in the area and are not the result of MGP contamination.

Soil Vapor

Soil vapor samples were collected and analyzed for BTEX compounds and naphthalene. Naphthalene and other PAHs were not detected in any of the samples. BTEX was detected in samples collected above areas of MGP tars.

Indoor and Ambient Air

Indoor and ambient air samples were collected during two rounds of sampling from buildings surrounding the site. The samples were analyzed for VOCs, which included BTEX and naphthalene. Although some VOCs were detected in several samples, the NYSDOH has determined that these detections do not appear to be related to the MGP site. Further monitoring of soil vapor and air samples will be required to monitor for potential indoor air exposures.

5.2: <u>Interim Remedial Measures</u>

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS. There were no IRMs performed at this site during the RI/FS.

5.3: <u>Summary of Human Exposure Pathways</u>:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the human exposure pathways can be found in Appendix G and E of the June 2002 and December 2003 RI reports, respectively.

An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: [1] a contaminant source, [2] contaminant release and transport mechanisms, [3] a point of exposure, [4] a route of exposure, and [5] a receptor population.
The source of contamination is the location where contaminants were released to the environment (any waste disposal area or point of discharge). Contaminant release and transport mechanisms carry contaminants from the source to a point where people may be exposed. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (e.g., ingestion, inhalation, or direct contact). The receptor population is the people who are, or may be, exposed to contaminants at a point of exposure.

An exposure pathway is complete when all five elements of an exposure pathway exist. An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future.

Potential exposure pathways at the Sag Harbor MGP site include the following:

- Direct contact with, incidental ingestion or inhalation of contaminated soil
- Direct contact with, or inhalation of vapors from contaminated groundwater
- Direct contact with or incidental ingestion of NAPL
- Inhalation of vapors in indoor air related to subsurface vapor intrusion

None of these pathways has been found to be complete at this site. The contamination (contaminated soil, groundwater, and NAPL) is below the ground surface, which minimizes the likelihood of incidental exposure. Two private water supply wells were identified in the area surrounding the site. Both were sampled, and neither contained site-related contamination. The rest of the area uses a public water supply, which is routinely tested to ensure that it meets drinking water standards for many chemicals, including the contaminants found at the Sag Harbor MGP site. KeySpan collected two rounds of indoor air samples from many of the buildings immediately surrounding the site, and the NYSDOH has determined that contamination from the site was not affecting the indoor air quality in the buildings.

5.4: <u>Summary of Environmental Impacts</u>

This section summarizes the existing and potential future environmental impacts presented by the site. Environmental impacts include existing and potential future exposure pathways to fish and wildlife receptors, as well as damage to natural resources such as aquifers and wetlands.

The Fish and Wildlife Impact Analysis, which is included in the RI report, presents a detailed discussion of the existing and potential impacts from the site to fish and wildlife receptors. The following environmental exposure pathways and ecological risks have been identified: Site contamination has impacted the groundwater resource in the upper glacial aquifer.

At this time, sediment sampling has not indicated any impacts to Sag Harbor Cove. However, contamination from the migration of DNAPL and groundwater from the site could potentially enter Sag Harbor Cove.

Sag Harbor Cove is an environmentally sensitive area which includes many species of flora and fauna. It is also a valuable recreational resource to the surrounding community. The potential for future contamination of the cove with MGP by-products could lead to a decrease in the cove's ability to support wildlife and could potentially lead to its devaluation as a recreational asset.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The remediation goals for this site are to eliminate or reduce to the extent practicable:

- exposures of persons at or around the site to VOCs, SVOCs, and cyanide in surface soil, subsurface soil, groundwater and soil vapor;
- environmental exposures of flora or fauna to VOCs, SVOCs, and cyanide in surface soil, subsurface soil, and groundwater;
- the release of contaminants from soil into groundwater that may create exceedances of groundwater quality standards; and
- the release of contaminants from surface soil, subsurface soil, groundwater, sediment, and soil vapor into ambient air, indoor air, sediment, and surface water through desorption, storm water erosion, vaporization, wind borne dust and dissolution.

Further, the remediation goals for the site include attaining to the extent practicable:

- ambient groundwater quality standards and
- recommended soil cleanup values for surface soils.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the Sag Harbor Manufactured Gas Plant Site were identified, screened and evaluated in the FS report which is available at the document repositories identified in Section 1.

A summary of the remedial alternatives that were considered for this site are discussed below. The present worth represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved.

7.1: <u>Description of Remedial Alternatives</u>

The following potential remedies were considered to address the contaminated surface soil, subsurface soil, groundwater, and soil vapor at the site.

Alternative 1: No Action

Present Worth: $2,000,000
Capital Cost: $0
Annual OM&M: $180,000

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. It requires continued monitoring only, allowing the site to remain in an unremediated state. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

Alternative 2A: Off-site excavation to a 10 foot depth, NAPL recovery, Engineered cap, On-site containment cells, Institutional controls, Groundwater and indoor air monitoring

Present Worth: $6,100,000
Capital Cost: $3,200,000
Annual OM&M: $120,000

This alternative would involve containment of the tar which remains on the MGP site, combined with limited excavation of neighboring properties where tar has spread. The overall approach would be to remove the tar which has already left the MGP site, and to immobilize the tar which remains on the Keyspan property (MGP site). The remedy is illustrated in Figure 6.

Subsurface barrier walls would be installed around the perimeter of the MGP site to prevent contaminant migration off-site. An impermeable engineered cap would be installed within the limits of the subsurface barrier walls to prevent rainwater infiltration through the contaminated soil and to prevent any direct exposures to contaminants. The barrier wall would extend downward far enough to reach the peat, silt, and clay unit beneath the site, thus reducing the impact of the tar as a groundwater contamination source. It should also be noted that some tar has been found below the peat, silt, and clay unit (which is absent in the central portion of the MGP site), and that the containment wall would not isolate this deeper contamination.

There would be two areas of off site excavation in the parking lots to the north and the south of the site. Excavation would proceed to a depth of approximately 10 feet, which should effectively remove all tar-impacted soil in these areas. The contamination underneath the retail stores adjacent to the north site boundary would not be addressed by this alternative.

