Department of Environmental Conservation

Division of Environmental Remediation

Record of Decision

West Side Corporation Site

Operable Unit No. 1 (On-Site)

Jamaica, Queens County

Site Number 2-41-026

July 2000

New York State Department of Environmental Conservation
GEORGE E. PATAKI, *Governor* JOHN P. CAHILL, *Commissioner*

DECLARATION STATEMENT - RECORD OF DECISION

West Side Corporation Inactive Hazardous Waste Site
Operable Unit No. 1 (On Site)
Jamaica, Queens County, New York
Site No. 2-41-026

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedy for the West Side Corporation Class 2 inactive hazardous waste disposal site which was chosen in accordance with the New York State Environmental Conservation Law. The remedial program selected is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300).

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for the West Side Corporation inactive hazardous waste site and upon public input to the Proposed Remedial Action Plan (PRAP) presented by the NYSDEC. A listing of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Assessment of the Site

Actual or threatened release of hazardous waste constituents from this site, if not addressed by implementing the response action selected in this ROD, presents a current or potential significant threat to public health and the environment.

Description of Selected Remedy

Based on the results of the Remedial Investigation/Feasibility Study (RI/FS) for the West Side Corporation Site and the criteria identified for evaluation of alternatives, the NYSDEC has selected Groundwater Extraction and Treatment, Soil Vapor Extraction and Treatment, and the use of chemical oxidants (e.g., Fenton's Reagent) to treat soils in Source Area 1. The components of the remedy are as follows:

- The installation of a groundwater extraction and treatment system. The extraction wells located at the downgradient site boundary will remove contaminated groundwater for treatment and provide for the containment of the groundwater on site.

- A soil vapor extraction and treatment system will be installed to treat the contaminated soils in Source Areas 1, 2, and 3. The remedy will include asphalt pavement in Source Areas 1, 2, and 3 to enhance the effectiveness of the Soil Vapor Extraction and Treatment (SVET) system.

- A pilot-scale study to assess the effectiveness of the application of Fenton's reagent (or other chemical oxidant, e.g., potassium permanganate) to reduce the volume of highly

contaminated PCE saturated soil and groundwater in Source Area 1 will be performed. This study will be expanded to full scale operation if feasible.

- Implementation of a long-term monitoring program to evaluate the effectiveness of the system will be instituted as a component of the O&M Plan for the site.

- To prevent future exposures to subsurface contaminants, the Department will seek to have restrictions placed upon the use of the site.

New York State Department of Health Acceptance

The New York State Department of Health concurs with the remedy selected for this site as being protective of human health.

Declaration

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable, and satisfies the preference for remedies that reduce toxicity, mobility, or volume as a principal element.

7/31/00
Date

Michael J. OToole, Jr., Director
Division of Environmental Remediation

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RECORD OF DECISION

West Side Corporation Site
Operable Unit No. 1 (On-site)
Jamaica, Queens County
Site No. 2-41-026
June 2000

SECTION 1: SUMMARY OF THE RECORD OF DECISION

The New York State Department of Environmental Conservation (NYSDEC), in consultation with the New York State Department of Health, has selected this remedy to address the significant threat to human health and/or the environment created by the presence of hazardous waste at the **West Side Corporation Site**, a Class 2 inactive hazardous waste disposal site. As more fully described in Sections 3 and 4 of this document, the site was used as a storage and distribution center for dry cleaning chemicals from approximately 1969 to 1992. Tetrachloroethene (also perchloroethylene or PCE) was unloaded from trucks and railroad cars into an on-site tank farm and transferred to 55-gallon drums for distribution to dry cleaning facilities. Improper handling of the chemicals resulted in the disposal of hazardous wastes, including PCE, at the site, some of which were released or have migrated from the site to surrounding areas, including the properties to the south and the east. These disposal activities have resulted in the following significant threats to the public health and/or the environment:

- a significant threat to human health associated with migration of contaminated groundwater off site in an aquifer used elsewhere as a source of potable water.

- a significant environmental threat associated with highly contaminated groundwater and the impacts of heavily contaminated soils that continue to release contaminants to groundwater.

In order to eliminate or mitigate the significant threats to public health and/or the environment that the hazardous wastes disposed at the West Side Corporation Site have caused, the following remedy has been selected:

- The installation of a groundwater extraction and treatment system. The extraction wells located at the downgradient site boundary will remove contaminated groundwater for treatment and provide for the containment of contaminated groundwater on site.

- A soil vapor extraction and treatment system will be installed to treat the contaminated soils in Source Areas 1, 2, and 3. The remedy will include asphalt pavement in Source Areas 1, 2, and 3 to enhance the effectiveness of the Soil Vapor Extraction and Treatment (SVET) system.

- A pilot-scale study to assess the effectiveness of the application of Fenton's reagent (or other chemical oxidant, e.g., potassium permanganate) to reduce the volume of highly contaminated PCE saturated soil and groundwater in Source Area 1 will be performed. This study will be expanded to full scale operation if feasible.

- Implementation of a long-term monitoring program to evaluate the effectiveness of the system will be instituted as a component of the O&M Plan for the site.

- To prevent future exposures to subsurface contaminants, the Department will seek to have restrictions placed upon the use of the site.

The selected remedy, discussed in detail in Section 7 of this document, is intended to attain the remediation goals selected for this site in Section 6 of this Record of Decision (ROD), in conformity with applicable standards, criteria, and guidance (SCGs).

SECTION 2: SITE LOCATION AND DESCRIPTION

The site consists of approximately 4.5 acres of land, located at 107-10 180th Street in Jamaica, New York (see Figures 1 & 2). The Site is owned by West Side Corp., and includes a brick structure, approximately 21,600 square feet (sf), currently leased by Atlantic Express Transportation (Atlantic), a school bus company. Contamination at the site does not present a threat to the workers or people using the buses. Atlantic has been using the facility for dispatching, repairing and maintaining school buses. The surrounding area is mixed commercial and residential. The Site is bordered to the west and south by a maintenance and storage yard owned by the New York City Department of Environmental Protection (NYCDEP). Formerly, the Jamaica Water Supply Company occupied this property west and south of the Site. Several production wells (Nos. 24, 24A, 24B, and 24C) now owned by NYCDEP (formally owned and operated by the Jamaica Water Supply Company) were located to the north, south and west of the site and not directly in line with the flow of groundwater from the site. These wells were used during periods of high demand, particularly during summer months. Historical data indicate that contaminated groundwater from the site was drawn toward these production wells when they were in operation. When contaminants were detected in these wells, the wells were taken out of service. This allowed natural groundwater flow patterns to reestablish until the wells were restarted. Well #24 was taken out of service in 1975. Wells 24A, 24B, and 24C were taken out of service in 1982.

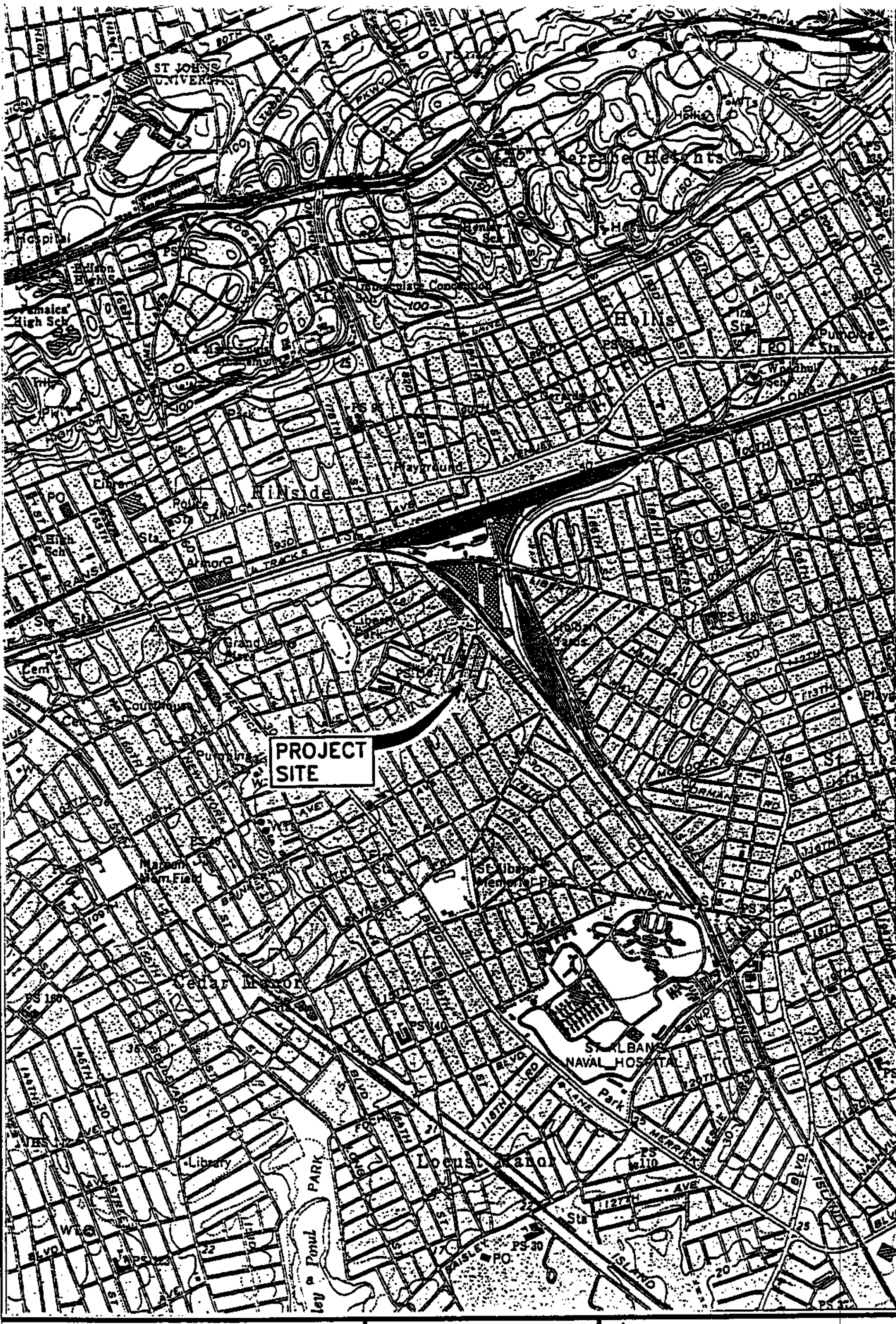
Operable Unit No. 1, which is the subject of this Record of Decision, consists of the site property itself. Operable Unit No. 2 includes areas where contaminated groundwater has migrated off site. An Operable Unit represents a portion of the site remedy which for technical or administrative reasons can be addressed separately to eliminate or mitigate a release, threat of release or exposure pathway resulting from the site contamination. The remaining operable unit for this site is described in Section 3.2 below.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

