REPORT

Description of Current Conditions for Areas South of Leith Street

Volume II of IV

General Motors Corporation
NAO-Flint Operations
Flint, Michigan

May 30, 2000

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

TECHNICAL REPORT

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NAO-Flint Operations
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BLASLAND, BOUCK & LEE, INC.
engineers & scientists

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SUMMARY REPORT

BUILDING 31/HAMILTON AVENUE TANK FARM

GM-CLCD NORTH
NAO FLINT OPERATIONS
FLINT, MICHIGAN

FACILITY ID: 0-002763

CONFIRMED RELEASE NO.: C-028-90

August 22, 1997

Prepared by:

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1.0 UNDERGROUND STORAGE TANKS

Thirteen underground storage tanks (USTs) were associated with the Hamilton Avenue Tank Farm.

1.1 Location

The Hamilton Avenue Tank Farm is located on the southeast corner of Hamilton Avenue and Industrial Avenue at the complex known as GM-CLCD North, NAO Flint Operations, Flint, Michigan. The Flint River is located approximately 1000 feet to the east. See Attachment 1.

1.2 UST Contents

The identification number, size, and contents of the USTs, detailed on the Buick Motor Division Storage Tank layout drawing number 42361-M dated 1973, are summarized as follows:

081/31T	12,000-gallon	Unleaded Gasoline
082/31T	12,000-gallon	Unleaded Gasoline
083/31T	12,000-gallon	Anti-freeze
084/31T	12,000-gallon	Anti-freeze
085/31T	12,000-gallon	BOPS (Solvent)
086/31T	12,000-gallon	Unleaded Gasoline
087/31T	12,000-gallon	Power Steering Fluid
088/31T	12,000-gallon	93 PS Thinner
089/31T	12,000-gallon	55 PS Thinner
090/31T	12,000-gallon	105 PS Thinner
091/31T	12,000-gallon	93 PS Thinner
132/31	12,000-gallon	#1 Diesel Oil
133/31	12,000-gallon	#1 Diesel Oil

1.3 Installation and Removal Dates

The USTs were installed in 1960 with the exception of UST 132 and 133 which were installed in 1979. Each UST was removed in December of 1986. The confirmed release number assigned to this tank farm is C-028-90.

2.0 INVESTIGATION ACTIVITIES

The USTs were removed in December, 1986. Information contained in internal General Motors files indicates that Mr. Ben Hall from the Michigan Department of Natural Resources (now Michigan Department of Environmental Quality) was on-

site during UST removal and soil excavation activities. These records also indicate that soil was excavated to clay boundaries that contained the tank farm. An unknown quantity of soil was taken to the Grand Blanc Landfill for final disposal.

2.1 Summary of Investigation Activities

Global Environmental Engineering, Inc. (Global) conducted a record review of internal General Motors files. The records indicated that further investigation was required to establish the condition of impacted soils and groundwater. Sample locations are summarized on Attachment 2.

On July 30, 1996 and July 31, 1996 Global supervised the advancement of eight Geoprobe borings (31-1 through 31-8). Two soil samples were collected from each boring, and groundwater samples were collected from six of the eight soil borings. See Attachment 6: Soil Boring Logs.

Global returned to the site on November 12, 1996 and supervised the advancement of three additional Geoprobe soil borings (31-9 through 31-11). Two soil samples were collected from each boring; however, it was not possible to collect groundwater samples from these locations using the Geoprobe.

On June 4, 1997, Global supervised the installation of five groundwater monitoring wells (MW-1 through MW-4D). Two soil samples were collected from each monitoring well location. The location of each monitoring well was chosen based on the groundwater and soil analytical sample results obtained during previous investigation activities. The screened intervals and soil types for the monitoring wells are listed below. See also Attachment 10: Monitoring Well Logs.

Well ID	Screened Interval (feet bgs)	Soil Type
MW-1	15.5 - 20.5	Silty Clay
MW-2	7 - 12	Sand/Silty Clay
MW-3	13 - 18	Sand/Silty Clay
MW-4S	7 - 12	Silty Clay
MW-4D	11- 16	Silty Clay

Groundwater samples from the monitoring wells were collected for laboratory analysis on June 10, 1997.

2.1.1 *Sample Collection and Analysis*

A minimum of two soil samples were collected for laboratory analysis from each soil boring based on the highest organic vapor analyzer reading (OVA) and/or the groundwater water interface, and the bottom-of-bore. Soil samples were collected from depths ranging from 7 to 27 feet below ground surface. Actual sample depths are given in Attachment 3. OVA results can be found on the soil boring logs, Attachment 6.

Each of the soil samples collected was placed into an unpreserved four-ounce container and transported at four degrees Celsius (4°C) using chain-of-custody procedures to Fire & Environmental Consulting Laboratories, Inc., in East Lansing, Michigan. Samples were analyzed in accordance with recommendations contained in *Environmental Response Division Operation Memorandum #6, Revision #4*, dated September 13, 1995.

Groundwater samples were collected from Geoprobe borings whenever possible using a screen point sampler attachment. The screen point sampler was driven to the desired sampling depth and an inner core, consisting of stainless steel wire screen, was pushed into the borehole allowing water to collect in the sampler. Monitoring wells were developed prior to sampling using a stainless steel bailer until water clarity stabilized. Approximately 48 hours following development, the monitoring wells were sampled. At the time of sampling, the monitoring wells were purged a minimum of three well volumes to ensure sample clarity.

Each of the groundwater samples collected for laboratory analysis was placed in laboratory-prepared glass bottles. Samples to be analyzed for dissolved lead were filtered in the field and preserved with nitric acid. Samples to be analyzed for volatile organics were preserved with hydrochloric acid. Each sample was transported at 4°C using chain-of-custody procedures to Fire & Environmental Consulting Laboratories, Inc., in East Lansing, Michigan. Samples were analyzed in accordance with recommendations contained in *Environmental Response Division Operational Memorandum #6, Revision #4*, dated September 13, 1995.

2.2 Summary of Geological Information

There are four basic rock formations comprising the bedrock of Genesee County: the Coldwater, Marshall, Michigan, and Saginaw formations. The Coldwater formation consists of sandy shale, and is a poor water producer. The Marshall formation consists of white to gray sandstone of varying grain size in the lower portion, and Napoleon Sandstone and Marshall Sandstone in the upper portion. The Marshall formation yields high quality groundwater. The Michigan formation consists of a gray shale and some thick dolostone layers, and is not a principal water bearing formation. The Saginaw formation is the youngest formation, and consists of sandstone, shale, sandy shale, limestone, and coal layers. Groundwater may be obtained from the sandstone layers within the Saginaw formation. Glacial drift material overlies the bedrock.

2.3 Summary of Hydrogeological Information

2.3.1 Depth to usable aquifer

The City of Flint is on a municipal water system. Most of the potable water wells within Genesee County are located beneath the glacial drift in the Saginaw Formation. The depth to the Saginaw Formation varies throughout the county, but is located roughly 300 feet below ground surface.

2.3.2 Local Groundwater Flow Direction

Based on static water level measurements obtained from the groundwater monitoring wells, groundwater flow is east toward the Flint River. See Attachment 11. → check it out - not shown.

2.3.3 Hydraulic Gradient

The hydraulic gradient, also based on static water level measurements of on-site wells, was estimated to be 0.022 ft/ft. 2.2'/100'

2.3.4 Hydraulic Conductivity

Slug test data obtained using a Hermit 2000© and analyzed using Aqtesolv© software indicated an average hydraulic conductivity of 0.004 ft/min. See Attachment 12.

0.002 cm/sec 10^{-3}

2.3.5 Natural Groundwater Velocity (Seepage Velocity)

The monitoring wells were screened in silty clay. The effective porosity of this water bearing unit is assumed to be 20% as recommended in MDEQ *Operational Memorandum No. 10, Attachment 2*, dated November 6, 1996. The natural groundwater velocity was estimated to be approximately 0.00044 ft/min or 230 ft/yr.

3.0 SOIL SAMPLE ANALYTICAL RESULTS

Soil samples were submitted to Fire & Environmental Consulting Laboratories, Inc., located in East Lansing, Michigan for analysis. Based on the former UST contents, the samples were analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX), polynuclear aromatic hydrocarbons (PNAs), chlorinated solvents, total lead, ethylene glycol, and propylene glycol. Analysis indicated the presence of the following constituents in concentrations exceeding the Tier I Soil Leaching to Groundwater Risk-Based Screening Levels (RBSLs): benzene, toluene, ethylbenzene, xylenes, and benzyl chloride. Additional constituents were detected in concentrations that did not exceed the RBSLs. No exceedances of the Tier I Direct Contact RBSLs were noted. See Attachment 3 for a summary of soil analytical results, Attachment 4 for a Tier I comparison table, and Attachment 5 for soil concentration maps.

4.0 GROUNDWATER SAMPLE ANALYTICAL RESULTS

Groundwater samples were submitted to Fire & Environmental Consulting Laboratories, Inc., located in East Lansing, Michigan for analysis. Based on the former UST contents, the samples were analyzed for BTEX, PNAs, chlorinated solvents, dissolved lead, ethylene glycol, and propylene glycol. Analysis indicated the presence of the following constituents in concentrations exceeding the Tier I Residential Health-Based Drinking Water and/or the Groundwater-Surface Water Interface RBSLs: benzene, toluene, ethylbenzene, xylenes, and 4,6-Dinitro-2-methylphenol. Additional constituents were detected in concentrations that did not exceed RBSLs. No exceedances of the Tier I Direct Contact RBSLs were noted. See Attachment 7 for a summary of soil analytical results, Attachment 8 for a Tier I comparison table, and Attachment 9 for groundwater concentration maps.

5.0 CONCLUSION

Soil concentrations exceeding the Tier I Soil Leaching to Groundwater RBSLs are present; however, the concentrations do not exceed the Tier I Direct Contact RBSLs. As the site is under pavement, exposure to impacted soil is not expected.

Groundwater concentrations exceeding the Tier I Residential Health-Based Drinking Water and Groundwater Surface Water Interface RBSLs are noted.

5.1 Sensitive Receptors

The Flint River is located approximately 1000 feet east of the former tank farm. See Attachment 1. Groundwater flow is east toward the east; however, current data indicates it is unlikely that impacted groundwater emanating from the former tank farm has or will reach the river.

The City of Flint is on a municipal water system. Most of the potable water wells within Genesee County are located beneath the glacial drift in the Saginaw Formation. The depth to the Saginaw Formation varies throughout the county, but is located roughly 300 feet below ground surface. It is unlikely that impacted groundwater will reach this aquifer.

5.2 Delineation

According to MDEQ Guidelines as established in the Memorandum dated January 19, 1996, the extent of contamination both horizontally and vertically must be delineated to below the Tier I residential unrestricted values.

Soil impacted with BTEX constituents is not delineated horizontally at boring 31-3 located on the west side of the former tank farm, and is not delineated vertically at boring SB-2/MW-2 located on the east side of the tank farm. See Attachment 5a.

Groundwater impacted with BTEX constituents is not delineated to the south, east or west. See Attachment 9a. Monitoring wells associated with Building 04 located to the north across Hamilton Avenue indicate non-detectable levels of BTEX.

5.3 Closure Potential

The site cannot be closed at this time. The site has not yet been fully delineated with respect to soil or groundwater, and closure potential cannot yet be thoroughly evaluated.

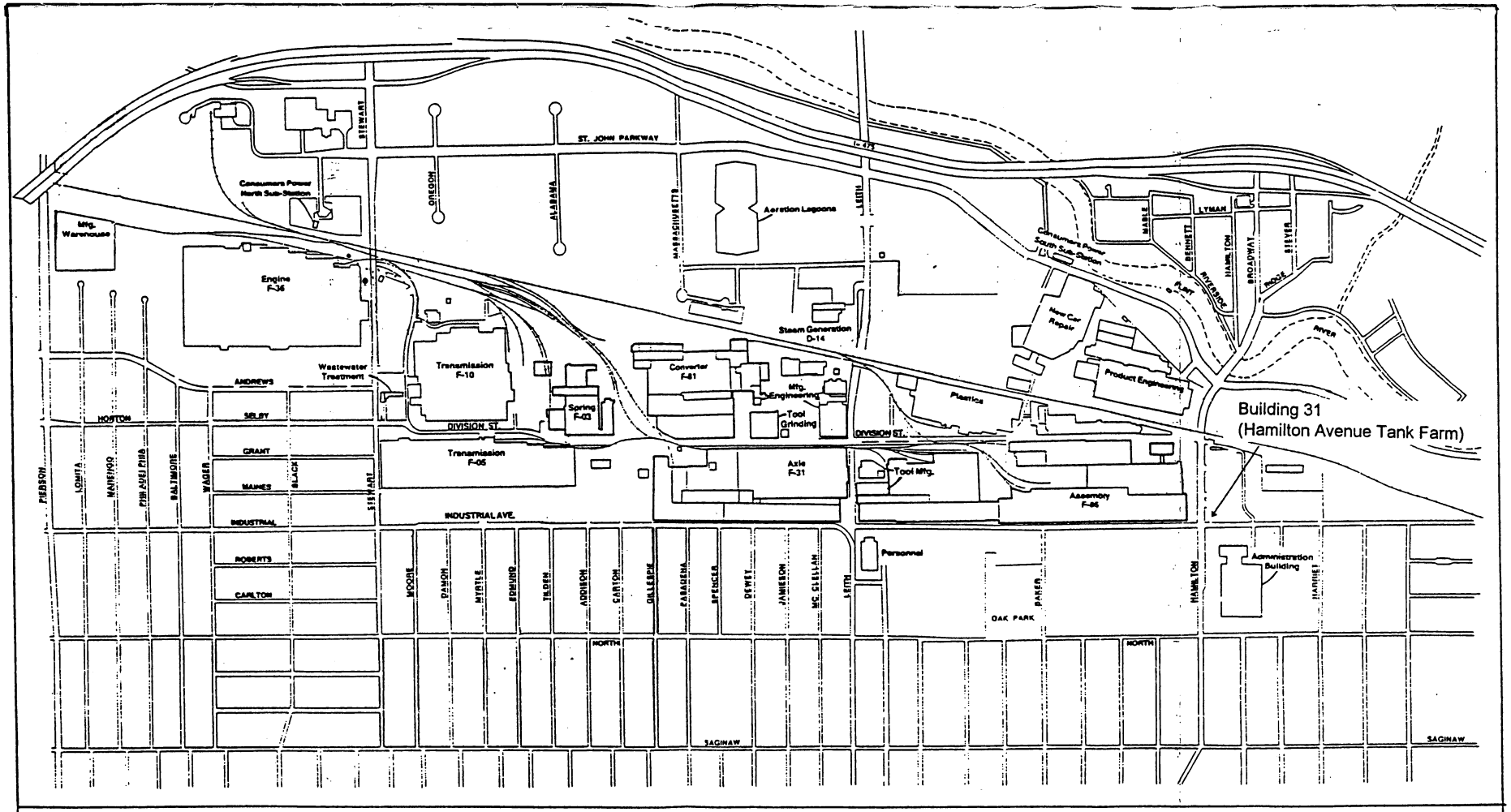
5.4 Future Work

Global recommends the following activities:

1. Complete the horizontal delineation of impacted soil at boring 31-3.
2. Complete the vertical delineation of impacted soil at boring SB-2/MW-2.
3. Complete the horizontal delineation of impacted groundwater to the south, east, and west of the former tank farm.

These recommendations may change based on negotiations with the MDEQ and the development of a site-wide remedial action plan.

ATTACHMENT 1



LEGEND

F-36	Factory Number
D-14	Division Number
□	Hazardous Waste Storage Area
38	Building Number
—	Property Line
■	Gate House
●	Pedestrian Entrance
—×—×—	Fence

Adapted from

EDI Engineering & Science

0 400 800 1200
Scale in Feet

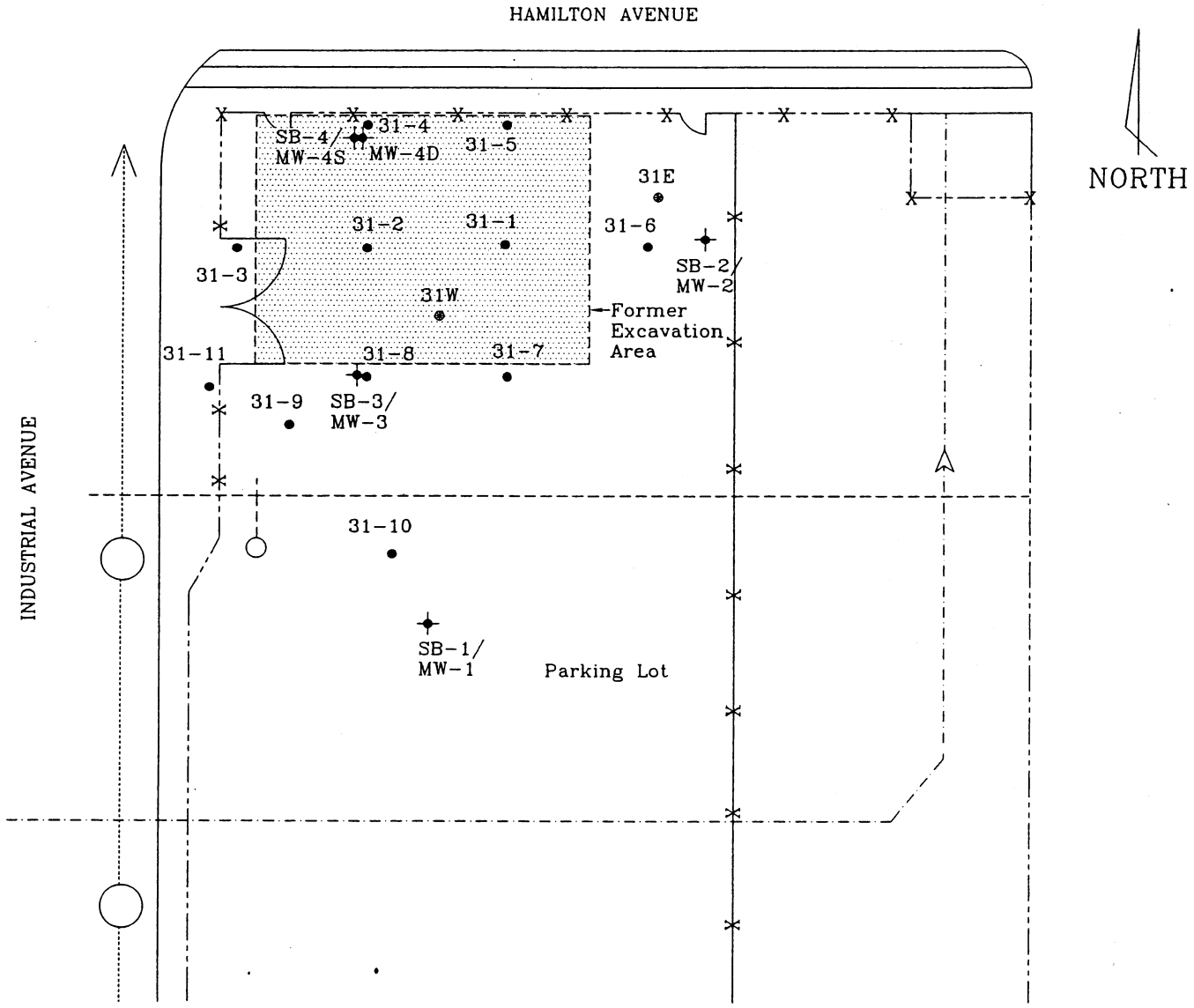
BOC FLINT OPERATIONS (BUICK SITE)

TANK FARM LOCATION/SITE DIAGRAM
ATTACHMENT 1

June, 1989

21080

ATTACHMENT 2



LEGEND:

- Monitoring Well Locations
- Geoprobe Sample Locations
- Fire Protection Line
- Storm Sewer Line
- 4" Process Waste
- Fence

GM-CLCD NORTH	
TITLE: SITE DIAGRAM/SOIL SAMPLE/ MONITORING WELL LOCATIONS BUILDING 31- FLINT, MICHIGAN	
DATE: 8/13/96	SCALE: 1"=40'
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 2
	PROJECT NUMBER: F174

ATTACHMENT 3

BUILDING 31/HAMILTON AVENUE TANK FARM
SUMMARY REPORT (Continued)

LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	Bldg 31-1 (11-13')		Bldg 31-1 (15-17')		Bldg 31-1 (17-19')		Bldg 31-2 (13-15')		Bldg 31-2 (17-19')	
Sample Depth (feet BGS)	11-13		15-17		17-19		13-15		17-19	
Date Collected	07/30/96		07/30/96		07/30/96		07/30/96		07/30/96	
Date Extracted	08/03/96		08/03/96		08/03/96		08/03/96		08/03/96	
Date Analyzed	08/03/96		08/03/96		08/03/96		08/03/96		08/03/96	
Analytical Method No.	8020		8020		8020		8020		8020	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	ND	10	ND	10	ND	10	ND	10	20	10
☐ Toluene	ND	10	ND	10	ND	10	ND	10	ND	10
☐ Ethylbenzene	ND	10	ND	10	ND	10	ND	10	ND	10
☐ Total Xylenes	ND	10	ND	10	ND	10	ND	10	ND	10
☐ MTBE										
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	Bldg 31-1 (11-13')		Bldg 31-1 (15-17')		Bldg 31-1 (17-19')		Bldg 31-2 (13-15')		Bldg 31-2 (17-19')	
Sample Depth (feet BGS)	11-13		15-17		17-19		13-15		17-19	
Date Collected	07/30/96		07/30/96		07/30/96		07/30/96		07/30/96	
Date Extracted	08/02/96		08/02/96		08/02/96		08/02/96		08/02/96	
Date Analyzed	08/07/96		08/07/96		08/07/96		08/07/96		08/07/96	
Analytical Method No.	8270		8270		8270		8270		8270	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Acenaphthylene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Anthracene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Benzo(a)anthracene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Benzo(a)pyrene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Benzo(b)fluoranthene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Benzo(g,h,i)perylene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Benzo(k)fluoranthene	ND	300	ND	300	ND	300	ND	300	ND	300

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

BUILDING 31/HAMILTON AVENUE TANK FARM
SUMMARY REPORT (Continued)

(Continued page 2 of 4)
LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	Bldg 31-1 (11-13')		Bldg 31-1 (15-17')		Bldg 31-1 (17-19')		Bldg 31-2 (13-15')		Bldg 31-2 (17-19')	
Sample Depth (feet BGS)	11-13		15-17		17-19		13-15		17-19	
Date Collected	07/30/96		07/30/96		07/30/96		07/30/96		07/30/96	
Date Extracted	08/02/96		08/02/96		08/02/96		08/02/96		08/02/96	
Date Analyzed	08/07/96		08/07/96		08/07/96		08/07/96		08/07/96	
Analytical Method No.	8270		8270		8270		8270		8270	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Chrysene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Dibenzo(a,h)anthracene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Fluoranthene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Fluorene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Indeno(1,2,3- cd)pyrene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Naphthalene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Phenanthrene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Pyrene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ 2-Methylnaphthalene	ND	300	ND	300	ND	300	ND	300	ND	300
METALS										
Sample ID	Bldg 31-1 (11-13')		Bldg 31-1 (15-17')		Bldg 31-1 (17-19')		Bldg 31-2 (13-15')		Bldg 31-2 (17-19')	
Sample Depth (feet BGS)	11-13		15-17		17-19		13-15		17-19	
Date Collected	07/30/96		07/30/96		07/30/96		07/30/96		07/30/96	
Date Extracted	08/08/96		08/08/96		08/08/96		08/08/96		08/08/96	
Date Analyzed	08/08/96		08/08/96		08/08/96		08/08/96		08/08/96	
Analytical Method No.	6020		6020		6020		6020		6020	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Cadmium										
☐ Total Chromium										
☐ Total Lead	2600	1000	3900	1000	4800	1000	3200	1000	4900	1000

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

PCBs										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Aroclor 1016										
☐ Aroclor 1221										
☐ Aroclor 1232										
☐ Aroclor 1242										
☐ Aroclor 1248										
☐ Aroclor 1254										
☐ Aroclor 1280										
HALOGENATED HYDROCARBONS										
Sample ID	Bldg 31-1 (11-13')		Bldg 31-1 (15-17')		Bldg 31-1 (17-19')		Bldg 31-2 (13-15')		Bldg 31-2 (17-19')	
Sample Depth (feet BGS)	11-13		15-17		17-19		13-15		17-19	
Date Collected	07/30/96		07/30/96		07/30/96		07/30/96		07/30/96	
Date Extracted	08/03/96		08/03/96		08/03/96		08/03/96		08/03/96	
Date Analyzed	08/03/96		08/03/96		08/03/96		08/03/96		08/03/96	
Analytical Method No.	8010		8010		8010		8010		8010	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Carbon Tetrachloride	ND	10	ND	10	ND	10	ND	10	ND	10
☐ 1,1-Dichloroethane	ND	10	ND	10	ND	10	ND	10	ND	10
☐ 1,2-Dichloroethane	ND	10	ND	10	ND	10	ND	10	ND	10
☐ 1,1-Dichloroethylene	ND	10	ND	10	ND	10	ND	10	ND	10

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

BUILDING 31/HAMILTON AVENUE TANK FARM
SUMMARY REPORT (Continued)

LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

HALOGENATED HYDROCARBONS (Cont.)										
Sample ID	Bldg 31-1 (11-13')		Bldg 31-1 (15-17')		Bldg 31-1 (17-19')		Bldg 31-2 (13-15')		Bldg 31-2 (17-19')	
Sample Depth (feet BGS)	11-13		15-17		17-19		13-15		17-19	
Date Collected	07/30/96		07/30/96		07/30/96		07/30/96		07/30/96	
Date Extracted	08/03/96		08/03/96		08/03/96		08/03/96		08/03/96	
Date Analyzed	08/03/96		08/03/96		08/03/96		08/03/96		08/03/96	
Analytical Method No.	8010		8010		8010		8010		8010	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ cis-1,2-Dichloroethylene	ND	10	ND	10	ND	10	ND	10	ND	10
☐ trans-1,2- Dichloroethylene	ND	10	ND	10	ND	10	ND	10	ND	10
☐ Tetrachloroethylene	ND	10	ND	10	ND	10	ND	10	ND	10
☐ 1,1,2-Trichloroethane	ND	10	ND	10	ND	10	ND	10	ND	10
OTHER *(Specify)*										
Sample ID	Bldg 31-1 (11-13')		Bldg 31-1 (15-17')		Bldg 31-1 (17-19')		Bldg 31-2 (13-15')		Bldg 31-2 (17-19')	
Sample Depth (feet BGS)	11-13		15-17		17-19		13-15		17-19	
Date Collected	07/30/96		07/30/96		07/30/96		07/30/96		07/30/96	
Date Extracted	08/12/96		08/12/96		08/12/96		08/12/96		08/12/96	
Date Analyzed	08/12/96		08/12/96		08/12/96		08/12/96		08/12/96	
Analytical Method No.	GC/FID or 8015m		GC/FID or 8015m		GC/FID or 8015m		GC/FID or 8015m		GC/FID or 8015m	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Ethylene Glycol	ND	5000	ND	5000	ND	5000	ND	5000	ND	5000
☐ Propylene Glycol	ND	5000	ND	5000	ND	5000	ND	5000	ND	5000
☐										
☐										
☐										
☐										
☐										

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	Bldg 31-3 (7-9')		Bldg 31-3 (13-15')		Bldg 31-4 (11-15')		Bldg 31-4 (15-19')		Bldg 31-5 (11-13')	
Sample Depth (feet BGS)	7-9		13-15		11-15		15-19		17-19	
Date Collected	07/30/96		07/30/96		07/30/96		07/30/96		07/30/96	
Date Extracted	08/03/96		08/03/96		08/03/96		08/03/96		08/03/96	
Date Analyzed	08/03/96		08/03/96		08/03/96		08/03/96		08/03/96	
Analytical Method No.	8020		8020		8020		8020		8020	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	ND	500	ND	10	ND	100	60	10	ND	100
☐ Toluene	9800	500	ND	10	ND	100	ND	10	ND	100
☐ Ethylbenzene	4600	500	ND	10	ND	100	ND	10	ND	100
☐ Total Xylenes	27,700	500	ND	10	100	100	ND	10	100	100
☐ MTBE										
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	Bldg 31-3 (7-9')		Bldg 31-3 (13-15')		Bldg 31-4 (11-15')		Bldg 31-4 (15-19')		Bldg 31-5 (11-13')	
Sample Depth (feet BGS)	7-9		13-15		11-15		15-19		17-19	
Date Collected	07/30/96		07/30/96		07/30/96		07/30/96		07/30/96	
Date Extracted	08/02/96		08/02/96		08/02/96		08/02/96		08/02/96	
Date Analyzed	08/07/96		08/07/96		08/07/96		08/07/96		08/07/96	
Analytical Method No.	8270		8270		8270		8270		8270	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Acenaphthylene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Anthracene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Benzo(a)anthracene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Benzo(a)pyrene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Benzo(b)fluoranthene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Benzo(g,h,i)perylene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Benzo(k)fluoranthene	ND	300	ND	300	ND	300	ND	300	ND	300

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

(Continued page 2 of 4)
LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	Bldg 31-3 (7-9')		Bldg 31-3 (13-15')		Bldg 31-4 (11-15')		Bldg 31-4 (15-19')		Bldg 31-5 (11-13')	
Sample Depth (feet BGS)	7-9		13-15		11-15		15-19		17-19	
Date Collected	07/30/96		07/30/96		07/30/96		07/30/96		07/30/96	
Date Extracted	08/02/96		08/02/96		08/02/96		08/02/96		08/02/96	
Date Analyzed	08/07/96		08/07/96		08/07/96		08/07/96		08/07/96	
Analytical Method No.	8270		8270		8270		8270		8270	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Chrysene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Dibenzo(a,h)anthracene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Fluoranthene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Fluorene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Indeno(1,2,3- cd)pyrene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Naphthalene	400	300	ND	300	ND	300	ND	300	ND	300
☐ 2-Methylnaphthalene	700	300	ND	300	ND	300	ND	300	ND	300
☐ Phenanthrene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Pyrene	ND	300	ND	300	ND	300	ND	300	ND	300
METALS										
Sample ID	Bldg 31-3 (7-9')		Bldg 31-3 (13-15')		Bldg 31-4 (11-15')		Bldg 31-4 (15-19')		Bldg 31-5 (11-13')	
Sample Depth (feet BGS)	7-9		13-15		11-15		15-19		17-19	
Date Collected	07/30/96		07/30/96		07/30/96		07/30/96		07/30/96	
Date Extracted	08/08/96		08/08/96		08/08/96		08/08/96		08/08/96	
Date Analyzed	08/08/96		08/08/96		08/08/96		08/08/96		08/08/96	
Analytical Method No.	6020		6020		6020		6020		6020	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Cadmium										
☐ Total Chromium										
☐ Total Lead	4600	1000	8400	1000	5800	1000	5900	1000	3700	1000

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

(Continued page 3 of 4)
LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

PCBs										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Aroclor 1016										
☐ Aroclor 1221										
☐ Aroclor 1232										
☐ Aroclor 1242										
☐ Aroclor 1248										
☐ Aroclor 1254										
☐ Aroclor 1280										
HALOGENATED HYDROCARBONS										
Sample ID	Bldg 31-3 (7-9')		Bldg 31-3 (13-15')		Bldg 31-4 (11-15')		Bldg 31-4 (15-19')		Bldg 31-5 (11-13')	
Sample Depth (feet BGS)	7-9		13-15		11-15		15-19		17-19	
Date Collected	07/30/96		07/30/96		07/30/96		07/30/96		07/30/96	
Date Extracted	08/03/96		08/03/96		08/03/96		08/03/96		08/03/96	
Date Analyzed	08/03/96		08/03/96		08/03/96		08/03/96		08/03/96	
Analytical Method No.	8010		8010		8010		8010		8010	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Carbon Tetrachloride	ND	500	ND	10	ND	10	ND	10	ND	10
☐ 1,1-Dichloroethane	ND	500	ND	10	ND	10	ND	10	ND	10
☐ 1,2-Dichloroethane	ND	500	ND	10	ND	10	ND	10	ND	10
☐ 1,1-Dichloroethylene	ND	500	ND	10	ND	10	ND	10	ND	10

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

(Continued page 4 of 4)
LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

HALOGENATED HYDROCARBONS										
Sample ID	Bldg 31-3 (7-9')		Bldg 31-3 (13-15')		Bldg 31-4 (11-15')		Bldg 31-4 (15-19')		Bldg 31-5 (11-13')	
Sample Depth (feet BGS)	7-9		13-15		11-15		15-19		17-19	
Date Collected	07/30/96		07/30/96		07/30/96		07/30/96		07/30/96	
Date Extracted	08/03/96		08/03/96		08/03/96		08/03/96		08/03/96	
Date Analyzed	08/03/96		08/03/96		08/03/96		08/03/96		08/03/96	
Analytical Method No.	8010		8010		8010		8010		8010	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ cis-1,2-Dichloroethylene	ND	500	ND	10	ND	10	ND	10	ND	10
☐ trans-1,2- Dichloroethylene	ND	500	ND	10	ND	10	ND	10	ND	10
☐ Tetrachloroethylene	ND	500	ND	10	ND	10	ND	10	ND	10
☐ 1,1,2-Trichloroethane	ND	500	ND	10	ND	10	ND	10	ND	10
OTHER *(Specify)*										
Sample ID	Bldg 31-3 (7-9')		Bldg 31-3 (13-15')		Bldg 31-4 (11-15')		Bldg 31-4 (15-19')		Bldg 31-5 (11-13')	
Sample Depth (feet BGS)	7-9		13-15		11-15		15-19		17-19	
Date Collected	07/30/96		07/30/96		07/30/96		07/30/96		07/30/96	
Date Extracted	08/12/96		08/12/96		08/12/96		08/12/96		08/12/96	
Date Analyzed	08/12/96		08/12/96		08/12/96		08/12/96		08/12/96	
Analytical Method No.	GC/FID or 8015m		GC/FID or 8015m		GC/FID or 8015m		GC/FID or 8015m		GC/FID or 8015m	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Ethylene Glycol	ND	5000	ND	5000	ND	5000	ND	5000	ND	5000
☐ Propylene Glycol	ND	5000	ND	5000	ND	5000	ND	5000	ND	5000
☐										
☐										
☐										
☐										
☐										
☐										
☐										

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	Bldg 31-5 (15-17')		Bldg 31-6 (13-14')		Bldg 31-6 (15-17')		Bldg 31-7 (15-17')		Bldg 31-7 (19-21')	
Sample Depth (feet BGS)	7-9		13-14		15-17		15-17		19-21	
Date Collected	07/30/96		07/31/96		07/31/96		07/31/96		07/31/96	
Date Extracted	08/03/96		08/06/96		08/06/96		08/06/96		08/06/96	
Date Analyzed	08/03/96		08/06/96		08/06/96		08/06/96		08/06/96	
Analytical Method No.	8020		8020		8020		8020		8020	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	ND	10	ND	10	60	10	ND	10	ND	100
☐ Toluene	ND	10	ND	10	ND	10	ND	10	ND	100
☐ Ethylbenzene	ND	10	ND	10	ND	10	ND	10	ND	100
☐ Total Xylenes	ND	10	ND	10	ND	10	ND	10	ND	100
☐ MTBE										
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	Bldg 31-5 (15-17')		Bldg 31- 6 (13-14')		Bldg 31-6 (15-17')		Bldg 31-7 (15-17')		Bldg 31-7 (19-21')	
Sample Depth (feet BGS)	7-9		13-14		15-17		15-17		19-21	
Date Collected	07/30/96		07/31/96		07/31/96		07/31/96		07/31/96	
Date Extracted	08/02/96		08/06/96		08/06/96		08/06/96		08/06/96	
Date Analyzed	08/06/96		08/08/96		08/08/96		08/08/96		08/08/96	
Analytical Method No.	8270		8270		8270		8270		8270	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Acenaphthylene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Anthracene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Benzo(a)anthracene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Benzo(a)pyrene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Benzo(b)fluoranthene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Benzo(g,h,i)perylene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Benzo(k)fluoranthene	ND	300	ND	300	ND	300	ND	300	ND	300

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

(Continued page 2 of 4)
LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	Bldg 31-5 (15-17')		Bldg 31-6 (13-14')		Bldg 31-6 (15-17')		Bldg 31-7 (15-17')		Bldg 31-7 (19-21')	
Sample Depth (feet BGS)	7-9		13-14		15-17		15-17		19-21	
Date Collected	07/30/96		07/31/96		07/31/96		07/31/96		07/31/96	
Date Extracted	08/02/96		08/06/96		08/06/96		08/06/96		08/06/96	
Date Analyzed	08/06/96		08/08/96		08/08/96		08/08/96		08/08/96	
Analytical Method No.	8270		8270		8270		8270		8270	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Chrysene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Dibenzo(a,h)anthracene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Fluoranthene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Fluorene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Indeno(1,2,3- cd)pyrene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Naphthalene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ 2-Methylnaphthalene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Phenanthrene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Pyrene	ND	300	ND	300	ND	300	ND	330	ND	300
METALS										
Sample ID	Bldg 31-5 (15-17')		Bldg 31-6 (13-14')		Bldg 31-6 (15-17')		Bldg 31-7 (15-17')		Bldg 31-7 (19-21')	
Sample Depth (feet BGS)	7-9		13-14		15-17		15-17		19-21	
Date Collected	07/30/96		07/31/96		07/31/96		07/31/96		07/31/96	
Date Extracted	08/08/96		08/08/96		08/08/96		08/08/96		08/08/96	
Date Analyzed	08/08/96		08/08/96		08/08/96		08/08/96		08/08/96	
Analytical Method No.	6020		6020		6020		6020		6020	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Cadmium										
☐ Total Chromium										
☐ Total Lead	7100	1000	1800	1000	5500	1000	5200	1000	3500	1000

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

(Continued page 3 of 4)
LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

PCBs										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Aroclor 1016										
☐ Aroclor 1221										
☐ Aroclor 1232										
☐ Aroclor 1242										
☐ Aroclor 1248										
☐ Aroclor 1254										
☐ Aroclor 1280										
HALOGENATED HYDROCARBONS										
Sample ID	Bldg 31-5 (15-17')		Bldg 31-6 (13-14')		Bldg 31-6 (15-17')		Bldg 31-7 (15-17')		Bldg 31-7 (19-21')	
Sample Depth (feet BGS)	7-9		13-14		15-17		15-17		19-21	
Date Collected	07/30/96		07/31/96		07/31/96		07/31/96		07/31/96	
Date Extracted	08/03/96		08/06/96		08/06/96		08/06/96		08/06/96	
Date Analyzed	08/03/96		08/06/96		08/06/96		08/06/96		08/06/96	
Analytical Method No.	8010		8010		8010		8010		8010	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Carbon Tetrachloride	ND	10	ND	10	ND	10	ND	10	ND	10
☐ 1,1-Dichloroethane	ND	10	ND	10	ND	10	ND	10	ND	10
☐ 1,2-Dichloroethane	ND	10	ND	10	ND	10	ND	10	ND	10
☐ 1,1-Dichloroethylene	ND	10	ND	10	ND	10	ND	10	ND	10

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

(Continued page 4 of 4)
LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

HALOGENATED HYDROCARBONS										
Sample ID	Bldg 31-5 (15-17')		Bldg 31-6 (13-14')		Bldg 31-6 (15-17')		Bldg 31-7 (15-17')		Bldg 31-7 (19-21')	
Sample Depth (feet BGS)	7-9		13-14		15-17		15-17		19-21	
Date Collected	07/30/96		07/31/96		07/31/96		07/31/96		07/31/96	
Date Extracted	08/03/96		08/06/96		08/06/96		08/06/96		08/06/96	
Date Analyzed	08/03/96		08/06/96		08/06/96		08/06/96		08/06/96	
Analytical Method No.	8010		8010		8010		8010		8010	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ cis-1,2-Dichloroethylene	ND	10	ND	10	ND	10	ND	10	ND	10
☐ trans-1,2- Dichloroethylene	ND	10	ND	10	ND	10	ND	10	ND	10
☐ Tetrachloroethylene	ND	10	ND	10	ND	10	ND	10	ND	10
☐ 1,1,2-Trichloroethane	ND	10	ND	10	ND	10	ND	10	ND	10
OTHER *(Specify)*										
Sample ID	Bldg 31-5 (15-17')		Bldg 31-6 (13-14')		Bldg 31-6 (15-17')		Bldg 31-7 (15-17')		Bldg 31-7 (19-21')	
Sample Depth (feet BGS)	7-9		13-14		15-17		15-17		19-21	
Date Collected	07/30/96		07/31/96		07/31/96		07/31/96		07/31/96	
Date Extracted	08/12/96		08/12/96		08/12/96		08/12/96		08/12/96	
Date Analyzed	08/12/96		08/12/96		08/12/96		08/12/96		08/12/96	
Analytical Method No.	GC/FID or 8015m		GC/FID or 8015m		GC/FID or 8015m		GC/FID or 8015m		GC/FID or 8015m	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Ethylene Glycol	ND	5000	ND	5000	ND	5000	ND	5000	ND	5000
☐ Propylene Glycol	ND	5000	ND	5000	ND	5000	5000	5000	ND	5000
☐										
☐										
☐										
☐										
☐										
☐										
☐										

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	Bldg 31-8 (13-15)		Bldg 31-8 (17-19)		Bldg 31-9 (17-19')		Bldg 31-9 (19-21')		Bldg 31-10 (7-9')	
Sample Depth (feet BGS)	13-15		17-19		17-19		19-21		7-9	
Date Collected	07/31/96		07/31/96		11/12/96		11/12/96		11/12/96	
Date Extracted	08/06/96		08/06/96		11/19/96		11/19/96		11/19/96	
Date Analyzed	08/06/96		08/06/96		11/19/96		11/19/96		11/19/96	
Analytical Method No.	8020		8020		8020		8020		8020	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	ND	100	ND	10	ND	10	ND	10	ND	10
☐ Toluene	34,000	100	20	10	ND	10	ND	10	ND	10
☐ Ethylbenzene	31,700	100	ND	10	ND	10	120	10	ND	10
☐ Total Xylenes	81,000	100	20	10	ND	10	ND	10	ND	10
☐ MTBE										
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	Bldg 31-8 (13-15)		Bldg 31-8 (17-19)		Bldg 31-9 (17-19')		Bldg 31-9 (19-21')		Bldg 31-10 (7-9')	
Sample Depth (feet BGS)	13-15		17-19		17-19		19-21		7-9	
Date Collected	07/31/96		07/31/96		11/12/96		11/12/96		11/12/96	
Date Extracted	08/06/96		08/06/96		11/19/96		11/19/96		11/19/96	
Date Analyzed	08/08/96		08/08/96		11/27/96		11/27/96		11/27/96	
Analytical Method No.	8270		8270		8270		8270		8270	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Acenaphthylene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Anthracene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Benzo(a)anthracene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Benzo(a)pyrene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Benzo(b)fluoranthene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Benzo(g,h,i)perylene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Benzo(k)fluoranthene	ND	300	ND	300	ND	300	ND	300	ND	300

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

SUMMARY REPORT (Continued)

LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	Bldg 31-8 (13-15)		Bldg 31-8 (17-19)		Bldg 31-9 (17-19')		Bldg 31-9 (19-21')		Bldg 31-10 (7-9')	
Sample Depth (feet BGS)	13-15		17-19		17-19		19-21		7-9	
Date Collected	07/31/96		07/31/96		11/12/96		11/12/96		11/12/96	
Date Extracted	08/06/96		08/06/96		11/19/96		11/19/96		11/19/96	
Date Analyzed	08/08/96		08/08/96		11/27/96		11/27/96		11/27/96	
Analytical Method No.	8270		8270		8270		8270		8270	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Chrysene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Dibenzo(a,h)anthracene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Fluoranthene	400	300	ND	300	ND	300	ND	300	ND	300
☐ Fluorene	300	300	ND	300	ND	300	ND	300	ND	300
☐ Indeno(1,2,3- cd)pyrene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Naphthalene	3200	300	ND	300	ND	300	ND	300	ND	300
☐ 2-Methylnaphthalene	1500	300	ND	300	ND	300	ND	300	ND	300
☐ Phenanthrene	500	300	ND	300	ND	300	ND	300	ND	300
☐ Pyrene	ND	300	ND	300	ND	300	ND	300	ND	300
METALS										
Sample ID	Bldg 31-8 (13-15)		Bldg 31-8 (17-19)		Bldg 31-9 (17-19')		Bldg 31-9 (19-21')		Bldg 31-10 (7-9')	
Sample Depth (feet BGS)	13-15		17-19		17-19		19-21		7-9	
Date Collected	07/31/96		07/31/96		11/12/96		11/12/96		11/12/96	
Date Extracted	08/08/96		08/08/96		11/20/96		11/20/96		11/20/96	
Date Analyzed	08/08/96		08/08/96		11/20/96		11/20/96		11/20/96	
Analytical Method No.	6020		6020		6020		6020		6020	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Cadmium										
☐ Total Chromium										
☐ Total Lead	1600	1000	4100	1000	1800	1000	3800	1000	4800	1000

BGS=Below Ground Surface

*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)

If Other (OT), Specify here: _____

MDL= Method Detection Limit

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LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

PCBs										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Aroclor 1016										
☐ Aroclor 1221										
☐ Aroclor 1232										
☐ Aroclor 1242										
☐ Aroclor 1248										
☐ Aroclor 1254										
☐ Aroclor 1280										
HALOGENATED HYDROCARBONS										
Sample ID	Bldg 31-8 (13-15)		Bldg 31-8 (17-19)		Bldg 31-9 (17-19')		Bldg 31-9 (19-21')		Bldg 31-10 (7-9')	
Sample Depth (feet BGS)	13-15		17-19		17-19		19-21		7-9	
Date Collected	07/31/96		07/31/96		11/12/96		11/12/96		11/12/96	
Date Extracted	08/06/96		08/06/96		11/19/96		11/19/96		11/19/96	
Date Analyzed	08/06/96		08/06/96		11/19/96		11/19/96		11/19/96	
Analytical Method No.	8010		8010		8010		8010		8010	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzyl Chloride	2300	100	ND	10	ND	10	ND	10	ND	10
☐ Carbon Tetrachloride	ND	100	ND	10	ND	10	ND	10	ND	10
☐ 1,1-Dichloroethane	ND	100	ND	10	ND	10	ND	10	ND	10
☐ 1,2-Dichloroethane	ND	100	ND	10	ND	10	ND	10	ND	10
☐ 1,1-Dichloroethylene	ND	100	ND	10	ND	10	ND	10	ND	10

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

(Continued page 4 of 4)
LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

HALOGENATED HYDROCARBONS										
Sample ID	Bldg 31-8 (13-15)		Bldg 31-8 (17-19)		Bldg 31-9 (17-19')		Bldg 31-9 (19-21')		Bldg 31-10 (7-9')	
Sample Depth (feet BGS)	13-15		17-19		17-19		19-21		7-9	
Date Collected	07/31/96		07/31/96		11/12/96		11/12/96		11/12/96	
Date Extracted	08/06/96		08/06/96		11/19/96		11/19/96		11/19/96	
Date Analyzed	08/06/96		08/06/96		11/19/96		11/19/96		11/19/96	
Analytical Method No.	8010		8010		8010		8010		8010	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ cis-1,2-Dichloroethylene	ND	100	ND	10	ND	10	ND	10	ND	10
☐ trans-1,2- Dichloroethylene	ND	100	ND	10	ND	10	ND	10	ND	10
☐ Tetrachloroethylene	ND	100	ND	10	ND	10	ND	10	ND	10
☐ 1,1,2-Trichloroethane	ND	100	ND	10	ND	10	ND	10	ND	10
OTHER *(Specify)*										
Sample ID	Bldg 31-8 (13-15)		Bldg 31-8 (17-19)		Bldg 31-9 (17-19')		Bldg 31-9 (19-21')		Bldg 31-10 (7-9')	
Sample Depth (feet BGS)	13-15		17-19		17-19		19-21		7-9	
Date Collected	07/31/96		07/31/96		11/12/96		11/12/96		11/12/96	
Date Extracted	08/12/96		08/12/96		12/09/96		12/09/96		12/09/96	
Date Analyzed	08/12/96		08/12/96		12/09/96		12/09/96		12/09/96	
Analytical Method No.	GC/FID or 8015m		GC/FID or 8015m		GC/FID or 8015m		GC/FID or 8015m		GC/FID or 8015m	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Ethylene Glycol	ND	5000	ND	5000	ND	5000	ND	5000	ND	5000
☐ Propylene Glycol	ND	5000	ND	5000	ND	5000	ND	5000	ND	5000
☐										
☐										
☐										
☐										
☐										

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

(Continued page 4 of 4)
LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

Other: SEMI-VOLATILE ORGANICS										
Sample ID	Bldg 31-8 (13-15)		Bldg 31-8 (17-19)		Bldg 31-9 (17-19')		Bldg 31-9 (19-21')		Bldg 31-10 (7-9')	
Sample Depth (feet BGS)	13-15		17-19		17-19		19-21		7-9	
Date Collected	07/31/96		07/31/96		11/12/96		11/12/96		11/12/96	
Date Extracted	08/06/96		08/06/96		11/19/96		11/19/96		11/19/96	
Date Analyzed	08/08/96		08/08/96		11/27/96		11/27/96		11/27/96	
Analytical Method No.	8270		8270		8270		8270		8270	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ p,m-Cresol	1600	300	ND	10	ND	10	ND	10	ND	10
☐ o-Cresol	1000	300	ND	10	ND	10	ND	10	ND	10
☐ Di-n-butyl phthalate	900	300	ND	10	ND	10	ND	10	ND	10
☐ Di-n-octyl phthalate	400	300	ND	10	ND	10	ND	10	ND	10
OTHER *(Specify)*										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐										
☐										
☐										
☐										
☐										
☐										
☐										

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	Bldg 31-10 (15-17)		Bldg 31-11 (14-16)		Bldg 31-11 (18-21')		SB1/MW1 (17-19')		SB1/MW1 (25-27')	
Sample Depth (feet BGS)	15-17		14-16		18-21		17-19		25-27	
Date Collected	11/13/96		11/13/96		11/13/96		06/04/97		06/04/97	
Date Extracted	11/19/96		11/19/96		11/19/96		06/12/97		06/12/97	
Date Analyzed	11/19/96		11/19/96		11/19/96		06/12/97		06/12/97	
Analytical Method No.	8020		8020		8020		8260		8260	
Collection Method*	GP		GP		GP		SS		SS	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	ND	10	ND	10	ND	10	ND	10	ND	10
☐ Toluene	760	10	ND	10	ND	10	410	10	640	10
☐ Ethylbenzene	30	10	ND	10	ND	10	30	10	100	10
☐ Total Xylenes	130	10	ND	10	ND	10	60	10	350	10
☐ MTBE										
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	Bldg 31-10 (15-17)		Bldg 31-11 (14-16)		Bldg 31-11 (18-21')		SB1/MW1 (17-19')		SB1/MW1 (25-27')	
Sample Depth (feet BGS)	15-17		14-16		18-21		17-19		25-27	
Date Collected	11/12/96		11/12/96		11/12/96		06/04/97		06/04/97	
Date Extracted	11/19/96		11/19/96		11/19/96		06/12/97		06/12/97	
Date Analyzed	11/27/96		11/27/96		11/27/96		06/12/97		06/12/97	
Analytical Method No.	8270		8270		8270		8270		8270	
Collection Method*	GP		GP		GP		SS		SS	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene	ND	300	ND	300	ND	300	ND	330	ND	330
☐ Acenaphthylene	ND	300	ND	300	ND	300	ND	330	ND	330
☐ Anthracene	ND	300	ND	300	ND	300	ND	330	ND	330
☐ Benzo(a)anthracene	ND	300	ND	300	ND	300	ND	330	ND	330
☐ Benzo(a)pyrene	ND	300	ND	300	ND	300	ND	330	ND	330
☐ Benzo(b)fluoranthene	ND	300	ND	300	ND	300	ND	330	ND	330
☐ Benzo(g,h,i)perylene	ND	300	ND	300	ND	300	ND	330	ND	330
☐ Benzo(k)fluoranthene	ND	300	ND	300	ND	300	ND	330	ND	330

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

(Continued page 2 of 4)
LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	Bldg 31-10 (15-17)		Bldg 31-11 (14-16)		Bldg 31-11 (18-21')		SB1/MW1 (17-19')		SB1/MW1 (25-27')	
Sample Depth (feet BGS)	15-17		14-16		18-21		17-19		25-27	
Date Collected	11/13/96		11/13/96		11/13/96		06/04/97		06/04/97	
Date Extracted	11/19/96		11/19/96		11/19/96		06/12/97		06/12/97	
Date Analyzed	11/27/96		11/27/96		11/27/96		06/12/97		06/12/97	
Analytical Method No.	8270		8270		8270		8270		8270	
Collection Method*	GP		GP		GP		SS		SS	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Chrysene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Dibenzo(a,h)anthracene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Fluoranthene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Fluorene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Indeno(1,2,3- cd)pyrene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Naphthalene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ 2-Methylnaphthalene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Phenanthrene	ND	300	ND	300	ND	300	ND	300	ND	300
☐ Pyrene	ND	300	ND	300	ND	300	ND	300	ND	300
METALS										
Sample ID	Bldg 31-10 (15-17)		Bldg 31-11 (14-16)		Bldg 31-11 (18-21')		SB1/MW1 (17-19')		SB1/MW1 (25-27')	
Sample Depth (feet BGS)	15-17		14-16		18-21		17-19		25-27	
Date Collected	11/13/96		11/13/96		11/13/96		06/04/97		06/04/97	
Date Extracted	11/20/96		11/20/96		11/20/96		06/12/97		06/12/97	
Date Analyzed	11/20/96		11/20/96		11/20/96		06/12/97		06/12/97	
Analytical Method No.	6020		6020		6020		6020		6020	
Collection Method*	GP		GP		GP		SS		SS	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Cadmium										
☐ Total Chromium										
☐ Total Lead	5800	1000	2300	1000	3600	1000	3400	1000	2300	1000

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

(Continued page 3 of 4)
LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

PCBs										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Aroclor 1016										
☐ Aroclor 1221										
☐ Aroclor 1232										
☐ Aroclor 1242										
☐ Aroclor 1248										
☐ Aroclor 1254										
☐ Aroclor 1280										
HALOGENATED HYDROCARBONS										
Sample ID	Bldg 31-10 (15-17)		Bldg 31-11 (14-16)		Bldg 31-11 (18-21')		SB1/MW1 (17-19')		SB1/MW1 (25-27')	
Sample Depth (feet BGS)	15-17		14-16		18-21		17-19		25-27	
Date Collected	11/13/96		11/13/96		11/13/96		06/04/97		06/04/97	
Date Extracted	11/19/96		11/19/96		11/19/96		06/12/97		06/12/97	
Date Analyzed	11/19/96		11/19/96		11/19/96		06/12/97		06/12/97	
Analytical Method No.	8010		8010		8010		8010		8010	
Collection Method*	GP		GP		GP		SS		SS	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzyl Chloride	ND	10	ND	10	ND	10	ND	10	ND	10
☐ Carbon Tetrachloride	ND	10	ND	10	ND	10	ND	10	ND	10
☐ 1,1-Dichloroethane	ND	10	ND	10	ND	10	ND	10	ND	10
☐ 1,2-Dichloroethane	ND	10	ND	10	ND	10	ND	10	ND	10
☐ 1,1-Dichloroethylene	ND	10	ND	10	ND	10	ND	10	ND	10

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

(Continued page 4 of 4)
LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

HALOGENATED HYDROCARBONS										
Sample ID	Bldg 31-10 (15-17)		Bldg 31-11 (14-16)		Bldg 31-11 (18-21')		SB1/MW1 (17-19')		SB1/MW1 (25-27')	
Sample Depth (feet BGS)	15-17		14-16		18-21		17-19		25-27	
Date Collected	11/13/96		11/13/96		11/13/96		06/04/97		06/04/97	
Date Extracted	11/20/96		11/20/96		11/20/96		06/12/97		06/12/97	
Date Analyzed	11/20/96		11/20/96		11/20/96		06/12/97		06/12/97	
Analytical Method No.	8010		8010		8010		8010		8010	
Collection Method*	GP		GP		GP		SS		SS	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ cis-1,2-Dichloroethylene	ND	100	ND	10	ND	10	ND	10	ND	10
☐ trans-1,2- Dichloroethylene	ND	100	ND	10	ND	10	ND	10	ND	10
☐ Tetrachloroethylene	ND	100	ND	10	ND	10	ND	10	ND	10
☐ 1,1,2-Trichloroethane	ND	100	ND	10	ND	10	ND	10	ND	10
OTHER *(Specify)*										
Sample ID	Bldg 31-10 (15-17)		Bldg 31-11 (14-16)		Bldg 31-11 (18-21')					
Sample Depth (feet BGS)	15-17		14-16		18-21					
Date Collected	11/12/96		11/12/96		11/12/96					
Date Extracted	12/09/96		12/09/96		12/09/96					
Date Analyzed	12/09/96		12/09/96		12/09/96					
Analytical Method No.	GC/FID or 8015m		GC/FID or 8015m		GC/FID or 8015m					
Collection Method*	GP		GP		GP					
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Ethylene Glycol	ND	5000	ND	5000	ND	5000				
☐ Propylene Glycol	ND	5000	ND	5000	ND	5000				
☐										
☐										
☐										
☐										
☐										

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

(Continued page 4 of 4)
LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

Other: SEMI-VOLATILE ORGANICS										
Sample ID	Bldg 31-10 (15-17)		Bldg 31-11 (14-16)		Bldg 31-11 (18-21')					
Sample Depth (feet BGS)	15-17		14-16		18-21					
Date Collected	11/13/96		11/13/96		11/13/96					
Date Extracted	11/20/96		11/20/96		11/20/96					
Date Analyzed	11/20/96		11/20/96		11/20/96					
Analytical Method No.	8270		8270		8270					
Collection Method*	GP		GP		GP					
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ p,m-Cresol	ND	10	ND	10	ND	10				
☐ o-Cresol	ND	10	ND	10	ND	10				
☐ Di-n-butyl phthalate	ND	10	ND	10	ND	10				
☐ Di-n-octyl phthalate	ND	10	ND	10	ND	10				
OTHER *(Specify)*										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐										
☐										
☐										
☐										
☐										
☐										
☐										

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	SB2/MW2 (7-9')		SB2/MW2 (17-19')		SB3/MW3 (13-15')		SB3/MW3 (19-21')		SB4/MW4 (19-21')	
Sample Depth (feet BGS)	7-9		17-19		13-15		19-21		19-21	
Date Collected	06/04/97		06/04/97		06/04/97		06/04/97		06/05/97	
Date Extracted	06/12/97		06/12/97		06/12/97		06/12/97		06/12/97	
Date Analyzed	06/12/97		06/12/97		06/12/97		06/12/97		06/12/97	
Analytical Method No.	8260		8260		8260		8260		8260	
Collection Method*	SS		SS		SS		SS		SS	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	ND	100	200	100	ND	1000	ND	10	ND	10
☐ Toluene	100	100	1900	100	51,000	1000	80	10	ND	10
☐ Ethylbenzene	100	100	2900	100	19,000	1000	ND	10	ND	10
☐ Total Xylenes	400	100	7500	100	73,000	1000	ND	10	ND	10
☐ MTBE										
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	SB2/MW2 (7-9')		SB2/MW2 (17-19')		SB3/MW3 (13-15')		SB3/MW3 (19-21')		SB4/MW4 (19-21')	
Sample Depth (feet BGS)	7-9		17-19		13-15		19-21		19-21	
Date Collected	06/04/97		06/04/97		06/04/97		06/04/97		06/05/97	
Date Extracted	06/12/97		06/12/97		06/12/97		06/12/97		06/12/97	
Date Analyzed	06/12/97		06/12/97		06/12/97		06/12/97		06/12/97	
Analytical Method No.	8270		8270		8260		8260		8270	
Collection Method*	SS		SS		SS		SS		SS	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Acenaphthylene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Anthracene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Benzo(a)anthracene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Benzo(a)pyrene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Benzo(b)fluoranthene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Benzo(g,h,i)perylene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Benzo(k)fluoranthene	ND	330	ND	330	ND	330	ND	330	ND	330

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

(Continued page 2 of 4)
LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	SB2/MW2 (7-9')		SB2/MW2 (17-19')		SB3/MW3 (13-15')		SB3/MW3 (19-21')		SB4/MW4 (19-21')	
Sample Depth (feet BGS)	7-9		17-19		13-15		19-21		19-21	
Date Collected	06/04/97		06/04/97		06/04/97		06/04/97		06/05/97	
Date Extracted	06/12/97		06/12/97		06/12/97		06/12/97		06/12/97	
Date Analyzed	06/12/97		06/12/97		06/12/97		06/12/97		06/12/97	
Analytical Method No.	8270		8270		8260		8260		8270	
Collection Method*	SS		SS		SS		SS		SS	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Chrysene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Dibenzo(a,h)anthracene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Fluoranthene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Fluorene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Indeno(1,2,3- cd)pyrene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Naphthalene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ 2-Methylnaphthalene	420	330	ND	330	ND	330	ND	330	ND	330
☐ Phenanthrene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Pyrene	ND	330	ND	330	ND	330	ND	330	ND	330
METALS										
Sample ID	SB2/MW2 (7-9')		SB2/MW2 (17-19')		SB3/MW3 (13-15')		SB3/MW3 (19-21')		SB4/MW4 (19-21')	
Sample Depth (feet BGS)	7-9		17-19		13-15		19-21		19-21	
Date Collected	06/04/97		06/04/97		06/04/97		06/04/97		06/05/97	
Date Extracted	06/12/97		06/12/97		06/12/97		06/12/97		06/12/97	
Date Analyzed	06/12/97		06/12/97		06/12/97		06/12/97		06/12/97	
Analytical Method No.	6020		6020		6020		6020		6020	
Collection Method*	SS		SS		SS		SS		SS	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Cadmium										
☐ Total Chromium										
☐ Total Lead	5200	1000	4400	1000	1300	1000	5900	1000	3500	1000

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

(Continued page 4 of 4)
LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

HALOGENATED HYDROCARBONS										
Sample ID	SB2/MW2 (7-9')		SB2/MW2 (17-19')		SB3/MW3 (13-15')		SB3/MW3 (19-21')		SB4/MW4 (19-21')	
Sample Depth (feet BGS)	7-9		17-19		13-15		19-21		19-21	
Date Collected	06/04/97		06/04/97		06/04/97		06/04/97		06/05/97	
Date Extracted	06/12/97		06/12/97		06/12/97		06/12/97		06/12/97	
Date Analyzed	06/12/97		06/12/97		06/12/97		06/12/97		06/12/97	
Analytical Method No.	8010		8010		8010		8010		8010	
Collection Method*	SS		SS		SS		SS		SS	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ cis-1,2-Dichloroethylene	ND	100	ND	10	ND	1000	ND	10	ND	10
☐ trans-1,2- Dichloroethylene	ND	100	ND	10	ND	1000	ND	10	ND	10
☐ Tetrachloroethylene	ND	100	ND	10	ND	1000	ND	10	ND	10
☐ 1,1,2-Trichloroethane	ND	100	ND	10	ND	1000	ND	10	ND	10
OTHER *(Specify)*										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐										
☐										
☐										
☐										
☐										
☐										
☐										

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	SB4/MW4 (19-21')									
Sample Depth (feet BGS)	19-21									
Date Collected	06/05/97									
Date Extracted	06/12/97									
Date Analyzed	06/12/97									
Analytical Method No.	8260									
Collection Method*	SS									
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	ND	10								
☐ Toluene	ND	10								
☐ Ethylbenzene	ND	10								
☐ Total Xylenes	ND	10								
☐ MTBE										
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	SB4/MW4 (19-21')									
Sample Depth (feet BGS)	19-21									
Date Collected	06/05/97									
Date Extracted	06/12/97									
Date Analyzed	06/12/97									
Analytical Method No.	8270									
Collection Method*	SS									
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene	ND	330								
☐ Acenaphthylene	ND	330								
☐ Anthracene	ND	330								
☐ Benzo(a)anthracene	ND	330								
☐ Benzo(a)pyrene	ND	330								
☐ Benzo(b)fluoranthene	ND	330								
☐ Benzo(g,h,i)perylene	ND	330								
☐ Benzo(k)fluoranthene	ND	330								

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

(Continued page 2 of 4)
LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	SB4/MW4 (19-21')									
Sample Depth (feet BGS)	19-21									
Date Collected	06/05/97									
Date Extracted	06/12/97									
Date Analyzed	06/12/97									
Analytical Method No.	8270									
Collection Method*	SS									
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Chrysene	ND	330								
☐ Dibenzo(a,h)anthracene	ND	330								
☐ Fluoranthene	ND	330								
☐ Fluorene	ND	330								
☐ Indeno(1,2,3- cd)pyrene	ND	330								
☐ Naphthalene	ND	330								
☐ 2-Methylnaphthalene	ND	330								
☐ Phenanthrene	ND	330								
☐ Pyrene	ND	330								
METALS										
Sample ID	SB4/MW4 (19-21')									
Sample Depth (feet BGS)	19-21									
Date Collected	06/05/97									
Date Extracted	06/12/97									
Date Analyzed	06/12/97									
Analytical Method No.	6020									
Collection Method*	SS									
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Cadmium										
☐ Total Chromium										
☐ Total Lead	4100	1000								

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

(Continued page 3 of 4)
LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

PCBs										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Aroclor 1016										
☐ Aroclor 1221										
☐ Aroclor 1232										
☐ Aroclor 1242										
☐ Aroclor 1248										
☐ Aroclor 1254										
☐ Aroclor 1280										
HALOGENATED HYDROCARBONS										
Sample ID	SB4/MW4 (19-21')									
Sample Depth (feet BGS)	19-21									
Date Collected	06/05/97									
Date Extracted	06/12/97									
Date Analyzed	06/12/97									
Analytical Method No.	8010									
Collection Method*	SS									
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzyl Chloride	ND	10								
☐ Carbon Tetrachloride	ND	10								
☐ 1,1-Dichloroethane	ND	10								
☐ 1,2-Dichloroethane	ND	10								
☐ 1,1-Dichloroethylene	ND	10								

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

BUILDING 31/HAMILTON AVENUE TANK FARM
SUMMARY REPORT (Continued)

(Continued page 4 of 4)
LABORATORY RESULTS SOIL
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

HALOGENATED HYDROCARBONS										
Sample ID	SB4/MW4 (19-21')									
Sample Depth (feet BGS)	19-21									
Date Collected	06/05/97									
Date Extracted	06/12/97									
Date Analyzed	06/12/97									
Analytical Method No.	8010									
Collection Method*	SS									
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ cis-1,2-Dichloroethylene	ND	10								
☐ trans-1,2- Dichloroethylene	ND	10								
☐ Tetrachloroethylene	ND	10								
☐ 1,1,2-Trichloroethane	ND	10								
OTHER *(Specify)*										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐										
☐										
☐										
☐										
☐										
☐										
☐										

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

ATTACHMENT 4

BUILDING 31/HAMILTON AVENUE TANK FARM
SUMMARY REPORT (Continued)

TIER I RBSL/TIER II OR TIER III SSTL COMPARISON TABLE FOR SOILS
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

☑ **Residential** ☐ **Commercial III** ☐ **Commercial IV** ☐ **Industrial**
Exposure Codes

Contaminant	Sample ID with Maximum Detected Concentration	Corresponding Sample Date	Maximum Detected Concentration (ug/kg)	Applicable Criterion (ug/kg)		
				Tier I Soil Leaching to Groundwater	Tier I Residential Direct Contact	Tier I Residential Infinite Source VSIC
VOLATILES						
☐ Benzene	SB2/MW2 (17-19')	06/04/97	200	100	88,000	9600
☐ Toluene	SB3/MW3 (13-15')	06/04/97	51,000	16,000	>620,000	2E+6
☐ Ethylbenzene	Bldg 31-8 (13-15')	07/31/96	31,700	1500	>380,000	6.7E+6
☐ Total Xylenes	Bldg 31-8 (13-15')	07/31/96	81,000	5600	>400,000	3.2E+7
☐ MTBE	NA					
POLYNUCLEAR AROMATICS						
☐ Acenaphthene			ND	300,000	76,000	5.7E+7
☐ Acenaphthylene			ND	520	1,500,000	ID
☐ Anthracene			ND	6,900,000	420,000,000	9.8E+8
☐ Benzo(a)anthracene			ND	E	14,000	ID
☐ Benzo(a)pyrene			ND	E	1400	ID
☐ Benzo(b)fluoranthene			ND	E	14,000	ID
☐ Benzo(g,h,i)perylene			ND	E	1,500,000	ID
☐ Benzo(k)fluoranthene			ND	E	140,000	ID
☐ Chrysene			ND	E	1,400,000	ID
☐ Dibenzo-(a,h)anthracene			ND	E	1400	ID
☐ Fluoranthene	Bldg 31-8 (13-15')	07/31/96	400	3,000,000	51,000,000	5.3E+8
☐ Fluorene	Bldg 31-8 (13-15')	07/31/96	300	390,000	51,000,000	8.9E+7
☐ Indeno(1,2,3- cd)pyrene			ND	E	14,000	ID
☐ Naphthalene	Bldg 31-8 (13-15')	07/31/96	3200	17,000	15,000,000	9.8E+6
☐ Phenanthrene	Bldg 31-8 (13-15')	07/31/96	500	12,000	1,500,000	ID
☐ Pyrene			ND	1,800,000	32,000,000	4.7E+8
☐ 2-Methylnaphthalene	Bldg 31-8 (13-15')	07/31/96	1500	5200	15,000,000	ID

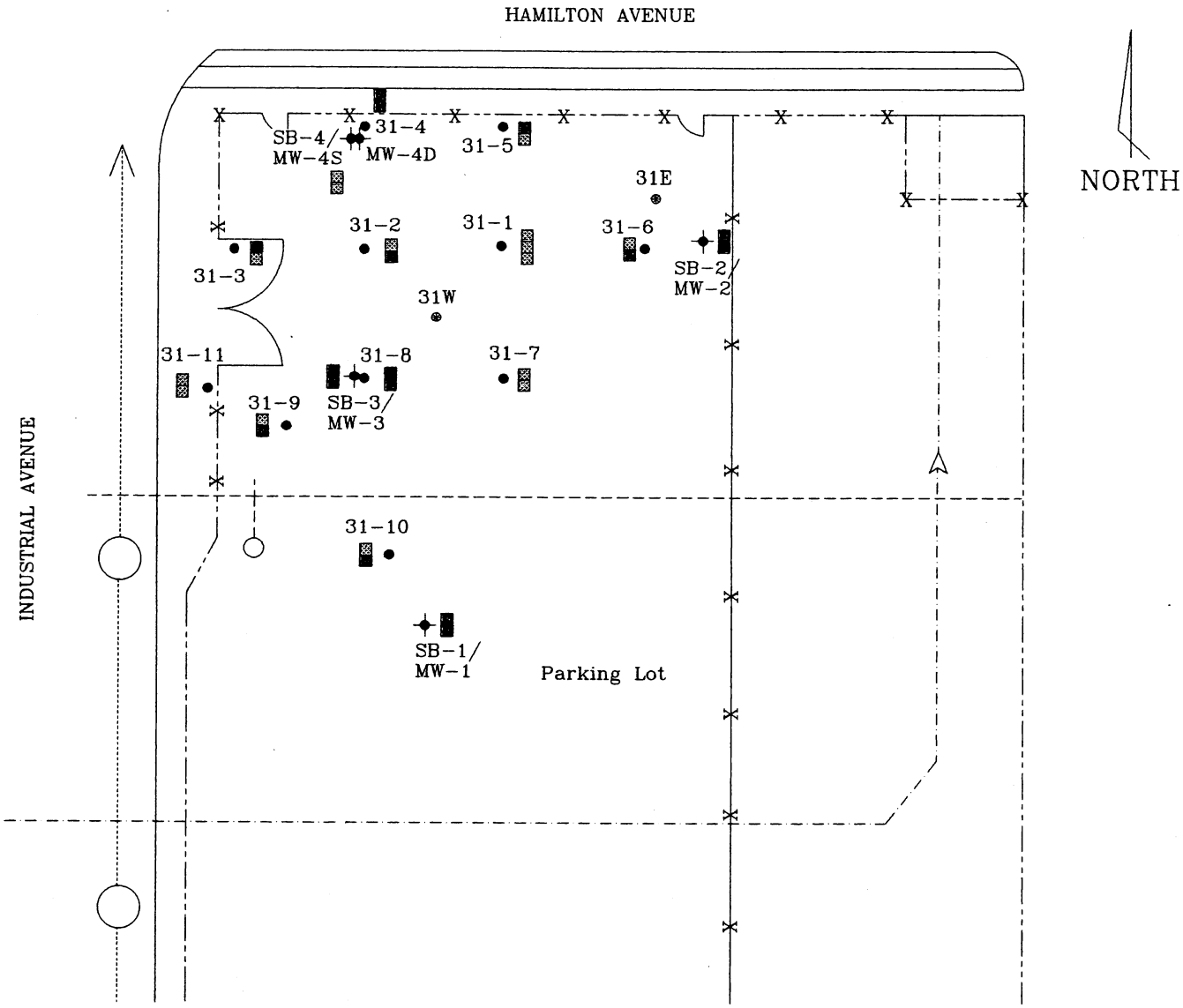
Shading indicates concentration exceeds one or more Tier I RBSLs
"E" = Chemical, due to its physiochemical properties, is not expected to leach through soils to groundwater under most conditions
"ID" = Insufficient Data
"ND" = Non-Detect

BUILDING 31/HAMILTON AVENUE TANK FARM
SUMMARY REPORT (Continued)

TIER I RBSL/TIER II OR TIER III SSTL COMPARISON TABLE FOR SOILS
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

Contaminant	Sample ID with Maximum Detected Concentration	Corresponding Sample Date	Maximum Detected Concentration (ug/kg)	Applicable Criterion (ug/kg)		
				Tier I Soil Leaching to Groundwater	Tier I Residential Direct Contact	Tier I Residential Infinite Source VSIC
METALS						
☐ Cadmium						
☐ Chromium III						
☐ Chromium VI						
☐ Total Lead	Bldg 31-3 (13-15')	07/30/96	8400	21,000	400,000	ID
PCBs						
☐ Aroclor 1016						
☐ Aroclor 1221						
☐ Aroclor 1232						
☐ Aroclor 1242						
☐ Aroclor 1248						
HALOGENATED HYDROCARBONS						
☐ Carbon Tetrachloride			ND	100	20,000	2600
☐ 1,1-Dichloroethane			ND	18,000	>1,100,000	2.2E+7
☐ 1,2-Dichloroethane			ND	100	28,000	4400
☐ 1,1-Dichloroethylene			ND	140	110,000	830
☐ cis-1,2-Dichloroethylene			ND	1400	>1,000,000	2.9E+7
☐ trans-1,2-Dichloroethylene			ND	2000	1,900,000	2.0E+5
☐ Tetrachloroethylene			ND	100	50,000	1.3E+5
☐ 1,1,2-Trichloroethane			ND	100	45,000	5.2E+7
OTHER*						
☐ Benzyl Chloride	Bldg 31-8 (13-15')	07/31/96	2300	100	15,000	10,000
☐ Ehtlyene Glycol			ND	300,000	>10,000,000	ID
☐ Propylene Glycol	Bldg 31-7 (15-17')	07/31/96	5000	3,000,000	>10,000,000	ID
☐ p,m-Cresol	Bldg 31-8 (13-15')	07/31/96	1600	Not Available	Not Available	Not Available
☐ 0-Cresol	Bldg 31-8 (13-15')	07/31/96	1000	Not Available	Not Available	Not Available
☐ Di-n-butyl phthalate	Bldg 31-8 (13-15')	07/31/96	900	960,000	>2,300,000	4.9E+8
☐ Di-n-octyl phthalate	Bldg 31-8 (13-15')	07/31/96	400	100,000,000	>7,600,000	ID

