Department of Environmental Conservation

Division of Hazardous Waste Remediation

Former Deknatel Facility

Site ID Number 241-007
Queens County, New York

Record of Decision

January 1994

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New York State Department of Environmental Conservation
MARIO M. CUOMO, *Governor* THOMAS C. JORLING, *Commissioner*

RECORD OF DECISION

FORMER DEKNATEL FACILITY
Queens Village, Queens, New York
Site No. 241007
December 1993

PREPARED BY
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF HAZARDOUS WASTE REMEDIATION

Former Deknatel Facility Inactive Hazardous Waste Site
Queens Village, Queens, New York
Site No. 2-41-007

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedial action for the former Deknatel Facility an inactive hazardous waste disposal site which was chosen in accordance with the New York State Environmental Conservation Law (ECL). 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 upon the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for the Deknatel Facility, Inactive Hazardous Waste Site and upon public input to the Proposed Remedial Action Plan (PRAP) presented by the NYSDEC. A bibliography 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 threat to public health and the environment.

Description of Selected Remedy

Based upon the results of the Remedial Investigation/Feasibility Study (RI/FS) for the Deknatel Facility and the criteria identified for evaluation of alternatives the NYSDEC has selected the excavation of contaminated soils, backfilling with clean fill and a groundwater extraction system with disposal to the New York City Sewer System. The components of the remedy are as follows:

- Excavation of contaminated soils in three impacted areas, transportation of excavated soils to an licenced off-site disposal facility and backfilling excavated areas with clean imported fill.

- A groundwater extraction system pumping at 30 gallons per minute and discharging to a municipal sewer via an existing building connection.

- monitoring of groundwater on an bi-annual basis

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 statutory preference for remedies that reduce toxicity, mobility, or volume as a principal element.

January 10, 1994
Date

Ann Hill DeBarbieri
Ann Hill DeBarbieri
Deputy Commissioner

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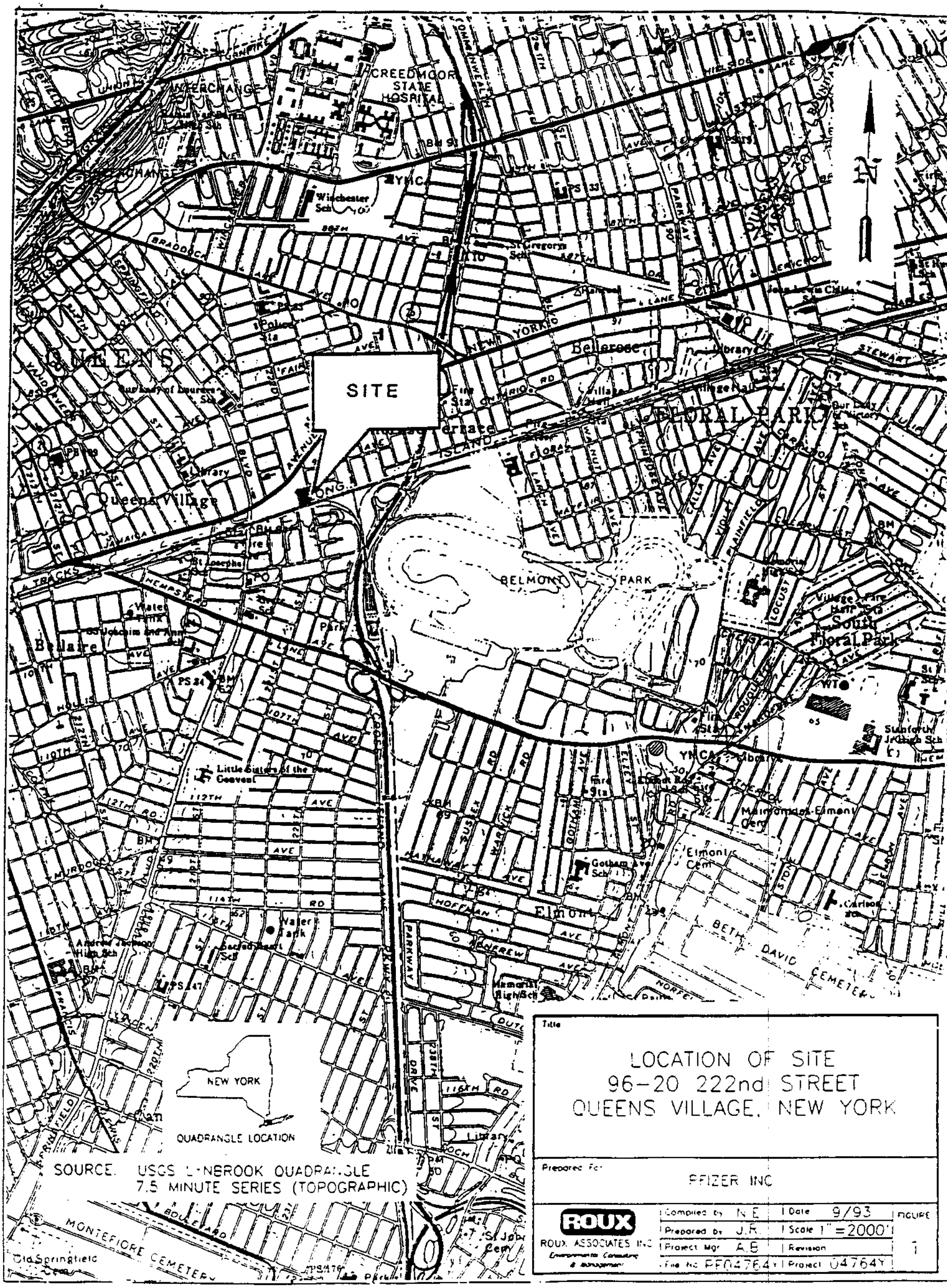


SOURCE: USGS L-NEBROOK QUADRANGLE
7.5 MINUTE SERIES (TOPOGRAPHIC)

Title

LOCATION OF SITE
96-20 222nd STREET
QUEENS VILLAGE, NEW YORK

Prepared For:
PFIZER INC

ROUX ASSOCIATES INC Environmental Consulting & Management	Compiled by N.E.	Date 9/93	FIGURE
	Prepared by J.R.	Scale 1" = 2000'	1
	Project Mgr A.B.	Revision	
	File No. PF04764Y	Project 04764Y	

SECTION 1: SITE LOCATION AND DESCRIPTION

The Site consists of the former Deknatel, Inc. facility located at 96-20 222nd Street in Queens Village, County of Queens, City of New York (Figure 1). Pfizer Inc (Pfizer) presently owns the Site. The Site was previously owned and operated by Deknatel, Inc., a business formerly owned by Pfizer.

The Site comprises approximately 0.5 acres and is bordered by a residential property to the north, 222nd Street to the east, a Long Island Railroad/MTA right-of-way to the south, and a commercial office building parking lot to the west. The Site is located in an urban area with a mixture of industrial, commercial and residential land use.

SECTION 2: SITE HISTORY

2.1: Operational/Disposal History

The former Deknatel facility was constructed about 1925. Costume jewelry, specifically artificial pearls, were manufactured at the facility until about 1956. The manufacturing process involved placing small globules of molten glass on thin copper wires to form the cores of the artificial pearls. After the pearls were formed, the copper wire was dissolved in a nitric-sulfuric acid bath. The nitric-sulfuric baths accumulated copper salts and were discarded when they were spent.

About 1956, Deknatel changed product lines and began manufacturing surgical needles. These were manufactured from stainless steel wire using various metal forming operations. Some of the raw stainless steel wire used had a thin copper coating which acted as a lubricant. Once the wire had been formed into the desired shape and size, the copper coating was dissolved and removed by immersion of the wire in a chromic-sulfuric acid bath. This bath accumulated copper salts, became spent and was removed from service. The needles were electropolished in a lead-lined bath containing chromic and phosphoric acids. This bath eventually accumulated salts of the metals comprising the stainless steel alloy used for making the needles, became depleted in chromic acid, and was removed from service.

The spent nitric-sulfuric acid baths containing copper salts generated by the imitation pearl manufacturing process (from about 1925 to about 1956) were reportedly disposed of through a sink in the laboratory. The sink drain was connected to a trap containing marble chips that neutralized the acid prior to disposal at Disposal Point One (DP-1), which is a drywell located at the southwest corner of the Site (Figure 2). Liquids disposed of at DP-1 seeped directly into the ground.

From about 1956 to about 1960, the spent chromic-sulfuric acid baths containing copper salts generated by the surgical needle manufacturing process were reportedly disposed of in the same laboratory sink. After about 1960, the sink drain was connected to the New York City sanitary sewer, and DP-1 was abandoned.

The spent electropolishing baths containing chromic and phosphoric acids and metal salts derived from the stainless steel used to make the surgical needles were reportedly disposed of at Disposal Point Two (DP-2) for an approximate 20 year period beginning in 1956. DP-2 is composed of two wooden barrels buried beneath the surface immediately adjacent to the west side of the main building, 5 to 10 feet north of the laboratory (Figure 2). Liquids disposed of at DP-2 seeped directly into the ground.

2.2: Remedial History

During an environmental audit of the former Deknatel facility in the mid-1980s, the historical disposal practices involving the use of the two former waste disposal points (DP-1 and DP-2) were discovered. Deknatel developed an investigative workplan titled "Source Investigation Study Workplan - Deknatel, Inc., Queens, New York," (December 1987).

Source investigation activities were initiated at the Site in January 1988. Several soil borings and three monitoring wells were installed at the Site, and soil and groundwater samples were collected and analyzed. Information was gathered regarding the use and quality of groundwater resources in the vicinity of the Site.

In September 1988, the report, "Source Investigation Study" was prepared. The source investigation identified the presence of elevated levels of chromium in subsurface soils. Other metals, such as copper and lead, were also detected at or near the surface close to the disposal points. Groundwater monitoring revealed the presence of chromium which, during one of three sampling events, was detected at levels slightly above the New York State (NYS) Class GA Ground-water Quality Standard of 50 micrograms per liter (μg/L).