The Site was used for the manufacture and distribution of ceramic pipes and fittings until 1969.

From about 1969 to 1992, the Site property was used as a storage and distribution center for laundromat supplies, hangers, plastic garment bags, and most notably dry cleaning chemicals including large quantities of tetrachloroethene (also known as perchloroethylene or PCE). The property was operated as the West Side Corporation.



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DATE: JANUARY 2003

GZA GeoEnvironmental of New York

SCALE IN FEET

0 1000 2000 4000

WEST SIDE CORPORATION
JAMAICA, NEW YORK

REMEDIAL INVESTIGATION/FEASIBILITY STUDY

LOCUS PLAN

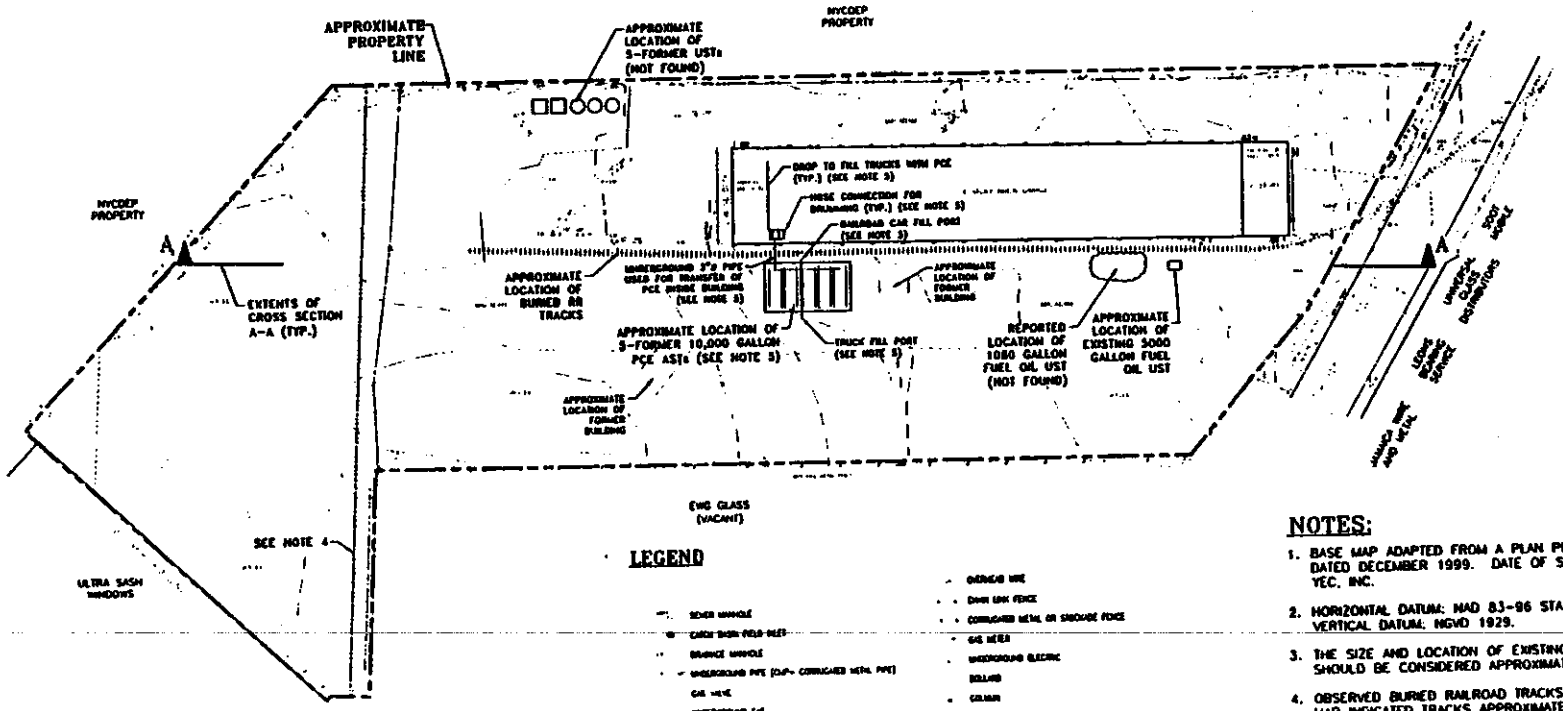
NOTE:
BASE MAP ADAPTED FROM U.S.G.S. QUADRANGLE MAP JAMAICA, N.Y. – 1979.

N

NEW YORK

PROJECT No.
55265

FIGURE No.
1



LEGEND

- SEWER MANHOLE
- CATCH BASIN FIELD INLET
- DRAINAGE MANHOLE
- UNDERGROUND PIPE (CAP= CORRUGATED METAL PIPE)
- GAS VALVE
- UNDERGROUND GAS
- WATER VALVE
- FIRE HYDRANT
- UTILITY POLE
- OVERHEAD WIRE
- CHAIN LINK FENCE
- CORRUGATED METAL OR STOCKADE FENCE
- GAS MAIN
- UNDERGROUND ELECTRIC
- BOLLARD
- CULVERT
- BAY
- CONCRETE LINE (1 FOOT WIDTH)

☼ Jamaica Water Supply (JWS) Company Pumping Well

NOTES:

1. BASE MAP ADAPTED FROM A PLAN PROVIDED BY YEC, INC. IN AUTOCAD FORMAT DATED DECEMBER 1999. DATE OF SURVEY: OCTOBER 6, 1999, PERFORMED BY YEC, INC.
2. HORIZONTAL DATUM: NAD 83-96 STATE PLANE COORDINATE SYSTEM, EAST ZONE. VERTICAL DATUM: NGVD 1929.
3. THE SIZE AND LOCATION OF EXISTING SITE FEATURES AND EXPLORATIONS SHOULD BE CONSIDERED APPROXIMATE.
4. OBSERVED BURIED RAILROAD TRACKS IN BORING MW-30. A 1974 SANBORN MAP INDICATED TRACKS APPROXIMATELY AS PRESENTED AS SHOWN ON FIGURE 3, A GEOPHYSICAL ANOMALY CORRILATES WITH THE RAILROAD TRACK LOCATION.
5. INFORMATION PERTAINING TO THE 5-FORMER 10,000 GALLON PCE ASTs AND THE ASSOCIATED TRANSFER LINES IS BASED ON A PLAN ENTITLED, "PERCHLORETHYLENE TANK INSTAL. FOR WEST SIDE CORP.", PREPARED BY RGJ CONTRACTING CO., INC., DATE UNKNOWN.

Well -24C

DRAFT

WEST SIDE CORPORATION
JAMAICA, NEW YORK

REMEDIAL INVESTIGATION/FEASIBILITY STUDY

SITE AND CROSS SECTION A-A

REV No.	DESCRIPTION	BY	DATE

SCALE IN FEET
0 40 80 160

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DATE: JANUARY 2000
PROJECT No.
55265

GeoEnvironmental of New York

Five 10,000 gallon Aboveground Storage Tanks (ASTs) were located outside the southeast portion of the Site building and were used for the storage of PCE (see Figure 2). These tanks were filled from truck tankers and railroad tanker cars. Railroad tracks were located between the building and the ASTs. The piping from the ASTs extended into the southern portion of the building where PCE was dispensed into 55-gallon drums for distribution to dry cleaning establishments. Improper handling of the chemicals has resulted in the disposal of hazardous wastes, primarily PCE, at the site, some of which were released or have migrated in groundwater from the site to surrounding areas, including the properties to the south and east.