ATTACHMENT 5

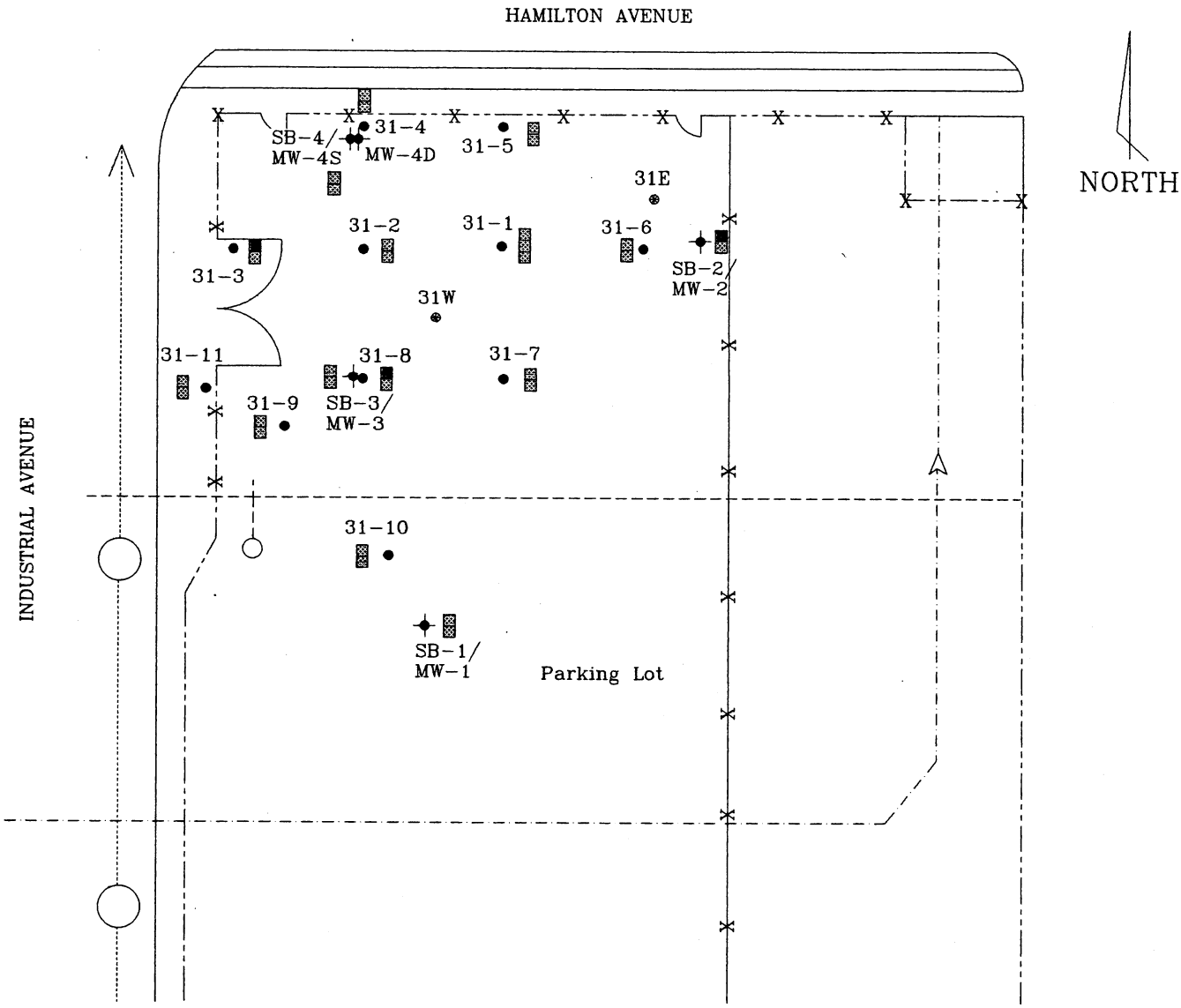


- Not Analyzed
- Not Detected
- Elevated levels below Tier I Industrial Soil Leaching to Groundwater RBSLs
- Elevated levels above Tier I Industrial Soil Leaching to Groundwater RBSLs

LEGEND:

- Monitoring Well Locations
- Geoprobe Sample Locations
- Fire Protection Line
- Storm Sewer Line
- 4" Process Waste
- Fence

GM-CLCD NORTH	
TITLE: SOIL CONCENTRATION MAP: BTEX BUILDING 31 TANKS 081/31T - 091/31T	
DATE: 8/13/96	SCALE: 1"=40'
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 5A
	PROJECT NUMBER: F174



- Not Analyzed
- Not Detected
- Elevated levels below Tier I Industrial Soil Leaching to Groundwater RBSLs
- Elevated levels above Tier I Industrial Soil Leaching to Groundwater RBSLs

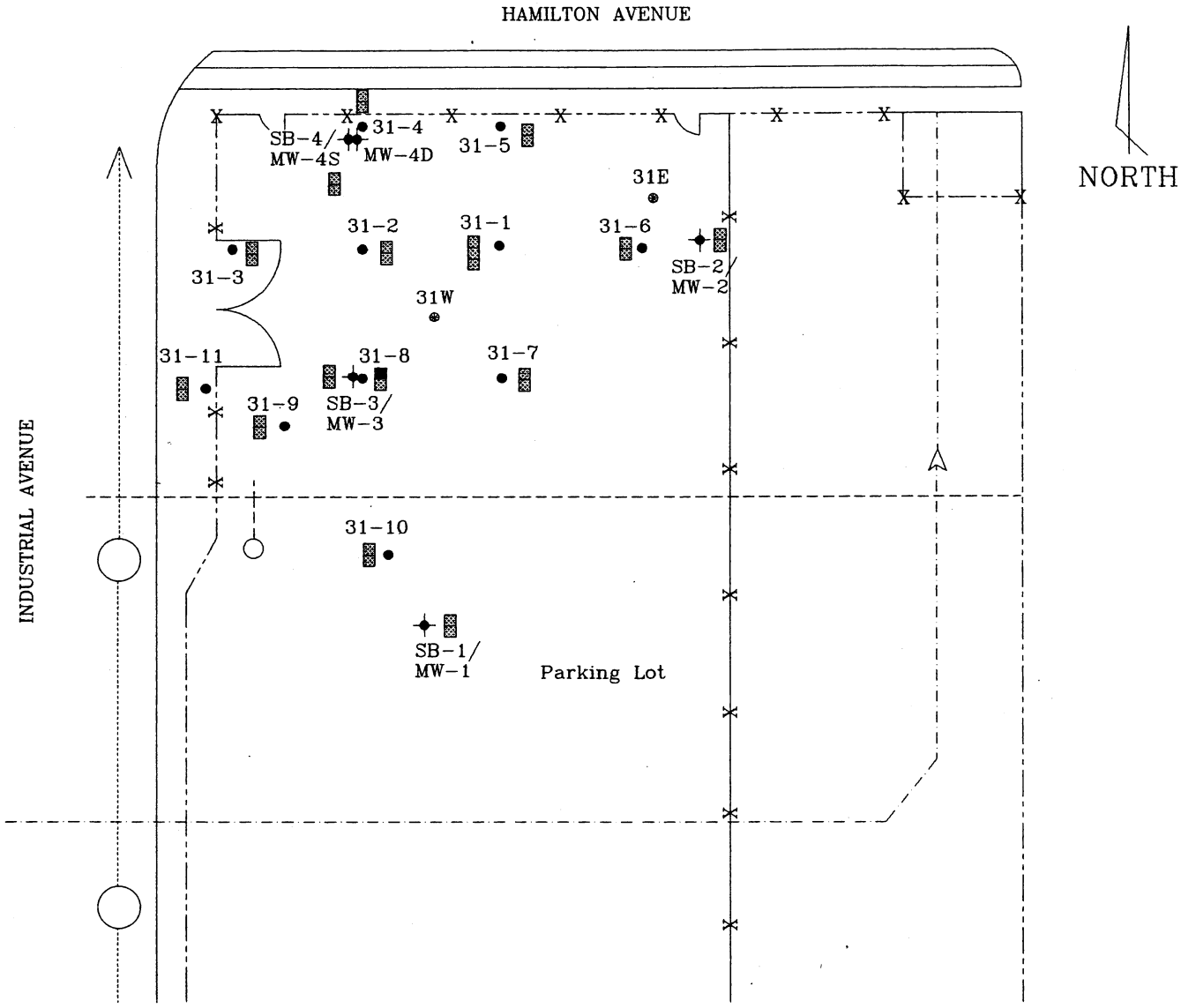
LEGEND:

- Monitoring Well Locations
- Geoprobe Sample Locations
- Fire Protection Line
- Storm Sewer Line
- 4" Process Waste
- Fence

GM-CLCD NORTH

TITLE: SOIL CONCENTRATION MAP: PNAHs
BUILDING 31
TANKS 081/31T - 091/31T

DATE: 8/13/96	SCALE: 1"=40'
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 5B
	PROJECT NUMBER: F174

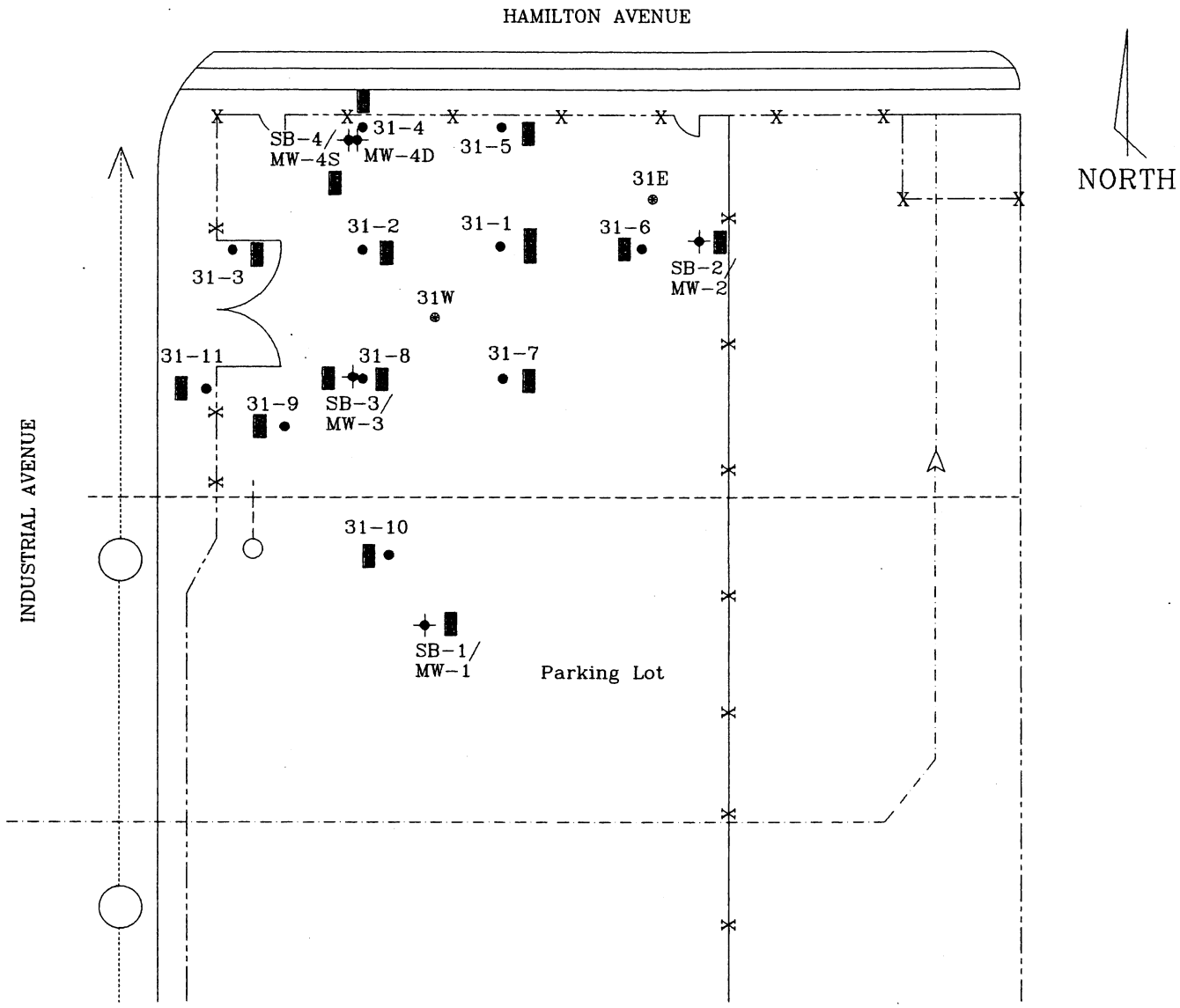


- Not Analyzed
- Not Detected
- Elevated levels below Tier I Industrial Soil Leaching to Groundwater RBSLs
- Elevated levels above Tier I Industrial Soil Leaching to Groundwater RBSLs

LEGEND:

- Monitoring Well Locations
- Geoprobe Sample Locations
- Fire Protection Line
- Storm Sewer Line
- 4" Process Waste
- Fence

GM-CLCD NORTH	
TITLE: SOIL CONCENTRATION MAP: HALOGENATED HYDROCARBONS, BUILDING 31 TANKS 081/31T - 091/31T	
DATE: 8/13/96	SCALE: 1"=40'
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 5C
	PROJECT NUMBER: F174



- □ Not Analyzed
- ▩ Not Detected
- ■ Elevated levels below Tier I Industrial Soil Leaching to Groundwater RBSLs
- ■ Elevated levels above Tier I Industrial Soil Leaching to Groundwater RBSLs

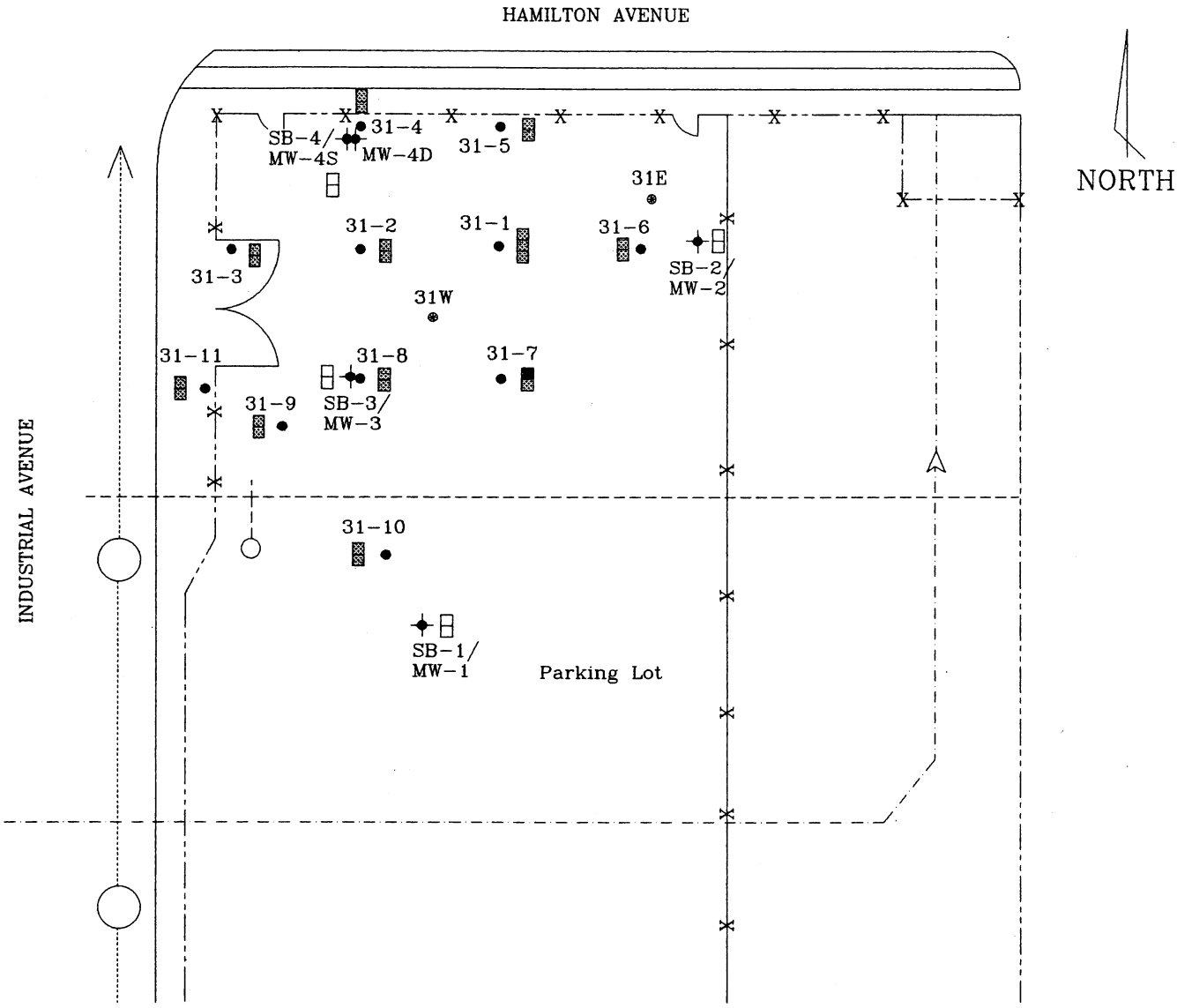
LEGEND:

- ✦ Monitoring Well Locations
- ● Geoprobe Sample Locations
- ---- Fire Protection Line
- ····· Storm Sewer Line
- —·—·— 4" Process Waste
- —✱— Fence

GM-CLCD NORTH

TITLE: SOIL CONCENTRATION MAP: LEAD
BUILDING 31
TANKS 081/31T - 091/31T

DATE: 8/13/96	SCALE: 1"=40'
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 5D
	PROJECT NUMBER: F174



- □ Not Analyzed
- ▩ Not Detected
- ■ Elevated levels below Tier I Industrial Soil Leaching to Groundwater RBSLs
- ■ Elevated levels above Tier I Industrial Soil Leaching to Groundwater RBSLs

LEGEND:

- ✦ Monitoring Well Locations
- ● Geoprobe Sample Locations
- ---- Fire Protection Line
- ····· Storm Sewer Line
- —·—·— 4" Process Waste
- —✱— Fence

GM-CLCD NORTH

TITLE: SOIL CONCENTRATION MAP: GLYCOL BUILDING 31 TANKS 081/31T - 091/31T

DATE: 8/13/96	SCALE: 1"=40'
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 5E
	PROJECT NUMBER: F174

ATTACHMENT 6

Global Environmental Engineering, Inc.
352 South Saginaw St., Suite 600
Flint, Michigan 48502
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	SB-1/MW-1	**Project:**	**GM - Building 31**
Date:	6/4/97	**Project #:**	F329
Drilling Contractor:	GEEI	**Location:**	
Prepared By:	JCW	**Twp/Sec.:**	
Time Started:	8:30	**Depth Drilled:**	27
Time Completed:		**Hole Diameter:**	8.25"
Length Coring Device:	4'	**Coring Device:**	4.5"
		Fluid Used:	None
		Driller:	Norm
		Helper:	Ash
		Weight/Drop:	140#/30"

Boring Methods		**Groundwater Information**	
X	**Hollow Stem Auger**	**GW Encountered at**	
	Hand Auger	**Monitor Wells Installed**	
	Geoprobe	**Yes** X	**No**

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	OVA	GC
	SS		CL	Silty Clay	Gray, Moist, No Fractures		
	SS	24.			1" Sand Lens		
	SS					400.0	
	SS	25.					
	SS		SP	Sand	Wet, Medium/Coarse		
	SS	26.					
	SS					840.0	
	SS	27.		Silty Sand	Fine		
			E.O.B.	End of Boring 27'			
		28.					
		29.					
		30.					
		31.					
		32.					
		33.					
		34.					
		35.					
		36.					
		37.					
		38.					
		39.					
		40.					
		41.					
		42.					
		43.					
		44.					
		45.					
		46.					

SS-Split Spoon
NR-No Recovery
HA-Hand Auger Sample
[X]-Laboratory/Jar Sample
PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)
AL-Acetate Liner
FS-Field Screening Container

Global Environmental Engineering, Inc.
5467 Hill 23 Dr., Suite B
Flint, Michigan 48507
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	SB-2/MW-2	**Project:**	**GM - Building 31**
Date:	6/4/97	**Project #:**	F329
Drilling Contractor:	GEEI	**Location:**	
Prepared By:	JCW	**Twp/Sec.:**	
Time Started:	11:45	**Depth Drilled:**	19'
Time Completed:		**Hole Diameter:**	8.25"
Length Coring Device:	4'	**Coring Device:**	4.5"

Boring Methods		**Groundwater Information**		
X	**Hollow Stem Auger**	**GW Encountered at**	**Fluid Used:**	None
	Hand Auger	**Monitor Wells Installed**	**Driller:**	Norm
	Geoprobe	**Yes X No**	**Helper:**	Ash
			Weight/Drop:	140lb/30"

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	FID	GC
				Asphalt	Approximately 8"		
		1.					
	SS		SP	Sand	Brown, Moist, Fine/Medium		
	SS	2.					
	SS						
	SS	3.				3.0	
	SS						
	SS	4.					
	SS						
	SS	5.				3.0	
	SS						
	SS	6.					
	SS						
	SS	7.				5.0	
	SS-[X]						
	SS-[X]	8.			Wet		
	SS-[X]				Black		
	SS-[X]	9.	CL	Silty Clay	Brown, Moist, No Fractures	>1000	
	SS						
	SS	10.			Gray, Trace of Gravel		
	SS						
	SS	11.				720.0	
	SS						
	SS	12.					
	SS						
	SS	13.			3" Gray Sand Lens, Wet	52.0	
	SS				2" Sand Lens, Wet		
	SS	14.					
	SS						
	SS	15.				32.0	
	SS				Gray, Moist, No Fractures, 2" Silt Lens, Wet		
	SS	16.					
	SS					34.0	
	SS	17.					
	SS-[X]						
	SS-[X]	18.					
	SS-[X]					34.0	
	SS-[X]	19.					
			E.O.B.	End of Boring 19'			
		20.					
		21.					
		22.					
		23.					

SS-Split Spoon	HA-Hand Auger Sample	PID-Photoionization Detector (ppm)	AL-Acetate Liner
NR-No Recovery	[X]-Laboratory/Jar Sample	GC-Gas Chromatograph (ppb)	FS-Field Screening Container

Global Environmental Engineering, Inc.
5467 Hill 23 Dr., Suite B
Flint, Michigan 48507
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	SB-3/MW-3	**Project:**	**GM - Building 31**
Date:	6/4/97	**Project #:**	F329
Drilling Contractor:	GEEI	**Location:**	
Prepared By:	JCW	**Twp/Sec.:**	
Time Started:	16:15	**Depth Drilled:**	21'
Time Completed:		**Hole Diameter:**	8.25"
Length Coring Device:	4'	**Coring Device:**	4.5"

Boring Methods		**Groundwater Information**		
X	**Hollow Stem Auger**	**GW Encountered at**	**Fluid Used:**	None
	Hand Auger	**Monitor Wells Installed**	**Driller:**	Norm
	Geoprobe	**Yes X No**	**Helper:**	Ash
			Weight/Drop:	140lb/30"

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	FID	GC
				Asphalt			
		1.					
	SS		SP	Sand	Brown, Moist, Fine/Medium		
	SS	2.					
	SS						
	SS	3.				6.0	
	SS						
	SS	4.	CL	Silty Clay	Brown/Gray, Fractures		
	SS						
	SS	5.				22.0	
	SS						
	SS	6.					
	SS						
	SS	7.				200.0	
	SS						
	SS	8.					
	SS				3" Sand Lens, Wet		
	SS	9.			2" Sand Lens, Wet	>1000	
	SS						
	SS	10.					
	SS						
	SS	11.			Gray, No Fractures	260.0	
	SS						
	SS	12.					
	SS						
	SS	13.				26.0	
	SS		SP	Sand	Wet, Fine/Medium		
	SS	14.					
	SS						
	SS	15.	CL	Silty Clay	Moist	>1000	
	SS-[X]		SP	Sand	Gray, Wet		
	SS-[X]	16.					
	SS-[X]					>1000	
	SS-[X]	17.	CL	Silty Clay	Moist		
	SS						
	SS	18.					
	SS					100.0	
	SS	19.					
	SS-[X]						
	SS-[X]	20.					
	SS-[X]					56.0	
	SS-[X]	21.					
			E.O.B.	End of Boring 21'			
		22.					
		23.					

SS-Split Spoon	HA-Hand Auger Sample	PID-Photoionization Detector (ppm)	AL-Acetate Liner
NR-No Recovery	[X]-Laboratory/Jar Sample	GC-Gas Chromatograph (ppb)	FS-Field Screening Container

Global Environmental Engineering, Inc.
5467 Hill 23 Dr., Suite B
Flint, Michigan 48507
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	SB-4/MW-4S	**Project:**	**GM - Building 31**
Date:	6/5/97	**Project #:**	F329
Drilling Contractor:	GEEI	**Location:**	
Prepared By:	JCW	**Twp/Sec.:**	
Time Started:	8:20	**Depth Drilled:**	21'
Time Completed:		**Hole Diameter:**	8.25"
Length Coring Device:	4'	**Coring Device:**	4.5"

Boring Methods		**Groundwater Information**		
X	**Hollow Stem Auger**	**GW Encountered at**	**Fluid Used:**	None
	Hand Auger	**Monitor Wells Installed**	**Driller:**	Norm
	Geoprobe	**Yes** X **No**	**Helper:**	Ash
			Weight/Drop:	140lb/30"

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	FID	GC
				Asphalt	Approximately 9"		
		1.					
	SS		SP	Sand	Brown, Moist, Fine/Medium		
	SS	2.					
	SS						
	SS	3.				3.0	
	SS						
	SS	4.	CL	Silty Clay	Brown/Gray, Fractures		
	SS						
	SS	5.				ND	
	SS						
	SS	6.					
	SS						
	SS	7.				1.0	
	SS						
	SS	8.			Wet		
	SS						
	SS	9.				3.0	
	SS						
	SS	10.					
	SS						
	SS	11.				28.0	
	SS						
	SS	12.					
	SS						
	SS	13.				720.0	
	SS						
	SS	14.					
	SS				Black		
	SS	15.				>1000	
	SS						
	SS	16.					
	SS		CL	Silty Clay	Gray, Moist, No Fractures		
	SS-[X]	17.				>1000	
	SS						
	SS	18.					
	SS						
	SS	19.				300.0	
	SS						
	SS	20.					
	SS						
	SS-[X]	21.				180.0	
			E.O.B.	End of Boring 21'			
		22.					
		23.					

SS-Split Spoon	HA-Hand Auger Sample	PID-Photoionization Detector (ppm)	AL-Acetate Liner
NR-No Recovery	[X]-Laboratory/Jar Sample	GC-Gas Chromatograph (ppb)	FS-Field Screening Container

Global Environmental Engineering, Inc.
5467 Hill 23 Dr., Suite B
Flint, Michigan 48507
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	SB-4/MW-4D	**Project:**	**GM - Building 31**
Date:	6/5/97	**Project #:**	F329
Drilling Contractor:	GEEI	**Location:**	
Prepared By:	JCW	**Twp/Sec.:**	
Time Started:	9:40	**Depth Drilled:**	21'
Time Completed:		**Hole Diameter:**	8.25"
Length Coring Device:	4'	**Coring Device:**	4.5"
		Fluid Used:	None
		Driller:	Norm
		Helper:	Ash
		Weight/Drop:	140lb/30"

Boring Methods		**Groundwater Information**
X	**Hollow Stem Auger**	**GW Encountered at**
	Hand Auger	**Monitor Wells Installed**
	Geoprobe	**Yes** X **No**

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	FID	GC
				Asphalt	Approximately 9"		
		1.					
	SS		SP	Sand	Brown, Moist, Fine/Medium		
	SS	2.					
	SS						
	SS	3.				3.0	
	SS						
	SS	4.	CL	Silty Clay	Brown/Gray, Fractures		
	SS						
	SS	5.				ND	
	SS						
	SS	6.					
	SS						
	SS	7.				1.0	
	SS						
	SS	8.			Wet		
	SS						
	SS	9.				3.0	
	SS						
	SS	10.					
	SS						
	SS	11.				28.0	
	SS						
	SS	12.					
	SS						
	SS	13.				720.0	
	SS						
	SS	14.					
	SS				Black		
	SS	15.				>1000	
	SS						
	SS	16.					
	SS		CL	Silty Clay	Gray, Moist, No Fractures		
	SS-[X]	17.				>1000	
	SS						
	SS	18.					
	SS						
	SS	19.				300.0	
	SS						
	SS	20.					
	SS						
	SS-[X]	21.				180.0	
			E.O.B.	End of Boring 21'			
		22.					
		23.					

SS-Split Spoon	HA-Hand Auger Sample	PID-Photoionization Detector (ppm)	AL-Acetate Liner
NR-No Recovery	[X]-Laboratory/Jar Sample	GC-Gas Chromatograph (ppb)	FS-Field Screening Container

ATTACHMENT 7

BUILDING 31/HAMILTON AVENUE TANK FARM
SUMMARY REPORT (Continued)

LABORATORY RESULTS GROUNDWATER
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	Bldg 31 - 1		Bldg 31 - 2		Bldg 31 - 4		Bldg 31 -5		Bldg 31 - 6	
Sample Depth (feet BGS)	-		-		-		-		-	
Date Collected	7/31/96		7/31/96		7/31/96		7/31/96		7/31/96	
Date Extracted	8/02/96		8/02/96		8/02/96		8/02/96		8/06/96	
Date Analyzed	8/02/96		8/02/96		8/02/96		8/02/96		8/06/96	
Collection Method*	GP		GP		GP		GP		GP	
Analytical Method No.	602		602		602		602		8260	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	1	1	2	1	60	10	8	1	ND	1
☐ Toluene	3	1	5	1	ND	10	2	1	ND	1
☐ Ethylbenzene	3	1	8	1	20	10	2	1	ND	1
☐ Total Xylenes	15	1	29	1	110	10	11	1	ND	1
☐ MTBE										
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	Bldg 31 - 1		Bldg 31 - 2		Bldg 31 - 4		Bldg 31 -5		Bldg 31 - 6	
Sample Depth (feet BGS)	-		-		-		-		-	
Date Collected	7/31/96		7/31/96		7/31/96		7/31/96		7/31/96	
Date Extracted	8/01/96		8/01/96		8/01/96		8/01/96		8/01/96	
Date Analyzed	8/06/96		8/06/96		8/06/96		8/06/96		8/06/96	
Collection Method*	GP		GP		GP		GP		GP	
Analytical Method No.	8270		8270		8270		8270		8270	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene	ND	10	ND	10	ND	10	ND	1	ND	1
☐ Acenaphthylene	ND	10	ND	10	ND	10	ND	1	ND	1
☐ Anthracene	ND	10	ND	10	ND	10	ND	1	ND	1
☐ Benzo(a)anthracene	ND	10	ND	10	ND	10	ND	1	ND	1
☐ Benzo(a)pyrene	ND	10	ND	10	ND	10	ND	1	ND	1
☐ Benzo(b)fluoranthene	ND	10	ND	10	ND	10	ND	1	ND	1
☐ Benzo(g,h,i)perylene	ND	10	ND	10	ND	10	ND	1	ND	1
☐ Benzo(k)fluoranthene	ND	10	ND	10	ND	10	ND	1	ND	1
☐ Chrysene	ND	10	ND	10	ND	10	ND	1	ND	1
☐ Dibenzo(a,h)anthracene	ND	10	ND	10	ND	10	ND	1	ND	1

LABORATORY RESULTS GROUNDWATER
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	Bldg 31 - 1		Bldg 31 - 2		Bldg 31 - 4		Bldg 31 -5		Bldg 31 - 6	
Sample Depth (feet BGS)	-		-		-		-		-	
Date Collected	7/31/96		7/31/96		7/31/96		7/31/96		7/31/96	
Date Extracted	8/01/96		8/01/96		8/02/96		8/02/96		8/06/96	
Date Analyzed	8/06/96		8/06/96		8/06/96		8/06/96		8/06/96	
Collection Method*	GP		GP		GP		GP		GP	
Analytical Method No.	8270		8270		8270		8270		8270	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Fluoranthene	ND	10	ND	10	ND	10	ND	1	ND	1
☐ Fluorene	ND	10	ND	10	ND	10	ND	1	ND	1
☐ Indeno(1,2,3- cd)pyrene	ND	10	ND	10	ND	10	ND	1	ND	1
☐ Naphthalene	ND	10	ND	10	**20**	10	ND	1	ND	1
☐ 2-Methylnaphthalene	ND	10	ND	10	ND	10	ND	1	ND	1
☐ Phenanthrene	ND	10	ND	10	ND	10	ND	1	ND	1
☐ Pyrene	ND	10	ND	10	ND	10	ND	1	ND	1
METALS - FILTERED										
Sample ID	Bldg 31 - 1		Bldg 31 - 2		Bldg 31 - 4		Bldg 31 -5		Bldg 31 - 6	
Sample Depth (feet BGS)	-		-		-		-		-	
Date Collected	7/31/96		7/31/96		7/31/96		7/31/96		7/31/96	
Date Extracted	8/08/96		8/08/96		8/08/96		8/08/96		8/08/96	
Date Analyzed	8/08/96		8/08/96		8/08/96		8/08/96		8/08/96	
Collection Method*	GP		GP		GP		GP		GP	
Analytical Method No.	200.8		200.8		200.8		200.8		200.8	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Cadmium										
☐ Total Chromium										
☐ Total Lead	ND	3	ND	3	ND	3	ND	3	ND	3

(Continued Page 3 of 4)
LABORATORY RESULTS GROUNDWATER
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)_
FACILITY NUMBER: 0-002763

Glycols										
Sample ID	Bldg 31 - 1		Bldg 31 - 2		Bldg 31 - 4		Bldg 31 -5		Bldg 31 - 6	
Sample Depth (feet BGS)	-		-		-		-		-	
Date Collected	7/31/96		7/31/96		7/31/96		7/31/96		7/31/96	
Date Extracted	8/06/96		8/06/96		8/06/96		8/06/96		8/06/96	
Date Analyzed	8/09/96		8/09/96		8/09/96		8/09/96		8/09/96	
Collection Method*	GP		GP		GP		GP		GP	
Analytical Method No.	624/8260M		624/8260M		624/8260M		624/8260M		624/8260M	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Ethylene Glycol	ND	500	ND	500	ND	500	ND	500	ND	500
☐ Propylene Glycol	ND	500	ND	500	ND	500	ND	500	ND	500
☐										
☐										
☐										
☐										
☐										
HALOGENATED HYDROCARBONS										
Sample ID	Bldg 31 - 1		Bldg 31 - 2		Bldg 31 - 4		Bldg 31 - 5		Bldg 31 - 6	
Sample Depth (feet BGS)	-		-		-		-		-	
Date Collected	7/30/96		7/30/96		7/30/96		7/30/96		7/30/96	
Date Extracted	8/02/96		8/02/96		8/02/96		8/02/96		8/10/96	
Date Analyzed	8/02/96		8/02/96		8/02/96		8/02/96		8/10/96	
Collection Method*	GP		GP		GP		GP		GP	
Analytical Method No.	601		601		601		601		601	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Carbon Tetrachloride	ND	1	ND	10	ND	10	ND	10	ND	1
☐ 1,1-Dichloroethane	ND	1	ND	10	ND	10	ND	10	ND	1
☐ 1,2-Dichloroethane	ND	1	ND	10	ND	10	ND	10	ND	1
☐ 1,1-Dichloroethylene	ND	1	ND	10	ND	10	ND	10	ND	1
☐ cis-1,2-Dichloroethylene	ND	1	ND	10	ND	10	ND	10	ND	1
☐ trans-1,2- Dichloroethylene	ND	1	ND	10	ND	10	ND	10	ND	1

(Continued Page 4 of 4)
LABORATORY RESULTS GROUNDWATER
FACILITY NAME: NAO FLINT OPERATIONS
(BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

HALOGENATED HYDROCARBONS (Cont.)										
☐ Tetrachloroethylene	ND	1	ND	10	ND	10	ND	10	ND	1
☐ Trichloroethylene	ND	1	ND	10	ND	10	ND	10	ND	1
☐ 1,1,2-Trichloroethane	ND	1	ND	10	ND	10	ND	10	ND	1
☐ Vinyl Chloride	ND	1	ND	10	ND	10	ND	10	ND	1
OTHER *(Specify)*										
Sample ID	Bldg 31 - 1		Bldg 31 - 2		Bldg 31 - 4		Bldg 31 - 5		Bldg 31 - 6	
Sample Depth (feet BGS)	-		-		-		-		-	
Date Collected	7/30/96		7/30/96		7/30/96		7/30/96		7/30/96	
Date Extracted	8/06/96		8/06/96		8/06/96		8/06/96		8/06/96	
Date Analyzed	8/06/96		8/06/96		8/06/96		8/06/96		8/06/96	
Collection Method*	GP		GP		GP		GP		GP	
Analytical Method No.	8270		8270		8270		8270		8270	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Di-n-butyl phthalate	ND	10	ND	10	10	10	ND	10	20	10
☐										
☐										
☐										
☐										
☐										
☐										
☐										
☐										
☐										
☐										
☐										
☐										

LABORATORY RESULTS GROUNDWATER
FACILITY NAME: NAO FLINT OPERATIONS (BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	Bldg 31-8		Bldg 31 - W		Bldg 31 - E		Bldg 31 - N			
Sample Depth (feet BGS)	-		-		-		-			
Date Collected	7/31/96		7/24/96		7/24/96		7/24/96			
Date Extracted	8/09/96		7/28/96		7/28/96		7/28/96			
Date Analyzed	8/09/96		7/28/96		7/28/96		7/28/96			
Collection Method*	GP		Bailer		Bailer		Bailer			
Analytical Method No.	8260		8020		8020		8020			
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	600	1	ND	1	ND	1	ND	1		
☐ Toluene	149,000	1	ND	1	ND	1	ND	1		
☐ Ethylbenzene	7400	1	ND	1	ND	1	ND	1		
☐ Total Xylenes	57,600	1	ND	1	ND	1	ND	1		
☐ MTBE										
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	Bldg 31-8		Bldg 31 - W		Bldg 31 - E		Bldg 31 - N			
Sample Depth (feet BGS)	-		-		-		-			
Date Collected	7/31/96		7/24/96		7/24/96		7/24/96			
Date Extracted	8/06/96		7/26/96		7/26/96		7/26/96			
Date Analyzed	8/06/96		7/28/96		7/28/96		7/28/96			
Collection Method*	GP		Bailer		Bailer		Bailer			
Analytical Method No.	601		601		601		601			
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene	ND	10	ND	5	ND	5	ND	5		
☐ Acenaphthylene	ND	10	ND	5	ND	5	ND	5		
☐ Anthracene	ND	10	ND	5	ND	5	ND	5		
☐ Benzo(a)anthracene	ND	10	ND	5	ND	5	ND	5		
☐ Benzo(a)pyrene	ND	10	ND	5	ND	5	ND	5		
☐ Benzo(b)fluoranthene	ND	10	ND	5	ND	5	ND	5		
☐ Benzo(g,h,i)perylene	ND	10	ND	5	ND	5	ND	5		
☐ Benzo(k)fluoranthene	ND	10	ND	5	ND	5	ND	5		
☐ Chrysene	ND	10	ND	5	ND	5	ND	5		
☐ Dibenzo(a,h)anthracene	ND	10	ND	5	ND	5	ND	5		

(Continued Page 2 of 4)
LABORATORY RESULTS GROUNDWATER
FACILITY NAME: NAO FLINT OPERATIONS (BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	Bldg 31-8		Bldg 31 - W		Bldg 31 - E		Bldg 31 - N			
Sample Depth (feet BGS)	-		-		-		-			
Date Collected	7/31/96		7/24/96		7/24/96		7/24/96			
Date Extracted	8/06/96		7/26/96		7/26/96		7/26/96			
Date Analyzed	8/09/96		7/2996		7/2996		7/29/96			
Collection Method*	GP		Bailer		Bailer		Bailer			
Analytical Method No.	8270		8270		8270		8270			
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Fluoranthene	ND	10	ND	5	ND	5	ND	5		
☐ Fluorene	ND	10	ND	5	ND	5	ND	5		
☐ Indeno(1,2,3- cd)pyrene	ND	10	ND	5	ND	5	ND	5		
☐ Naphthalene	50	10	ND	5	ND	5	ND	5		
☐ 2-Methylnaphthalene	ND	10	ND	5	ND	5	ND	5		
☐ Phenanthrene	ND	10	ND	5	ND	5	ND	5		
☐ Pyrene	ND	10	ND	5	ND	5	ND	5		
METALS - FILTERED										
Sample ID	Bldg 31-8		Bldg 31 - W		Bldg 31 - E		Bldg 31 - N			
Sample Depth (feet BGS)	-		-		-		-			
Date Collected	7/31/96		7/24/96		7/24/96		7/24/96			
Date Extracted	8/06/96		7/26/96		7/26/96		7/26/96			
Date Analyzed	8/09/96		7/28/96		7/28/96		7/28/96			
Collection Method*	GP		Bailer		Bailer		Bailer			
Analytical Method No.	200.8		200.8		200.8		200.8			
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Cadmium										
☐ Total Chromium										
☐ Total Lead	ND	3	ND	3	ND	3	ND	3		

(Continued Page 3 of 4)
LABORATORY RESULTS GROUNDWATER
FACILITY NAME: NAO FLINT OPERATIONS (BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

Glycols										
Sample ID	31-8		Bldg 31 - W		Bldg 31 - E		Bldg 31 - N			
Sample Depth (feet BGS)	-		-		-		-			
Date Collected	07/31/96		7/24/96		7/24/96		7/24/96			
Date Extracted	08/06/96		7/26/96		7/26/96		7/26/96			
Date Analyzed	08/09/96		7/29/96		7/29/96		7/29/96			
Collection Method*	GP		Bailer		Bailer		Bailer			
Analytical Method No.	624/8260M		624/8260M		624/8260M		624/8260M			
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Ethylene Glycol	ND	500	ND	500	ND	500	ND	500		
☐ Propylene Glycol	ND	500	ND	500	ND	500	ND	500		
☐										
☐										
☐										
☐										
☐										
HALOGENATED HYDROCARBONS										
Sample ID	Bldg 31-8		Bldg 31 - W		Bldg 31 - E		Bldg 31 - N			
Sample Depth (feet BGS)	-		-		-		-			
Date Collected	7/31/96		7/24/96		7/24/96		7/24/96			
Date Extracted	8/06/96		7/26/96		7/26/96		7/26/96			
Date Analyzed	8/09/96		7/28/96		7/28/96		7/28/96			
Collection Method*	GP		Bailer		Bailer		Bailer			
Analytical Method No.	601		601		601		601			
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Carbon Tetrachloride	ND	10	ND	1	ND	1	ND	1		
☐ 1,1-Dichloroethane	ND	10	ND	1	ND	1	ND	1		
☐ 1,2-Dichloroethane	ND	10	ND	1	ND	1	ND	1		
☐ 1,1-Dichloroethylene	ND	10	ND	1	ND	1	ND	1		
☐ cis-1,2-Dichloroethylene	ND	10	ND	1	ND	1	ND	1		
☐ trans-1,2- Dichloroethylene	ND	10	ND	1	ND	1	ND	1		

(Continued Page 4 of 4)
LABORATORY RESULTS GROUNDWATER
FACILITY NAME: NAO FLINT OPERATIONS (BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

HALOGENATED HYDROCARBONS (Cont.)										
☐ Tetrachloroethylene	ND	10	ND	1	ND	1	ND	1		
☐ Trichloroethylene	ND	10	ND	1	ND	1	ND	1		
☐ 1,1,2-Trichloroethane	ND	10	ND	1	ND	1	ND	1		
☐ Vinyl Chloride	ND	10	ND	1	ND	1	ND	1		
OTHER *(Specify)*										
Sample ID	Bldg 31- 8									
Sample Depth (feet BGS)	-									
Date Collected	7/31/96									
Date Extracted	8/06/96									
Date Analyzed	8/09/96									
Collection Method*	GP									
Analytical Method No.	601									
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Diethyl phthalate	30	10								
☐ 4,6-Dinitro-2-methylphenol	10	10								
☐ Di-n-butyl phthalate	ND	10								
☐										
☐										
☐										
☐										
☐										
☐										
☐										
☐										
☐										
☐										

LABORATORY RESULTS GROUNDWATER
FACILITY NAME: NAO FLINT OPERATIONS (BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	MW-1		MW-2		MW-3		MW-4S		MW-4D	
Sample Depth (feet BGS)										
Date Collected	06/10/97		06/10/97		06/10/97		06/10/97		06/10/97	
Date Extracted										
Date Analyzed	06/13/97		06/13/97		06/13/97		06/13/97		06/13/97	
Collection Method*	Bailer		Bailer		Bailer		Bailer		Bailer	
Analytical Method No.	8260		8260		8260		8260		8260	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	120	50	8	1	300	100	ND	1	251	5
☐ Toluene	35,400	50	8	1	121,000	100	11	1	32	5
☐ Ethylbenzene	5860	50	10	1	15,200	100	2	1	127	5
☐ Total Xylenes	21,240	50	18	1	55,700	100	6	1	323	5
☐ MTBE										
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	MW-1		MW-2		MW-3		MW-4S		MW-4D	
Sample Depth (feet BGS)										
Date Collected	06/10/97		06/10/97		06/10/97		06/10/97		06/10/97	
Date Extracted	06/17/97		06/17/97		06/17/97		06/17/97		06/17/97	
Date Analyzed	06/18/97		06/18/97		06/18/97		06/18/97		06/18/97	
Collection Method*	Bailer		Bailer		Bailer		Bailer		Bailer	
Analytical Method No.	8270		8270		8270		8270		8270	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene	ND	5	ND	5	ND	5	ND	5	ND	5
☐ Acenaphthylene	ND	5	ND	5	ND	5	ND	5	ND	5
☐ Anthracene	ND	5	ND	5	ND	5	ND	5	ND	5
☐ Benzo(a)anthracene	ND	5	ND	5	ND	5	ND	5	ND	5
☐ Benzo(a)pyrene	ND	5	ND	5	ND	5	ND	5	ND	5
☐ Benzo(b)fluoranthene	ND	5	ND	5	ND	5	ND	5	ND	5
☐ Benzo(g,h,i)perylene	ND	5	ND	5	ND	5	ND	5	ND	5
☐ Benzo(k)fluoranthene	ND	5	ND	5	ND	5	ND	5	ND	5
☐ Chrysene	ND	5	ND	5	ND	5	ND	5	ND	5
☐ Dibenzo(a,h)anthracene	ND	5	ND	5	ND	5	ND	5	ND	5

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LABORATORY RESULTS GROUNDWATER
FACILITY NAME: NAO FLINT OPERATIONS (BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	MW-1		MW-2		MW-3		MW-4S		MW-4D	
Sample Depth (feet BGS)										
Date Collected	06/10/97		06/10/97		06/10/97		06/10/97		06/10/97	
Date Extracted	06/17/97		06/17/97		06/17/97		06/17/97		06/17/97	
Date Analyzed	06/18/97		06/18/97		06/18/97		06/18/97		06/18/97	
Collection Method*	Bailer		Bailer		Bailer		Bailer		Bailer	
Analytical Method No.	8270		8270		8270		8270		8270	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Fluoranthene	ND	5	ND	5	ND	5	ND	5	ND	5
☐ Fluorene	ND	5	ND	5	ND	5	ND	5	ND	5
☐ Indeno(1,2,3- cd)pyrene	ND	5	ND	5	ND	5	ND	5	ND	5
☐ Naphthalene	13	5	ND	5	43	5	ND	5	12	5
☐ 2-Methylnaphthalene	ND	5	ND	5	16	5	ND	5	35	5
☐ Phenanthrene	ND	5	ND	5	ND	5	ND	5	ND	5
☐ Pyrene	ND	5	ND	5	ND	5	ND	5	ND	5
METALS - FILTERED										
Sample ID	MW-1		MW-2		MW-3		MW-4S		MW-4D	
Sample Depth (feet BGS)										
Date Collected	06/10/97		06/10/97		06/10/97		06/10/97		06/10/97	
Date Extracted	06/16/97		06/16/97		06/16/97		06/16/97		06/16/97	
Date Analyzed	06/16/97		06/16/97		06/16/97		06/16/97		06/16/97	
Collection Method*	Bailer		Bailer		Bailer		Bailer		Bailer	
Analytical Method No.	200.8		200.8		200.8		200.8		200.8	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Cadmium										
☐ Total Chromium										
☐ Total Lead	ND	3	ND	3	ND	3	ND	3	ND	3

(Continued Page 3 of 4)
LABORATORY RESULTS GROUNDWATER
FACILITY NAME: NAO FLINT OPERATIONS (BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

PCBs										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Collection Method*										
Analytical Method No.										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐										
☐										
☐										
☐										
☐										
☐										
☐										
HALOGENATED HYDROCARBONS										
Sample ID	MW-1		MW-2		MW-3		MW-4S		MW-4D	
Sample Depth (feet BGS)										
Date Collected	06/10/97		06/10/97		06/10/97		06/10/97		06/10/97	
Date Extracted	06/13/97		06/13/97		06/13/97		06/13/97		06/13/97	
Date Analyzed	06/13/97		06/13/97		06/13/97		06/13/97		06/13/97	
Collection Method*	Bailer		Bailer		Bailer		Bailer		Bailer	
Analytical Method No.	601		601		601		601		601	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Carbon Tetrachloride	ND	50	ND	1	ND	1	ND	1	ND	5
☐ 1,1-Dichloroethane	ND	50	ND	1	ND	1	ND	1	ND	5
☐ 1,2-Dichloroethane	ND	50	ND	1	ND	1	ND	1	ND	5
☐ 1,1-Dichloroethylene	ND	50	ND	1	ND	1	ND	1	ND	5
☐ cis-1,2-Dichloroethylene	ND	50	ND	1	ND	1	ND	1	ND	5
☐ trans-1,2- Dichloroethylene	ND	50	ND	1	ND	1	ND	1	ND	5

(Continued Page 4 of 4)
LABORATORY RESULTS GROUNDWATER
FACILITY NAME: NAO FLINT OPERATIONS (BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

HALOGENATED HYDROCARBONS (Cont.)										
☐ Tetrachloroethylene	ND	50	ND	1	ND	1	ND	1	ND	5
☐ Trichloroethylene	ND	50	ND	1	ND	1	ND	1	ND	5
☐ 1,1,2-Trichloroethane	ND	50	ND	1	ND	1	ND	1	ND	5
☐ Vinyl Chloride	ND	50	ND	1	ND	1	ND	1	ND	5
OTHER *(Specify)*										
Sample ID	MW-1		MW-2		MW-3		MW-4S		MW-4D	
Sample Depth (feet BGS)										
Date Collected	06/10/97		06/10/97		06/10/97		06/10/97		06/10/97	
Date Extracted	06/13/97		06/13/97		06/13/97		06/13/97		06/13/97	
Date Analyzed	06/13/97		06/13/97		06/13/97		06/13/97		06/13/97	
Collection Method*	Bailer		Bailer		Bailer		Bailer		Bailer	
Analytical Method No.	601		601		601		601		601	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Dichlorodifluormethane	ND	50	ND	1	ND	1	148	1	178	5
☐										
☐										
☐										
☐										
☐										
☐										
☐										
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☐										
☐										

ATTACHMENT 8

BUILDING 31/HAMILTON AVENUE TANK FARM
SUMMARY REPORT (Continued)

TIER I RBSL/TIER II OR TIER III SSTL
COMPARISON TABLE FOR GROUNDWATER
FACILITY NAME: NAO FLINT OPERATIONS (BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

☑ **Residential** ☐ **Commercial** ☑ **Industrial**

Contaminant	Sample ID with Maximum Detected Concentration	Corresponding Sample Date	Maximum Detected Concentration (ug/l)	Applicable Criterion (ug/l)			
				Tier I Residential Health-Based Drinking Water	Tier I Industrial Health-Based Drinking Water	Tier I Groundwater Surface Water Interface	Tier I Direct Contact
VOLATILES							
☐ Benzene	Bldg 31-8	07/31/96	600	5	5	53	9300
☐ Toluene	Bldg 31-8	07/31/96	149,000	790	790	110	>526,000
☐ Ethylbenzene	MW-3	06/10/97	15,200	74	74	31	>169,000
☐ Total Xylenes	Bldg 31-8	07/31/96	57,600	280	280	59	>186,000
☐ MTBE			NA				
POLYNUCLEAR AROMATICS (PNAs)							
☐ Acenaphthene			ND	1300	3800	3.8	>4240
☐ Acenaphthylene			ND	26	75	Not Available	ID
☐ Anthracene			ND	7300	21,000	110,000	>43
☐ Benzo(a)anthracene			ND	1.2	4.8	.31	4
☐ Benzo(a)pyrene			ND	.2	.2	.31	.24
☐ Benzo(b)fluoranthene			ND	1.2	4.8	.31	2
☐ Benzo(g,h,i)perylene			ND	26	75	Not Available	ID
☐ Benzo(k)fluoranthene			ND	12	48	.31	20
☐ Chrysene			ND	120	480	.31	400
☐ Dibenzo-(a,h)anthracene			ND	.12	.48	.31	.11
☐ Fluoranthene			ND	880	2500	370	>206
☐ Fluorene			ND	880	2500	14,000	>1980
☐ Indeno(1,2,3-cd)pyrene			ND	1.2	4.8	.31	>0.022
☐ Naphthalene	Bldg 31-8	07/31/96	50	260	750	34	>31,000
☐ Phenanthrene			ND	26	75	Not Available	>1000
☐ Pyrene			ND	550	1600	11,000	>135
☐ 2-Methylnaphthalene	MW-4D	06/10/97	35	260	750	59	>110,000

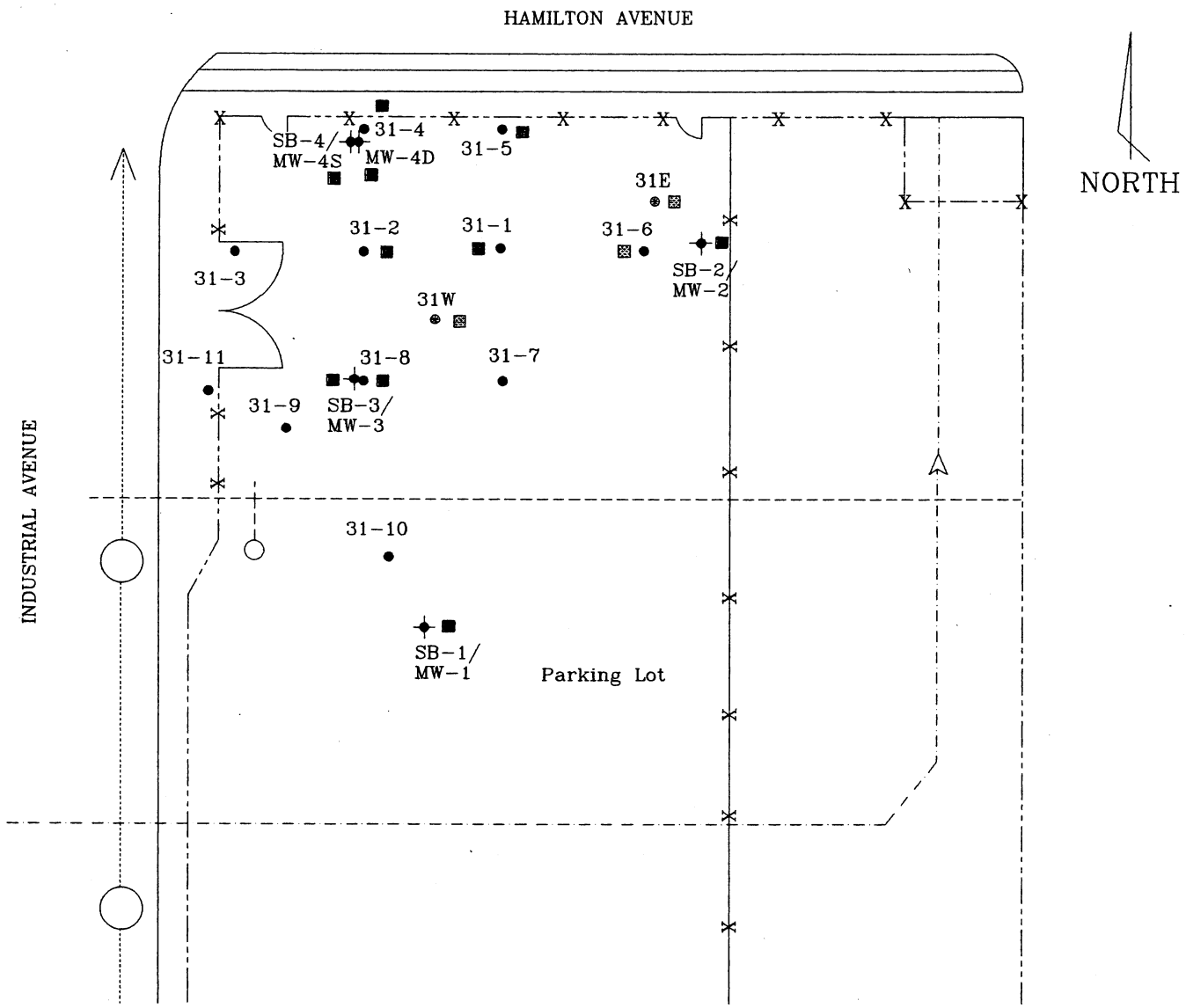
Shading indicates concentration exceeds one or more Tier I RBSL
"ID" = Insufficient Data

BUILDING 31/HAMILTON AVENUE TANK FARM
SUMMARY REPORT (Continued)

ATTACHMENT NO. 19
TIER I RBSL/TIER II OR TIER III SSTL
COMPARISON TABLE FOR GROUNDWATER
FACILITY NAME: NAO FLINT OPERATIONS (BLDG 31/TANKS 081/31T - 91 & 132/31 -133/31)
FACILITY NUMBER: 0-002763

Contaminant	Sample ID with Maximum Detected Concentration	Corresponding Sample Date	Maximum Detected Concentration (ug/l)	Applicable Criterion (ug/l)			
				Tier I Residential Health-Based Drinking Water	Tier I Industrial Health-Based Drinking Water	Tier I Groundwater Surface Water Interface	Tier I Direct Contact
METALS - FILTERED							
☐ Cadmium			NA				
☐ Chromium III			NA				
☐ Chromium VI			NA				
☐ Total Lead			ND	4	4	140,000	Not Available
PCBs - Not Analyzed							
HALOGENATED HYDROCARBONS							
☐ Carbon Tetrachloride			ND	5	5	21	1600
☐ 1,1-Dichloroethane			ND	880	2500	Not Available	2,100,000
☐ 1,2-Dichloroethane			ND	5	5	560	11,000
☐ 1,1-Dichloroethylene			ND	7	7	32	9900
☐ cis-1,2-Dichloroethylene			ND	70	70	Not Available	170,000
☐ trans-1,2-Dichloroethylene			ND	100	100	300	200,000
☐ Tetrachloroethylene			ND	5	5	22	5000
☐ 1,1,2-Trichloroethane			ND	5	5	65	9600
OTHER *							
☐ Ethlyene Glycol			ND	15,000	42,000	68,000	210,000,000
☐ Propylene Glycol			ND	150,000	420,000	190,000	ID
☐ Di-n-butyl phthalate	Bldg 31-6	07/31/96	20	880	2500	12,000	87,000
☐ Diethyl phthalate	Bldg 31-8	07/31/96	30	5500	16,000	120,000	>1,080,000
☐ 4,6-Dinitro-2-methylphenol	Bldg 31-8	07/31/96	10	2.6	7.3	.59	ID

ATTACHMENT 9

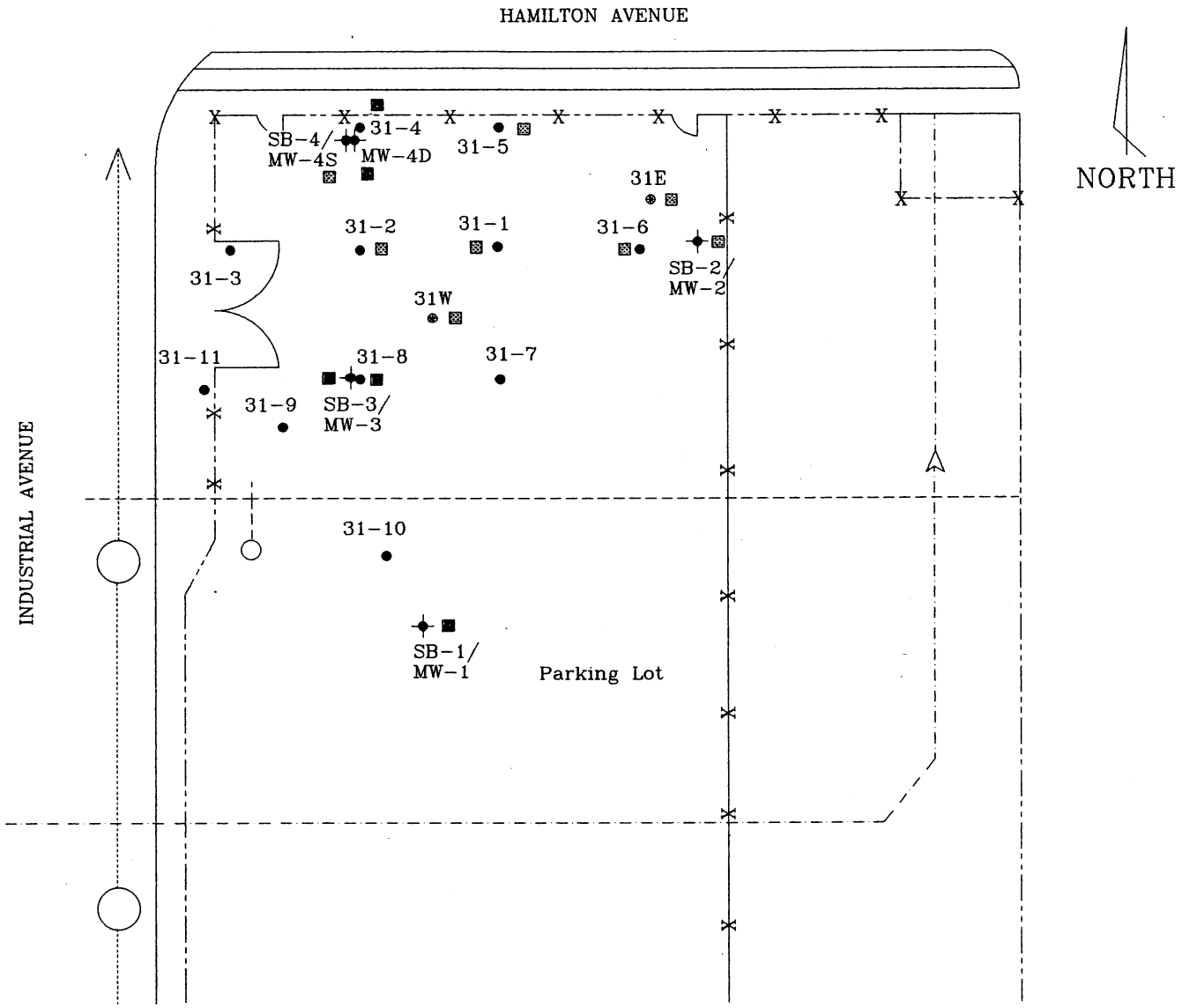


- □ Not Sampled
- ▩ Not Detected
- ■ Elevated levels below Tier I Industrial Health-based Drinking Water to RBSLs
- ■ Elevated levels above Tier I Industrial Health-based Drinking Water to RBSLs

LEGEND:

- ✦ Monitoring Well Locations
- ● Geoprobe Sample Locations
- ---- Fire Protection Line
- ····· Storm Sewer Line
- —·—·— 4" Process Waste
- —x— Fence

GM-CLCD NORTH	
TITLE: GROUNDWATER CONCENTRATION MAP: BTEX BUILDING 31 TANKS 081/31T - 091/31T	
DATE: 8/13/96	SCALE: 1"=40'
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9A
	PROJECT NUMBER: F174



- □ Not Sampled
- ▩ Not Detected
- ■ Elevated levels below Tier I Industrial Health-based Drinking Water to RBSLs
- ■ Elevated levels above Tier I Industrial Health-based Drinking Water to RBSLs

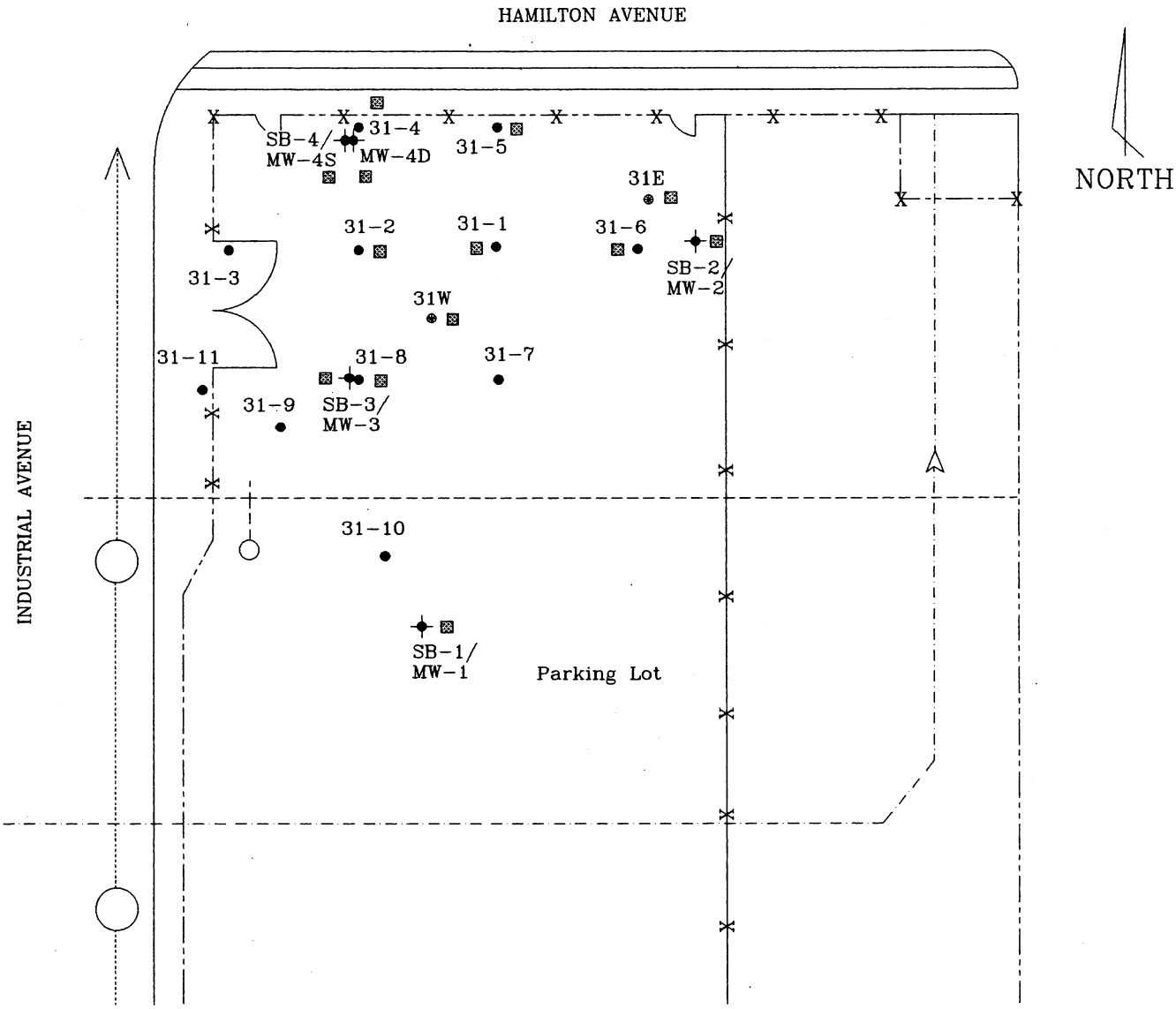
LEGEND:

- ✦ Monitoring Well Locations
- ● Geoprobe Sample Locations
- ---- Fire Protection Line
- ····· Storm Sewer Line
- —·—·— 4" Process Waste
- —✱— Fence

GM-CLCD NORTH

TITLE: GROUNDWATER CONCENTRATION MAP: PNAHs
BUILDING 31
TANKS 081/31T - 091/31T

DATE: 8/13/96	SCALE: 1"=40'
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9B
	PROJECT NUMBER: F174



- □ Not Sampled
- ▩ Not Detected
- ■ Elevated levels below Tier I Industrial Health-based Drinking Water to RBSLs
- ■ Elevated levels above Tier I Industrial Health-based Drinking Water to RBSLs

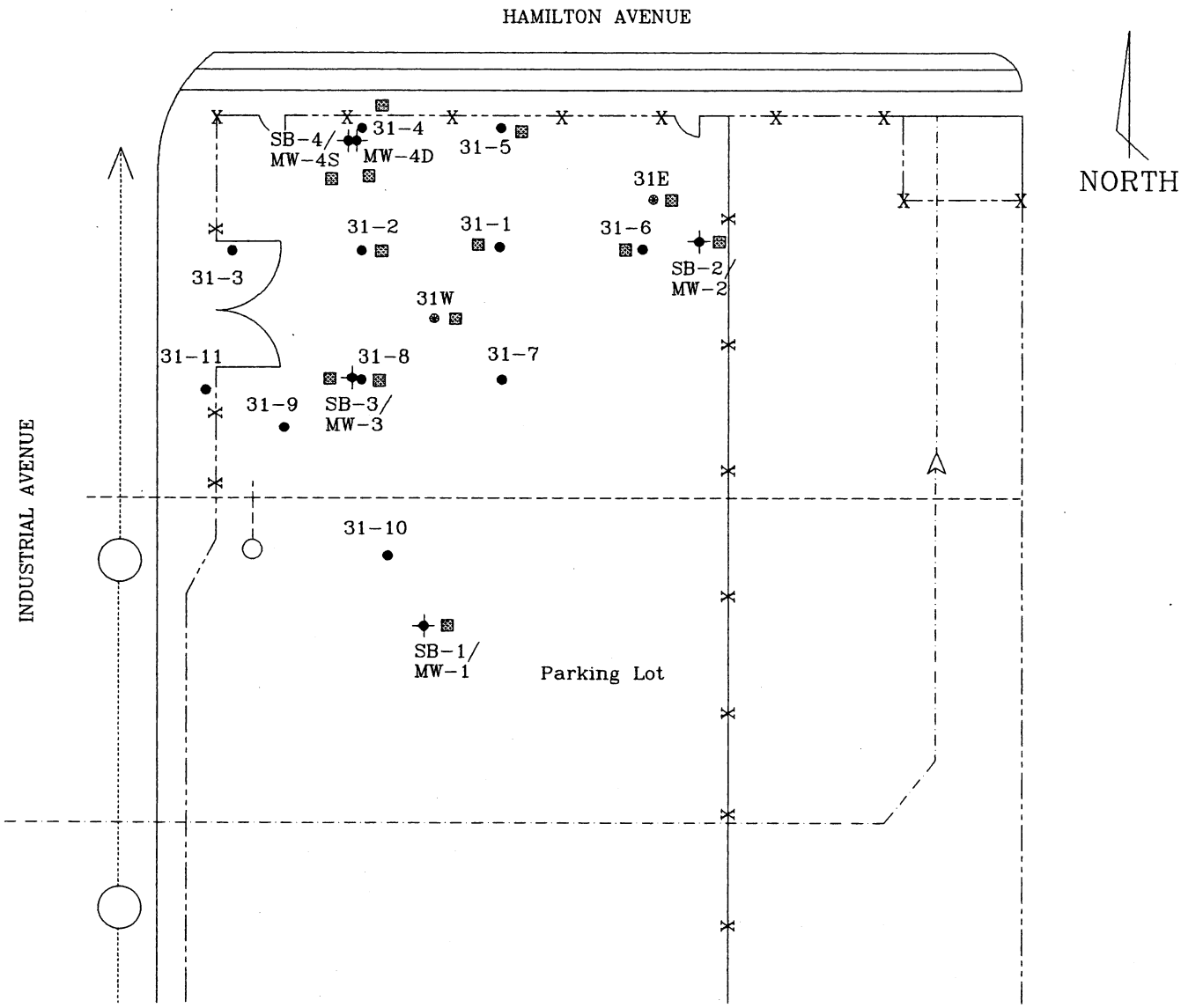
LEGEND:

- ✦ Monitoring Well Locations
- ● Geoprobe Sample Locations
- ---- Fire Protection Line
- ····· Storm Sewer Line
- —·—· 4" Process Waste
- —✱— Fence

GM-CLCD NORTH

TITLE: GROUNDWATER CONCENTRATION MAP: HALOGENATED HYDROCARBONS, BUILDING 31 TANKS 081/31T - 091/31T

DATE: 8/13/96	SCALE: 1"=40'
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9C
	PROJECT NUMBER: F174