The Site was placed on the "Registry" of Inactive Hazardous Waste Disposal Sites in New York State (Site No. 2-41-007) as a Class 2a site in March 1988. Subsequent to this inclusion on the Registry, a Phase I Investigation was conducted for the NYSDEC. In September 1990, the Site was reclassified as a Class 2 Site.

In August 1989, Deknatel submitted a "Workplan for a Supplemental Remedial Investigation/Feasibility (RI/FS) Study" to the NYSDEC. This workplan outlined RI activities to delineate the distribution of contaminants on-site, to further investigate groundwater quality, and to confirm the velocity and direction of groundwater flow beneath the Site. The Supplemental RI/FS Workplan also outlined an FS to focus on remedial action objectives and identify remedial alternatives that could be implemented at the Site.

An Order on Consent was issued on March 4, 1992 for the development and implementation of an RI/FS for this Site. The Workplan for the RI/FS was approved for implementation by NYSDEC at the time of issuance of the Order.

SECTION 3: CURRENT STATUS

Pfizer Inc initiated an RI/FS in April 1992 to address the contamination at the Site.

3.1: 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 1992 and October 1992. A report titled "Remedial Investigation Report" has been prepared describing the field activities and findings of the RI in detail. A summary of the RI follows.

The RI activities consisted of the following:

- Drilling and sampling of 11 soil borings and installation of three monitoring wells. Water level measurements in the three new and three existing monitoring wells at the Site and construction of groundwater flow maps.

- Analysis of soil and groundwater samples.

- Performance of aquifer tests to determine the Site-specific hydraulic conductivity.

- Calculation of groundwater flow rates using measured hydraulic gradients and hydraulic conductivities.

Subsequent to performance of the RI, an off-site groundwater investigation and an additional source investigation (1993) were conducted to further characterize soil and groundwater conditions both on- and off-site. The additional investigation was deemed necessary to support the selection of remedial alternatives in an FS.

The additional field tasks included performance of the following:

- Installation of eight off-site and three on-site monitoring wells to characterize both horizontal and vertical groundwater flow downgradient of the Site.

- Drilling and sampling of eleven test borings.

- Collection of two rounds of groundwater samples and water-level measurements.

The results of these additional field tasks were presented in the reports titled "Off-Site Ground-Water Investigation and Additional Source Investigation" dated May 28, 1993, and "Focused Feasibility Study Addendum for Ground Water" dated September 8, 1993.

The analytical data obtained from the RI and subsequent field tasks were compared to Applicable Standards, Criteria, and Guidance (SCGs) in determining remedial alternatives. Groundwater, drinking water and surface water SCGs identified for the former Deknatel facility were based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part 5 of NYS Sanitary Code. For the evaluation and interpretation of soil and sediment analytical results, NYSDEC soil cleanup guidelines for the protection of groundwater, background conditions, and risk-based remediation criteria were used to develop remediation goals for soil.

Based upon the results of the RI in comparison to the SCGs and potential public health and environmental exposure rates, certain areas and media of the Site require remediation.

3.1.1 Soil Quality

RI estimated that of the approximately 670 pounds of chromium disposed of at the DP-1, only about 8.1 pounds of chromium were calculated as remaining in the underlying soils. This is due to the large volume of water used at the time of disposal which significantly diluted this wastestream and subsequently flushed the chromium from the soils beneath DP-1. Area adjacent to DP-2 with 1,650 pounds of chromium disposed of is the major chromium source area. Total and hexavalent chromium were found in the soils at or near DP-2 at elevated concentrations from the surface and extended to 72 feet subsurface. Concentrations were found highest near the surface and decreased with increasing horizontal and vertical distances from DP-2.

Total chromium (Cr) and hexavalent chromium (Cr^{+6}), lead and phosphorus were detected at elevated concentrations relative to background levels in soil at the Site. The maximum concentrations of these constituents were detected in soil beneath DP-1 and DP-2.

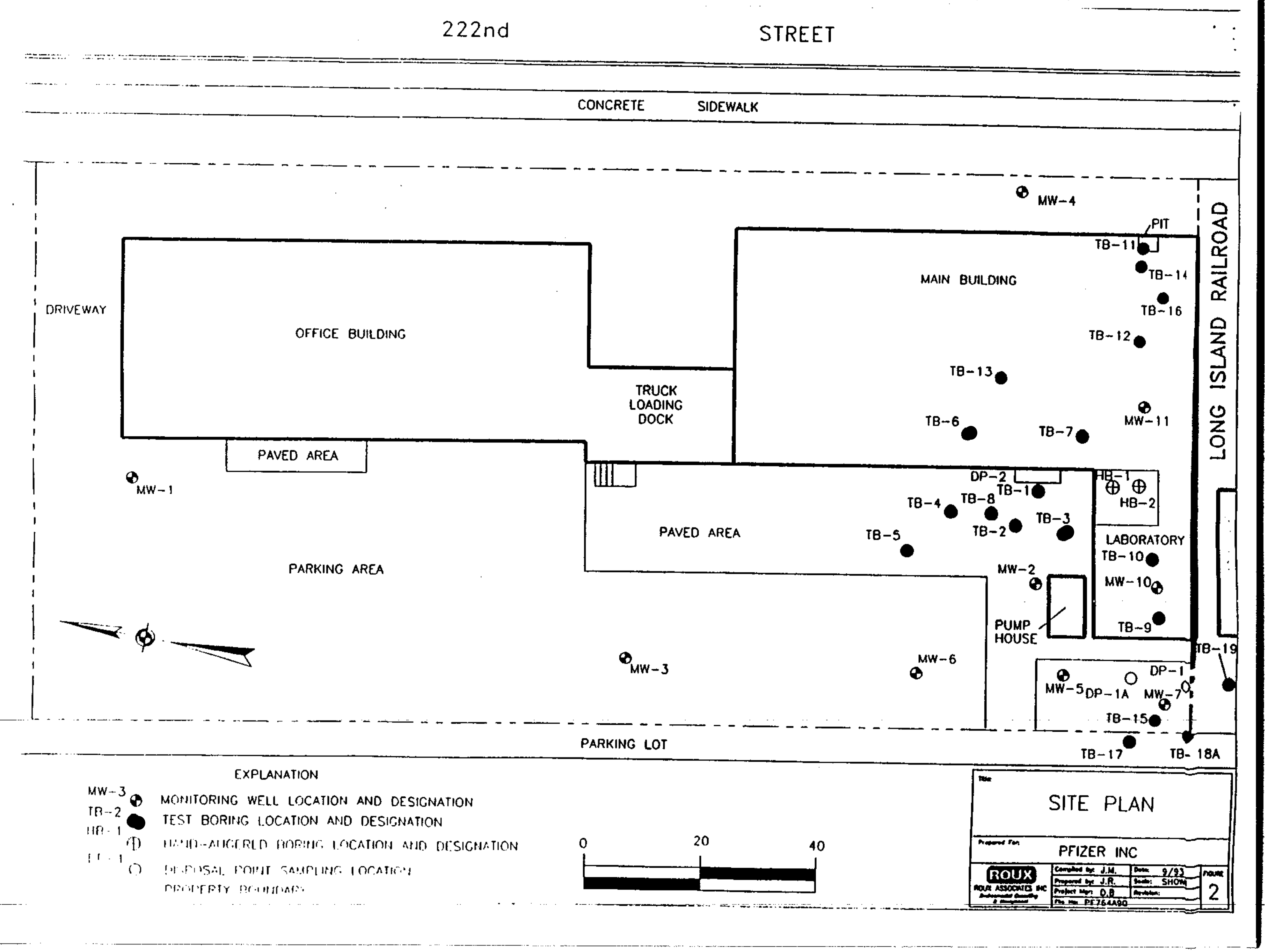
The majority of the Cr^{+6}-impacted soil at the Site is contained within an approximate 20-foot radius from DP-2 to a depth of 30 feet. The highest concentrations of Cr^{+6} in soil beneath DP-2 is 4,610 milligrams per kilogram (mg/Kg). Typically Cr^{+6} ranged from 0.12 to 10 mg/kg.

In the vicinity of DP-1, elevated concentrations of Cr^{+6} were detected in soil within an oval-shaped area approximately 16 feet long by 10 feet wide, extending to a depth of 15 feet. Concentrations within this area ranged from not detected to 46.7 mg/kg.