NAPL collection wells would be installed in at least three locations within the limits of the barrier wall. The objective would be to reduce the volume of tar in the soil and to reduce the mobility of the tar that remains. These wells will collect tar passively (without pumping); however, provisions would be made to pump some or all of the wells at low flow rates if it appears that this would improve tar removal. The number of wells could be increased, if collection from the initial wells proves successful.

An institutional control, in the form of an environmental easement on the MGP property, would be established to protect the integrity of the containment system. Groundwater and indoor air quality would be monitored.

Construction of the remedy would require approximately 1 season (October through April). These time restrictions reflect a long-standing agreement between Keyspan and the Village of Sag Harbor.

Alternative 2B: Off-site stabilization to a 10 foot depth, NAPL recovery, Engineered cap, On-site containment cells, Institutional controls, Sub-slab depressurization system, Groundwater and indoor air monitoring

Present Worth: *$7,500,000*
Capital Cost: *$5,500,000*
Annual OM&M: *$180,000*

This alternative would include the features of Alternative 2A, with the off-site excavation in the northern parking lot replaced by in-situ stabilization. Stabilization is a form of containment which involves the in-situ mixing of contaminants with a stabilizing agent such as cement. The overall approach is to make a large, solid mass of low-strength concrete whose low permeability would reduce contact with groundwater and thus reduce the amount of groundwater contamination being generated.

In addition, a sub-slab depressurization system would be installed beneath the block of retail stores to the north of the site, to provide an increased level of protection against potential vapor intrusion. This alternative is also illustrated on Figure 6.

Construction of the remedy would require approximately 1 season.

Alternative 3A: Excavation of on-site and off-site source material to a 10 foot depth, NAPL recovery, Institutional controls, Groundwater and indoor air monitoring

Present Worth: *$10,700,000*
Capital Cost: *$9,100,000*
Annual OM&M: *$100,000*

This alternative would include the excavation of tar-impacted soil up to a depth of 10 feet over the entire site as well as on the parcels to the north and south of the site. This would require the removal of the existing commercial buildings on the north parcel. As shown on Figure 7, the excavation limits would reach to Long Island Avenue on the north, into Bridge street on the west, east to the Post Office, and into the parking area for the commercial building to the south

This alternative would remove the majority of tar in the subsurface both on-site and off. The area of deep tar penetration in the center of the MGP site would be the only appreciable location of contamination to remain.

The NAPL recovery, institutional controls, groundwater monitoring, and indoor air monitoring would be similar to alternative 2A.

Construction of this remedy would require from1 to 2 seasons.

Alternative 3B: On-site and off-site excavation to a 10 foot depth, On-site and off-site stabilization to a 36 foot depth), NAPL recovery, Sub-slab depressurization system, Institutional controls, Groundwater and indoor air monitoring

Present Worth: *$12,300,000*
Capital Cost: *$10,400,000*
Annual OM&M: *$160,000*

The excavation proposed in this remedy would include most of the site as well as the parking lot area to the south to a depth of ten feet. The stabilization would occur in three areas both on and off-site, to a depth of 36 feet, to contain the remaining deeper DNAPL in these areas. This alternative, including the areas selected for excavation and deeper stabilization, is illustrated in Figure 6.

The sub-slab depressurization system would be installed beneath the retail building north of the site. The institutional controls and groundwater and indoor air monitoring aspects of the remedy would be similar to remedy 2A. The construction of the remedy would require from1 to 2 seasons.

Alternative 4: Excavation of on-site and off-site source material to a 10 foot depth, On-site stabilization to a 60 foot depth, Institutional controls, Sub-slab depressurization, Groundwater monitoring

Present Worth: *$33,300,000*
Capital Cost: *$31,600,000*
Annual OM&M: *$160,000*

This remedy would entail excavation of contaminants from the top ten feet of soil both on the site and off the site in the parking lot to the north and in the parking area for the commercial building south of the site. Following this, stabilization would be performed on the remaining contamination on-site to a depth of sixty feet below grade. The remedy is illustrated in Figure 6.

The sub-slab depressurization system would be installed beneath the retail store building north of the site. The institutional controls and groundwater and indoor air monitoring aspects of the remedy would be similar to remedy 2A.

Construction would require from 1 to 2 seasons.

Alternative 5: Excavation of the site to unrestricted levels

Present Worth: *$69,000,000*
Capital Cost: *$69,000,000*
Annual OM&M: *$0*

This alternative would excavate the entire mass of contaminated soil, regardless of depth, to provide the maximum extent of groundwater protection and direct exposure protection. Due to the great depth to which tars have penetrated in areas where the peat, silt, and clay layer is absent, the excavation would be quite deep and very expensive. With all contaminated soil removed, there would be no need for ongoing operation, monitoring, and maintenance.

Construction would require from 3 to 8 seasons.

7.2 Evaluation of Remedial Alternatives

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375, which governs the remediation of inactive hazardous waste disposal sites in New York State. A detailed discussion of the evaluation criteria and comparative analysis is included in the FS report.

The first two evaluation criteria are termed "threshold criteria" and must be satisfied in order for an alternative to be considered for selection.

1. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the NYSDEC has determined to be applicable on a case-specific basis.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and materials is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

7. Cost-Effectivness. Capital costs and operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision. The costs for each alternative are presented in Table 2.

This final criterion is considered a "modifying criterion" and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

8. Community Acceptance - Concerns of the community regarding the RI/FS reports and the PRAP are evaluated. A responsiveness summary will be prepared that describes public comments received and the manner in which the NYSDEC will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

SECTION 8: SUMMARY OF THE PROPOSED REMEDY

The NYSDEC is proposing Alternative 3A: Excavation of on-site and off-site source material to a depth of 10 feet, NAPL recovery, Institutional controls, Sub-slab depressurization system, groundwater and indoor air monitoring as the remedy for this site. The elements of this remedy are described at the end of this section and are shown on Figure 7.

The proposed remedy is based on the results of the RI and the evaluation of alternatives presented in the FS.