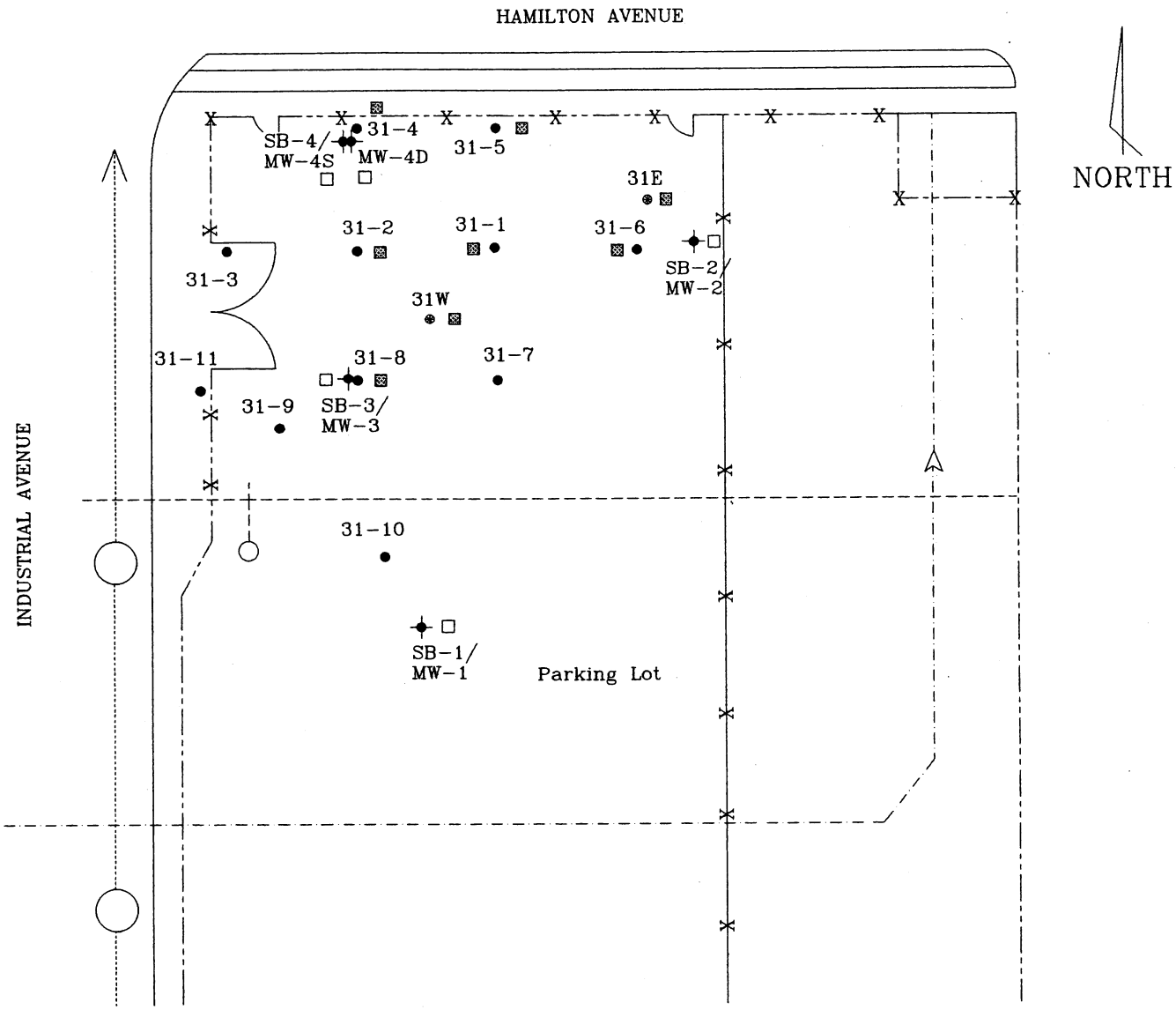


- □ Not Sampled
- ▩ Not Detected
- ■ Elevated levels below Tier I Industrial Health-based Drinking Water to RBSLs
- ■ Elevated levels above Tier I Industrial Health-based Drinking Water to RBSLs

LEGEND:

- ✦ Monitoring Well Locations
- ● Geoprobe Sample Locations
- ---- Fire Protection Line
- ····· Storm Sewer Line
- —·—·— 4" Process Waste
- —✱— Fence

GM-CLCD NORTH	
TITLE: GROUNDWATER CONCENTRATION MAP: LEAD BUILDING 31 TANKS 081/31T - 091/31T	
DATE: 8/13/96	SCALE: 1"=40'
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9D
	PROJECT NUMBER: F174



- □ Not Sampled
- ▩ Not Detected
- ■ Elevated levels below Tier I Industrial Health-based Drinking Water to RBSLs
- ■ Elevated levels above Tier I Industrial Health-based Drinking Water to RBSLs

LEGEND:

- ✦ Monitoring Well Locations
- ● Geoprobe Sample Locations
- ---- Fire Protection Line
- ····· Storm Sewer Line
- —·—·— 4" Process Waste
- —x— Fence

GM-CLCD NORTH

TITLE: GROUNDWATER CONCENTRATION MAP: GLYCOL,. BUILDING 31 TANKS 081/31T - 091/31T

DATE: 8/13/96	SCALE: 1"=40'
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9E
	PROJECT NUMBER: F174

ATTACHMENT 10

Global Environmental Engineering Inc.
5467 Hill 23 Drive, Suite B
Flint, Michigan 48507
Tel: (810) 238-9190
Fax: (810) 238-9195

Monitoring Well:	SB-1/MW-1	Project Name:	GM - BUILDING 31
Date:	6/4/97	Project No.:	F329
Contractor:	GEEI	Location:	
Prepared By:	ALK	Twp/Range/Sec.:	
Time Started:	8:30	Depth Drilled:	27'
Time Completed:		Hole Diamater:	8.25"
Coring Device:	5'	Inner Diamater:	4.50"
		Drilling Fluid:	None
		Driller:	Norm
		Helper:	Ash

Boring Methods

X	Hollow Stem Auger
	Hand Auger
	Geoprobe

Water Level Data

Date	SWL Elevation
6/10/97	8.40'

WELL SPECIFICATIONS

Well Casing Cover:

Material:	Steel
Diamater:	12"
Length:	12"
Lock:	No

Well Casing:

Diamater:	2"
Length:	20.5'
Material:	PVC
Cap:	Expandable
Locking:	Dolphin

Well Screen:

Diamater:	2"
Length:	5'
Slotsize:	0.01
Material:	PVC
Well Screen Interval:	15.5'-20.5'
Filter Pack:	Sand

Top of Casing:

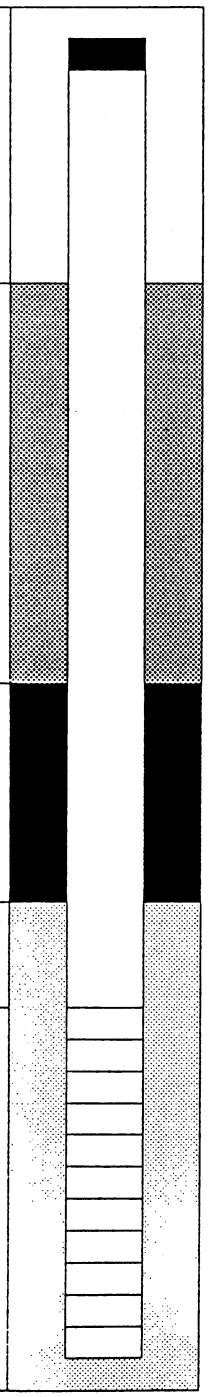
Depth to Top of Grout Backfill: 1'

Depth to Top of Bentonite: 13.5'

Depth to Top of Sand: 13'

Depth to Top of Screen: 15.5'

Total Well Depth: 20.5'



SOIL PROFILE

0 - 9" Concrete
9" - 3' Silty Sand
3 - 21.5' Silty Clay
21.5 - 22' Sand
22 - 25' Silty Clay
25 - 26.5 Sand
26.5 - 27 Silty Sand

Groundwater Encountered at 18'

Global Environmental Engineering Inc.
5467 Hill 23 Drive, Suite B
Flint, Michigan 48507
Tel: (810) 238-9190
Fax: (810) 238-9195

Monitoring Well:	SB-2/MW-2	Project Name:	GM - BUILDING 31
Date:	6/4/97	Project No.:	F329
Contractor:	GEEI	Location:	
Prepared By:	ALK	Twp/Range/Sec.:	
Time Started:	11:45	Depth Drilled:	19'
Time Completed:		Hole Diamater:	8.25"
Coring Device:	5'	Inner Diamater:	4.50"
		Drilling Fluid:	None
		Driller:	Norm
		Helper:	Ash

Boring Methods

X	Hollow Stem Auger
	Hand Auger
	Geoprobe

Water Level Data

Date	SWL Elevation
6/10/97	6.95

WELL SPECIFICATIONS

Well Casing Cover:

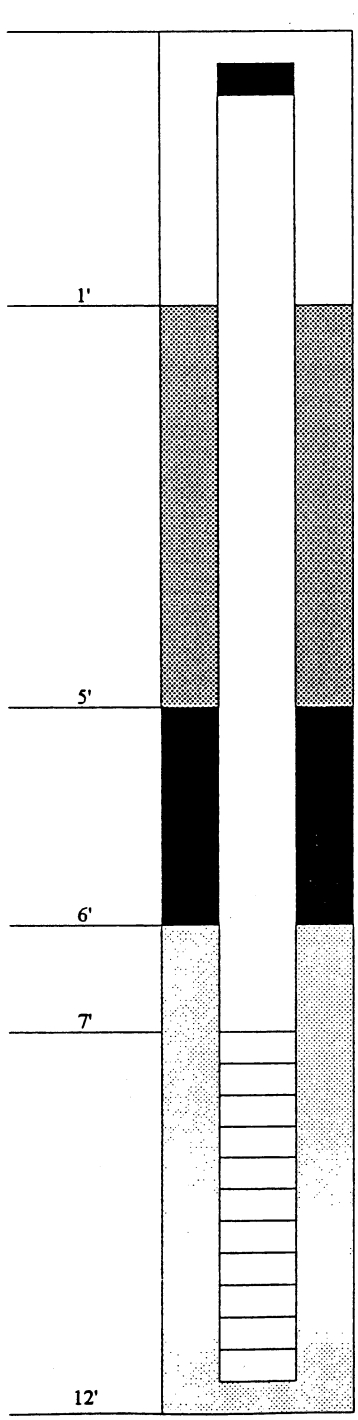
Material:	Steel
Diamater:	12"
Length:	12"
Lock:	No

Well Casing:

Diamater:	2"
Length:	12'
Material:	PVC
Cap:	Expandable
Locking:	Dolphin

Well Screen:

Diamater:	2"
Length:	5'
Slotsize:	0.01
Material:	PVC
Well Screen Interval:	7'-12'
Filter Pack:	Sand



SOIL PROFILE

0 - 8" Concrete
8" - 8.5' Sand
8.5 - 19' Silty Clay

Groundwater Encountered at 8'

Global Environmental Engineering Inc.
5467 Hill 23 Drive, Suite B
Flint, Michigan 48507
Tel: (810) 238-9190
Fax: (810) 238-9195

Monitoring Well:	SB-3/MW-3	Project Name:	GM - BUILDING 31
Date:	6/4/97	Project No.:	F329
Contractor:	GEEI	Location:	
Prepared By:	ALK	Twp/Range/Sec.:	
Time Started:	16:15	Depth Drilled:	21'
Time Completed:		Hole Diamater:	8.25"
Coring Device:	5'	Inner Diamater:	4.50"
		Drilling Fluid:	None
		Driller:	Norm
		Helper:	Ash

Boring Methods

X	Hollow Stem Auger
	Hand Auger
	Geoprobe

Water Level Data

Date	SWL Elevation
6/10/97	7.17

WELL SPECIFICATIONS

'ell Casing Cover:

Material:	Steel
Diamater:	12"
Length:	12"
Lock:	No

.Vell Casing:

Diamater:	2"
Length:	18'
Material:	PVC
Cap:	Expandable
Locking:	Dolphin

/ell Screen:

Diamater:	2"
Length:	5'
Slotsize:	0.01
Material:	PVC
Well Screen Interval:	13'-18'
Filter Pack:	Sand

Top of Casing:

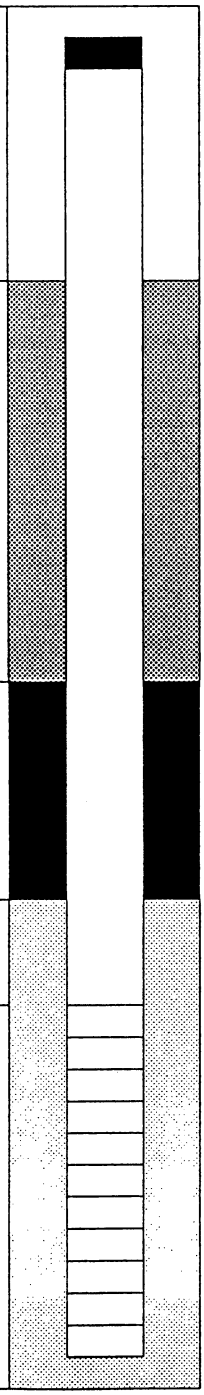
Depth to Top of Grout Backfill: 1'

Depth to Top of Bentonite: 11'

Depth to Top of Sand: 12'

Depth to Top of Screen: 13'

Total Well Depth: 18'



SOIL PROFILE

0 - 10" Asphalt
10" - 3.5' Sand
3.5 - 13' Silty Clay
13 - 14.5 Sand
14.5 - 15 Silty Clay
15 - 16.5 Sand
16.5 - 21' Silty Clay

Groundwater Encountered at 15.5'

Global Environmental Engineering Inc.
5467 Hill 23 Drive, Suite B
Flint, Michigan 48507
Tel: (810) 238-9190
Fax: (810) 238-9195

Monitoring Well:	SB-4/MW-4S	Project Name:	GM - BUILDING 31
Date:	6/5/97	Project No.:	F329
Contractor:	GEEI	Location:	
Prepared By:	ALK	Twp/Range/Sec.:	
Time Started:	8:20	Depth Drilled:	21'
Time Completed:		Hole Diamater:	8.25"
Coring Device:	5'	Inner Diamater:	4.50"
		Drilling Fluid:	None
		Driller:	Norm
		Helper:	Ash

Boring Methods

X	Hollow Stem Auger
	Hand Auger
	Geoprobe

Water Level Data

Date	SWL Elevation
6/10/97	6.08

WELL SPECIFICATIONS

Vell Casing Cover:

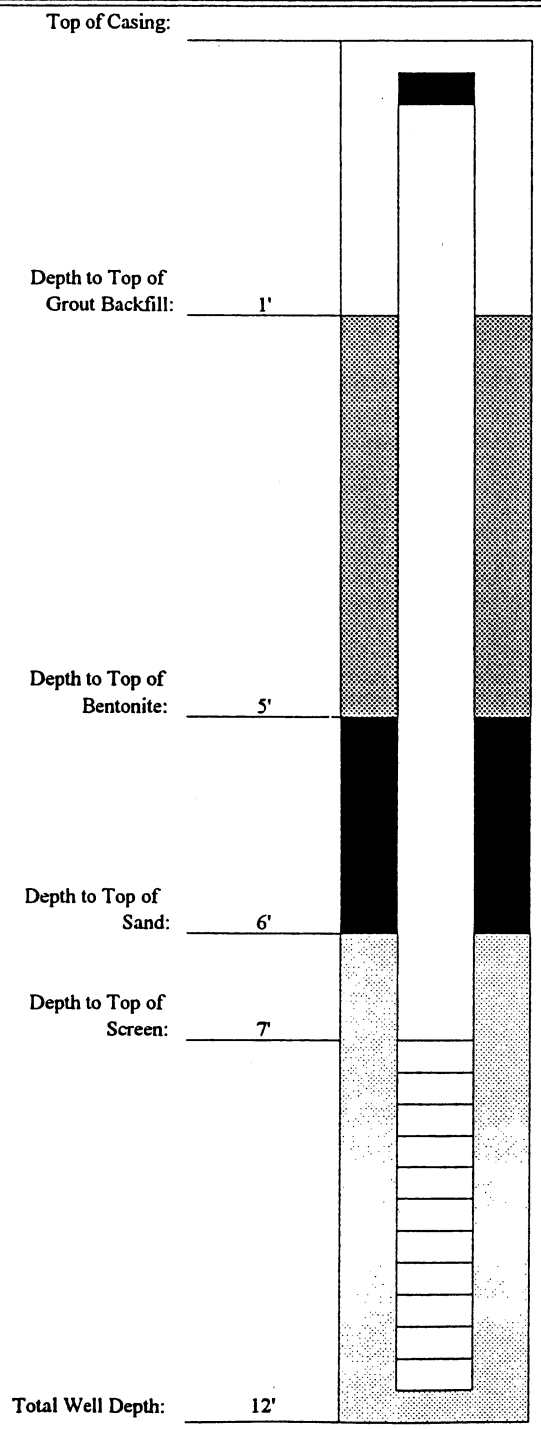
Material:	Steel
Diamater:	12"
Length:	12"
Lock:	No

Vell Casing:

Diamater:	2"
Length:	12'
Material:	PVC
Cap:	Expandable
Locking:	Dolphin

Vell Screen:

Diamater:	2"
Length:	5'
Slotsize:	0.01
Material:	PVC
Well Screen Interval:	7'-12'
Filter Pack:	Sand



SOIL PROFILE

0 - 10" Asphalt
10" - 3.5' Sand
3.5 - 21' Silty Clay

Groundwater Encountered at 8'

Global Environmental Engineering Inc.
5467 Hill 23 Drive, Suite B
Flint, Michigan 48507
Tel: (810) 238-9190
Fax: (810) 238-9195

Monitoring Well:	SB-4/MW-4D	Project Name:	GM - BUILDING 31
Date:	6/5/97	Project No.:	F329
Contractor:	GEEI	Location:	
Prepared By:	ALK	Twp/Range/Sec.:	
Time Started:	9:40	Depth Drilled:	21'
Time Completed:		Hole Diamater:	8.25"
Coring Device:	5'	Inner Diamater:	4.50"
		Drilling Fluid:	None
		Driller:	Norm
		Helper:	Ash

Boring Methods

X	Hollow Stem Auger
	Hand Auger
	Geoprobe

Water Level Data

Date	SWL Elevation
6/10/97	6.09

WELL SPECIFICATIONS

Well Casing Cover:

Material:	Steel
Diamater:	12"
Length:	12"
Lock:	No

Well Casing:

Diamater:	2"
Length:	16'
Material:	PVC
Cap:	Expandable
Locking:	Dolphin

Well Screen:

Diamater:	2"
Length:	5'
Slotsize:	0.01
Material:	PVC
Well Screen Interval:	11'-16'
Filter Pack:	Sand

Top of Casing:

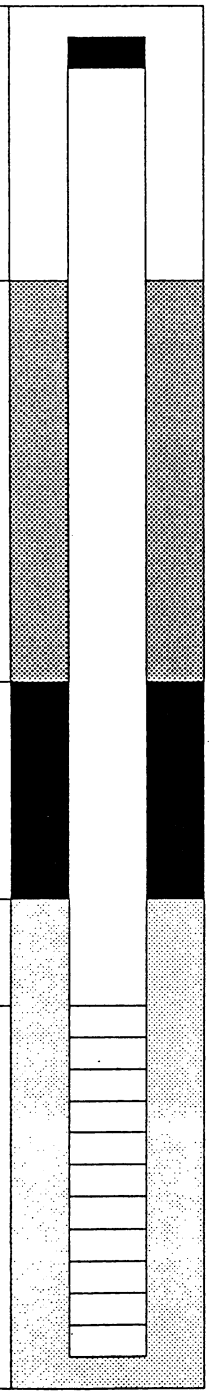
Depth to Top of Grout Backfill: 1'

Depth to Top of Bentonite: 9'

Depth to Top of Sand: 10'

Depth to Top of Screen: 11'

Total Well Depth: 16'

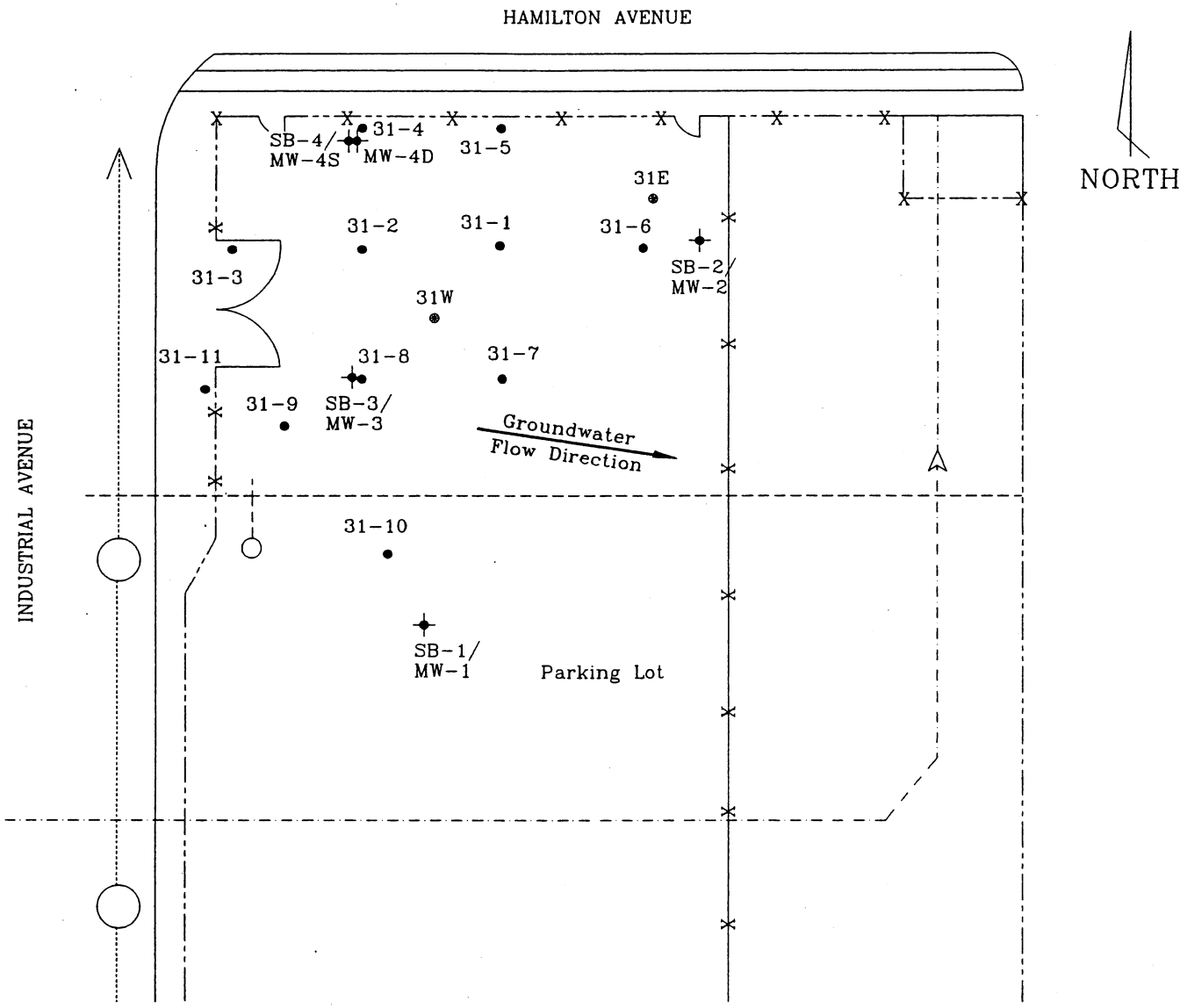


SOIL PROFILE

0 - 10" Asphalt
10" - 3.5' Sand
3.5 - 21' Silty Clay

Groundwater Encountered at 8'

ATTACHMENT 11



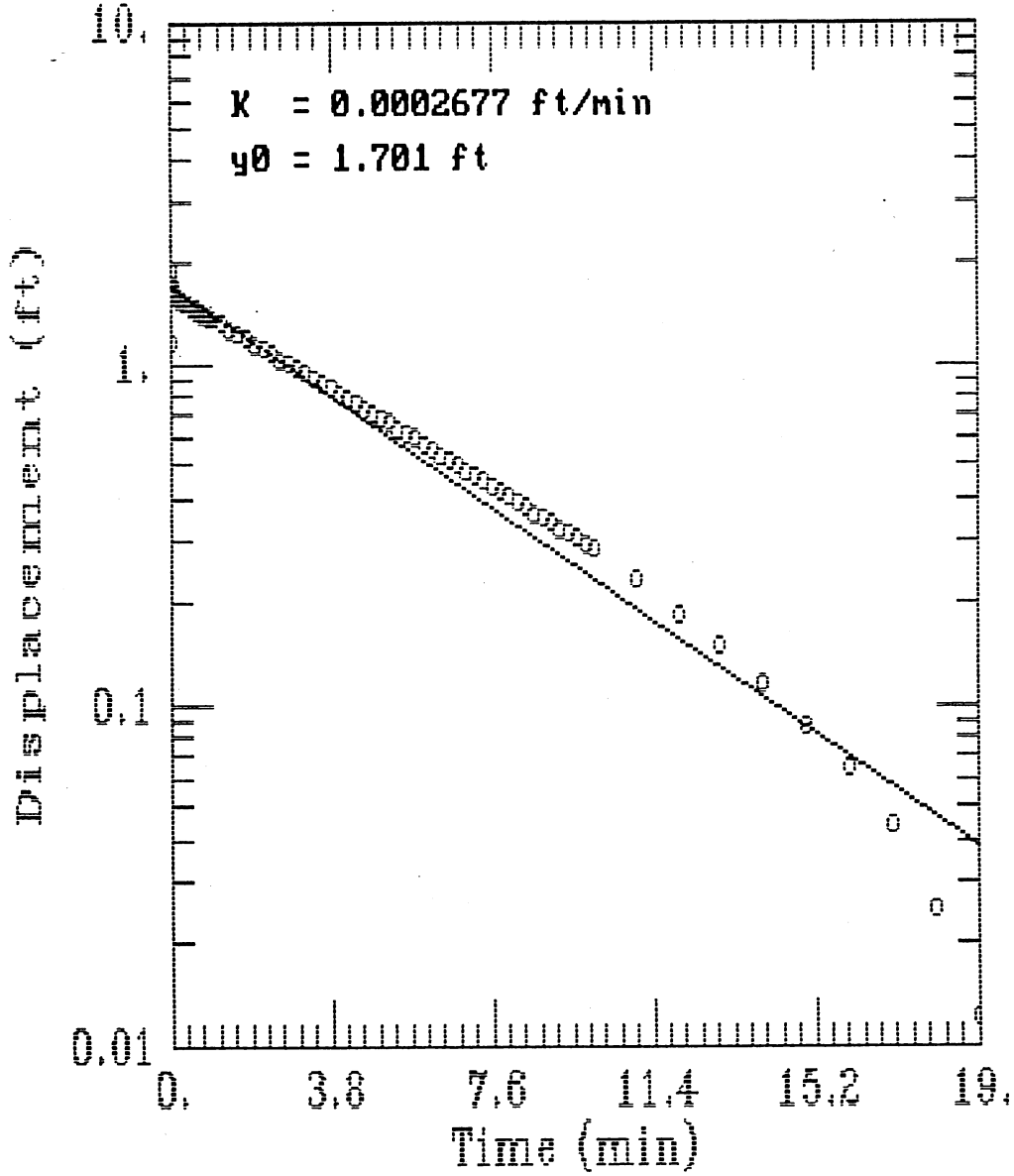
LEGEND:

- Monitoring Well Locations
- Geoprobe Sample Locations
- Fire Protection Line
- Storm Sewer Line
- 4" Process Waste
- Fence

GM-CLCD NORTH	
TITLE: GROUNDWATER FLOW DIRECTION MAP BUILDING 31 FLINT, MICHIGAN	
DATE: 8/13/96	SCALE: 1"=40'
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 11
	PROJECT NUMBER: F174

ATTACHMENT 12

BUILDING 31 - MW4D

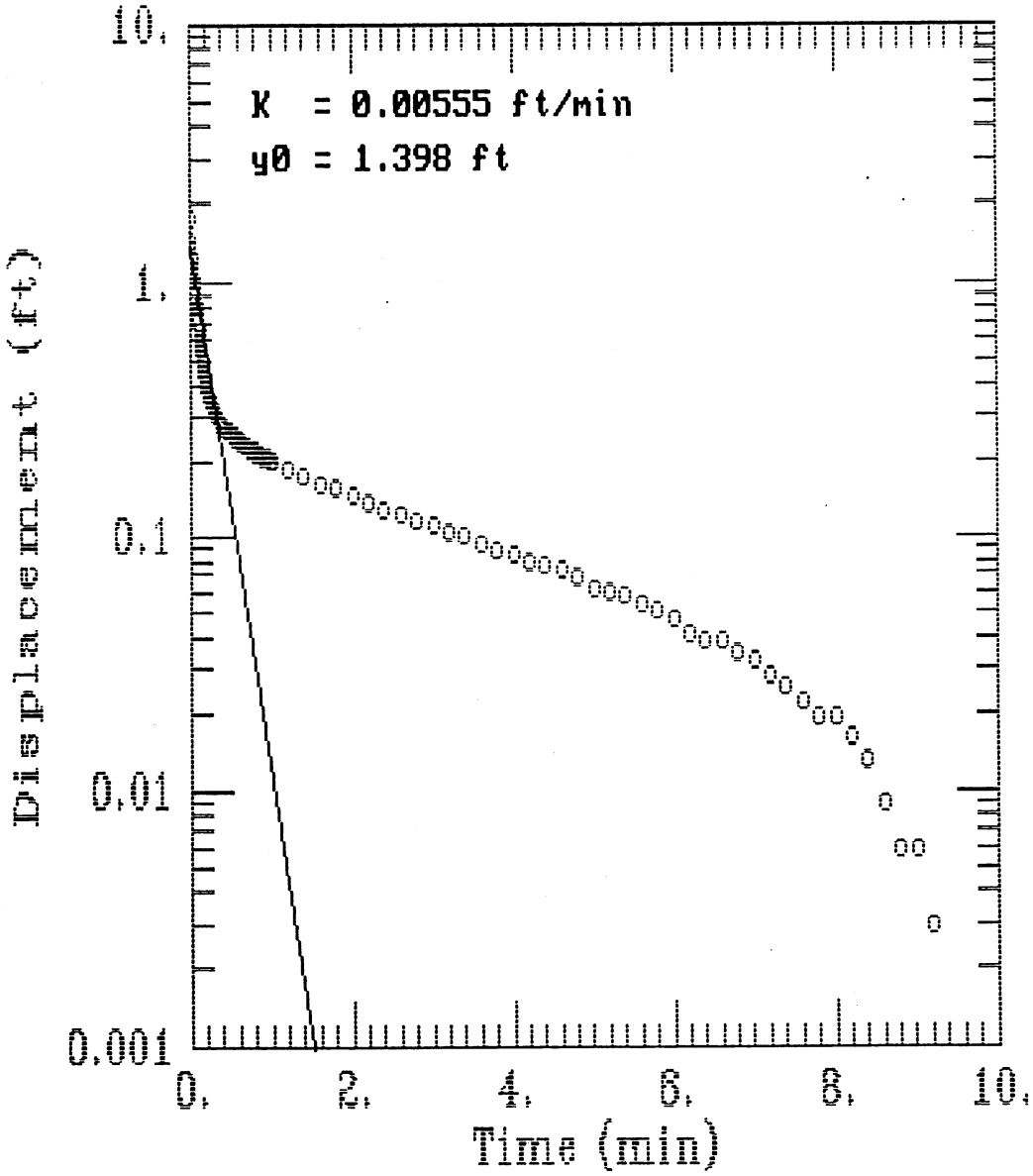


AQTESOLV

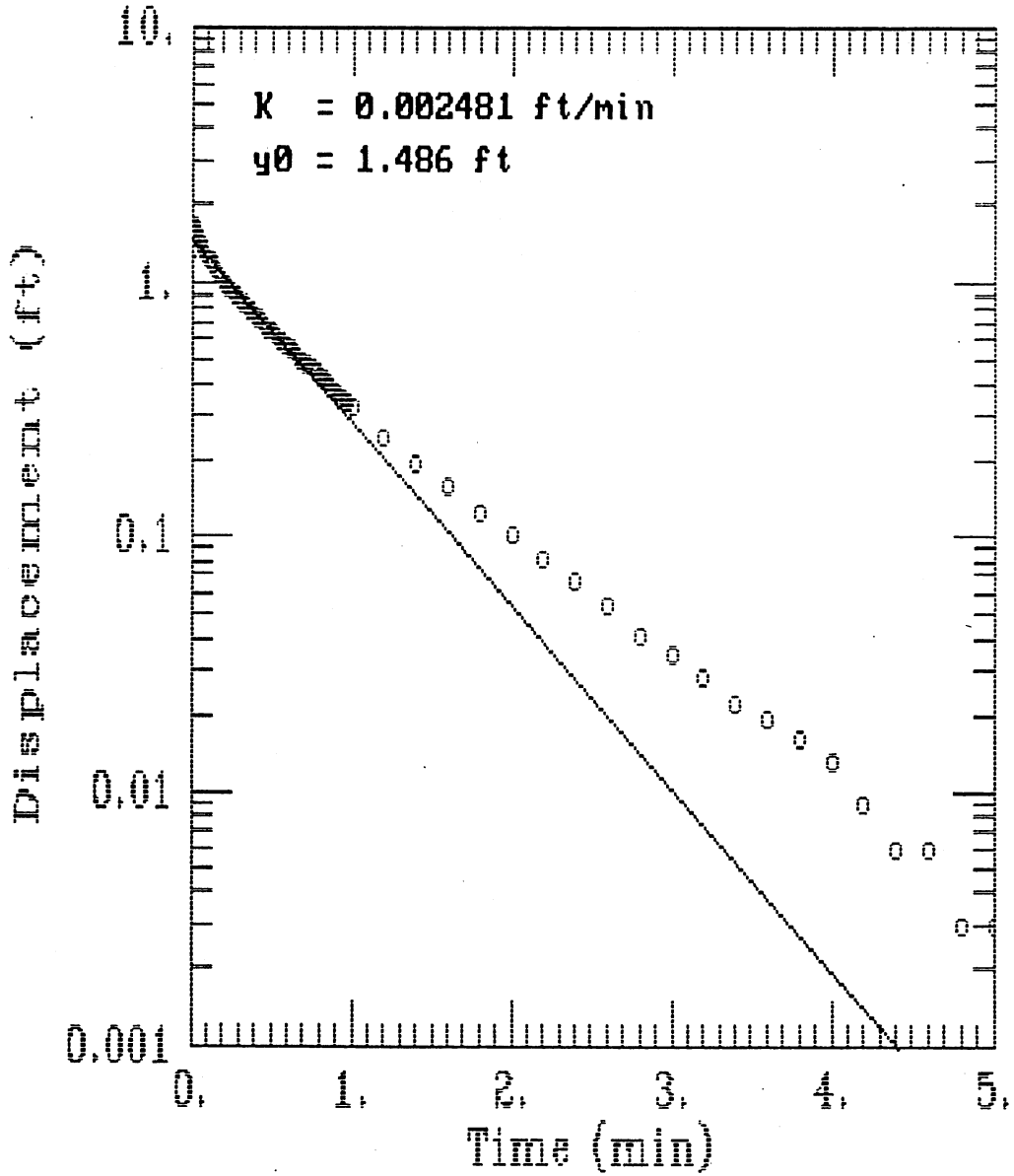
GERAGHTY & MILLER, INC.

Modeling Group

BUILDING 31 - MW4S



BUILDING 31 - MW1



AQTESOLV

GERAGHTY & MILLER, INC.

Modeling Group

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Appendix G - Supplemental Information - Building 02 Tanks 67 through 70

SUMMARY REPORT

BUILDING 02
TANKS 67/02 - 70/02

GM-CLCD NORTH
NAO FLINT OPERATIONS
FLINT, MICHIGAN

FACILITY ID: 0-002763

CONFIRMED RELEASE NO.: C-471-97

September 9, 1997

Prepared by:

Global Environmental Engineering, Inc.
5467 Hill 23 Drive, Ste. B
Flint, Michigan 48507
(810) 238-9190

Global
Environmental
Engineering Inc.

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1.0 UNDERGROUND STORAGE TANKS

For the purposes of this summary report, the Building 02 investigation results will be combined with the Building 40 investigation results due to the proximity of the underground storage tanks (USTs). See Attachment 1 for former tank locations.

1.1 Location

The four USTs associated with Building 02 (Tanks 67/02 - 70/02) were located on the southwest corner of Building 02. See Attachment 1.

1.2 UST Contents

The identification number, size, and contents of the USTs, detailed on the Buick Motor Division Storage Tank layout drawing number 42361-M dated 1973, are summarized as follows:

067/02	10,000-gallon	Unleaded Gasoline
068/02	10,000-gallon	Unleaded Gasoline
069/02	10,000-gallon	Leaded Gasoline
070/02	10,000-gallon	Leaded Gasoline

1.3 Installation and Removal Dates

UST removal activities associated with Building 02 began in August, 1985 and were completed November 1, 1985. UST installation dates are not available.

2.0 INVESTIGATION ACTIVITIES

During UST removal activities, visual and PID readings indicated the presence of gasoline in the soil adjacent to the tanks. In September, 1985, an oil loss report was submitted to the Michigan Department of Natural Resources. An unknown volume of soil was excavated. The depth of the excavation was approximately 14 bgs.

2.1 Summary of Investigation Activities

Based on the information above, Global recommended that soil borings be conducted to determine the condition of impacted media.

On July 24, 1996, Global supervised the advancement of five soil borings (40-1 through 40-4) using a Geoprobe in the area of the Building 40 tank

farm. The borings were located in a line between Building 40 and Building 02. The borings were advanced to a maximum depth of 19 feet below grade.

On July 29, 1996, Global supervised the advancement five soil borings (02S-1 through 02S-5) using a Geoprobe in and around the former excavation associated with the Building 02. Obstructions were noted in each boring with the exception of 02S-1. The maximum boring depth was 21 feet below ground surface. Soil and groundwater samples were collected when possible.

On November 11, 1996, Global supervised the advancement two monitoring wells (SB1/MW1 and SB2/MW2) using a truck-mounted drill rig. On December 10, 1996, Global supervised the installation of MW-3 (02S/GP1/MW3) using a Geoprobe, which due to the soil types present, ultimately proved unusable. On June 3, 1997, Global returned to the site to re-drill and install a new well at the MW-3 location. An attempt was made to install a fourth monitoring well located in the roadway, west of MW-2. An obstruction was encountered at five feet below ground surface and the boring was abandoned. Also, one boring each was to be drilled inside Building 02 and Building 40 using a Geoprobe operated by Great Lakes Geological Technical Services, Inc. The boring located in Building 40 could not be completed due to the presence of a subfloor. The boring drilled in the southeast end of Building 02 was advanced to 21 feet below grade.

Groundwater was encountered at varying depths, in lenses of varying thickness and grain size. MW-1 was located in an unpaved area. The monitoring wells were screened as shown below. See also Attachment 10: Monitoring Well Logs.

Well ID	Screened Interval (feet bgs)	Soil Type
MW-1	4 - 9	Sandy Silt/Silty Sand
MW-2	5 - 10	Silty Sand/Sandy Clay
MW-3	14 - 19	Silty Clay/Sand

On January 2, 1997, MW-1 and MW-2 were sampled. On September 10, 1997, MW-3 was sampled. On September 12, 1997, a slug test was conducted on MW-3.

2.1.1 Sample Collection and Analysis

A minimum of two soil samples were collected for laboratory analysis from each soil boring based on the highest organic vapor analyzer

reading (OVA) and/or the groundwater water interface, and the bottom-of-bore. Soil samples were collected from depths ranging from 7 to 27 feet below ground surface. Actual sample depths are given in Attachment 3. OVA results can be found on the soil boring logs, Attachment 6.

Each of the soil samples collected was placed into an unpreserved four-ounce container and transported at four degrees Celsius (4°C) using chain-of-custody procedures to Fire & Environmental Consulting Laboratories, Inc., in East Lansing, Michigan. Samples were analyzed in accordance with recommendations contained in *Environmental Response Division Operation Memorandum #6, Revision #4*, dated September 13, 1995.

Groundwater samples were collected from Geoprobe borings whenever possible using a screen point sampler attachment. The screen point sampler was driven to the desired sampling depth and an inner core, consisting of stainless steel wire screen, was pushed into the borehole allowing water to collect in the sampler. Monitoring wells were developed prior to sampling using a stainless steel bailer until water clarity stabilized. Approximately 48 hours following development, the monitoring wells were sampled. At the time of sampling, the monitoring wells were purged a minimum of three well volumes to ensure sample clarity.

Each of the groundwater samples collected for laboratory analysis was placed in laboratory-prepared glass bottles. Samples to be analyzed for dissolved lead were filtered in the field and preserved with nitric acid. Samples to be analyzed for volatile organics were preserved with hydrochloric acid. Each sample was transported at 4°C using chain-of-custody procedures to Fire & Environmental Consulting Laboratories, Inc., in East Lansing, Michigan. Samples were analyzed in accordance with recommendations contained in *Environmental Response Division Operational Memorandum #6, Revision #4*, dated September 13, 1995.

2.2 Summary of Geological Information

There are four basic rock formations comprising the bedrock of Genesee County: the Coldwater, Marshall, Michigan, and Saginaw formations. The Coldwater formation consists of sandy shale, and is a poor water producer. The Marshall formation consists of white to gray sandstone of varying grain size in the lower portion, and Napoleon Sandstone and Marshall Sandstone

in the upper portion. The Marshall formation yields high quality groundwater. The Michigan formation consists of a gray shale and some thick dolostone layers, and is not a principal water bearing formation. The Saginaw formation is the youngest formation, and consists of sandstone, shale, sandy shale, limestone, and coal layers. Groundwater may be obtained from the sandstone layers within the Saginaw formation. Glacial drift material overlies the bedrock.

2.3 Summary of Hydrogeological Information

2.3.1 Depth to usable aquifer

The City of Flint is on a municipal water system. Most of the potable water wells within Genesee County are located beneath the glacial drift in the Saginaw Formation. The depth to the Saginaw Formation varies throughout the county, but is located roughly 300 feet below ground surface.

2.3.2 Local Groundwater Flow Direction

It is assumed that groundwater flow is east toward the river, although the presence of subsurface structures such as tunnels and building footings may influence groundwater flow at shallow depths. A flow could not be determined based on the static water level measurements from the three monitoring wells due to the variability of the well screen depths and soil types encountered in the screened intervals. See Attachment 10: Monitoring Well Logs; and Attachment 11: Groundwater Flow Diagram.

2.3.3 Hydraulic Gradient

The hydraulic gradient for this area of the site could not be determined for the reasons stated in Section 2.3.2, above.

2.3.4 Hydraulic Conductivity

Slug test data obtained using a Hermit 2000© and analyzed using Aqtesolv© software indicated an average hydraulic conductivity of 0.0016 ft/min. See Attachment 12.

2.3.5 *Natural Groundwater Velocity (Seepage Velocity)*

The natural groundwater velocity is estimated based on the hydraulic conductivity, the hydraulic gradient, and the effective porosity. Due to the variability of the well screen depths and soil types encountered in the screened intervals, neither the hydraulic gradient nor the effective porosity could be determined in this area. Therefore, the natural groundwater velocity has not been estimated.

3.0 SOIL SAMPLE ANALYTICAL RESULTS

Soil samples were submitted to Fire & Environmental Consulting Laboratories, Inc., located in East Lansing, Michigan for analysis. Initially, sample analytical parameters were based on the former UST contents individually associated with each tank farm (Building 40 and Building 02). As the investigation proceeded and it became clear that combining the two areas would be more efficient, analytical parameters were expanded for each sample to include the following constituents: benzene, toluene, ethylbenzene, and xylenes (BTEX), polynuclear aromatic hydrocarbons (PNAs), halogenated hydrocarbons, chromium, and lead. Analysis indicated the presence of the following constituents in concentrations exceeding the Tier I Soil Leaching to Groundwater Risk-Based Screening Levels (RBSLs): benzene, toluene, ethylbenzene, xylenes, 2-methylnapthalene, and lead. Additional constituents were detected in concentrations that did not exceed the RBSLs. No exceedances of the Tier I Direct Contact RBSLs were noted, with the exception of lead in sample Bldg 02S-2 (5-6'). See Attachment 3 for a summary of soil analytical results, Attachment 4 for a Tier I comparison table, and Attachment 5 for soil concentration maps.

4.0 GROUNDWATER SAMPLE ANALYTICAL RESULTS

Soil samples were submitted to Fire & Environmental Consulting Laboratories, Inc., located in East Lansing, Michigan for analysis. Initially, sample analytical parameters were based on the former UST contents individually associated with each tank farm (Building 40 and Building 02). As the investigation proceeded and it became clear that combining the two areas would be more efficient, analytical parameters were expanded for each sample to include the following constituents: benzene, toluene, ethylbenzene, and xylenes (BTEX), polynuclear aromatic hydrocarbons (PNAs), halogenated hydrocarbons, chromium, and lead. Analysis indicated the presence of the following constituents in concentrations exceeding the Tier I Residential Health-Based Drinking Water and/or the Groundwater-Surface Water Interface RBSLs: benzene, ethylbenzene, toluene, xylenes, napthalene, and lead. Additional constituents were detected in concentrations that did not exceed RBSLs. No exceedances of the Tier I Direct Contact RBSLs were noted, with the

exception of benzene in sample Bldg 02S-5. See Attachment 7 for a summary of groundwater analytical results, Attachment 8 for a Tier I comparison table, and Attachment 9 for groundwater concentration maps.

5.0 CONCLUSION

Soil concentrations exceeding the Tier I Soil Leaching to Groundwater RBSLs are present, and lead is present in concentrations exceeding the Tier I Direct Contact RBSLs. As the site is under pavement, exposure to impacted soil is not expected.

Groundwater concentrations exceeding the Tier I Residential Health-Based Drinking Water, Groundwater Surface Water Interface, and Direct Contact RBSLs are noted.

Significant barriers to investigation are noted in this area in the way of buildings, equipment, subflooring, and subsurface structures/obstructions. Delineating impacted media to residential criteria in this area may not be possible.

5.1 Sensitive Receptors

The Flint River is located approximately 1500 feet east of the former tank farms. See Attachment 1. Current data indicates it is unlikely that impacted groundwater emanating from the former tank farm has or will reach the river.

The City of Flint is on a municipal water system. Most of the potable water wells within Genesee County are located beneath the glacial drift in the Saginaw Formation. The depth to the Saginaw Formation varies throughout the county, but is located roughly 300 feet below ground surface. It is unlikely that impacted groundwater will reach this aquifer.

5.2 Delineation

According to MDEQ Guidelines as established in the Memorandum dated January 19, 1996, the extent of contamination both horizontally and vertically must be delineated to below the Tier I residential unrestricted values.

Soil impacted with BTEX and PNA constituents is not delineated horizontally to the south or vertically at boring 40-1. Soil impacted with BTEX is not delineated directly north of boring 02S-4. Substantially elevated levels of lead are noted in borings 02S-2, 02S-3, and 02S-4, and the lead is not delineated vertically at these points, and is not delineated to the north or south. Substantially elevated levels of BTEX are also noted in this area, in borings, 02S-1, 02S-3, 02S-4, 02S-5, and vertical delineation was obtained

in only one boring, 02S-1, and the entire pocket remains undelineated to the north. See Attachments 5a - 5j. Borings 02S-2, 02S-3, and 02S-4 were terminated due to the presence of obstructions, and vertical delineation in this area may not be possible at this time. The concrete obstruction was noted in each boring at approximately six feet below ground surface. Further, delineation to the north may not be possible due to the presence, structure, and contents of Building 02.

Groundwater is impacted with BTEX constituents is not delineated to the south or west of borings 40-1 and 40-2, and to the north of boring 02S-5. Groundwater impacted with lead is not delineated to the east, north, and south of SB-1/MW-1 and boring 40-1. Boring 40-1 also indicated the presence of 1,2-Dichloroethane above the Tier I Health-Based Drinking Water RBSL. This constituent was not noted in any other samples analyzed for halogenated hydrocarbons. See Attachments 9a - 9j. The presence of buildings, equipment, subflooring, and subsurface structures/obstructions, may prevent any further delineation in this area.

5.3 Closure Potential

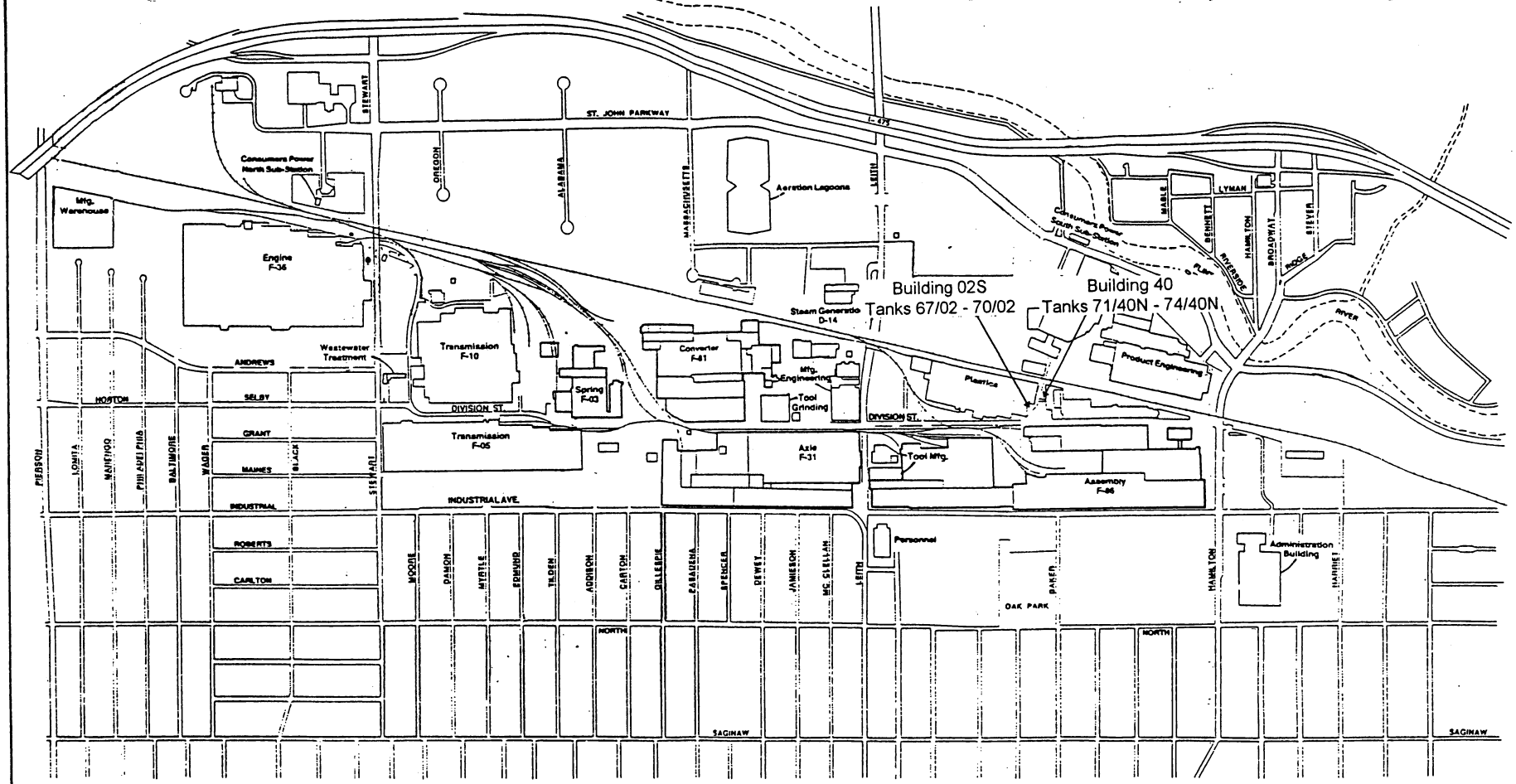
In addition to the barriers encountered during the investigation, the levels of BTEX in the soil and groundwater greatly exceed the applicable Tier I Direct Contact RBSLs for both residential and industrial sites. Active remediation is required in this area to reduce concentrations to acceptable levels.

5.4 Future Work

Global recommends that a feasibility study be conducted to determine the most cost-effective and efficient remediation option available.

This recommendations may change based on negotiations with the MDEQ and the development of the site-wide remedial action plan.

ATTACHMENT 1



LEGEND

F-36	Factory Number
D-14	Division Number
□	Hazardous Waste Storage Area
38	Building Number
—	Property Line
■	Gate House
●	Pedestrian Entrance
⊸⊸	Fence

Adapted from

EDI Engineering & Science

0 400 800 1200
Scale in Feet

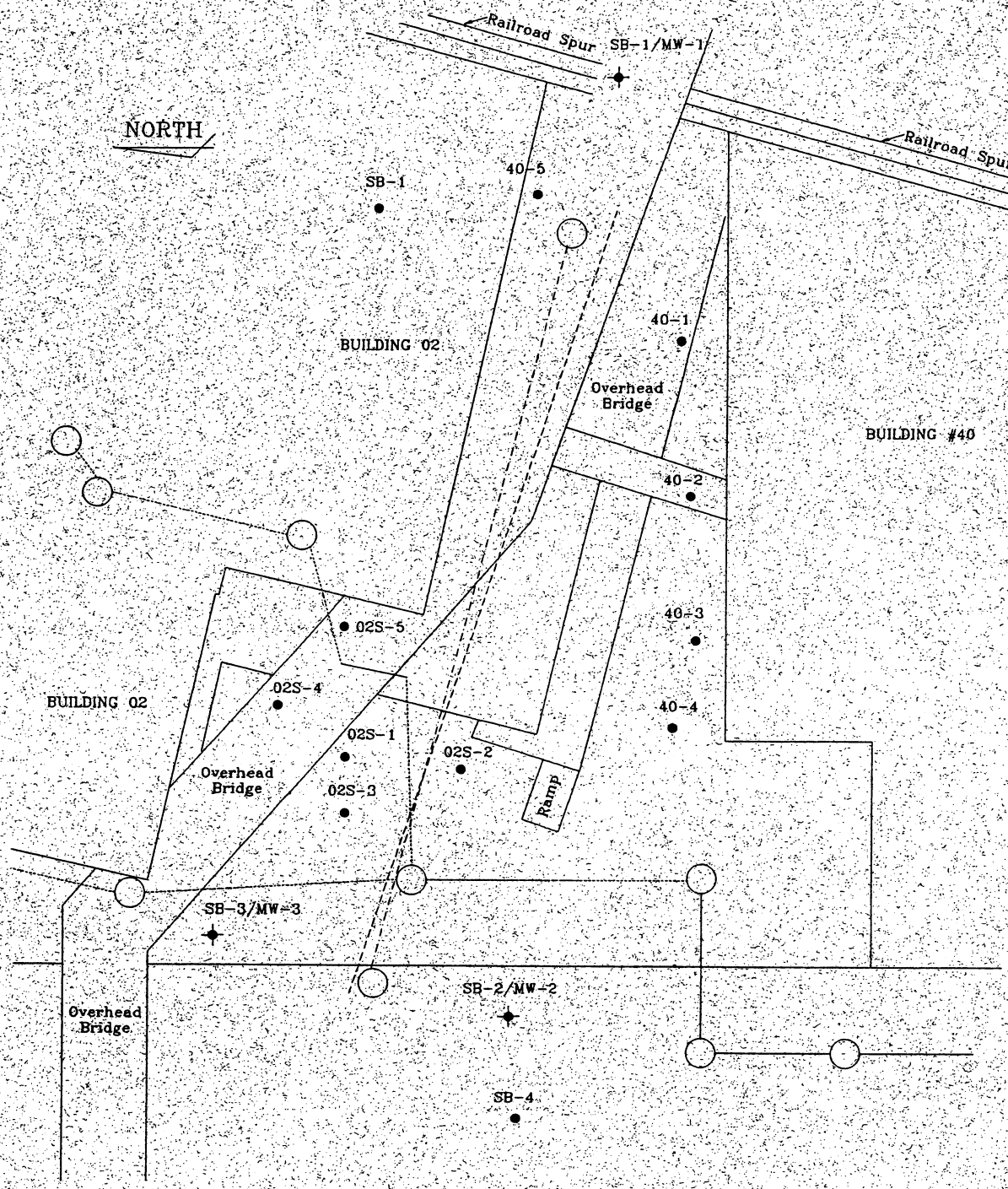
BOC FLINT OPERATIONS (BUICK SITE)

TANK FARM LOCATIONS/SITE DIAGRAM
ATTACHMENT 1

June, 1989

21080

ATTACHMENT 2



LEGEND:

- Geoprobe Sample Locations
- Monitoring Well Locations
- Fire Protection Line
- Sanitary Line
- Storm Sewer Line

GM-CLCD NORTH

TITLE: SAMPLE LOCATIONS
BUILDINGS 02 & 40
TANKS 67/02-70/02 & 71/40N-74/40N

SCALE: 1"=50'

DATE: 4/29/97

APPROVED BY: A.L.K.

PREPARED BY: C.G.S.

ATTACHMENT NUMBER 2

PROJECT NUMBER: F174

Global Environmental Engineering Inc.

ATTACHMENT 3

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	Bldg 02S-1 (13-15')		Bldg 02S-1 (19-21')		Bldg 02S-2 (5-6')		Bldg 02S-3 (6-8')		Bldg 02S-4 (10-12')	
Sample Depth (feet BGS)	13-15		19-21		5-6		6-8		10-12	
Date Collected	07/29/96		07/29/96		07/29/96		07/29/96		07/29/96	
Date Extracted	08/06/96		08/06/96		08/06/96		08/06/96		08/06/96	
Date Analyzed	08/06/96		08/06/96		08/06/96		08/06/96		08/06/96	
Analytical Method No.	8020		8020		8020		8020		8020	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	900	100	10	10	ND	10	2,600	500	17,500	500
☐ Toluene	7,200	100	90	10	ND	10	1,700	500	95,900	500
☐ Ethylbenzene	5,800	100	40	10	ND	10	44,200	500	135,000	500
☐ Total Xylenes	24,500	100	310	10	ND	10	75,800	500	410,000	500
☐ MTBE	ND	100	ND	10	ND	10	ND	500	ND	500
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene										
☐ Acenaphthylene										
☐ Anthracene										
☐ Benzo(a)anthracene										
☐ Benzo(a)pyrene										
☐ Benzo(b)fluoranthene										
☐ Benzo(g,h,i)perylene										
☐ Benzo(k)fluoranthene										

BGS=Below Ground Surface
*Collection Method Codes (list all that apply): Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
If Other (OT), Specify here:
MDL= Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

POLYNUCLEAR AROMATICS (PNAs)										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Chrysene										
☐ Dibenzo(a,h)anthracene										
☐ Fluoranthene										
☐ Fluorene										
☐ Indeno(1,2,3- cd)pyrene										
☐ Naphthalene										
☐ Phenanthrene										
☐ Pyrene										
☐ 2-Methylnaphthalene										
METALS										
Sample ID	Bldg 02S-1 (13-15')		Bldg 02S-1 (19-21')		Bldg 02S-2 (5-6')		Bldg 02S-3 (6-8')		Bldg 02S-4 (10-12')	
Sample Depth (feet BGS)	13-15		19-21		5-6		6-8		10-12	
Date Collected	07/29/96		07/29/96		07/29/96		07/29/96		07/29/96	
Date Extracted	08/08/96		08/08/96		08/08/96		08/08/96		08/08/96	
Date Analyzed	08/08/96		08/08/96		08/08/96		08/08/96		08/08/96	
Analytical Method No.	6020		6020		6020		6020		6020	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Cadmium										
☐ Total Chromium										
☐ Total Lead	10,200	1000	5,500	1000	954,000	1000	69,400	1000	30,600	1000

BGS=Below Ground Surface
*Collection Method Codes (list all that apply): Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
If Other (OT), Specify here: _____
MDL= Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	Bldg 02S-5 (15-17')		Bldg 02S-5 (19-21')							
Sample Depth (feet BGS)	15-17		19-21							
Date Collected	07/29/96		07/29/96							
Date Extracted	08/06/96		08/06/96							
Date Analyzed	08/06/96		08/06/96							
Analytical Method No.	8020		8020							
Collection Method*	GP		GP							
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	ND	100	21,300	500						
☐ Toluene	ND	100	66,200	500						
☐ Ethylbenzene	13,900	100	46,900	500						
☐ Total Xylenes	30,800	100	180,700	500						
☐ MTBE	ND	100	ND	500						
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene										
☐ Acenaphthylene										
☐ Anthracene										
☐ Benzo(a)anthracene										
☐ Benzo(a)pyrene										
☐ Benzo(b)fluoranthene										
☐ Benzo(g,h,i)perylene										
☐ Benzo(k)fluoranthene										

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
If Other (OT), Specify here: _____
MDL= Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

POLYNUCLEAR AROMATICS (PNAs)										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Chrysene										
☐ Dibenzo(a,h)anthracene										
☐ Fluoranthene										
☐ Fluorene										
☐ Indeno(1,2,3-cd)pyrene										
☐ Naphthalene										
☐ 2-Methylnaphthalene										
☐ Phenanthrene										
☐ Pyrene										
METALS										
Sample ID	Bldg 02S-5 (15-17')		Bldg 02S-5 (19-21')							
Sample Depth (feet BGS)	15-17		19-21							
Date Collected	07/29/96		07/29/96							
Date Extracted	08/08/96		08/08/96							
Date Analyzed	08/08/96		08/08/96							
Analytical Method No.	6020		6020							
Collection Method*	GP		GP							
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Cadmium										
☐ Total Chromium										
☐ Total Lead	14,100	1000	5,800	1000						

BGS=Below Ground Surface
*Collection Method Codes (list all that apply): Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
If Other (OT), Specify here: _____
MDL= Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	Bldg 02S-5 (15-17')		Bldg 02S-5 (19-21')		Bld 02 SB-1 (13-15')		Bld 02 SB-1 (19-21')			
Sample Depth (feet BGS)	15-17		19-21		13-15		19-21			
Date Collected	07/29/96		07/29/96		06/03/97		06/03/97			
Date Extracted	08/06/96		08/06/96							
Date Analyzed	08/06/96		08/06/96		06/11/97		06/11/97			
Analytical Method No.	8020		8020		8260		8260			
Collection Method*	GP		GP		GP		GP			
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	ND	100	21,300	500	ND	10	ND	10		
☐ Toluene	ND	100	66,200	500	ND	10	ND	10		
☐ Ethylbenzene	13,900	100	46,900	500	ND	10	ND	10		
☐ Total Xylenes	30,800	100	180,700	500	ND	10	ND	10		
☐ MTBE	ND	100	ND	500						
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID					Bld 02 SB-1 (13-15')		Bld 02 SB-1 (19-21')			
Sample Depth (feet BGS)					13-15		19-21			
Date Collected					06/03/97		06/03/97			
Date Extracted					06/06/97		06/06/97			
Date Analyzed					06/05/97		06/05/97			
Analytical Method No.					8260		8260			
Collection Method*					GP		GP			
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene					ND	330	ND	330		
☐ Acenaphthylene					ND	330	ND	330		
☐ Anthracene					ND	330	ND	330		
☐ Benzo(a)anthracene					ND	330	ND	330		
☐ Benzo(a)pyrene					ND	330	ND	330		
☐ Benzo(b)fluoranthene					ND	330	ND	330		
☐ Benzo(g,h,i)perylene					ND	330	ND	330		
☐ Benzo(k)fluoranthene					ND	330	ND	330		

BGS=Below Ground Surface
*Collection Method Codes (list all that apply): Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
If Other (OT), Specify here: _____
MDL= Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

POLYNUCLEAR AROMATICS (PNAs)										
Sample ID					Bld 02 SB-1 (13-15')		Bld 02 SB-1 (19-21')			
Sample Depth (feet BGS)					13-15		19-21			
Date Collected					06/03/97		06/03/97			
Date Extracted					06/06/97		06/06/97			
Date Analyzed					06/05/97		06/05/97			
Analytical Method No.					8260		8260			
Collection Method*					GP		GP			
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Chrysene					ND	330	ND	330		
☐ Dibenzo(a,h)anthracene					ND	330	ND	330		
☐ Fluoranthene					ND	330	ND	330		
☐ Fluorene					ND	330	ND	330		
☐ Indeno(1,2,3- cd)pyrene					ND	330	ND	330		
☐ Naphthalene					ND	330	ND	330		
☐ 2-Methylnaphthalene					ND	330	ND	330		
☐ Phenanthrene					ND	330	ND	330		
☐ Pyrene										
METALS										
Sample ID	Bldg 02S-5 (15-17')		Bldg 02S-5 (19-21')		Bld 02 SB-1 (13-15')		Bld 02 SB-1 (19-21')			
Sample Depth (feet BGS)	15-17		19-21		13-15		19-21			
Date Collected	07/29/96		07/29/96		06/03/97		06/03/97			
Date Extracted	08/08/96		08/08/96		06/06/97		06/06/97			
Date Analyzed	08/08/96		08/08/96		06/05/97		06/05/97			
Analytical Method No.	6020		6020		8260		8260			
Collection Method*	GP		GP		GP		GP			
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Cadmium										
☐ Total Chromium					7800	1000	14000	1000		
☐ Total Lead	14,100	1000	5,800	1000	4400	1000	5900	1000		

BGS=Below Ground Surface
*Collection Method Codes (list all that apply): Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
If Other (OT), Specify here: _____
MDL= Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	SB1/MW1		SB1/MW1		SB2/MW2		SB2/MW2			
Sample Depth (feet BGS)	4-6		10-12		8-10		14-16			
Date Collected	11/08/96		11/08/96		11/08/96		11/08/96			
Date Extracted	11/16/96		11/20/96		11/20/96		11/20/96			
Date Analyzed	11/16/96		11/20/96		11/20/96		11/20/96			
Analytical Method No.	8020		8020		8020		8020			
Collection Method*	GP		GP		GP		GP			
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	ND	10	ND	10	ND	10	ND	10		
☐ Toluene	ND	10	ND	10	ND	10	ND	10		
☐ Ethylbenzene	ND	10	ND	10	300	10	ND	10		
☐ Total Xylenes	ND	10	ND	10	200	10	ND	10		
☐ MTBE	NA	NA	NA	NA	NA	NA	NA	NA		
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	SB1/MW1		SB1/MW1							
Sample Depth (feet BGS)	4-6		10-12							
Date Collected	11/08/96		11/08/96							
Date Extracted	11/15/96		11/15/96							
Date Analyzed	11/16/96		11/16/96							
Analytical Method No.	8270		8270							
Collection Method*	GP		GP							
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene	ND	300	ND	300						
☐ Acenaphthylene	ND	300	ND	300						
☐ Anthracene	ND	300	ND	300						
☐ Benzo(a)anthracene	ND	300	ND	300						
☐ Benzo(a)pyrene	ND	300	ND	300						
☐ Benzo(b)fluoranthene	ND	300	ND	300						
☐ Benzo(g,h,i)perylene	ND	300	ND	300						
☐ Benzo(k)fluoranthene	ND	300	ND	300						

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
If Other (OT), Specify here: _____
MDL= Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	SB1/MW1		SB1/MW1							
Sample Depth (feet BGS)	4-6		10-12							
Date Collected	11/08/96		11/08/96							
Date Extracted	11/15/96		11/20/96							
Date Analyzed	11/16/96		11/20/96							
Analytical Method No.	8270		8020							
Collection Method*	GP		GP							
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Chrysene	ND	300	ND	300						
☐ Dibenzo(a,h)anthracene	ND	300	ND	300						
☐ Fluoranthene	ND	300	ND	300						
☐ Fluorene	ND	300	ND	300						
☐ Indeno(1,2,3- cd)pyrene	ND	300	ND	300						
☐ Naphthalene	ND	300	ND	300						
☐ Phenanthrene	ND	300	ND	300						
☐ Pyrene	ND	300	ND	300						
☐ 2-Methylnaphthalene	ND	300	ND	300						
METALS										
Sample ID	SB1/MW1		SB1/MW1		SB2/MW2		SB2/MW2			
Sample Depth (feet BGS)	4-6		10-12		8-10		8-10			
Date Collected	11/08/96		11/08/96		11/08/96		11/08/96			
Date Extracted	11/20/96		11/20/96		11/20/96		11/20/96			
Date Analyzed	11/20/96		11/20/96		11/20/96		11/20/96			
Analytical Method No.	6020		6020		6020		6020			
Collection Method*	GP		GP		GP		GP			
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Cadmium										
☐ Total Chromium										
☐ Total Lead	8300	1000	5000	1000	5300	1000	6100	1000		

BGS=Below Ground Surface
*Collection Method Codes (list all that apply), Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
If Other (OT), Specify here: _____
MDL= Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO OPERATIONS (TANKS 071/40N - 074/40N
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	Bldg 40-1 (17-19')		Bldg 40-2 (3-5')		Bldg 40-2 (13-15')		Bldg 40-3 (11-13')		Bldg 40-3 (19-21')	
Sample Depth (feet BGS)	17-19		3-5		13-15		11-13		19-21	
Date Collected	7/24/96		7/24/96		7/24/96		7/24/96		7/24/96	
Date Extracted	7/27/96		7/27/96		7/27/96		7/27/96		7/27/96	
Date Analyzed	7/27/96		7/27/96		7/27/96		7/27/96		7/27/96	
Analytical Method No.	8020		8020		8020		8020		8020	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	600	500	ND	10	ND	10	ND	10	ND	10
☐ Toluene	1,100	500	ND	10	ND	10	ND	10	ND	10
☐ Ethylbenzene	20,300	500	ND	10	ND	10	ND	10	ND	10
☐ Total Xylenes	69,000	500	ND	10	ND	10	ND	10	ND	10
☐ MTBE										
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	Bldg 40-1 (17-19')		Bldg 40-2 (3-5')		Bldg 40-2 (13-15')		Bldg 40-3 (11-13')		Bldg 40-3 (19-21')	
Sample Depth (feet BGS)	17-19		3-5		13-15		11-13		19-21	
Date Collected	7/24/96		7/24/96		7/24/96		7/24/96		7/24/96	
Date Extracted	7/29/96		7/29/96		7/29/96		7/29/96		7/29/96	
Date Analyzed	8/04/96		8/04/96		8/04/96		8/04/96		8/04/96	
Analytical Method No.	8270		8270		8270		8270		8270	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Acenaphthylene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Anthracene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Benzo(a)anthracene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Benzo(a)pyrene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Benzo(b)fluoranthene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Benzo(g,h,i)perylene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Benzo(k)fluoranthene	ND	330	ND	330	ND	330	ND	330	ND	330

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
If Other (OT), Specify here: _____
MDL= Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	Bldg 40-1 (17-19')		Bldg 40-2 (3-5')		Bldg 40-2 (13-15')		Bldg 40-3 (11-13')		Bldg 40-3 (19-21')	
Sample Depth (feet BGS)	17-19		3-5		13-15		11-13		19-21	
Date Collected	7/24/96		7/24/96		7/24/96		7/24/96		7/24/96	
Date Extracted	7/29/96		7/29/96		7/29/96		7/29/96		7/29/96	
Date Analyzed	8/04/96		8/04/96		8/04/96		8/04/96		8/04/96	
Analytical Method No.	8270		8270		8270		8270		8270	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Chrysene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Dibenzo(a,h)anthracene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Fluoranthene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Fluorene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Indeno(1,2,3-cd)pyrene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Naphthalene	4,420	330	ND	330	ND	330	ND	330	ND	330
☐ Phenanthrene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Pyrene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ 2-Methylnaphthalene	9,310	330	ND	330	ND	330	ND	330	ND	330
METALS										
Sample ID	Bldg 40-1 (17-19')		Bldg 40-2 (3-5')		Bldg 40-2 (13-15')		Bldg 40-3 (11-13')		Bldg 40-3 (19-21')	
Sample Depth (feet BGS)	17-19		3-5		13-15		11-13		19-21	
Date Collected	7/24/96		7/24/96		7/24/96		7/24/96		7/24/96	
Date Extracted	7/29/96		7/29/96		7/29/96		7/29/96		7/29/96	
Date Analyzed	7/29/96		7/29/96		7/29/96		7/29/96		7/29/96	
Analytical Method No.	6020		6020		6020		6020		6020	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Cadmium	ND	50	ND	50	ND	50	ND	50	ND	50
☐ Total Chromium	1400	1000	8700	1000	13500	1000	1800	1000	5500	1000
☐ Total Lead	6000	1000	24800	1000	9400	1000	2200	1000	4500	1000

BGS=Below Ground Surface
*Collection Method Codes (list all that apply): Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
If Other (OT), Specify here: _____
MDL= Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

PCBs										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Aroclor 1016										
☐ Aroclor 1221										
☐ Aroclor 1232										
☐ Aroclor 1242										
☐ Aroclor 1248										
☐ Aroclor 1254										
☐ Aroclor 1280										
HALOGENATED HYDROCARBONS										
Sample ID	Bldg 40-1 (17-19')		Bldg 40-2 (3-5')		Bldg 40-2 (13-15')		Bldg 40-3 (11-13')		Bldg 40-3 (19-21')	
Sample Depth (feet BGS)	17-19		3-5		13-15		11-13		19-21	
Date Collected	7/24/96		7/24/96		7/24/96		7/24/96		7/24/96	
Date Extracted	7/27/96		7/27/96		7/27/96		7/27/96		7/27/96	
Date Analyzed	7/27/96		7/27/96		7/27/96		7/27/96		7/27/96	
Analytical Method No.	8010		8010		8010		8010		8010	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Carbon Tetrachloride	ND	500	ND	10	ND	10	ND	10	ND	10
☐ 1,1-Dichloroethane	ND	500	ND	10	ND	10	ND	10	ND	10
☐ 1,2-Dichloroethane	ND	500	ND	10	ND	10	ND	10	ND	10
☐ 1,1-Dichloroethylene	ND	500	ND	10	ND	10	ND	10	ND	10

BGS=Below Ground Surface
*Collection Method Codes (list all that apply): Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
If Other (OT), Specify here: _____
MDL= Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

HALOGENATED HYDROCARBONS										
Sample ID	Bldg 40-1 (17-19')		Bldg 40-2 (3-5')		Bldg 40-2 (13-15')		Bldg 40-3 (11-13')		Bldg 40-3 (19-21')	
Sample Depth (feet BGS)	17-19		3-5		13-15		11-13		19-21	
Date Collected	7/24/96		7/24/96		7/24/96		7/24/96		7/24/96	
Date Extracted	7/27/96		7/27/96		7/27/96		7/27/96		7/27/96	
Date Analyzed	7/27/96		7/27/96		7/27/96		7/27/96		7/27/96	
Analytical Method No.	8010		8010		8010		8010		8010	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ cis-1,2-Dichloroethylene	ND	500	ND	10	ND	10	ND	10	ND	10
☐ trans-1,2-Dichloroethylene	ND	500	ND	10	ND	10	ND	10	ND	10
☐ Tetrachloroethylene	ND	500	ND	10	ND	10	ND	10	ND	10
☐ 1,1,2-Trichloroethane	ND	500	ND	10	ND	10	ND	10	ND	10
OTHER *(Specify)*										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐										
☐										
☐										
☐										
☐										
☐										
☐										

BGS=Below Ground Surface
*Collection Method Codes (list all that apply): Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
If Other (OT), Specify here: _____
MDL= Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	Bldg 40-4 (14-16')		Bldg 40-5 (7-9')		Bldg 40-5 (15-17')					
Sample Depth (feet BGS)	14-16		7-9		15-17					
Date Collected	7/24/96		11/12/96		11/12/96					
Date Extracted	7/27/96		11/16/96		11/16/96					
Date Analyzed	7/27/96		11/16/96		11/16/96					
Analytical Method No.	8020		8020		8020					
Collection Method*	GP		GP		GP					
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	ND	100	ND	10	ND	10				
☐ Toluene	ND	100	ND	10	ND	10				
☐ Ethylbenzene	ND	100	ND	10	ND	10				
☐ Total Xylenes	ND	100	ND	10	ND	10				
☐ MTBE										
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	Bldg 40-4 (14-16')		Bldg 40-5 (7-9')		Bldg 40-5 (15-17')					
Sample Depth (feet BGS)	14-16		7-9		15-17					
Date Collected	7/24/96		11/12/96		11/12/96					
Date Extracted	7/29/96		11/19/96		11/19/96					
Date Analyzed	8/04/96		11/27/96		11/27/96					
Analytical Method No.	8270		8270		8270					
Collection Method*	GP		GP		GP					
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene	ND	3000	ND	300	ND	300				
☐ Acenaphthylene	ND	3000	ND	300	ND	300				
☐ Anthracene	ND	3000	ND	300	ND	300				
☐ Benzo(a)anthracene	ND	3000	ND	300	ND	300				
☐ Benzo(a)pyrene	ND	3000	ND	300	ND	300				
☐ Benzo(b)fluoranthene	ND	3000	ND	300	ND	300				
☐ Benzo(g,h,i)perylene	ND	3000	ND	300	ND	300				
☐ Benzo(k)fluoranthene	ND	3000	ND	300	ND	300				