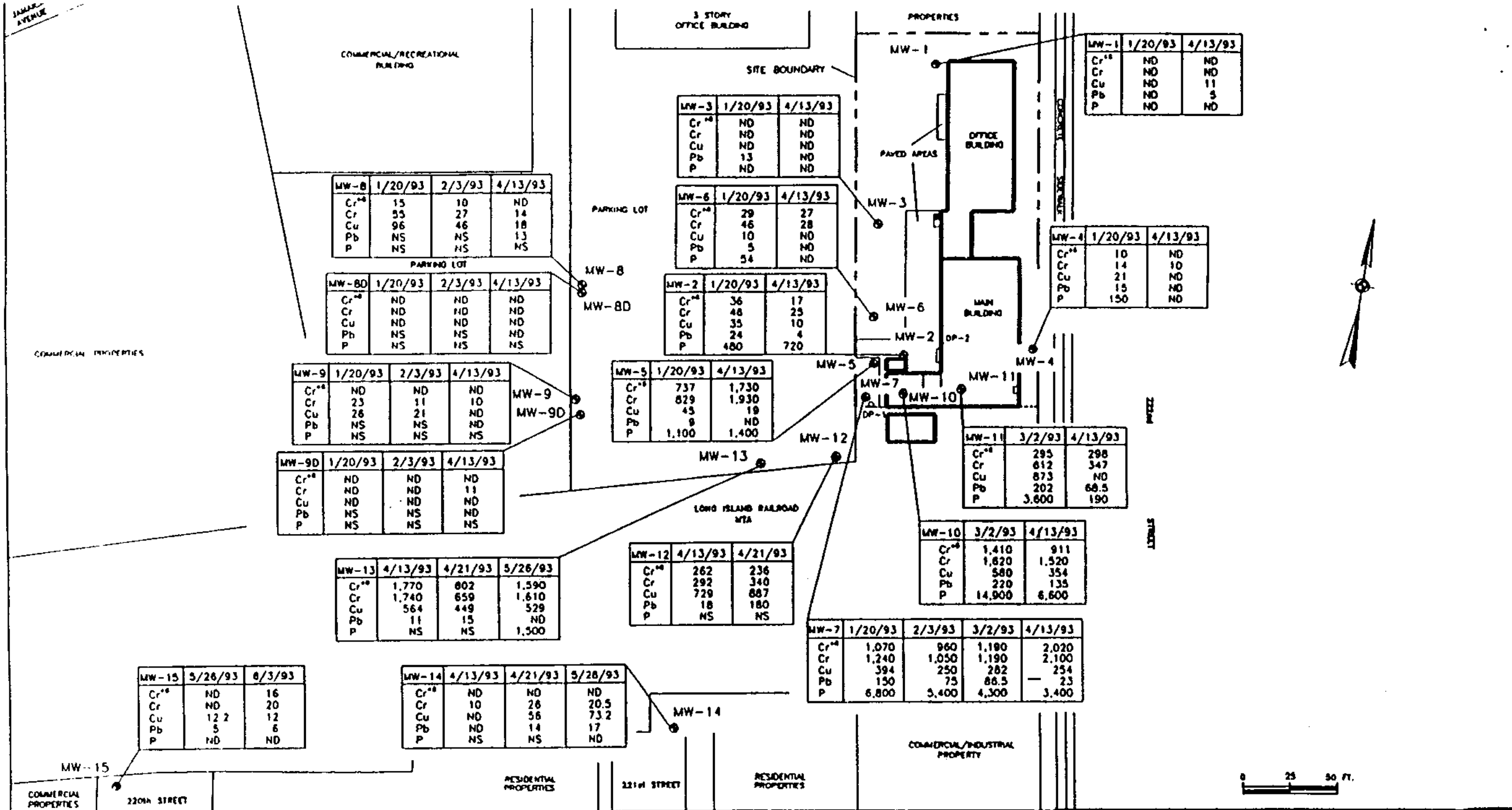
The following are the maximum chromium concentrations (ppm) with depths:

	LOCATION	Cr^{+6}	Total Cr	DEPTH (feet)
Around DP-1	DP-1	9.50	4,100	8-10
		1.30	69	13-15
	DP-1A	0.10	33	57-59
	MW-5	0.10	11	59-61
Around DP-2	DP-2	4,610.00	25,800	0-1
		150.00	4,570	2-3
	TB-8	0.26	64	54-56
		0.27	29	64-65
	TB-3	2.00	114	54-56
		0.46	72	59-61
	TB-1	3.20	110	54-56
		2.80	59	60-62
	TB-7	0.20	36	45-47
Background	MW-4		10	59-61

In addition to DP-1 and DP-2, elevated concentrations of Cr^{+6} attributable to the Site sewer system were detected beneath a former floor drain in the laboratory building and a concrete pit structure in the



222nd STREET
CONCRETE SIDEWALK
DRIVEWAY
OFFICE BUILDING
TRUCK LOADING DOCK
MAIN BUILDING
LONG ISLAND RAILROAD
PIT
MW-4
TB-11
TB-14
TB-16
TB-12
TB-13
TB-6
TB-7
MW-11
PAVED AREA
MW-1
DP-2
HB-1
HB-2
TB-1
TB-4
TB-8
TB-3
TB-2
TB-5
PAVED AREA
LABORATORY
TB-10
MW-10
MW-2
PARKING AREA
PUMP HOUSE
TB-9
TB-19
MW-3
MW-6
MW-5
DP-1A
DP-1
MW-7
TB-15
PARKING LOT
TB-17
TB-18A
EXPLANATION
MW-3 MONITORING WELL LOCATION AND DESIGNATION
TB-2 TEST BORING LOCATION AND DESIGNATION
HB-1 HAND-AUGERED BORING LOCATION AND DESIGNATION
DISPOSAL POINT SAMPLING LOCATION
PROPERTY BOUNDARY
0
20
40
Title:
SITE PLAN
Prepared For:
PFIZER INC
ROUX
ROUX ASSOCIATES INC
Compiled by: J.M.
Prepared by: J.R.
Project Mgr: O.B
File No. PF764A90
Date: 9/93
Scale: SHOWN
Revision:
FIGURE
2



MW-1	1/20/93	4/13/93
Cr^{+6}	ND	ND
Cr	ND	ND
Cu	ND	11
Pb	ND	5
P	ND	ND

MW-2	1/20/93	4/13/93
Cr^{+6}	36	17
Cr	48	25
Cu	35	10
Pb	24	4
P	480	720

MW-3	1/20/93	4/13/93
Cr^{+6}	ND	ND
Cr	ND	ND
Cu	ND	ND
Pb	13	ND
P	ND	ND

MW-4	1/20/93	4/13/93
Cr^{+6}	10	ND
Cr	14	10
Cu	21	ND
Pb	15	ND
P	150	ND

MW-5	1/20/93	4/13/93
Cr^{+6}	737	1,730
Cr	829	1,930
Cu	45	19
Pb	9	ND
P	1,100	1,400

MW-6	1/20/93	4/13/93
Cr^{+6}	29	27
Cr	46	28
Cu	10	ND
Pb	5	ND
P	54	ND

MW-7	1/20/93	2/3/93	3/2/93	4/13/93
Cr^{+6}	1,070	960	1,190	2,020
Cr	1,240	1,050	1,190	2,100
Cu	394	250	282	254
Pb	150	75	86.5	23
P	6,800	5,400	4,300	3,400

MW-8	1/20/93	2/3/93	4/13/93
Cr^{+6}	15	10	ND
Cr	55	27	14
Cu	96	46	18
Pb	NS	NS	13
P	NS	NS	NS

MW-8D	1/20/93	2/3/93	4/13/93
Cr^{+6}	ND	ND	ND
Cr	ND	ND	ND
Cu	ND	ND	ND
Pb	NS	NS	ND
P	NS	NS	NS

MW-9	1/20/93	2/3/93	4/13/93
Cr^{+6}	ND	ND	ND
Cr	23	11	10
Cu	26	21	ND
Pb	NS	NS	ND
P	NS	NS	NS

MW-9D	1/20/93	2/3/93	4/13/93
Cr^{+6}	ND	ND	ND
Cr	ND	ND	11
Cu	ND	ND	ND
Pb	NS	NS	ND
P	NS	NS	NS

MW-10	3/2/93	4/13/93
Cr^{+6}	1,410	911
Cr	1,620	1,520
Cu	580	354
Pb	220	135
P	14,900	6,600

MW-11	3/2/93	4/13/93
Cr^{+6}	295	298
Cr	612	347
Cu	873	ND
Pb	202	68.5
P	3,600	190

MW-12	4/13/93	4/21/93
Cr^{+6}	262	236
Cr	292	340
Cu	729	887
Pb	18	180
P	NS	NS

MW-13	4/13/93	4/21/93	5/26/93
Cr^{+6}	1,770	802	1,590
Cr	1,740	659	1,610
Cu	564	449	529
Pb	11	15	ND
P	NS	NS	1,500

MW-14	4/13/93	4/21/93	5/28/93
Cr^{+6}	ND	ND	ND
Cr	10	26	20.5
Cu	ND	56	73.2
Pb	ND	14	17
P	NS	NS	ND

MW-15	5/26/93	6/3/93
Cr^{+6}	ND	16
Cr	ND	20
Cu	12.2	12
Pb	5	6
P	ND	ND

EXPLANATION

MW-3 MONITORING WELL LOCATION AND DESIGNATION

DP-1 DISPOSAL POINT LOCATION AND DESIGNATION

— — — SITE BOUNDARY

MW-4	1/20/93	4/13/93
Cr^{+6}	10	ND
Cr	14	10
Cu	21	ND
Pb	15	ND
P	150	ND

- CONCENTRATION OF HEXAVALENT CHROMIUM IN GROUND WATER
- CONCENTRATION OF TOTAL CHROMIUM IN GROUND WATER
- CONCENTRATION OF COPPER IN GROUND WATER
- CONCENTRATION OF LEAD IN GROUND WATER
- CONCENTRATION OF TOTAL PHOSPHORUS IN GROUND WATER

ALL CONCENTRATIONS ARE IN MICROGRAMS PER LITER (ug/L)

ND - NON-DETECTED
NS - NOT SAMPLED

DETECTION LIMITS

Cr^{+6}	10 ug/L
Cr	10 ug/L
Cu	10 ug/L
Pb	3 ug/L
P	20 ug/L

Title:

GROUND-WATER QUALITY DATA JANUARY THROUGH JUNE 1993

Prepared For:

PFIZER INC

ROUX
ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: N.E.	Date: 9/93	FIGURE 3
Prepared by: J.R.	Scale: SHOWN	
Project Mgr: A.B.	Revision:	
File No: PF764C89		

southeast portion of the main building (Figure 2). Maximum concentration of Cr^{+6} detected beneath the laboratory building and the concrete pit structure were 202 mg/kg and 4.1 mg/kg, respectively. In each of these areas the extent of soil impacts attributable to the sewer system is primarily limited to soil less than 17 feet in depth, and within a 5 foot radius of the concrete pit and former floor drain.

During performance of the RI, Cr^{+6} was identified as the primary constituent of concern at the Site due to the potential for impact to groundwater beneath the Site (Cr^{+6} is relatively mobile in groundwater).

3.1.2 On-Site Groundwater Quality

The groundwater data collected from January through June 1993 is shown in Figure 3.

The concentrations of Cr^{+6} in on-site groundwater ranged from not detected at Monitoring Wells MW-1, MW-3 and MW-4, to a maximum of 2,020 micrograms per liter (μg/L) at Monitoring Well MW-7. The highest concentrations of Cr^{+6} were detected in groundwater samples from Monitoring Wells MW-5 (1,730 μg/L), MW-7 (2,020 μg/L) and MW-10 (1,410 μg/L) located in the southwest corner of the Site. The Cr^{+6} concentration generally comprised between 80 and 100 percent of the total Cr concentration. The concentrations of both Cr^{+6} and total Cr in groundwater beneath the southwest portion of the Site exceed the New York State Class GA Groundwater Standard of 50 μg/L.