Several USTs were reportedly located around the Site building. These tanks apparently contained diesel and gasoline fuel for delivery and Site vehicles. Exploratory investigations (test-pits excavated along the west property line where the tanks were believed to have been installed) indicated that the tanks have been removed. The current occupant is using natural gas for heating the building. However, a partially filled heating oil underground tank exists at the site.

3.2: Remedial History

The site was first listed in the Registry in August 1997, on the basis of information contained in a subsurface investigation report provided to the Department by the New York City Corporation Counsel. The report was prepared by EEA, Inc., apparently for a potential purchaser. Groundwater was found to contain up to 50,000 ppb of tetrachloroethylene (PCE) and soil up to 3,100,000 ppb of PCE according to the report prepared by EEA.

The current owner(s) of the site declined to undertake the remediation of the site. Therefore, a remedial investigation/feasibility study (RI/FS) was initiated by NYSDEC in July 1998 under the NYS superfund program.

During the investigation of the site, it was determined that groundwater contamination extends downgradient of the site to the south-southwest. Rather than delay work on site while the extent of off-site groundwater contamination is defined, a second Operable Unit that includes off-site contaminated groundwater was established. The off-site investigation and evaluation of cleanup alternatives will be completed while steps are taken to begin the design of the on-site remedy.

SECTION 4: SITE CONTAMINATION

To evaluate the contamination present at the site and to evaluate alternatives to address the significant threat to human health and the environment posed by the presence of hazardous waste, the NYSDEC has recently conducted a Remedial Investigation/Feasibility Study (RI/FS).

4.1: 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 in two phases. The first phase was conducted between February and April 1999 and the second phase between September and October 1999. A report entitled Remedial Investigation,

West Side Corporation Site, dated July 2000 has been prepared which describes the field activities and findings of the RI in detail.

The RI included the following activities:

- *Geophysical survey to locate the presence or absence of metallic materials (e.g., drums, tanks, utilities, etc.).*
- *Soil Vapor Survey to detect the presence of VOCs in the soil.*
- *Installation of Geoprobe® soil borings and monitoring wells for analysis of soils and groundwater as well as physical properties of soil and hydrogeologic conditions.*
- *Excavation of test pits to locate underground utilities, tanks, etc.*

To determine which media (soil, groundwater, etc.) are contaminated at levels of concern, the RI analytical data was compared to environmental Standards, Criteria, and Guidance values (SCGs). Groundwater, drinking water and surface water SCGs identified for the Westside Corporation Site are based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part V of New York State Sanitary Code. For soils, NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046 provides soil cleanup guidelines for the protection of groundwater, background conditions, and health-based exposure scenarios. In addition, for soils, site-specific background concentration levels can be considered for certain classes of contaminants.

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.

Chemical concentrations are reported in parts per billion (ppb), parts per million (ppm), For comparison purposes, where applicable, SCGs are provided for each medium.

4.1.1: Site Geology and Hydrogeology

The overburden deposits encountered at the Site generally consist of fill materials, glacial outwash, and clay soil. The fill deposit encountered at the site ranged in thickness from approximately 0.5 feet to 10 feet below ground surface and comprised of brown sandy silt, brown silty sands and gravelly sands with fragments of ceramic, glass, plastic pellets, and metal debris.

Glacial outwash deposits consisting primarily of gravelly sand underlies the fill and/or the silt at the Site. This glacial sediment was observed up to depths of approximately 70 feet below ground surface (bgs) as shown in Figure 3. The groundwater table is approximately 12 feet bgs.

The Gardiners Clay was encountered underneath the upper glacial sands at the Site at an average depth of about 65 feet bgs. The clay layer is believed to be approximately 30 feet thick. The clay surface beneath the Site may act as a basin for the groundwater and soils above.

Based on regional topography, the general flow of groundwater in the Jamaica area is southerly toward Jamaica Bay, located approximately 3 miles south of the Site.

As discussed in Sections 2 and 3.2, the extent of groundwater contamination downgradient of the site will be determined during the investigation of Operable Unit No. 2.

4.1.2: Nature of Contamination

As described in the RI report, many soil and groundwater samples were collected at the site to characterize the nature and extent of contamination. The main categories of contaminants that exceed their SCGs are volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

The VOC contaminants of concern are tetrachloroethene (PCE), trichloroethene (TCE), 1,2-dichloroethene (1,2-DCE), 1,1-DCE, acetone, 2-butanone, ethylbenzene, vinyl chloride, and xylenes. Several SVOC petroleum-related compounds including benzo(a)pyrene, chrysene, and benzo(a)anthracene were detected at concentrations exceeding SCGs.

4.1.3: Extent of Contamination

Table 1 summarizes the extent of contamination for the contaminants of concern in overburden groundwater, surface soil, subsurface soil, cesspool soil and cesspool water and compares the data with the SCGs for the site. The following paragraphs summarize the media investigated and the findings of the investigation.

Surface Soil

Twelve surface soil samples were collected from locations at the Site and the adjacent property east of the Site. Five surface soil samples were collected from three perimeter locations at the Site (including two duplicate samples). Twelve VOC compounds were detected in the 17 surface soil samples analyzed, however, none of the compounds exceeded the SCGs. PCE was identified with the highest concentrations. The concentrations ranged from 360 to 920 ppb which are below the soil guidance value of 1400 ppb. PCE concentrations at the remaining 12 surface soil sample locations ranged from not detected to 170 ppb. Surface soil is not considered a significant threat at the site.

Subsurface Soil

Three areas of VOC subsurface soil contamination are apparent at the Site and have been designated Source Area 1, Source Area 2 and Source Area 3 as shown on Figure 4. Subsurface soil samples with compounds identified exceeding cleanup goals were generally located at depths ranging from 1 to 8 feet below ground surface. These depths are from the unsaturated portion of the Site soils.

The on-site subsurface soil samples were reported to contain six VOCs exceeding cleanup goals. The compounds include PCE, TCE, 1,2-DCE, 1,1-DCE, acetone, and 2-butanone. Two VOCs, ethylbenzene, and xylenes, were detected at a location north of the site (upgradient) at concentrations greater than objectives. PCE was detected most frequently and at the highest concentrations.

PCE concentrations in Source Area 1 (where ASTs were located) were as high as 5,900,000 ppb in shallow soils and as high as 7,100,000 ppb in deep soils. Dense non-aqueous phase liquid (DNAPL) exists based upon the PCE concentrations and dye testing. However, direct observation of free product was not noted in soil samples collected from the unsaturated zone. PCE is present in an area estimated to be 31,600 square feet at a depth of about 1 foot to 12 feet below ground surface (bgs).

PCE concentrations in Source Area 2 were as high as 890,000 ppb. The area of contamination is approximately 5,000 square feet. The depth of PCE contamination extends to the water table, about 12 feet. The higher levels of PCE were detected in the upper 4 feet of the soils.

PCE concentrations in Source Area 3 were as high as 120,000 ppb. The area of contamination is approximately 2,000 square feet. The depth of the contamination was typically less than 4 feet.

Groundwater

Nineteen VOC compounds were detected in the 70 groundwater samples collected. Seven compounds were identified at concentrations exceeding the groundwater standards. These compounds include PCE, TCE, 1,2-DCE, vinyl chloride, toluene, chloroform, and xylene (total).

PCE in groundwater exceeded the Class GA groundwater standard (PCE concentration of 5 ppb) over much of the Site. The most prominent area of shallow groundwater contamination appeared to originate in Source Area 1 near MW-8S. This area corresponds to the area of highest VOC contamination in the unsaturated soil. The concentration of PCE in MW-8S was reported at 210,000 ppb with decreasing concentrations identified downgradient.

Elevated concentrations of PCE, significantly higher than the groundwater standards, are also evident in the deep groundwater samples collected. The highest concentration of contaminants in deep groundwater was identified at MW-8D at 25,000 ppb. The data suggests that the bulk of the PCE contamination is in the upper 20 to 30 feet of the aquifer. The analytical data also indicates PCE contamination in groundwater north of the Site (i.e., PCE at 510 ppb in shallow ground water and 1300 ppb in deep ground water). The source of this contamination will be investigated as part of the work for Operable Unit No. 2. The PCE concentrations contour map for the shallow and the deep groundwater are shown in Figures 5 and 6 respectively.