BGS=Below Ground Surface
*Collection Method Codes (list all that apply): Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
If Other (OT), Specify here: _____
MDL= Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	Bldg 40-4 (14-16')		Bldg 40-5 (7-9')		Bldg 40-5 (15-17')					
Sample Depth (feet BGS)	14-16		7-9		15-17					
Date Collected	7/24/96		11/12/96		11/12/96					
Date Extracted	7/29/96		11/19/96		11/19/96					
Date Analyzed	8/04/96		11/27/96		11/27/96					
Analytical Method No.	8270		8270		8270					
Collection Method*	GP		GP		GP					
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Chrysene	ND	3000	ND	300	ND	300				
☐ Dibenzo(a,h)anthracene	ND	3000	ND	300	ND	300				
☐ Fluoranthene	ND	3000	ND	300	ND	300				
☐ Fluorene	ND	3000	ND	300	ND	300				
☐ Indeno(1,2,3- cd)pyrene	ND	3000	ND	300	ND	300				
☐ Naphthalene	ND	3000	ND	300	ND	300				
☐ 2-Methylnaphthalene	ND	3000	ND	300	ND	300				
☐ Phenanthrene	3,000	3000	ND	300	ND	300				
☐ Pyrene	ND	3000	ND	300	ND	330				
METALS										
Sample ID	Bldg 40-4 (14-16')		Bldg 40-5 (7-9')		Bldg 40-5 (15-17')					
Sample Depth (feet BGS)	14-16		7-9		15-17					
Date Collected	7/24/96		11/12/96		11/12/96					
Date Extracted	7/29/96		11/20/96		11/20/96					
Date Analyzed	7/29/96		11/20/96		11/20/96					
Analytical Method No.	6020		6020		6020					
Collection Method*	GP		GP		GP					
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Cadmium	ND	50								
☐ Total Chromium	4700	1000								
☐ Total Lead	5000	1000	11200	1000	5900	1000				

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
If Other (OT), Specify here: _____
MDL= Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

PCBs										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Aroclor 1016										
☐ Aroclor 1221										
☐ Aroclor 1232										
☐ Aroclor 1242										
☐ Aroclor 1248										
☐ Aroclor 1254										
☐ Aroclor 1280										
HALOGENATED HYDROCARBONS										
Sample ID	Bldg 40-4 (14-16')		Bldg 40-5 (7-9')		Bldg 40-5 (15-17')					
Sample Depth (feet BGS)	14-16		7-9		15-17					
Date Collected	7/24/96		11/12/96		11/12/96					
Date Extracted	7/27/96		11/16/96		11/16/96					
Date Analyzed	7/27/96		11/16/96		11/16/96					
Analytical Method No.	8010		8010		8010					
Collection Method*	GP		GP		GP					
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Carbon Tetrachloride	ND	100	ND	10	ND	10				
☐ 1,1-Dichloroethane	ND	100	ND	10	ND	10				
☐ 1,2-Dichloroethane	ND	100	ND	10	ND	10				
☐ 1,1-Dichloroethylene	ND	100	ND	10	ND	10				

BGS=Below Ground Surface
*Collection Method Codes (list all that apply): Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
If Other (OT), Specify here: _____
MDL= Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

HALOGENATED HYDROCARBONS										
Sample ID	Bldg 40-4 (14-16')		Bldg 40-5 (7-9')		Bldg 40-5 (15-17')					
Sample Depth (feet BGS)	14-16		7-9		15-17					
Date Collected	7/24/96		11/12/96		11/12/96					
Date Extracted	7/27/96		11/16/96		11/16/96					
Date Analyzed	7/27/96		11/16/96		11/16/96					
Analytical Method No.	8010		8010		8010					
Collection Method*	GP		GP		GP					
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ cis-1,2-Dichloroethylene	ND	100	ND	10	ND	10				
☐ trans-1,2-Dichloroethylene	ND	100	ND	10	ND	10				
☐ Tetrachloroethylene	ND	100	ND	10	ND	10				
☐ 1,1,2-Trichloroethane	ND	100	ND	10	ND	10				
OTHER *(Specify)*										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐										
☐										
☐										
☐										
☐										
☐										
☐										

BGS=Below Ground Surface
*Collection Method Codes (list all that apply): Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
If Other (OT), Specify here: _____
MDL= Method Detection Limit

ATTACHMENT 4

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

TIER I RBSL/TIER II OR TIER III SSTL COMPARISON TABLE FOR SOILS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

☑ Residential ☐ Commercial III ☐ Commercial IV ☑ Industrial
Exposure Codes

Contaminant	Sample ID with Maximum Detected Concentration	Corresponding Sample Date	Maximum Detected Concentration (ug/kg)	Applicable Criterion (ug/kg)		
				Tier I Soil Leaching to Groundwater	Tier I Residential Direct Contact	Tier I Residential Infinite Source VSIC
VOLATILES						
☐ Benzene	Bldg 02S-5 (19-21')	07/29/96	21,300	100	88,000	9600
☐ Toluene	Bldg 02S-4 (10-12')	07/29/96	95,000	16,000	>620,000	2E+6
☐ Ethylbenzene	Bldg 02S-4 (10-12')	07/29/96	135,000	1500	>380,000	6.7E+6
☐ Total Xylenes	Bldg 02S-4 (10-12')	07/29/96	910,000	5600	>400,000	3.2E+7
☐ MTBE						
POLYNUCLEAR AROMATICS						
☐ Acenaphthene			ND	300,000	76,000	5.7E+7
☐ Acenaphthylene			ND	520	1,500,000	ID
☐ Anthracene			ND	6,900,000	420,000,000	9.8E+8
☐ Benzo(a)anthracene			ND	E	14,000	ID
☐ Benzo(a)pyrene			ND	E	1400	ID
☐ Benzo(b)fluoranthene			ND	E	14,000	ID
☐ Benzo(g,h,i)perylene			ND	E	1,500,000	ID
☐ Benzo(k)fluoranthene			ND	E	140,000	ID
☐ Chrysene			ND	E	1,400,000	ID
☐ Dibenzo- (a,h)anthracene			ND	E	1400	ID
☐ Fluoranthene			ND	3,000,000	51,000,000	5.3E+8
☐ Fluorene			ND	390,000	51,000,000	8.9E+7
☐ Indeno(1,2,3- cd)pyrene			ND	E	14,000	ID
☐ Naphthalene	Bldg 40-1 (17-19')	07/24/96	4,420	17,000	15,000,000	9.8E+6
☐ Phenanthrene	Bldg 40-4 (14-16')	07/24/96	3,000	12,000	1,500,000	ID
☐ Pyrene			ND	1,800,000	32,000,000	4.7E+8
☐ 2-Methylnapthalene	Bldg 40-1 (17-19')	07/24/96	9,301	5200	15,000,000	ID

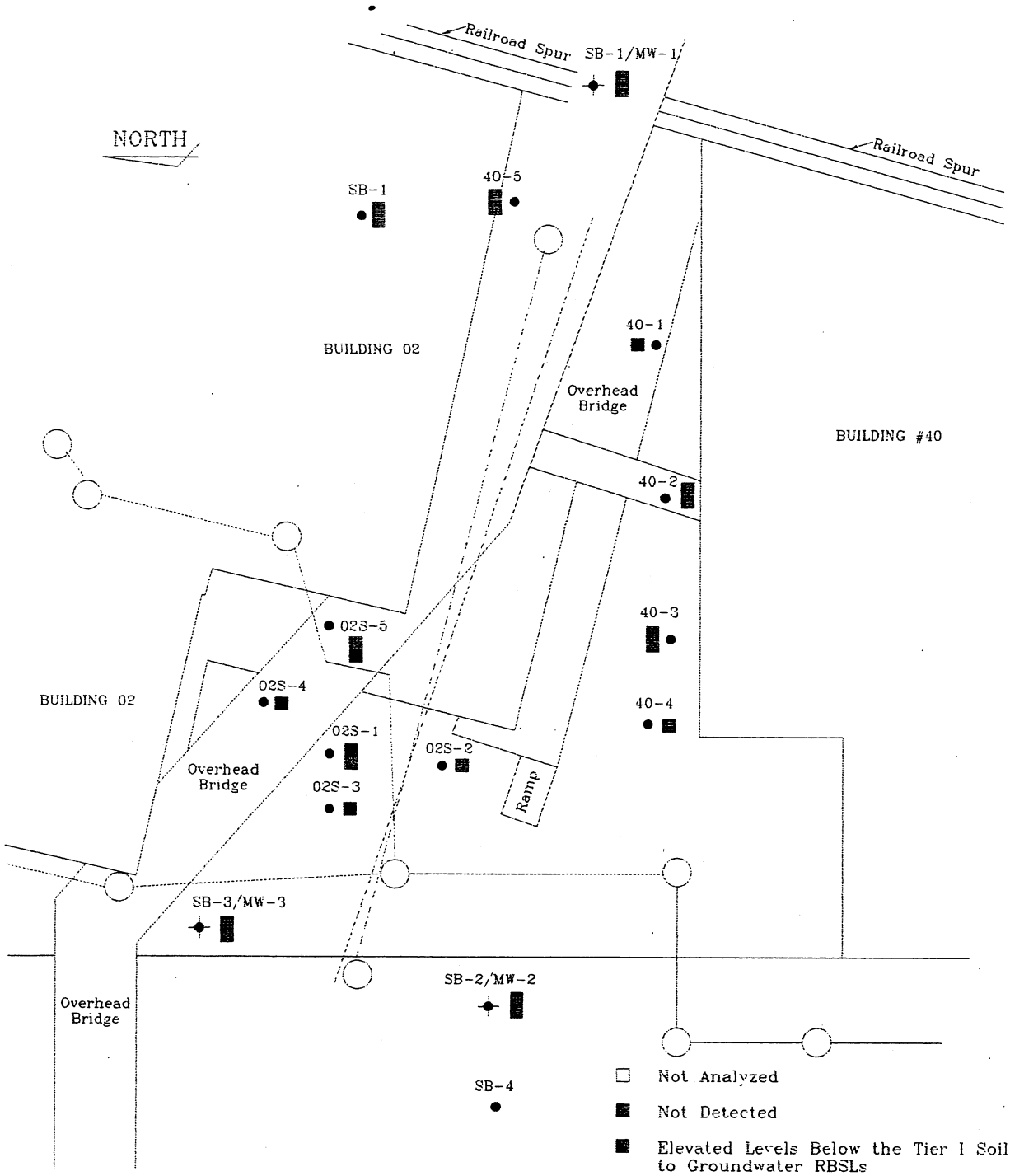
Shading indicates concentration exceeds one or more Tier I RBSLs
"E" = Chemical, due to its physiochemical properties, is not expected to leach through soils to groundwater under most conditions
"ID" = Insufficient Data
"ND" = Non-Detect

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

TIER I RBSL/TIER II OR TIER III SSTL COMPARISON TABLE FOR SOILS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

Contaminant	Sample ID with Maximum Detected Concentration	Corresponding Sample Date	Maximum Detected Concentration (ug/kg)	Applicable Criterion (ug/kg)		
				Tier I Soil Leaching to Groundwater	Tier I Residential Direct Contact	Tier I Residential Infinite Source VSIC
METALS						
☐ Cadmium			NA	1200	210,000	ID
☐ Total Chromium	Bldg 40-2 (13-15')	07/24/96	13,500	18,000	2,000,000	ID
☐ Total Lead	Bldg 02S-2 (5-6')	07/29/96	954,000	21,000	400,000	ID
PCBs						
☐ Aroclor 1016						
☐ Aroclor 1221						
☐ Aroclor 1232						
☐ Aroclor 1242						
☐ Aroclor 1248						
☐ Aroclor 1254						
☐ Aroclor 1280						
HALOGENATED HYDROCARBONS						
☐ Carbon Tetrachloride			ND	100	20,000	2600
☐ 1,1-Dichloroethane			ND	18,000	>1,100,000	2.2E+7
☐ 1,2-Dichloroethane			ND	100	28,000	4400
☐ 1,1-Dichloroethylene			ND	140	110,000	830
☐ cis-1,2-Dichloroethylene			ND	1400	>1,000,000	2.9E+7
☐ trans-1,2-Dichloroethylene			ND	2000	1,900,000	2.0E+5
☐ Tetrachloroethylene			ND	100	50,000	1.3E+5
☐ 1,1,2-Trichloroethane			ND	100	45,000	5.2E+7
OTHER*						
☐						
☐						

ATTACHMENT 5



Not Analyzed

Not Detected

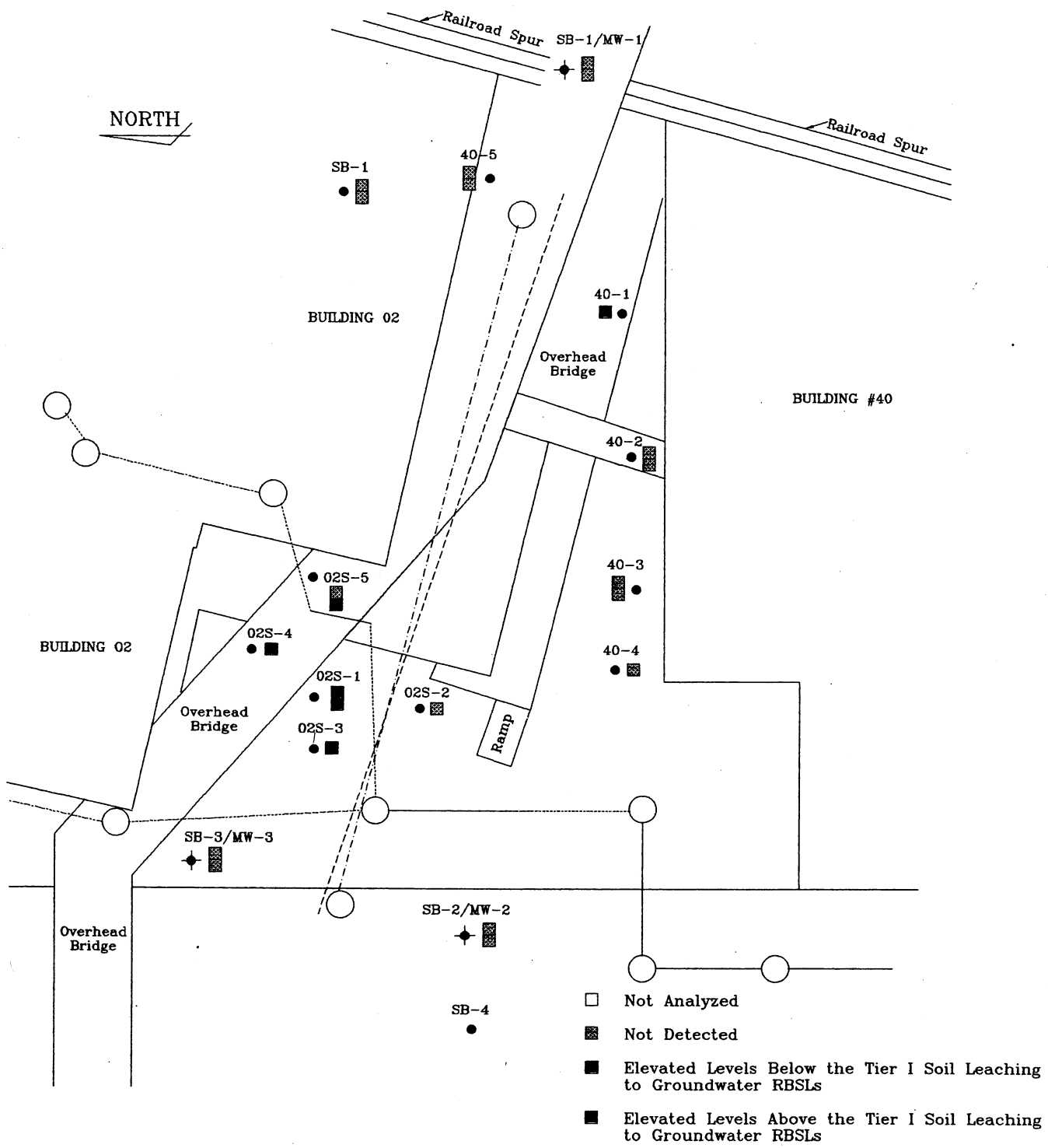
Elevated Levels Below the Tier I Soil Leaching to Groundwater RBSLs

Elevated Levels Above the Tier I Soil Leaching to Groundwater RBSLs

LEGEND:

- Geoprobe Sample Locations
- Monitoring Well Locations
- Fire Protection Line
- Sanitary Line
- Storm Sewer Line

GM-CLCD NORTH	
TITLE: SOIL CONCENTRATION MAP: BENZENE BUILDING 02 & 40 TANKS 67/02-70/02 & 71/40N-74/40N	
SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 5a
	PROJECT NUMBER: F174



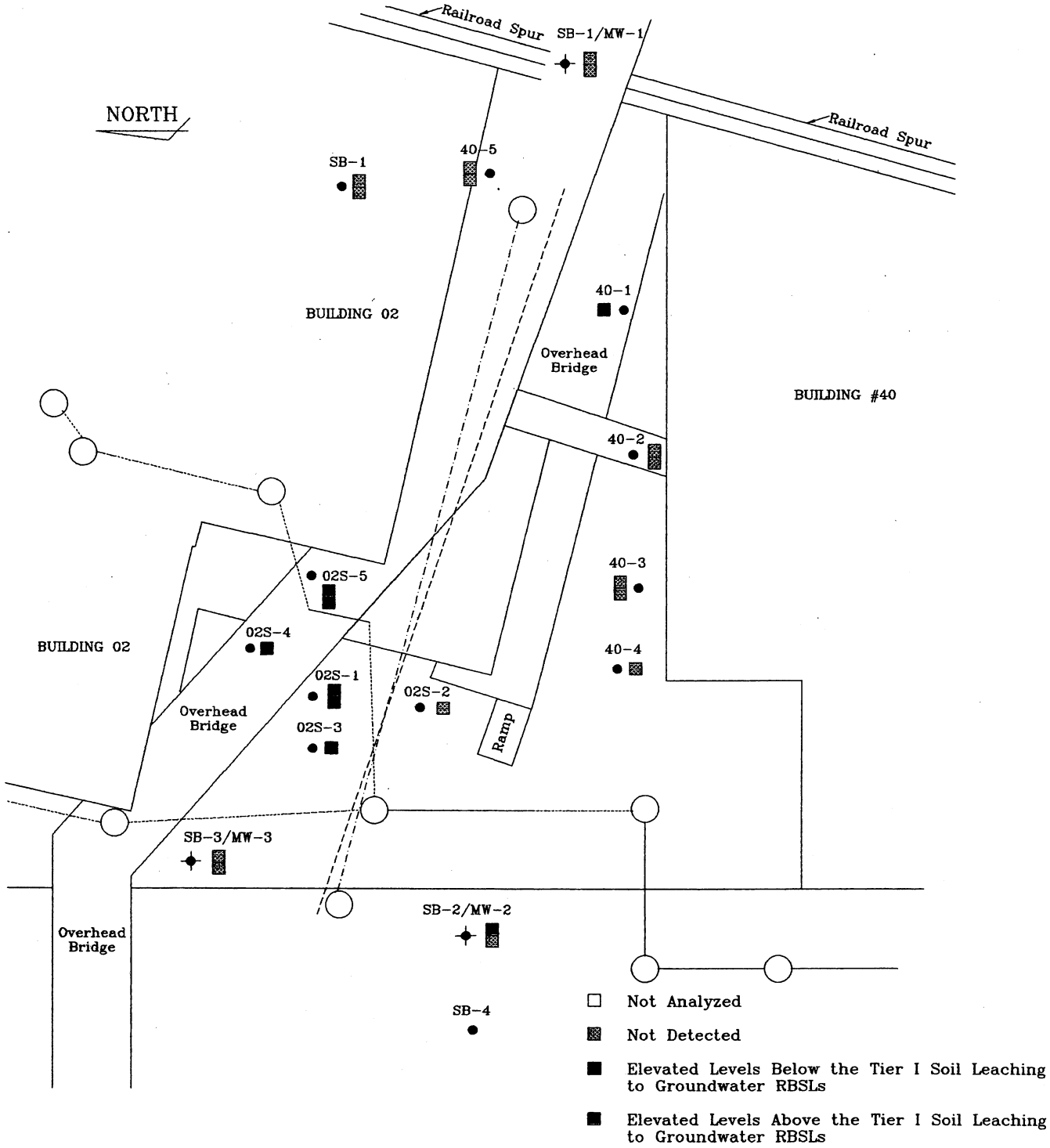
LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- ——— Sanitary Line
- —·—· Storm Sewer Line

GM-CLCD NORTH

TITLE: SOIL CONCENTRATION MAP:TOLUENE
BUILDINGS 02 & 40
TANKS 67/02-70/02 & 71/40N-74/40N

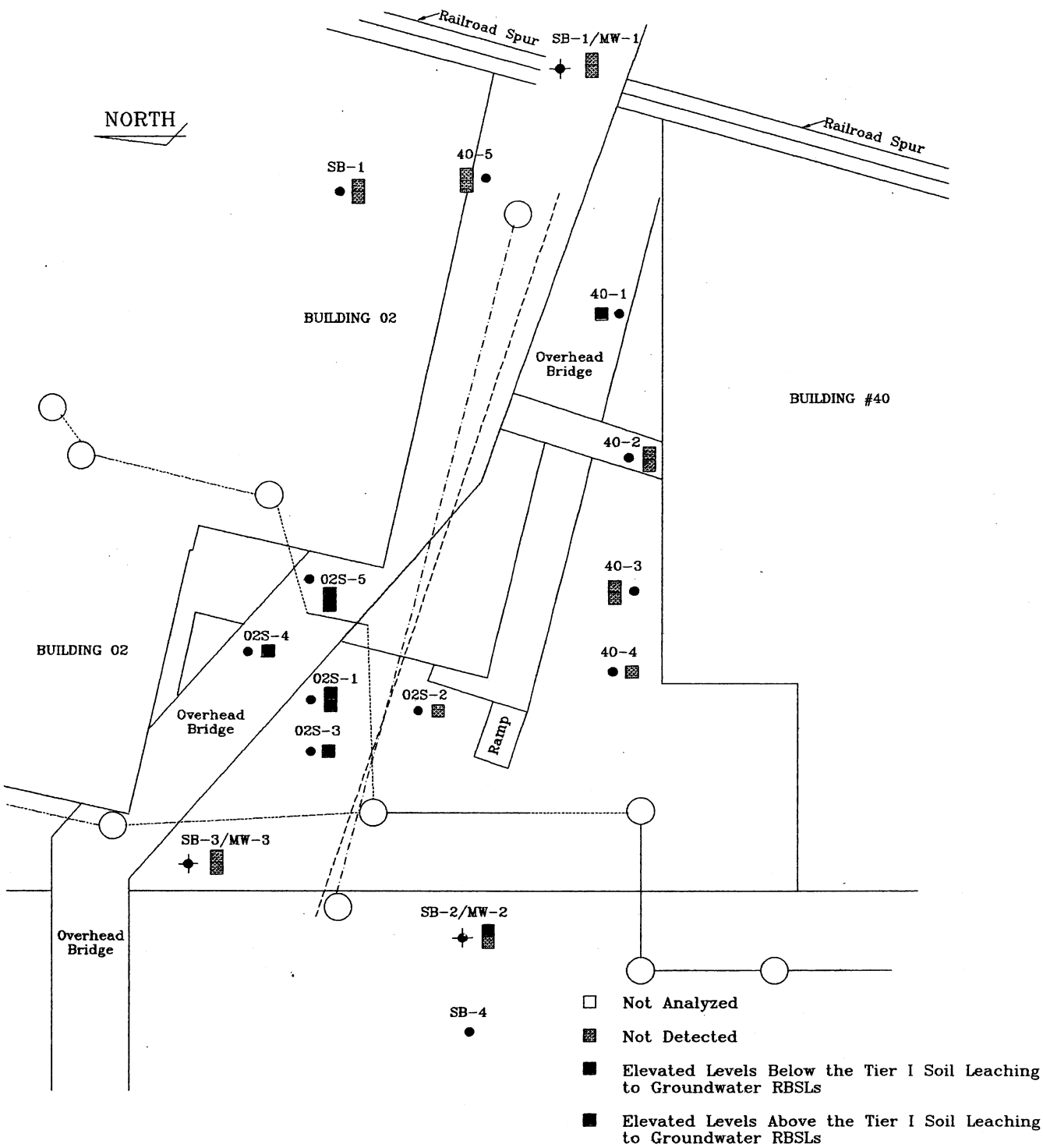
SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER:5b
	PROJECT NUMBER: F174



LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- ----- Sanitary Line
- —·—·— Storm Sewer Line

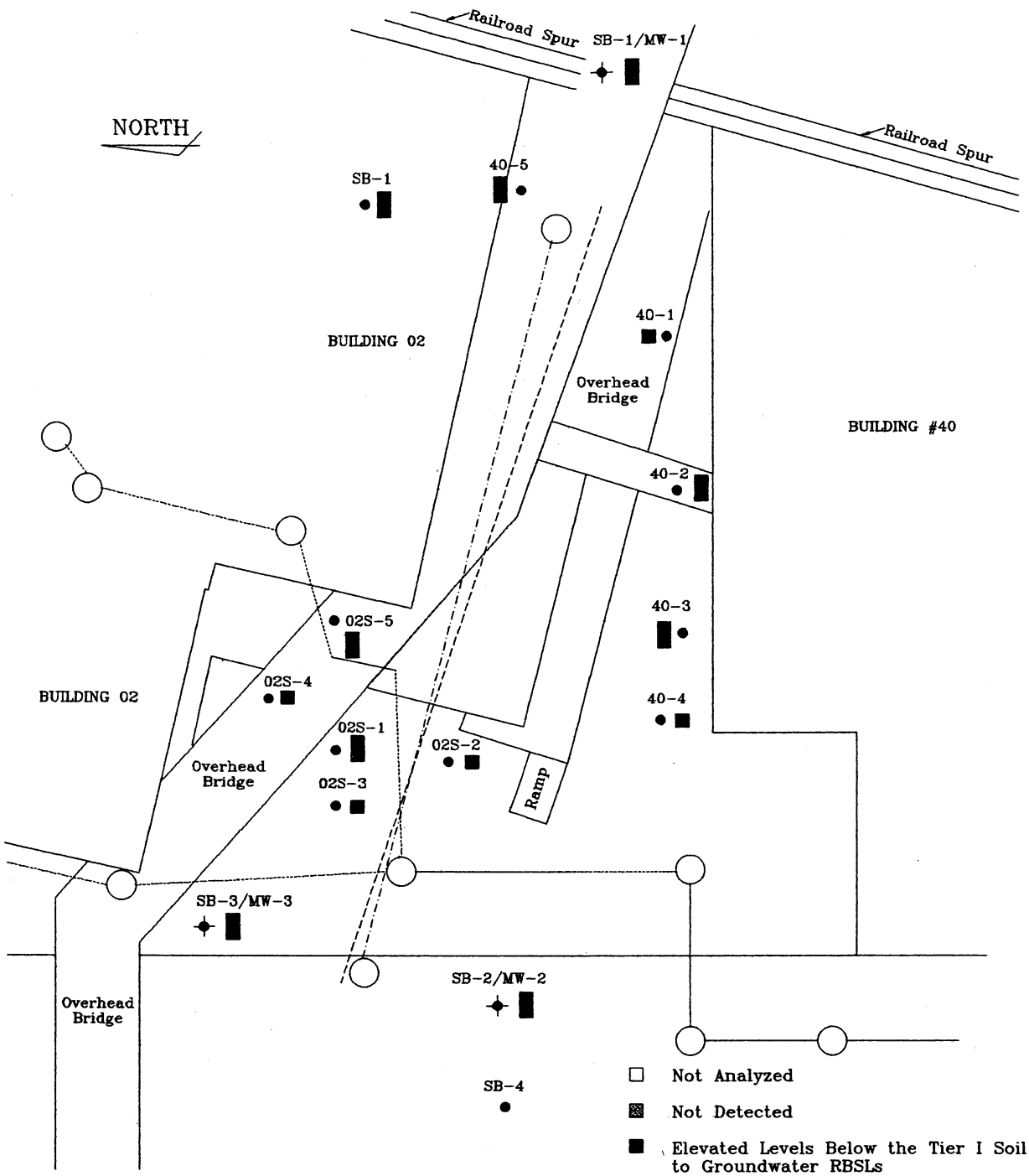
GM-CLCD NORTH	
TITLE: SOIL CONCENTRATION MAP: ETHYLBENZENE BUILDINGS 02 & 40 TANKS 67/02-70/02 & 71/40N-74/40N	
SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 5c
	PROJECT NUMBER: F174



LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- ---- Sanitary Line
- —·—· Storm Sewer Line

GM-CLCD NORTH	
TITLE: SOIL CONCENTRATION MAP: TOTAL XYLENES BUILDINGS 02 & 40 TANKS 67/02-70/02 & 71/40N-74/40N	
SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 5d
	PROJECT NUMBER: F174



Not Analyzed

Not Detected

Elevated Levels Below the Tier I Soil Leaching to Groundwater RBSLs

Elevated Levels Above the Tier I Soil Leaching to Groundwater RBSLs

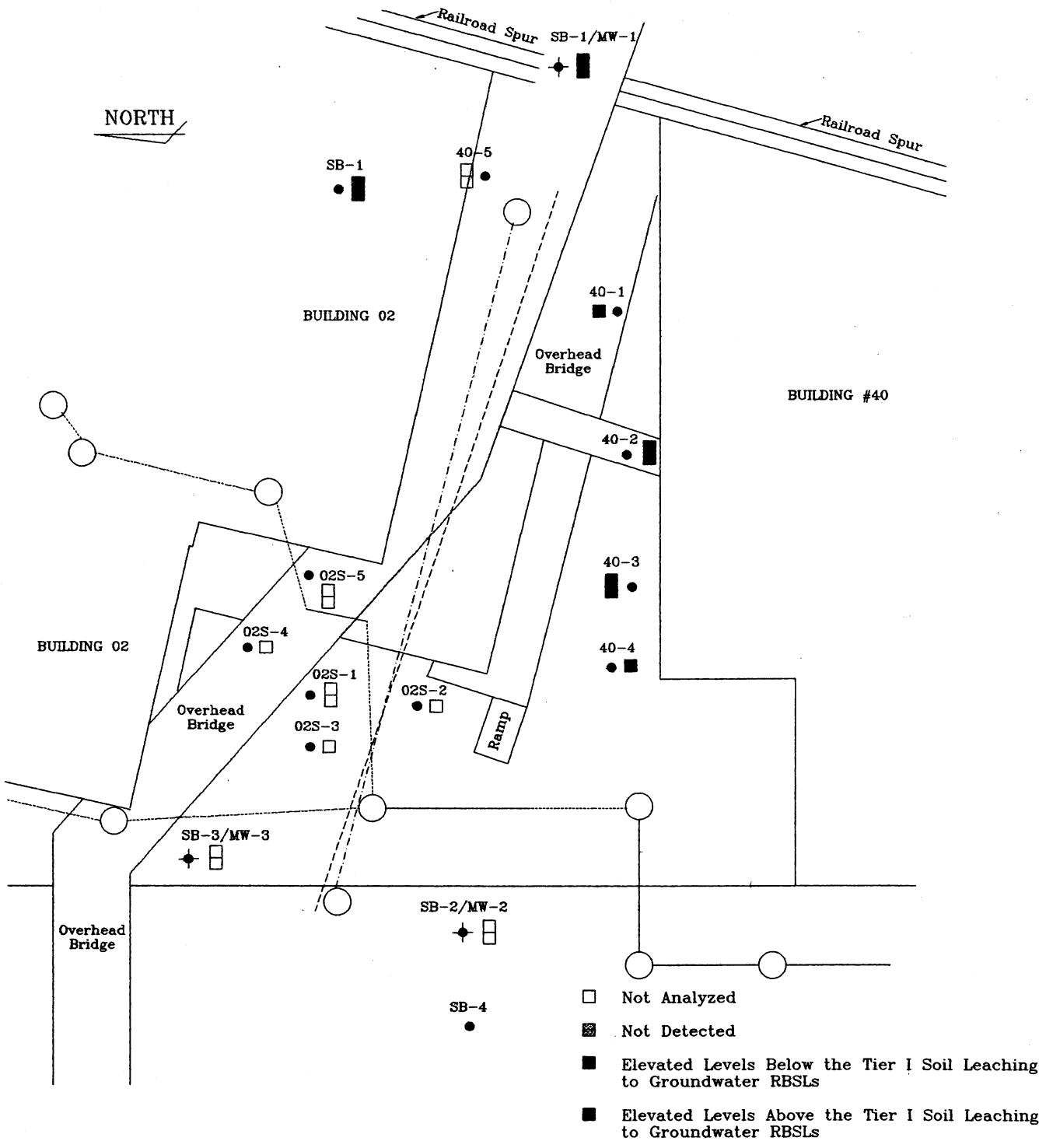
LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- ------ Sanitary Line
- —·—·— Storm Sewer Line

GM-CLCD NORTH

TITLE: SOIL CONCENTRATION MAP: TOTAL LEAD
BUILDINGS 02 & 40
TANKS 67/02-70/02 - 71/40N-74/40N

SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 5f
	PROJECT NUMBER: F174



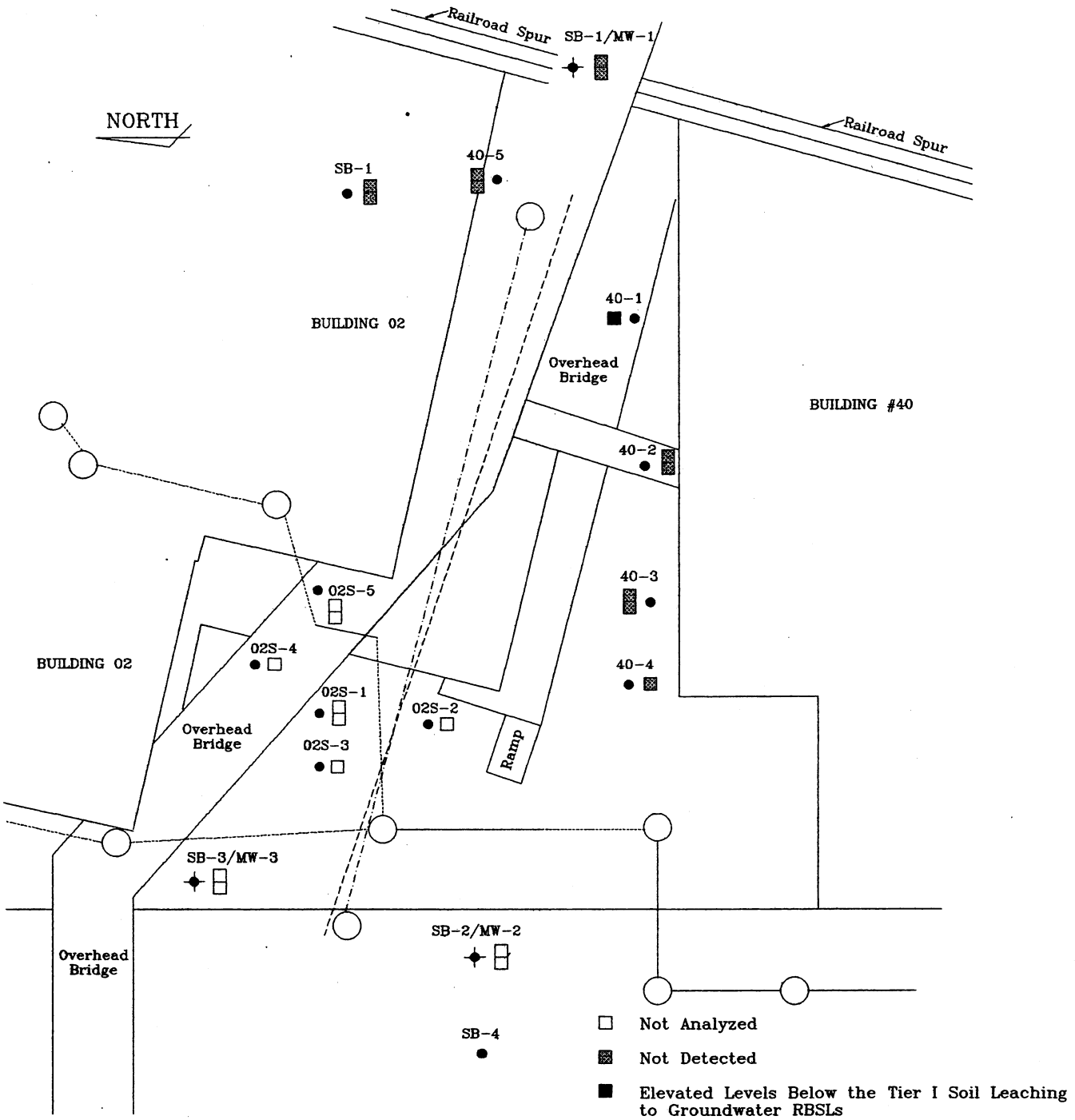
LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- ------ Sanitary Line
- —·—·— Storm Sewer Line

GM-CLCD NORTH

TITLE: SOIL CONCENTRATION MAP: CHROMIUM
BUILDINGS 02 & 40
TANKS 67/02-70/02 - 71/40N-74/40N

SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 5g
	PROJECT NUMBER: F174



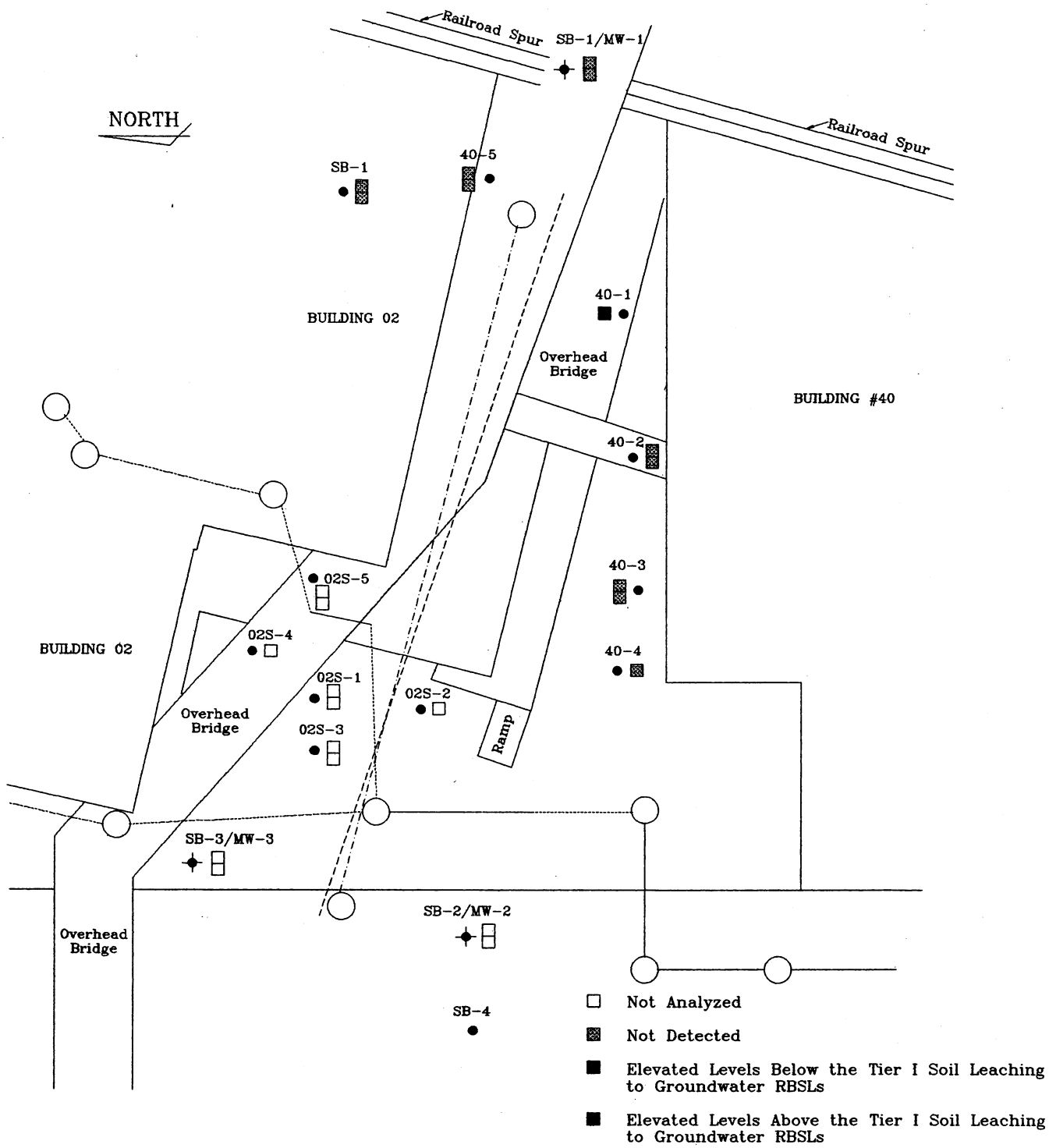
LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- —— Sanitary Line
- —·— Storm Sewer Line

GM-CLCD NORTH

TITLE: SOIL CONCENTRATION MAP: 2-METHYLNAPHTHALENE
BUILDING 02 & 40
TANKS 67/02-70/02 & 71/40N - 74/40N

SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 5h
	PROJECT NUMBER: F174



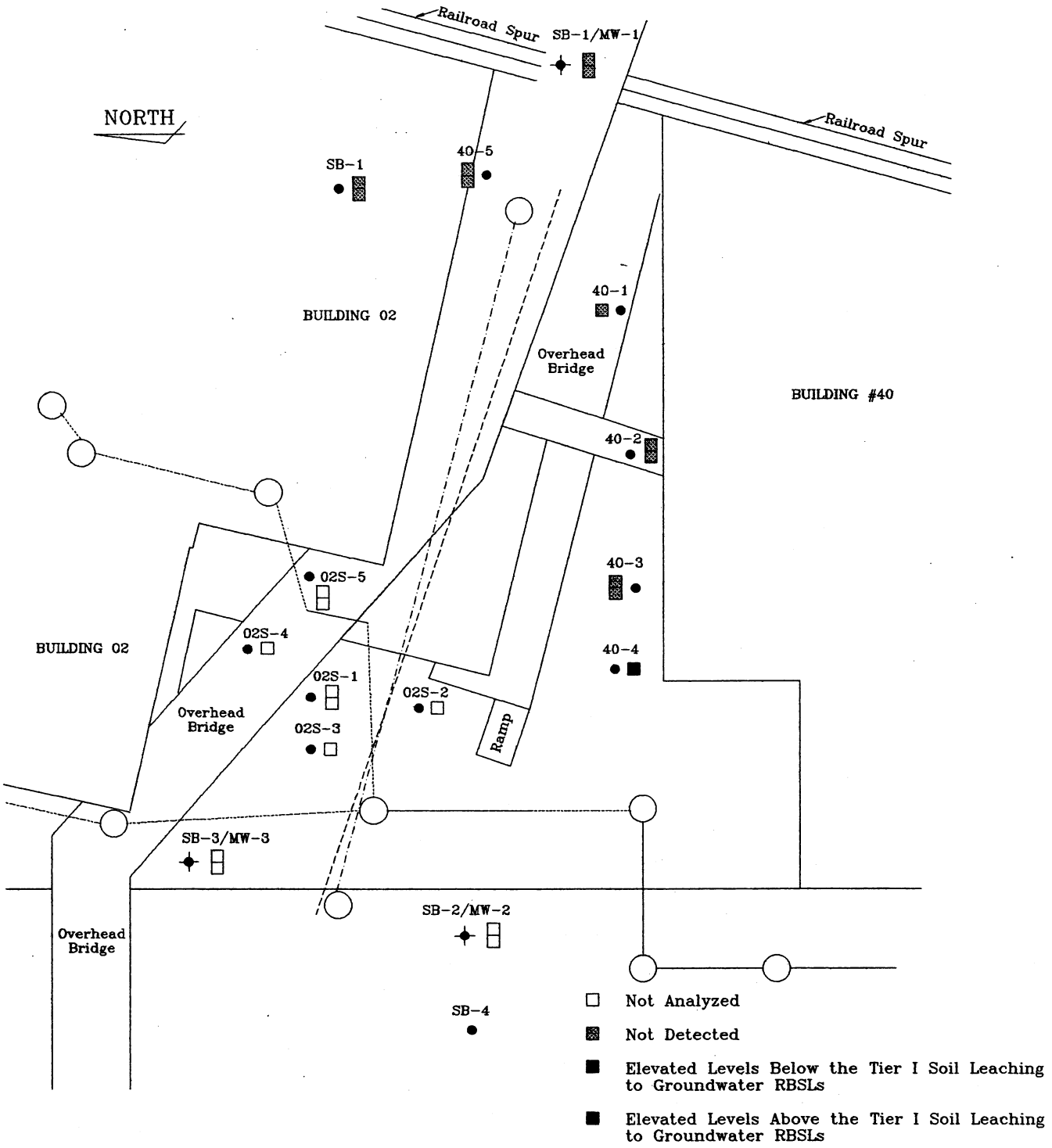
LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- —— Sanitary Line
- —·— Storm Sewer Line

GM-CLCD NORTH

TITLE: SOIL CONCENTRATION MAP: NAPHTHALENE
BUILDINGS 02 & 40
TANKS 67/02-70/02 & 71/40N-74/40N

SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 5i
	PROJECT NUMBER: F174



LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- —— Sanitary Line
- —·— Storm Sewer Line

GM-CLCD NORTH

TITLE: SOIL CONCENTRATION MAP: PHENANTHRENE
BUILDING 02 & 40
TANKS 67/02-70/02 & 71/40N-74/40N

SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 5j
	PROJECT NUMBER: F174

ATTACHMENT 6

Global Environmental Engineering, Inc.
352 South Saginaw St., Suite 600
Flint, Michigan 48502
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	Bldg 2S-1	Project:	GM CLCD North UST Closure
Date:	7/29/96	Project #:	F174
Drilling Contractor:	YECI	Location:	Hamilton & Industrial Ave.
Prepared By:	JCW	Twp/Sec.:	
Time Started:	8:20	Depth Drilled:	21'
Time Completed:		Hole Diameter:	2"
Length Coring Device:	2'	Coring Device:	2"

Boring Methods		Groundwater Information			
	Hollow Stem Auger	GW Encountered at	14'	Fluid Used:	None
	Hand Auger	Monitor Wells Installed		Driller:	Ken
X	Geoprobe	Yes	No	Helper:	N/A
				Weight/Drop:	N/A

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	FID	GC
				Concrete			
		1		Stone			
	GP-1		SP	Sand	Brown, Moist, Fine/Medium		
		2					
		3				ND	
		4					
		5				ND	
	GP-2						
		6					
		7				2.0	
		8				2.0	
	GP-3	9					
		10				3.0	
		11					
		12				3.5	
		13					
	GP-4						
		14					
	[X]	15			Gray, Wet Medium/Coarse	>1000	
			CL	Silty Clay	Moist, No Fractures		
		16					
		17				220	
	GP-5				Fine/Medium		
		18	SM	Silty Sand	Wet		
		19				380	
	GP-6						
		20					
	[X]	21				>1000	
			E.O.B.	End of Boring 21'			
		22					
		23					
		24					
		25					

SS-Split Spoon
NR-No Recovery
HA-Hand Auger Sample
[X]-Laboratory/Jar Sample
PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)
AL-Acetate Liner
FS-Field Screening Container

Global Environmental Engineering, Inc.
352 South Saginaw St., Suite 600
Flint, Michigan 48502
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	Bldg 2S-2	Project:	GM CLCD North UST Closure
Date:	7/29/96	Project #:	F174
Drilling Contractor:	YECI	Location:	Hamilton & Industrial Ave.
Prepared By:	JCW	Twp/Sec.:	
Time Started:	9:45	Depth Drilled:	6'
Time Completed:		Hole Diameter:	2"
Length Coring Device:	2'	Coring Device:	2"
		Fluid Used:	None
		Driller:	Ken
		Helper:	N/A
		Weight/Drop:	N/A

Boring Methods	
	Hollow Stem Auger
	Hand Auger
X	Geoprobe

Groundwater Information	
GW Encountered at	
Monitor Wells Installed	
Yes	No

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	FID	GC
				Concrete			
		1		Stone			
	GP-1		CL	Clay	Brown/Black, Moist, No Fractures		
		2					
		3				ND	
		4					
		5				1.0	
	GP-2				Black		
	[X]	6				25.0	
			E.O.B.	End of Boring 6'			
		7					
		8					
		9					
		10					
		11					
		12					
		13					
		14					
		15					
		16					
		17					
		18					
		19					
		20					
		21					
		22					
		23					
		24					
		25					

SS-Split Spoon
NR-No Recovery
HA-Hand Auger Sample
[X]-Laboratory/Jar Sample
PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)
AL-Acetate Liner
FS-Field Screening Container

Global Environmental Engineering, Inc.
352 South Saginaw St., Suite 600
Flint, Michigan 48502
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	Bldg 2S-3	Project:	GM CLCD North UST Closure
Date:	7/29/96	Project #:	F174
Drilling Contractor:	YECI	Location:	Hamilton & Industrial Ave.
Prepared By:	JCW	Twp/Sec.:	
Time Started:	9:45	Depth Drilled:	8'
Time Completed:		Hole Diameter:	2"
Length Coring Device:	2'	Coring Device:	2"
		Fluid Used:	None
		Driller:	Ken
		Helper:	N/A
		Weight/Drop:	N/A

Boring Methods

	Hollow Stem Auger
	Hand Auger
X	Geoprobe

Groundwater Information

GW Encountered at	
Monitor Wells Installed	
Yes	No

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	FID	GC
				Concrete			
		1		Stone			
	GP-1		CL	Sandy Clay	Brown, Moist, No Fractures, <25% Recovery, Wood Chips		
		2					
		3				ND	
		4					
					Black		
		5				ND	
	GP-2				Brown		
		6					
		7			Black, Trace of Gravel	>1000	
	[X]	8				>1000	
			E.O.B.	End of Boring 8'			
		9					
		10					
		11					
		12					
		13					
		14					
		15					
		16					
		17					
		18					
		19					
		20					
		21					
		22					
		23					
		24					
		25					

SS-Split Spoon
NR-No Recovery
HA-Hand Auger Sample
[X]-Laboratory/Jar Sample
PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)
AL-Acetate Liner
FS-Field Screening Container

Global Environmental Engineering, Inc.
352 South Saginaw St., Suite 600
Flint, Michigan 48502
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	Bldg 2S-4	Project:	GM CLCD North UST Closure
Date:	7/29/96	Project #:	F174
Drilling Contractor:	YECI	Location:	Hamilton & Industrial Ave.
Prepared By:	JCW	Twp/Sec.:	
Time Started:	12:30	Depth Drilled:	12'
Time Completed:		Hole Diameter:	2"
Length Coring Device:	2'	Coring Device:	2"
		Fluid Used:	None
		Driller:	Ken
		Helper:	N/A
		Weight/Drop:	N/A

Boring Methods

	Hollow Stem Auger
	Hand Auger
X	Geoprobe

Groundwater Information

GW Encountered at	
Monitor Wells Installed	
Yes	No

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	FID	GC
				Concrete			
		1		Stone			
	GP-1		SP	Sand	Brown, Moist, Fine/Medium		
		2					
						7.0	
		3					
		4					
						22.0	
		5					
	GP-2						
		6					
					Gray	760	
		7					
		8					
					Black	>1000	
		9					
	GP-3						
		10					
		11					
	[X]	12				>1000	
			E.O.B.	End of Boring 12'(Concrete)			
		13					
		14					
		15					
		16					
		17					
		18					
		19					
		20					
		21					
		22					
		23					
		24					
		25					

SS-Split Spoon
NR-No Recovery
HA-Hand Auger Sample
[X]-Laboratory/Jar Sample
PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)
AL-Acetate Liner
FS-Field Screening Container

Global Environmental Engineering, Inc.
352 South Saginaw St., Suite 600
Flint, Michigan 48502
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	Bldg 2S-5	Project:	GM CLCD North UST Closure
Date:	7/29/96	Project #:	F174
Drilling Contractor:	YECI	Location:	Hamilton & Industrial Ave.
Prepared By:	JCW	Twp/Sec.:	
Time Started:	13:15	Depth Drilled:	21'
Time Completed:		Hole Diameter:	2"
Length Coring Device:	2'	Coring Device:	2"
		Fluid Used:	None
		Driller:	Ken
		Helper:	N/A
		Weight/Drop:	N/A

Boring Methods

	Hollow Stem Auger
	Hand Auger
X	Geoprobe

Groundwater Information

GW Encountered at	19'
Monitor Wells Installed	
Yes	No

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	FID	GC
				Concrete			
		1		Stone			
	GP-1		SP	Sand	Brown, Moist, Fine/Medium		
		2					
		3	CL	Sandy Clay	Brown/Black, No Fractures	ND	
		4					
		5				1.0	
	GP-2		CL	Clay	Brown/Gray, Fractures		
		6					
		7				1.5	
		8					
		9				2.0	
	GP-3						
		10					
		11				2.0	
		12					
		13				220	
	GP-4						
		14					
		15				680	
		16					
		17			2" Sand Lens 2" Sand Lens	>1000	
	GP-5		SP	Sand	Brown		
		18					
		19				>1000	
	GP-6				Wet Gray		
		20					
		21				>1000	
			E.O.B.	End of Boring 21'			
		22					
		23					
		24					
		25					

SS-Split Spoon
NR-No Recovery
HA-Hand Auger Sample
[X]-Laboratory/Jar Sample
PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)
AL-Acetate Liner
FS-Field Screening Container

Global Environmental Engineering, Inc.
352 South Saginaw St., Suite 600
Flint, Michigan 48502
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	Bldg 40-1	**Project:**	GM CLCD North UST Closure
Date:	7/24/96	**Project #:**	F174
Drilling Contractor:	YECI	**Location:**	Hamilton & Industrial Ave.
Prepared By:	JCW	**Twp/Sec.:**	
Time Started:	8:30	**Depth Drilled:**	21'
Time Completed:		**Hole Diameter:**	2"
Length Coring Device:	2'	**Coring Device:**	2"
		Fluid Used:	None
		Driller:	Ken
		Helper:	N/A
		Weight/Drop:	N/A

Boring Methods		Groundwater Information	
	Hollow Stem Auger	GW Encountered at	
	Hand Auger	Monitor Wells Installed	
X	Geoprobe	Yes	No

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	FID	GC
				Concrete			
		1		Stone			
	GP-1		SP	Sand	Black, Moist, Fine/Medium		
		2					
		3				>1000	
		4					
		5				>1000	
	GP-2						
		6					
		7				820	
		8			3" Brown Clay Lens		
		9			1" Clay Lens	>1000	
	GP-3		CL	Clay	Brown, No Fractures		
		10					
		11				400.00	
		12					
		13				120.0	
	GP-4				Brown/Gray, Fractures		
		14					
		15				240	
		16			Gray, Moist, No Fractures		
		17		Sandy Clay		>1000	
	GP-5		SP	Sand			
		18			Black, Fine/Medium		
		19				>1000	
	GP-6[X]				Wet		
		20					
		21				>1000	
			E.O.B	End of Boring 21'			
		22					
		23					
		24					
		25					

SS-Split Spoon
NR-No Recovery
HA-Hand Auger Sample
[X]-Laboratory/Jar Sample
PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)
AL-Acetate Liner
FS-Field Screening Container

Global Environmental Engineering, Inc.
352 South Saginaw St., Suite 600
Flint, Michigan 48502
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	Bldg 40-2	Project:	GM CLCD North UST Closure
Date:	7/24/96	Project #:	F174
Drilling Contractor:	YECI	Location:	Hamilton & Industrial Ave.
Prepared By:	JCW	Twp/Sec.:	
Time Started:	10:15	Depth Drilled:	15'
Time Completed:		Hole Diameter:	2"
Length Coring Device:	2'	Coring Device:	2"
		Fluid Used:	None
		Driller:	Ken
		Helper:	N/A
		Weight/Drop:	N/A

Boring Methods		Groundwater Information	
	Hollow Stem Auger	GW Encountered at	
	Hand Auger	Monitor Wells Installed	
X	Geoprobe	Yes	No

Penetration Tons/Sq ft	Sample Type	Depth (ft)	USCS Code	SOIL DESCRIPTION	REMARKS	FID	GC
				Concrete			
		1		Stone			
	GP-1		SP	Sand	Black, Moist, Fine/Medium		
		2					
		3				ND	
		4					
	[X]	5				4.0	
	GP-2						
		6					
		7				ND	
		8					
		9				ND	
	GP-3		CL	Clay	Brown, No Fractures		
		10					
		11				ND	
		12					
					Gray		
		13				ND	
	GP-4						
		14					
	[X]	15				ND	
			E.O.B	End of Boring 15'			
		16					
		17					
		18					
		19					
		20					
		21					
		22					
		23					
		24					
		25					

SS-Split Spoon
NR-No Recovery
HA-Hand Auger Sample
[X]-Laboratory/Jar Sample
PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)
AL-Acetate Liner
FS-Field Screening Container

Global Environmental Engineering, Inc.
352 South Saginaw St., Suite 600
Flint, Michigan 48502
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	Bldg 40-3	Project:	GM CLCD-North UST Closure
Date:	7/24/96	Project #:	F174
Drilling Contractor:	YECI	Location:	Hamilton & Industrial Ave.
Prepared By:	JCW	Twp/Sec.:	
Time Started:	11:15	Depth Drilled:	21'
Time Completed:		Hole Diameter:	2"
Length Coring Device:	2'	Coring Device:	2"
		Fluid Used:	None
		Driller:	Ken
		Helper:	N/A
		Weight/Drop:	N/A

Boring Methods	
	Hollow Stem Auger
	Hand Auger
X	Geoprobe

Groundwater Information	
GW Encountered at	
Monitor Wells Installed	
Yes	No

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	FID	GC
				Concrete			
		1		Stone			
	GP-1		SP	Sand	Black, Moist, Fine/Medium		
		2					
		3				ND	
		4					
		5				ND	
	GP-2						
		6					
		7				ND	
		8					
		9				ND	
	GP-3						
		10					
		11				ND	
		12					
					Gray		
		13				160	
	GP-4		CL	Clay	No Fractures		
		14					
		15				14.0	
	GP-5		ML	Clayee Silt			
		16					
		17				16.0	
	GP-6						
		18					
		19				55.0	
	GP-7						
		20					
		21				16.0	
			E.O.B	End of Boring 21'			
		22					
		23					
		24					
		25					

SS-Split Spoon
NR-No Recovery
HA-Hand Auger Sample
[X]-Laboratory/Jar Sample
PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)
AL-Acetate Liner
FS-Field Screening Container

Global Environmental Engineering, Inc.
352 South Saginaw St., Suite 600
Flint, Michigan 48502
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	Bldg 40-4	Project:	GM CLCD North UST Closure
Date:	7/24/96	Project #:	F174
Drilling Contractor:	YECI	Location:	Hamilton & Industrial Ave.
Prepared By:	JCW	Twp/Sec.:	
Time Started:	14:00	Depth Drilled:	16'
Time Completed:		Hole Diameter:	2"
Length Coring Device:	2'	Coring Device:	2"
		Fluid Used:	None
		Driller:	Ken
		Helper:	N/A
		Weight/Drop:	N/A

Boring Methods

	Hollow Stem Auger
	Hand Auger
X	Geoprobe

Groundwater Information

GW Encountered at	
Monitor Wells Installed	
Yes	No

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	FID	GC
				Concrete			
		1		Stone			
	GP-1		SP	Sand	Black, Moist, Fine/Medium		
		2					
		3				ND	
		4					
		5				1.0	
	GP-2						
		6					
		7				ND	
		8					
		9				ND	
	GP-3						
		10					
		11				ND	
		12					
		13				4.0	
	GP-4						
		14					
					Black, Wet		
		15					
	[X]					>1000	
		16					
			E.O.B	End of Boring 16'			
		17					
		18					
		19					
		20					
		21					
		22					
		23					
		24					
		25					

SS-Split Spoon
NR-No Recovery
HA-Hand Auger Sample
[X]-Laboratory/Jar Sample
PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)
AL-Acetate Liner
FS-Field Screening Container

lobal Environmental Engineering, Inc.
352 South Saginaw St., Suite 600
Flint, Michigan 48502
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	Bldg 40-5	Project:	GM CLCD North UST Closure
Date:	7/24/96	Project #:	F174
Drilling Contractor:	YECI	Location:	Hamilton & Industrial Ave.
Prepared By:	JCW	Twp/Sec.:	
Time Started:	15:15	Depth Drilled:	2.5'
Time Completed:		Hole Diameter:	2"
Length Coring Device:	2'	Coring Device:	2"
		Fluid Used:	None
		Driller:	Ken
		Helper:	N/A
		Weight/Drop:	N/A

Boring Methods

	Hollow Stem Auger
	Hand Auger
X	Geoprobe

Groundwater Information

GW Encountered at	
Monitor Wells Installed	
Yes	No

Penetration Blows/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	FID	GC
				Concrete			
		1					
	GP-1						
		2					
				Bricks	Sample Refusal		
		3	E.O.B	End of Boring 2.5'			
		4					
		5					
		6					
		7					
		8					
		9					
		10					
		11					
		12					
		13					
		14					
		15					
		16					
		17					
		18					
		19					
		20					
		21					
		22					
		23					
		24					
		25					

S-Split Spoon
-No Recovery

HA-Hand Auger Sample
[X]-Laboratory/Jar Sample

PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)

AL-Acetate Liner
FS-Field Screening Container

Global Environmental Engineering, Inc.
5467 Hill 23 Dr., Suite B
Flint, Michigan 48507
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	SB1/MW1	Project:	GMCLCD N.
Date:	11/8/96	Project #:	F174
Drilling Contractor:	GEEI	Location:	Building 40/02 South
Prepared By:	JCW	Twp/Sec.:	
Time Started:	12:45	Depth Drilled:	12'
Time Completed:		Hole Diameter:	4.5"
Length Coring Device:	5'	Coring Device:	8.25"
		Fluid Used:	None
		Driller:	Elroy
		Helper:	NA
		Weight/Drop:	140#/30"

Boring Methods

X	Hollow Stem Auger
	Hand Auger
	Geoprobe

Groundwater Information

GW Encountered at

Monitor Wells Installed

Yes X No

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	OVA	GC
		1					
		2					
	SS		SP	Sand	Brown, Moist, Fine/Medium		
	SS	3					
	SS						
	SS	4				ND	
	SS						
	SS	5			Wet		
	SS						
	SS	6				520	
	SS						
	SS	7					
	SS						
	SS	8				12.0	
	SS						
	SS	9					
	SS						
	SS	10	CL	Clay	No Fractures, Trace of Gravel	4.0	
	SS						
	SS	11					
	SS					4.0	
	SS	12					
			E.O.B.	End of Boring 12'			
		13					
		14					
		15					
		16					
		17					
		18					
		19					
		20					
		21					
		22					
		23					

SS-Split Spoon
NR-No Recovery

HA-Hand Auger Sample
[X]-Laboratory/Jar Sample

PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)

AL-Acetate Liner
FS-Field Screening Container

Global Environmental Engineering, Inc.
5467 Hill 23 Dr., Suite B
Flint, Michigan 48507
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	SB2/MW2	**Project:**	GMCLCD N. – UST Closures
Date:	11/8/96	**Project #:**	F174
Drilling Contractor:	YECI	**Location:**	Building 40/02 South
Prepared By:	JCW	**Twp/Sec.:**	
Time Started:	14:50	**Depth Drilled:**	16'
Time Completed:		**Hole Diameter:**	4.5"
Length Coring Device:	5'	**Coring Device:**	8.25"
		Fluid Used:	None
		Driller:	Scott
		Helper:	NA
		Weight/Drop:	140#/30"

Boring Methods		Groundwater Information
X	Hollow Stem Auger	GW Encountered at
	Hand Auger	Monitor Wells Installed
	Geoprobe	Yes X No

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	OVA	GC
		1					
		2					
	SS		CL	Sandy Clay	Brown, Moist, No Fractures		
	SS	3					
	SS						
	SS	4				ND	
	SS			Clay	Brown/Gray, Fractures		
	SS	5					
	SS						
	SS	6				8.0	
	SS			Sandy Clay			
	SS	7					
	SS						
	SS	8				>1000	
	SS						
	SS	9					
	SS						
	SS-[X]	10		Clay	Some Silt	>1000	
	SS						
	SS	11					
	SS						
	SS	12			Gray, No Fractures	NA	
	SS						
	SS	13					
	SS						
	SS	14				NA	
	SS						
	SS	15					
	SS						
	SS-[X]	16				NA	
			E.O.B.	End of Boring 16'			
		17					
		18					
		19					
		20					
		21					
		22					
		23					
		24					
		25					

SS–Split Spoon
NR–No Recovery
HA–Hand Auger Sample
[X]–Laboratory/Jar Sample
PID–Photoionization Detector (ppm)
GC–Gas Chromatograph (ppb)
AL–Acetate Liner
FS–Field Screening Container

ATTACHMENT 7

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

GROUNDWATER LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	Bldg 02S-5		Bldg 02S/40 (MW1)		02S/40 (MW2)		SB-1		MW-3	
Sample Depth (feet BGS)	-						15-17			
Date Collected	07/29/96		01/02/97		01/02/97		06/03/97		06/10/97	
Date Extracted	08/05/96		01/02/97		01/02/97		06/10/97		06/13/97	
Date Analyzed	08/05/96		01/02/97		01/02/97		06/10/97		06/13/97	
Collection Method*	GP		Bailer		Bailer		GP		Bailer	
Analytical Method No.	8260		8260		8260		8260		8260	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	10100	10	ND	1	20	1	ND	1	350	10
☐ Toluene	130	10	ND	1	ND	1	5	1	20	10
☐ Ethylbenzene	200	10	ND	1	10	1	ND	1	190	10
☐ Total Xylenes	1040	10	ND	1	11	1	2	1	20	10
☐ MTBE										
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID			Bldg 02S/40 (MW1)		02S/40 (MW2)				MW-3	
Sample Depth (feet BGS)										
Date Collected			01/02/97		01/02/97				06/10/97	
Date Extracted			01/03/97		01/03/97				06/17/97	
Date Analyzed			01/06/97		01/06/97				06/18/97	
Collection Method*			Bailer		Bailer				Bailer	
Analytical Method No.			8270		8270				8270	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene			ND	5	ND	5			ND	5
☐ Acenaphthylene			ND	5	ND	5			ND	5
☐ Anthracene			ND	5	ND	5			ND	5
☐ Benzo(a)anthracene			ND	5	ND	5			ND	5
☐ Benzo(a)pyrene			ND	5	ND	5			ND	5
☐ Benzo(b)fluoranthene			ND	5	ND	5			ND	5
☐ Benzo(g,h,i)perylene			ND	5	ND	5			ND	5
☐ Benzo(k)fluoranthene			ND	5	ND	5			ND	5
☐ Chrysene			ND	5	ND	5			ND	5
☐ Dibenzo(a,h)anthracene			ND	5	ND	5			ND	5

BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table: _____
MDL = Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

GROUNDWATER LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

DUPLICATE TABLE AS NEEDED

POLYNUCLEAR AROMATICS (PNAs)										
Sample ID			Bldg 02S/40 (MW1)		02S/40 (MW2)				MW-3	
Sample Depth (feet BGS)										
Date Collected			01/02/97		01/02/97				06/10/97	
Date Extracted			01/03/97		01/03/97				06/17/97	
Date Analyzed			01/06/97		01/06/97				06/18/97	
Collection Method*			Bailer		Bailer				Bailer	
Analytical Method No.			8270		8270				8270	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Fluoranthene			ND	5	ND	5			ND	5
☐ Fluorene			ND	5	ND	5			ND	5
☐ Indeno(1,2,3-cd)pyrene			ND	5	ND	5			ND	5
☐ Naphthalene			ND	5	ND	5			ND	5
☐ 2-Methylnaphthalene			ND	5	ND	5			ND	5
☐ Phenanthrene			ND	5	ND	5			ND	5
☐ Pyrene			ND	5	ND	5			ND	5
METALS - FILTERED										
Sample ID	Bldg 02S-5		Bldg 02S/40 (MW1)		02S/40 (MW2)				MW-3	
Sample Depth (feet BGS)	-									
Date Collected	07/29/96		01/02/97		01/02/97				06/10/97	
Date Extracted	08/08/96		01/03/97		01/03/97				06/17/97	
Date Analyzed	08/08/96		01/06/97		01/06/97				06/18/97	
Collection Method*	GP		Bailer		Bailer				Bailer	
Analytical Method No.	200.08		200.8		200.8				200.8	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Cadmium										
☐ Total Chromium			20	10	ND	10			ND	10
☐ Total Lead	ND	3	32	3	ND	3			ND	3

*The Chain of Custody requested chromium analysis, the laboratory analyzed for cadmium in error.
BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table: _____
MDL = Method Detection Limit

ATTACHMENT 8

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

GROUNDWATER LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

PCBs										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Collection Method*										
Analytical Method No.										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Aroclor 1016										
☐ Aroclor 1221										
☐ Aroclor 1232										
☐ Aroclor 1242										
☐ Aroclor 1248										
☐ Aroclor 1254										
☐ Aroclor 1280										
HALOGENATED HYDROCARBONS										
Sample ID			Bldg 02S/40 (MW1)		02S/40 (MW2)		SB-1		MW-3	
Sample Depth (feet BGS)							15-17			
Date Collected			01/02/97		01/02/97		06/03/97		06/10/97	
Date Extracted			01/02/97		01/02/97		06/10/97			
Date Analyzed			01/02/97		01/02/97		06/10/97		06/13/97	
Collection Method*			Bailer		Bailer		GP		Bailer	
Analytical Method No.			601		601		601		601	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Carbon Tetrachloride			ND	1	ND	1	ND	1	ND	10
☐ 1,1-Dichloroethane			ND	1	ND	1	ND	1	ND	10
☐ 1,2-Dichloroethane			ND	1	ND	1	ND	1	ND	10
☐ 1,1-Dichloroethylene			ND	1	ND	1	ND	1	ND	10
☐ cis-1,2-Dichloroethylene			ND	1	ND	1	NA	1	ND	10
☐ trans-1,2-Dichloroethylene			ND	1	ND	1	ND	1	ND	10

BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table: _____
MDL = Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

GROUNDWWATER LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

HALOGENATED HYDROCARBONS (Cont.)										
☐ Tetrachloroethylene			ND	1	ND	1	ND	1	ND	1
☐ 1,1,2-Trichloroethane			ND	1	ND	1	ND	1	ND	1
OTHER *(Specify)*										
Sample ID							SB-1		MW-3	
Sample Depth (feet BGS)							15-17			
Date Collected							06/03/97		06/10/97	
Date Extracted							06/10/97			
Date Analyzed							06/10/97		06/13/97	
Collection Method*							GP		Bailer	
Analytical Method No.							601		601	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Bromodichloroethane							ND	1	ND	10
☐ Bromoform							ND	1	ND	10
☐ Bromomethane							ND	1	ND	10
☐ Chlorobenzene							ND	1	ND	10
☐ Chloroethane							ND	1	ND	10
☐ 2-Chloroethylvinyl							ND	1	ND	10
☐ Chloroform							ND	1	ND	10
☐ Chloromethane							ND	1	ND	10
☐ Dibromochloromethane							ND	1	ND	10
☐ 1,2-Dichlorobenzene							ND	1	ND	10
☐ 1,3-Dichlorobenzene							ND	1	ND	10
☐ 1,4-Dichlorobenzene							ND	1	ND	10
☐ Dichlorodifluoromethane							ND	1	ND	10
☐ cis-1,3-Dichloropropane							ND	1	ND	10
☐ trans-1,3-Dichloropropene							ND	1	ND	10
☐ Methylene Chloride							ND	1	ND	10
☐ Vinyl chloride							ND	1	ND	10

BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table: _____
MDL = Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

GROUNDWATER LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	Bldg 40-1		Bldg 40-3		Bldg 40-4					
Sample Depth (feet BGS)	-		-		-					
Date Collected	7/24/96		7/24/96		7/24/96					
Date Extracted	7/28/96		7/28/96		7/28/96					
Date Analyzed	7/28/96		7/28/96		7/28/96					
Collection Method*	GP		GP		GP					
Analytical Method No.	8020		8020		8020					
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	5940	50	480	50	ND	1				
☐ Toluene	7910	50	790	50	ND	1				
☐ Ethylbenzene	1800	50	250	50	ND	1				
☐ Total Xylenes	11,130	50	1600	50	ND	1				
☐ MTBE										
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	Bldg 40-1		Bldg 40-3		Bldg 40-4					
Sample Depth (feet BGS)	-		-		-					
Date Collected	7/24/96		7/24/96		7/24/96					
Date Extracted	7/26/96		7/26/96		7/26/96					
Date Analyzed	7/2996		7/2996		7/2996					
Collection Method*	GP		GP		GP					
Analytical Method No.	8270		8270		8270					
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene	ND	50	ND	50	ND	5				
☐ Acenaphthylene	ND	50	ND	50	ND	5				
☐ Anthracene	ND	50	ND	50	ND	5				
☐ Benzo(a)anthracene	ND	50	ND	50	ND	5				
☐ Benzo(a)pyrene	ND	50	ND	50	ND	5				
☐ Benzo(b)fluoranthene	ND	50	ND	50	ND	5				
☐ Benzo(g,h,i)perylene	ND	50	ND	50	ND	5				
☐ Benzo(k)fluoranthene	ND	50	ND	50	ND	5				
☐ Chrysene	ND	50	ND	50	ND	5				
☐ Dibenzo(a,h)anthracene	ND	50	ND	50	ND	5				

BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table: _____
MDL = Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

GROUNDWATER LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

DUPLICATE TABLE AS NEEDED

POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	Bldg 40-1		Bldg 40-3		Bldg 40-4					
Sample Depth (feet BGS)	-		-		-					
Date Collected	7/24/96		7/24/96		7/24/96					
Date Extracted	7/26/96		7/26/96		7/26/96					
Date Analyzed	7/2996		7/2996		7/2996					
Collection Method*	GP		GP		GP					
Analytical Method No.	8270		8270		8270					
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Fluoranthene	ND	50	ND	50	ND	5				
☐ Fluorene	ND	50	ND	50	ND	5				
☐ Indeno(1,2,3-cd)pyrene	ND	50	ND	50	ND	5				
☐ Naphthalene	156	50	ND	50	ND	5				
☐ 2-Methylnaphthalene	116	50	ND	50	ND	5				
☐ Phenanthrene	ND	50	ND	50	ND	5				
☐ Pyrene	ND	50	ND	50	ND	5				
METALS - FILTERED										
Sample ID	Bldg 40-1		Bldg 40-3		Bldg 40-4					
Sample Depth (feet BGS)	-		-		-					
Date Collected	7/24/96		7/24/96		7/24/96					
Date Extracted	7/29/96		7/29/96		7/29/96					
Date Analyzed	7/2996		7/2996		7/2996					
Collection Method*	GP		GP		GP					
Analytical Method No.	200.8		200.8		200.8					
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Cadmium	ND	2	ND	2	ND	2				
☐ Total Chromium	ND	10	ND	10	ND	10				
☐ Total Lead	14	3	ND	3	ND	3				

BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table: _____
MDL = Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