Alternative 3A is being proposed because, as described below, it satisfies the threshold criteria and provides the best balance of the primary balancing criteria described in Section 7.2. It would achieve the remediation goals for the site by removing soils at or near the surface which would are the most likely to expose human and wildlife receptors to PAHs, BTEX, and cyanide. This removal would also prevent the contamination of shallow groundwater and production of contaminated soil gas.

The proposed alternative is not expected to fully achieve groundwater SCGs on site. Tar has penetrated to depths beyond the limits that this Alternative will reach. This deeper tar will continue to remain in contact with groundwater moving beneath the site, and will continue to act as a source of groundwater contamination. However, with all of the shallow soil contamination removed, the shallow groundwater contaminant levels are expected to decline significantly. Transfer of volatile contaminants into soil gas is also expected to diminish greatly as the contaminant concentrations decline.

Alternative 1 was rejected because it did not meet either of the threshold criteria. Remedial Alternatives 2A, 2B, 3A, 3B, 4, and 5 all would meet the two threshold criteria, so the choice between these alternatives rests upon the remaining five balancing criteria.

Alternative 2B would require the least construction, with the shortest construction time, and would therefore have the fewest short-term impacts. Alternative 5, with its extended schedule and massive scale of construction, would present the most short term impacts, which would include increased noise and truck traffic for the entire duration of the construction. Alternatives 2A, 3A, 3B, and 4 would all have similar short-term impacts, since they involve similar shallow excavation and installation of similar remedial components. Of these, Alternatives 3A, 3B, and 4 would have the longest construction schedules at one to two years. These are still significantly less than the time required for Alternative 5.

Alternative 5 would have the greatest long-term effectiveness, since it would permanently remove all or nearly all of the source material. The long-term effectiveness of Alternatives 2A and 2B would rely heavily on institutional controls, which could be less certain in the long term. Alternatives 3A and 3B would offer proven long-term effectiveness due to the extent of the source removal and NAPL collection. Only routine ongoing maintenance procedures would be required. The containment remedies do not reduce the volume of waste, so their long-term effectiveness would depend on maintaining the integrity of the barrier wall and cap through institutional controls. Although the cap would divert rainwater away from the contamination, this does not prevent the tar from contacting the groundwater passing underneath the site. Thus, the tar would continue to act as a source of groundwater contamination.

Evaluating the long-term effectiveness of in-situ stabilization, called for in alternatives 2B, 3B, and 4 would require treatability testing during the remedial design phase of the project. The behavior of the stabilized cement/soil mixture when exposed to seasonal freeze/thaw cycles near the ground surface has not yet been established.

Alternative 5 would offer the greatest reduction of toxicity, mobility or volume, although the actual increased protection offered over the proposed Alternative is not significant. Alternative 2B would offer minimal reduction in mobility and no reduction in toxicity or volume. Alternatives 2A and 3B would provide more reduction in volume, with some reduction in mobility. The remaining active Alternatives (3A and 4) would have similar levels of reduction due to the source removal and NAPL collection. However, of those six alternatives, 3A would represent the most feasible and implementable overall reduction in mobility and volume due to the extent of the source removal combined with NAPL collection.

Alternative 2B would be the most easily implemented, since the limited off-site work would present few access issues. Alternatives 2A, 3A, 3B, and 4 would have comparable implementability, as the excavation in those options extends to the same level. However, Alternatives 3B and 4 both call for extensive in-situ stabilization, which would have more implementation issues to resolve than 2A and 3A. Alternative 5 would be extraordinarily difficult to implement, due to the depth of the required excavation. Extensive excavation support would be required to excavate to 90 or more feet. Moreover, the highly permeable subsurface soils would make dewatering of the excavation extremely difficult. Sea water would be expected to flow in from the adjacent Sag Harbor Cove at a very high rate.

Cost-effectiveness would vary greatly between the alternatives. Alternative 5 would be more than twice as costly than the next highest alternative, while not providing any appreciable increase in the level of protection from exposures. Alternative 2A would be the least costly, but would also provide the lowest level of protection from exposure. Alternatives 2B, 3B, and 4 would provide less protection, and with greater uncertainty in long-term effectiveness than 3A, at similar or greater cost. Alternative 3A, through source removal, NAPL collection, institutional controls, and long-term monitoring would address all of the readily accessible source material at this site and would be in the middle of the cost range.

The estimated present worth cost to implement the remedy is $10,700,000. The cost to construct the remedy is estimated to be $9,100,000 and the estimated average annual operation, maintenance, and monitoring costs for 30 years is $100,000.

The elements of the proposed remedy are as follows:

1. A remedial design program would be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program.

2. An excavation support system to allow for shallow subsurface soil removal would be installed. The commercial building to the north would be removed. The top ten feet of contaminated soil would then be excavated. Soils would be dewatered and transported off-site for proper treatment and disposal. The excavated areas would be backfilled with clean soil materials from an off-site location. Demolished building materials determined to be free of contamination may be used to backfill the lower portion of the excavated areas.

3. All vegetated areas would be covered with one foot of clean soil and all non-vegetated areas with either concrete or a paving system.

4. Several passive NAPL recovery wells would be installed to collect NAPL remaining in the subsurface. The wells will collect tar passively (without pumping) at first. Additional wells will be installed if additional areas of mobile tar are identified. Low-flow pumping may be implemented if early results indicate that this would increase tar recovery.

5. A site management plan would be developed to: (a) address remaining contaminated soils that may be excavated during future redevelopment. The plan would note that soils beneath the remaining peat layer are considered contaminated; and would require soil characterization and, where applicable, disposal/reuse in accordance with NYSDEC regulations; (b) evaluate the potential for vapor intrusion for any buildings on or adjacent to the site, including provision for mitigation of any impacts identified; (c) identify any use restrictions; and (d) provide for the operation and maintenance of the components of the remedy.

6. Imposition of an institutional control in the form of an environmental easement that

would (a) require compliance with the approved site management plan; (b) limit the use and development of the property to commercial uses only unless authorized by NYSDEC and NYSDOH; (c) restrict the use of groundwater as a source of potable water, without necessary water quality treatment as determined by NYSDOH; and (d) require the property owner to complete and submit to the NYSDEC a periodic certification.