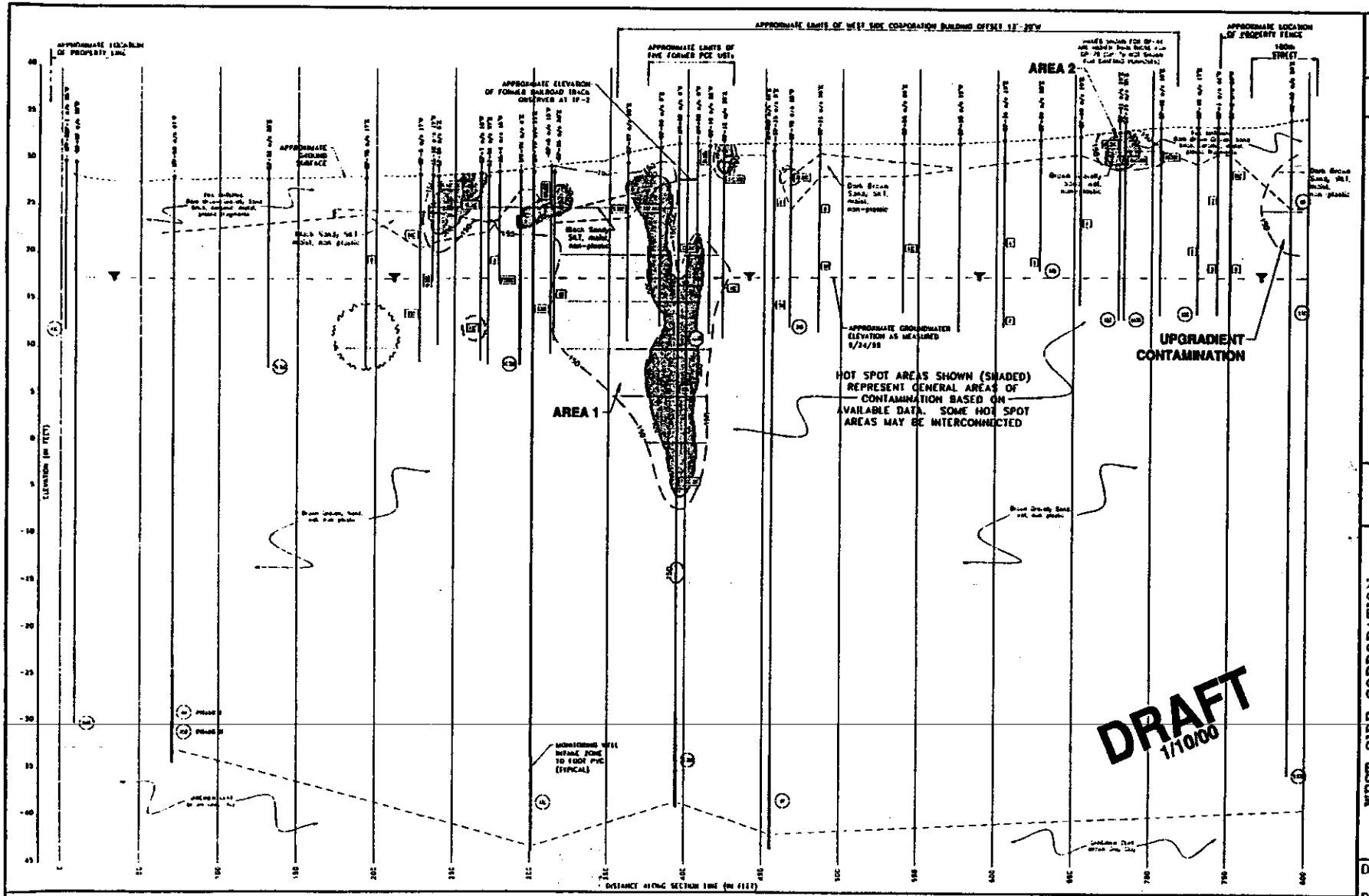
Elevated concentrations of PCE were also detected in deep groundwater samples collected from off-site Geoprobe® soil borings near the former Jamaica Water supply well 24C. These PCE concentrations, averaging about 1,000 ppb, were observed to be typically ten times higher than the closest on-site deep groundwater PCE concentrations. These elevated PCE levels appear to be residual Site contamination that migrated from past supply well pumping activities.

Degradation compounds of PCE (TCE, 1,2-DCE and vinyl chloride) at concentrations exceeding their respective groundwater standards, were detected in both shallow and deep locations throughout the Site.

Table 1
Nature and Extent of Contamination

MEDIUM	CATEGORY	CONTAMINANT OF CONCERN	CONCENTRATION RANGE (ppb)	FREQUENCY of EXCEEDING SCGs	SCG (ppb)
Overburden Groundwater	Volatile Organic Compounds (VOCs)	Tetrachloroethene (PCE)	1 to 210,000	64 of 70	5
		1,2-Dichloroethene (total DCE)	1 to 3,400	45 of 70	5
		Trichloroethene (TCE)	1 to 1,200	43 of 70	5
		Vinyl Chloride	1 to 290	11 of 70	2
Subsurface Soil	Volatile Organic Compounds (VOCs)	Tetrachloroethene (PCE)	1 to 7,100,000	26 of 95	1,400
		1,2-Dichloroethene (total)	1 to 28,000	9 of 95	300
		Trichloroethene	1 to 14,000	10 of 95	700
		Ethylbenzene	1 to 11,000	2 of 95	5,500
		Xylene (total)	1 to 22,000	2 of 95	1,200
On-Site Sanitary Cesspool/ Stormwater Drainage Structure Soil	Volatile Organic Compounds (VOCs)	Tetrachloroethene (PCE)	1 to 12,000	2 of 11	1,400
On-Site Sanitary Cesspool/ Stormwater Drainage Structure Water	Volatile Organic Compounds (VOCs)	Tetrachloroethene (PCE)	2 to 220	4 of 7	5
		1,2-Dichloroethene (total DCE)	2 to 500	3 of 7	5

Notes: SCGs are based on either NYSDEC Class GA groundwater standards as promulgated in 6 NYCRR 703, dated June 1998 or TAGM 4046 (Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives Levels", prepared by NYSDEC, January 24, 1994) values.



LEGEND:

- (xx) ANALYTICAL SOIL PCE CONCENTRATION MEASURED IN ppb
- (x) ANALYTICAL GROUNDWATER PCE CONCENTRATION MEASURED IN ppb
- APPROXIMATE LIMIT OF ORGANIC VAPOR METER READING CONTOUR MEASURED IN ppm
- o/s = OFFSET

NOTES:

1. BASE MAP ADAPTED FROM A PLAN PROVIDED BY YEC, INC. IN AUTOCAD FORMAT DATED MAY 1999. DATE OF SURVEY: MARCH 29, 1999, PERFORMED BY YEC, INC.
2. HORIZONTAL DATUM: NAD 83-96 STATE PLANE COORDINATE SYSTEM, EAST ZONE. VERTICAL DATUM: NGVD 1929.
3. THE SIZE AND LOCATION OF EXISTING SITE FEATURES AND EXPLORATIONS SHOULD BE CONSIDERED APPROXIMATE.

REV No.	DESCRIPTION	BY	DATE

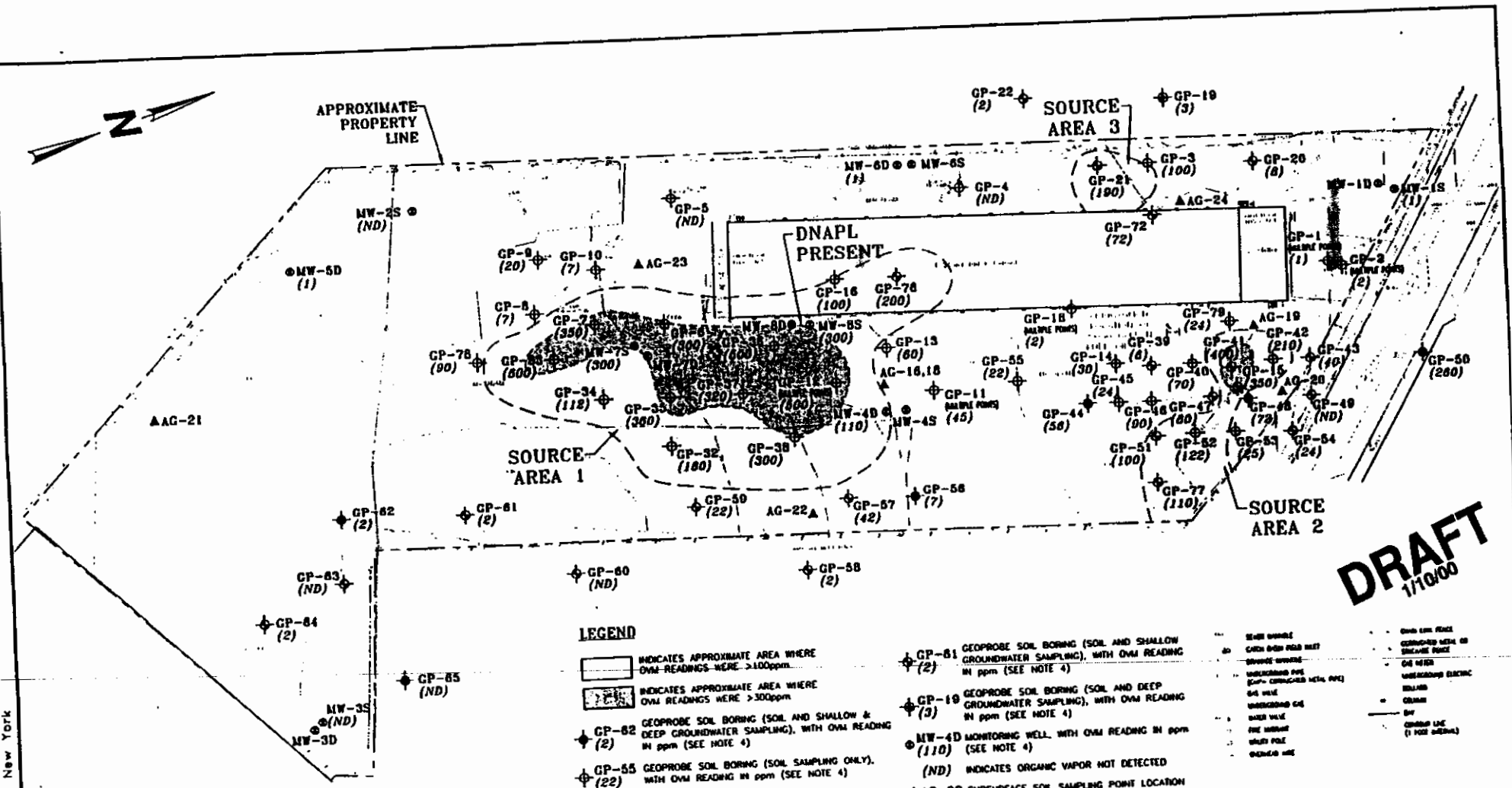
SCALE IN FEET
HORIZONTAL 0 30 60 120
VERTICAL 0 5 10 20