GROUNDWATER LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

PCBs										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Collection Method*										
Analytical Method No.										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Aroclor 1016										
☐ Aroclor 1221										
☐ Aroclor 1232										
☐ Aroclor 1242										
☐ Aroclor 1248										
☐ Aroclor 1254										
☐ Aroclor 1280										
HALOGENATED HYDROCARBONS										
Sample ID	Bldg 40-1		Bldg 40-3		Bldg 40-4					
Sample Depth (feet BGS)	-		-		-					
Date Collected	7/24/96		7/24/96		7/24/96					
Date Extracted	7/28/96		7/28/96		7/28/96					
Date Analyzed	7/2896		7/2896		7/2896					
Collection Method*	GP		GP		GP					
Analytical Method No.	601		601		601					
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Carbon Tetrachloride	ND	50	ND	50	ND	1				
☐ 1,1-Dichloroethane	ND	50	650	50	8	1				
☐ 1,2-Dichloroethane	150	50	ND	50	ND	1				
☐ 1,1-Dichloroethylene	ND	50	ND	50	ND	1				
☐ cis-1,2-Dichloroethylene	ND	50	ND	50	ND	1				
☐ trans-1,2- Dichloroethylene	ND	50	ND	50	ND	1				

BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table: _____
MDL = Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

GROUNDWATER LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

HALOGENATED HYDROCARBONS (Cont.)										
☐ Tetrachloroethylene	ND	50	ND	50	ND	1				
☐ 1,1,2-Trichloroethane	ND	50	ND	50	ND	1				
OTHER *(Specify)*										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Collection Method*										
Analytical Method No.										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐										
☐										
☐										
☐										
☐										
☐										
☐										
☐										
☐										
☐										
☐										
☐										
☐										

BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table: _____
MDL = Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT
TIER I RBSL/TIER II OR TIER III SSTL\
COMPARISON TABLE FOR GROUNDWATER
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

☑ Residential ☐ Commercial ☑ Industrial

Contaminant	Sample ID with Maximum Detected Concentration	Corresponding Sample Date	Maximum Detected Concentration (ug/l)	Applicable Criterion (ug/l)			
				Tier I Residential Health-Based Drinking Water	Tier I Industrial Health-Based Drinking Water	Tier I Groundwater Surface Water Interface	Tier I Direct Contact
VOLATILES							
☐ Benzene	Bldg 02S-5	07/29/96	10,100	5	5	53	9300
☐ Toluene	Bldg 40-1	07/24/96	7,910	790	790	110	>526,000
☐ Ethylbenzene	Bldg 40-1	07/24/96	1,800	74	74	31	>169,000
☐ Total Xylenes	Bldg 40-1	07/24/96	11,130	280	280	59	>186,000
☐ MTBE							
POLYNUCLEAR AROMATICS (PNAs)							
☐ Acenaphthene			ND	1300	3800	3.8	>4240
☐ Acenaphthylene			ND	26	75	Not Available	ID
☐ Anthracene			ND	7300	21,000	110,000	>43
☐ Benzo(a)anthracene			ND	1.2	4.8	.31	4
☐ Benzo(a)pyrene			ND	.2	.2	.31	.24
☐ Benzo(b)fluoranthene			ND	1.2	4.8	.31	2
☐ Benzo(g,h,i)perylene			ND	26	75	Not Available	ID
☐ Benzo(k)fluoranthene			ND	12	48	.31	20
☐ Chrysene			ND	120	480	.31	400
☐ Dibenzo-(a,h)anthracene			ND	.12	.48	.31	.11
☐ Fluoranthene			ND	880	2500	370	>206
☐ Fluorene			ND	880	2500	14,000	>1980
☐ Indeno(1,2,3-cd)pyrene			ND	1.2	4.8	.31	>0.022
☐ Naphthalene	Bldg 40-1	07/24/96	156	260	750	34	>31,000
☐ Phenanthrene			ND	26	75	Not Available	>1000
☐ Pyrene			ND	550	1600	11,000	>135
☐ 2-Methylnaphthalene	Bldg 40-1	07/24/96	16	260	750	59	>110,000

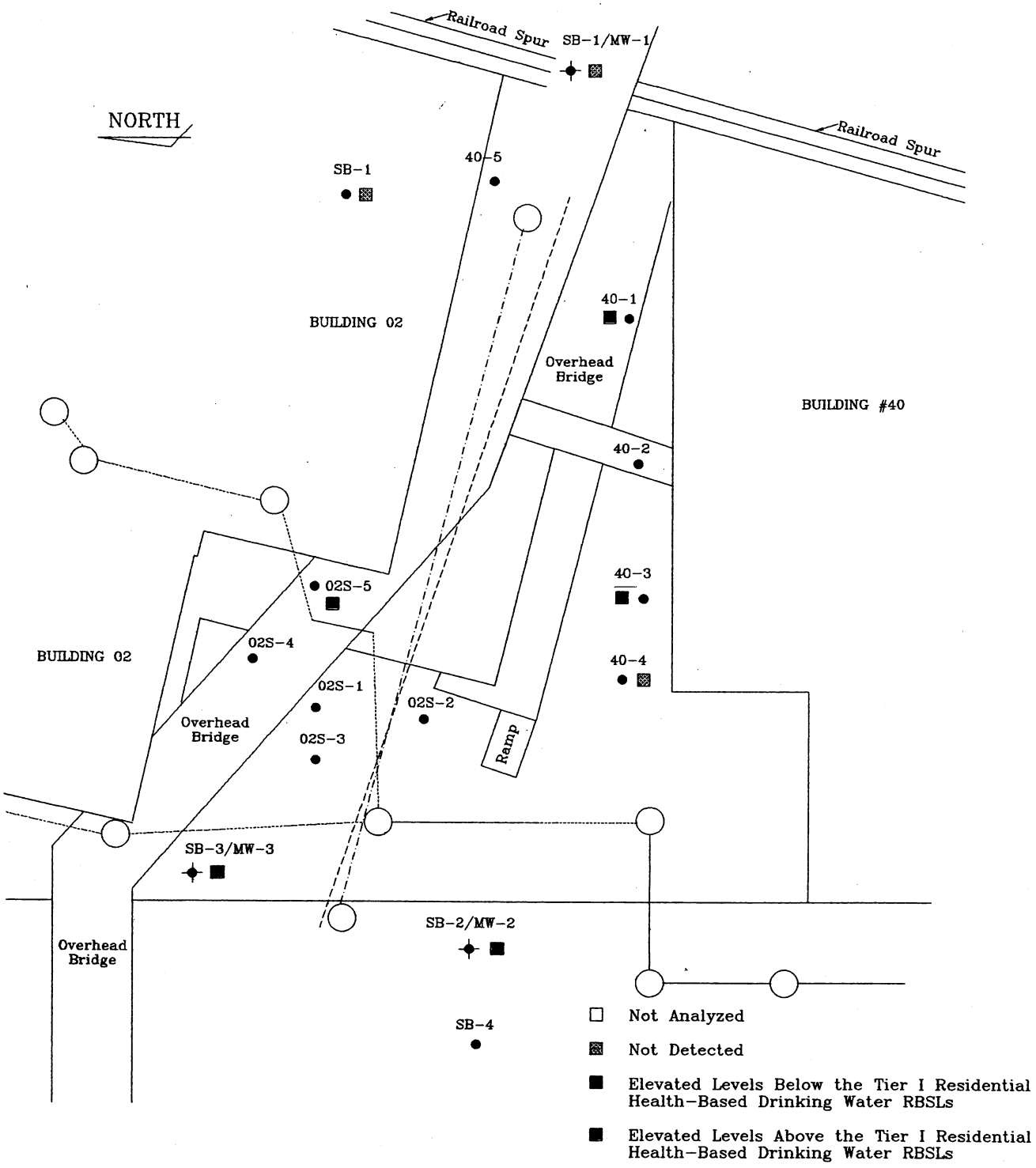
Shading indicates concentration exceeds one or more Tier I RBSLs
"ND" = Non-Detect
"NA" = Not Analyzed

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

TIER I RBSL/TIER II OR TIER III SSTL
COMPARISON TABLE FOR GROUNDWATER
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

Contaminant	Sample ID with Maximum Detected Concentration	Corresponding Sample Date	Maximum Detected Concentration (ug/l)	Applicable Criterion (ug/l)			
				Tier I Residential Health-Based Drinking Water	Tier I Industrial Health-Based Drinking Water	Tier I Groundwater Surface Water Interface	Tier I Direct Contact
METALS - FILTERED							
☐ Cadmium			ND	5	5	64	110,000
☐ Total Chromium	MW1	01/02/97	20	100	100	77	320,000,000
☐ Total Lead	MW1	01/02/97	32	4	4	140,000	Not Available
PCBs - Not Analyzed							
HALOGENATED HYDROCARBONS							
☐ Carbon Tetrachloride			ND	5	5	21	1600
☐ Chloroethane			ND	880	2500	Not Available	2,100,000
☐ 1,1-Dichloroethane	Bldg 40-3	07/24/96	650	5	5	560	11,000
☐ 1,2-Dichloroethane	Bldg 40-1	07/24/96	150	7	7	32	9900
☐ 1,1-Dichloroethylene			ND	70	70	Not Available	170,000
☐ cis-1,2-Dichloroethylene			ND	100	100	300	200,000
☐ trans-1,2-Dichloroethylene			ND	5	5	22	5000
☐ Tetrachloroethylene			ND	5	5	65	9600
☐ 1,1,2-Trichloroethane			ND	5	5	65	9600
☐ Trichloroethylene			ND	5	5	94	11,000
☐ Vinyl Chloride			ND	2	2	3.1	290
OTHER *							
☐							
☐							
☐							
☐							
☐							

ATTACHMENT 9



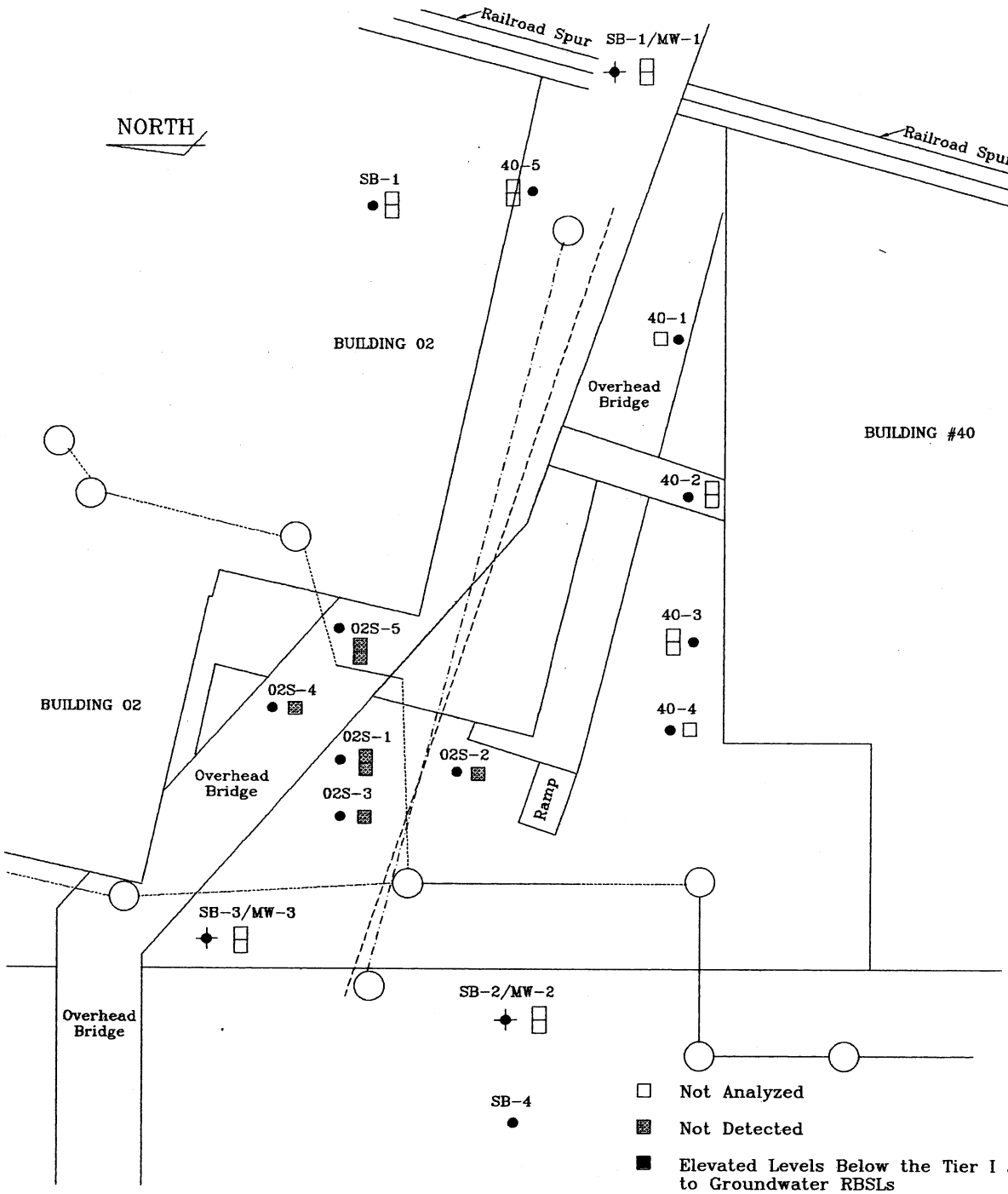
LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- ------ Sanitary Line
- —·—·— Storm Sewer Line

GM-CLCD NORTH

TITLE: GROUNDWATER CONCENTRATION MAP: BENZENE
BUILDINGS 02 & 40
TANKS 67/02-70/02 & 71/40N-74/40N

SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9a
	PROJECT NUMBER: F174



Not Analyzed

Not Detected

Elevated Levels Below the Tier I Soil Leaching to Groundwater RBSLs

Elevated Levels Above the Tier I Soil Leaching to Groundwater RBSLs

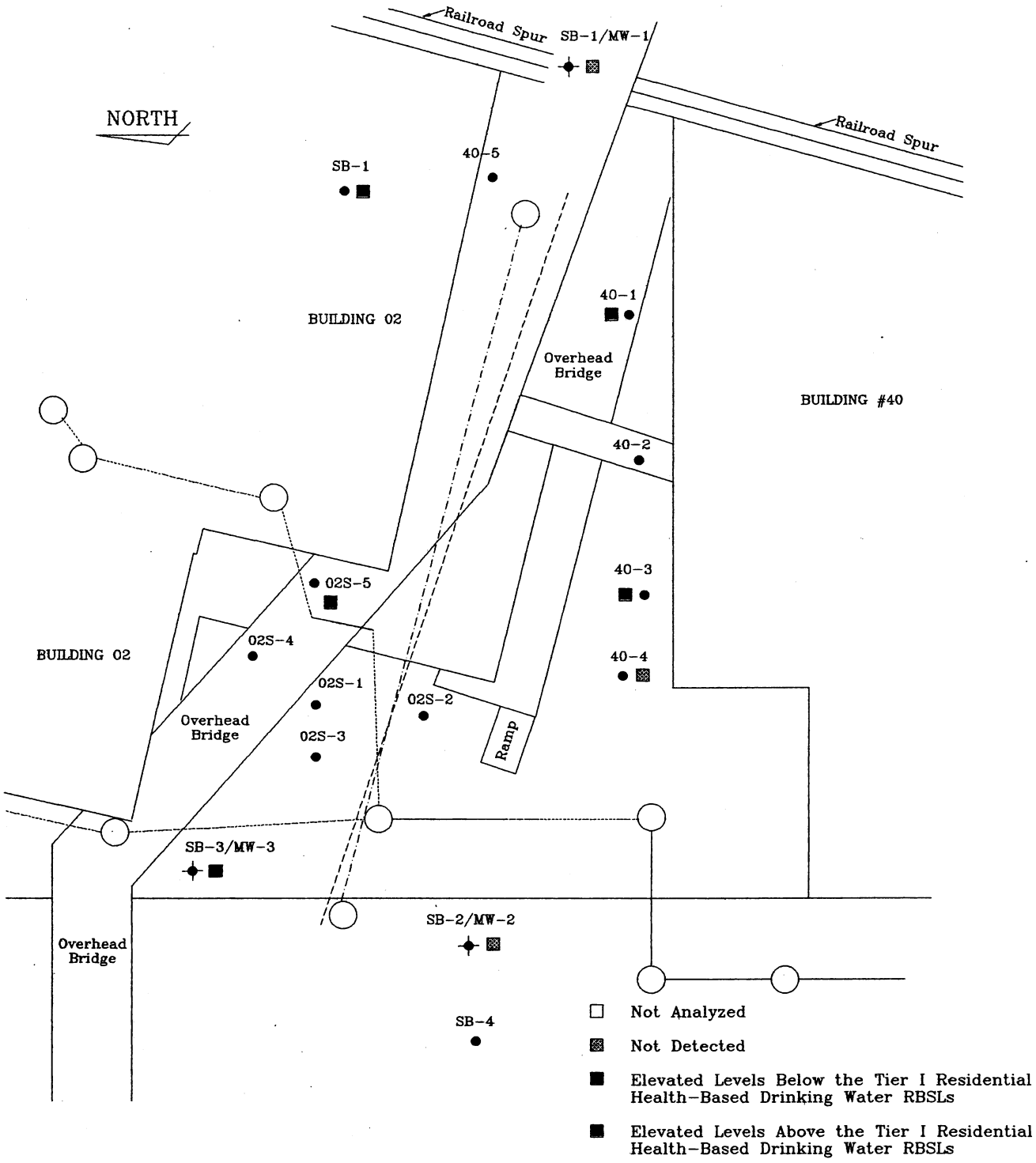
LEGEND:

- Geoprobe Sample Locations
- Monitoring Well Locations
- Fire Protection Line
- Sanitary Line
- Storm Sewer Line

GM-CLCD NORTH

TITLE: SOIL CONCENTRATION MAP: MTBE
BUILDINGS 02 & 40
TANKS 67/02-70/02 & 71/40N-74/40N

SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 5e
	PROJECT NUMBER: F174



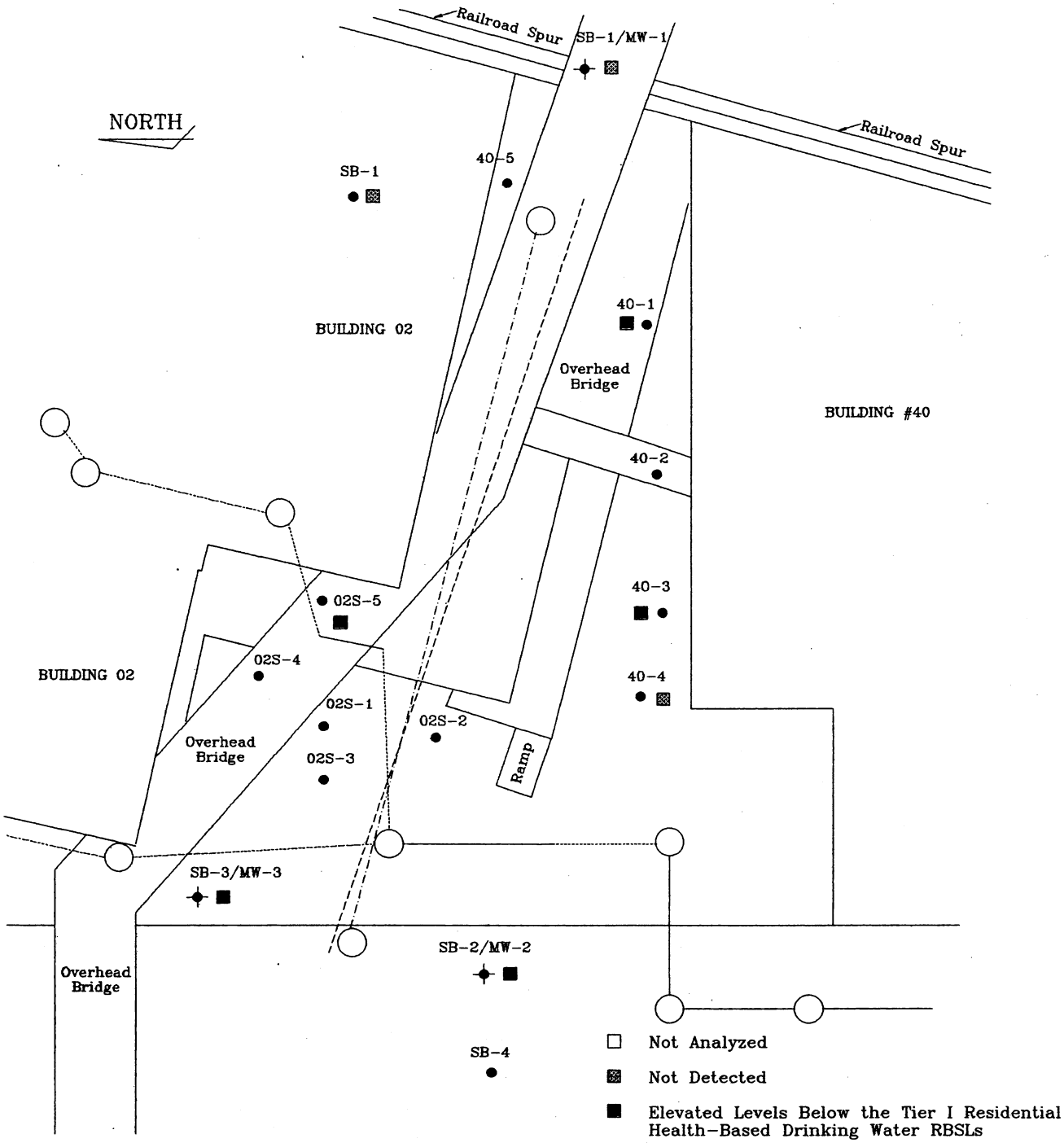
LEGEND:

- Geoprobe Sample Locations
- Monitoring Well Locations
- Fire Protection Line
- Sanitary Line
- Storm Sewer Line

GM-CLCD NORTH

TITLE: GROUNDWATER CONCENTRATION MAP: TOLUENE
BUILDINGS 02 & 40
TANKS 67/02-70/02 & 71/40N-74/40N

SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9b
	PROJECT NUMBER: F174



Not Analyzed

Not Detected

Elevated Levels Below the Tier I Residential Health-Based Drinking Water RBSLs

Elevated Levels Above the Tier I Residential Health-Based Drinking Water RBSLs

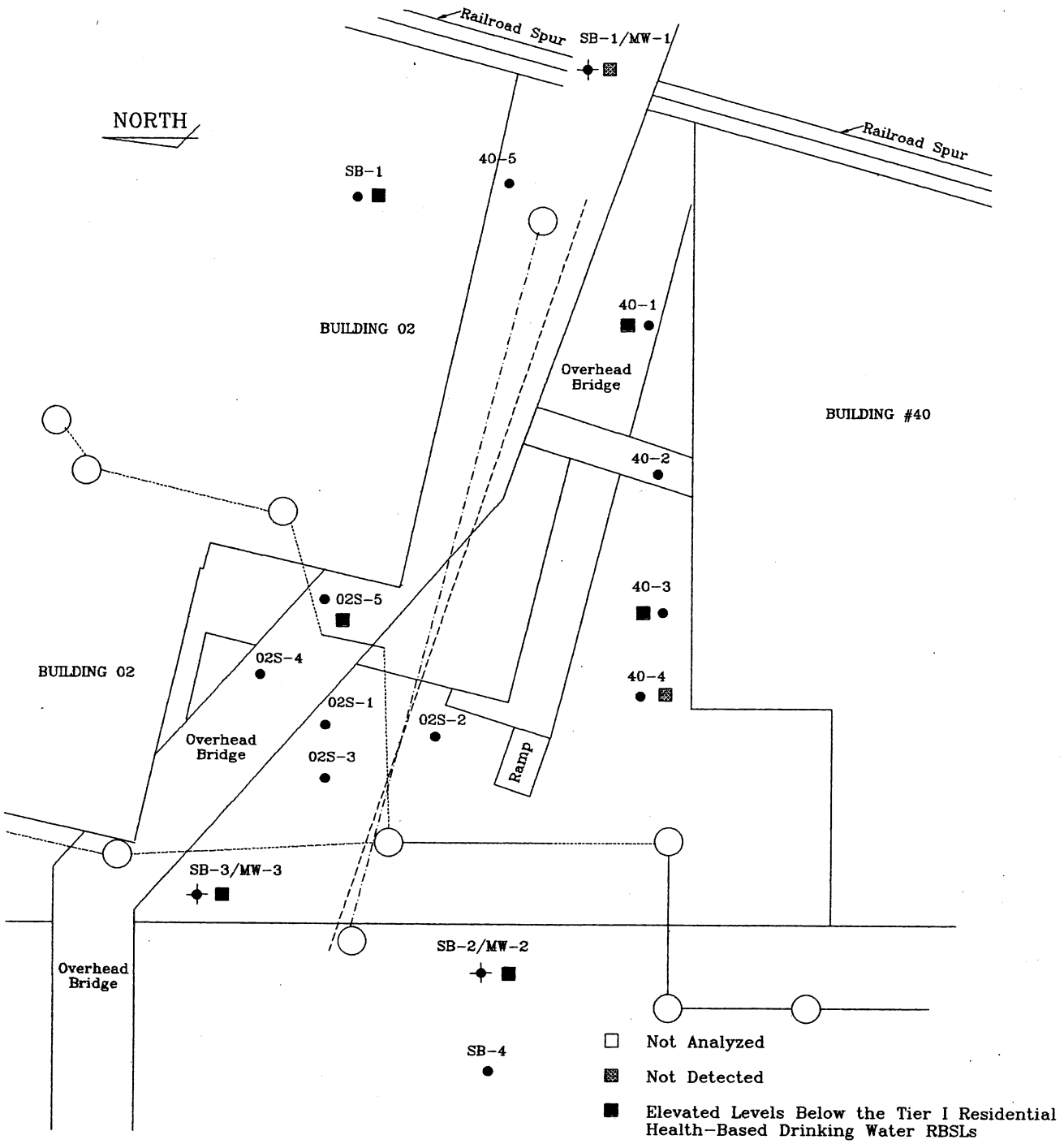
LEGEND:

- Geoprobe Sample Locations
- Monitoring Well Locations
- Fire Protection Line
- Sanitary Line
- Storm Sewer Line

GM-CLCD NORTH

TITLE: GROUNDWATER CONCENTRATION MAP: ETHYLBENZENE BUILDINGS 02 & 40 TANKS 67/02-70/02 & 71/40N-74/40N

SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9c
	PROJECT NUMBER: F174



Not Analyzed

Not Detected

Elevated Levels Below the Tier I Residential Health-Based Drinking Water RBSLs

Elevated Levels Above the Tier I Residential Health-Based Drinking Water RBSLs

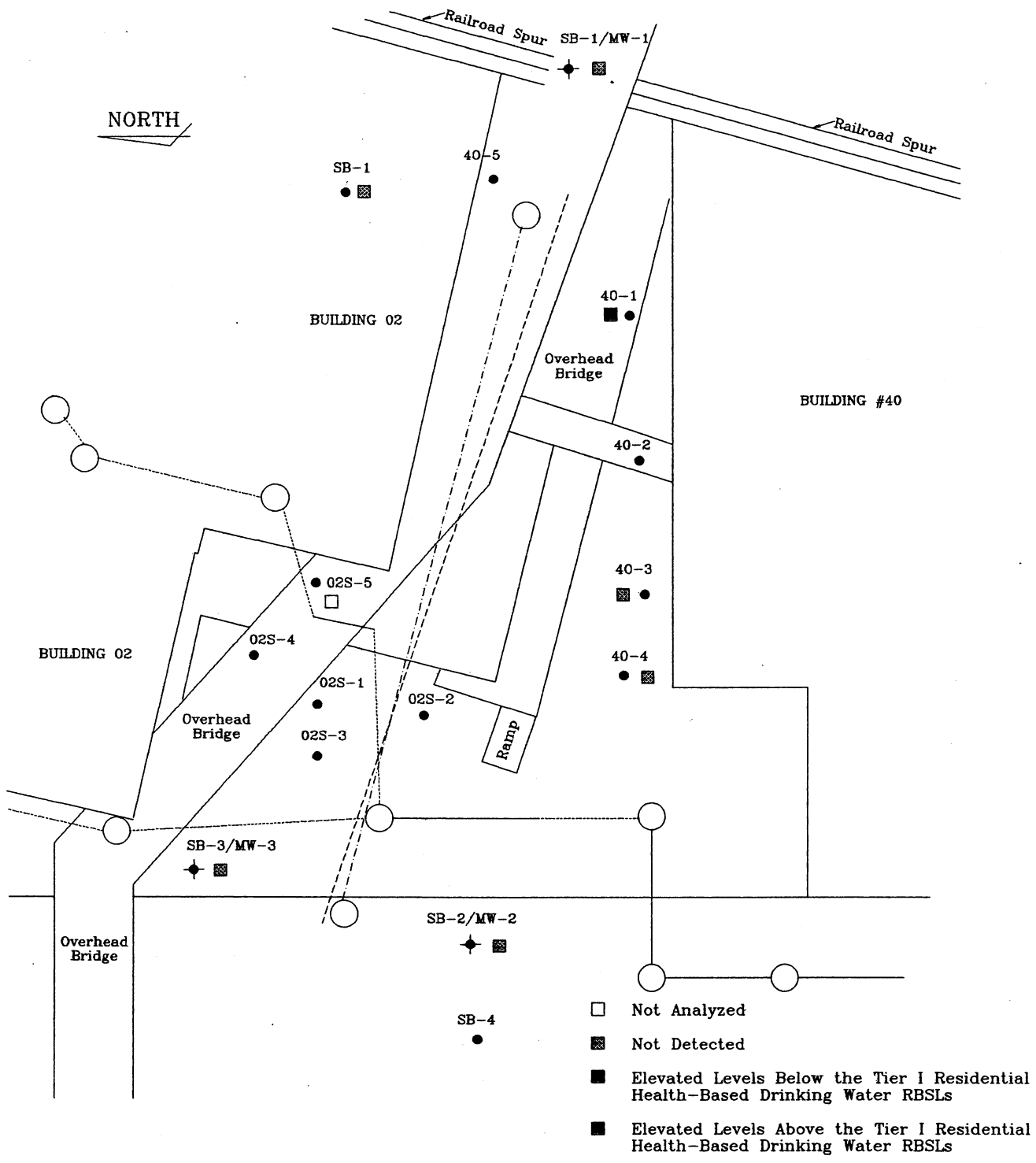
LEGEND:

- Geoprobe Sample Locations
- Monitoring Well Locations
- Fire Protection Line
- Sanitary Line
- Storm Sewer Line

GM-CLCD NORTH

TITLE: GROUNDWATER CONCENTRATION MAP: XYLENES
BUILDINGS 02 & 40
TANKS 67/02-70/02 & 71/40N-74/40N

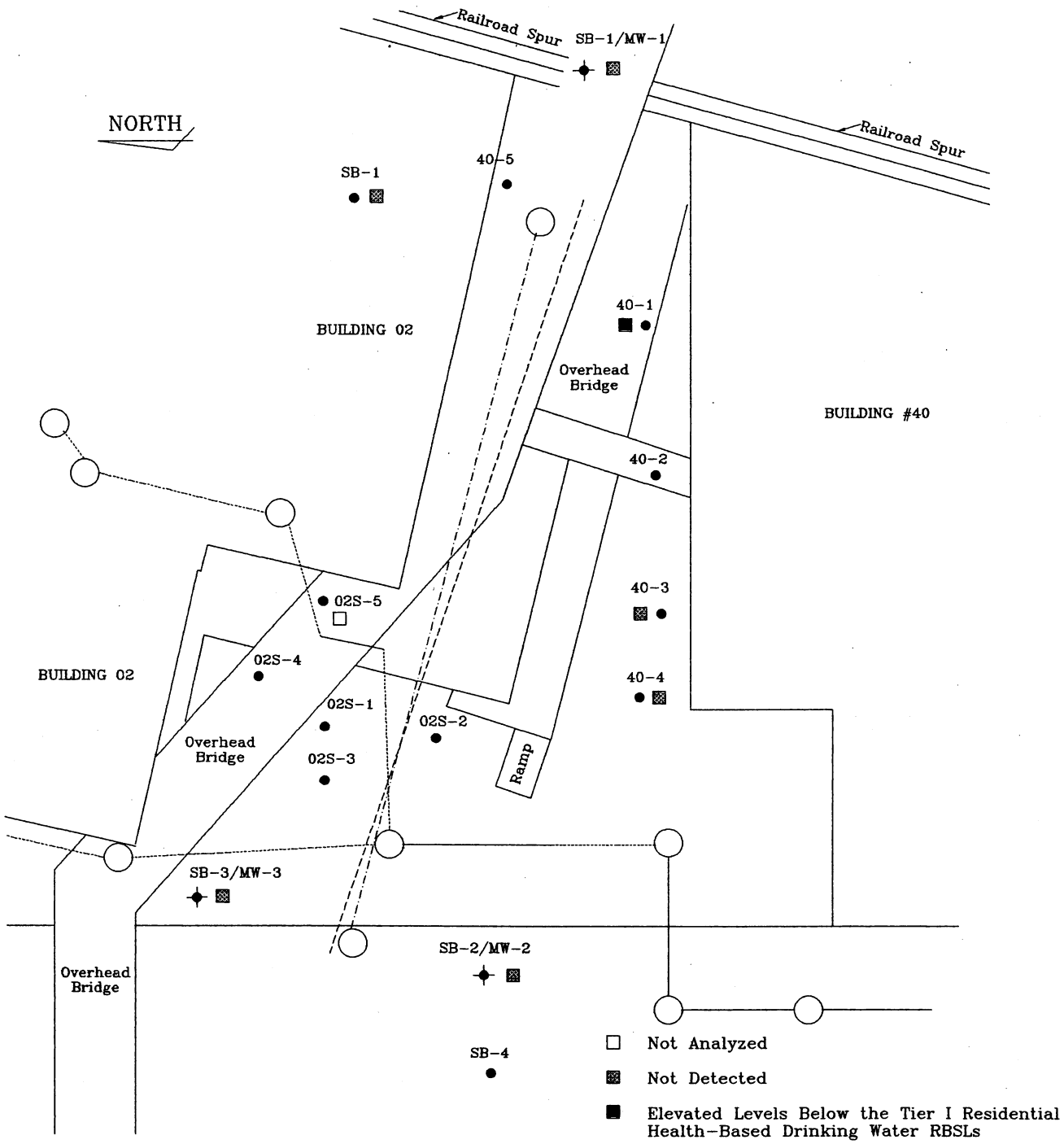
SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9d
	PROJECT NUMBER: F174



LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- ——— Sanitary Line
- —·—· Storm Sewer Line

GM-CLCD NORTH	
TITLE: GROUNDWATER CONCENTRATION MAP: NAPTHALENE BUILDINGS 02 & 40 TANKS 67/02-70/02 & 70/40N-74/40N	
SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9e
	PROJECT NUMBER: F174



Not Analyzed

Not Detected

Elevated Levels Below the Tier I Residential Health-Based Drinking Water RBSLs

Elevated Levels Above the Tier I Residential Health-Based Drinking Water RBSLs

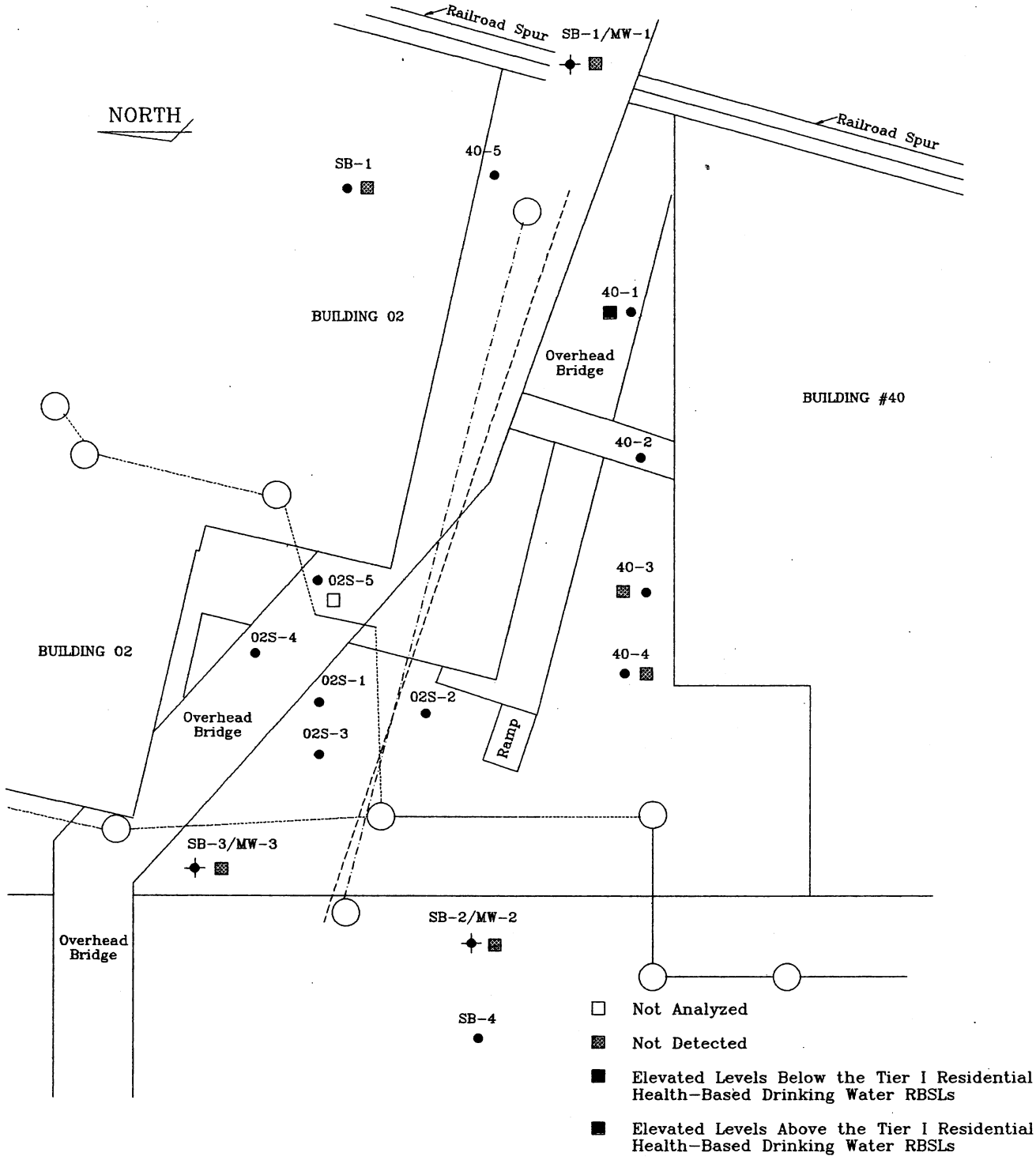
LEGEND:

- Geoprobe Sample Locations
- Monitoring Well Locations
- Fire Protection Line
- Sanitary Line
- Storm Sewer Line

GM-CLCD NORTH

TITLE: GROUNDWATER CONCENTRATION MAP: 2-METHYLNAPHTHALENE BUILDINGS 02 & 40 TANKS 67/02-70/02 & 71/40N-74/40N

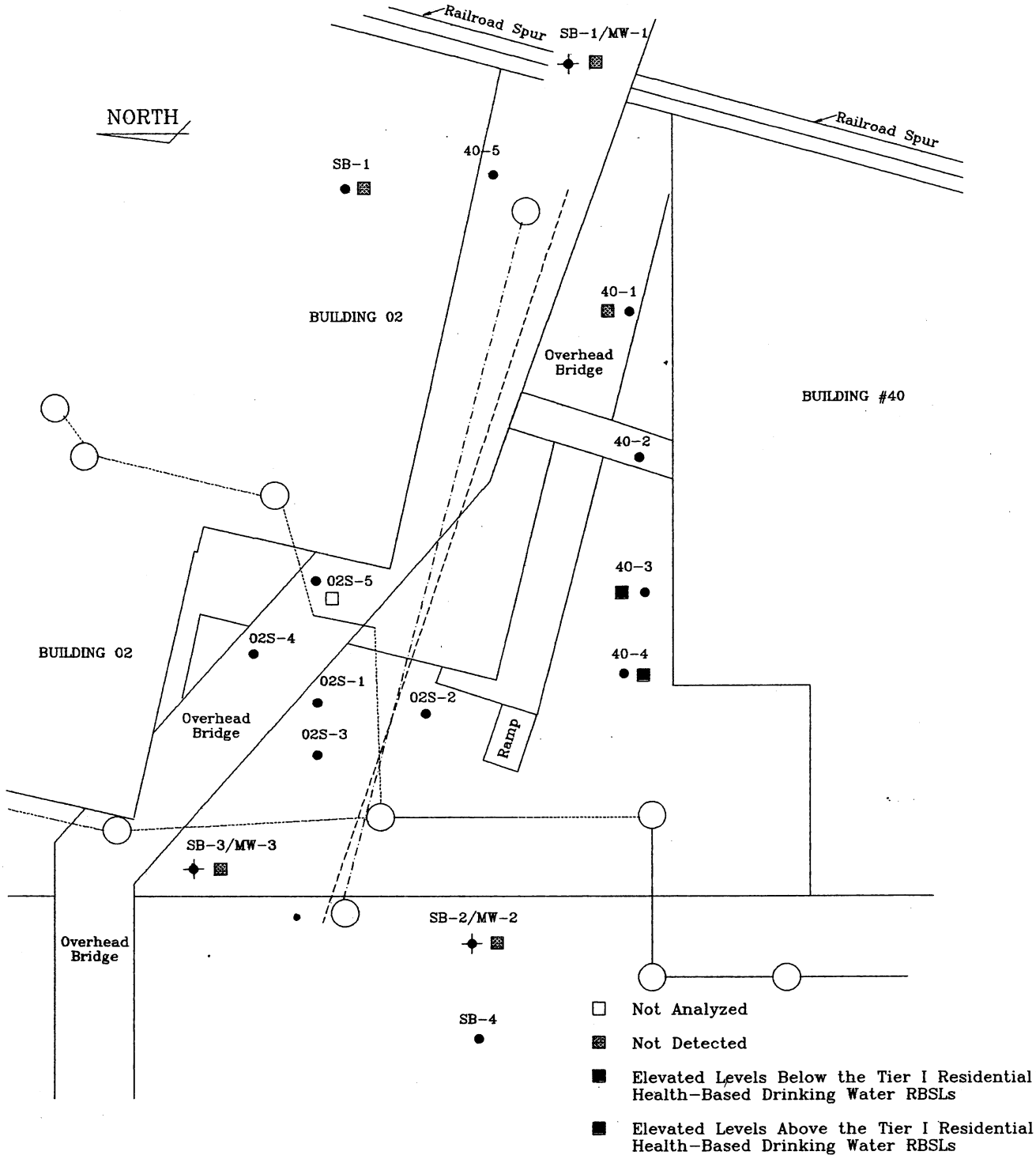
SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9f
	PROJECT NUMBER: F174



LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- ——— Sanitary Line
- —·—·— Storm Sewer Line

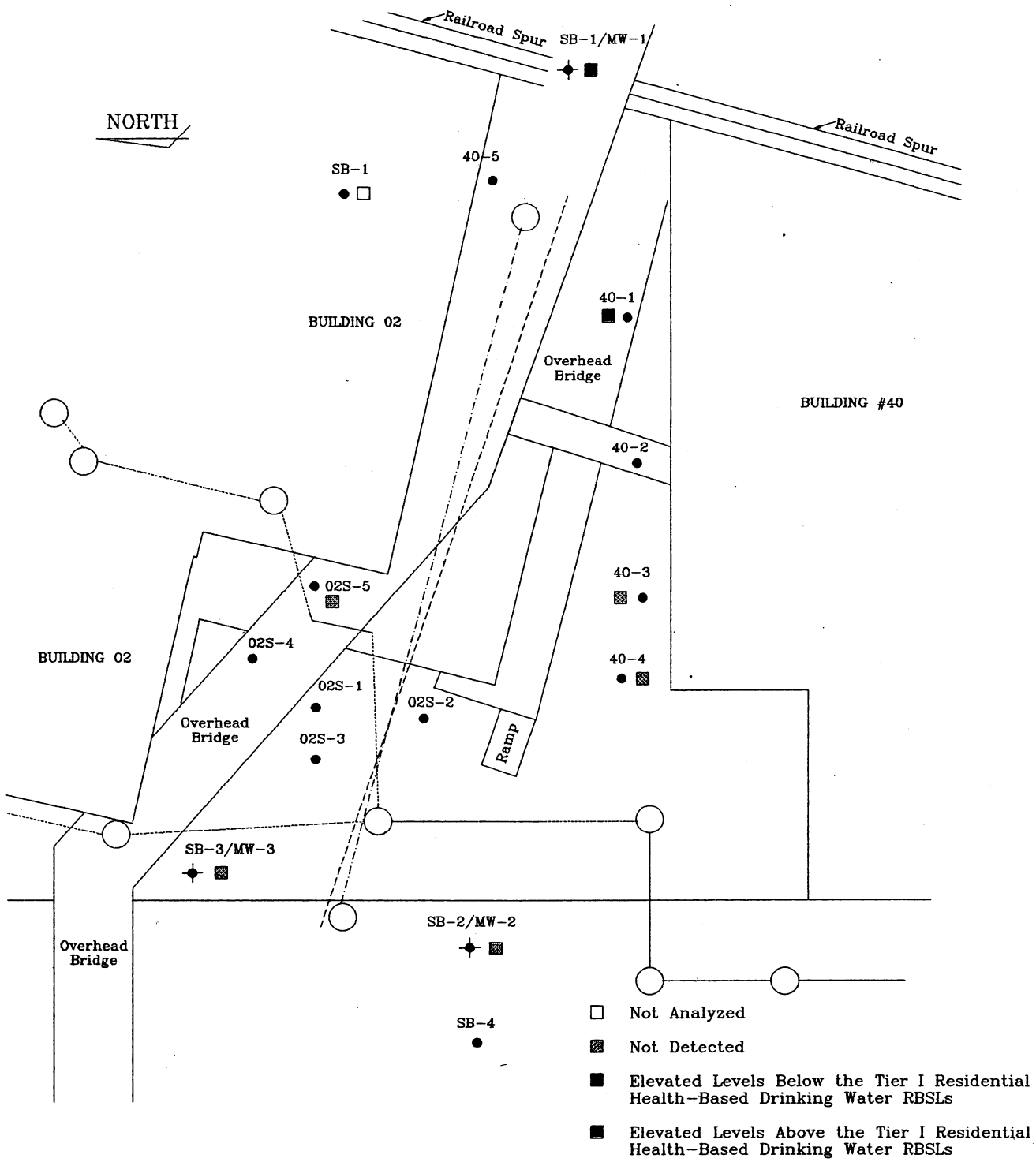
GM-CLCD NORTH	
TITLE: GROUNDWATER CONCENTRATION MAP: 1,2-DICHLOROETHANE BUILDINGS 02 & 40 TANKS 67/02-70/02 & 71/40N-74/40N	
SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9g
	PROJECT NUMBER: F174



LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- ------ Sanitary Line
- —·—· Storm Sewer Line

GM-CLCD NORTH	
TITLE: GROUNDWATER CONCENTRATION MAP: 1,1-DICHLOROETHANE BUILDING 02 & 40 TANKS 67/02-70/02 & 71/40N-74/40N	
SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9h
	PROJECT NUMBER: F174



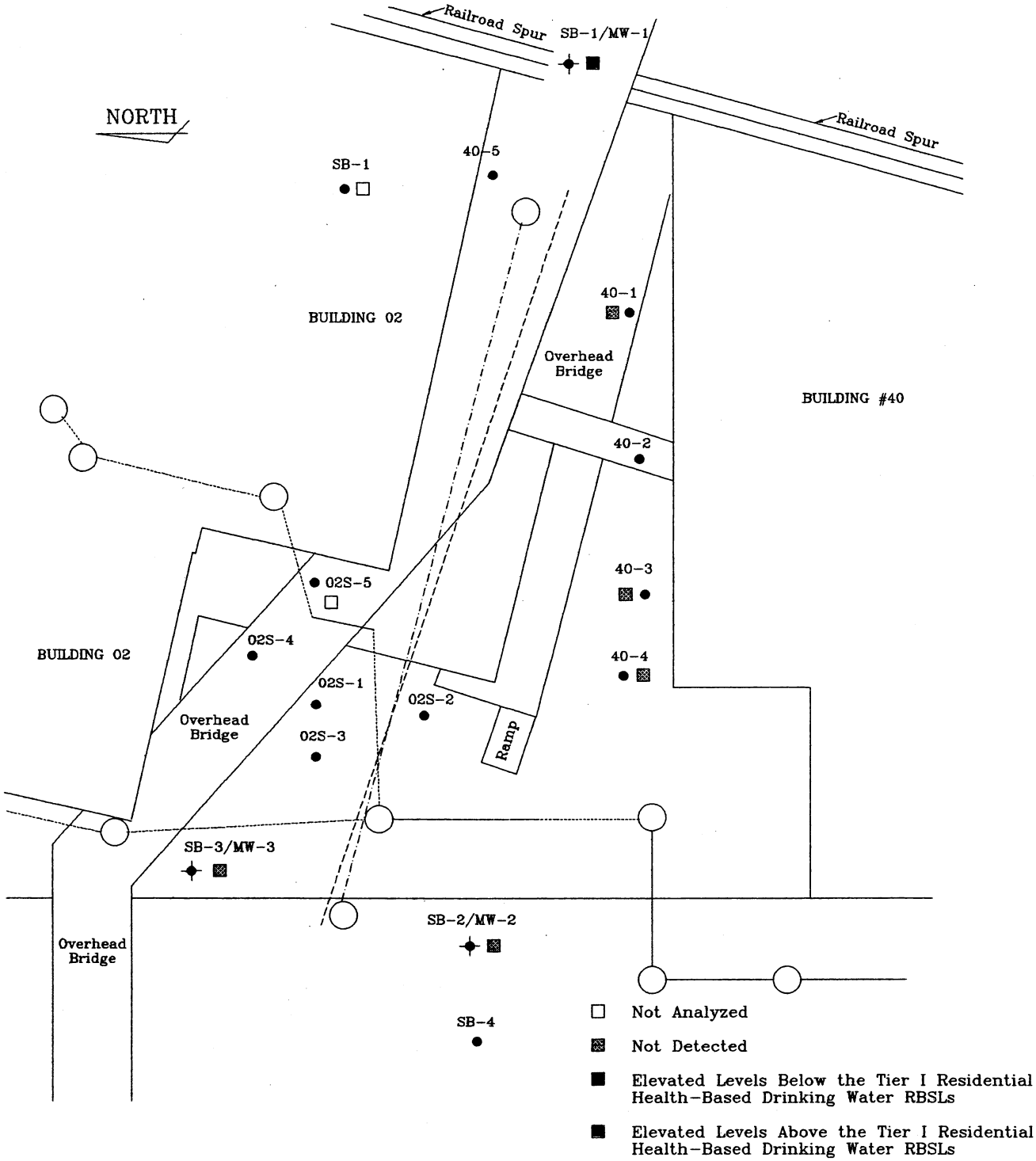
LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- ------ Sanitary Line
- —·—·— Storm Sewer Line

GM-CLCD NORTH

TITLE: GROUNDWATER CONCENTRATION MAP: LEAD
BUILDINGS 02 & 40
TANKS 67/02-70/02 & 71/40N-74/40N

SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9i
	PROJECT NUMBER: F174



LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- —— Sanitary Line
- —·—·— Storm Sewer Line

GM-CLCD NORTH

TITLE: GROUNDWATER CONCENTRATION MAP: CHROMIUM
BUILDING 02 & 40
TANKS 67/02-70/02 & 71/40N-74/40N

SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9j
	PROJECT NUMBER: F174

ATTACHMENT 10

Global Environmental Engineering Inc.
5467 Hill 23 Drive, Suite B
Flint, Michigan 48507
Tel: (810) 238-9190
Fax: (810) 238-9195

Monitoring Well:	MW-1	Project Name:	GM-CLCD N.
Date:	11/8/96	Project No.:	F174
Contractor:	GEEI	Location:	Building 40/02 South
Prepared By:	JCW	Twp/Range/Sec.:	
Time Started:	12:45	Depth Drilled:	12'
Time Completed:		Hole Diamater:	8.25"
Coring Device:	5'	Inner Diamater:	4.50"
		Drilling Fluid:	None
		Driller:	Elroy
		Helper:	NA

Boring Methods

X	Hollow Stem Auger
	Hand Auger
	Geoprobe

Water Level Data

Date	SWL Elevation

WELL SPECIFICATIONS

Well Casing Cover:

Material:	Steel
Diamater:	12"
Length:	12"
Lock:	No

Well Casing:

Diamater:	2"
Length:	3.5'
Material:	PVC
Cap:	Expandable
Locking:	Dolphin

Well Screen

Diamater:	2"
Length:	5'
Slotsize:	.01"
Material:	PVC
Well Screen Interval:	3.5'-8.5'
Filter Pack:	Sand

Top of Casing:

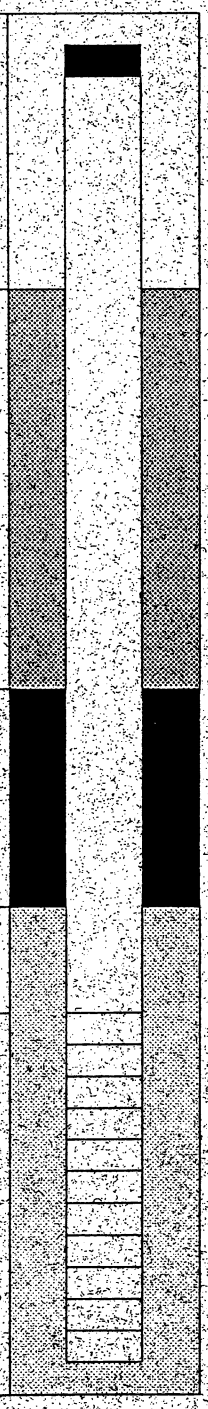
Depth to Top of Grout Backfill: 1'

Depth to Top of Bentonite: 1.5'

Depth to Top of Sand: 2.5'

Depth to Top of Screen: 3.5'

Total Well Depth: 8.5'



SOIL PROFILE

0'-9.5' - Sand

9.5'-12' - Clay

Groundwater Encountered at 5'

End of Boring 12'

Global Environmental Engineering Inc.
5467 Hill 23 Drive, Suite B
Flint, Michigan 48507
Tel: (810) 238-9190
Fax: (810) 238-9195

Monitoring Well:	MW-2	Project Name:	GM-CLCD N.
Date:	11/8/96	Project No.:	F174
Contractor:	GEEI	Location:	Building 40/02 South
Prepared By:	JCW	Twp/Range/Sec.:	
Time Started:	14:50	Depth Drilled:	16'
Time Completed:		Hole Diamater:	8.25"
Coring Device:	5'	Inner Diamater:	4.50"
		Drilling Fluid:	None
		Driller:	Elroy
		Helper:	NA

Boring Methods

X	Hollow Stem Auger
	Hand Auger
	Geoprobe

Water Level Data

Date	SWL Elevation

WELL SPECIFICATIONS

Well Casing Cover:

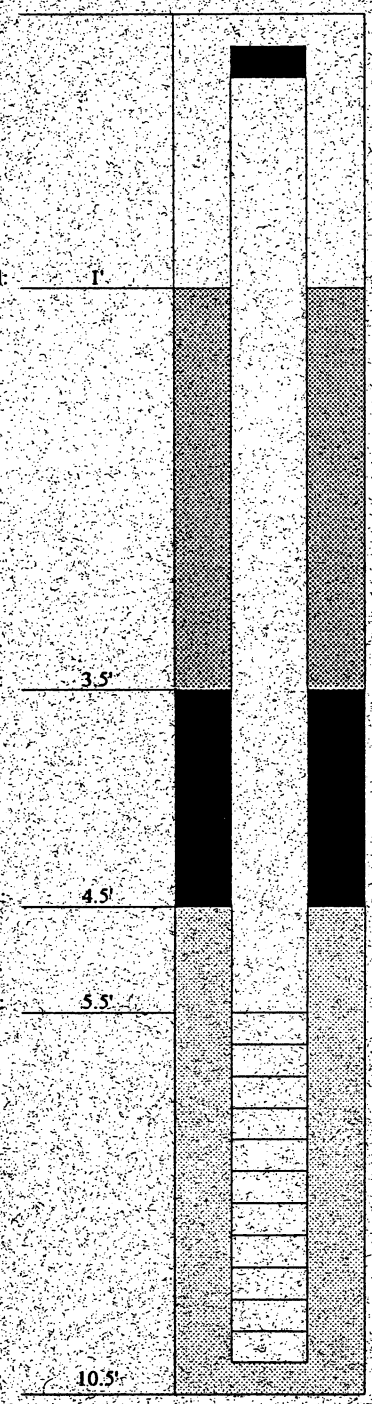
Material:	Steel
Diamater:	12"
Length:	12"
Lock:	No

Well Casing:

Diamater:	2"
Length:	5.5'
Material:	PVC
Cap:	Expandable
Locking:	Dolphin

Well Screen

Diamater:	2"
Length:	5'
Slotsize:	.01"
Material:	PVC
Well Screen Interval:	5.5'-10.5'
Filter Pack:	Sand



SOIL PROFILE

0'-4.5' - Sandy Clay

4.5'-6.5' - Clay

6.5'-10' Sandy Clay

Groundwater Encountered at 6.5'

End of Boring 16'

Global Environmental Engineering Inc.
5467 Hill 23 Drive, Suite B
Flint, Michigan 48507
Tel: (810) 238-9190
Fax: (810) 238-9195

Monitoring Well:	MW-3	Project Name:	GM-CLCD N.
Date:	12/10/96	Project No:	F174
Contractor:	YECI	Location:	Building 40/02 South
Prepared By:	JCW	Twp/Range/Sec:	
Time Started:	14:15	Depth Drilled:	21'
Time Completed:		Hole Diamater:	8.25"
Coring Device:	5'	Inner Diamater:	4.50"
		Drilling Fluid:	None
		Driller:	Scott
		Helper:	NA

Boring Methods	
	Hollow Stem Auger
	Hand Auger
X	Geoprobe

Water Level Data

Date	SWL Elevation

WELL SPECIFICATIONS

Well Casing Cover:

Material:	Steel
Diamater:	12"
Length:	12"
Lock:	No

Well Casing:

Diamater:	2"
Length:	12'
Material:	PVC
Cap:	Expandable
Locking:	Dolphin

Well Screen

Diamater:	2"
Length:	5'
Slotsize:	.01"
Material:	PVC
Well Screen Interval:	5'
Filter Pack:	Sand

Top of Casing:

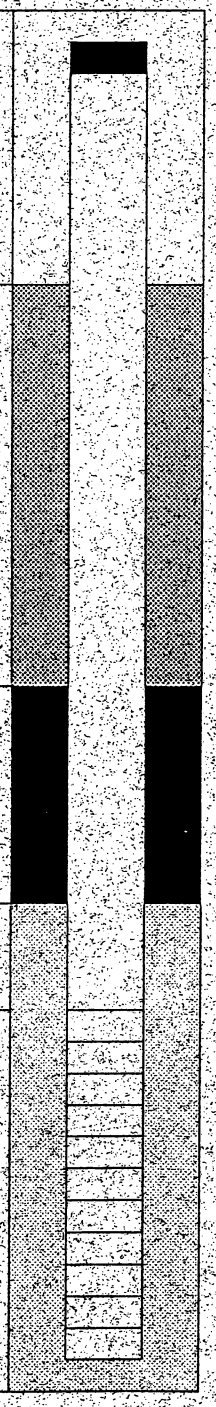
Depth to Top of Grout Backfill: 1'

Depth to Top of Bentonite: 10'

Depth to Top of Sand: 11'

Depth to Top of Screen: 12'

Total Well Depth: 17'



SOIL PROFILE

0'-.5' - Concrete

.5'-4.5' - Sand

4.5'-6' - Clay

6'-9' - Sandy Clay

9'-12.5' - Silty Clay

12.5'-13.5' - Sandy Silt

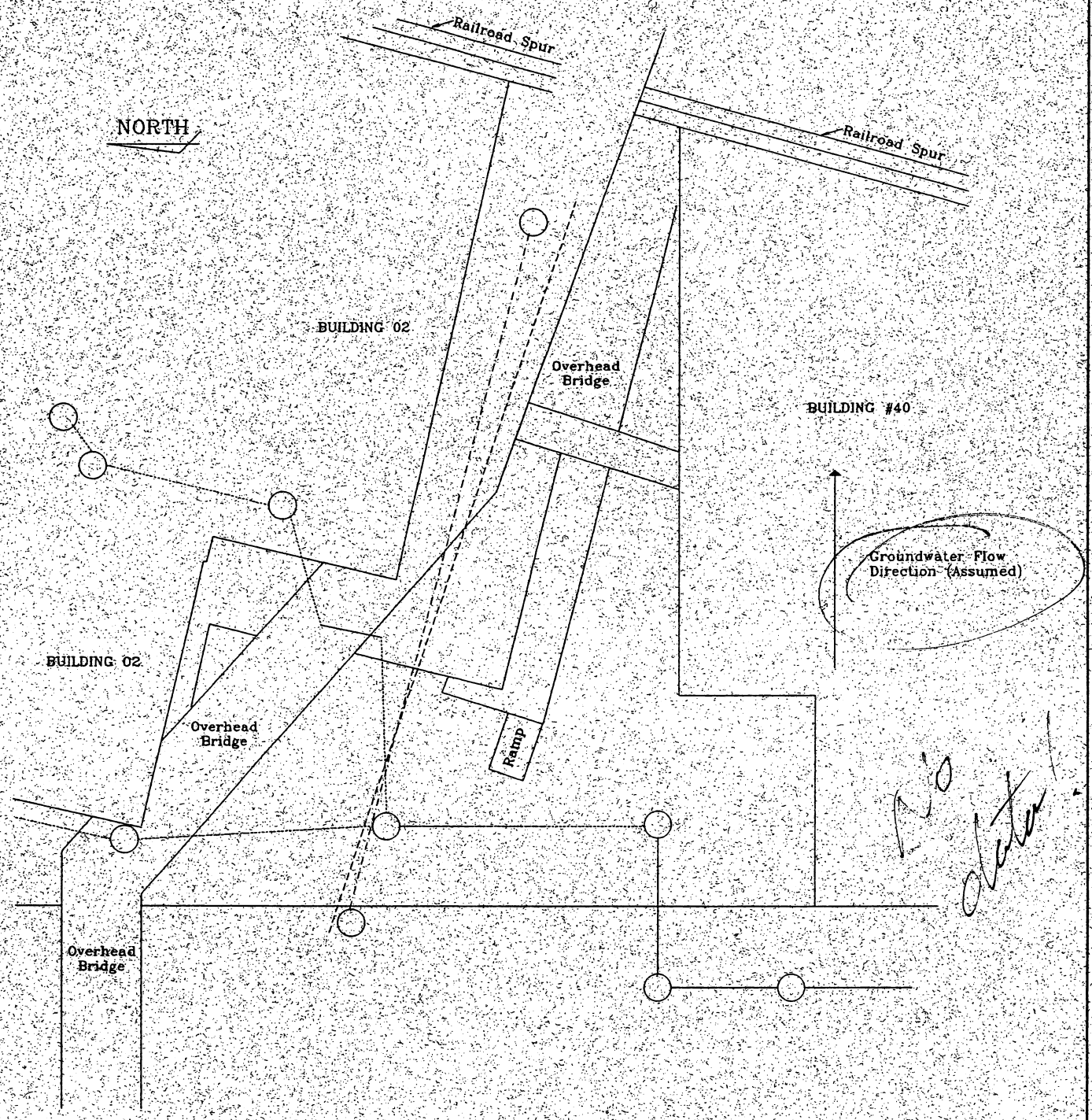
13.5'-17' - Sandy Silt

17'-19' - Silt

19'-21' - Sand

End of Boring 21'

ATTACHMENT-11



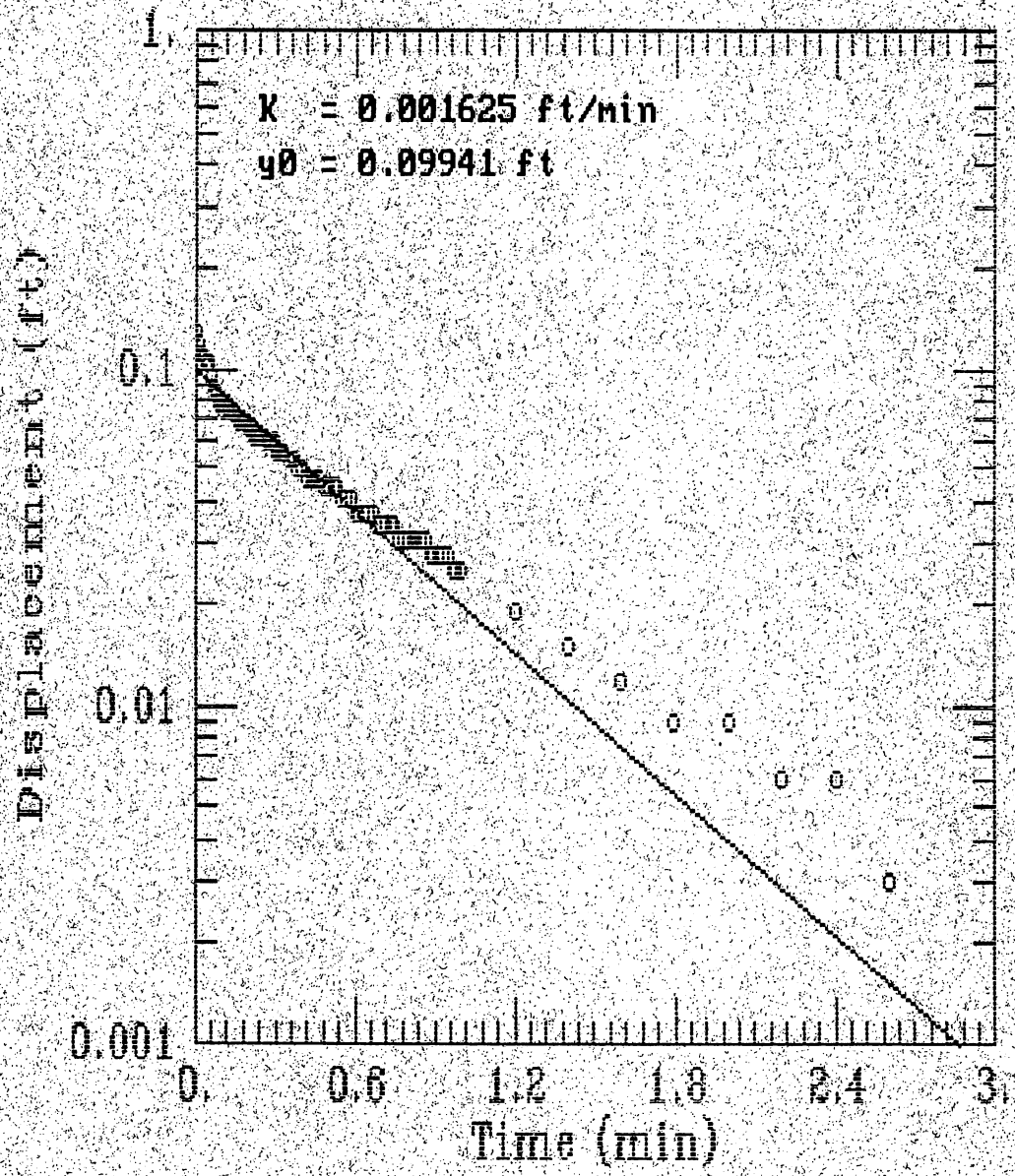
LEGEND:

- Geoprobe Sample Locations
- Monitoring Well Locations
- Fire Protection Line
- Sanitary Line
- Storm Sewer Line

GM-CLCD NORTH	
TITLE: GROUNDWATER FLOW MAP BUILDINGS 02 & 40 TANKS 67/02-70/02 & 71/40N-74/40N	
SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER 11
	PROJECT NUMBER: F174

ATTACHMENT 12

BUILDING 40/02 - MW3



AQTESOLV

GERAGHTY & MILLER, INC.

Modeling Group

AQTESOLV RESULTS
Version 1.10

07/25/97 15:02:08

TEST DESCRIPTION

Data set..... gm40mw3n.dat
Data set title..... BUILDING 40/02 - MW3

Knowns and Constants:
- No. of data points..... 88
- Radius of well casing..... 0.08333
- Radius of well..... 0.3333
- Aquifer saturated thickness..... 6
- Well screen length..... 5
- Static height of water in well..... 2.91
- Log(Re/Rw)..... 1.455
- A, B, C..... 2.021, 0.301, 0.000

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

RESULTS FROM STATISTICAL CURVE MATCHING

STATISTICAL MATCH PARAMETER ESTIMATES

	Estimate		Std. Error
K =	1.6251E-003	+/-	5.9071E-005
y0 =	9.9414E-002	+/-	1.7421E-003

ANALYSIS OF MODEL RESIDUALS

residual = calculated - observed
weighted residual = residual * weight

Weighted Residual Statistics:
- Number of residuals..... 88
- Number of estimated parameters..... 2
- Degrees of freedom..... 86
- Residual mean..... 0.0005688
- Residual standard deviation..... 0.006431
- Residual variance..... 4.136E-005

Model Residuals:

Time	Observed	Calculated	Residual	Weight
0.0083	0.129	0.098096	0.030904	1
0.0166	0.119	0.096796	0.022204	1
0.025	0.11	0.095497	0.014503	1
0.0333	0.107	0.094231	0.012769	1
0.0416	0.104	0.092982	0.011018	1
0.05	0.104	0.091735	0.012265	1
0.0583	0.094	0.090519	0.0034812	1
0.0666	0.088	0.089319	-0.0013188	1
0.075	0.085	0.088121	-0.0031206	1
0.0833	0.082	0.086952	-0.0049524	1
0.0916	0.078	0.0858	-0.0077997	1
0.1	0.078	0.084649	-0.0066487	1
0.1083	0.075	0.083527	-0.0085266	1
0.1166	0.078	0.082419	-0.0044193	1
0.125	0.075	0.081314	-0.0063136	1
0.1333	0.075	0.080236	-0.0052357	1
0.1416	0.072	0.079172	-0.007172	1
0.15	0.072	0.07811	-0.0061099	1
0.1583	0.072	0.077074	-0.0050744	1
0.1666	0.069	0.076053	-0.0070527	1
0.175	0.069	0.075032	-0.0060324	1
0.1833	0.069	0.074038	-0.0050377	1
0.1916	0.069	0.073056	-0.0040562	1
0.2	0.066	0.072076	-0.0060762	1
0.2083	0.066	0.071121	-0.0051207	1
0.2166	0.066	0.070178	-0.0041779	1
0.225	0.063	0.069236	-0.0062364	1
0.2333	0.063	0.068319	-0.0053186	1
0.2416	0.063	0.067413	-0.0044129	1
0.25	0.063	0.066509	-0.0035085	1
0.2583	0.063	0.065627	-0.0026269	1
0.2666	0.06	0.064757	-0.0047569	1
0.275	0.06	0.063888	-0.0038881	1
0.2833	0.06	0.063041	-0.0030412	1
0.2916	0.06	0.062205	-0.0022055	1
0.3	0.056	0.061371	-0.005371	1
0.3083	0.056	0.060557	-0.0045574	1
0.3166	0.056	0.059755	-0.0037546	1
0.325	0.056	0.058953	-0.002953	1
0.3333	0.056	0.058171	-0.0021715	1
0.35	0.053	0.05663	-0.0036303	1
0.3666	0.053	0.055139	-0.0021388	1
0.3833	0.05	0.053678	-0.0036779	1

0.4	0.05	0.052256	-0.0022558	1
0.4166	0.047	0.05088	-0.0038795	1
0.4333	0.047	0.049532	-0.0025315	1
0.45	0.047	0.048219	-0.0012192	1
0.4666	0.047	0.046949	5.0759E-005	1
0.4833	0.044	0.045705	-0.0017054	1
0.5	0.044	0.044494	-0.00049445	1
0.5166	0.044	0.043323	0.00067743	1
0.5333	0.044	0.042175	0.0018252	1
0.55	0.041	0.041057	-5.7405E-005	1
0.5666	0.041	0.039976	0.0010239	1
0.5833	0.041	0.038917	0.0020831	1
0.6	0.037	0.037886	-0.00088586	1
0.6166	0.037	0.036888	0.00011196	1
0.6333	0.037	0.035911	0.0010893	1
0.65	0.037	0.034959	0.0020407	1
0.6666	0.037	0.034039	0.0029614	1
0.6833	0.034	0.033137	0.00086325	1
0.7	0.034	0.032259	0.0017412	1
0.7166	0.034	0.031409	0.0025908	1
0.7333	0.034	0.030577	0.0034229	1
0.75	0.034	0.029767	0.0042331	1
0.7666	0.031	0.028983	0.002017	1
0.7833	0.031	0.028215	0.0027849	1
0.8	0.031	0.027468	0.0035325	1
0.8166	0.031	0.026744	0.0042559	1
0.8333	0.031	0.026036	0.0049644	1
0.85	0.031	0.025346	0.0056542	1
0.8666	0.031	0.024678	0.0063218	1
0.8833	0.028	0.024024	0.0039756	1
0.9	0.028	0.023388	0.0046121	1
0.9166	0.028	0.022772	0.0052281	1
0.9333	0.028	0.022169	0.0058314	1
0.95	0.028	0.021581	0.0064187	1
0.9666	0.025	0.021013	0.0039871	1
0.9833	0.025	0.020456	0.0045438	1
1	0.025	0.019914	0.0050858	1
1.2	0.019	0.014438	0.0045621	1
1.4	0.015	0.010468	0.0045324	1
1.6	0.012	0.0075891	0.0044109	1
1.8	0.009	0.0055022	0.0034978	1
2	0.009	0.0039891	0.0050109	1
2.2	0.006	0.0028921	0.0031079	1
2.4	0.006	0.0020968	0.0039032	1
2.6	0.003	0.0015202	0.0014798	1

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

Estimate

K = 1.6251E-003

y0 = 9.9414E-002

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Appendix H - Supplemental Information - Building 40 Tanks 71 through 74

SUMMARY REPORT

BUILDING 40
TANKS 071/40N - 074/40N

GM-CLCD NORTH
NAO FLINT OPERATIONS
FLINT, MICHIGAN

FACILITY ID: 0-002763

CONFIRMED RELEASE NO.: C-470-97

September 9, 1997

Prepared by:
Global Environmental Engineering, Inc.
5467 Hill 23 Drive, Ste. B
Flint, Michigan 48507
(810) 238-9190

Global
Environmental
Engineering Inc.

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ATTACHMENTS

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Attachment 3	Soil Analytical Results
Attachment 4	Soil Comparison Tables
Attachment 5	Soil Concentration Maps
Attachment 6	Soil Boring Logs
Attachment 7	Groundwater Analytical Results
Attachment 8	Groundwater Comparison Tables
Attachment 9	Groundwater Concentration Maps
Attachment 10	Monitoring Well Logs
Attachment 11	Groundwater Flow Diagram
Attachment 12	Slug Test Results

1.0 UNDERGROUND STORAGE TANKS

For the purposes of this summary report, the Building 40 investigation results will be combined with the Building 02 investigation results due to the proximity of the underground storage tanks (USTs). See Attachment 1 for former tank locations.