7. The property owner would provide a periodic certification, prepared and submitted by a professional engineer or such other expert acceptable to the NYSDEC, until the NYSDEC notifies the property owner in writing that this certification is no longer needed. This submittal would contain certification that the institutional controls and engineering controls, are still in place, allow the NYSDEC access to the site, and that nothing has occurred that would impair the ability of the control to protect public health or the environment, or constitute a violation or failure to comply with the site management plan.

TABLE 1
Nature and Extent of Contamination
{April, 2000-May, 2004}

SURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Total BTEX	ND[d] to 0.012	10	0 of 15
Semivolatile Organic Compounds (SVOCs)	Total PAHs	ND-950	500	2 of 29

SUBSURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Total BTEX	ND-1390	10	25 of 129
Semivolatile Organic Compounds (SVOCs)	Total PAHs	ND-6222	500	24 of 129

SEDIMENTS	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Total BTEX	ND-0.027	NA	NA
			NA	NA
Semivolatile Organic Compounds (SVOCs)	Total PAHs	ND-46.8	ER-L[c]= 4	7 of 18
			ER-M[c]=45	1 of 18

GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Total BTEX	ND-23900	NA	NA
	Benzene	ND-8700	1	109 of 240
	Toluene	ND-7900	5	41 of 240
	Ethylbenzene	ND-6900	5	84 of 240
	Xylene	ND-4600	5	92 of 240

GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
Semivolatile Organic Compounds (SVOCs)	Total PAHs	ND-580200	NA	NA

SURFACE WATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Total BTEX	ND-1	NA	NA
	Benzene	ND	10	0 of 16
	Toluene	ND	6000	0 of 16
	Ethylbenzene	ND	4.5	0 of 16
	Xylene	ND-1	19	0 of 16
Semivolatile Organic Compounds (SVOCs)	Total PAHs	ND	NA	NA

SOIL GAS	Contaminants of Concern	Concentration Range Detected (µg/m^3)[a]	SCG[b] (µg/m^3)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Benzene	ND-52	NA	NA
	Toluene	3.8-349	NA	NA
	Ethylbenzene	ND-39	NA	NA
	Xylene	ND-172	NA	NA
Semivolatile Organic Compounds (SVOCs)	Naphthalene	ND	NA	NA

INDOOR AND AMBIENT AIR	Contaminants of Concern	Concentration Range Detected (µg/m^3)[a]	SCG[b] (µg/m^3)[a]	Frequency of Detection
Volatile Organic Compounds (VOCs)	Benzene	ND-11.4	NA	8 of 63
	Toluene	ND-400	NA	39 of 63
	Ethylbenzene	ND-14	NA	8 of 63

INDOOR AND AMBIENT AIR	Contaminants of Concern	Concentration Range Detected (:g/m^3)[a]	SCG[b] (:g/m^3)[a]	Frequency of Detection
	Xylene	ND-122	NA	25 of 63
Semivolatile Organic Compounds (SVOCs)	Naphthalene	ND	NA	NA

[a] ppb = parts per billion, which is equivalent to micrograms per liter, ug/L, in water;
ppm = parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
ug/m^3 = micrograms per cubic meter

[b] SCG = standards, criteria, and guidance values; {list SCGs for each medium}

[c] ER-L = EffectRange - Low and ER-M = Effect Range - Moderate. A sediment is considered to be contaminated if either of these criteria is exceeded. If both criteria are exceeded, the sediment is severely impacted. If only the ER-L is exceeded, the impact is considered to be moderate.