GZA GeoEnvironmental of New York

WEST SIDE CORPORATION
JAMAICA, NEW YORK
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

GEOLOGIC AND ANALYTICAL CROSS SECTION A-A

DRAWN BY: DEW
DATE: JANUARY 2000
PROJECT No. 55265
FIGURE No. 3



LEGEND

- INDICATES APPROXIMATE AREA WHERE OVM READINGS WERE >100ppm
- INDICATES APPROXIMATE AREA WHERE OVM READINGS WERE >300ppm
- GP-62 (2) GEOPROBE SOIL BORING (SOIL AND SHALLOW & DEEP GROUNDWATER SAMPLING), WITH OVM READING IN ppm (SEE NOTE 4)
- GP-55 (22) GEOPROBE SOIL BORING (SOIL SAMPLING ONLY), WITH OVM READING IN ppm (SEE NOTE 4)
- GP-61 (2) GEOPROBE SOIL BORING (SOIL AND SHALLOW GROUNDWATER SAMPLING), WITH OVM READING IN ppm (SEE NOTE 4)
- GP-19 (3) GEOPROBE SOIL BORING (SOIL AND DEEP GROUNDWATER SAMPLING), WITH OVM READING IN ppm (SEE NOTE 4)
- MW-4D (110) MONITORING WELL, WITH OVM READING IN ppm (SEE NOTE 4)
- (ND) INDICATES ORGANIC VAPOR NOT DETECTED
- AG-22 SUBSURFACE SOIL SAMPLING POINT LOCATION

NOTES:

1. BASE MAP ADAPTED FROM A PLAN PROVIDED BY YEC, INC. IN AUTOCAD FORMAT DATED DECEMBER 1999. DATE OF SURVEY: OCTOBER 6, 1999, PERFORMED BY YEC, INC.
2. HORIZONTAL DATUM: NAD 83-96 STATE PLANE COORDINATE SYSTEM, EAST ZONE. VERTICAL DATUM NGVD 1929.
3. THE SIZE AND LOCATION OF EXISTING SITE FEATURES AND EXPLORATIONS SHOULD BE CONSIDERED APPROXIMATE.

WEST SIDE CORPORATION
JAMAICA, NEW YORK

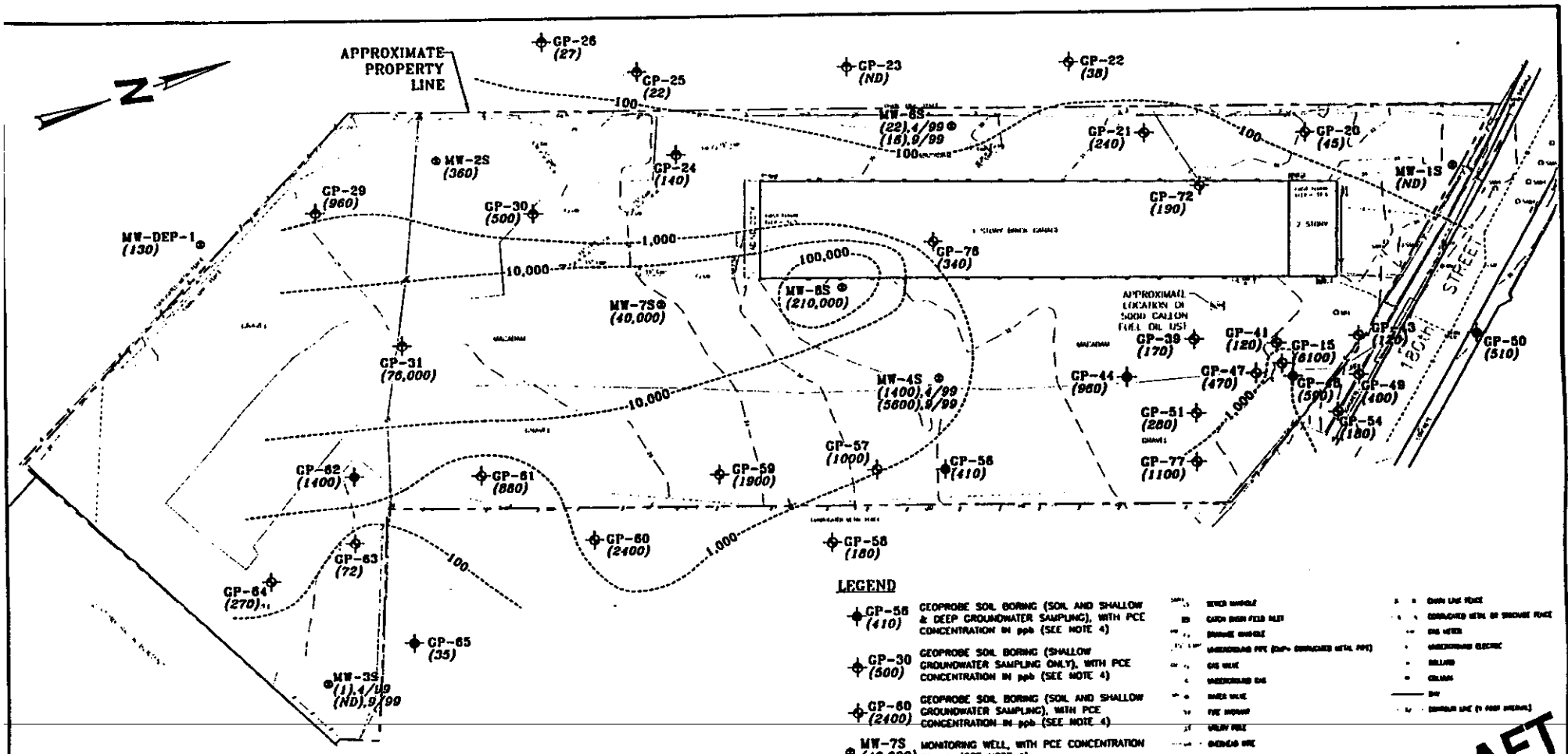
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

SCALE IN FEET
0 30 60 120

REV No.	DESCRIPTION	BY	DATE

DRAWN BY: DEW
DATE: JANUARY 2000
PROJECT No. 55265

A Geo-Environmental of New York



LEGEND

- GP-56 (410) — GEOPROBE SOIL BORING (SOIL AND SHALLOW & DEEP GROUNDWATER SAMPLING), WITH PCE CONCENTRATION IN ppb (SEE NOTE 4)
- GP-30 (500) — GEOPROBE SOIL BORING (SHALLOW GROUNDWATER SAMPLING ONLY), WITH PCE CONCENTRATION IN ppb (SEE NOTE 4)
- GP-60 (2400) — GEOPROBE SOIL BORING (SOIL AND SHALLOW GROUNDWATER SAMPLING), WITH PCE CONCENTRATION IN ppb (SEE NOTE 4)
- MW-7S (40,000) — MONITORING WELL, WITH PCE CONCENTRATION IN ppb (SEE NOTE 4)
- (ND) — INDICATES PCE NOT DETECTED
- 1,000 — CONTOUR LINE INDICATING ANALYTICAL PCE CONCENTRATIONS IN ppb

NOTES:

1. BASE MAP ADAPTED FROM A PLAN PROVIDED BY YEC, INC. IN AUTOCAD FORMAT DATED DECEMBER 1999. DATE OF SURVEY: OCTOBER 6, 1999, PERFORMED BY YEC, INC.
2. HORIZONTAL DATUM: NAD 83-96 STATE PLANE COORDINATE SYSTEM, EAST ZONE. VERTICAL DATUM: NGVD 1929.
3. THE SIZE AND LOCATION OF EXISTING SITE FEATURES AND EXPLORATIONS SHOULD BE CONSIDERED APPROXIMATE.
4. GROUNDWATER SAMPLES FROM GEOPROBE SOIL BORINGS WERE COLLECTED BETWEEN SEPTEMBER 14, 1999 AND OCTOBER 1, 1999, WITH THE EXCEPTION OF GP-15 WHICH WAS COLLECTED MARCH 12, 1999. GROUNDWATER SAMPLES FROM MONITORING WELLS WERE COLLECTED BETWEEN APRIL 14, 1999 AND APRIL 16, 1999 (UNLESS