The maximum concentrations of lead and copper detected beneath the southwest portion of the Site exceed the respective NYS Class GA Groundwater Standards. The highest concentrations of these metals were 220 μg/L for lead, 873 μg/L for copper, and 14,900 μg/L for phosphorus. Groundwater Standards for these constituents are 25 μg/L for lead, and 200 μg/L for copper. There is no standard for phosphorous.

Detections of lead and copper in groundwater beneath other areas of the Site were below standard concentrations.

3.1.3 Off-Site Groundwater Quality

Groundwater quality data for the off-site wells are shown in Figure 3.

The maximum concentrations of Cr^{+6} were detected in off-site groundwater samples collected from Monitoring Wells. These concentrations of both Cr^{+6} and total Cr in MW-12 and MW-13 exceed the NYS Class GA Groundwater Standard of 50 μg/L.

In addition to MW-12 and MW-13, total Cr was also detected in the sample collected January 20, 1993, from Monitoring Well MW-8 (55 μg/L).

Copper was detected in five of the seven off-site monitoring wells. However, only in Monitoring Wells MW-12 (887 μg/L) and MW-13 (564 μg/L) did concentrations exceed the NYS Class GA Groundwater Standard of 200 μg/L. Likewise, lead was detected in four of the seven off-site monitoring wells; with only the confirmatory sample from Monitoring Well MW-12 (180 μg/L) exceeding the NYS Class GA Groundwater Standard of 25 μg/L. Total chromium, Cr^{+6}, copper (Cu) and lead (Pb) that exceed Class GA Groundwater Standards are summarized below:

M. Well	Cr	Cr^{+6}	Cu	Pb
MW-5	1930	1730	-	-
MW-7	2100	2020	254	-
MW-10	1520	1410	354	135
MW-11	347	298	-	68
MW-12	340	236	887	180
MW-13	1610	1590	564	-
STANDARDS	**50**	**50**	**200**	**25**

Based upon RI calculations, approximately 4 pounds of Cr^{+6} are present in the groundwater.

3.2 Summary of Human Exposure Pathways:

The potential pathways for human contact with impacted media at the Site are as follows:

- direct contact with, or ingestion of, impacted soil, or inhalation of fugitive dust from impacted soil at the Site; and
- direct contact with, or ingestion of, impacted groundwater from beneath or downgradient of the Site.

As currently configured, there is minimal potential for human exposure to impacted soil at the Site for the following reasons:

- both former disposal points are located on the Deknatel property, which is surrounded by a locked fence;
- disposal Points 1 and 2 are both covered with either manholes or lids to prevent accidental contact with impacted soil; and
- impacted soil at the Site is either covered by pavement and the existing buildings, thereby precluding potential for human exposure, or the concentrations of constituents in the exposed soil are below NYSDEC guidance levels.

Similarly, there is little potential for human exposure to impacted groundwater in the foreseeable future because there are no potable water supply wells utilizing the Upper Glacial aquifer downgradient of the Site. In addition, there are no plans in the foreseeable future to develop public potable groundwater supplies from the Upper Glacial aquifer downgradient of the Site; and there are administrative controls in place to prevent private development of groundwater for potable use.

3.3 Summary of Environmental Exposure Pathways:

The Site soils are contaminated with total chromium to the groundwater table depth (54 feet). The total chromium concentrations are almost three times the background concentrations. The groundwater at the

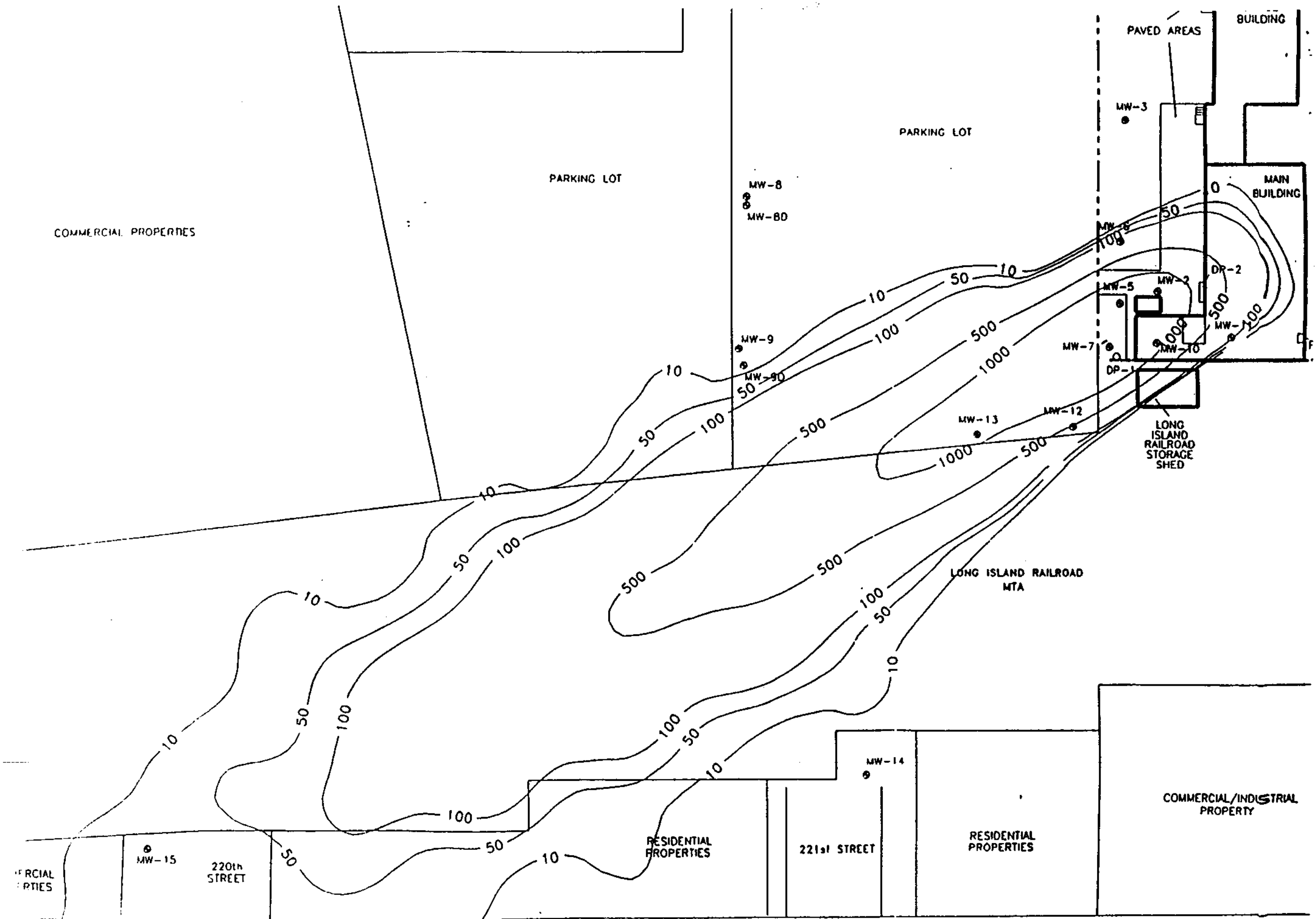

BUILDING
PAVED AREAS
MW-3
PARKING LOT
MAIN BUILDING
PARKING LOT
MW-8
MW-8D
COMMERCIAL PROPERTIES
MW-6
DP-2
MW-5
MW-2
MW-1
MW-9
MW-9D
MW-7
MW-10
DP-1
MW-13
MW-12
LONG ISLAND RAILROAD STORAGE SHED
LONG ISLAND RAILROAD MTA
MW-14
COMMERCIAL/INDUSTRIAL PROPERTY
RESIDENTIAL PROPERTIES
221st STREET
RESIDENTIAL PROPERTIES
MW-15
220th STREET
0
10
50
100
500
1000

Figure 3a

Site as well as off-site is contaminated with total and hexavalent concentrations (up to 2000 ppb). The groundwater standards are 50 ppb. Other groundwater violations are for lead and copper.

Without soil and groundwater remediation, groundwater downgradient of the Site will remain in violation of groundwater standards.

The primary environmental exposure pathway is continued impact to groundwater in the Upper Glacial aquifer by infiltrating precipitation and a rising water table contacting impacted soils. These processes provide a source of contaminants to groundwater downgradient of the Site.

SECTION 4: ENFORCEMENT STATUS

The NYSDEC and Pfizer Inc entered into a Consent Order on March 4, 1992 . The Order obligates Pfizer Inc to implement an RI/FS remedial program.

The following is the enforcement history of this Site:

Date	Index No.	Subject of Order
3/4/92	W2-0258-88-12	RI/FS

Pfizer Inc. is negotiating an Order on Consent with NYSDEC for implementation of the selected remedy.

SECTION 5: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6NYCRR 375-1.10. These goals are established under the guideline of meeting all standards, criteria, and guidance (SCGs) and protecting human health and the environment.

At a minimum, the remedy selected should eliminate or mitigate all significant threats to the public health and to 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:

- Reduce, control, or eliminate the contamination present within the soils on Site.
- Eliminate the potential for direct human or animal contact with the contaminated soils on Site.
- Prevent, to the extent possible, migration of contaminants in the soil to groundwater.
- Provide for attainment of SCGs for groundwater quality at the limits of the area of concern (AOC).

SECTION 6: SUMMARY OF THE EVALUATION OF ALTERNATIVES

Potential remedial alternatives for the former Deknatel facility were identified, screened, evaluated and presented in the reports (1993) titled "Focused Feasibility Study for Source Control" and "Focused Feasibility Study Addendum for Ground Water". A summary of the detailed analysis follows:

6.1: Description of Alternatives

The potential remedies are intended to address the contaminated soil and groundwater at the Site.

6.1.1 REMEDIAL ALTERNATIVES - SOIL

Alternative 1:
No Action

The no action alternative for both soil and groundwater 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 is an unacceptable alternative as the Site would remain in its present condition, and human health and the environment would not be adequately protected.