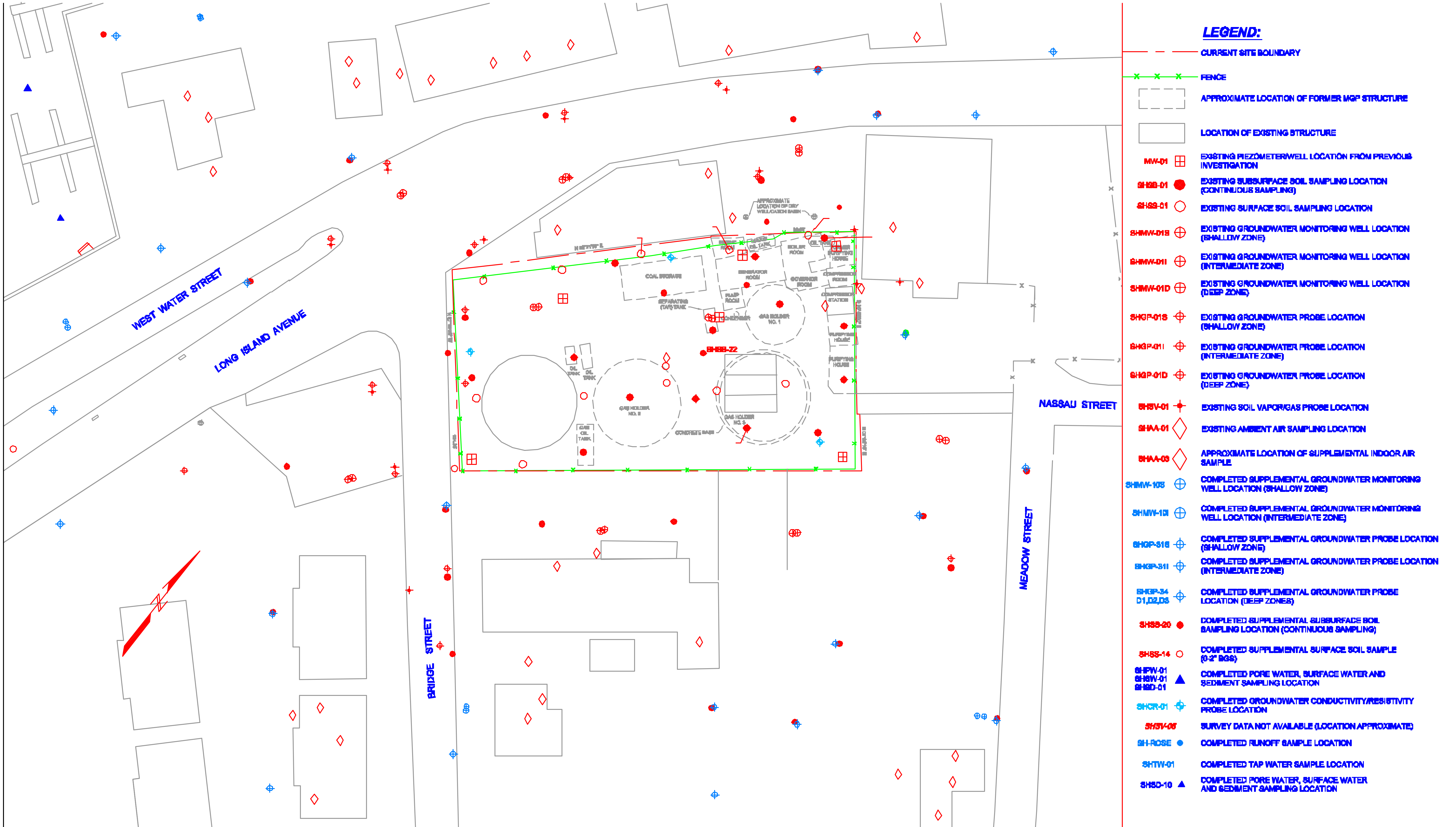
[d]ND = Not Detected

[e]NA = Not applicable

Table 2
Remedial Alternative Costs

Remedial Alternative	Capital Cost	Annual OM&M	Total Present Worth
Alternative 1: No Action	$0	$0	$0
Alternative 2A: Off-site excavation (10'), NAPL recovery, Engineered cap, On-site containment cells, Institutional controls, Groundwater and indoor air monitoring	$3,200,000	120,000	$6,100,000
Alternative 2B: Off-site stabilization (10'), NAPL recovery, Engineered cap, On-site containment cells, Institutional controls, Sub-slab depressurization system, Groundwater and indoor air monitoring	$5,500,000	$180,000	$7,500,000
Alternative 3A: Excavation of on-site and off-site source material (10'), NAPL recovery, Institutional controls, Groundwater and indoor air monitoring	$9,100,000	$100,000	$10,700,000
Alternative 3B: On-site and off-site excavation (10'), On-site and off-site stabilization (36'), NAPL recovery, Sub-slab depressurization system, Institutional controls, Groundwater and indoor air monitoring	$10,400,000	$160,000	$12,300,000
Alternative 4: Excavation of off-site source material (10'), On-site stabilization (60'), Institutional controls, Sub-slab depressurization, Groundwater monitoring	$31,600,000	$160,000	$33,300,000
Alternative 5: Restoration of the site to pre-release conditions	$69,000,000	$0	$69,000,000