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WEST SIDE CORPORATION
JAMAICA, NEW YORK

REMEDIAL INVESTIGATION/FEASIBILITY STUDY

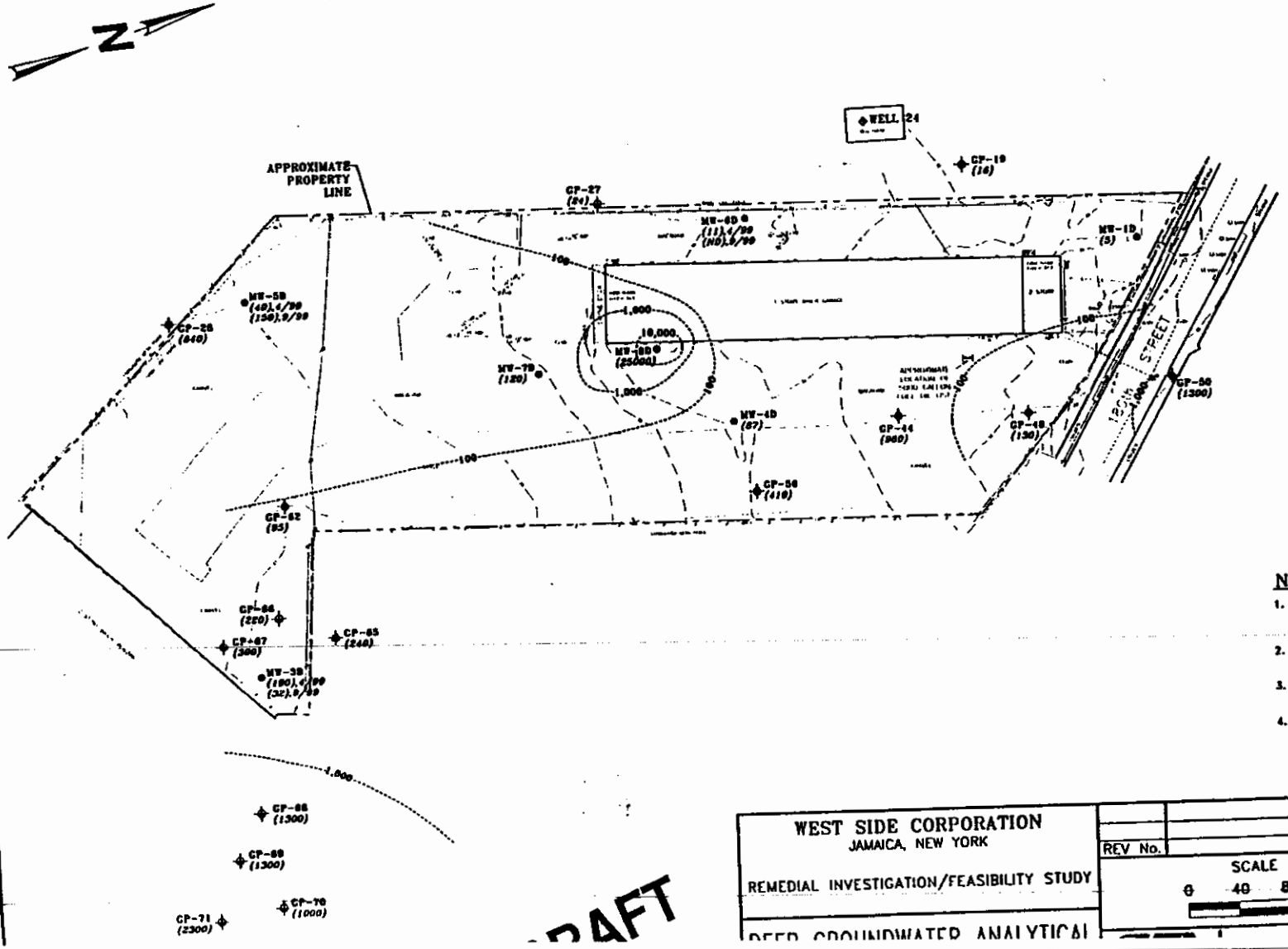
SHALLOW GROUNDWATER ANALYTICAL PCE CONCENTRATIONS CONTOUR MAP

REV No.	DESCRIPTION	BY	DATE

SCALE IN FEET
0 30 60 120

GZA

DRAWN BY: DEW
DATE: JANUARY 2000
PROJECT No. 55265
FIGURE No. 5



NOTES:

1. BASE MAP ADAPTED FROM A PLAN PROVIDED BY YEC, INC. IN AUTOCAD FORMAT DATED DECEMBER 1999. DATE OF SURVEY: OCTOBER 6, 1999, PERFORMED BY YEC, INC.
2. HORIZONTAL DATUM: NAD 83-96 STATE PLANE COORDINATE SYSTEM, EAST ZONE. VERTICAL DATUM: NGVD 1929.
3. THE SIZE AND LOCATION OF EXISTING SITE FEATURES AND EXPLORATIONS SHOULD BE CONSIDERED APPROXIMATE.
4. GROUNDWATER SAMPLES FROM GEOPROBE SOIL BORINGS WERE COLLECTED BETWEEN SEPTEMBER 21, 1999 AND OCTOBER 1, 1999. GROUNDWATER SAMPLES FROM MONITORING WELL WERE COLLECTED BETWEEN APRIL 14, 1999 AND APRIL 16, 1999 (UNLESS OTHERWISE NOTED NEXT TO PCE CONCENTRATION.

WEST SIDE CORPORATION
JAMAICA, NEW YORK

REMEDIAL INVESTIGATION/FEASIBILITY STUDY

DEEP GROUNDWATER ANALYTICAL

REV No.	DESCRIPTION	BY	DATE

SCALE IN FEET
0 40 80 160

DRAWN BY: DEW
DATE: JANUARY 2000
PROJECT No.
55265

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4.2: Summary of Human Exposure Pathways:

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 health risks can be found in Section 6.0 of the R.I. Report.

An exposure pathway is the manner by which an individual may come in contact with a contaminant. The five elements of an exposure pathway are 1) the source of contamination; 2) the environmental media and transport mechanisms; 3) the point of exposure; 4) the route of exposure; and 5) the receptor population. These elements of an exposure pathway may be based on past, present, or future events. Therefore exposure pathways that could exist in the future include:

- ingestion, inhalation of vapors, or dermal contact with contaminated groundwater extracted for use.
- ingestion, inhalation, or dermal contact with contaminated subsurface soils by maintenance workers or construction workers.
- ingestion, inhalation, or dermal contact with contaminated Cesspool/Drainage structure soil and water by maintenance workers.

Currently, there are no completed human exposure pathways at the site. Subsurface soils and groundwater are highly contaminated but on site groundwater is not used and soil excavation would be necessary to expose people to contaminated soils.

4.3: Summary of Environmental Exposure Pathways

This section summarizes the types of environmental exposures and ecological risks which may be presented by the site.

The West Side Site and the areas surrounding the Site are primarily urban with commercial and industrial land use. There are no surface waters (lakes, ponds, streams etc.) or wetlands in the vicinity of the site, which could be impacted by the contamination from the site. Therefore, there are no fish and wildlife concerns at this site.

SECTION 5: 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 Potentially Responsible Parties (PRP) for the site, documented to date, include: West Side Corporation. The site is currently owned by West Side Corporation and was operated by West Side Corporation during the time that PCE was handled at the Site.

The PRP declined to implement the RI/FS at the site when requested by the NYSDEC. Therefore, the RI/FS is being conducted under the State Superfund program. After the remedy is selected, the PRPs will again be contacted to assume responsibility for the remedial program. If an agreement cannot be reached

with the PRPs, the NYSDEC will evaluate the site for further action under the State Superfund. The PRPs are subject to legal actions by the State for recovery of all response costs the State has incurred.

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. The overall remedial goal is to meet all Standards, Criteria and Guidance (SCGs) and be protective of human health and the environment. 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 goals selected for this site are:

- *Eliminate, to the extent practicable, off-site migration of groundwater that does not attain NYSDEC Class GA Ambient Water Quality Criteria and NYSDOH drinking water standards.*
- *Eliminate, to the extent practicable, future direct contact with the contaminated soils and groundwater.*
- *Eliminate, to the extent practicable, the continuing release of contaminants from on-site soil to groundwater.*
- *Reduce, to the extent practicable, the level of groundwater contamination on site, particularly the designated source areas.*

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 laws and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the West Side Corporation site were identified, screened and evaluated in the report entitled Feasibility Study West Side Corporation Site, dated July 2000.

A summary of the detailed analysis follows. As presented below, the time to implement reflects only the time required to implement the remedy, and does not include the time required to design the remedy, procure contracts for design and construction or to negotiate with responsible parties for implementation of the remedy.