1.1 Location

The four USTs formerly associated with Building 40N (Tanks 071/40N - 074/40N) were located on the north side of Building 40N between Building 02 and Building 40N. See Attachment 1.

1.2 UST Contents

The identification number, size, and contents of the USTs, detailed on the Buick Motor Division Storage Tank layout drawing number 42361-M dated 1973, are summarized as follows:

071/40N	10,000-gallon	Transmission Oil
072/40N	16,000-gallon	Waste Solvent
073/40N	10,000-gallon	Waste Solvent
074/40N	12,000-gallon	Unknown

* UST contents as listed on the Michigan UST-DMS Facility and Tank Data Listing by County, dated November 29, 1995.

1.3 Installation and Removal Dates

The USTs associated with Building 40N were installed in 1964 and removed in 1987.

2.0 INVESTIGATION ACTIVITIES

During UST removal activities, a saturated zone of soils extending from approximately 10-13 feet bgs was noted. A full volatile scan was run on a water sample obtained from this zone which indicated elevated levels of toluene. An unknown amount of soil was excavated from this area.

2.1 Summary of Investigation Activities

Based on the information above, Global recommended that soil borings be conducted to determine the condition of impacted media.

On July 24, 1996, Global supervised the advancement of five soil borings (40-1 through 40-4) using a Geoprobe in the area of the Building 40 tank

farm. The borings were located in a line between Building 40 and Building 02. The borings were advanced to a maximum depth of 19 feet below grade.

On July 29, 1996, Global supervised the advancement five soil borings (02S-1 through 02S-5) using a Geoprobe in and around the former excavation associated with the Building 02. Obstructions were noted in each boring with the exception of 02S-1. The maximum boring depth was 21 feet below ground surface. Soil and groundwater samples were collected when possible.

On November 11, 1996, Global supervised the advancement two monitoring wells (SB1/MW1 and SB2/MW2) using a truck-mounted drill rig. On December 10, 1996, Global supervised the installation of MW-3 (02S/GP1/MW3) using a Geoprobe, which due to the soil types present, ultimately proved unusable. On June 3, 1997, Global returned to the site to re-drill and install a new well at the MW-3 location. An attempt was made to install a fourth monitoring well located in the roadway, west of MW-2. An obstruction was encountered at five feet below ground surface and the boring was abandoned. Also, one boring each was to be drilled inside Building 02 and Building 40 using a Geoprobe operated by Great Lakes Geological Technical Services, Inc. The boring located in Building 40 could not be completed due to the presence of a subfloor. The boring drilled in the southeast end of Building 02 was advanced to 21 feet below grade.

Groundwater was encountered at varying depths, in lenses of varying thickness and grain size. MW-1 was located in an unpaved area. The monitoring wells were screened as shown below. See also Attachment 10: Monitoring Well Logs.

Well ID	Screened Interval (feet bgs)	Soil Type
MW-1	4 - 9	Sandy Silt/Silty Sand
MW-2	5 - 10	Silty Sand/Sandy Clay
MW-3	14 - 19	Silty Clay/Sand

On January 2, 1997, MW-1 and MW-2 were sampled. On September 10, 1997, MW-3 was sampled. On September 12, 1997, a slug test was conducted on MW-3.

2.1.1 Sample Collection and Analysis

A minimum of two soil samples were collected for laboratory analysis from each soil boring based on the highest organic vapor analyzer

reading (OVA) and/or the groundwater water interface, and the bottom-of-bore. Soil samples were collected from depths ranging from 7 to 27 feet below ground surface. Actual sample depths are given in Attachment 3. OVA results can be found on the soil boring logs, Attachment 6.

Each of the soil samples collected was placed into an unpreserved four-ounce container and transported at four degrees Celsius (4°C) using chain-of-custody procedures to Fire & Environmental Consulting Laboratories, Inc., in East Lansing, Michigan. Samples were analyzed in accordance with recommendations contained in *Environmental Response Division Operation Memorandum #6, Revision #4*, dated September 13, 1995.

Groundwater samples were collected from Geoprobe borings whenever possible using a screen point sampler attachment. The screen point sampler was driven to the desired sampling depth and an inner core, consisting of stainless steel wire screen, was pushed into the borehole allowing water to collect in the sampler. Monitoring wells were developed prior to sampling using a stainless steel bailer until water clarity stabilized. Approximately 48 hours following development, the monitoring wells were sampled. At the time of sampling, the monitoring wells were purged a minimum of three well volumes to ensure sample clarity.

Each of the groundwater samples collected for laboratory analysis was placed in laboratory-prepared glass bottles. Samples to be analyzed for dissolved lead were filtered in the field and preserved with nitric acid. Samples to be analyzed for volatile organics were preserved with hydrochloric acid. Each sample was transported at 4°C using chain-of-custody procedures to Fire & Environmental Consulting Laboratories, Inc., in East Lansing, Michigan. Samples were analyzed in accordance with recommendations contained in *Environmental Response Division Operational Memorandum #6, Revision #4*, dated September 13, 1995.

2.2 Summary of Geological Information

There are four basic rock formations comprising the bedrock of Genesee County: the Coldwater, Marshall, Michigan, and Saginaw formations. The Coldwater formation consists of sandy shale, and is a poor water producer. The Marshall formation consists of white to gray sandstone of varying grain size in the lower portion, and Napoleon Sandstone and Marshall Sandstone

in the upper portion. The Marshall formation yields high quality groundwater. The Michigan formation consists of a gray shale and some thick dolostone layers, and is not a principal water bearing formation. The Saginaw formation is the youngest formation, and consists of sandstone, shale, sandy shale, limestone, and coal layers. Groundwater may be obtained from the sandstone layers within the Saginaw formation. Glacial drift material overlies the bedrock.

2.3 Summary of Hydrogeological Information

2.3.1 Depth to usable aquifer

The City of Flint is on a municipal water system. Most of the potable water wells within Genesee County are located beneath the glacial drift in the Saginaw Formation. The depth to the Saginaw Formation varies throughout the county, but is located roughly 300 feet below ground surface.

2.3.2 Local Groundwater Flow Direction

It is assumed that groundwater flow is east toward the river, although the presence of subsurface structures such as tunnels and building footings may influence groundwater flow at shallow depths. A flow could not be determined based on the static water level measurements from the three monitoring wells due to the variability of the well screen depths and soil types encountered in the screened intervals. See Attachment 10: Monitoring Well Logs; and Attachment 11: Groundwater Flow Diagram.

2.3.3 Hydraulic Gradient

The hydraulic gradient for this area of the site could not be determined for the reasons stated in Section 2.3.2, above.

2.3.4 Hydraulic Conductivity

Slug test data obtained using a Hermit 2000© and analyzed using Aqtesolv© software indicated an average hydraulic conductivity of 0.0016 ft/min. See Attachment 12.

2.3.5 *Natural Groundwater Velocity (Seepage Velocity)*

The natural groundwater velocity is estimated based on the hydraulic conductivity, the hydraulic gradient, and the effective porosity. Due to the variability of the well screen depths and soil types encountered in the screened intervals, neither the hydraulic gradient nor the effective porosity could be determined in this area. Therefore, the natural groundwater velocity has not been estimated.

3.0 SOIL SAMPLE ANALYTICAL RESULTS

Soil samples were submitted to Fire & Environmental Consulting Laboratories, Inc., located in East Lansing, Michigan for analysis. Initially, sample analytical parameters were based on the former UST contents individually associated with each tank farm (Building 40 and Building 02). As the investigation proceeded and it became clear that combining the two areas would be more efficient, analytical parameters were expanded for each sample to include the following constituents: benzene, toluene, ethylbenzene, and xylenes (BTEX), polynuclear aromatic hydrocarbons (PNAs), halogenated hydrocarbons, chromium, and lead. Analysis indicated the presence of the following constituents in concentrations exceeding the Tier I Soil Leaching to Groundwater Risk-Based Screening Levels (RBSLs): benzene, toluene, ethylbenzene, xylenes, 2-methylnapthalene, and lead. Additional constituents were detected in concentrations that did not exceed the RBSLs. No exceedances of the Tier I Direct Contact RBSLs were noted, with the exception of lead in sample Bldg 02S-2 (5-6'). See Attachment 3 for a summary of soil analytical results, Attachment 4 for a Tier I comparison table, and Attachment 5 for soil concentration maps.

4.0 GROUNDWATER SAMPLE ANALYTICAL RESULTS

Soil samples were submitted to Fire & Environmental Consulting Laboratories, Inc., located in East Lansing, Michigan for analysis. Initially, sample analytical parameters were based on the former UST contents individually associated with each tank farm (Building 40 and Building 02). As the investigation proceeded and it became clear that combining the two areas would be more efficient, analytical parameters were expanded for each sample to include the following constituents: benzene, toluene, ethylbenzene, and xylenes (BTEX), polynuclear aromatic hydrocarbons (PNAs), halogenated hydrocarbons, chromium, and lead. Analysis indicated the presence of the following constituents in concentrations exceeding the Tier I Residential Health-Based Drinking Water and/or the Groundwater-Surface Water Interface RBSLs: benzene, ethylbenzene, toluene, xylenes, napthalene, and lead. Additional constituents were detected in concentrations that did not exceed RBSLs. No exceedances of the Tier I Direct Contact RBSLs were noted, with the

exception of benzene in sample Bldg 02S-5. See Attachment 7 for a summary of groundwater analytical results, Attachment 8 for a Tier I comparison table, and Attachment 9 for groundwater concentration maps.

5.0 CONCLUSION

Soil concentrations exceeding the Tier I Soil Leaching to Groundwater RBSLs are present, and lead is present in concentrations exceeding the Tier I Direct Contact RBSLs. As the site is under pavement, exposure to impacted soil is not expected.

Groundwater concentrations exceeding the Tier I Residential Health-Based Drinking Water, Groundwater Surface Water Interface, and Direct Contact RBSLs are noted.

Significant barriers to investigation are noted in this area in the way of buildings, equipment, subflooring, and subsurface structures/obstructions. Delineating impacted media to residential criteria in this area may not be possible.

5.1 Sensitive Receptors

The Flint River is located approximately 1500 feet east of the former tank farms. See Attachment 1. Current data indicates it is unlikely that impacted groundwater emanating from the former tank farm has or will reach the river.

The City of Flint is on a municipal water system. Most of the potable water wells within Genesee County are located beneath the glacial drift in the Saginaw Formation. The depth to the Saginaw Formation varies throughout the county, but is located roughly 300 feet below ground surface. It is unlikely that impacted groundwater will reach this aquifer.

5.2 Delineation

According to MDEQ Guidelines as established in the Memorandum dated January 19, 1996, the extent of contamination both horizontally and vertically must be delineated to below the Tier I residential unrestricted values.

Soil impacted with BTEX and PNA constituents is not delineated horizontally to the south or vertically at boring 40-1. Soil impacted with BTEX is not delineated directly north of boring 02S-4. Substantially elevated levels of lead are noted in borings 02S-2, 02S-3, and 02S-4, and the lead is not delineated vertically at these points, and is not delineated to the north or south. Substantially elevated levels of BTEX are also noted in this area, in borings, 02S-1, 02S-3, 02S-4, 02S-5, and vertical delineation was obtained

in only one boring, 02S-1, and the entire pocket remains undelineated to the north. See Attachments 5a - 5j. Borings 02S-2, 02S-3, and 02S-4 were terminated due to the presence of obstructions, and vertical delineation in this area may not be possible at this time. The concrete obstruction was noted in each boring at approximately six feet below ground surface. Further, delineation to the north may not be possible due to the presence, structure, and contents of Building 02.

Groundwater is impacted with BTEX constituents is not delineated to the south or west of borings 40-1 and 40-2, and to the north of boring 02S-5. Groundwater impacted with lead is not delineated to the east, north, and south of SB-1/MW-1 and boring 40-1. Boring 40-1 also indicated the presence of 1,2-Dichloroethane above the Tier I Health-Based Drinking Water RBSL. This constituent was not noted in any other samples analyzed for halogenated hydrocarbons. See Attachments 9a - 9j. The presence of buildings, equipment, subflooring, and subsurface structures/obstructions, may prevent any further delineation in this area.

5.3 Closure Potential

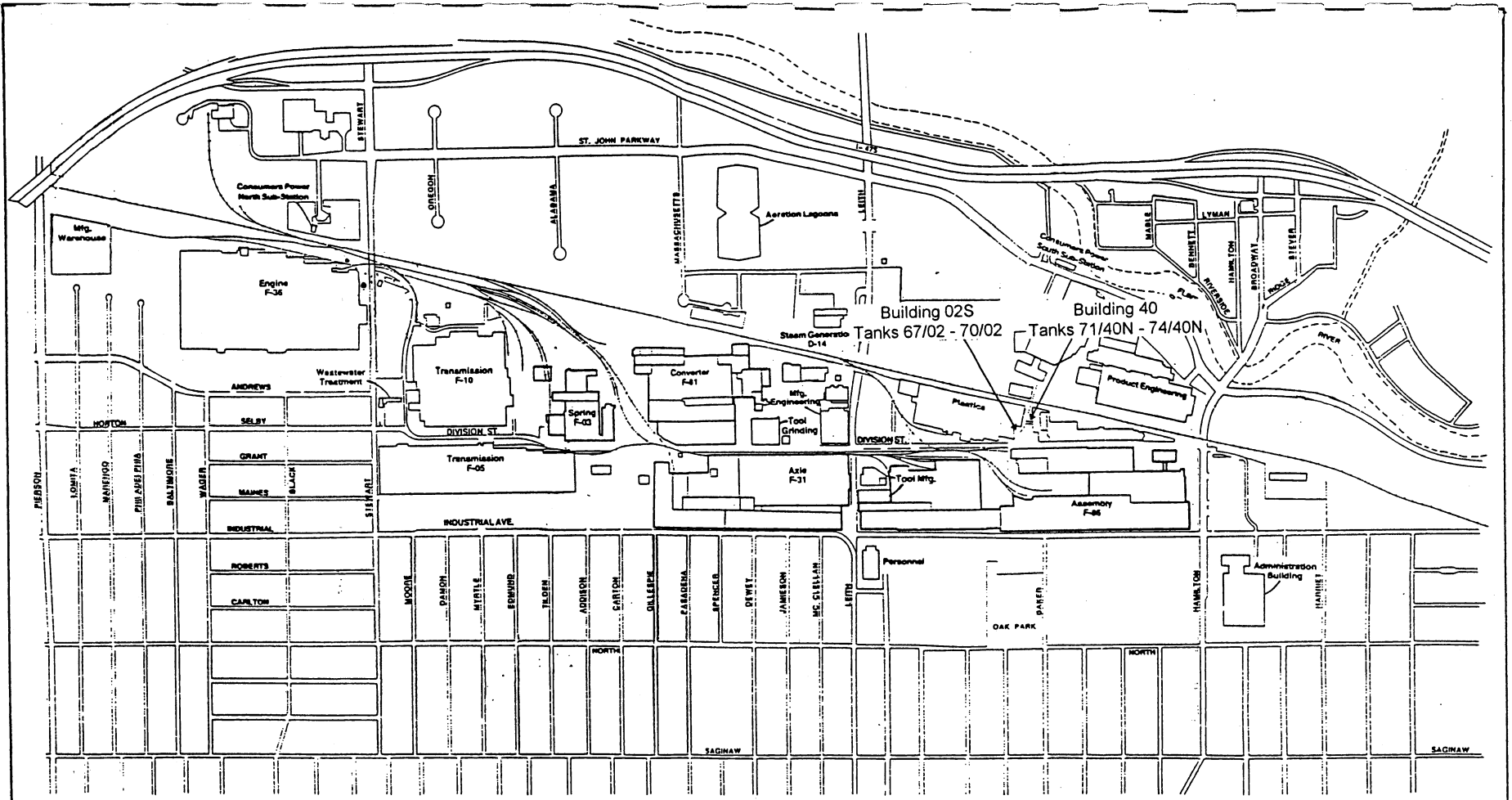
In addition to the barriers encountered during the investigation, the levels of BTEX in the soil and groundwater greatly exceed the applicable Tier I Direct Contact RBSLs for both residential and industrial sites. Active remediation is required in this area to reduce concentrations to acceptable levels.

5.4 Future Work

Global recommends that a feasibility study be conducted to determine the most cost-effective and efficient remediation option available.

This recommendations may change based on negotiations with the MDEQ and the development of the site-wide remedial action plan.

ATTACHMENT 1



LEGEND

F-36	Factory Number
D-14	Division Number
□	Hazardous Waste Storage Area
38	Building Number
—	Property Line
■	Gate House
●	Pedestrian Entrance
—x—x—	Fence

Adapted from

0 400 800 1200
Scale in Feet

BOC FLINT OPERATIONS (BUICK SITE)

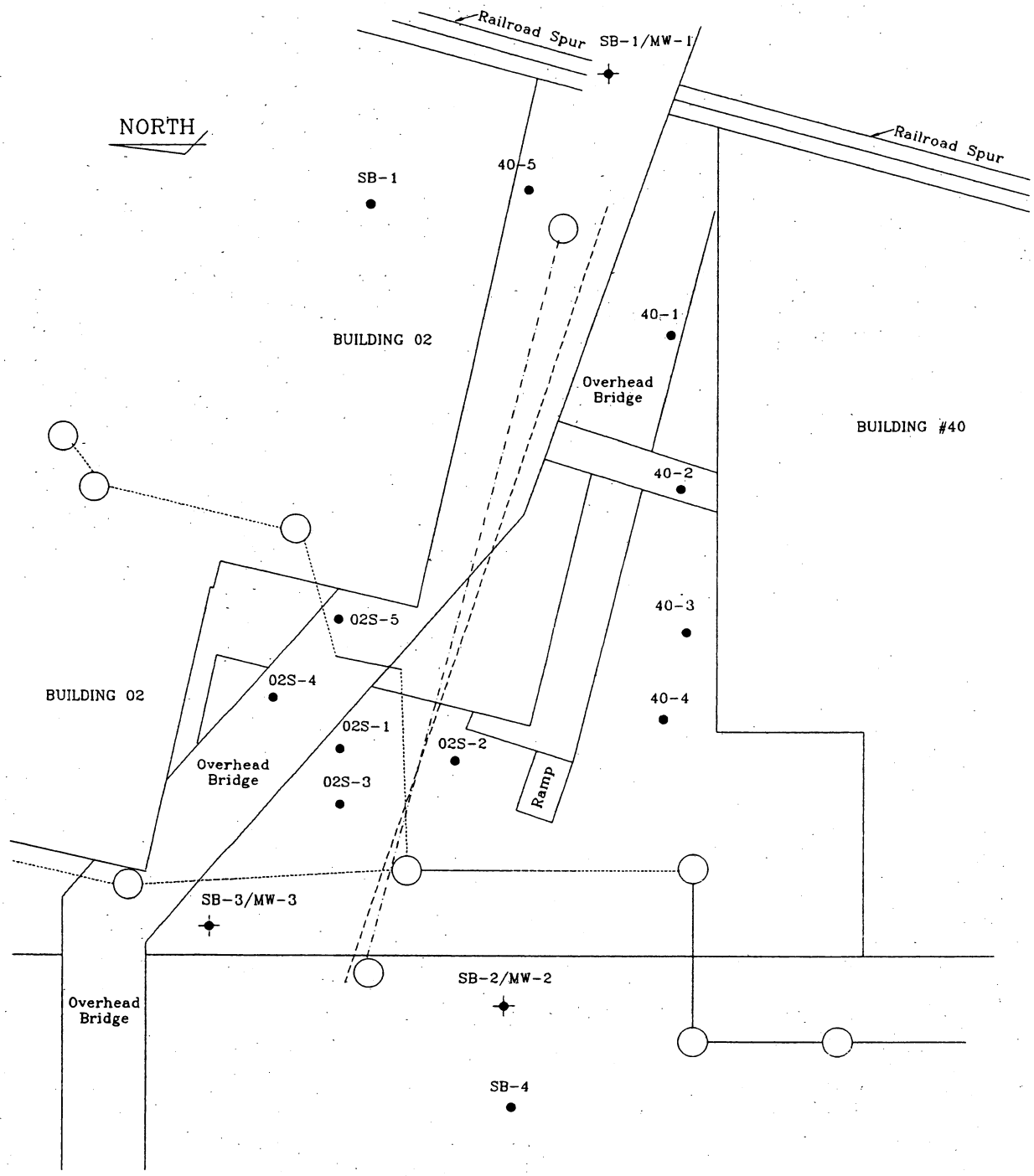
TANK FARM LOCATIONS/SITE DIAGRAM
ATTACHMENT 1

EDI Engineering & Science

June, 1989

21080

ATTACHMENT 2



LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- ------ Sanitary Line
- —·—· Storm Sewer Line

GM-CLCD NORTH	
TITLE: SAMPLE LOCATIONS BUILDINGS 02 & 40 TANKS 67/02-70/02 & 71/40N-74/40N	
SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 2
	PROJECT NUMBER: F174

ATTACHMENT 3

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	Bldg 02S-1 (13-15')		Bldg 02S-1 (19-21')		Bldg 02S-2 (5-6')		Bldg 02S-3 (6-8')		Bldg 02S-4 (10-12')	
Sample Depth (feet BGS)	13-15		19-21		5-6		6-8		10-12	
Date Collected	07/29/96		07/29/96		07/29/96		07/29/96		07/29/96	
Date Extracted	08/06/96		08/06/96		08/06/96		08/06/96		08/06/96	
Date Analyzed	08/06/96		08/06/96		08/06/96		08/06/96		08/06/96	
Analytical Method No.	8020		8020		8020		8020		8020	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	900	100	10	10	ND	10	2,600	500	17,500	500
☐ Toluene	7,200	100	90	10	ND	10	1,700	500	95,900	500
☐ Ethylbenzene	5,800	100	40	10	ND	10	44,200	500	135,000	500
☐ Total Xylenes	24,500	100	310	10	ND	10	75,800	500	410,000	500
☐ MTBE	ND	100	ND	10	ND	10	ND	500	ND	500
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene										
☐ Acenaphthylene										
☐ Anthracene										
☐ Benzo(a)anthracene										
☐ Benzo(a)pyrene										
☐ Benzo(b)fluoranthene										
☐ Benzo(g,h,i)perylene										
☐ Benzo(k)fluoranthene										

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

ATTACHMENT 4

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

POLYNUCLEAR AROMATICS (PNAs)										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Chrysene										
☐ Dibenzo(a,h)anthracene										
☐ Fluoranthene										
☐ Fluorene										
☐ Indeno(1,2,3- cd)pyrene										
☐ Naphthalene										
☐ Phenanthrene										
☐ Pyrene										
☐ 2-Methylnaphthalene										
METALS										
Sample ID	Bldg 02S-1 (13-15')		Bldg 02S-1 (19-21')		Bldg 02S-2 (5-6')		Bldg 02S-3 (6-8')		Bldg 02S-4 (10-12')	
Sample Depth (feet BGS)	13-15		19-21		5-6		6-8		10-12	
Date Collected	07/29/96		07/29/96		07/29/96		07/29/96		07/29/96	
Date Extracted	08/08/96		08/08/96		08/08/96		08/08/96		08/08/96	
Date Analyzed	08/08/96		08/08/96		08/08/96		08/08/96		08/08/96	
Analytical Method No.	6020		6020		6020		6020		6020	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Cadmium										
☐ Total Chromium										
☐ Total Lead	10,200	1000	5,500	1000	954,000	1000	69,400	1000	30,600	1000

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	Bldg 02S-5 (15-17')		Bldg 02S-5 (19-21')							
Sample Depth (feet BGS)	15-17		19-21							
Date Collected	07/29/96		07/29/96							
Date Extracted	08/06/96		08/06/96							
Date Analyzed	08/06/96		08/06/96							
Analytical Method No.	8020		8020							
Collection Method*	GP		GP							
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	ND	100	21,300	500						
☐ Toluene	ND	100	66,200	500						
☐ Ethylbenzene	13,900	100	46,900	500						
☐ Total Xylenes	30,800	100	180,700	500						
☐ MTBE	ND	100	ND	500						
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene										
☐ Acenaphthylene										
☐ Anthracene										
☐ Benzo(a)anthracene										
☐ Benzo(a)pyrene										
☐ Benzo(b)fluoranthene										
☐ Benzo(g,h,i)perylene										
☐ Benzo(k)fluoranthene										

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

POLYNUCLEAR AROMATICS (PNAs)										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Chrysene										
☐ Dibenzo(a,h)anthracene										
☐ Fluoranthene										
☐ Fluorene										
☐ Indeno(1,2,3- cd)pyrene										
☐ Naphthalene										
☐ 2-Methylnaphthalene										
☐ Phenanthrene										
☐ Pyrene										
METALS										
Sample ID	Bldg 02S-5 (15-17')		Bldg 02S-5 (19-21')							
Sample Depth (feet BGS)	15-17		19-21							
Date Collected	07/29/96		07/29/96							
Date Extracted	08/08/96		08/08/96							
Date Analyzed	08/08/96		08/08/96							
Analytical Method No.	6020		6020							
Collection Method*	GP		GP							
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Cadmium										
☐ Total Chromium										
☐ Total Lead	14,100	1000	5,800	1000						

BGS=Below Ground Surface

*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)

*If Other (OT), Specify here:*_____

MDL= Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	Bldg 02S-5 (15-17')		Bldg 02S-5 (19-21')		Bld 02 SB-1 (13-15')		Bld 02 SB-1 (19-21')			
Sample Depth (feet BGS)	15-17		19-21		13-15		19-21			
Date Collected	07/29/96		07/29/96		06/03/97		06/03/97			
Date Extracted	08/06/96		08/06/96							
Date Analyzed	08/06/96		08/06/96		06/11/97		06/11/97			
Analytical Method No.	8020		8020		8260		8260			
Collection Method*	GP		GP		GP		GP			
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	ND	100	21,300	500	ND	10	ND	10		
☐ Toluene	ND	100	66,200	500	ND	10	ND	10		
☐ Ethylbenzene	13,900	100	46,900	500	ND	10	ND	10		
☐ Total Xylenes	30,800	100	180,700	500	ND	10	ND	10		
☐ MTBE	ND	100	ND	500						
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID					Bld 02 SB-1 (13-15')		Bld 02 SB-1 (19-21')			
Sample Depth (feet BGS)					13-15		19-21			
Date Collected					06/03/97		06/03/97			
Date Extracted					06/06/97		06/06/97			
Date Analyzed					06/05/97		06/05/97			
Analytical Method No.					8260		8260			
Collection Method*					GP		GP			
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene					ND	330	ND	330		
☐ Acenaphthylene					ND	330	ND	330		
☐ Anthracene					ND	330	ND	330		
☐ Benzo(a)anthracene					ND	330	ND	330		
☐ Benzo(a)pyrene					ND	330	ND	330		
☐ Benzo(b)fluoranthene					ND	330	ND	330		
☐ Benzo(g,h,i)perylene					ND	330	ND	330		
☐ Benzo(k)fluoranthene					ND	330	ND	330		

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

POLYNUCLEAR AROMATICS (PNAs)										
Sample ID					Bld 02 SB-1 (13-15')		Bld 02 SB-1 (19-21')			
Sample Depth (feet BGS)					13-15		19-21			
Date Collected					06/03/97		06/03/97			
Date Extracted					06/06/97		06/06/97			
Date Analyzed					06/05/97		06/05/97			
Analytical Method No.					8260		8260			
Collection Method*					GP		GP			
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Chrysene					ND	330	ND	330		
☐ Dibenzo(a,h)anthracene					ND	330	ND	330		
☐ Fluoranthene					ND	330	ND	330		
☐ Fluorene					ND	330	ND	330		
☐ Indeno(1,2,3- cd)pyrene					ND	330	ND	330		
☐ Naphthalene					ND	330	ND	330		
☐ 2-Methylnaphthalene					ND	330	ND	330		
☐ Phenanthrene					ND	330	ND	330		
☐ Pyrene										
METALS										
Sample ID	Bldg 02S-5 (15-17')		Bldg 02S-5 (19-21')		Bld 02 SB-1 (13-15')		Bld 02 SB-1 (19-21')			
Sample Depth (feet BGS)	15-17		19-21		13-15		19-21			
Date Collected	07/29/96		07/29/96		06/03/97		06/03/97			
Date Extracted	08/08/96		08/08/96		06/06/97		06/06/97			
Date Analyzed	08/08/96		08/08/96		06/05/97		06/05/97			
Analytical Method No.	6020		6020		8260		8260			
Collection Method*	GP		GP		GP		GP			
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Cadmium										
☐ Total Chromium					7800	1000	14000	1000		
☐ Total Lead	14,100	1000	5,800	1000	4400	1000	5900	1000		

BGS=Below Ground Surface

*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)

*If Other (OT), Specify here:*_____

MDL= Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	SB1/MW1		SB1/MW1		SB2/MW2		SB2/MW2			
Sample Depth (feet BGS)	4-6		10-12		8-10		14-16			
Date Collected	11/08/96		11/08/96		11/08/96		11/08/96			
Date Extracted	11/16/96		11/20/96		11/20/96		11/20/96			
Date Analyzed	11/16/96		11/20/96		11/20/96		11/20/96			
Analytical Method No.	8020		8020		8020		8020			
Collection Method*	GP		GP		GP		GP			
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	ND	10	ND	10	ND	10	ND	10		
☐ Toluene	ND	10	ND	10	ND	10	ND	10		
☐ Ethylbenzene	ND	10	ND	10	300	10	ND	10		
☐ Total Xylenes	ND	10	ND	10	200	10	ND	10		
☐ MTBE	NA	NA	NA	NA	NA	NA	NA	NA		
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	SB1/MW1		SB1/MW1							
Sample Depth (feet BGS)	4-6		10-12							
Date Collected	11/08/96		11/08/96							
Date Extracted	11/15/96		11/15/96							
Date Analyzed	11/16/96		11/16/96							
Analytical Method No.	8270		8270							
Collection Method*	GP		GP							
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene	ND	300	ND	300						
☐ Acenaphthylene	ND	300	ND	300						
☐ Anthracene	ND	300	ND	300						
☐ Benzo(a)anthracene	ND	300	ND	300						
☐ Benzo(a)pyrene	ND	300	ND	300						
☐ Benzo(b)fluoranthene	ND	300	ND	300						
☐ Benzo(g,h,i)perylene	ND	300	ND	300						
☐ Benzo(k)fluoranthene	ND	300	ND	300						

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	SB1/MW1		SB1/MW1							
Sample Depth (feet BGS)	4-6		10-12							
Date Collected	11/08/96		11/08/96							
Date Extracted	11/15/96		11/20/96							
Date Analyzed	11/16/96		11/20/96							
Analytical Method No.	8270		8020							
Collection Method*	GP		GP							
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Chrysene	ND	300	ND	300						
☐ Dibenzo(a,h)anthracene	ND	300	ND	300						
☐ Fluoranthene	ND	300	ND	300						
☐ Fluorene	ND	300	ND	300						
☐ Indeno(1,2,3- cd)pyrene	ND	300	ND	300						
☐ Naphthalene	ND	300	ND	300						
☐ Phenanthrene	ND	300	ND	300						
☐ Pyrene	ND	300	ND	300						
☐ 2-Methylnaphthalene	ND	300	ND	300						
METALS										
Sample ID	SB1/MW1		SB1/MW1		SB2/MW2		SB2/MW2			
Sample Depth (feet BGS)	4-6		10-12		8-10		8-10			
Date Collected	11/08/96		11/08/96		11/08/96		11/08/96			
Date Extracted	11/20/96		11/20/96		11/20/96		11/20/96			
Date Analyzed	11/20/96		11/20/96		11/20/96		11/20/96			
Analytical Method No.	6020		6020		6020		6020			
Collection Method*	GP		GP		GP		GP			
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Cadmium										
☐ Total Chromium										
☐ Total Lead	8300	1000	5000	1000	5300	1000	6100	1000		

BGS=Below Ground Surface

*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)

If Other (OT), Specify here: _____

MDL= Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO OPERATIONS (TANKS 071/40N - 074/40N
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	Bldg 40-1 (17-19')		Bldg 40-2 (3-5')		Bldg 40-2 (13-15')		Bldg 40-3 (11-13')		Bldg 40-3 (19-21')	
Sample Depth (feet BGS)	17-19		3-5		13-15		11-13		19-21	
Date Collected	7/24/96		7/24/96		7/24/96		7/24/96		7/24/96	
Date Extracted	7/27/96		7/27/96		7/27/96		7/27/96		7/27/96	
Date Analyzed	7/27/96		7/27/96		7/27/96		7/27/96		7/27/96	
Analytical Method No.	8020		8020		8020		8020		8020	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	600	500	ND	10	ND	10	ND	10	ND	10
☐ Toluene	1,100	500	ND	10	ND	10	ND	10	ND	10
☐ Ethylbenzene	20,300	500	ND	10	ND	10	ND	10	ND	10
☐ Total Xylenes	69,000	500	ND	10	ND	10	ND	10	ND	10
☐ MTBE										
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	Bldg 40-1 (17-19')		Bldg 40-2 (3-5')		Bldg 40-2 (13-15')		Bldg 40-3 (11-13')		Bldg 40-3 (19-21')	
Sample Depth (feet BGS)	17-19		3-5		13-15		11-13		19-21	
Date Collected	7/24/96		7/24/96		7/24/96		7/24/96		7/24/96	
Date Extracted	7/29/96		7/29/96		7/29/96		7/29/96		7/29/96	
Date Analyzed	8/04/96		8/04/96		8/04/96		8/04/96		8/04/96	
Analytical Method No.	8270		8270		8270		8270		8270	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Acenaphthylene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Anthracene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Benzo(a)anthracene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Benzo(a)pyrene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Benzo(b)fluoranthene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Benzo(g,h,i)perylene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Benzo(k)fluoranthene	ND	330	ND	330	ND	330	ND	330	ND	330

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	Bldg 40-1 (17-19')		Bldg 40-2 (3-5')		Bldg 40-2 (13-15')		Bldg 40-3 (11-13')		Bldg 40-3 (19-21')	
Sample Depth (feet BGS)	17-19		3-5		13-15		11-13		19-21	
Date Collected	7/24/96		7/24/96		7/24/96		7/24/96		7/24/96	
Date Extracted	7/29/96		7/29/96		7/29/96		7/29/96		7/29/96	
Date Analyzed	8/04/96		8/04/96		8/04/96		8/04/96		8/04/96	
Analytical Method No.	8270		8270		8270		8270		8270	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Chrysene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Dibenzo(a,h)anthracene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Fluoranthene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Fluorene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Indeno(1,2,3- cd)pyrene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Naphthalene	4,420	330	ND	330	ND	330	ND	330	ND	330
☐ Phenanthrene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ Pyrene	ND	330	ND	330	ND	330	ND	330	ND	330
☐ 2-Methylnaphthalene	9,310	330	ND	330	ND	330	ND	330	ND	330
METALS										
Sample ID	Bldg 40-1 (17-19')		Bldg 40-2 (3-5')		Bldg 40-2 (13-15')		Bldg 40-3 (11-13')		Bldg 40-3 (19-21')	
Sample Depth (feet BGS)	17-19		3-5		13-15		11-13		19-21	
Date Collected	7/24/96		7/24/96		7/24/96		7/24/96		7/24/96	
Date Extracted	7/29/96		7/29/96		7/29/96		7/29/96		7/29/96	
Date Analyzed	7/29/96		7/29/96		7/29/96		7/29/96		7/29/96	
Analytical Method No.	6020		6020		6020		6020		6020	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Cadmium	ND	50	ND	50	ND	50	ND	50	ND	50
☐ Total Chromium	1400	1000	8700	1000	13500	1000	1800	1000	5500	1000
☐ Total Lead	6000	1000	24800	1000	9400	1000	2200	1000	4500	1000

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

PCBs										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Aroclor 1016										
☐ Aroclor 1221										
☐ Aroclor 1232										
☐ Aroclor 1242										
☐ Aroclor 1248										
☐ Aroclor 1254										
☐ Aroclor 1280										
HALOGENATED HYDROCARBONS										
Sample ID	Bldg 40-1 (17-19')		Bldg 40-2 (3-5')		Bldg 40-2 (13-15')		Bldg 40-3 (11-13')		Bldg 40-3 (19-21')	
Sample Depth (feet BGS)	17-19		3-5		13-15		11-13		19-21	
Date Collected	7/24/96		7/24/96		7/24/96		7/24/96		7/24/96	
Date Extracted	7/27/96		7/27/96		7/27/96		7/27/96		7/27/96	
Date Analyzed	7/27/96		7/27/96		7/27/96		7/27/96		7/27/96	
Analytical Method No.	8010		8010		8010		8010		8010	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Carbon Tetrachloride	ND	500	ND	10	ND	10	ND	10	ND	10
☐ 1,1-Dichloroethane	ND	500	ND	10	ND	10	ND	10	ND	10
☐ 1,2-Dichloroethane	ND	500	ND	10	ND	10	ND	10	ND	10
☐ 1,1-Dichloroethylene	ND	500	ND	10	ND	10	ND	10	ND	10

BGS=Below Ground Surface

*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)

If Other (OT), Specify here: _____

MDL= Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

HALOGENATED HYDROCARBONS										
Sample ID	Bldg 40-1 (17-19')		Bldg 40-2 (3-5')		Bldg 40-2 (13-15')		Bldg 40-3 (11-13')		Bldg 40-3 (19-21')	
Sample Depth (feet BGS)	17-19		3-5		13-15		11-13		19-21	
Date Collected	7/24/96		7/24/96		7/24/96		7/24/96		7/24/96	
Date Extracted	7/27/96		7/27/96		7/27/96		7/27/96		7/27/96	
Date Analyzed	7/27/96		7/27/96		7/27/96		7/27/96		7/27/96	
Analytical Method No.	8010		8010		8010		8010		8010	
Collection Method*	GP		GP		GP		GP		GP	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ cis-1,2-Dichloroethylene	ND	500	ND	10	ND	10	ND	10	ND	10
☐ trans-1,2-Dichloroethylene	ND	500	ND	10	ND	10	ND	10	ND	10
☐ Tetrachloroethylene	ND	500	ND	10	ND	10	ND	10	ND	10
☐ 1,1,2-Trichloroethane	ND	500	ND	10	ND	10	ND	10	ND	10
OTHER *(Specify)*										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐										
☐										
☐										
☐										
☐										
☐										
☐										

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	Bldg 40-4 (14-16')		Bldg 40-5 (7-9')		Bldg 40-5 (15-17')					
Sample Depth (feet BGS)	14-16		7-9		15-17					
Date Collected	7/24/96		11/12/96		11/12/96					
Date Extracted	7/27/96		11/16/96		11/16/96					
Date Analyzed	7/27/96		11/16/96		11/16/96					
Analytical Method No.	8020		8020		8020					
Collection Method*	GP		GP		GP					
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	ND	100	ND	10	ND	10				
☐ Toluene	ND	100	ND	10	ND	10				
☐ Ethylbenzene	ND	100	ND	10	ND	10				
☐ Total Xylenes	ND	100	ND	10	ND	10				
☐ MTBE										
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	Bldg 40-4 (14-16')		Bldg 40-5 (7-9')		Bldg 40-5 (15-17')					
Sample Depth (feet BGS)	14-16		7-9		15-17					
Date Collected	7/24/96		11/12/96		11/12/96					
Date Extracted	7/29/96		11/19/96		11/19/96					
Date Analyzed	8/04/96		11/27/96		11/27/96					
Analytical Method No.	8270		8270		8270					
Collection Method*	GP		GP		GP					
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene	ND	3000	ND	300	ND	300				
☐ Acenaphthylene	ND	3000	ND	300	ND	300				
☐ Anthracene	ND	3000	ND	300	ND	300				
☐ Benzo(a)anthracene	ND	3000	ND	300	ND	300				
☐ Benzo(a)pyrene	ND	3000	ND	300	ND	300				
☐ Benzo(b)fluoranthene	ND	3000	ND	300	ND	300				
☐ Benzo(g,h,i)perylene	ND	3000	ND	300	ND	300				
☐ Benzo(k)fluoranthene	ND	3000	ND	300	ND	300				

BGS=Below Ground Surface

*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)

If Other (OT), Specify here: _____

MDL= Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	Bldg 40-4 (14-16')		Bldg 40-5 (7-9')		Bldg 40-5 (15-17')					
Sample Depth (feet BGS)	14-16		7-9		15-17					
Date Collected	7/24/96		11/12/96		11/12/96					
Date Extracted	7/29/96		11/19/96		11/19/96					
Date Analyzed	8/04/96		11/27/96		11/27/96					
Analytical Method No.	8270		8270		8270					
Collection Method*	GP		GP		GP					
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Chrysene	ND	3000	ND	300	ND	300				
☐ Dibenzo(a,h)anthracene	ND	3000	ND	300	ND	300				
☐ Fluoranthene	ND	3000	ND	300	ND	300				
☐ Fluorene	ND	3000	ND	300	ND	300				
☐ Indeno(1,2,3- cd)pyrene	ND	3000	ND	300	ND	300				
☐ Naphthalene	ND	3000	ND	300	ND	300				
☐ 2-Methylnaphthalene	ND	3000	ND	300	ND	300				
☐ Phenanthrene	3,000	3000	ND	300	ND	300				
☐ Pyrene	ND	3000	ND	300	ND	330				
METALS										
Sample ID	Bldg 40-4 (14-16')		Bldg 40-5 (7-9')		Bldg 40-5 (15-17')					
Sample Depth (feet BGS)	14-16		7-9		15-17					
Date Collected	7/24/96		11/12/96		11/12/96					
Date Extracted	7/29/96		11/20/96		11/20/96					
Date Analyzed	7/29/96		11/20/96		11/20/96					
Analytical Method No.	6020		6020		6020					
Collection Method*	GP		GP		GP					
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Cadmium	ND	50								
☐ Total Chromium	4700	1000								
☐ Total Lead	5000	1000	11200	1000	5900	1000				

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
If Other (OT), Specify here: _____
MDL= Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

SOIL LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

PCBs										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Analytical Method No.										
Collection Method*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Aroclor 1016										
☐ Aroclor 1221										
☐ Aroclor 1232										
☐ Aroclor 1242										
☐ Aroclor 1248										
☐ Aroclor 1254										
☐ Aroclor 1280										
HALOGENATED HYDROCARBONS										
Sample ID	Bldg 40-4 (14-16')		Bldg 40-5 (7-9')		Bldg 40-5 (15-17')					
Sample Depth (feet BGS)	14-16		7-9		15-17					
Date Collected	7/24/96		11/12/96		11/12/96					
Date Extracted	7/27/96		11/16/96		11/16/96					
Date Analyzed	7/27/96		11/16/96		11/16/96					
Analytical Method No.	8010		8010		8010					
Collection Method*	GP		GP		GP					
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Carbon Tetrachloride	ND	100	ND	10	ND	10				
☐ 1,1-Dichloroethane	ND	100	ND	10	ND	10				
☐ 1,2-Dichloroethane	ND	100	ND	10	ND	10				
☐ 1,1-Dichloroethylene	ND	100	ND	10	ND	10				

BGS=Below Ground Surface

*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)

*If Other (OT), Specify here:*_____

MDL= Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

TIER I RBSL/TIER II OR TIER III SSTL COMPARISON TABLE FOR SOILS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

☑ **Residential** ☐ **Commercial III** ☐ **Commercial IV** ☑ **Industrial**
Exposure Codes

Contaminant	Sample ID with Maximum Detected Concentration	Corresponding Sample Date	Maximum Detected Concentration (ug/kg)	Applicable Criterion (ug/kg)		
				Tier I Soil Leaching to Groundwater	Tier I Residential Direct Contact	Tier I Residential Infinite Source VSIC
VOLATILES						
☐ Benzene	Bldg 02S-5 (19-21')	07/29/96	21,300	100	88,000	9600
☐ Toluene	Bldg 02S-4 (10-12')	07/29/96	95,000	16,000	>620,000	2E+6
☐ Ethylbenzene	Bldg 02S-4 (10-12')	07/29/96	135,000	1500	>380,000	6.7E+6
☐ Total Xylenes	Bldg 02S-4 (10-12')	07/29/96	910,000	5600	>400,000	3.2E+7
☐ MTBE						
POLYNUCLEAR AROMATICS						
☐ Acenaphthene			ND	300,000	76,000	5.7E+7
☐ Acenaphthylene			ND	520	1,500,000	ID
☐ Anthracene			ND	6,900,000	420,000,000	9.8E+8
☐ Benzo(a)anthracene			ND	E	14,000	ID
☐ Benzo(a)pyrene			ND	E	1400	ID
☐ Benzo(b)fluoranthene			ND	E	14,000	ID
☐ Benzo(g,h,i)perylene			ND	E	1,500,000	ID
☐ Benzo(k)fluoranthene			ND	E	140,000	ID
☐ Chrysene			ND	E	1,400,000	ID
☐ Dibenzo- (a,h)anthracene			ND	E	1400	ID
☐ Fluoranthene			ND	3,000,000	51,000,000	5.3E+8
☐ Fluorene			ND	390,000	51,000,000	8.9E+7
☐ Indeno(1,2,3- cd)pyrene			ND	E	14,000	ID
☐ Naphthalene	Bldg 40-1 (17-19')	07/24/96	4,420	17,000	15,000,000	9.8E+6
☐ Phenanthrene	Bldg 40-4 (14-16')	07/24/96	3,000	12,000	1,500,000	ID
☐ Pyrene			ND	1,800,000	32,000,000	4.7E+8
☐ 2-Methylnapthalene	Bldg 40-1 (17-19')	07/24/96	9,301	5200	15,000,000	ID

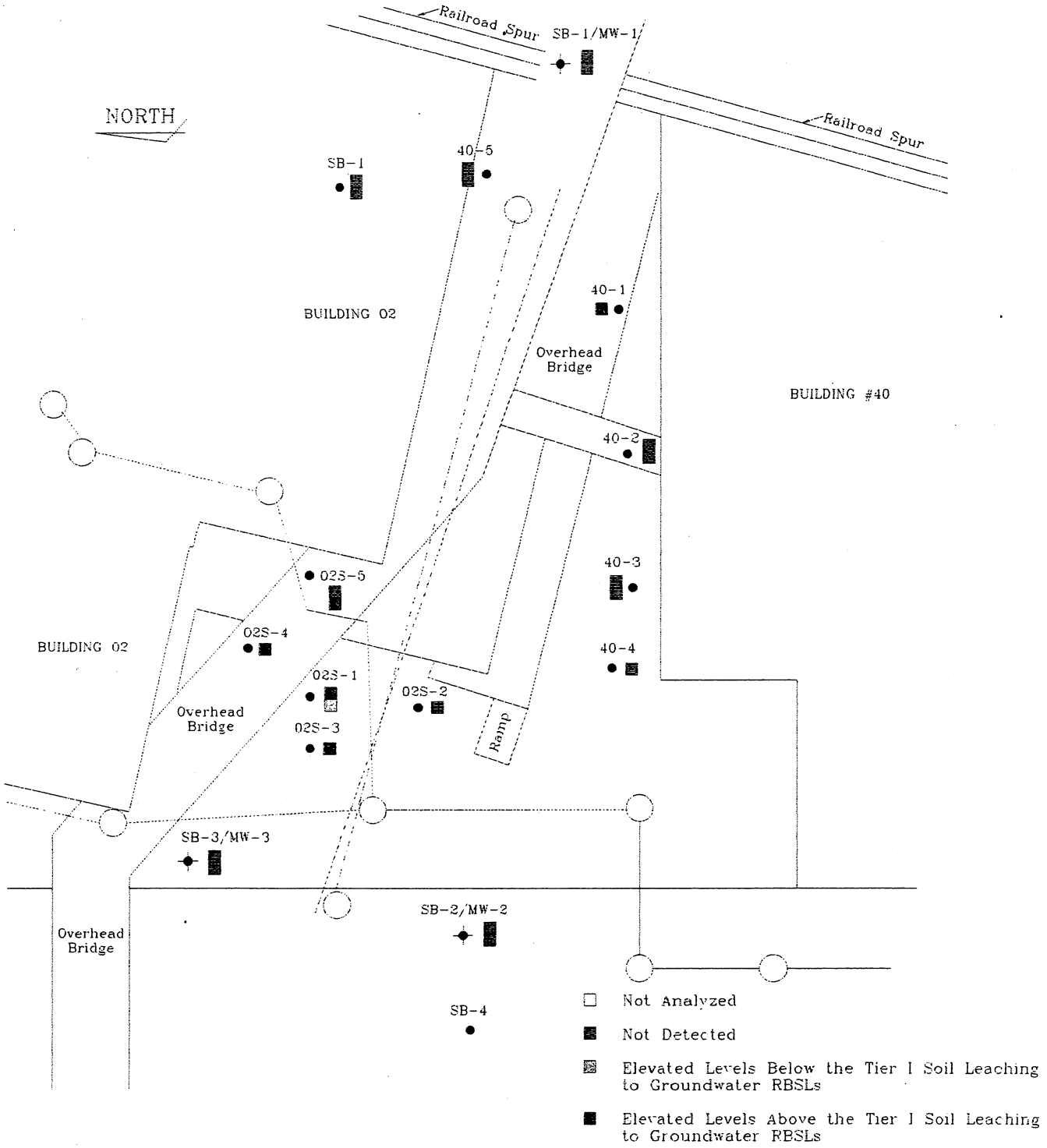
Shading indicates concentration exceeds one or more Tier I RBSLs
"E" = Chemical, due to its physiochemical properties, is not expected to leach through soils to groundwater under most conditions
"ID" = Insufficient Data
"ND" = Non-Detect

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

TIER I RBSL/TIER II OR TIER III SSTL COMPARISON TABLE FOR SOILS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

Contaminant	Sample ID with Maximum Detected Concentration	Corresponding Sample Date	Maximum Detected Concentration (ug/kg)	Applicable Criterion (ug/kg)		
				Tier I Soil Leaching to Groundwater	Tier I Residential Direct Contact	Tier I Residential Infinite Source VSIC
METALS						
☐ Cadmium			NA	1200	210,000	ID
☐ Total Chromium	Bldg 40-2 (13-15')	07/24/96	13,500	18,000	2,000,000	ID
☐ Total Lead	Bldg 02S-2 (5-6')	07/29/96	954,000	21,000	400,000	ID
PCBs						
☐ Aroclor 1016						
☐ Aroclor 1221						
☐ Aroclor 1232						
☐ Aroclor 1242						
☐ Aroclor 1248						
☐ Aroclor 1254						
☐ Aroclor 1280						
HALOGENATED HYDROCARBONS						
☐ Carbon Tetrachloride			ND	100	20,000	2600
☐ 1,1-Dichloroethane			ND	18,000	>1,100,000	2.2E+7
☐ 1,2-Dichloroethane			ND	100	28,000	4400
☐ 1,1-Dichloroethylene			ND	140	110,000	830
☐ cis-1,2-Dichloroethylene			ND	1400	>1,000,000	2.9E+7
☐ trans-1,2-Dichloroethylene			ND	2000	1,900,000	2.0E+5
☐ Tetrachloroethylene			ND	100	50,000	1.3E+5
☐ 1,1,2-Trichloroethane			ND	100	45,000	5.2E+7
OTHER*						
☐						
☐						

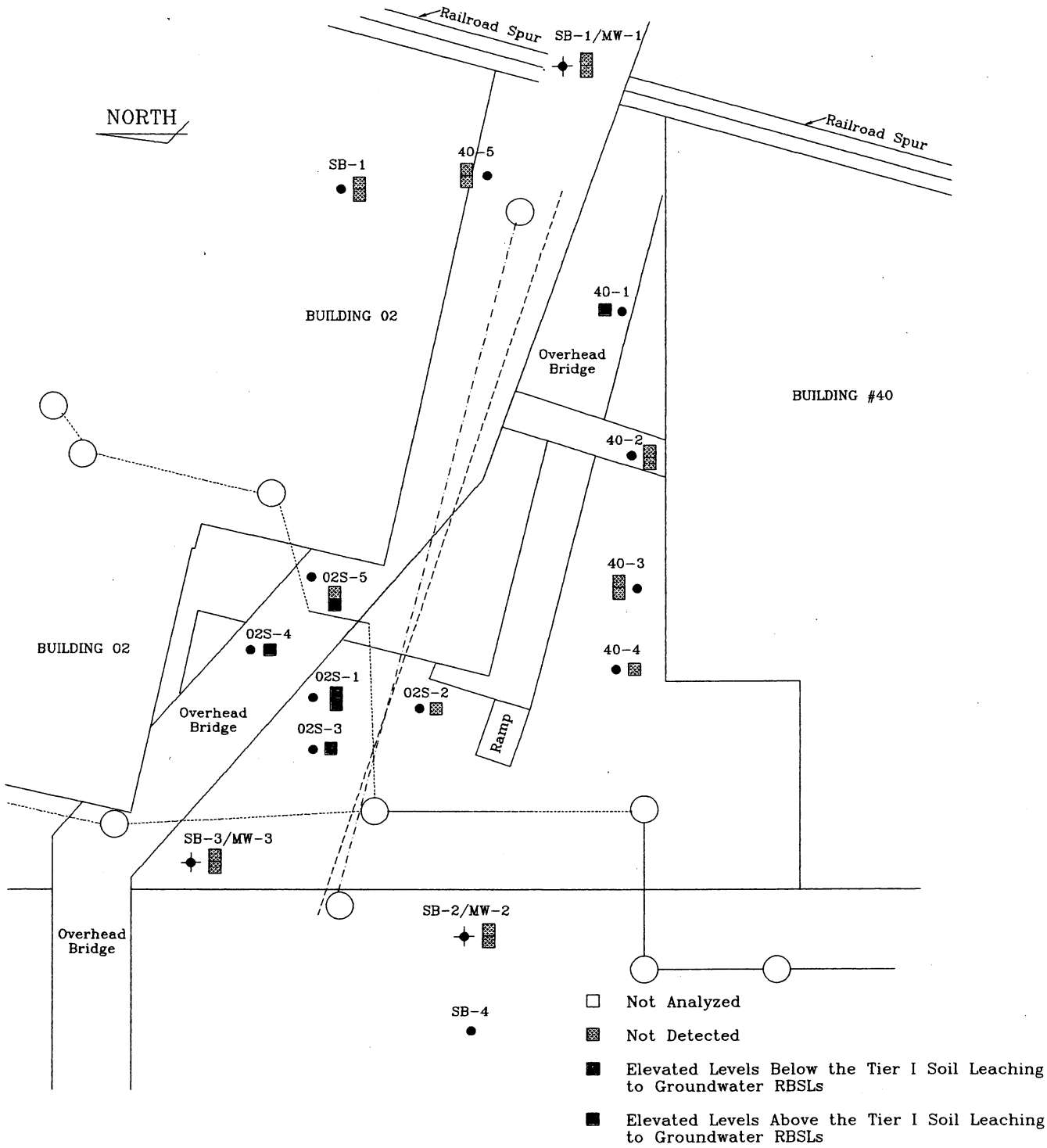
ATTACHMENT 6



LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- ····· Sanitary Line
- — · — Storm Sewer Line

GM-CLCD NORTH	
TITLE: SOIL CONCENTRATION MAP: BENZENE BUILDING 02 & 40 TANKS 67/02-70/02 & 71/40N-74/40N	
SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY. C.G.S.
	ATTACHMENT NUMBER:5a
	PROJECT NUMBER: F174



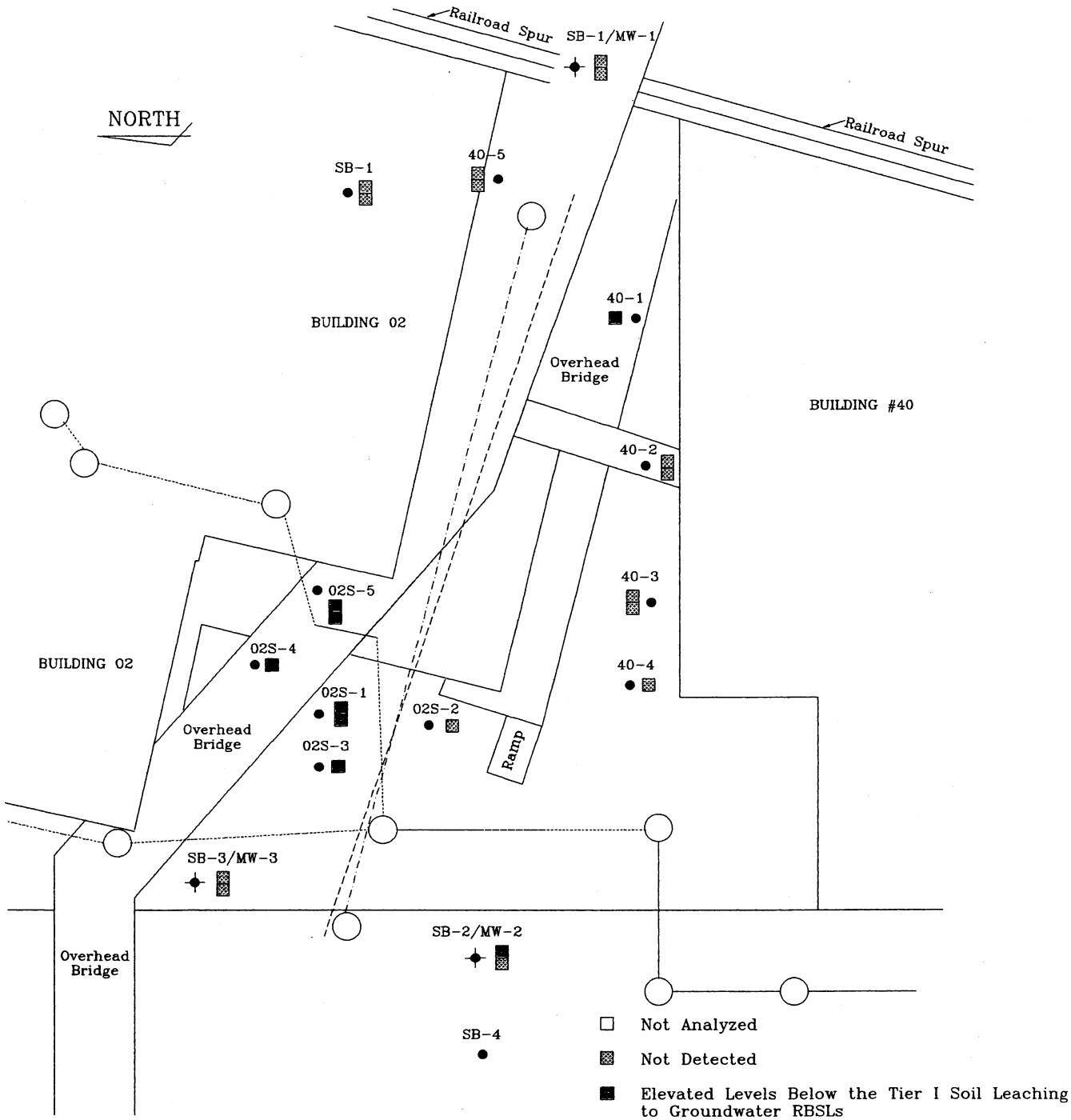
LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- ------- Sanitary Line
- —·—·— Storm Sewer Line

GM-CLCD NORTH

TITLE: SOIL CONCENTRATION MAP:TOLUENE
BUILDINGS 02 & 40
TANKS 67/02-70/02 & 71/40N-74/40N

SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER:5b
	PROJECT NUMBER: F174



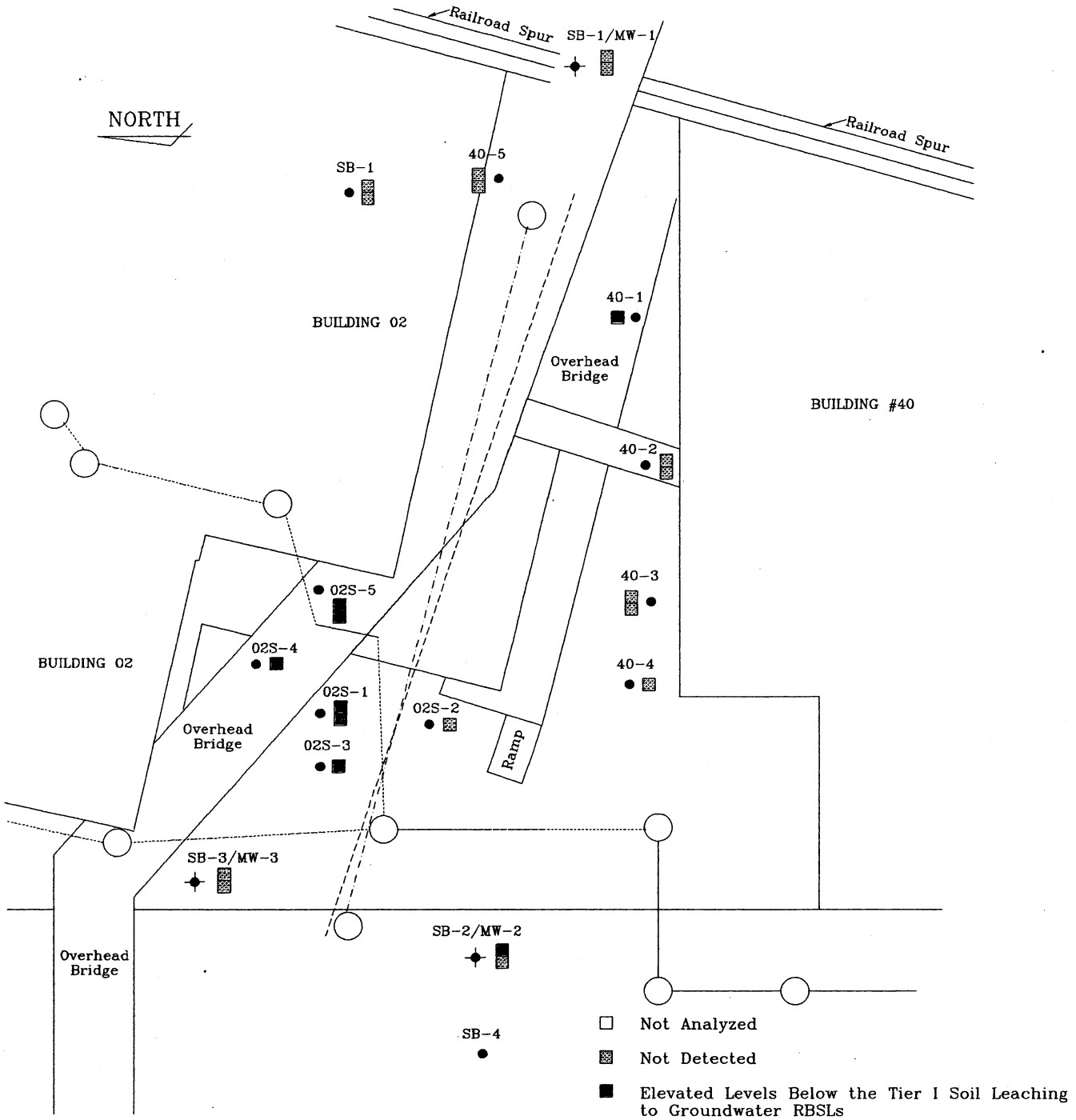
LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- -------- Sanitary Line
- —·—·— Storm Sewer Line

GM-CLCD NORTH

TITLE: SOIL CONCENTRATION MAP: ETHYLBENZENE
BUILDINGS 02 & 40
TANKS 67/02-70/02 & 71/40N-74/40N

SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 5c
	PROJECT NUMBER: F174



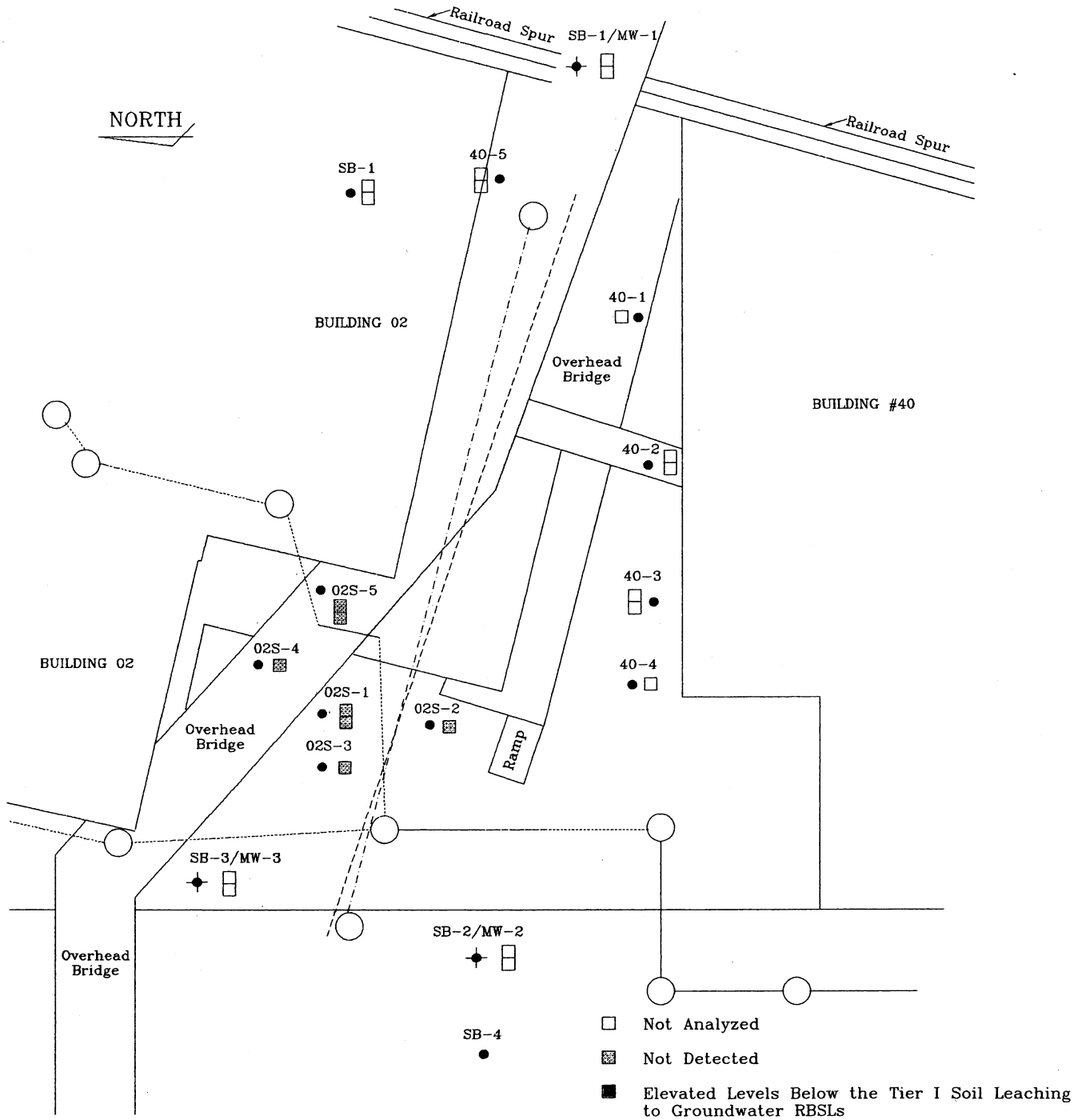
LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- ------- Sanitary Line
- —·—·— Storm Sewer Line

GM-CLCD NORTH

TITLE: SOIL CONCENTRATION MAP: TOTAL XYLENES
BUILDINGS 02 & 40
TANKS 67/02-70/02 & 71/40N-74/40N

SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 5d
	PROJECT NUMBER: F174



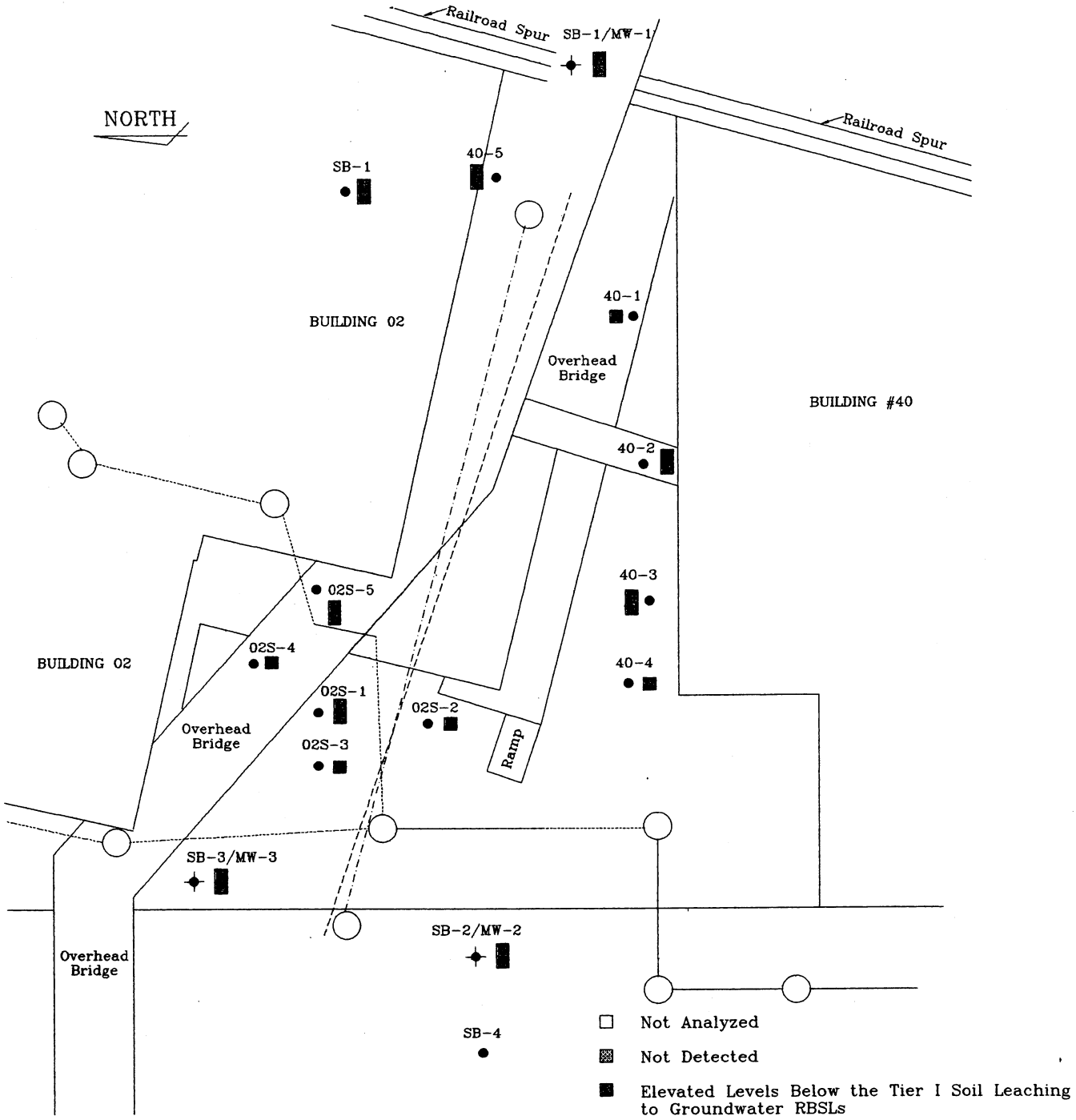
LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- ------ Sanitary Line
- —·—·— Storm Sewer Line

GM-CLCD NORTH

TITLE: SOIL CONCENTRATION MAP: MTBE
BUILDINGS 02 & 40
TANKS 67/02-70/02 & 71/40N-74/40N

SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 5e
	PROJECT NUMBER: F174



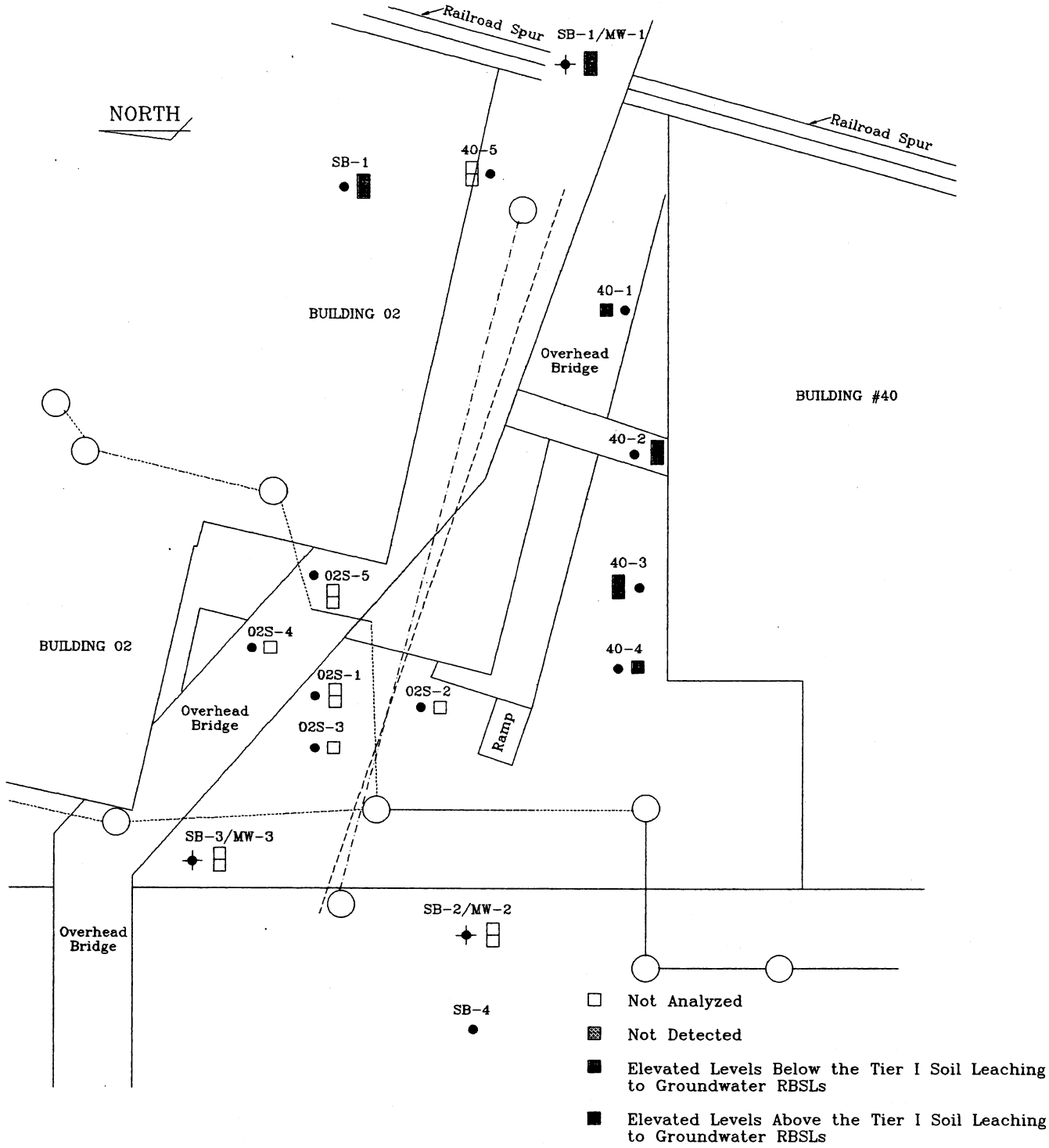
LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- ------ Sanitary Line
- —·—·— Storm Sewer Line