SAG HARBOR
MANUFACTURED GAS PLANT
Site No. 1-52-159
Figure 1
Site Location Map

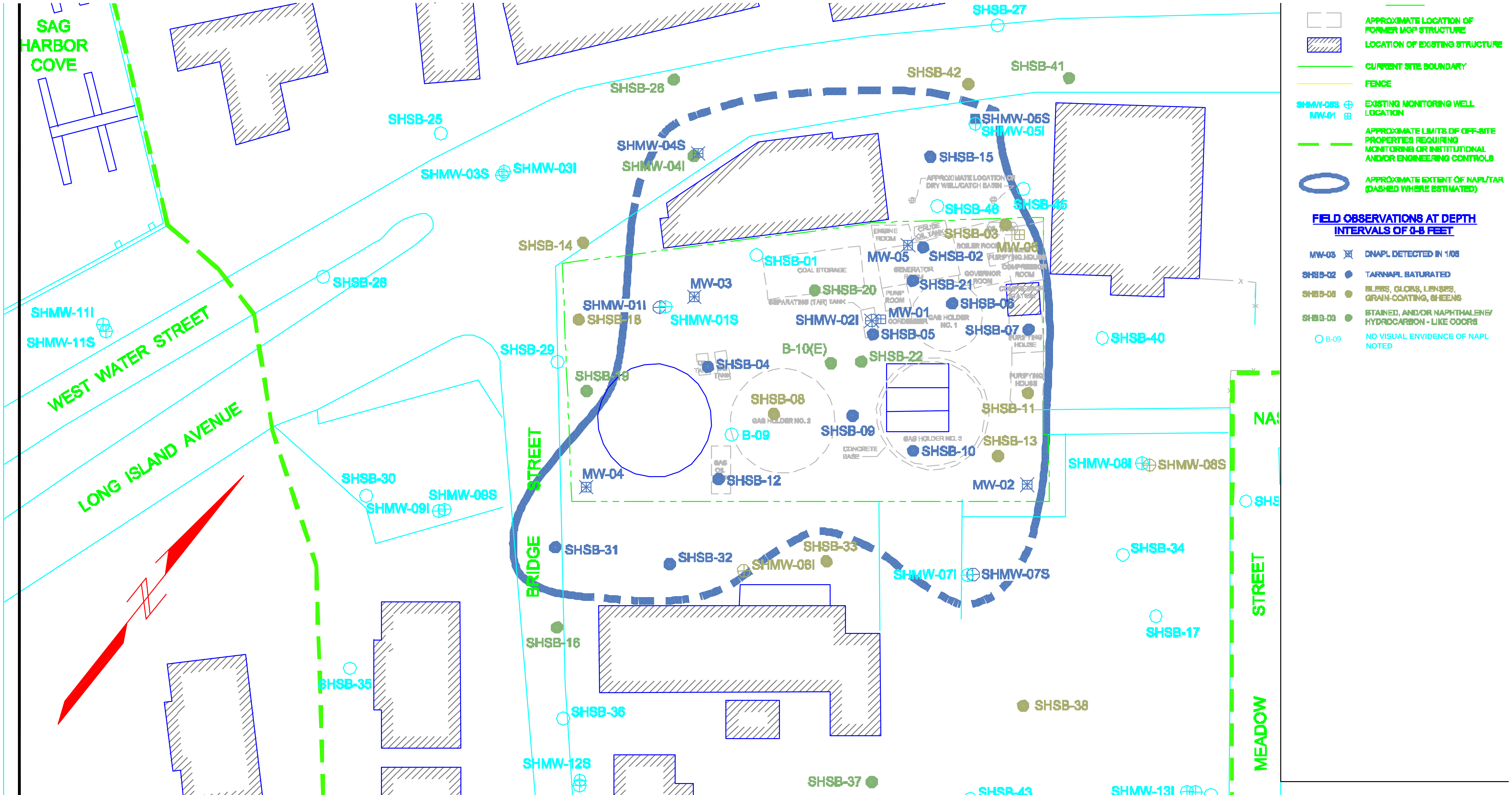


Not to Scale

SAG HARBOR MANUFACTURED GAS PLANT
SAG HARBOR (V), SUFFOLK COUNTY, NEW YORK

SAMPLE LOCATIONS

FIGURE 2

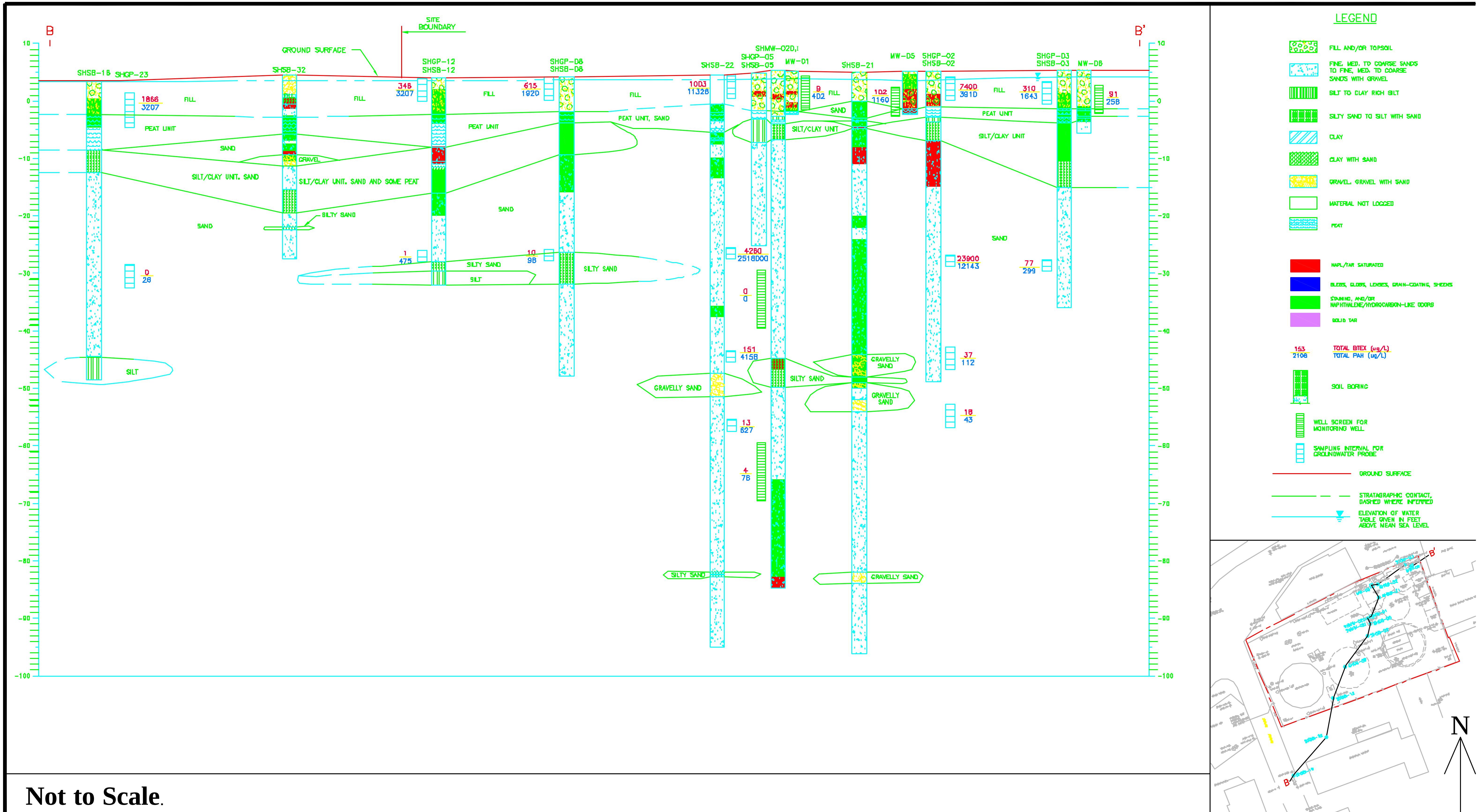


Not to Scale

SAG HARBOR MANUFACTURED GAS PLANT
SAG HARBOR (V), SUFFOLK COUNTY, NEW YORK

NAPL EXTENT

FIGURE 3