7.1: Description of Remedial Alternatives

The potential remedies are intended to address the contaminants of concern in soils and groundwater at the site.

Alternative 1. ***No Action***

Present Worth: ..... *$ 95,00(*

Capital Cost: ..... *$ 0*
Annual O&M: ..... *$ 6,200*
Time to Implement ..... *0 months*

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. This alternative assumes that annual groundwater monitoring would be conducted in existing on-site wells for 30 years. During each monitoring event, ten wells would be purged and sampled, and water levels in the fourteen on-site wells would be measured. Groundwater samples would be analyzed for VOCs.

Alternative 2. ***Soil Vapor Extraction and Groundwater Extraction and Treatment***

Present Worth: ..... *$ 4,234,000*
Capital Cost: ..... *$ 1,470,000*
Annual O&M: ..... *$ 180,000*
Time to Implement ..... *6 months - 9 months*

Groundwater extraction and ex-situ treatment are components of this alternative. Extraction wells would be located at the downgradient Site boundary and within Source Area 1 (see Figure 7). The extraction wells would be operated for the purposes of containment of impacted Site groundwater, and to prevent further migration of the highly contaminated groundwater associated with Source Area 1. The pretreatment system would be operated for long-term groundwater control (i.e., 30 years) by extracting water at approximately 20 gallons per minute (gpm), or 5 gallons per minute per well. Extraction wells would extend to the top of clay (approximately 65 feet bgs). A pump test and a treatability study would be performed to collect data for the design of the extraction wells (to confirm the number of wells needed and the flow rate) and the components (air stripper, granular activated carbon system, catalytic oxidation system for destruction of air emissions or other acceptable components to be refined during the design phase) of the treatment system. This alternative also provides for treatment of impacted soil associated with Source Areas 1, 2 and 3 using Soil Vapor Extraction (SVE). Construction of an asphalt cover in impacted areas and unpaved locations would be needed to enhance the effectiveness of the SVE system. Excavation of selected "hot spots" would be considered further during detailed design. The cost of SVE system operation and maintenance would be compared with and without "hot spot" soil removal. This alternative is considered a traditional approach to Site remediation.

Alternative 3. ***Groundwater Extraction and Treatment, Soil Vapor Extraction and Treatment, and Fenton's Reagent (or other chemical oxidant) Application in Source Area 1.***

Present Worth: ..... *$ 4,576,000*
Capital Cost: ..... *$ 2,153,000*
Annual O&M: ..... *$ 158,000*
Time to Implement ..... *12 months - 18 months*

As in Alternative No. 2, groundwater extraction and ex-situ treatment are components of this alternative. However, as opposed to Alternative No. 2, extraction wells are located only at the downgradient Site boundary, and would be operated for the purposes of containment of impacted Site groundwater. To

address the highly contaminated groundwater/DNAPL associated with Source Area 1, the injection of Fenton's reagent (or other chemical oxidant) is included (see Figure 8). Fenton's reagent, an innovative technology, is an aggressive approach to treating this highly contaminated saturated area where DNAPL is present. Fenton's reagent would be applied to reduce the volume of highly contaminated saturated soil, highly contaminated groundwater and DNAPL. Fenton's reagent consists of an oxidizer (hydrogen peroxide) with an iron catalyst capable of oxidizing complex organic compounds such as PCE. Residual hydrogen peroxide decomposes into water and oxygen, and the iron precipitates. Heat is generated in the process. The process must be controlled carefully and insufficient mixing may reduce the effectiveness of the treatment. Fenton's reagent would be applied in four to five phases approximately 30 days apart. A pilot-scale treatability study would be conducted to collect the parameters (volume, concentration, rate of application of the reagents, etc.) for designing the system.

If found effective, the pilot study would be expanded to full-scale operation. Only a limited number of vendors are available to implement this technology. Different vendors use different concentrations of reagents. Using high concentrations of reagents may make the process difficult to control and may require portions of the site to be closed during the use of the reagent. Using dilute solutions would not require shutdown of the Site, however, this would further limit the number of vendors available for this application.

This alternative also provides for the treatment of impacted soil associated with Source Areas 1, 2 and 3 using SVE and construction of an asphalt cover in impacted areas and unpaved locations, as in Alternative 2. Excavation of Source Areas 2 and 3 would be further considered during the detailed design.

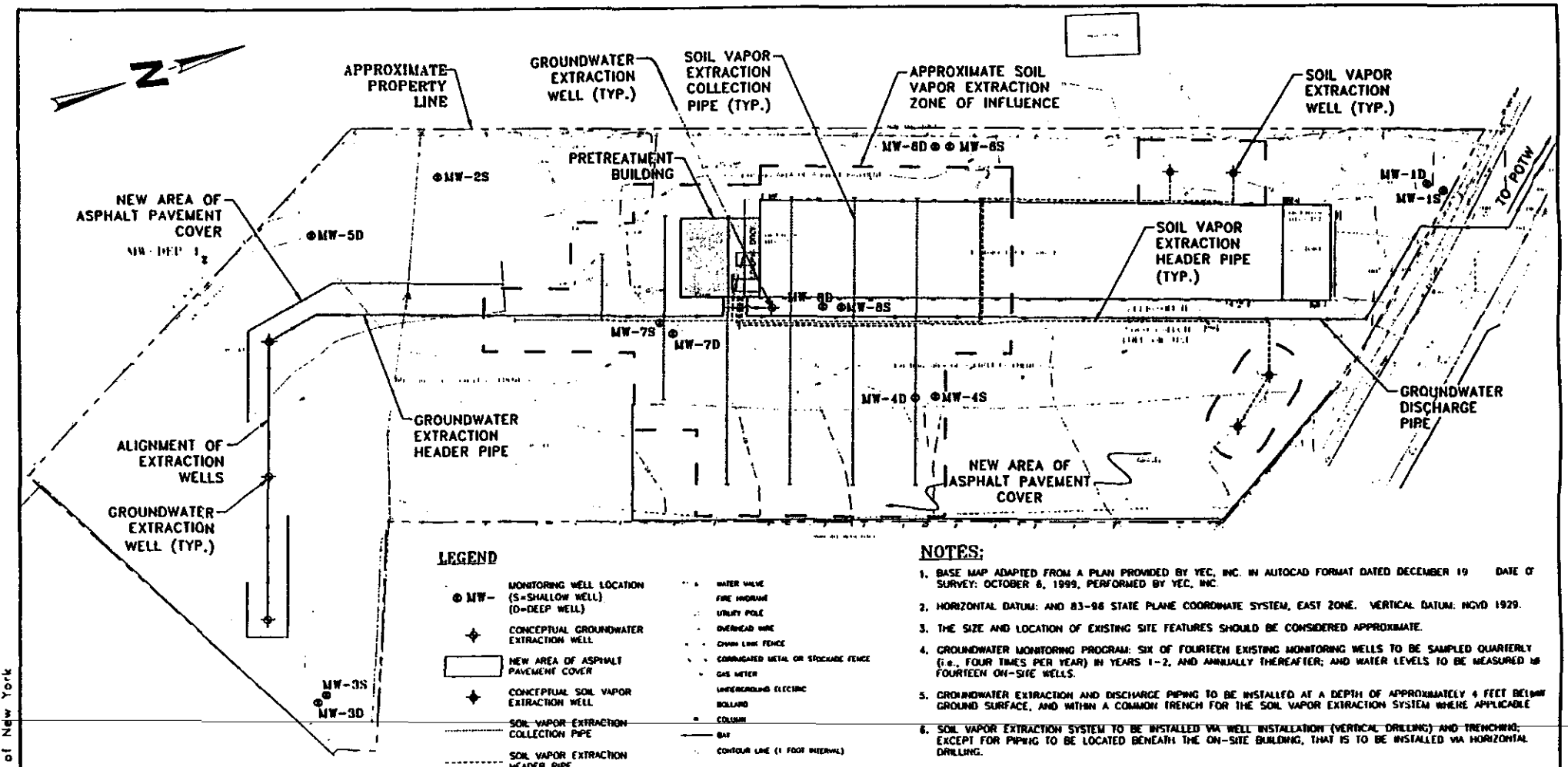
Alternative 4. ***Fenton's Reagent (or other chemical oxidant) and Soil Vapor Extraction***

Present Worth: *$2,184,000*
Capital Cost: ..... *$ 1,423,000*
Annual O&M: ..... *$ 50,000*
Time to Implement ..... *12 months - 18 months*

As in Alternative No. 2 and 3, this alternative provides for treatment of impacted soil associated with Source Areas 1, 2 and 3 using SVE (and possibly limited "hot spot" excavation), and construction of an asphalt cover. Also, included with this alternative is the application of Fenton's reagent, an innovative technology, to treat the highly contaminated saturated soil, highly contaminated groundwater and DNAPL within Source Area 1, as described in Alternative 3. However, Site wide Alternative No. 4 does not include containment of impacted, on-site groundwater. Rather, impacted groundwater would be addressed as part of an off-site remedy.