GM-CLCD NORTH

TITLE: SOIL CONCENTRATION MAP: TOTAL LEAD
BUILDINGS 02 & 40
TANKS 67/02-70/02 - 71/40N-74/40N

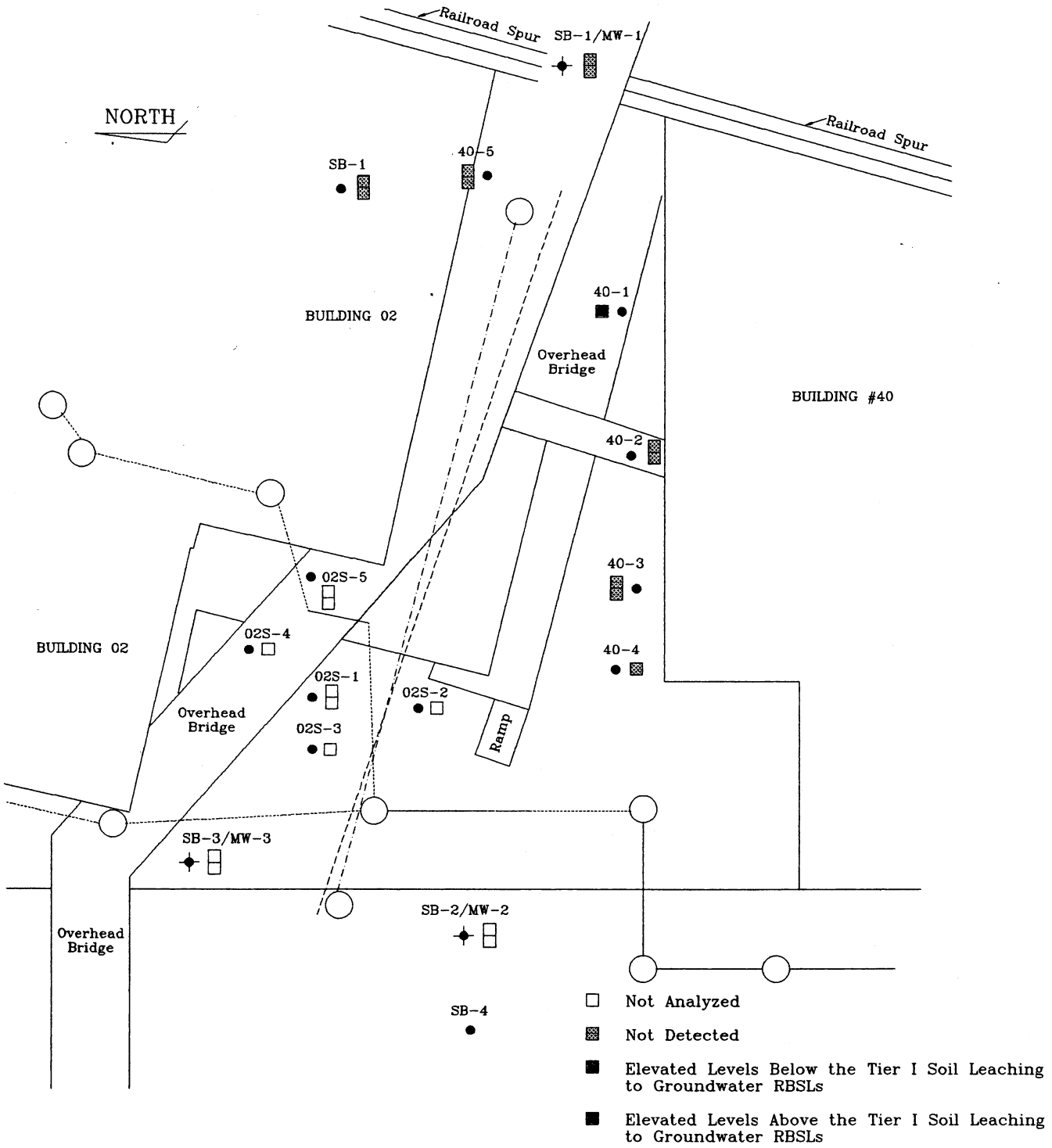
SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 5f
	PROJECT NUMBER: F174



LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- ------ Sanitary Line
- —·—·— Storm Sewer Line

GM-CLCD NORTH	
TITLE: SOIL CONCENTRATION MAP: CHROMIUM BUILDINGS 02 & 40 TANKS 67/02-70/02 - 71/40N-74/40N	
SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 5g
	PROJECT NUMBER: F174



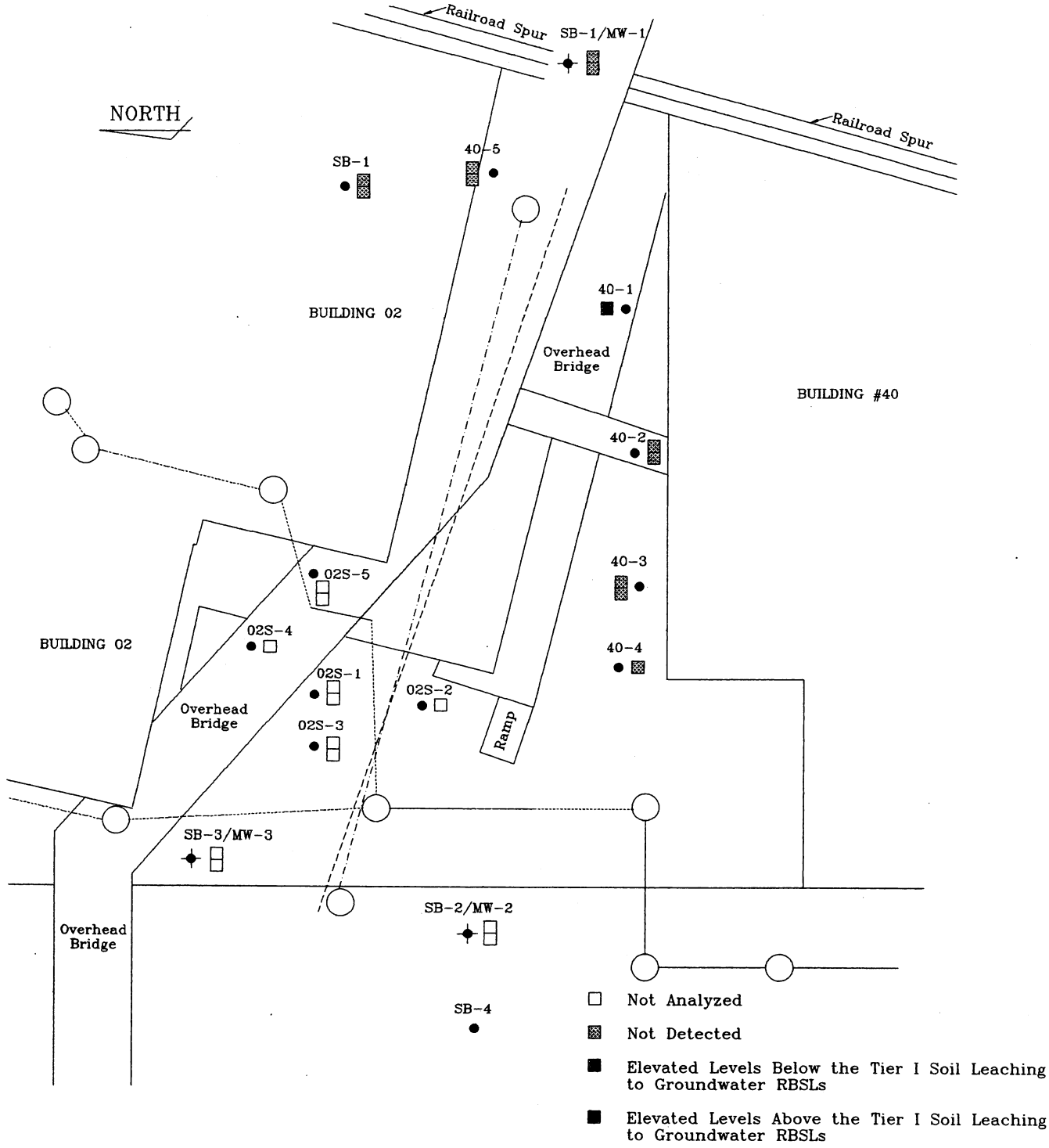
LEGEND:

- Geoprobe Sample Locations
- Monitoring Well Locations
- Fire Protection Line
- Sanitary Line
- Storm Sewer Line

GM-CLCD NORTH

TITLE: SOIL CONCENTRATION MAP: 2-METHYLNAPHTHALENE
BUILDING 02 & 40
TANKS 67/02-70/02 & 71/40N - 74/40N

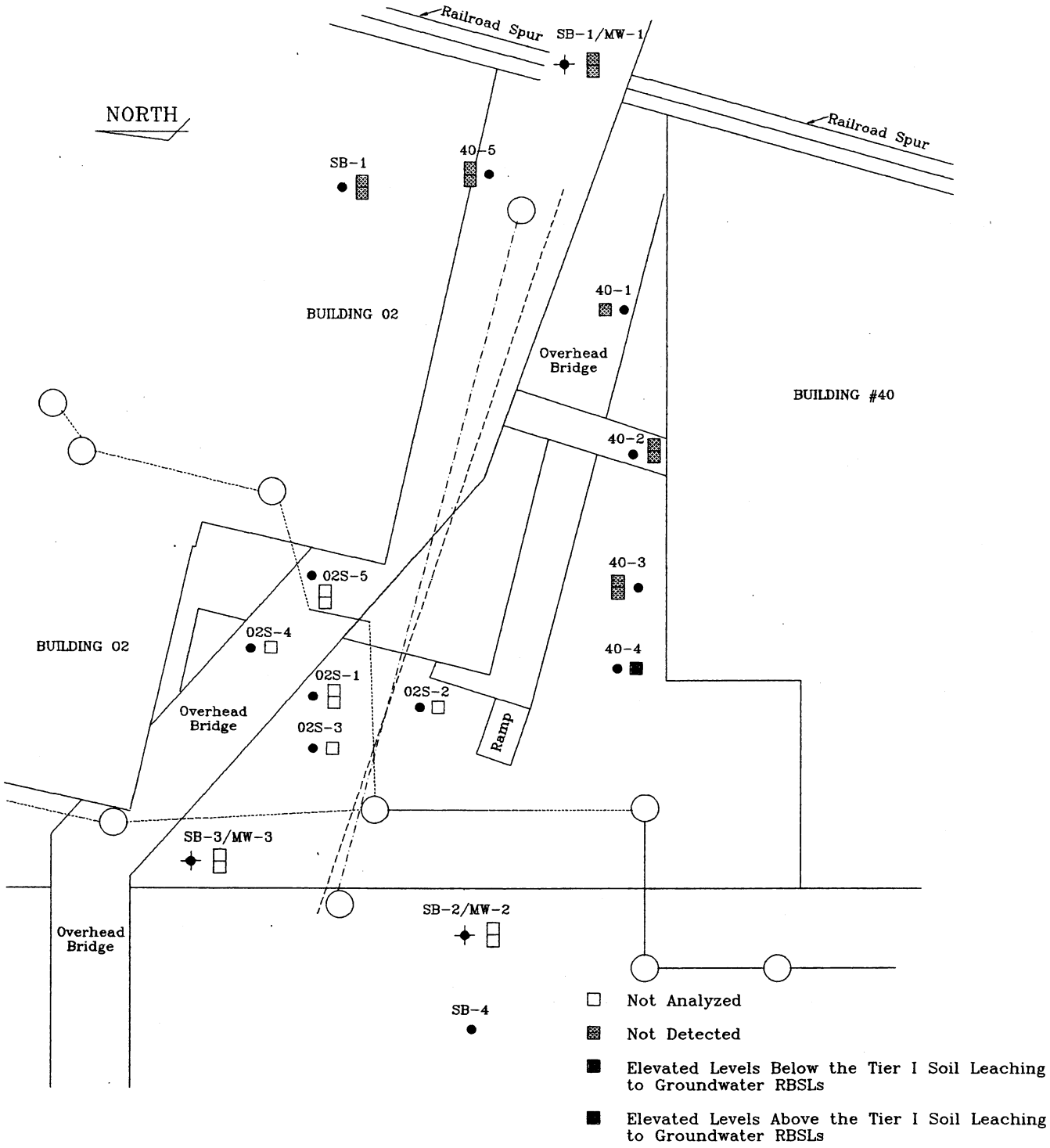
SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 5h
	PROJECT NUMBER: F174



LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- ------ Sanitary Line
- -·-·- Storm Sewer Line

GM-CLCD NORTH	
TITLE: SOIL CONCENTRATION MAP: NAPHTHALENE BUILDINGS 02 & 40 TANKS 67/02-70/02 & 71/40N-74/40N	
SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 5i
	PROJECT NUMBER: F174



LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- ------- Sanitary Line
- —·— Storm Sewer Line

GM-CLCD NORTH	
TITLE: SOIL CONCENTRATION MAP: PHENANTHRENE BUILDING 02 & 40 TANKS 67/02-70/02 & 71/40N-74/40N	
SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 5j
	PROJECT NUMBER: F174

ATTACHMENT 7

Global Environmental Engineering, Inc.
352 South Saginaw St., Suite 600
Flint, Michigan 48502
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	Bldg 2S-1	Project:	GM CLCD North UST Closure
Date:	7/29/96	Project #:	F174
Drilling Contractor:	YECI	Location:	Hamilton & Industrial Ave.
Prepared By:	JCW	Twp/Sec.:	
Time Started:	8:20	Depth Drilled:	21'
Time Completed:		Hole Diameter:	2"
Length Coring Device:	2'	Coring Device:	2"
		Fluid Used:	None
		Driller:	Ken
		Helper:	N/A
		Weight/Drop:	N/A

Boring Methods	
	Hollow Stem Auger
	Hand Auger
X	Geoprobe

Groundwater Information	
GW Encountered at	14'
Monitor Wells Installed	
Yes	No

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	FID	GC
				Concrete			
		1		Stone			
	GP-1		SP	Sand	Brown, Moist, Fine/Medium		
		2					
		3				ND	
		4					
		5				ND	
	GP-2						
		6					
		7				2.0	
		8				2.0	
	GP-3	9					
		10				3.0	
		11					
		12				3.5	
		13					
	GP-4						
		14					
	[X]	15			Gray, Wet Medium/Coarse	>1000	
			CL	Silty Clay	Moist, No Fractures		
		16					
		17				220	
	GP-5				Fine/Medium		
		18	SM	Silty Sand	Wet		
		19				380	
	GP-6						
		20					
	[X]	21				>1000	
			E.O.B.	End of Boring 21'			
		22					
		23					
		24					
		25					

SS-Split Spoon
NR-No Recovery
HA-Hand Auger Sample
[X]-Laboratory/Jar Sample
PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)
AL-Acetate Liner
FS-Field Screening Container

Global Environmental Engineering, Inc.
352 South Saginaw St., Suite 600
Flint, Michigan 48502
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	Bldg 2S-2	Project:	GM CLCD North UST Closure
Date:	7/29/96	Project #:	F174
Drilling Contractor:	YECI	Location:	Hamilton & Industrial Ave.
Prepared By:	JCW	Twp/Sec.:	
Time Started:	9:45	Depth Drilled:	6'
Time Completed:		Hole Diameter:	2"
Length Coring Device:	2'	Coring Device:	2"
		Fluid Used:	None
		Driller:	Ken
		Helper:	N/A
		Weight/Drop:	N/A

Boring Methods

	Hollow Stem Auger
	Hand Auger
X	Geoprobe

Groundwater Information

GW Encountered at	
Monitor Wells Installed	
Yes	No

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	FID	GC
				Concrete			
		1		Stone			
	GP-1		CL	Clay	Brown/Black, Moist, No Fractures		
		2					
		3				ND	
		4					
		5				1.0	
	GP-2				Black		
	[X]	6				25.0	
			E.O.B.	End of Boring 6'			
		7					
		8					
		9					
		10					
		11					
		12					
		13					
		14					
		15					
		16					
		17					
		18					
		19					
		20					
		21					
		22					
		23					
		24					
		25					

SS-Split Spoon
NR-No Recovery
HA-Hand Auger Sample
[X]-Laboratory/Jar Sample
PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)
AL-Acetate Liner
FS-Field Screening Container

Global Environmental Engineering, Inc.
352 South Saginaw St., Suite 600
Flint, Michigan 48502
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	Bldg 2S-3	Project:	GM CLCD North UST Closure
Date:	7/29/96	Project #:	F174
Drilling Contractor:	YECI	Location:	Hamilton & Industrial Ave.
Prepared By:	JCW	Twp/Sec.:	
Time Started:	9:45	Depth Drilled:	8'
Time Completed:		Hole Diameter:	2"
Length Coring Device:	2'	Coring Device:	2"
		Fluid Used:	None
		Driller:	Ken
		Helper:	N/A
		Weight/Drop:	N/A

Boring Methods

	Hollow Stem Auger
	Hand Auger
X	Geoprobe

Groundwater Information

GW Encountered at	
Monitor Wells Installed	
Yes	No

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	FID	GC
				Concrete			
		1		Stone			
	GP-1		CL	Sandy Clay	Brown, Moist, No Fractures, <25% Recovery, Wood Chips		
		2					
		3				ND	
		4					
					Black		
		5				ND	
	GP-2				Brown		
		6					
		7			Black, Trace of Gravel	>1000	
	[X]	8				>1000	
			E.O.B.	End of Boring 8'			
		9					
		10					
		11					
		12					
		13					
		14					
		15					
		16					
		17					
		18					
		19					
		20					
		21					
		22					
		23					
		24					
		25					

SS-Split Spoon
NR-No Recovery
HA-Hand Auger Sample
[X]-Laboratory/Jar Sample
PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)
AL-Acetate Liner
FS-Field Screening Container

Global Environmental Engineering, Inc.
352 South Saginaw St., Suite 600
Flint, Michigan 48502
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	Bldg 2S-4	Project:	GM CLCD North UST Closure
Date:	7/29/96	Project #:	F174
Drilling Contractor:	YECI	Location:	Hamilton & Industrial Ave.
Prepared By:	JCW	Twp/Sec.:	
Time Started:	12:30	Depth Drilled:	12'
Time Completed:		Hole Diameter:	2"
Length Coring Device:	2'	Coring Device:	2"
		Fluid Used:	None
		Driller:	Ken
		Helper:	N/A
		Weight/Drop:	N/A

Boring Methods

	Hollow Stem Auger
	Hand Auger
X	Geoprobe

Groundwater Information

GW Encountered at	
Monitor Wells Installed	
Yes	No

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	FID	GC
				Concrete			
		1		Stone			
	GP-1		SP	Sand	Brown, Moist, Fine/Medium		
		2					
		3				7.0	
		4					
		5				22.0	
	GP-2						
		6					
		7			Gray	760	
		8					
		9			Black	>1000	
	GP-3						
		10					
		11					
	[X]	12				>1000	
			E.O.B.	End of Boring 12'(Concrete)			
		13					
		14					
		15					
		16					
		17					
		18					
		19					
		20					
		21					
		22					
		23					
		24					
		25					

SS-Split Spoon
NR-No Recovery
HA-Hand Auger Sample
[X]-Laboratory/Jar Sample
PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)
AL-Acetate Liner
FS-Field Screening Container

Global Environmental Engineering, Inc.
352 South Saginaw St., Suite 600
Flint, Michigan 48502
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	Bldg 2S-5	Project:	GM CLCD North UST Closure
Date:	7/29/96	Project #:	F174
Drilling Contractor:	YECI	Location:	Hamilton & Industrial Ave.
Prepared By:	JCW	Twp/Sec.:	
Time Started:	13:15	Depth Drilled:	21'
Time Completed:		Hole Diameter:	2"
Length Coring Device:	2'	Coring Device:	2"
Fluid Used:	None		
Driller:	Ken		
Helper:	N/A		
Weight/Drop:	N/A		

Boring Methods

	Hollow Stem Auger
	Hand Auger
X	Geoprobe

Groundwater Information

GW Encountered at	19'
Monitor Wells Installed	
Yes	No

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	FID	GC
				Concrete			
		1		Stone			
	GP-1		SP	Sand	Brown, Moist, Fine/Medium		
		2					
		3	CL	Sandy Clay	Brown/Black, No Fractures	ND	
		4					
		5				1.0	
	GP-2		CL	Clay	Brown/Gray, Fractures		
		6					
		7				1.5	
		8					
		9				2.0	
	GP-3						
		10					
		11				2.0	
		12					
		13				220	
	GP-4						
		14					
		15				680	
		16					
		17			2" Sand Lens 2" Sand Lens	>1000	
	GP-5		SP	Sand	Brown		
		18					
		19				>1000	
	GP-6				Wet Gray		
		20					
		21				>1000	
			E.O.B.	End of Boring 21'			
		22					
		23					
		24					
		25					

SS-Split Spoon
NR-No Recovery
HA-Hand Auger Sample
[X]-Laboratory/Jar Sample
PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)
AL-Acetate Liner
FS-Field Screening Container

Global Environmental Engineering, Inc.
352 South Saginaw St., Suite 600
Flint, Michigan 48502
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	Bldg 40-1	Project:	GM CLCD North UST Closure
Date:	7/24/96	Project #:	F174
Drilling Contractor:	YECI	Location:	Hamilton & Industrial Ave.
Prepared By:	JCW	Twp/Sec.:	
Time Started:	8:30	Depth Drilled:	21'
Time Completed:		Hole Diameter:	2"
Length Coring Device:	2'	Coring Device:	2"
		Fluid Used:	None
		Driller:	Ken
		Helper:	N/A
		Weight/Drop:	N/A

Boring Methods

	Hollow Stem Auger
	Hand Auger
X	Geoprobe

Groundwater Information

GW Encountered at	
Monitor Wells Installed	
Yes	No

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	FID	GC
				Concrete			
		1		Stone			
	GP-1		SP	Sand	Black, Moist, Fine/Medium		
		2					
		3				>1000	
		4					
		5				>1000	
	GP-2						
		6					
		7				820	
		8			3" Brown Clay Lens		
		9			1" Clay Lens	>1000	
	GP-3		CL	Clay	Brown, No Fractures		
		10					
		11				400.00	
		12					
		13				120.0	
	GP-4				Brown/Gray, Fractures		
		14					
		15				240	
		16			Gray, Moist, No Fractures		
		17		Sandy Clay		>1000	
	GP-5		SP	Sand			
		18			Black, Fine/Medium		
		19				>1000	
	GP-6[X]				Wet		
		20					
		21				>1000	
			E.O.B	End of Boring 21'			
		22					
		23					
		24					
		25					

SS-Split Spoon
NR-No Recovery
HA-Hand Auger Sample
[X]-Laboratory/Jar Sample
PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)
AL-Acetate Liner
FS-Field Screening Container

Global Environmental Engineering, Inc.
352 South Saginaw St., Suite 600
Flint, Michigan 48502
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	Bldg 40-2	Project:	GM CLCD North UST Closure
Date:	7/24/96	Project #:	F174
Drilling Contractor:	YECI	Location:	Hamilton & Industrial Ave.
Prepared By:	JCW	Twp/Sec.:	
Time Started:	10:15	Depth Drilled:	15'
Time Completed:		Hole Diameter:	2"
Length Coring Device:	2'	Coring Device:	2"
Fluid Used:	None		
Driller:	Ken		
Helper:	N/A		
Weight/Drop:	N/A		

Boring Methods	
	Hollow Stem Auger
	Hand Auger
X	Geoprobe

Groundwater Information	
GW Encountered at	
Monitor Wells Installed	
Yes	No

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	FID	GC
				Concrete			
		1		Stone			
	GP-1		SP	Sand	Black, Moist, Fine/Medium		
		2					
		3				ND	
		4					
	[X]	5				4.0	
	GP-2						
		6					
		7				ND	
		8					
		9				ND	
	GP-3		CL	Clay	Brown, No Fractures		
		10					
		11				ND	
		12					
					Gray		
		13				ND	
	GP-4						
		14					
	[X]	15				ND	
			E.O.B	End of Boring 15'			
		16					
		17					
		18					
		19					
		20					
		21					
		22					
		23					
		24					
		25					

SS-Split Spoon
NR-No Recovery
HA-Hand Auger Sample
[X]-Laboratory/Jar Sample
PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)
AL-Acetate Liner
FS-Field Screening Container

Global Environmental Engineering, Inc.
352 South Saginaw St., Suite 600
Flint, Michigan 48502
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	Bldg 40-3	Project:	GM CLCD-North UST Closure
Date:	7/24/96	Project #:	F174
Drilling Contractor:	YECI	Location:	Hamilton & Industrial Ave.
Prepared By:	JCW	Twp/Sec.:	
Time Started:	11:15	Depth Drilled:	21'
Time Completed:		Hole Diameter:	2"
Length Coring Device:	2'	Coring Device:	2"
		Fluid Used:	None
		Driller:	Ken
		Helper:	N/A
		Weight/Drop:	N/A

Boring Methods

	Hollow Stem Auger
	Hand Auger
X	Geoprobe

Groundwater Information

GW Encountered at
Monitor Wells Installed
Yes No

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	FID	GC
				Concrete			
		1		Stone			
	GP-1		SP	Sand	Black, Moist, Fine/Medium		
		2					
		3				ND	
		4					
		5				ND	
	GP-2						
		6					
		7				ND	
		8					
		9				ND	
	GP-3						
		10					
		11				ND	
		12					
					Gray		
		13				160	
	GP-4		CL	Clay	No Fractures		
		14					
		15				14.0	
	GP-5		ML	Clayee Silt			
		16					
		17				16.0	
	GP-6						
		18					
		19				55.0	
	GP-7						
		20					
		21				16.0	
			E.O.B	End of Boring 21'			
		22					
		23					
		24					
		25					

SS-Split Spoon
NR-No Recovery
HA-Hand Auger Sample
[X]-Laboratory/Jar Sample
PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)
AL-Acetate Liner
FS-Field Screening Container

Global Environmental Engineering, Inc.
352 South Saginaw St., Suite 600
Flint, Michigan 48502
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	Bldg 40-4	Project:	GM CLCD North UST Closure
Date:	7/24/96	Project #:	F174
Drilling Contractor:	YECI	Location:	Hamilton & Industrial Ave.
Prepared By:	JCW	Twp/Sec.:	
Time Started:	14:00	Depth Drilled:	16'
Time Completed:		Hole Diameter:	2"
Length Coring Device:	2'	Coring Device:	2"
		Fluid Used:	None
		Driller:	Ken
		Helper:	N/A
		Weight/Drop:	N/A

Boring Methods		Groundwater Information	
	Hollow Stem Auger	GW Encountered at	
	Hand Auger	Monitor Wells Installed	
X	Geoprobe	Yes	No

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	FID	GC
				Concrete			
		1		Stone			
	GP-1		SP	Sand	Black, Moist, Fine/Medium		
		2					
		3				ND	
		4					
		5				1.0	
	GP-2						
		6					
		7				ND	
		8					
		9				ND	
	GP-3						
		10					
		11				ND	
		12					
		13				4.0	
	GP-4						
		14			Black, Wet		
		15					
	[X]					>1000	
		16					
			E.O.B	End of Boring 16'			
		17					
		18					
		19					
		20					
		21					
		22					
		23					
		24					
		25					

SS-Split Spoon
NR-No Recovery
HA-Hand Auger Sample
[X]-Laboratory/Jar Sample
PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)
AL-Acetate Liner
FS-Field Screening Container

lobal Environmental Engineering, Inc.
352 South Saginaw St., Suite 600
Flint, Michigan 48502
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	Bldg 40-5	Project:	GM CLCD North UST Closure
Date:	7/24/96	Project #:	F174
Drilling Contractor:	YECI	Location:	Hamilton & Industrial Ave.
Prepared By:	JCW	Twp/Sec.:	
Time Started:	15:15	Depth Drilled:	2.5'
Time Completed:		Hole Diameter:	2"
Length Coring Device:	2'	Coring Device:	2"
		Fluid Used:	None
		Driller:	Ken
		Helper:	N/A
		Weight/Drop:	N/A

Boring Methods

	Hollow Stem Auger
	Hand Auger
X	Geoprobe

Groundwater Information

GW Encountered at	
Monitor Wells Installed	
Yes	No

Penetration Blows/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	FID	GC
				Concrete			
		1					
	GP-1						
		2					
				Bricks	Sample Refusal		
		3	E.O.B	End of Boring 2.5'			
		4					
		5					
		6					
		7					
		8					
		9					
		10					
		11					
		12					
		13					
		14					
		15					
		16					
		17					
		18					
		19					
		20					
		21					
		22					
		23					
		24					
		25					

S-Split Spoon
-No Recovery

HA-Hand Auger Sample
[X]-Laboratory/Jar Sample

PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)

AL-Acetate Liner
FS-Field Screening Container

Global Environmental Engineering, Inc.
5467 Hill 23 Dr., Suite B
Flint, Michigan 48507
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	SB1/MW1	Project:	GMCLCD N.
Date:	11/8/96	Project #:	F174
Drilling Contractor:	GEEI	Location:	Building 40/02 South
Prepared By:	JCW	Twp/Sec.:	
Time Started:	12:45	Depth Drilled:	12'
Time Completed:		Hole Diameter:	4.5"
Length Coring Device:	5'	Coring Device:	8.25"
		Fluid Used:	None
		Driller:	Elroy
		Helper:	NA
		Weight/Drop:	140#/30"

Boring Methods

X	Hollow Stem Auger
	Hand Auger
	Geoprobe

Groundwater Information

GW Encountered at	
Monitor Wells Installed	
Yes X	No

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	OVA	GC
		1					
		2					
	SS		SP	Sand	Brown, Moist, Fine/Medium		
	SS	3					
	SS					ND	
	SS	4					
	SS						
	SS	5			Wet		
	SS						
	SS	6				520	
	SS						
	SS	7					
	SS					12.0	
	SS	8					
	SS						
	SS	9					
	SS						
	SS	10	CL	Clay	No Fractures, Trace of Gravel	4.0	
	SS						
	SS	11					
	SS					4.0	
	SS	12					
			E.O.B.	End of Boring 12'			
		13					
		14					
		15					
		16					
		17					
		18					
		19					
		20					
		21					
		22					
		23					

SS-Split Spoon
NR-No Recovery

HA-Hand Auger Sample
[X]-Laboratory/Jar Sample

PID-Photoionization Detector (ppm)
GC-Gas Chromatograph (ppb)

AL-Acetate Liner
FS-Field Screening Container

Global Environmental Engineering, Inc.
5467 Hill 23 Dr., Suite B
Flint, Michigan 48507
Tel: (810) 238-9190
Fax: (810) 238-9195

Soil Boring:	SB2/MW2	Project:	GMCLCD N. – UST Closures
Date:	11/8/96	Project #:	F174
Drilling Contractor:	YECI	Location:	Building 40/02 South
Prepared By:	JCW	Twp/Sec.:	
Time Started:	14:50	Depth Drilled:	16'
Time Completed:		Hole Diameter:	4.5"
Length Coring Device:	5'	Coring Device:	8.25"
		Fluid Used:	None
		Driller:	Scott
		Helper:	NA
		Weight/Drop:	140#/30"

Boring Methods		Groundwater Information
X	Hollow Stem Auger	GW Encountered at
	Hand Auger	Monitor Wells Installed
	Geoprobe	Yes X No

Penetration Tons/Sq ft.	Sample Type	Depth (ft.)	USCS Code	SOIL DESCRIPTION	REMARKS	OVA	GC
		1					
		2					
	SS		CL	Sandy Clay	Brown, Moist, No Fractures		
	SS	3					
	SS						
	SS	4				ND	
	SS			Clay	Brown/Gray, Fractures		
	SS	5					
	SS						
	SS	6				8.0	
	SS			Sandy Clay			
	SS	7					
	SS						
	SS	8				>1000	
	SS						
	SS	9					
	SS						
	SS-[X]	10		Clay	Some Silt	>1000	
	SS						
	SS	11					
	SS						
	SS	12			Gray, No Fractures	NA	
	SS						
	SS	13					
	SS						
	SS	14				NA	
	SS						
	SS	15					
	SS						
	SS-[X]	16				NA	
			E.O.B.	End of Boring 16'			
		17					
		18					
		19					
		20					
		21					
		22					
		23					
		24					
		25					

SS–Split Spoon
NR–No Recovery
HA–Hand Auger Sample
[X]–Laboratory/Jar Sample
PID–Photoionization Detector (ppm)
GC–Gas Chromatograph (ppb)
AL–Acetate Liner
FS–Field Screening Container

ATTACHMENT 8

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

GROUNDWATER LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	Bldg 02S-5		Bldg 02S/40 (MW1)		02S/40 (MW2)		SB-1		MW-3	
Sample Depth (feet BGS)	-						15-17			
Date Collected	07/29/96		01/02/97		01/02/97		06/03/97		06/10/97	
Date Extracted	08/05/96		01/02/97		01/02/97		06/10/97		06/13/97	
Date Analyzed	08/05/96		01/02/97		01/02/97		06/10/97		06/13/97	
Collection Method*	GP		Bailer		Bailer		GP		Bailer	
Analytical Method No.	8260		8260		8260		8260		8260	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	10100	10	ND	1	20	1	ND	1	350	10
☐ Toluene	130	10	ND	1	ND	1	5	1	20	10
☐ Ethylbenzene	200	10	ND	1	10	1	ND	1	190	10
☐ Total Xylenes	1040	10	ND	1	11	1	2	1	20	10
☐ MTBE										
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID			Bldg 02S/40 (MW1)		02S/40 (MW2)				MW-3	
Sample Depth (feet BGS)										
Date Collected			01/02/97		01/02/97				06/10/97	
Date Extracted			01/03/97		01/03/97				06/17/97	
Date Analyzed			01/06/97		01/06/97				06/18/97	
Collection Method*			Bailer		Bailer				Bailer	
Analytical Method No.			8270		8270				8270	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene			ND	5	ND	5			ND	5
☐ Acenaphthylene			ND	5	ND	5			ND	5
☐ Anthracene			ND	5	ND	5			ND	5
☐ Benzo(a)anthracene			ND	5	ND	5			ND	5
☐ Benzo(a)pyrene			ND	5	ND	5			ND	5
☐ Benzo(b)fluoranthene			ND	5	ND	5			ND	5
☐ Benzo(g,h,i)perylene			ND	5	ND	5			ND	5
☐ Benzo(k)fluoranthene			ND	5	ND	5			ND	5
☐ Chrysene			ND	5	ND	5			ND	5
☐ Dibenzo(a,h)anthracene			ND	5	ND	5			ND	5

BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table:
MDL = Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

GROUNDWATER LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

DUPLICATE TABLE AS NEEDED

POLYNUCLEAR AROMATICS (PNAs)										
Sample ID			Bldg 02S/40 (MW1)		02S/40 (MW2)				MW-3	
Sample Depth (feet BGS)										
Date Collected			01/02/97		01/02/97				06/10/97	
Date Extracted			01/03/97		01/03/97				06/17/97	
Date Analyzed			01/06/97		01/06/97				06/18/97	
Collection Method*			Bailer		Bailer				Bailer	
Analytical Method No.			8270		8270				8270	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Fluoranthene			ND	5	ND	5			ND	5
☐ Fluorene			ND	5	ND	5			ND	5
☐ Indeno(1,2,3- cd)pyrene			ND	5	ND	5			ND	5
☐ Naphthalene			ND	5	ND	5			ND	5
☐ 2-Methylnaphthalene			ND	5	ND	5			ND	5
☐ Phenanthrene			ND	5	ND	5			ND	5
☐ Pyrene			ND	5	ND	5			ND	5
METALS - FILTERED										
Sample ID	Bldg 02S-5		Bldg 02S/40 (MW1)		02S/40 (MW2)				MW-3	
Sample Depth (feet BGS)	-									
Date Collected	07/29/96		01/02/97		01/02/97				06/10/97	
Date Extracted	08/08/96		01/03/97		01/03/97				06/17/97	
Date Analyzed	08/08/96		01/06/97		01/06/97				06/18/97	
Collection Method*	GP		Bailer		Bailer				Bailer	
Analytical Method No.	200.08		200.8		200.8				200.8	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Cadmium										
☐ Total Chromium			20	10	ND	10			ND	10
☐ Total Lead	ND	3	32	3	ND	3			ND	3

*The Chain of Custody requested chromium analysis, the laboratory analyzed for cadmium in error.
BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table:_____
MDL = Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

GROUNDWATER LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

PCBs										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Collection Method*										
Analytical Method No.										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Aroclor 1016										
☐ Aroclor 1221										
☐ Aroclor 1232										
☐ Aroclor 1242										
☐ Aroclor 1248										
☐ Aroclor 1254										
☐ Aroclor 1280										
HALOGENATED HYDROCARBONS										
Sample ID			Bldg 02S/40 (MW1)		02S/40 (MW2)		SB-1		MW-3	
Sample Depth (feet BGS)							15-17			
Date Collected			01/02/97		01/02/97		06/03/97		06/10/97	
Date Extracted			01/02/97		01/02/97		06/10/97			
Date Analyzed			01/02/97		01/02/97		06/10/97		06/13/97	
Collection Method*			Bailer		Bailer		GP		Bailer	
Analytical Method No.			601		601		601		601	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Carbon Tetrachloride			ND	1	ND	1	ND	1	ND	10
☐ 1,1-Dichloroethane			ND	1	ND	1	ND	1	ND	10
☐ 1,2-Dichloroethane			ND	1	ND	1	ND	1	ND	10
☐ 1,1-Dichloroethylene			ND	1	ND	1	ND	1	ND	10
☐ cis-1,2-Dichloroethylene			ND	1	ND	1	NA	1	ND	10
☐ trans-1,2- Dichloroethylene			ND	1	ND	1	ND	1	ND	10

BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table:
MDL = Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

GROUNDWWATER LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

HALOGENATED HYDROCARBONS (Cont.)										
☐ Tetrachloroethylene			ND	1	ND	1	ND	1	ND	1
☐ 1,1,2-Trichloroethane			ND	1	ND	1	ND	1	ND	1
OTHER *(Specify)*										
Sample ID							SB-1		MW-3	
Sample Depth (feet BGS)							15-17			
Date Collected							06/03/97		06/10/97	
Date Extracted							06/10/97			
Date Analyzed							06/10/97		06/13/97	
Collection Method*							GP		Bailer	
Analytical Method No.							601		601	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Bromodichloroethane							ND	1	ND	10
☐ Bromoform							ND	1	ND	10
☐ Bromomethane							ND	1	ND	10
☐ Chlorobenzene							ND	1	ND	10
☐ Chloroethane							ND	1	ND	10
☐ 2-Chloroethylvinyl							ND	1	ND	10
☐ Chloroform							ND	1	ND	10
☐ Chloromethane							ND	1	ND	10
☐ Dibromochloromethane							ND	1	ND	10
☐ 1,2-Dichlorobenzene							ND	1	ND	10
☐ 1,3-Dichlorobenzene							ND	1	ND	10
☐ 1,4-Dichlorobenzene							ND	1	ND	10
☐ Dichlorodifluoromethane							ND	1	ND	10
☐ cis-1,3-Dichloropropane							ND	1	ND	10
☐ trans-1,3-Dichloropropene							ND	1	ND	10
☐ Methylene Chloride							ND	1	ND	10
☐ Vinyl chloride							ND	1	ND	10

BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table:
MDL = Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

GROUNDWATER LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

VOLATILES										
Sample ID	Bldg 40-1		Bldg 40-3		Bldg 40-4					
Sample Depth (feet BGS)	-		-							
Date Collected	7/24/96		7/24/96		7/24/96					
Date Extracted	7/28/96		7/28/96		7/28/96					
Date Analyzed	7/28/96		7/28/96		7/28/96					
Collection Method*	GP		GP		GP					
Analytical Method No.	8020		8020		8020					
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Benzene	5940	50	480	50	ND	1				
☐ Toluene	7910	50	790	50	ND	1				
☐ Ethylbenzene	1800	50	250	50	ND	1				
☐ Total Xylenes	11,130	50	1600	50	ND	1				
☐ MTBE										
POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	Bldg 40-1		Bldg 40-3		Bldg 40-4					
Sample Depth (feet BGS)	-		-		-					
Date Collected	7/24/96		7/24/96		7/24/96					
Date Extracted	7/26/96		7/26/96		7/26/96					
Date Analyzed	7/2996		7/2996		7/2996					
Collection Method*	GP		GP		GP					
Analytical Method No.	8270		8270		8270					
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Acenaphthene	ND	50	ND	50	ND	5				
☐ Acenaphthylene	ND	50	ND	50	ND	5				
☐ Anthracene	ND	50	ND	50	ND	5				
☐ Benzo(a)anthracene	ND	50	ND	50	ND	5				
☐ Benzo(a)pyrene	ND	50	ND	50	ND	5				
☐ Benzo(b)fluoranthene	ND	50	ND	50	ND	5				
☐ Benzo(g,h,i)perylene	ND	50	ND	50	ND	5				
☐ Benzo(k)fluoranthene	ND	50	ND	50	ND	5				
☐ Chrysene	ND	50	ND	50	ND	5				
☐ Dibenzo(a,h)anthracene	ND	50	ND	50	ND	5				

BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table:
MDL = Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

GROUNDWATER LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

DUPLICATE TABLE AS NEEDED

POLYNUCLEAR AROMATICS (PNAs)										
Sample ID	Bldg 40-1		Bldg 40-3		Bldg 40-4					
Sample Depth (feet BGS)	-		-		-					
Date Collected	7/24/96		7/24/96		7/24/96					
Date Extracted	7/26/96		7/26/96		7/26/96					
Date Analyzed	7/2996		7/2996		7/2996					
Collection Method*	GP		GP		GP					
Analytical Method No.	8270		8270		8270					
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Fluoranthene	ND	50	ND	50	ND	5				
☐ Fluorene	ND	50	ND	50	ND	5				
☐ Indeno(1,2,3- cd)pyrene	ND	50	ND	50	ND	5				
☐ Naphthalene	156	50	ND	50	ND	5				
☐ 2-Methylnaphthalene	116	50	ND	50	ND	5				
☐ Phenanthrene	ND	50	ND	50	ND	5				
☐ Pyrene	ND	50	ND	50	ND	5				
METALS - FILTERED										
Sample ID	Bldg 40-1		Bldg 40-3		Bldg 40-4					
Sample Depth (feet BGS)	-		-		-					
Date Collected	7/24/96		7/24/96		7/24/96					
Date Extracted	7/29/96		7/29/96		7/29/96					
Date Analyzed	7/2996		7/2996		7/2996					
Collection Method*	GP		GP		GP					
Analytical Method No.	200.8		200.8		200.8					
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Cadmium	ND	.2	ND	.2	ND	.2				
☐ Total Chromium	ND	10	ND	10	ND	10				
☐ Total Lead	14	3	ND	3	ND	3				

BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table:_____
MDL = Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

GROUNDWATER LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

PCBs										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Collection Method*										
Analytical Method No.										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Aroclor 1016										
☐ Aroclor 1221										
☐ Aroclor 1232										
☐ Aroclor 1242										
☐ Aroclor 1248										
☐ Aroclor 1254										
☐ Aroclor 1280										
HALOGENATED HYDROCARBONS										
Sample ID	Bldg 40-1		Bldg 40-3		Bldg 40-4					
Sample Depth (feet BGS)	-		-		-					
Date Collected	7/24/96		7/24/96		7/24/96					
Date Extracted	7/28/96		7/28/96		7/28/96					
Date Analyzed	7/2896		7/2896		7/2896					
Collection Method*	GP		GP		GP					
Analytical Method No.	601		601		601					
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Carbon Tetrachloride	ND	50	ND	50	ND	1				
☐ 1,1-Dichloroethane	ND	50	650	50	8	1				
☐ 1,2-Dichloroethane	150	50	ND	50	ND	1				
☐ 1,1-Dichloroethylene	ND	50	ND	50	ND	1				
☐ cis-1,2-Dichloroethylene	ND	50	ND	50	ND	1				
☐ trans-1,2- Dichloroethylene	ND	50	ND	50	ND	1				

BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table:
MDL = Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

GROUNDWATER LABORATORY ANALYTICAL RESULTS
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

HALOGENATED HYDROCARBONS (Cont.)										
☐ Tetrachloroethylene	ND	50	ND	50	ND	1				
☐ 1,1,2-Trichloroethane	ND	50	ND	50	ND	1				
OTHER *(Specify)*										
Sample ID										
Sample Depth (feet BGS)										
Date Collected										
Date Extracted										
Date Analyzed										
Collection Method*										
Analytical Method No.										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐										
☐										
☐										
☐										
☐										
☐										
☐										
☐										
☐										
☐										
☐										
☐										
☐										

BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table:_____
MDL = Method Detection Limit

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

TIER I RBSL/TIER II OR TIER III SSTL\
COMPARISON TABLE FOR GROUNDWATER
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

☑ **Residential** ☐ **Commercial** ☑ **Industrial**

Contaminant	Sample ID with Maximum Detected Concentration	Corresponding Sample Date	Maximum Detected Concentration (ug/l)	Applicable Criterion (ug/l)			
				Tier I Residential Health-Based Drinking Water	Tier I Industrial Health-Based Drinking Water	Tier I Groundwater Surface Water Interface	Tier I Direct Contact
VOLATILES							
☐ Benzene	Bldg 02S-5	07/29/96	10,100	5	5	53	9300
☐ Toluene	Bldg 40-1	07/24/96	7,910	790	790	110	>526,000
☐ Ethylbenzene	Bldg 40-1	07/24/96	1,800	74	74	31	>169,000
☐ Total Xylenes	Bldg 40-1	07/24/96	11,130	280	280	59	>186,000
☐ MTBE							
POLYNUCLEAR AROMATICS (PNAs)							
☐ Acenaphthene			ND	1300	3800	3.8	>4240
☐ Acenaphthylene			ND	26	75	Not Available	ID
☐ Anthracene			ND	7300	21,000	110,000	>43
☐ Benzo(a)anthracene			ND	1.2	4.8	.31	4
☐ Benzo(a)pyrene			ND	.2	.2	.31	.24
☐ Benzo(b)fluoranthene			ND	1.2	4.8	.31	2
☐ Benzo(g,h,i)perylene			ND	26	75	Not Available	ID
☐ Benzo(k)fluoranthene			ND	12	48	.31	20
☐ Chrysene			ND	120	480	.31	400
☐ Dibenzo-(a,h)anthracene			ND	.12	.48	.31	.11
☐ Fluoranthene			ND	880	2500	370	>206
☐ Fluorene			ND	880	2500	14,000	>1980
☐ Indeno(1,2,3-cd)pyrene			ND	1.2	4.8	.31	>0.022
☐ Naphthalene	Bldg 40-1	07/24/96	156	260	750	34	>31,000
☐ Phenanthrene			ND	26	75	Not Available	>1000
☐ Pyrene			ND	550	1600	11,000	>135
☐ 2-Methylnaphthalene	Bldg 40-1	07/24/96	16	260	750	59	>110,000

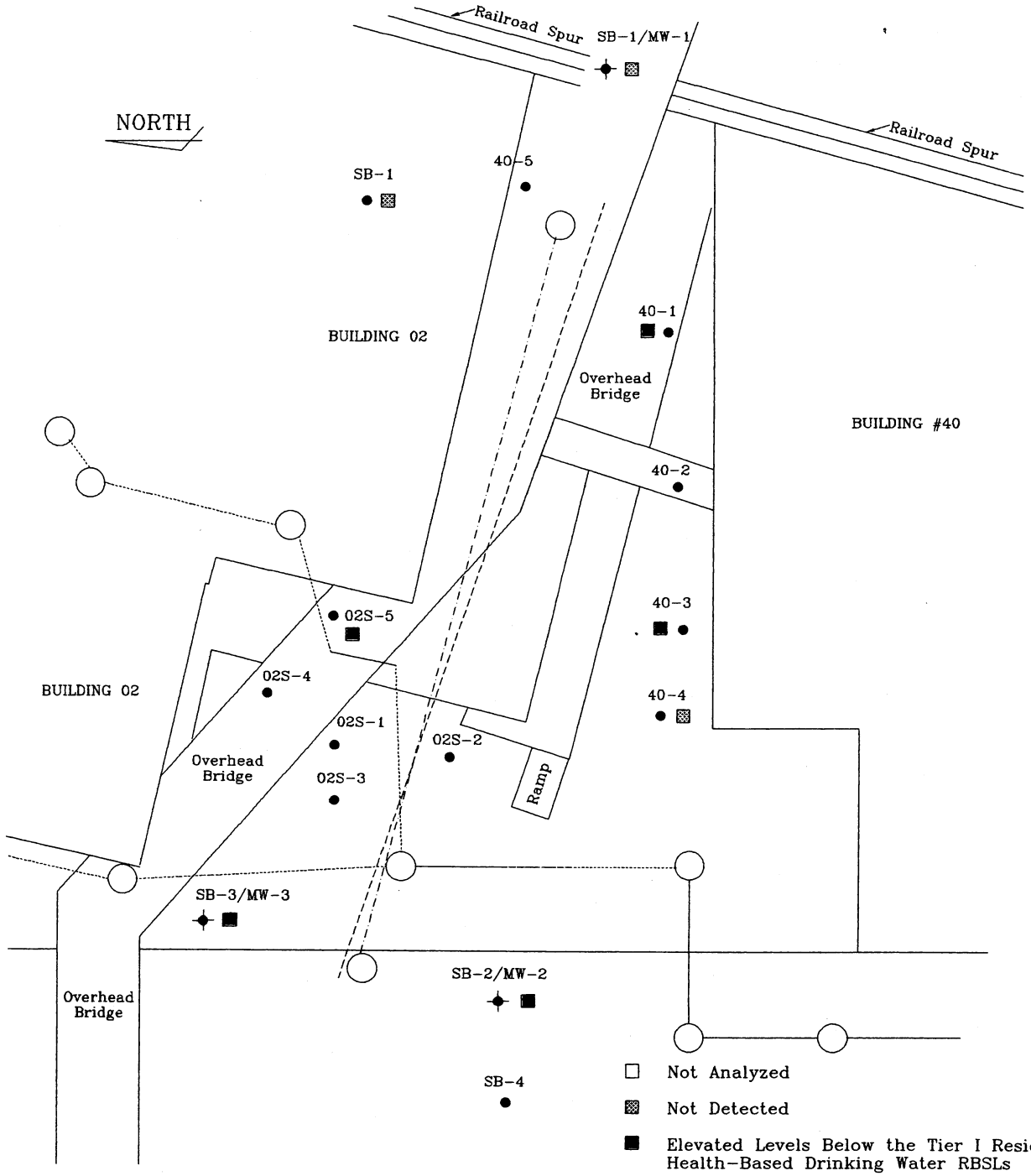
Shading indicates concentration exceeds one or more Tier I RBSLs
"ND" = Non-Detect
"NA" = Not Analyzed

BUILDING 40/02 (TANKS 71/40N -74/40N AND 67/02-70/02)
SUMMARY REPORT

TIER I RBSL/TIER II OR TIER III SSTL
COMPARISON TABLE FOR GROUNDWATER
FACILITY NAME: NAO FLINT OPERATIONS
FACILITY NUMBER: 0-002763

Contaminant	Sample ID with Maximum Detected Concentration	Corresponding Sample Date	Maximum Detected Concentration (ug/l)	Applicable Criterion (ug/l)			
				Tier I Residential Health-Based Drinking Water	Tier I Industrial Health-Based Drinking Water	Tier I Groundwater Surface Water Interface	Tier I Direct Contact
METALS - FILTERED							
☐ Cadmium			ND	5	5	.64	110,000
☐ Total Chromium	MW1	01/02/97	20	100	100	77	320,000,000
☐ Total Lead	MW1	01/02/97	32	4	4	140,000	Not Available
PCBs - Not Analyzed							
HALOGENATED HYDROCARBONS							
☐ Carbon Tetrachloride			ND	5	5	21	1600
☐ Chloroethane			ND	880	2500	Not Available	2,100,000
☐ 1,1-Dichloroethane	Bldg 40-3	07/24/96	650	5	5	560	11,000
☐ 1,2-Dichloroethane	Bldg 40-1	07/24/96	150	7	7	32	9900
☐ 1,1-Dichloroethylene			ND	70	70	Not Available	170,000
☐ cis-1,2-Dichloroethylene			ND	100	100	300	200,000
☐ trans-1,2-Dichloroethylene			ND	5	5	22	5000
☐ Tetrachloroethylene			ND	5	5	65	9600
☐ 1,1,2-Trichloroethane			ND	5	5	65	9600
☐ Trichloroethylene			ND	5	5	94	11,000
☐ Vinyl Chloride			ND	2	2	3.1	290
OTHER *							
☐							
☐							
☐							
☐							
☐							

ATTACHMENT 9



Not Analyzed

Not Detected

Elevated Levels Below the Tier I Residential Health-Based Drinking Water RBSLs

Elevated Levels Above the Tier I Residential Health-Based Drinking Water RBSLs

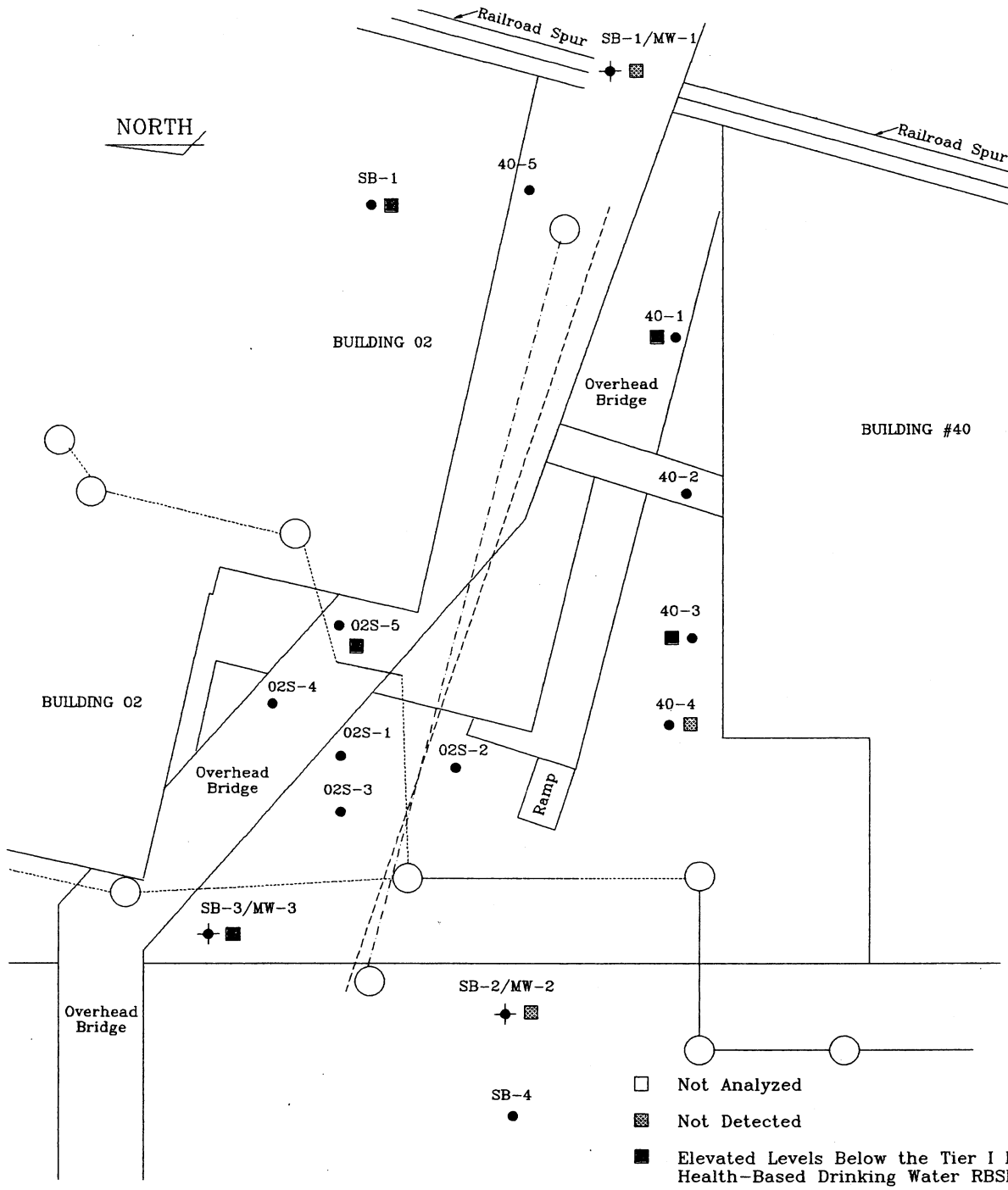
LEGEND:

- Geoprobe Sample Locations
- Monitoring Well Locations
- Fire Protection Line
- Sanitary Line
- Storm Sewer Line

GM-CLCD NORTH

TITLE: GROUNDWATER CONCENTRATION MAP: BENZENE
BUILDINGS 02 & 40
TANKS 67/02-70/02 & 71/40N-74/40N

SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9a
	PROJECT NUMBER: F174



Not Analyzed

Not Detected

Elevated Levels Below the Tier I Residential Health-Based Drinking Water RBSLs

Elevated Levels Above the Tier I Residential Health-Based Drinking Water RBSLs

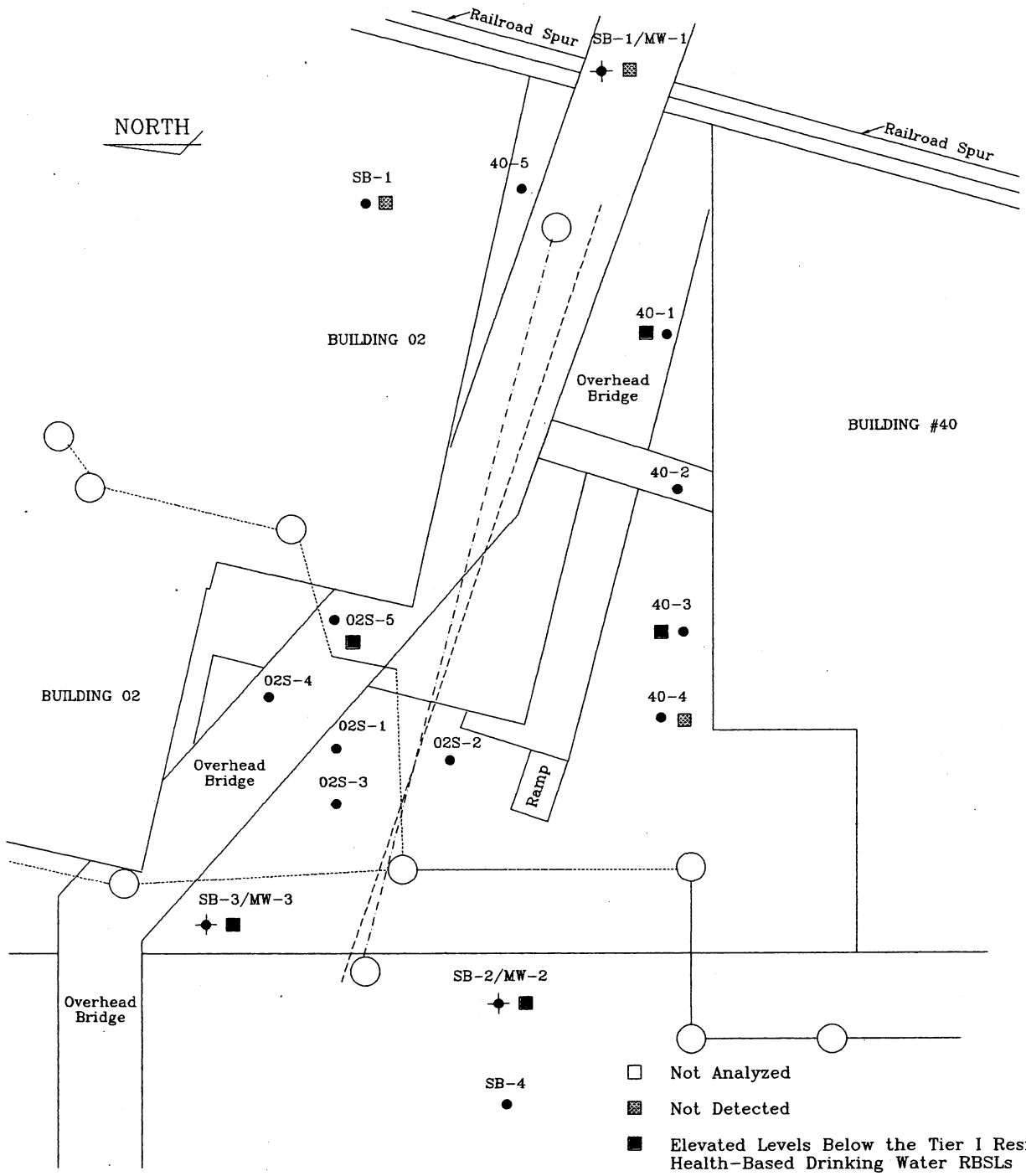
LEGEND:

- Geoprobe Sample Locations
- Monitoring Well Locations
- Fire Protection Line
- Sanitary Line
- Storm Sewer Line

GM-CLCD NORTH

TITLE: GROUNDWATER CONCENTRATION MAP: TOLUENE
BUILDINGS 02 & 40
TANKS 67/02-70/02 & 71/40N-74/40N

SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9b
	PROJECT NUMBER: F174



Not Analyzed

Not Detected

Elevated Levels Below the Tier I Residential Health-Based Drinking Water RBSLs

Elevated Levels Above the Tier I Residential Health-Based Drinking Water RBSLs

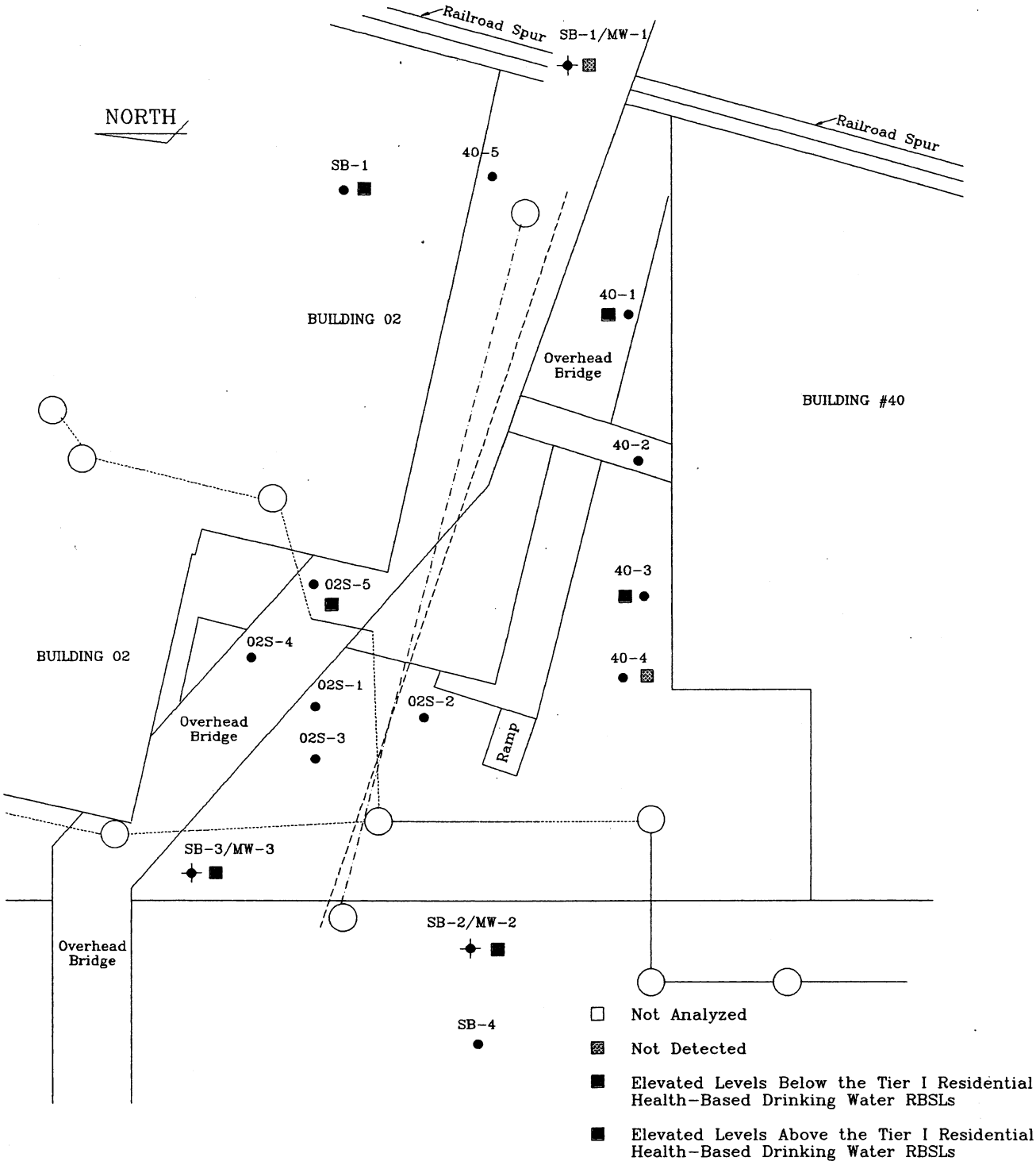
LEGEND:

- Geoprobe Sample Locations
- Monitoring Well Locations
- Fire Protection Line
- Sanitary Line
- Storm Sewer Line

GM-CLCD NORTH

TITLE: GROUNDWATER CONCENTRATION MAP: ETHYLBENZENE BUILDINGS 02 & 40 TANKS 67/02-70/02 & 71/40N-74/40N

SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9c
	PROJECT NUMBER: F174



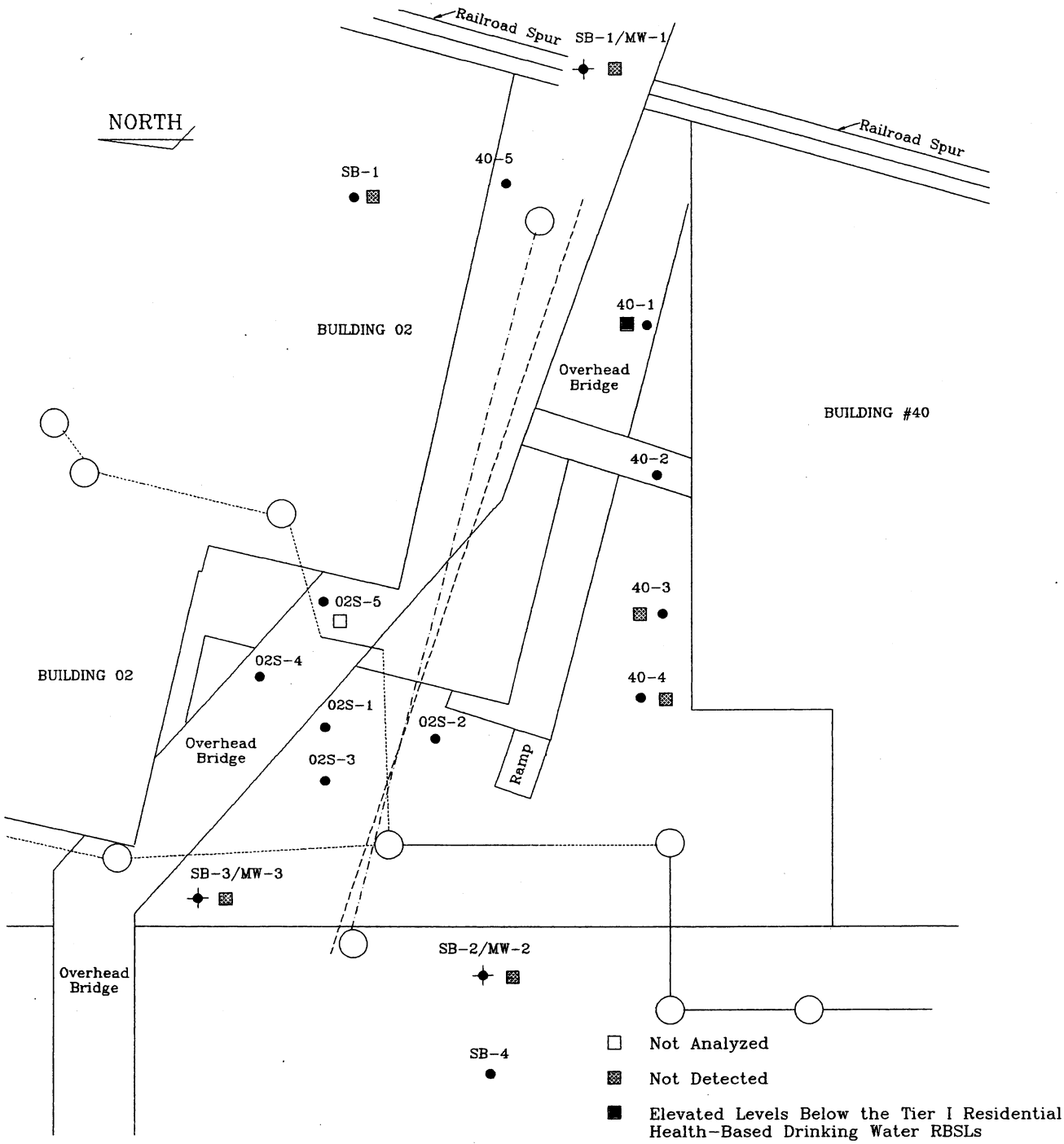
LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- -------- Sanitary Line
- —·—·— Storm Sewer Line

GM-CLCD NORTH

TITLE: GROUNDWATER CONCENTRATION MAP: XYLENES
BUILDINGS 02 & 40
TANKS 67/02-70/02 & 71/40N-74/40N

SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9d
	PROJECT NUMBER: F174



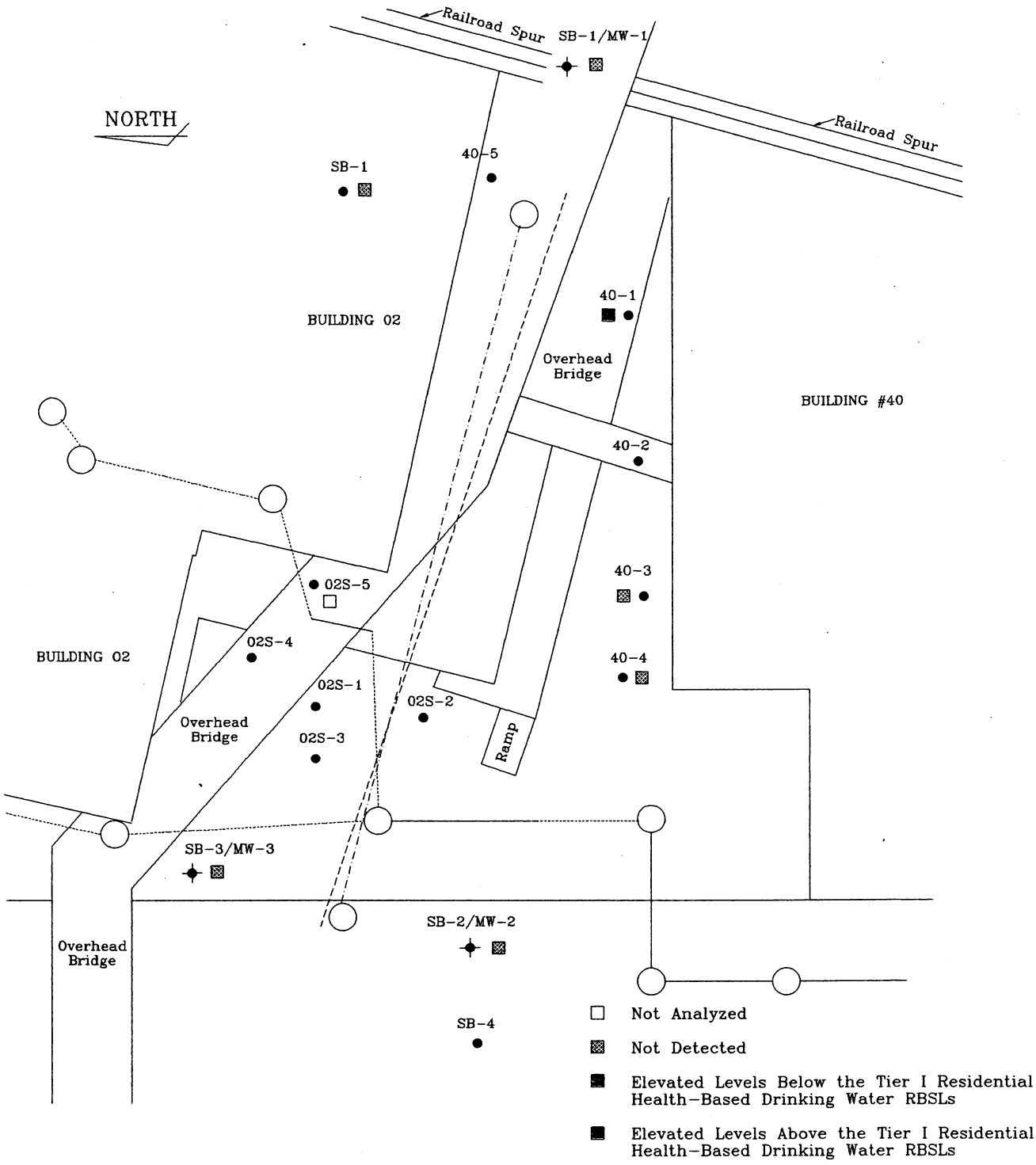
LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- ------- Sanitary Line
- —·—·— Storm Sewer Line