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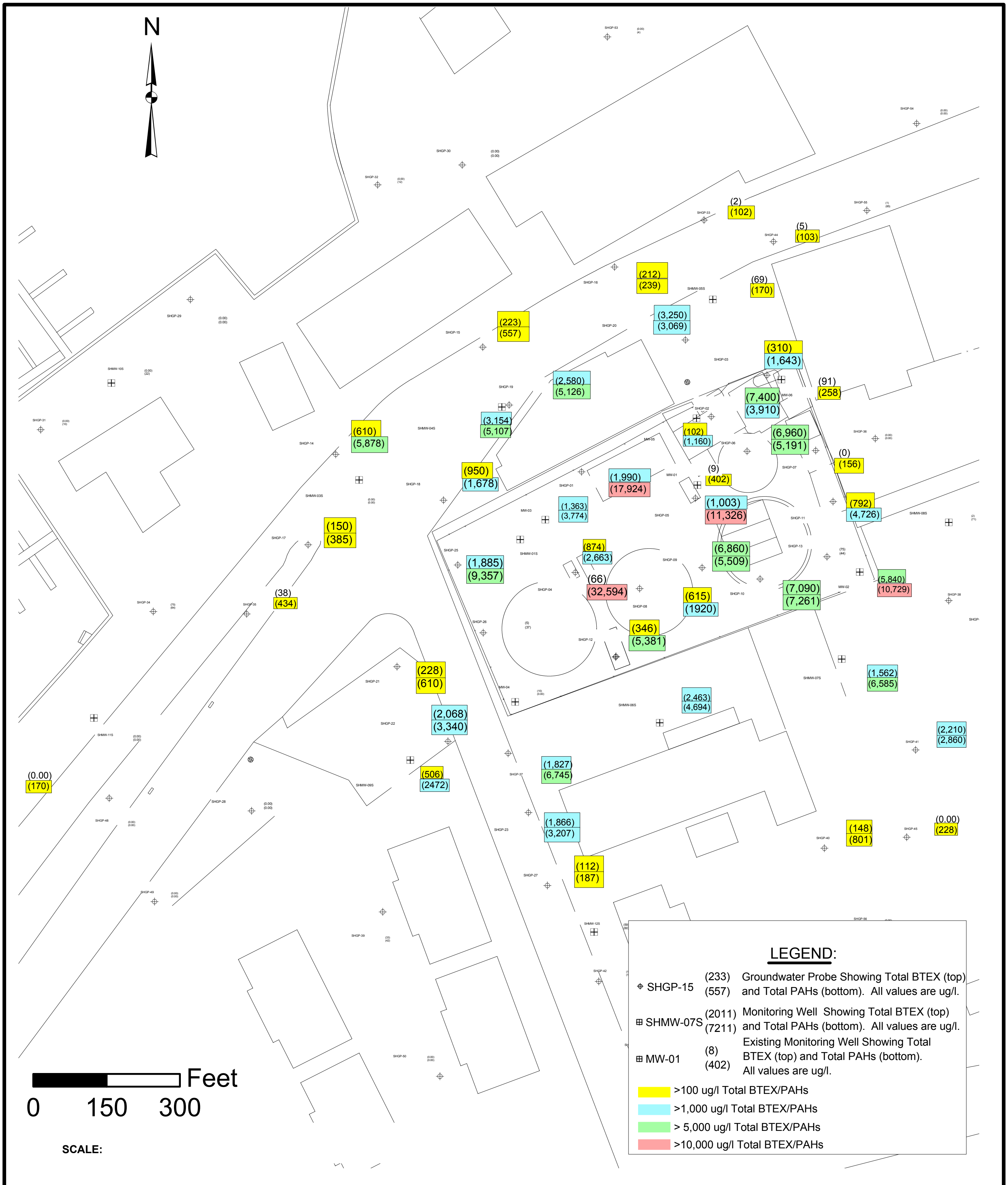
Sag Harbor Manufactured gas Plant
Sag Harbor (V), Suffolk County, New York

Cross-Section of the Extent of NAPL Contamination

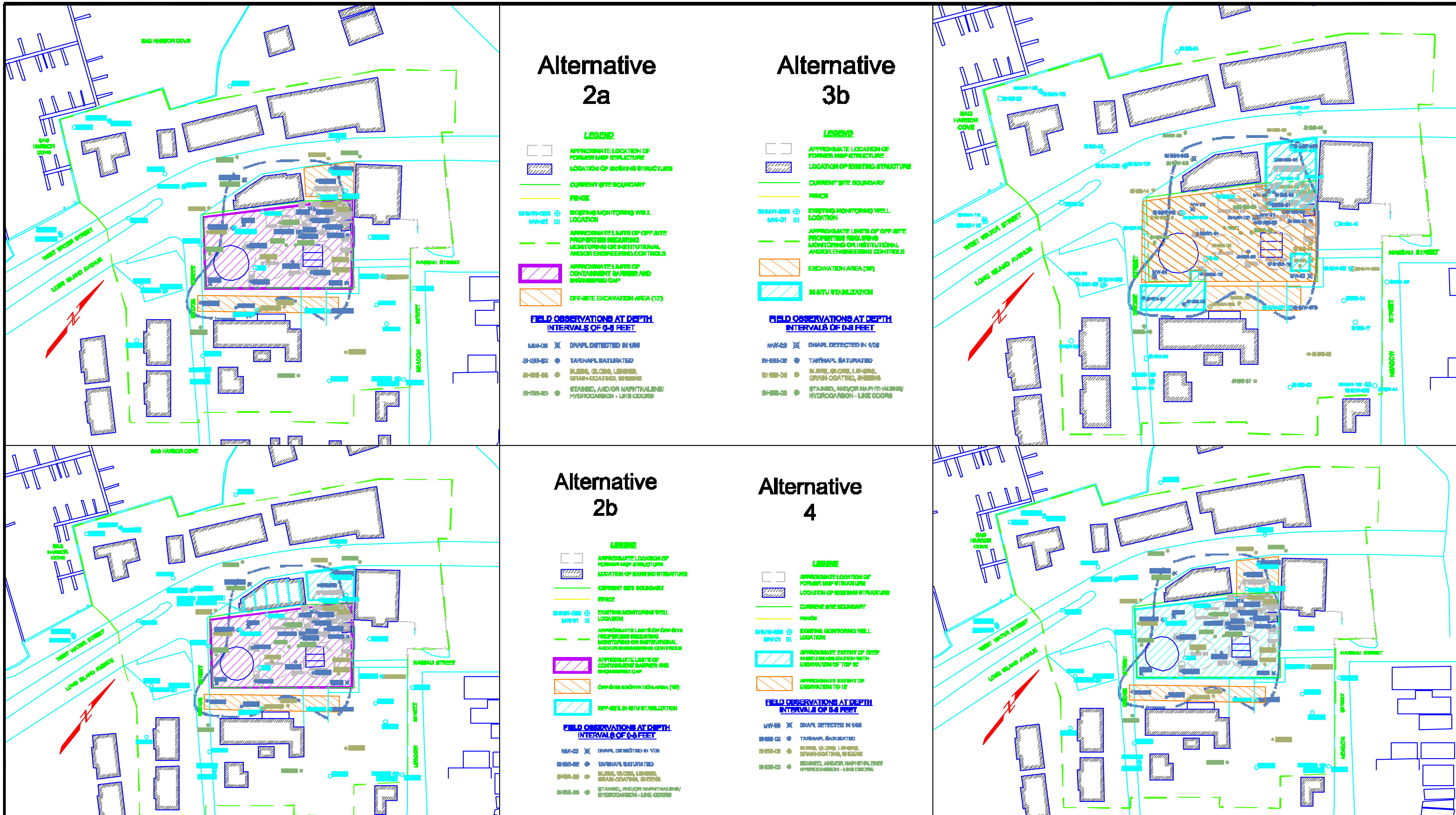
FIGURE 4



SAG HARBOR MANUFACTURED GAS PLANT
SAG HARBOR (V), SUFFOLK COUNTY NEW YORK

FIGURE 5

CONTAMINANT IMPACTS IN SHALLOW GROUNDWATER (0 TO 10 FEET)