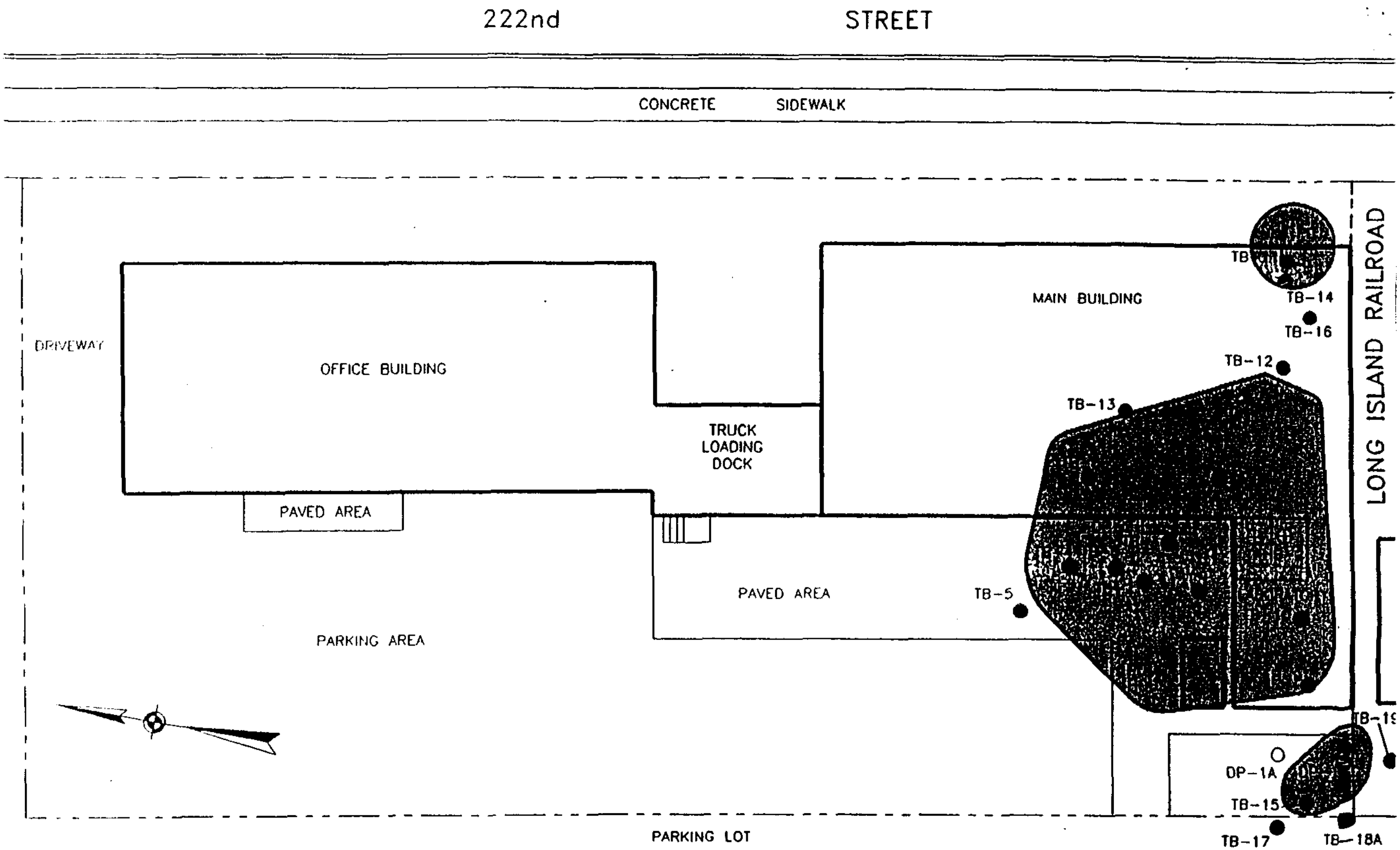
Alternative 2:
Excavation and Replacement

Present Worth:	$4,160,000
Capital Cost:	$4,160,000
Annual O&M:	Not Applicable
Time to Implement:	6 Months

The soils (approximately 4,100 cubic yards or 7,200 tons) would be removed using conventional deep excavation techniques and the resultant excavation would be backfilled using clean fill. The soils would be transported to an appropriate off-site licensed disposal facility.

For this alternative, based upon the Cr^{+6} data, inferred concentration contours of 0.5 mg/Kg were developed, the Conceptual Limits of Remediatiation (CLR) were determined and are as shown in Figure 4. The CLR at DP-1 is an oval-shaped area approximately 16 feet long by 10 feet wide, and extends to a depth of about 15 feet below ground surface. The CLR for DP-2 extends to the groundwater table, approximately 54 feet in depth below ground surface. The CLR for the pit structure is approximately 13 feet in diameter extending to a depth of about 22 feet.

The amount of Cr^{+6} which would remain outside of the CLR above the water table after remediation is estimated to be 3.4 pounds. The RI concluded that CLR would be protective of future groundwater quality and that the estimated Cr^{+6} above the present groundwater table would not cause Cr^{+6} concentrations in groundwater immediately downgradient of the Site to exceed 50 ppb. Concentrations of total chromium at locations outside of the CLRs are within the range of 5 to 15 mg/Kg, which is similar to concentrations detected in the background wells MW-1 and MW-4.



EXPLANATION

TB-2 ●	TEST BORING LOCATION AND DESIGNATION
HB-1 ⊕	HAND-AUGERED BORING LOCATION AND DESIGNATION
DP-1 ○	DISPOSAL POINT SAMPLING LOCATION
— · —	PROPERTY BOUNDARY
▦	CONCEPTUAL LIMIT OF SOIL REMEDIATION

0 20 40

Title: CONCEPTUAL LIMIT OF SOIL REMEDIATION

Prepared For: PFIZER INC

ROUX
ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: N.E.	Date: 9/93	FIGURE
Prepared by: J.R.	Scale: SHOWN	4
Project Mgr: A.B.	Revision:	
File No: PF764B85		

Alternative 3:
In-Situ Stabilization

Present Worth:	$3,770,000
Capital Cost:	$3,770,000
Annual O&M:	Not Applicable
Time to Implement:	5 Months

The soils would be stabilized and treated in-place (in-situ) using soil mixing techniques. The treatment includes adding a reducing agent to reduce Cr^{+6} to Cr^{+3}. Prior to in-situ stabilization, a limited amount of the most impacted soil at DP-2 and around DP-1 cistern (approximately 2,000 cubic yards or 3,000 tons) would be excavated and disposed offsite. The volume of removed soil would be equal to the estimated swelling of the volume within the CLR due to the introduction of the stabilization additives.

The Conceptual Limits of Remediatiation (CLR) for this alternative are the same as described in alternative 2 and are shown in Figure 4.

6.1.2 REMEDIAL ALTERNATIVES - GROUNDWATER

Alternative 1:
No Action

This alternative is similar to No Action Alternative for soil, as previously described in Section 7.1.

Alternative 2:
Natural Attenuation with Monitoring

Present Worth:	$399,000
Capital Cost:	$ 0
Annual O&M:	$ 46,000
Time to Implement:	Not Applicable

Under this alternative natural attenuation would be relied upon to reduce the concentrations of constituents of concern in groundwater to concentrations that satisfy NYS Class GA Standards, and to prevent migration of impacted groundwater to potential receptors (i.e., Jamaica Water Supply Company [JWSC] wells). Geochemical conditions in the aquifer are conducive to in-situ reduction of Cr^{+6} to Cr^{+3}, which in turn will be removed from solution by precipitation or sorption processes. In addition, natural attenuation via dispersion within the aquifer would further reduce constituent concentrations in groundwater during migration.

The effectiveness of natural attenuation would be monitored bi-annually using existing monitoring wells that define the extent of impacted groundwater. The groundwater monitoring data would be evaluated on an annual basis to determine the effectiveness of the source control in preventing future groundwater impacts, and to determine the effectiveness of natural attenuation in controlling migration of Cr^{+6}.

Alternative 3a:
Groundwater Extraction at Leading Edge of Plume and Discharge to Sewer

Present Worth:	\$660,000
Capital Cost:	\$171,000
Annual O&M:	\$113,000
Time to Implement:	1.5 years

Under this alternative, groundwater would be extracted from the leading edge of the plume (i.e., at MW-15) at an estimated rate of 21 gallons per minute (gpm) and discharged directly to the municipal sewer in the vicinity of the well head.

The actual pumping rates would be adjusted during implementation of the selected alternative to achieve the required hydraulic capture with the minimum pumping rate.

In addition, the effectiveness of this alternative, and all remaining alternatives (i.e., Alternatives 3b, 3c, 4a - 4c and 5a - 5c), in achieving remedial action objectives would be monitored biannually using those monitoring wells that define the extent of impacted groundwater. A Site status report would be prepared on an annual basis to document the results of the monitoring program.

Alternative 3b:
Groundwater Extraction at Leading Edge of Plume, Treatment, and Discharge to Sewer

Present Worth:	\$1,586,000
Capital Cost:	\$ 590,000
Annual O&M:	\$ 230,000
Time to Implement:	2 years

Under this alternative groundwater extraction would proceed as described in Alternative 3a. The extracted groundwater would be pumped through a force main back to the Site and treated using physicochemical treatment methods to reduce concentrations of Cr^{+6} to below 50 μg/L prior to discharge to the sewer.

The main components of the treatment system would include ph adjustment by addition of acid and ferrous sulfate causing reduction of Cr^{+6} to Cr^{+3}, precipitation & flocculation by raising ph (caustic addition), clarification and filtration to remove solids and final pH adjustment.

Sludge generated during treatment process would be passed through a filter press and disposed off-site.

Alternative 3c:
Groundwater Extraction at Leading Edge of Plume, Treatment, and Discharge to Groundwater

Present Worth:	\$1,602,000
Capital Cost:	\$ 688,000
Annual O&M:	\$ 211,000
Time to Implement:	2 years

Under this alternative groundwater extraction and treatment would proceed as described in Alternative 3b, with the addition of carbon adsorption polishing to the treatment system to remove any organics that may be present due to regional groundwater degradation. The treated water would then be injected back to the aquifer through a recharge well located on-site.