GM-CLCD NORTH

TITLE: GROUNDWATER CONCENTRATION MAP: NAPTHALENE
BUILDINGS 02 & 40
TANKS 67/02-70/02 & 70/40N-74/40N

SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9e
	PROJECT NUMBER: F174



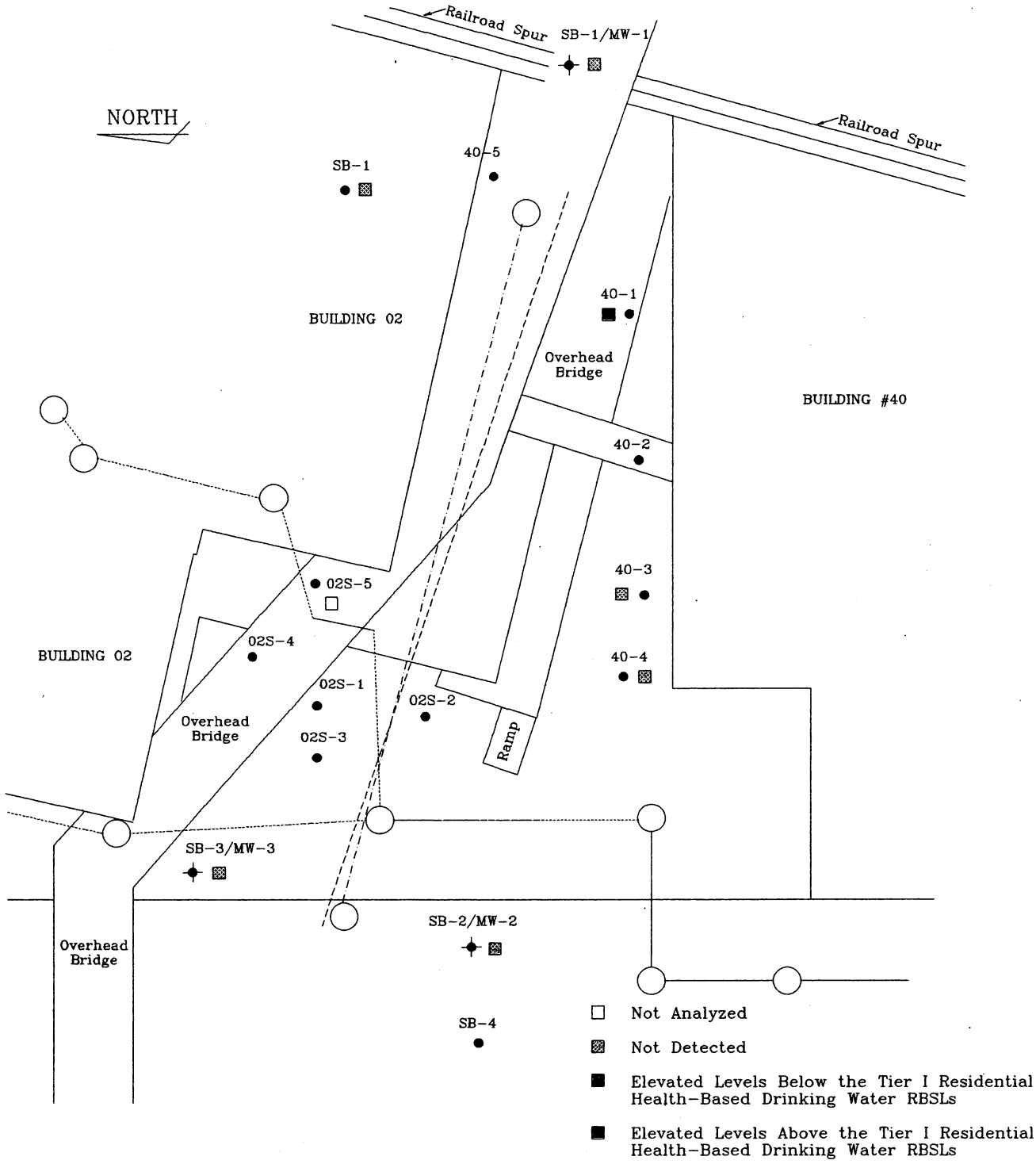
LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- ------- Sanitary Line
- —·—·— Storm Sewer Line

GM-CLCD NORTH

TITLE: GROUNDWATER CONCENTRATION MAP: 2-METHYLNAPHTHALENE BUILDINGS 02 & 40 TANKS 67/02-70/02 & 71/40N-74/40N

SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9f
	PROJECT NUMBER: F174



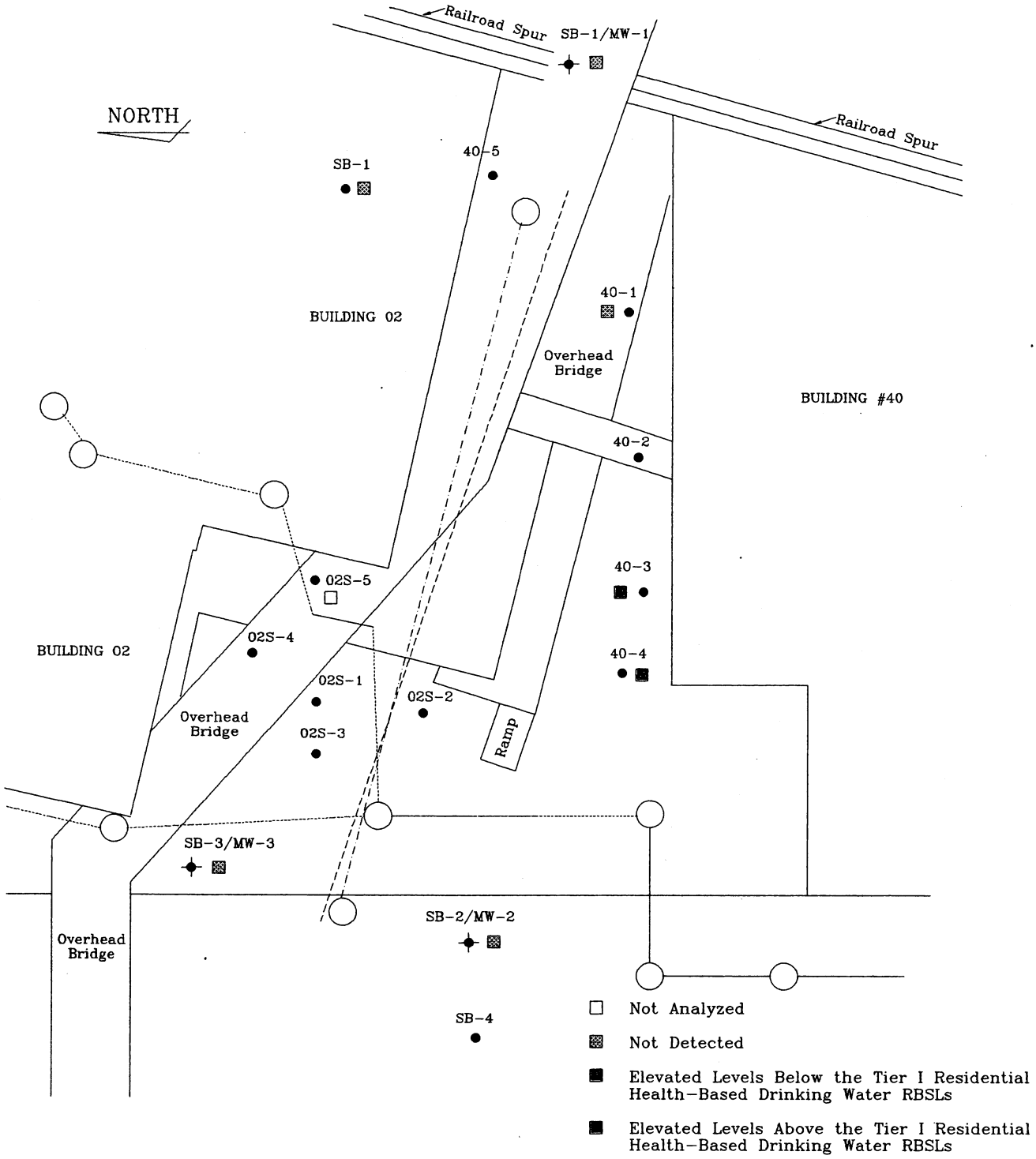
LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- ------- Sanitary Line
- —·—·— Storm Sewer Line

GM-CLCD NORTH

TITLE: GROUNDWATER CONCENTRATION MAP: 1,2-DICHLOROETHANE BUILDINGS 02 & 40 TANKS 67/02-70/02 & 71/40N-74/40N

SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9g
	PROJECT NUMBER: F174



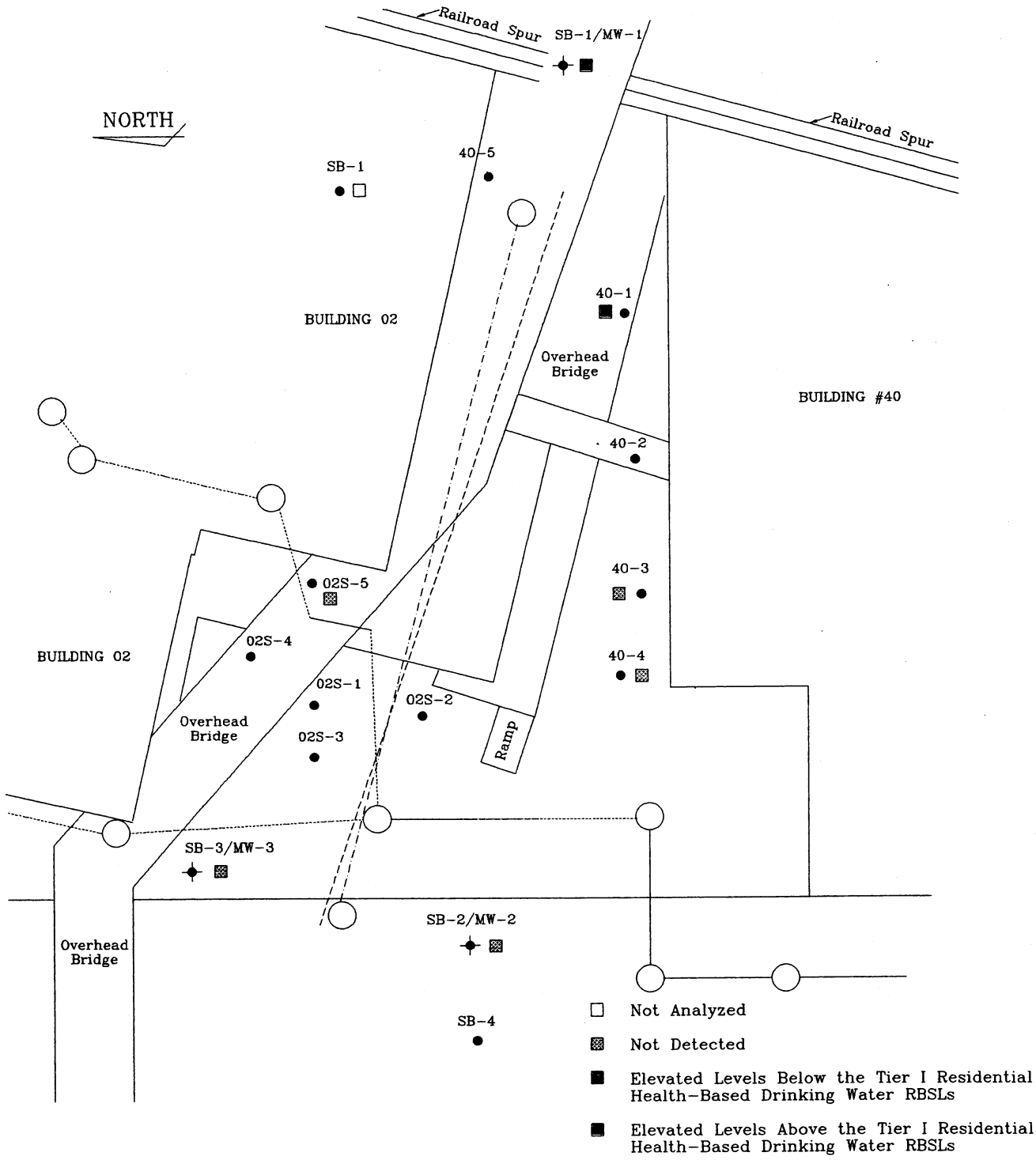
LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- ------- Sanitary Line
- -·-·- Storm Sewer Line

GM-CLCD NORTH

TITLE: GROUNDWATER CONCENTRATION MAP: 1,1-DICHLOROETHANE BUILDING 02 & 40 TANKS 67/02-70/02 & 71/40N-74/40N

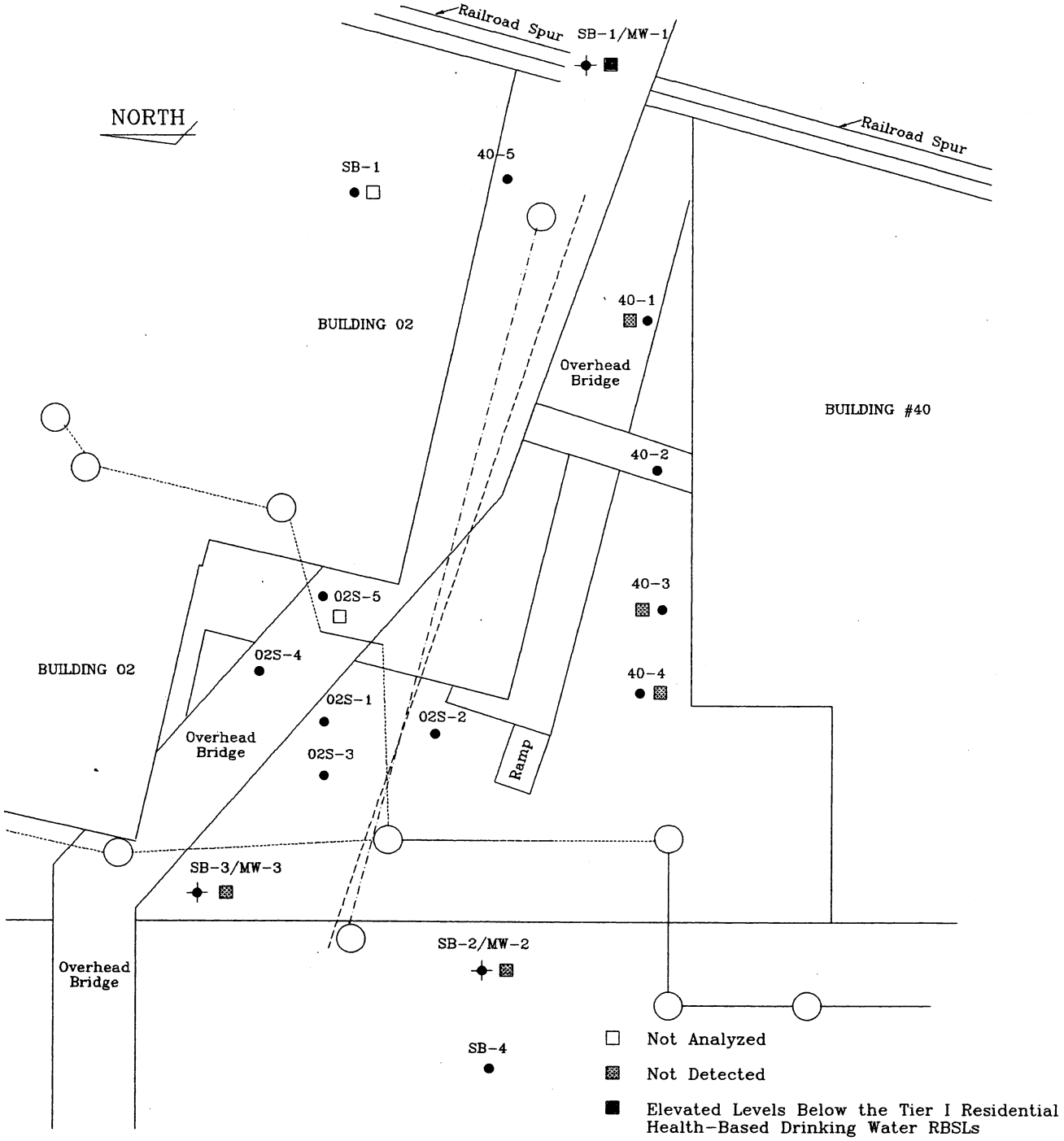
SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9h
	PROJECT NUMBER: F174



LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- ------ Sanitary Line
- —·—·— Storm Sewer Line

GM-CLCD NORTH	
TITLE: GROUNDWATER CONCENTRATION MAP: LEAD BUILDINGS 02 & 40 TANKS 67/02-70/02 & 71/40N-74/40N	
SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9i
	PROJECT NUMBER: F174



Not Analyzed

Not Detected

Elevated Levels Below the Tier I Residential Health-Based Drinking Water RBSLs

Elevated Levels Above the Tier I Residential Health-Based Drinking Water RBSLs

LEGEND:

- Geoprobe Sample Locations
- Monitoring Well Locations
- Fire Protection Line
- Sanitary Line
- Storm Sewer Line

GM-CLCD NORTH

TITLE: GROUNDWATER CONCENTRATION MAP: CHROMIUM
BUILDING 02 & 40
TANKS 67/02-70/02 & 71/40N-74/40N

SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 9j
	PROJECT NUMBER: F174

ATTACHMENT 10

Global Environmental Engineering Inc.
5467 Hill 23 Drive, Suite B
Flint, Michigan 48507
Tel: (810) 238-9190
Fax: (810) 238-9195

Monitoring Well:	MW-1	Project Name:	GM-CLCD N.
Date:	11/8/96	Project No.:	F174
Contractor:	GEEI	Location:	Building 40/02 South
Prepared By:	JCW	Twp/Range/Sec.:	
Time Started:	12:45	Depth Drilled:	12'
Time Completed:		Hole Diamater:	8.25"
Coring Device:	5'	Inner Diamater:	4.50"
		Drilling Fluid:	None
		Driller:	Elroy
		Helper:	NA

Boring Methods

X	Hollow Stem Auger
	Hand Auger
	Geoprobe

Water Level Data

Date	SWL Elevation

WELL SPECIFICATIONS

Well Casing Cover:

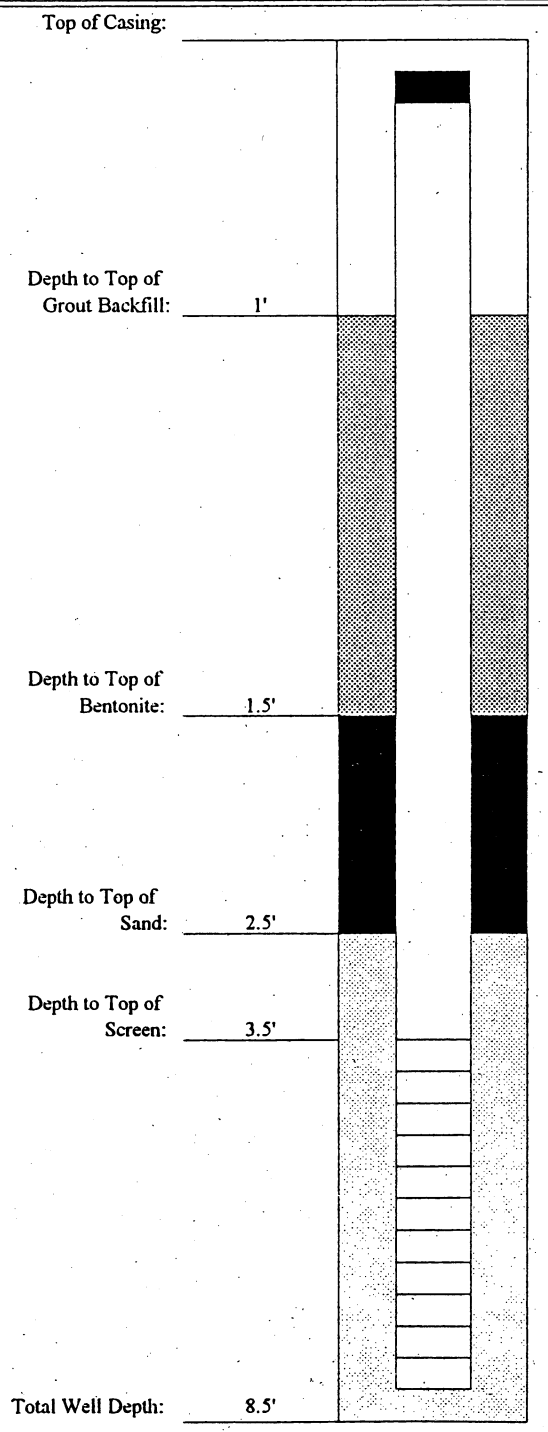
Material:	Steel
Diamater:	12"
Length:	12"
Lock:	No

Well Casing:

Diamater:	2"
Length:	3.5'
Material:	PVC
Cap:	Expandable
Locking:	Dolphin

Well Screen

Diamater:	2"
Length:	5'
Slotsize:	.01"
Material:	PVC
Well Screen Interval:	3.5'-8.5'
Filter Pack:	Sand



SOIL PROFILE

0'-9.5' - Sand

9.5'-12' - Clay

Groundwater Encountered at 5'

End of Boring 12'

Global Environmental Engineering Inc.
5467 Hill 23 Drive, Suite B
Flint, Michigan 48507
Tel: (810) 238-9190
Fax: (810) 238-9195

Monitoring Well:	MW-2	Project Name:	GM-CLCD N.
Date:	11/8/96	Project No.:	F174
Contractor:	GEEI	Location:	Building 40/02 South
Prepared By:	JCW	Twp/Range/Sec.:	
Time Started:	14:50	Depth Drilled:	16'
Time Completed:		Hole Diamater:	8.25"
Coring Device:	5'	Inner Diamater:	4.50"
		Drilling Fluid:	None
		Driller:	Elroy
		Helper:	NA

Boring Methods		Water Level Data	
X	Hollow Stem Auger	Date	SWL Elevation
	Hand Auger		
	Geoprobe		

WELL SPECIFICATIONS

Well Casing Cover:

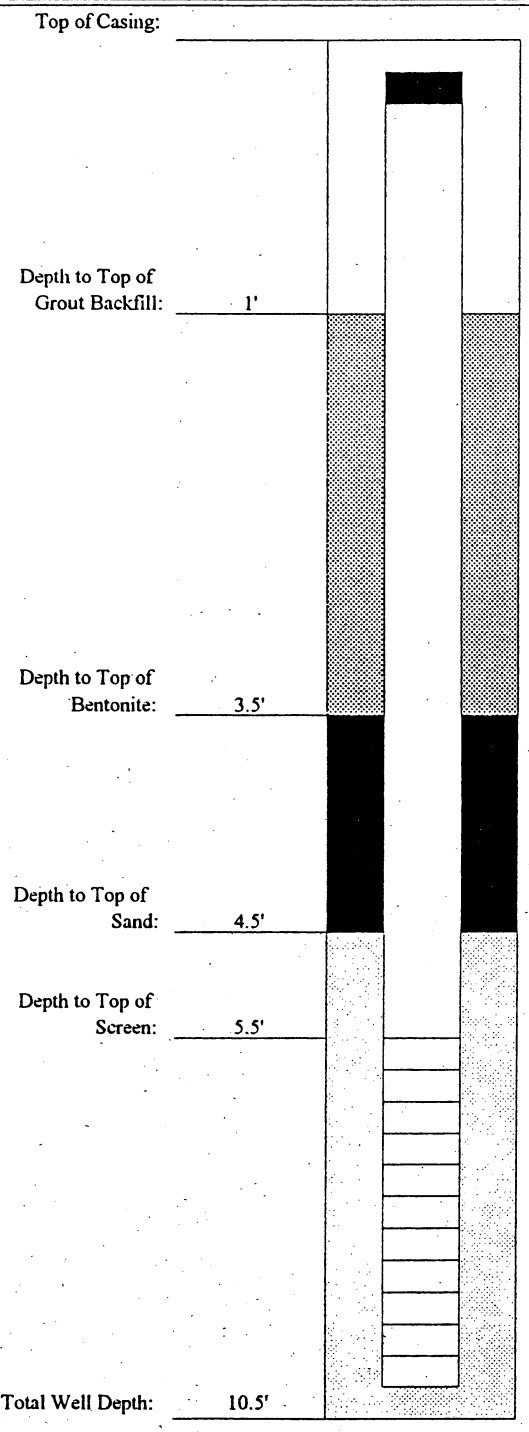
Material:	Steel
Diamater:	12"
Length:	12"
Lock:	No

Well Casing:

Diamater:	2"
Length:	5.5'
Material:	PVC
Cap:	Expandable
Locking:	Dolphin

Well Screen

Diamater:	2"
Length:	5'
Slotsize:	.01"
Material:	PVC
Well Screen Interval:	5.5'-10.5'
Filter Pack:	Sand



SOIL PROFILE

0'-4.5' - Sandy Clay

4.5'-6.5' - Clay

6.5'-10' Sandy Clay

Groundwater Encountered at 6.5'

End of Boring 16'

Global Environmental Engineering Inc.
5467 Hill 23 Drive, Suite B
Flint, Michigan 48507
Tel: (810) 238-9190
Fax: (810) 238-9195

Monitoring Well:	MW-3	Project Name:	GM-CLCD N.
Date:	12/10/96	Project No.:	F174
Contractor:	YECI	Location:	Building 40/02 South
Prepared By:	JCW	Twp/Range/Sec.:	
Time Started:	14:15	Depth Drilled:	21'
Time Completed:		Hole Diamater:	8.25"
Coring Device:	5'	Inner Diamater:	4.50"
		Drilling Fluid:	None
		Driller:	Scott
		Helper:	NA

Boring Methods		Water Level Data	
	Hollow Stem Auger	Date	SWL Elevation
	Hand Auger		
X	Geoprobe		

WELL SPECIFICATIONS

Well Casing Cover:

Material:	Steel
Diamater:	12"
Length:	12"
Lock:	No

Well Casing:

Diamater:	2"
Length:	12'
Material:	PVC
Cap:	Expandable
Locking:	Dolphin

Well Screen

Diamater:	2"
Length:	5'
Slotsize:	.01"
Material:	PVC
Well Screen Interval:	5'
Filter Pack:	Sand

Top of Casing:

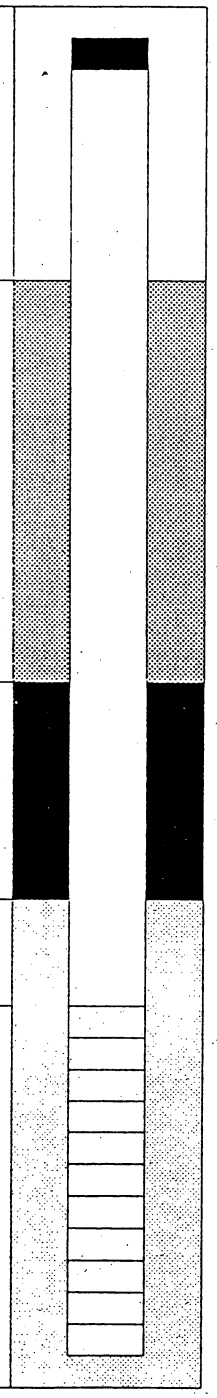
Depth to Top of Grout Backfill: 1'

Depth to Top of Bentonite: 10'

Depth to Top of Sand: 11'

Depth to Top of Screen: 12'

Total Well Depth: 17'



SOIL PROFILE

0'-.5' - Concrete

.5'-4.5' - Sand

4.5'-6' - Clay

6'-9' - Sandy Clay

9'-12.5' - Silty Clay

12.5'-13.5' - Sandy Silt

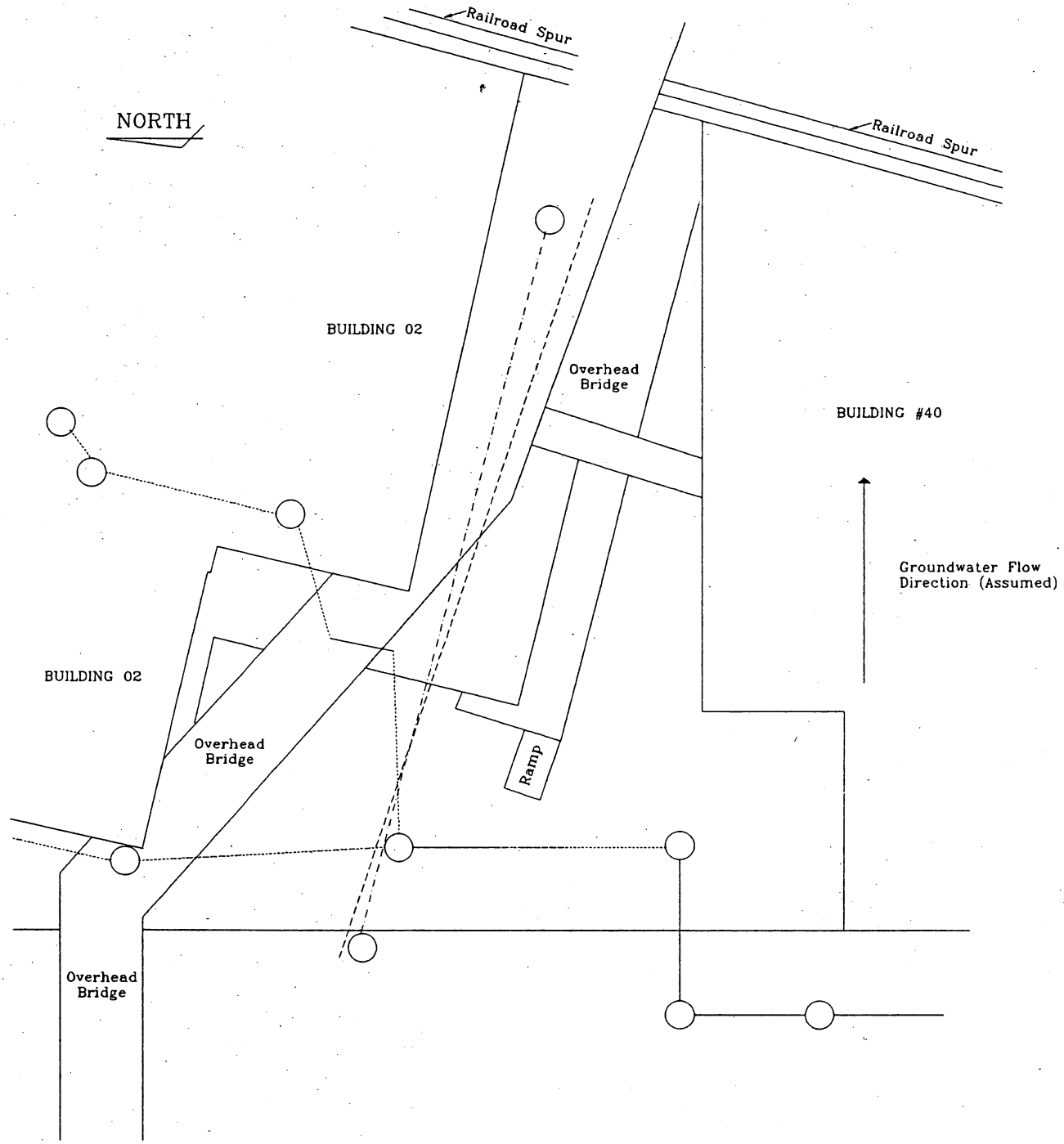
13.5'-17' - Sandy Silt

17'-19' - Silt

19'-21' - Sand

End of Boring 21'

ATTACHMENT 11



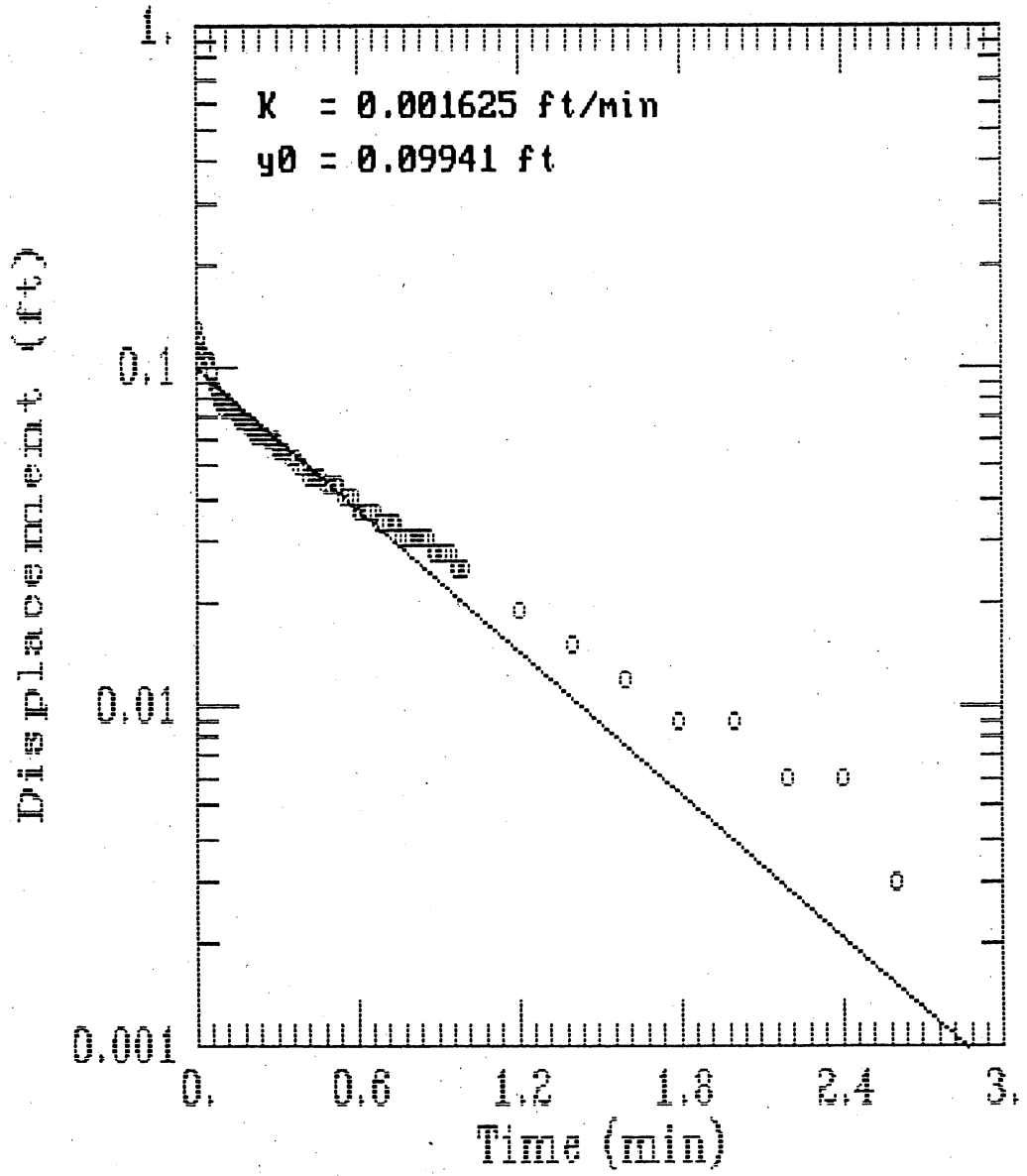
LEGEND:

- ● Geoprobe Sample Locations
- ✦ Monitoring Well Locations
- ---- Fire Protection Line
- ------ Sanitary Line
- -·-·- Storm Sewer Line

GM-CLCD NORTH	
TITLE: GROUNDWATER FLOW MAP BUILDINGS 02 & 40 TANKS 67/02-70/02 & 71/40N-74/40N	
SCALE: 1"=50'	DATE: 4/29/97
Global Environmental Engineering Inc.	APPROVED BY: A.L.K.
	PREPARED BY: C.G.S.
	ATTACHMENT NUMBER: 11
	PROJECT NUMBER: F174

ATTACHMENT 12

BUILDING 40/02 - MW3



AQTESOLV

GERAGHTY & MILLER, INC.

Modeling Group

AQTESOLV RESULTS
Version 1.10

07/25/97 15:02:08

TEST DESCRIPTION

Data set..... gm40mw3n.dat
Data set title..... BUILDING 40/02 - MW3

Knowns and Constants:
- No. of data points..... 88
- Radius of well casing..... 0.08333
- Radius of well..... 0.3333
- Aquifer saturated thickness..... 6
- Well screen length..... 5
- Static height of water in well..... 2.91
- Log(Re/Rw)..... 1.455
- A, B, C..... 2.021, 0.301, 0.000

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

RESULTS FROM STATISTICAL CURVE MATCHING

STATISTICAL MATCH PARAMETER ESTIMATES

	Estimate		Std. Error
K =	1.6251E-003	+/-	5.9071E-005
y0 =	9.9414E-002	+/-	1.7421E-003

ANALYSIS OF MODEL RESIDUALS

residual = calculated - observed
weighted residual = residual * weight

Weighted Residual Statistics:
- Number of residuals..... 88
- Number of estimated parameters.... 2
- Degrees of freedom..... 86
- Residual mean..... 0.0005688
- Residual standard deviation..... 0.006431
- Residual variance..... 4.136E-005

Model Residuals:

Time	Observed	Calculated	Residual	Weight
0.0083	0.129	0.098096	0.030904	1
0.0166	0.119	0.096796	0.022204	1
0.025	0.11	0.095497	0.014503	1
0.0333	0.107	0.094231	0.012769	1
0.0416	0.104	0.092982	0.011018	1
0.05	0.104	0.091735	0.012265	1
0.0583	0.094	0.090519	0.0034812	1
0.0666	0.088	0.089319	-0.0013188	1
0.075	0.085	0.088121	-0.0031206	1
0.0833	0.082	0.086952	-0.0049524	1
0.0916	0.078	0.0858	-0.0077997	1
0.1	0.078	0.084649	-0.0066487	1
0.1083	0.075	0.083527	-0.0085266	1
0.1166	0.078	0.082419	-0.0044193	1
0.125	0.075	0.081314	-0.0063136	1
0.1333	0.075	0.080236	-0.0052357	1
0.1416	0.072	0.079172	-0.007172	1
0.15	0.072	0.07811	-0.0061099	1
0.1583	0.072	0.077074	-0.0050744	1
0.1666	0.069	0.076053	-0.0070527	1
0.175	0.069	0.075032	-0.0060324	1
0.1833	0.069	0.074038	-0.0050377	1
0.1916	0.069	0.073056	-0.0040562	1
0.2	0.066	0.072076	-0.0060762	1
0.2083	0.066	0.071121	-0.0051207	1
0.2166	0.066	0.070178	-0.0041779	1
0.225	0.063	0.069236	-0.0062364	1
0.2333	0.063	0.068319	-0.0053186	1
0.2416	0.063	0.067413	-0.0044129	1
0.25	0.063	0.066509	-0.0035085	1
0.2583	0.063	0.065627	-0.0026269	1
0.2666	0.06	0.064757	-0.0047569	1
0.275	0.06	0.063888	-0.0038881	1
0.2833	0.06	0.063041	-0.0030412	1
0.2916	0.06	0.062205	-0.0022055	1
0.3	0.056	0.061371	-0.005371	1
0.3083	0.056	0.060557	-0.0045574	1
0.3166	0.056	0.059755	-0.0037546	1
0.325	0.056	0.058953	-0.002953	1
0.3333	0.056	0.058171	-0.0021715	1
0.35	0.053	0.05663	-0.0036303	1
0.3666	0.053	0.055139	-0.0021388	1
0.3833	0.05	0.053678	-0.0036779	1

0.4	0.05	0.052256	-0.0022558	1
0.4166	0.047	0.05088	-0.0038795	1
0.4333	0.047	0.049532	-0.0025315	1
0.45	0.047	0.048219	-0.0012192	1
0.4666	0.047	0.046949	5.0759E-005	1
0.4833	0.044	0.045705	-0.0017054	1
0.5	0.044	0.044494	-0.00049445	1
0.5166	0.044	0.043323	0.00067743	1
0.5333	0.044	0.042175	0.0018252	1
0.55	0.041	0.041057	-5.7405E-005	1
0.5666	0.041	0.039976	0.0010239	1
0.5833	0.041	0.038917	0.0020831	1
0.6	0.037	0.037886	-0.00088586	1
0.6166	0.037	0.036888	0.00011196	1
0.6333	0.037	0.035911	0.0010893	1
0.65	0.037	0.034959	0.0020407	1
0.6666	0.037	0.034039	0.0029614	1
0.6833	0.034	0.033137	0.00086325	1
0.7	0.034	0.032259	0.0017412	1
0.7166	0.034	0.031409	0.0025908	1
0.7333	0.034	0.030577	0.0034229	1
0.75	0.034	0.029767	0.0042331	1
0.7666	0.031	0.028983	0.002017	1
0.7833	0.031	0.028215	0.0027849	1
0.8	0.031	0.027468	0.0035325	1
0.8166	0.031	0.026744	0.0042559	1
0.8333	0.031	0.026036	0.0049644	1
0.85	0.031	0.025346	0.0056542	1
0.8666	0.031	0.024678	0.0063218	1
0.8833	0.028	0.024024	0.0039756	1
0.9	0.028	0.023388	0.0046121	1
0.9166	0.028	0.022772	0.0052281	1
0.9333	0.028	0.022169	0.0058314	1
0.95	0.028	0.021581	0.0064187	1
0.9666	0.025	0.021013	0.0039871	1
0.9833	0.025	0.020456	0.0045438	1
1	0.025	0.019914	0.0050858	1
1.2	0.019	0.014438	0.0045621	1
1.4	0.015	0.010468	0.0045324	1
1.6	0.012	0.0075891	0.0044109	1
1.8	0.009	0.0055022	0.0034978	1
2	0.009	0.0039891	0.0050109	1
2.2	0.006	0.0028921	0.0031079	1
2.4	0.006	0.0020968	0.0039032	1
2.6	0.003	0.0015202	0.0014798	1

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

	Estimate
K =	1.6251E-003
y0 =	9.9414E-002

BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Appendix I - Supplemental Information - Former Tank Farm 94

General Motors Corporation
Powertrain Group
902 East Hamilton Avenue
Flint, Michigan 48550

Former Tank Farm 94
Document Review

Global Environmental Engineering Inc.
Project No. F298

October 13, 1997

October 13, 1997

Ms. Lynn Niedzwiecki
GM Powertrain Group
902 East Hamilton Avenue
Flint, Michigan 48550
Mail Code: 485-184-151

RE: Former Tank Farm 94
CLCD North - Building 84

Dear Ms. Niedzwiecki:

Enclosed please find the Report summarizing the file review and recent groundwater sample analytical results for the former UST Tank Farm 94.

If you have any questions or require any additional information please feel free to contact me at (810) 238-9190.

Sincerely,

GLOBAL ENVIRONMENTAL ENGINEERING INC.

Mark W. Keyes
Project Manager

enclosures.

cc: Robert Metcalf
Ed Biessel

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1.0 INTRODUCTION

Global Environmental Engineering Inc. (Global) was retained by General Motors Corporation, Powertrain Group (GMPTG) to review the existing files relating to the former Tank Farm 94 and prepare a chronology of site activities. Tank Farm 94 was associated with Building 84, located at 902 East Hamilton Avenue, Flint, Michigan.

2.0 FILE REVIEW

The UST locations and soil borings completed by WW Engineering & Sciences, 1992 investigation is illustrated on Figure 1. The results of the soil remediation and verification sample locations collected by Woodward Clyde, 1995, are illustrated on Figure 2. A summary of the groundwater and soil sample analytical results is presented in Tables 1 and 2, and a summary of the Michigan Department of Environmental Quality Risk Based Screening Levels is presented in Tables 3 and 4. A summary of the UST contents, date of installation and capacities is contained in Table A.

2.1 Available Documents

The following documents relating to Tank Farm 94 were made available by GMPTG and reviewed by Global:

October 20, 1992	-	"Remedial Subsurface Investigation Report," WW Engineering & Science
February 17, 1994	-	"Status Report Soil and Groundwater Remediation Tank Farm 94," Advanced Environmental, Inc.
June 9, 1994	-	"Corrective Action Plan and Soil and Groundwater Feasibility Analysis GM Former Tank Farm 94," Advanced Environmental, Inc.
April 21, 1995	-	"Soil Investigation, Engine Test Cell Addition," Construction Testing Services, Inc.
March 1, 1996	-	Excavation Soil Sampling Summary Report, Buick V6," Woodward-Clyde Consultants.
March 6, 1996	-	Extraction Well sample analytical results.
March 25, 1997	-	Extraction Well sample analytical results.

2.2 Chronology

The former Tank Farm 94 consisted of 10 underground storage tanks (USTs) used to store various grades of gasoline and stoddard solvent. The capacity, date of installation and contents of the Tank Farm 94 USTs were detailed on Buick Motor Division Storage Tank Layout drawing number 42361 - M, drawn in 1973, last revised in 1983. Table A summarizes the UST information:

Table A
Former Tank Farm 94 - UST Summary

UST No.	Capacity (gallons)	Year Installed	Contents
94	6000	1972	Lead Free Gasoline
95	6000	1972	Lead Free Gasoline
96	6000	1972	Nonusable Waste Storage
97	6000	1971	Stoddard Solvent
98	6000	1971	Return Flow from Tank #97
99	15,000	1971	GM 6141
100	6000	1966	Indolene Clear
101	15,000	1954	Indolene Clear
102	15,000	1954	GM 6141
103	5000	1959	Indolene 30

In November 1989, eight groundwater monitoring wells were installed as part of a leak detection system. Sampling of the wells in December 1989, indicated a release from the UST system. In February 1990, the USTs were tightness tested and the release was confirmed. The USTs were then emptied, cleaned and temporarily filled with water. A confirmed release was reported on February 16, 1990. An Initial Abatement Report, an Initial Site Characterization Report, and a

Free Product Recovery Report were submitted to the Michigan State Police/Fire Marshal Division on April 30, 1991

From May to July 1991, nine of the USTs were removed and one of the USTs was closed in place. Tank number 98 was left in place. The location of the former USTs is illustrated on the attached Figure 1.

In June 1992, WW Engineering & Science, Inc. completed a investigation to delineate the horizontal and vertical extent of soil and groundwater impact related to the release. WW Engineering & Science, Inc. concluded that additional investigation was not necessary and a feasibility analysis be conducted to select a corrective action. Several remediation options were discussed, however, no specific corrective action was proposed.

In February 1994, Advanced Environmental, Inc. prepared a Status Report summarizing the previous investigations and compared the existing data to the then applicable Michigan Department of Natural Resources (MDNR) Type C closure criteria. In June 1994, Advanced Environmental, Inc. prepared a Corrective Action Plan and Soil and Groundwater Feasibility Analysis. Due to a proposed building addition to be constructed in the zone of impact, the closure objectives were changed from a Type C closure to a Type B closure. The Corrective Action Plan was designed to remediate the release to MDNR Type B cleanup criteria, utilizing a pump and treat groundwater remediation system with limited soil excavation and disposal. (Note that the Type B criteria has been replaced with the current categories and criteria established under Part 213 of NREPA.)

From December 1995 to January 1996, approximately 5200 cubic yards of soil were excavated from the former UST area and treated on-site by thermal desorption. During the soil removal all of the monitoring wells, except MW15, installed by WW Engineering & Sciences were removed. Soil samples collected by Woodward-Clyde Consultants from the excavation indicated elevated petroleum concentrations above the Tier I Industrial direct contact cleanup criteria in one location (SBT-10-10). Following the completion of the soil removal three groundwater extraction wells (EW101, EW102, and EW103) were installed and plumbed to the exiting tank farm collection sump, in preparation for operating the groundwater treatment system. In February 1996, pumps were installed in the three wells. The pumps were then operated only long enough to purge the wells

and collect groundwater samples. The City of Flint was contacted regarding discharge of the treated groundwater to both the sanitary and/or the storm sewers, however because of permitting restrictions neither option was available and the pumps were not operated. Figure 2 illustrates the location of the excavation samples and extraction wells.

3.0 SITE MONITORING

The locations of the remaining groundwater monitoring and extraction wells are illustrated on Figure 3.

3.1 Groundwater Monitoring Well Installation

In February 1997, Global drilled three soil borings to complete the delineation of the UST investigation. Two of the soil borings were converted into groundwater monitoring wells to determine the current groundwater conditions and the third soil boring (EW104) was drilled to resample the elevated excavation sample, SBT-10-10. Global collected groundwater samples in March 1997, from the two new wells (EW105 and EW106), the three extraction wells (EW101 - EW103) and one of the original investigation wells (MW15). Of the original groundwater monitoring wells installed by WW Engineering & Sciences, Inc. only MW15, located to the north of Building 84B was still intact. The original groundwater monitoring wells were removed during the soil remediation.

3.2 Sample Collection and Analytical Results

Groundwater data indicated elevated levels of benzene (27μg/l) in EW102 and MTBE (97μg/l) in EW106. Only the elevated benzene concentration exceeds the MDEQ Health Based Drinking Water Cleanup Criteria, but is below the Industrial Direct Contact Criteria. Well locations are illustrated on the attached Figure 3. The March 1997 groundwater analytical results are presented in Table 1.

4.0 CONCLUSION

Based on the March 1997, analytical results of the groundwater, the project will be incorporated into a site wide quarterly monitoring program until such a time as the site meets a suitable closure criteria.

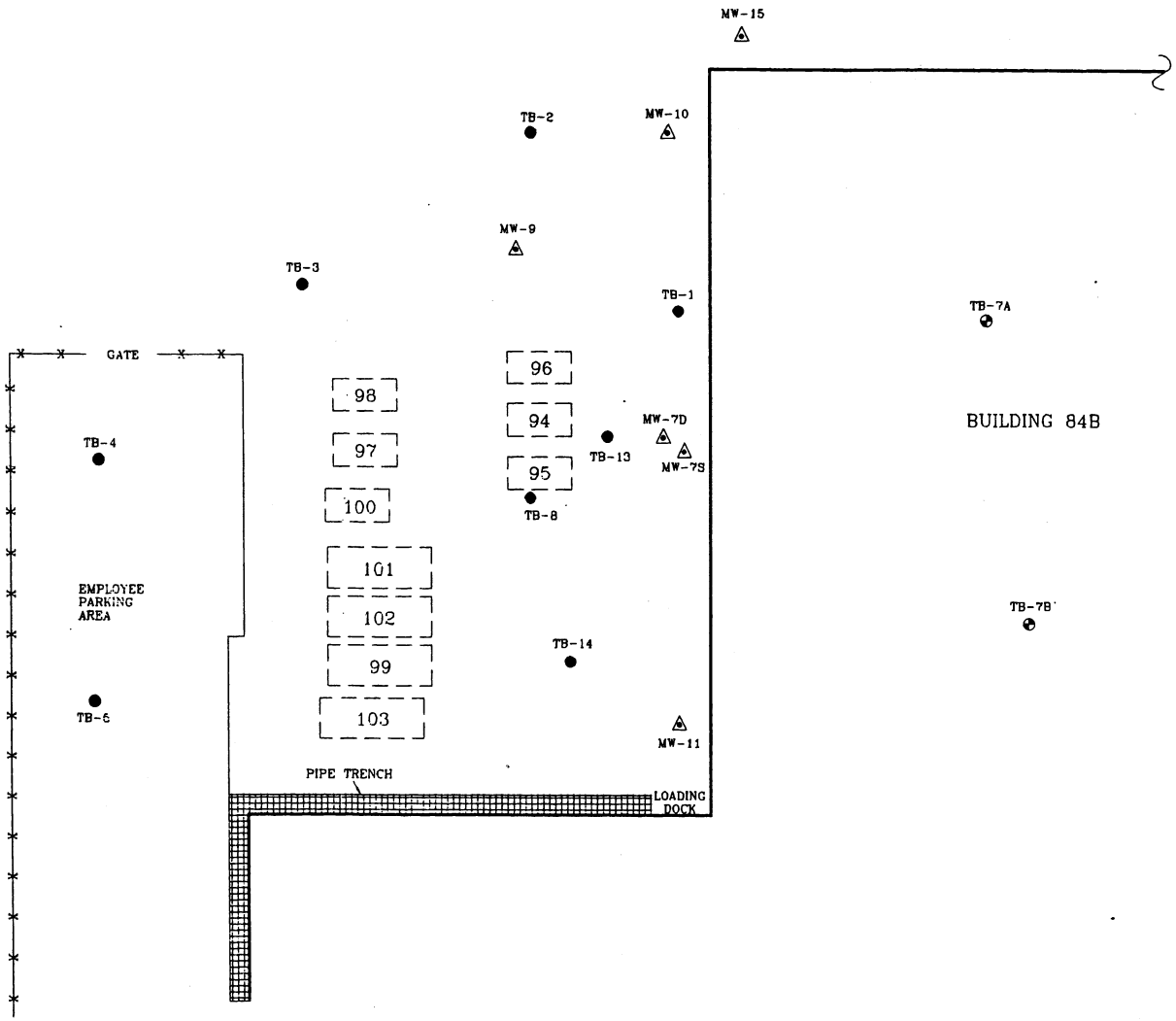
5.0 SIGNATURE

The information contained in this report for the GMPTG is based on documents provided by GM and recent site investigation activities:

Prepared by : _____
Mark W. Keyes, Project Manager

Reviewed by : _____
Amanda L. Kurzman, Project Manager

Date: October 13, 1997



NORTH

UST	Contents	
94	Gasoline	Lead Free Gasoline
95	Gasoline	Lead Free Gasoline
96	Non Usable	Waste Storage
97	Gasoline	Stoddard Solvent
98	Varsol Stoddard	Return Flow from #97
99	Gasoline	GM 6141
100	Gasoline	Indolene Clear
101	Howell EEE	Indolene Clear
102	Howell EEE	GM 6141
103	Regular Gasoline	Indolene 30

LEGEND:

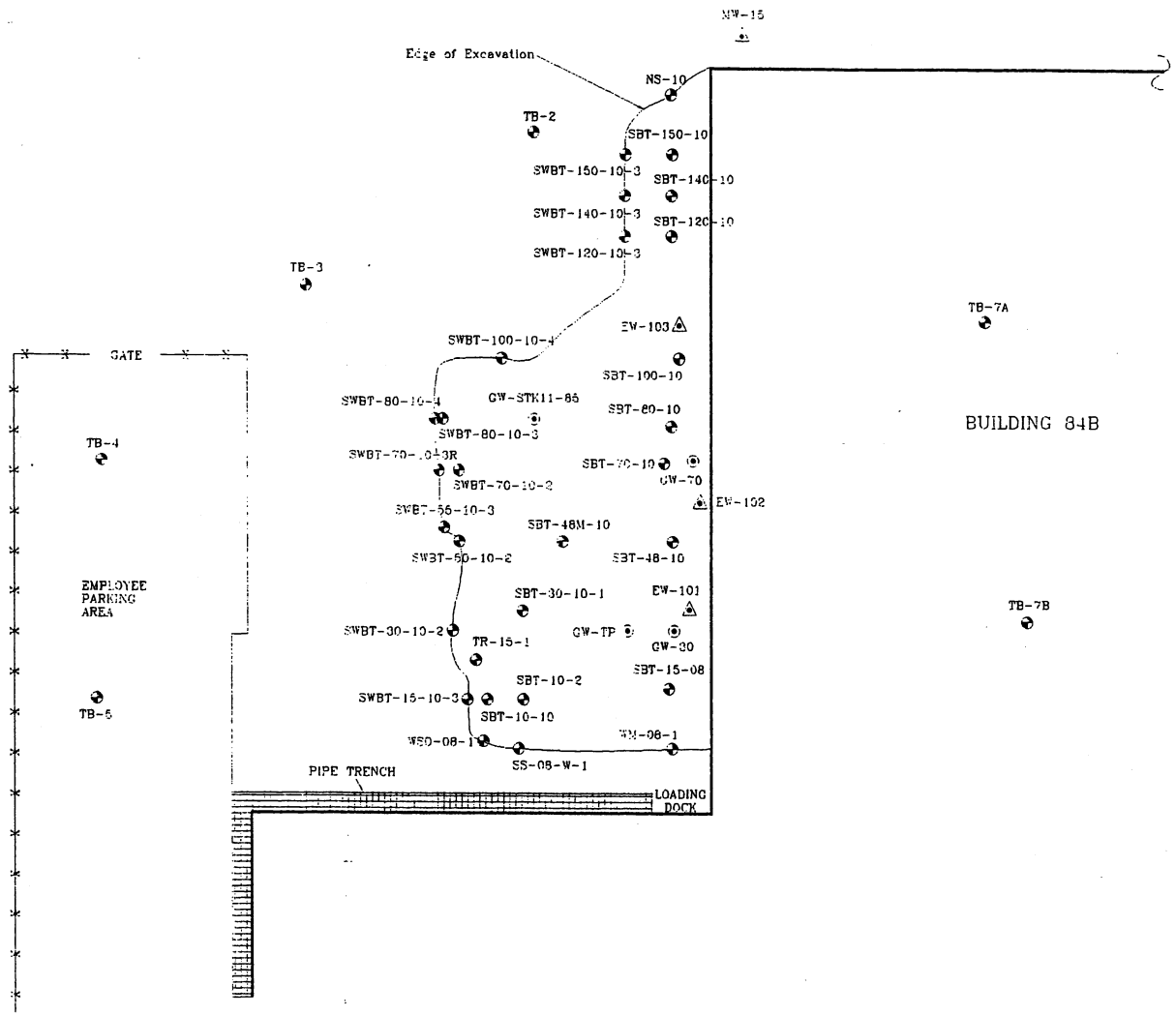
- ● Soil Boring Locations
- △ Monitoring Well Locations
- X X Fence (TYP.)
- ⊏⊐ Underground Storage Tanks

WW Engineering & Science 1992 Investigation

GM TANK FARM #94

TITLE: SOIL BORING & MONITORING WELL LOCATIONS
FORMER TANK FARM #94
FLINT, MICHIGAN

DATE: 6/5/97	SCALE: 1"=~~40'~~ Reduced
Global Environmental Engineering Inc.	APPROVED BY: M.W.K.
	PREPARED BY: C.G.S.
	FIGURE NUMBER: 1
	PROJECT NUMBER: F298



LEGEND:

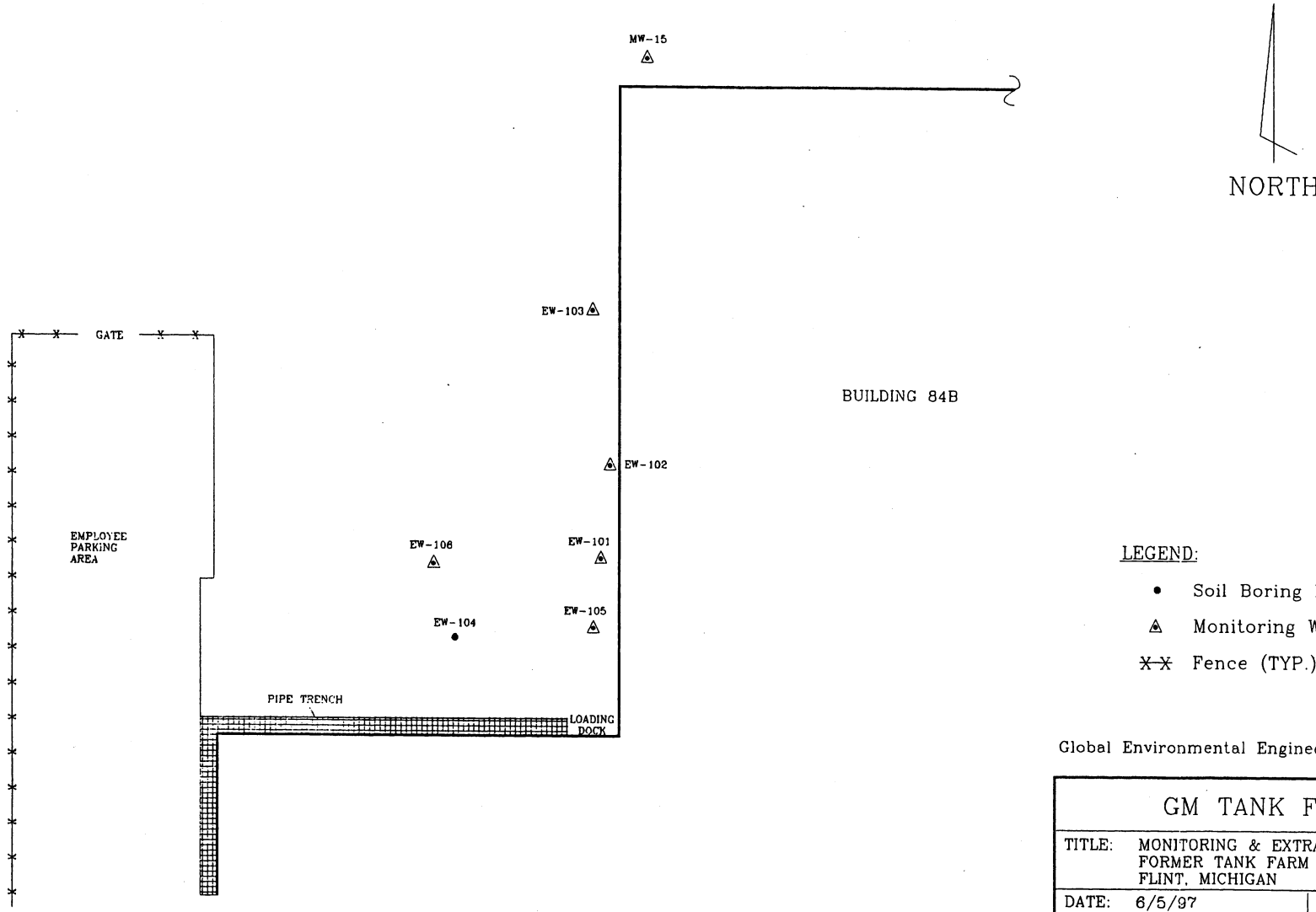
- Soil Sample Locations
- Water Sample Locations
- Monitoring Well Locations
- ~~X X~~ Fence (TYP.)

Woodward Clyde 1995 Soil Remediation

GM TANK FARM #94

TITLE: SOIL REMEDIATION/VERIFICATION SAMPLE LOCATIONS
FORMER TANK FARM #94
FLINT, MICHIGAN

DATE: 6/5/97	SCALE: 1"=~~10'~~ Reduced
Global Environmental Engineering Inc.	APPROVED BY: M.W.K.
	PREPARED BY: C.G.S.
	FIGURE NUMBER: 2
	PROJECT NUMBER: F298



LEGEND:

- • Soil Boring Location
- ▲ Monitoring Well Locations
- X-X Fence (TYP.)

Global Environmental Engineering 1997 Investigation

GM TANK FARM #94	
TITLE: MONITORING & EXTRACTION WELL LOCATIONS FORMER TANK FARM #94 FLINT, MICHIGAN	
DATE: 6/5/97	SCALE: 1"=~~40'~~ Reduced
Global Environmental Engineering Inc.	APPROVED BY: M.W.K.
	PREPARED BY: C.G.S.
	FIGURE NUMBER: 3
	PROJECT NUMBER: F298

TANK FARM 94
GENERAL MOTORS CORPORATION - FLINT, MICHIGAN
TABLE 1: GROUNDWATER LABORATORAY ANALYTICAL RESULT SUMMARY

Sample ID	Date	Sample Analytical Parameters (reported in ug/l)							
		Benzene	Toluene	Ethylbenzene	Xylene	MTBE	PNAs	Solvents	Lead
Samples collected during WW Engineering & Science Investigation									
TB-13	7/14/92	10,525	2,350	2,950	9,475	NA	Naphthalene 41	NA	66
MW-11/WS-1	7/28/92	ND	ND	ND	ND	51	ND	ND	ND
MW-10/WS-1	7/28/92	60	58	1,000	ND	ND	Napthalene 100	ND	ND
MW-9/WS-1 (Dup)	7/28/92	25	1.6	ND	ND	ND	ND	ND	ND
MW-9/WS-1	7/28/92	28	1.7	ND	ND	ND	ND	Vinyl Chloride 5.4	ND
MW-7D/WS-1	7/28/92	ND	ND	ND	12,000	ND	ND	ND	ND
MW-7S/WS-1	7/28/92	3,100	660	3,700	MISS	MISS	Naphthalene 120	MISS	ND
Bldg 84b SB-7B Test Site #4	5/9/92	ND	ND	ND	ND	ND	NA	1,2-Dichloroethene 4.0 Methylene Chloride 11 Vinyl Chloride 4.0	ND
Bldg 84b SB-7A Test Site #2	5/9/92	ND	ND	ND	ND	ND	ND	1,2-Dichloroethene 2.0	ND
MW-15/WS-1	5/9/92	ND	ND	ND	ND	ND	ND	Vinyl Chloride 1.3	ND
TB-14 Dup	8/1/92	20	24	ND	96	ND	Naphthalene 110	ND	2.3
TB-14B	8/1/92	80	410	2.7	630	ND	Naphthalene 110	ND	1.1
TB-14	7/13/92	3,600	2,250	1,400	6,126	NA	Naphthalene 54	NA	57
Samples collected during Woodward Clyde Investigation/Excavation									
GW-30	12/19/95	20	2.5	1.3	7.5	NA	NA	NA	NA
GW-70	12/19/95	1,700	120	210	850	NA	NA	NA	NA
GW-STK11-85	1/2/96	51	13,000	7,000	38,000	NA	ND	NA	NA
GW-TP	12/19/95	63	51	14	49	NA	NA	NA	NA

Sample ID	Date	Sample Analytical Parameters (reported in ug/l)							
		Benzene	Toluene	Ethylbenzene	Xylene	MTBE	PNAs	Solvents	Lead
EW 101	2/20/96	2.3	ND	ND	3.6	520	ND	NA	NA
EW 101 (After)	2/20/96	8	1.2	ND	4.1	520	ND	NA	NA
EW 102	2/20/96	64	1.3	33	20	ND	ND	NA	NA
EW 102 (After)	2/20/96	59	1.7	32	22	ND	ND	NA	NA
EW 103	2/20/96	10	8.3	1.2	7.8	ND	ND	NA	NA
EW 103 (After)	2/20/96	5.9	11	1.4	8.6	ND	ND	NA	NA
Samples collected during Global Environmental Engineering Investigation									
EW 101	3/4/97	ND	ND	ND	ND	NA	ND	NA	ND
EW-102	3/4/97	27	ND	ND	ND	NA	ND	NA	ND
EW-103	3/4/97	ND	ND	ND	ND	NA	ND	NA	ND
MW-15	3/4/97	ND	ND	ND	ND	NA	ND	NA	ND
EW-105	3/18/97	ND	ND	ND	ND	ND	ND	NA	ND
EW-106	3/18/97	ND	ND	ND	ND	97	ND	NA	ND

TANK FARM 94
GENERAL MOTORS CORPORATION - FLINT, MICHIGAN
TABLE 2: SOIL LABORATORAY ANALYTICAL RESULT SUMMARY

Sample ID	Date	Sample Analytical Parameters (reported in ug/kg)							
		Benzene	Toluene	Ethylbenzene	Xylene	MTBE	PNAs	Solvents	Lead
Samples collected during WW Engineering & Science investigation									
SB-7B SS-2	5/9/92	ND	ND	ND	ND	ND	ND	ND	3,900
SB-7B SS-5	5/9/92	ND	ND	ND	ND	ND	ND	ND	6,800
SB-7A SS-6	5/9/92	ND	ND	ND	ND	ND	ND	ND	7,900
MW-15 SS-6	7/14/92	ND	ND	ND	ND	NA	ND	NA	6,900
MW-10 SS-4	7/9/92	ND	ND	ND	273	NA	Naphthalene 820	NA	17,000
TB-8 SS-5	7/9/92	270	ND	ND	ND	NA	ND	NA	15,000
MW-7D SS-4	7/7/92	matrix interference	17,000	95,000	370,000	ND	Phenanthrene 690 Pyrene 820	ND	36,000
MW-7D SS-11	7/7/92	ND	ND	ND	ND	ND	ND	ND	18,000
TB-8B SS-3	8/1/92	ND	ND	ND	ND	ND	ND	ND	4,800
MW-9 SS-6	7/7/92	ND	ND	ND	ND	ND	ND	ND	8,700
MW-10B SS-5	8/1/92	6300	ND	ND	160,000	ND	Naphthalene 1700	ND	6,800
MW-11 SS-7	7/7/92	ND	ND	ND	ND	ND	ND	ND	16,000

Sample ID	Date	Sample Analytical Parameters (reported in ug/kg)							
		Benzene	Toluene	Ethylbenzene	Xylene	MTBE	PNAs	Solvents	Lead
TB-13 SS-3	7/14/92	720	3,335	1,460	4,405	NA	Acenaphthene 1400 Acenaphthylene 1700 Anthracene 5700 Benzo(a)anthracene 23000 Benzo(a)pyrene 18000 Benzo(b)fluoranthene 24000 Benzo(ghi)perylene 4600 Chrysene 27000 Dibenzo(ah)anthracene 3700 Fluoranthene 31000 Fluorene 2900 Indeno (123-cd)pyrene 4600 Naphthalene 870 Pyrene 3200	NA	4,300
TB-14B SS-2	8/1/92	ND	ND	ND	ND	ND	ND	ND	4,600
MW-15B SS-8	8/1/92	ND	ND	ND	ND	ND	ND	ND	9,400
Samples collected during Woodward Clyde investigation/excavation									
SB-1 (14-16')	4/10/95	ND	39	51	ND	NA	ND	NA	NA
SB-1 (19-21')	4/10/95	290	820	23,000	62,000	NA	ND	NA	NA
SB-2 (9-11')	4/10/95	ND	16	17	85	NA	ND	NA	NA
SB-2 (14-16')	4/10/95	ND	ND	ND	ND	NA	ND	NA	NA
SB-3 (9-11')	4/10/95	ND	ND	ND	ND	NA	ND	NA	NA
SB-4 (6-8')	4/10/95	9,600	20,000	68,000	250,000	NA	Anthracene 5300 Benzo(a)anthracene 8100 Benzo(a)pyrene 6000 Chrysene 12000 Dibenzo(ah)anthracene 20000 Fluoranthene 17000 Naphthalene 4600 Phenanthrene 14000 Pyrene 16000	NA	NA
SB-4 (9-11')	4/10/95	17	29	39	180	NA	ND	NA	NA

Sample ID	Date	Sample Analytical Parameters (reported in ug/kg):							
		Benzene	Toluene	Ethylbenzene	Xylene	MTBE	PNAs	Solvents	Lead
WM-08-1 (Sidewall)	12/18/95	ND	ND	ND	ND	NA	ND	NA	NA
SBT-15-08 (Floor)	12/18/96	37	23	59	245	NA	ND	NA	NA
SBT-48-10 (Floor)	12/20/95	ND	ND	ND	ND	NA	ND	NA	NA
SBT-70-10 (Floor)	12/15/95	180	ND	ND	ND	NA	NA	NA	NA
SBT-80-10 (Floor)	1/3/96	260	860	600	2,400	NA	NA	NA	NA
SBT-100-10 (Floor)	1/3/96	210	2,400	670	2,700	NA	NA	NA	NA
SBT-120-10 (Floor)	1/3/96	24	400	140	690	NA	ND	NA	NA
SBT-140-10 (Floor)	1/3/96	ND	78,000	45,000	190,000	NA	Acenaphthalene 5700	NA	NA
SBT-150-10 (Floor)	1/3/96	100	670	790	3,200	NA	Acenaphthalene 1600	NA	NA
NS-10 (Floor)	1/4/96	25	ND	ND	ND	NA	ND	NA	NA
SS-08-W-1 (Sidewall)	12/20/95	24	ND	11	ND	NA	ND	NA	NA
WSO-08-1 (Sidewall)	12/20/95	3,800	18,000	1,900	11,600	NA	NA	NA	NA
SWBT-15-10-3 (Sidewall)	12/19/95	ND	ND	ND	ND	NA	ND	NA	NA
SWBT-30-10-2 (Sidewall)	12/20/95	ND	ND	ND	ND	NA	ND	NA	NA
SWBT-50-10-2 (Sidewall)	12/20/95	91	20	300	689	NA	2-Methylnaphthalene 410	NA	NA

Sample ID	Date	Sample Analytical Parameters (reported in ug/kg):							
		Benzene	Toluene	Ethylbenzene	Xylene	MTBE	PNAs	Solvents	Lead
SWBT-55-10-3 (Sidewall)	12/21/95	65	22	21	ND	NA	ND	NA	NA
SWBT-70-10-2 (Floor)	12/20/95	12,000	5,600	19,000	73,700	NA	NA	NA	NA
SWBT-70-10-3-R (Sidewall)	1/2/96	ND	ND	ND	ND	NA	ND	NA	NA
SWBT-80-10-3 (Floor)	1/3/96	ND	14	ND	ND	NA	Acenaphthalene 1900	NA	NA
SWBT-80-10-4 (Sidewall)	1/4/96	ND	ND	ND	ND	NA	Benzo(a)anthracene 790	NA	NA
SBT-100-10-4 (Sidewall)	1/4/96	ND	270	ND	ND	NA	Fluoranthene 490	NA	NA
SWBT-120-10-3 (Sidewall)	1/3/96	ND	ND	ND	ND	NA	ND	NA	NA
SWBT-140-10-3 (Sidewall)	1/3/96	11	41	18	ND	NA	ND	NA	NA
P-145 (Sidewall)	1/4/96	ND	100	66	140	NA	Fluorene 4700 Phenanthrene 9700 Fluoranthene 15000	NA	NA
SWBT-150-10-3 (Sidewall)	1/4/96	ND	ND	ND	ND	NA	ND	NA	NA
SWBT-10-2 (Floor)	12/19/95	ND	ND	ND	ND	NA	ND	NA	NA
SBT-10-10 (Floor)	12/18/96	32,000	10,000	110,000	420,000	NA	NA	NA	NA
TR-15-1 (Floor)	12/19/95	19	ND	ND	ND	NA	NA	NA	NA

Sample ID	Date	Sample Analytical Parameters (reported in ug/kg)							
		Benzene	Toluene	Ethylbenzene	Xylene	MTBE	PNAs	Solvents	Lead
SBT-30-10-1 (Floor)	12/19/95	ND	ND	ND	ND	NA	Phenanthrene 2000 Anthracene 730 Fluoranthene 2300 Pyrene 1600 Benzo(a)anthracene 740 Chrysene 720 Benzo(b)fluoranthene 550 Benzo(k)fluoranthene 720 Benzo(a)pyrene 460	NA	NA
SBT-48-M-10 (Floor)	12/21/95	14	16	830	2,041	NA	ND	NA	NA
SBT-TK11-10 (Floor)	1/2/96	50	170,000	86,000	350,000	NA	Naphthalene 700 Acenaphthene 22000	NA	NA
Samples collected during Global Environmental Engineering investigation									
EW-4 (8-10')	3/11/97	ND	ND	ND	ND	ND	ND	NA	7000
EW-5 (8-10')	3/11/97	ND	ND	ND	ND	ND	ND	NA	3700
EW-6 (12-14')	3/11/97	ND	ND	ND	ND	ND	ND	NA	11000

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GENERAL MOTORS CORPORATION - FLINT, MICHIGAN
TABLE 3: RISK-BASED SCREENING LEVELS - GROUNDWATER

Chemical	Risk-Based Screening Levels - Groundwater		
	Health-Based Drinking Water (Residential)	Health-Based Drinking Water (Comm./Industrial)	Direct Contact
Benzene	5	5	9,300
Toluene	790	790	526,000
Ethylbenzene	74	74	169,000
Xylenes	280	280	186,000
MTBE	240	690	1,700,000
Lead	4	4	Insufficient Data
Naphthalene	260	750	31,000
1,2-Dichloroethene	70	70	170,000
Methylene Chloride	5	5	110,000
Vinyl Chloride	2	2	290

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GENERAL MOTORS CORPORATION - FLINT, MICHIGAN
TABLE 4: RISK-BASED SCREENING LEVELS - SOIL

Chemical	Risk-Based Screening Levels - Soil		
	Leaching to Groundwater	20X Drinking Water Criteria	Direct Contact (Residential)
Benzene	100	100	88,000
Toluene	16,000	3,950	620,000
Ethylbenzene	1,500	1,480	380,000
Xylenes	5,600	5,600	400,000
MTBE	4,800	1,200	10,000,000
Lead	21,000 (Type A Default)	20	400,000
Acenaphthene	300,000	26,000	76,000,000
Acenaphthylene	520	520	15,000,000
Anthracene	6,900,000	146,000	420,000,000
Benzo(a)anthracene	E	24	14,000
Benzo (b)fluoranthene	E	24	14,000
Benzo(k)fluoranthene	E	240	140,000
Benzo(ghi)perylene	E	520	1,500,000
Chrysene	E	2,400	1,400,000
Dibenzo(ah) anthracene	E	2.4	1,400
Fluoranthene	3,000,000	17,600	51,000,000
Fluorene	390,000	17,600	51,000,000
Indeno(123-cd) pyrene	E	24	14,000
2-Methylnaphthalene	5,200	5,200	15,000,000
Naphthalene	17,000	5,200	15,000,000
Phenanthrene	12,000	Insufficient Data	1,500,000

Chemical	Risk-Based Screening Levels - Soil		
	Leaching to Groundwater	20X Drinking Water Criteria	Direct Contact (Residential)
Pyrene	1,800,000	3,000,000	32,000,000
1,2-Dichloroethene	1,400	1,400	1,000,000
Methylene Chloride	100	100	340,000
Vinyl Chloride	40	40	1,200