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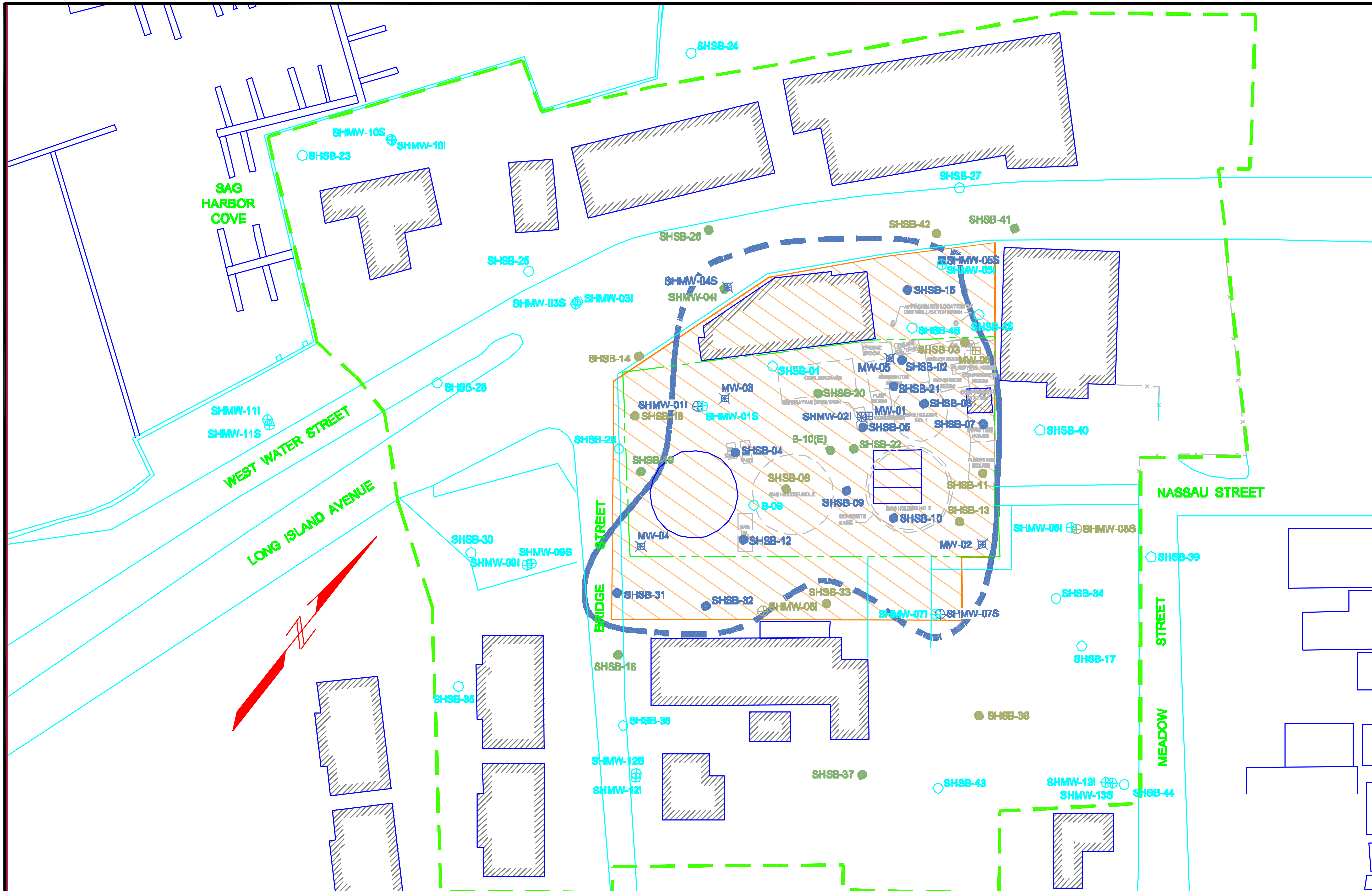
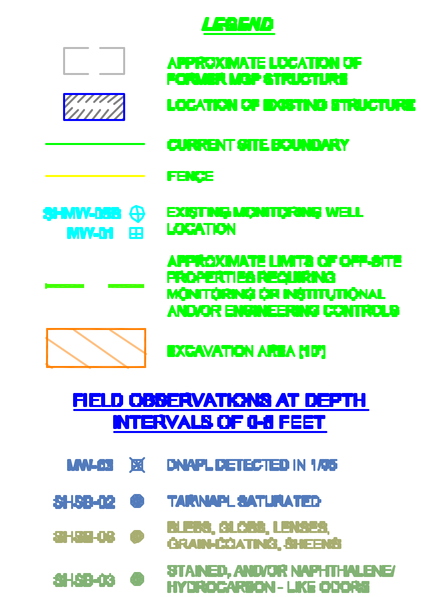
SAG HARBOR MANUFACTURED GAS PLANT
SAG HARBOR (V), SUFFOLK COUNTY, NEW YORK

REMEDIAL ALTERNATIVES

FIGURE 6



Alternative 3a



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SAG HARBOR MANUFACTURED GAS PLANT
SAG HARBOR (V), SUFFOLK COUNTY, NEW YORK

PROPOSED REMEDY

FIGURE 7