7.2 Evaluation of Remedial Alternatives

The criteria used to compare the potential remedial alternatives are defined in the regulation that directs the remediation of inactive hazardous waste sites in New York State (6 NYCRR Part 375). For each of the criteria, a brief description is provided, followed by an evaluation of the alternatives against that criterion. A detailed discussion of the evaluation criteria and comparative analysis is included in the Feasibility Study.



LEGEND

- ⊕ MW- MONITORING WELL LOCATION (S=SHALLOW WELL) (D=DEEP WELL)
- CONCEPTUAL GROUNDWATER EXTRACTION WELL
- NEW AREA OF ASPHALT PAVEMENT COVER
- CONCEPTUAL SOIL VAPOR EXTRACTION WELL
- SOIL VAPOR EXTRACTION COLLECTION PIPE
- SOIL VAPOR EXTRACTION HEADER PIPE
- GROUNDWATER EXTRACTION/ DISCHARGE PIPE WITH FLOW DIRECTION
- APPROXIMATE SOIL VAPOR EXTRACTION ZONE OF INFLUENCE
- APPROXIMATE PROPERTY LINE
- SEWER MANHOLE
- CATCH BASIN FIELD INLET
- DRAINAGE MANHOLE
- UNDERGROUND PIPE (CORRUGATED METAL PIPE)
- GAS VALVE
- UNDERGROUND GAS
- WATER VALVE
- FIRE HYDRANT
- UTILITY POLE
- OVERHEAD WIRE
- CHAIN LINK FENCE
- CORRUGATED METAL OR STOCKADE FENCE
- GAS METER
- UNDERGROUND ELECTRIC
- BOLLARD
- COLUMN
- BAY
- CONTOUR LINE (1 FOOT INTERVAL)

NOTES:

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3. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.
4. GROUNDWATER MONITORING PROGRAM: SIX OF FOURTEEN EXISTING MONITORING WELLS TO BE SAMPLED QUARTERLY (i.e., FOUR TIMES PER YEAR) IN YEARS 1-2, AND ANNUALLY THEREAFTER; AND WATER LEVELS TO BE MEASURED IN FOURTEEN ON-SITE WELLS.
5. GROUNDWATER EXTRACTION AND DISCHARGE PIPING TO BE INSTALLED AT A DEPTH OF APPROXIMATELY 4 FEET BELOW GROUND SURFACE, AND WITHIN A COMMON TRENCH FOR THE SOIL VAPOR EXTRACTION SYSTEM WHERE APPLICABLE
6. SOIL VAPOR EXTRACTION SYSTEM TO BE INSTALLED VIA WELL INSTALLATION (VERTICAL DRILLING) AND TRENCHING, EXCEPT FOR PIPING TO BE LOCATED BENEATH THE ON-SITE BUILDING, THAT IS TO BE INSTALLED VIA HORIZONTAL DRILLING.
7. APPROXIMATE LOCATIONS AND DIMENSIONS OF GROUNDWATER & SOIL VAPOR EXTRACTION SYSTEMS AND PRETREATMENT BUILDING ARE INDICATED. ACTUAL LOCATIONS AND DIMENSIONS MAY VARY DURING REMEDIATION, AS NECESSARY.

DRAFT 1/26/00

WEST SIDE CORPORATION
JAMAICA, NEW YORK

FEASIBILITY STUDY

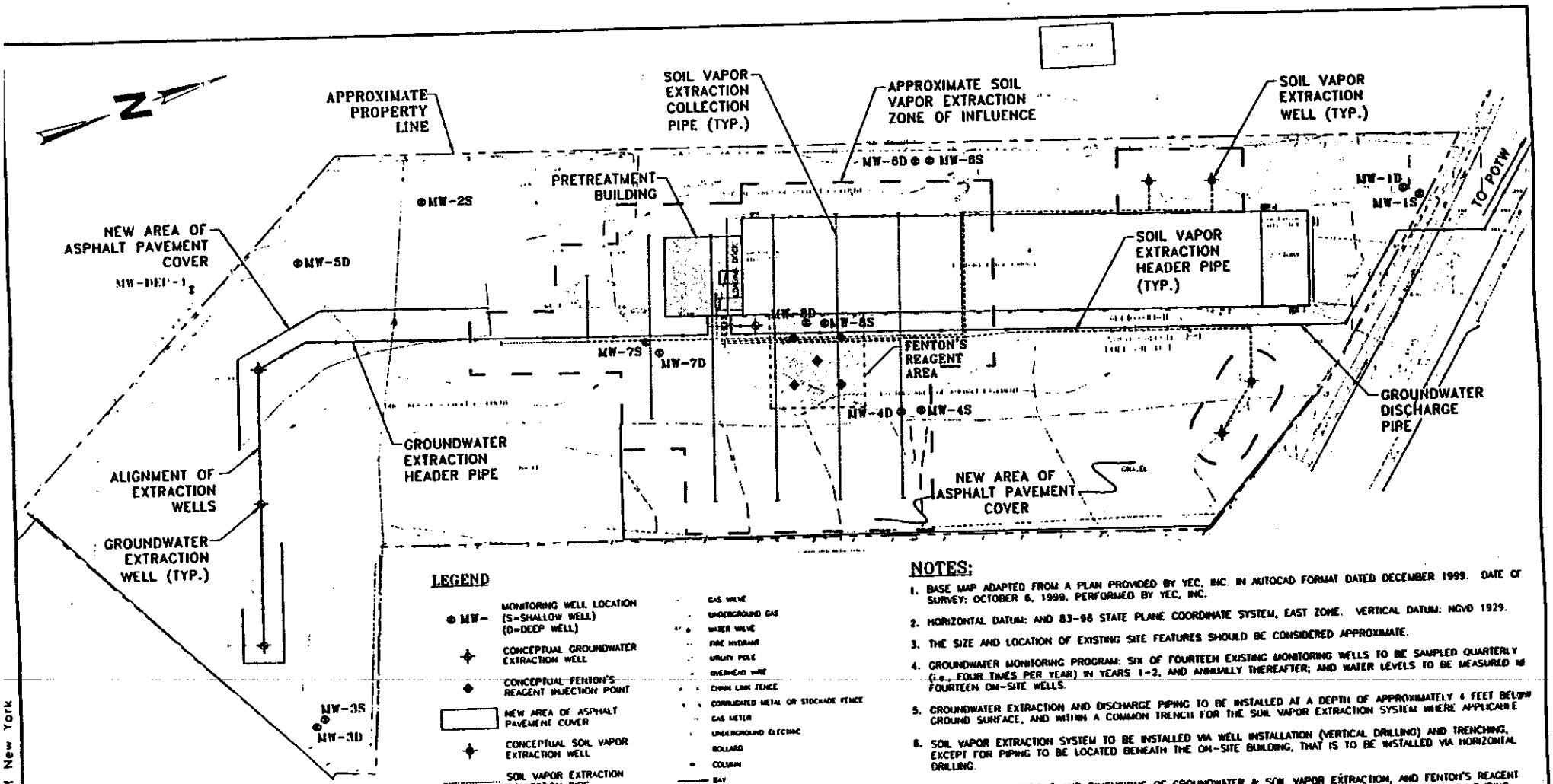
ALTERNATIVE 2
GROUNDWATER EXTRACTION & TREATMENT AND SOIL VAPOR EXTRACTION SYSTEMS LAYOUT

REV No.	DESCRIPTION	BY	DATE

SCALE IN FEET
0 30 60 120

DRAWN BY: DEW
DATE: JANUARY 200
PROJECT No. 55265
FIGURE No. 7

GZA GeoEnvironmental of New York



LEGEND

- MW- MONITORING WELL LOCATION (S=SHALLOW WELL) (D=DEEP WELL)
- CONCEPTUAL GROUNDWATER EXTRACTION WELL
- CONCEPTUAL FENTON'S REAGENT INJECTION POINT
- NEW AREA OF ASPHALT PAVEMENT COVER
- CONCEPTUAL SOIL VAPOR EXTRACTION WELL
- SOIL VAPOR EXTRACTION COLLECTION PIPE
- SOIL VAPOR EXTRACTION HEADER PIPE
- GROUNDWATER EXTRACTION/ DISCHARGE PIPE WITH FLOW DIRECTION
- APPROXIMATE SOIL VAPOR EXTRACTION ZONE OF INFLUENCE
- APPROXIMATE PROPERTY LINE
- SEWER MANHOLE
- GAS VALVE
- UNDERGROUND GAS
- WATER VALVE
- FIRE HYDRANT
- UTILITY POLE
- OVERHEAD WIRE
- CHAIN LINK FENCE
- CORRUGATED METAL OR STOCKADE FENCE
- GAS METER
- UNDERGROUND ELECTRIC
- BOLLARD
- COLUMN
- BAY
- CONTOUR LINE (1 FOOT INTERVAL)

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DRAFT 06/00

WEST SIDE CORPORATION
JAMAICA, NEW YORK

FEASIBILITY STUDY

ALTERNATIVE 3
GROUNDWATER EXTRACTION & TREATMENT

REV No.	DESCRIPTION	BY	DATE

SCALE IN FEET
0 30 60 120

DRAWN BY: DEW
DATE: JANUARY 2000
PROJECT No.
55265

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