Alternative 4a:
Groundwater Extraction at Leading Edge of Plume and Onsite, and Discharge to Sewer

Present Worth:	$795,000
Capital Cost:	$232,000
Annual O&M:	$130,000
Time to Implement:	1.5 years

Under this alternative groundwater would be extracted as described in Alternative 3a. The extracted groundwater would be discharged directly to the municipal sewer in the vicinity of the well head, while the water extracted from the on-site well would be discharged into the existing Site connection to the municipal sewer.

The well located on-site would pump approximately 14 gpm and capture groundwater currently containing the highest concentrations of Cr^{+6}. Following source remediation the on-site well would also capture any residual Cr^{+6} migrating from the Site. The portion of the plume that is currently further downgradient from the Site would be captured by the well located at Monitoring Well MW-15 pumping at approximately 21 gpm.

Alternative 4b:
Groundwater Extraction at Leading Edge of Plume and Onsite, Treatment and Discharge to Sewer

Present Worth:	$1,779,000
Capital Cost:	$ 623,000
Annual O&M:	$ 267,000
Time to Implement:	2 years

Under this alternative groundwater would be extracted as described in Alternative 4a. The extracted groundwater would be pumped through a force main back to the Site and treated using physicochemical treatment methods identical to those described in Alternative 3b. System components would be sized accordingly for the increased flow rate.

Alternative 4c:
Groundwater Extraction at Leading Edge of Plume and Onsite, Treatment, and Discharge to Groundwater

Present Worth:	$1,807,000
Capital Cost:	$ 785,000
Annual O&M:	$ 236,000
Time to Implement:	2 years

Under this alternative groundwater extraction and treatment would proceed as described in Alternative 4b, with the addition of carbon adsorption polishing. The treated water would then be injected back to the aquifer through two recharge wells located on-site.

Alternative 5a:
<u>Groundwater Extraction On-site and Discharge to Sewer</u>

Present Worth:	$684,000
Capital Cost:	$151,000
Annual O&M:	$123,000
Time to Implement:	2 months

Under this alternative groundwater would be extracted on-site from the area where the highest concentrations of Cr^{+6} have been detected (i.e., MW-5 and MW-7). The extracted groundwater would be discharged into the existing site connection to the municipal sewer. The pumping rate for the extraction well in this alternative was increased to 30 gpm, relative to the 14 gpm for the on-site extraction well in Alternative 4. The rate was increased to expand the downgradient extent of the capture zone, thereby enabling capture of a greater amount of Cr^{+6} while pumping from only the on-site location.

The extraction well in this alternative would capture groundwater currently containing the highest concentrations of Cr^{+6}, and following source remediation would also capture any residual Cr^{+6} migrating from the Site. This alternative would capture 40 % of Cr^{+6} currently in the aquifer. The portion of the plume that is currently further downgradient from the Site would be addressed through natural attenuation via reduction to Cr^{+3} and dispersion.

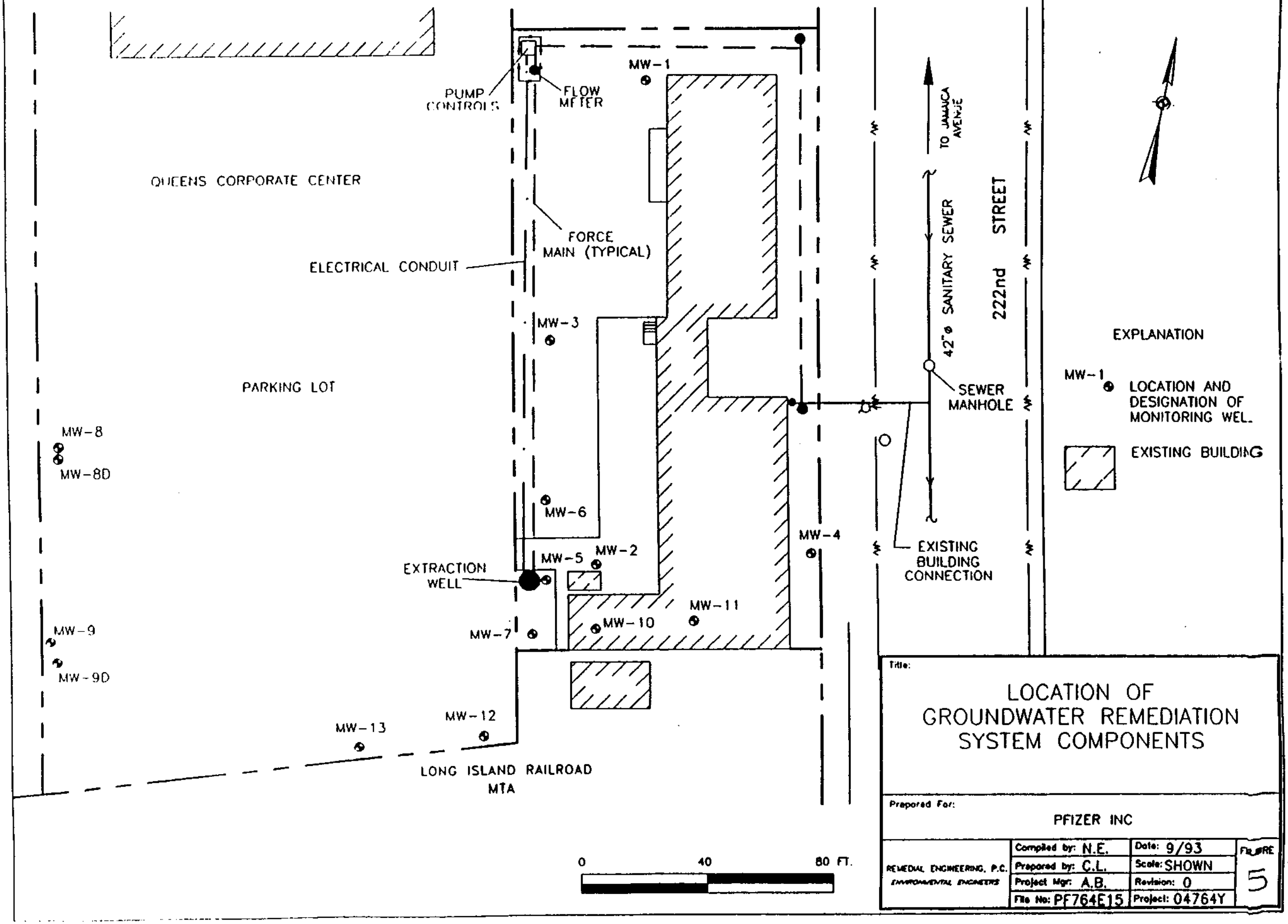
Alternative 5b:
<u>Groundwater Extraction On-site, Treatment and Discharge to Sewer</u>

Present Worth:	$1,627,000
Capital Cost:	$ 532,000
Annual O&M:	$ 253,000
Time to Implement:	1 year

Under this alternative, groundwater extraction would proceed as described in Alternative 5a. The extracted groundwater would be treated on-site using physicochemical treatment methods identical to those described in Alternative 3b. The treated water would be discharged through the existing Site connection to the municipal sewer.

Alternative 5c:
<u>Groundwater Extraction On-site, Treatment, and Discharge to Groundwater</u>

Present Worth:	$1,609,000
Capital Cost:	$ 630,000
Annual O&M:	$ 226,000
Time to Implement:	1 year


QUEENS CORPORATE CENTER
PUMP CONTROLS
FLOW METER
MW-1
FORCE MAIN (TYPICAL)
ELECTRICAL CONDUIT
MW-3
PARKING LOT
MW-8
MW-8D
MW-6
EXTRACTION WELL
MW-5
MW-2
MW-7
MW-10
MW-11
MW-4
MW-9
MW-9D
MW-13
MW-12
LONG ISLAND RAILROAD
MTA
TO JAMAICA AVENUE
42"⌀ SANITARY SEWER
222nd STREET
SEWER MANHOLE
EXISTING BUILDING CONNECTION
EXPLANATION
MW-1 LOCATION AND DESIGNATION OF MONITORING WEL.
EXISTING BUILDING
0
40
80 FT.
Title:
LOCATION OF GROUNDWATER REMEDIATION SYSTEM COMPONENTS
Prepared For:
PFIZER INC
REMEDIAL ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERS
Compiled by: N.E.
Prepared by: C.L.
Project Mgr: A.B.
File No: PF764E15
Date: 9/93
Scale: SHOWN
Revision: 0
Project: 04764Y
FIGURE
5

Under this alternative groundwater extraction and treatment would proceed as described in Alternative 5b, with the addition of carbon adsorption polishing. The treated water would then be injected back to the aquifer through one recharge well located onsite.

6.2 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 (6NYCRR 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 contained in the FS Report.

1. Compliance with New york State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether or not a remedy will meet applicable environmental laws, regulations, standards, and guidance.

Soil

Alternatives 2 and 3 for soil would be implemented in compliance with applicable local and New York City Laws and Ordinances as they relate to requirements such as hours of operation, noise and traffic. Disposal of the building demolition debris and/or excavated material would be performed in compliance with 6 NYCRR Part 360 for landfills located in New York. For disposal at other licensed facilities, implementation would be performed in compliance with other states' respective applicable waste disposal regulations.

Chemical Specific. Alternative 2 would permanently remove both the detected Cr^{+6} and lead constituents at concentrations exceeding the cleanup guidance levels specified in the New York Draft Cleanup Policy and Guidelines.

During the initial pre-treatment excavation for Alternative 3 for soil, the impacted soils containing the greatest concentrations of lead and Cr^{+6} would be removed. The subsequent in-situ treatment and stabilization would reduce Cr^{+6} to Cr^{+3} which is significantly less soluble and less toxic than Cr^{+6}. The residual concentrations of total Cr would be below cleanup levels specified in the New York State TAGM 4046 (November 1992). The residual lead would be stabilized within a soil-cement mass.

Action Specific. Off-site transportation of excavated impacted soils would be performed in compliance with 6 NYCRR Part 364 for transportation in New York State. Off-site transportation would be performed in compliance with the applicable rules and regulations of other states and the U.S. Department of Transportation. Application to NYSDEC, NYSDOT and NYSDOH would be required to determine whether the beneficial use of the excavated soil is permissible. All engineering designs would be prepared and implemented in accordance with the New York City Building Code, as necessary.

Other Requirements. During implementation of Alternatives 2 and 3 for soil, appropriate health and safety protocols would be developed, in compliance with 29 CFR 1910.120, and proper material handling procedures would be implemented. Safe working conditions would be maintained in accordance with 29 CFR 1926, regarding excavations, as well as other applicable OSHA and state safety requirements.

Groundwater

Alternatives 3, 4 & 5 would satisfy the chemical specific SCGs for Site related constituents in groundwater (6 NYCRR Part 703) and drinking water (10 NYCRR Part 5), which are the primary remedial action objectives for groundwater. Chemical specific SCGs related to discharge of extracted groundwater or handling of treatment residues would also be satisfied. These include compliance with applicable sewer discharge limits, groundwater discharge limits, and waste disposal regulations. Alternative 1 would not satisfy groundwater SCGs, Alternative 2 would meet SCGs in 10 to 12 years (via natural attenuation).

2. Protection of Human Health and the Environment. This criterion is an overall evaluation of the health and environmental impacts to assess whether each alternative is protective.

Soil

The soil alternatives 2 and 3 would provide overall protection of human health and the environment as described below:

- The permanent and irreversible removal under Alternative 2, or partial removal and in-situ stabilization under Alternative 3, of the DP-1, DP-2 and pit area Cr^{+6} impacted soil would be protective of future groundwater quality downgradient of the Site.

- Well accepted material handling procedures, dust control techniques, surface water management, health and safety protocols and factors of safety in design would be implemented to protect the surrounding community, environment and health & safety of workers.

- The use of compacted clean backfill material would improve the marketability of the Site for future use and would not restrict future Site use activities.

- There are no environmentally sensitive areas such as wetlands or streams at or in the immediate vicinity of the Site which would be impacted.

Groundwater

Following implementation of the proposed soil remedy, groundwater modeling results indicate there would be no potential for Cr^{+6} in groundwater impacted by the Site to migrate to JWSC wells at concentrations exceeding NYS Class GA Groundwater Quality Standards. There are no private wells located downgradient of the Site that are threatened by any potential migration of impacted groundwater. In addition, there are institutional controls that preclude the installation of private wells for potable purposes downgradient of the Site. Therefore, based upon the available data, the no action alternative for groundwater (Alternative 1 and Alternative 2 (No Action with Monitoring) are protective of public health under existing groundwater use conditions and potential future use conditions.

The other alternatives for groundwater (Alternatives 3 through 5) would provide a greater degree of assurance of protection of public health due to pumping to hydraulically capture impacted groundwater and handling the pumped groundwater in a manner which would be protective of both human health and the environment.

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

<u>Soil</u>

During excavation activities for Alternatives 2 and 3 for soil, appropriate material handling protocols would be implemented to control fugitive dust emissions caused primarily when the excavated soil is dry. The existing perimeter security fence would be augmented and maintained as required. Proper control of surface water and direct precipitation into the excavations would be implemented.

During off-site transportation, proper documentation would be maintained.

The time to achieve remedial objectives for Alternatives 2 and 3 is approximately 6 months.

<u>Groundwater</u>

Under the natural attenuation alternative for groundwater, it is estimated that groundwater downgradient of the Site should attain NYS Class GA Standards within ten years following source remediation.

In general, the pumping alternatives would attain NYS Class GA Standards within a shorter time frame than the natural attenuation alternative. However, the short-term effectiveness of installing a pumping well at the leading edge of the plume (Alternatives 3 - 4 for groundwater) is considered low for the following reasons.

- Groundwater in the area of MW-15 is currently within NYS Class GA Standards. Pumping at this location may have the adverse effect of increasing the hydraulic gradient in the aquifer and causing the migration of higher concentrations of Cr^{+6} into previously unimpacted areas.

- Installing a pumping system at the leading edge of the plume would require significant time to implement due the need to establish a Revocable Consent agreement with New York City. Revocable Consent is the approval required to install subsurface structures and piping on New York City property. The estimated minimum time period for the Revocable Consent review and approval process is one year.

- The location of a well at the leading edge of the plume is on a narrow street in a residential area. During construction there would be short-term impacts to residents due to presence of drill rigs, backhoe, and support trucks; temporary road closing; driveway interferences; and, construction noise.

- Conveying extracted groundwater from the leading edge of the plume back to the Site for treatment would require obtaining approval to construct a force main through Long Island Rail Road LIRR and/or New York City property, additional time for construction, and related short-term community impacts (e.g., road construction).

In contrast to pumping at the leading edge of the plume, a well located onsite (Alternative 5) has high potential for short-term effectiveness for the following reasons.

- The extraction well located on-site is in the area where Cr^{+6} concentrations are highest. Therefore, pumping from this area would result in the capture and extraction of the groundwater containing the highest concentrations of Cr^{+6}.

- The extraction well located on-site does not require access agreements with outside parties. In addition, Pfizer has already received written conceptual approval from the NYCDEP regarding the plan to discharge untreated water into the sewer (Farag 1993). Therefore, it is expected that this alternative could be implemented quickly. Following implementation, this alternative is designed to capture any chromium released into groundwater beneath the Site prior to completion of the source remediation.

- There would be no impacts to residential areas during construction and operation of this alternative.

Alternatives 3b, 3c, 4b, 4c, 5b and 5c would require additional time to implement due to treatability testing, design and construction requirements.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of alternatives after implementation of the response actions. 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 controls intended to limit the risk, and 3) the reliability of these controls.

Soil

Excavation of the impacted soil (Alternative 2 for soil) would provide a permanent and irreversible reduction of contaminant mass within the CLRs for DP-1, DP-2 and the pit structure area. Removal of the Cr^{+6} and lead impacted soil would be protective of groundwater quality immediately downgradient of the Site.

In-situ stabilization (Alternative 3 for soil) satisfies criteria for long term effectiveness and permanence as defined by Technical Administrative Guidance Memorandum (TAGM) Item 2.1(c) Solidification/Chemical Fixation. The technology of in-situ soil mixing has been successfully demonstrated by the USEPA.

While further controls are not necessary, groundwater monitoring would be performed to confirm the effectiveness of this alternative.

Groundwater

Over time, all alternatives for groundwater would result in the restoration of groundwater to NYS Class GA Standards (for Site-related constituents) in the aquifer downgradient of the Site. For all alternatives this effectiveness would be permanent due to the elimination of the source as described in the remedial alternatives for soil.

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.

Soil

Alternative 2 for soil would permanently and irreversibly remove nearly all of the Cr^{+6} impacted soils on the Site. This alternative would also remove the lead impacted soils. Disposal at a properly licensed off-site disposal facility would assure positive containment of the Cr^{+6} (and Cr^{+3} and lead) impacted soils.

The initial excavation for Alternative 3 for soil would result in remediation of the Cr^{+6} and lead impacted soils having the greatest concentrations of these constituents by removal to an off-site landfill.

The volume of impacted soil would be reduced under Alternative 3 by the removal of a limited amount of soil. However, the introduction of the additives under Alternative 3 would increase the volume of the mixture of soil and stabilizing compounds.

Groundwater

Alternatives 1 and 2 for groundwater would reduce the toxicity, mobility and volume of impacted groundwater due to the natural chemical reduction of Cr^{+6} to Cr^{+3} in the aquifer. As a result of Cr^{+6} reduction, the volume of impacted groundwater would decrease over time, until all groundwater satisfies NYS Class GA Standards. Given the geochemical conditions within the aquifer, the reduction of Cr^{+6} to Cr^{+3} should be irreversible.

Alternatives 3 through 5 for groundwater would reduce mobility and volume via hydraulic capture and extraction of impacted groundwater. While capture zones propagated under Alternative 3 and 4 would intercept greater than 98 percent of the impacted groundwater, Alternative 5 would intercept and remove a minimum of 40 percent of the mass of Cr^{+6} in groundwater. Reduction of toxicity, mobility and volume of the remaining 60 percent of the Cr^{+6} in groundwater would occur due to the natural chemical reduction of Cr^{+6} to Cr^{+3} in the aquifer.

Alternatives 3b, 3c, 4b, 4c, 5b and 5c for groundwater utilize above-ground treatment to remove chromium from the groundwater, resulting in a reduction of toxicity of the extracted groundwater prior to discharge. This chromium is then concentrated in a sludge, that would require off-site disposal. The sludge may be considered a hazardous waste depending upon waste characterization testing.

For the alternatives that discharge directly to the sewer without treatment, concentrations of constituents would not exceed sewer discharge limits. In addition, it is anticipated that the strong reducing conditions of the sewer (i.e., high organic carbon content) would quickly reduce the Cr^{+6} to Cr^{+3}, resulting in a reduction of toxicity without the generation of an additional waste stream.

6. **Implementability**. The technical and administrative feasibility of implementing each alternative is evaluated. Technically, this includes the difficulties associated with the construction, the reliability of the technology, and the ability to monitor the effectiveness of the remedy. Administratively, the availability of the necessary personal and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc.

Soil

Gravel and cobbles within the Site soils are anticipated at depth intervals of about 8 to 12 feet and 25 to 30 feet. Proper penetration of the waste piles through these zones would be facilitated using conventional construction techniques such as removal of the obstructions with a backhoe, pre-drilling or the use of a large pile hammer. Removal of the impacted soil from the excavation would be readily implemented using conventional mechanized equipment suited for such operations. Backfill and compaction operations to replace the excavated materials would be routine.

Delays in the construction schedule would be likely due to the probable presence of gravel and cobbles. In addition, the presence of possible silt/clay interbeds, as cited in the RI, may impede the effectiveness of the soil mixing process. This alternative would not provide the ability for direct visual inspection to verify that all of the source volume within the CLRs has been thoroughly and uniformly stabilized.

Alternative 2 for soil would employ currently available methods, equipment and materials which are routinely utilized in the construction industry. There are a number of qualified contractors in the vicinity of New York City who have experience with similar excavations. Preliminary contacts with potential off-site disposal facilities, licensed to handle the Cr^{+6} impacted soil, have indicated that ample disposal capacity would be available.

There are only a limited number of specialty contractors who are experienced and qualified to perform in-situ stabilization for Alternative 3 for Site soil conditions. Since the equipment used is highly specialized, especially for stabilization within the gravel and cobble zones, mobilization of additional equipment or replacement, if required, may delay the project schedule.

Groundwater

Following implementation of the remedial alternatives for soil, all of the groundwater alternatives are expected to be very reliable in achieving the remedial action objectives, without any future remedial action being necessary.

Alternatives 1 and 2 for groundwater would be the easiest alternatives to implement from both the administrative and technical feasibility perspectives. Alternatives 3 and 4 would require obtaining Revocable Consent from New York City prior to implementation, resulting in an estimated one year delay. These alternatives (3 & 4) would require installation of a force main from the area of the MW-15 back to the Site, and construction of a treatment system. Due to the presence of the LIRR and/or extensive work required on NYC streets, these alternatives would be considered more difficult from a technical feasibility perspective. Access agreements would be required with LIRR. The construction on LIRR property would be within 50 feet of the tracks, requiring extensive coordination with LIRR. In addition, construction in New York City streets is typically difficult due to the uncertainties regarding locations of utilities (current and abandoned), lateral building connections, and unanticipated structures.

Within the New York City area there are vendors who can supply the technologies, materials, equipment and services required to implement each alternative.

7. Cost. Capital and operation and maintenance costs would be estimated for each alternative and compared on a present worth basis. Although cost is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the remaining criteria, cost effectiveness can be used as the basis for the final decision. The costs for each alternative are presented in Table 1.

Soil

The estimated capital costs for soil remediation would be $4,160,000 for Alternative 2 and $3,770,000 for Alternative 3. The annual operation and maintenance for Alternative 2 and Alternative 3 would involve groundwater monitoring, the cost for which is included in the remedial alternatives for groundwater.

Groundwater

The cost analysis indicates that natural attenuation with monitoring (Alternative 2 for groundwater) would cost approximately $399,000.

Alternatives 3a and 5a (groundwater extraction with one well, and discharge to sewer) would have a net present worth of $660,000 and $684,000, respectively. Alternative 4a (groundwater extraction with two wells, and discharge to sewer) has a net present worth of approximately $795,000.

The alternatives involving groundwater extraction and treatment range in cost from approximately $1,586,000 (Alternative 3b) to $1,807,000 (Alternative 4c).

8. Community Acceptance. - Concerns of the community regarding the RI/FS reports and the Proposed Remedial Action Plan are evaluated. A " Responsiveness Summary" will be prepared that describes public comments received and how the Department will address the concerns raised. If the final remedy selected differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

SECTION 7: SUMMARY OF THE SELECTED ALTERNATIVE

Based upon the results of the RI/FS, and the evaluation presented in Section 7, the NYSDEC is proposing to implement **Alternative 2 for soil and Alternative 5a for groundwater** as the remedies for this Site.

This selection is based upon the following criteria:

Soil

Alternative 2 provides for visual inspection, is considered permanent and can be implemented by well-proven technologies. Alternative 2 is also protective of human health and the environment and has high short- and long-term effectiveness. Alternative 3 for soil would be protective but considered difficult to implement due to the possible presence of cobbles beneath the Site and the lack of qualified contractors. Therefore, Alternative 2 for soil is the preferred alternative.

Groundwater

Alternatives 1 and 2 for groundwater are considered to be protective of human health and the environment. However, groundwater extraction alternatives (Alternatives 3 through 5) will result in a more rapid attainment of SCGs than Alternatives 1 and 2. The short-term effectiveness of Alternatives 3 and 4 is low. Alternatives 5b and 5c may not reduce toxicity, and are more difficult and time-consuming to implement, thereby reducing short-term effectiveness. Alternative 5a is as protective of human health and the environment as Alternatives 5b and 5c. However, Alternative 5a is quick and easier to implement prior to source removal, has greater short-term effectiveness, and is lower in cost. Therefore, Alternative 5a for groundwater is the preferred alternative.

The modelling results indicate that within one year following source remediation, 92 % of Cr^{+6} that is within the capture zone of the extraction well will be removed. After two years of pumping, 97 % of Cr^{+6} that is within the capture zone of the on-Site extraction well will be removed.

The estimated present worth cost to implement the remedy is $4,844,000. The cost to construct the remedy is estimated to be $4,311,000 and the estimated average annual operation and maintenance cost is $123,000.

The elements of the selected remedy are:

A remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial program.

Soil

- Impacted soils will be excavated from the Site using conventional braced excavation methods. The areal limits for the excavation are shown in Figure 4. Excavation of DP-1 and the pit will extend to approximately 15 feet and 22 feet below land surface respectively. Excavation of DP-2 will proceed as close as practical to the water table (54 feet below land surface).

- The excavated impacted soils will be transported off-site for disposal at an appropriate, licensed facility.

- Upon completion of the excavation, backfilling will proceed using clean fill material.

Groundwater

- An extraction well will be located in the southwest corner of the Site near Monitoring Well MW-5, and as close as possible to the western Site boundary (Figure 5). The extraction well will pump at an approximate rate of 30 gallons per minute.

- The extraction well will withdraw groundwater impacted by Cr^{+6}. The extracted groundwater will be routed around the existing building on-site through a force main and discharged to a municipal sewer via the existing building connection.

- Sampling of existing (on-site and off-site) wells to monitor groundwater remediation will be performed bi-annually for the duration of the remediation action.

- The duration of pumping will be based upon an evaluation of the groundwater quality data with respect to NYS Class GA Standards, and assessment of the cost-effectiveness of continued pumping.

SECTION 8: <u>HIGHLIGHTS OF COMMUNITY PARTICIPATION</u>

Consistent with the approved Citizens Participation plan, a public meeting was held on November 30, 1993 on the PRAP. Two residents and a attorney representing third property attended the meeting. Prior to the meeting, notice was published in the Newsday and meeting notice/information was mailed to adjacent property owners as well as to the document repositories. Due to small number of attendees, significant time was spent during and after the meeting explaining the investigation and remediation of this site. Subsequent to the public meeting of November 30, 1993, no additional comments or questions were received.

APPENDIX A

RESPONSIVENESS SUMMARY

Response to questions and comments raised at the public meeting of November 30, 1993 concerning the Proposed Remedial Action Plan for the Former Deknatel Facility.

Prepared by
The New York State Department of Environmental Conservation
Division of Hazardous Waste Remediation

December 16, 1993

For further information contact:

Shaminder P. Singh
Project Manager
(718) 482-4996

RESPONSIVENESS SUMMARY

The following questions were raised during the public meeting of November 30, 1993:

Q. Mr. Burgos: What is Pfizer planning to do with the property after remediation?

A. Pfizer has not stated plans for the final use of the property after it has been remediated. Since the removal is consistent with NYSDEC guidelines and standards (TAGM HWR-92-4046), there will be no post remedial site restrictions, other than the monitoring and performance of the groundwater extraction system.

Q. Mr. Burgos: I have a vegetable and plant garden in the backyard. Should I be worried about contamination from soil and groundwater?

A. The soil and groundwater contamination on the site is in the southern portion of the property; Mr. Burgos property is on the North side of the site. Extensive soil and groundwater sampling between the disposal areas and northern property boundary does not show any contamination. Furthermore, the groundwater flows in the southwesterly direction which is from Mr. Burgos property towards the site. There is no indication of any present or potential impacts on his garden.

Q. Ms. Cabrera: I'm wondering whether you know what portion of the Red Ground property (business) Pfizer is going to use? How much will you come into the parking lot? What portion of the parking lot will be used?

A. At this time Pfizer is designing the proposed remedy and does not know exactly how much of the Red Grounds property will be needed during remediation.

The property Pfizer will need from Red Ground is located in the existing fenced parking lot to the west of Pfizer. Pfizer will install a new temporary fence in the area that it will use during the remediation. Pfizer does not intend to drive back and forth through Red Grounds parking lot. After remediation Pfizer will restore the Red Ground's property to its condition just prior to site remediation.

It is understood that Pfizer is presently negotiating with Red Grounds for use of this property.

The following question was raised immediately following the public meeting:

Q. Ms. Rossi: Is Jamaica water supply getting contaminated with chromium?

A. The Jamaica Water Supply System is currently utilizing wells from areas other than the "local" wells, located over one half mile from the site. The off-site groundwater plume from the property extends approximately 200 feet to the 220 Street. Based upon the continuous sampling of these local water supply wells there is no evidence of site related chromium contamination.

APPENDIX B - ADMINISTRATIVE RECORD

1. **December 1987:**
   "Source Investigation Study", (Workplan), Deknatel, Inc. Queens, New York.

2. **September 1988:**
   Source Investigation Study", Deknatel Inc., New York.

3. **August 1989:**
   "Workplan For A Supplemental Remedial Investigation/Feasibility Study At the Deknatel Facility Queens Village, New York", Deknatel Inc.

4. **September 1989**
   NYSDEC Engineering Investigations At Inactive Hazardous Waste Sites, "Phase I Investigations", Deknatel Site, Queens Village, New York.

5. **April 1990:**
   Deknatel Inc., "Supplemental RI/FS Response to NYSDEC Comments".

6. **March 1992:**
   NYSDEC, "Order On Consent", Pfizer Hospital Products Group, Inc.

7. **September 1992:**
   "Installation and Sampling of Off-Site Monitoring Wells," Deknatel Inc.

8. **October 1992:**
   "Remedial Investigation Report", Pfizer Hospital Products Group Inc.

9. **May 1993:**
   "Focussed Feasibility Study for Source Control", Pfizer Inc.

10. **May 1993:**
    "Off-site, Groundwater Investigation and Additional Source Investigation", Pfizer Inc., Volume I, II and III.

11. **September 1993:**
    Draft "Focussed Feasibility Study Addendum for Groundwater", Pfizer Inc.

12. **November 1993:**
    NYSDEC Draft "Proposed Remedial Action Plan" for Former Deknatel Facility.

13. **December 1993:**
    NYSDEC "Responsiveness Summary for the Public Meeting of November 30, 1993" for Former Deknatel Facility.