Appendix D

MPCA File Review Information and Previous Investigation Reports

Leak # 2094 MPCA File Excerpts

100 0 100 200 300 400 500 Feet

Duluth
Brownfields Study Area
CITY WATERFRONT PROPERTY

Minnesota Pollution Control Agency

Underground Storage Tank Information

FOOD SERVICE OF AMERICA

An MPCA Leaking Underground Storage Tank Site.
ID Number: 2094

Groundwater | Cleanup Actions | Legal Entity | Treatments | Reporting

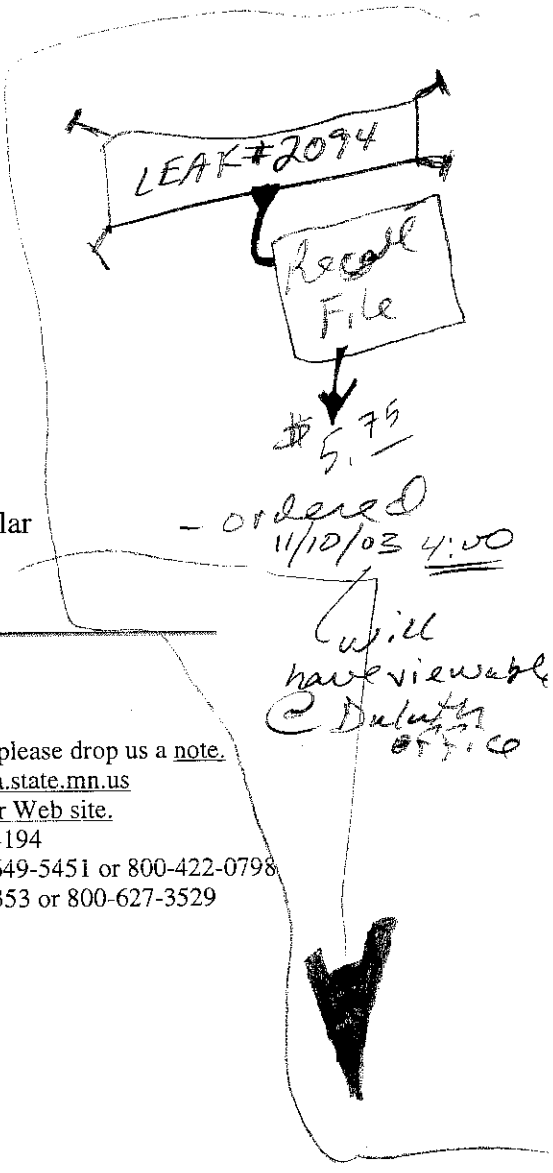
Search

Index

Glossary

Home

Site Address:	FOOT OF 8TH AVE W AND WATERFRONT
City:	DULUTH
Site Zip Code:	55802
County:	St. Louis
Release Discovered Date:	21-JUL-89
Release Report Date:	21-JUL-89
Leaksite Conditional Closure Date:	
Leaksite Complete Site Closure Date:	22-AUG-95
Contaminated Soils Remaining:	Y
Offsite Contamination	U
Product Released:	Gasoline Regular
Project Manager:	Joslyn, James



If you have suggestions on how we can improve our service to you, please drop us a note.
If you have questions or problems, contact webmaster@pca.state.mn.us
For more information about Minnesota, visit the Northstar Web site.
MPCA, 520 Lafayette Road, St. Paul, MN 55155-4194
Phone: 651-296-6300, 800-657-3864; 24-hour emergency number: 651-649-5451 or 800-422-0798
TTY: 651-282-5332, TTY 24-hour emergency number: 651-297-5353 or 800-627-3529

Underground Storage Tank Information

FOOD SERVICE OF AMERICA

An MPCA Leaking Underground Storage Tank Site.
ID Number: 2094

Groundwater | Cleanup Actions | Legal Entity | Treatments | Reporting

Report Date	05-MAR-90
Type of Report Received	Inactive - Remedial Investig
Assigned Hydrologist	3188
Review Complete Date	
Responding Staff	3296
MPCA Response Type	Request More Information
Response Date	24-APR-90
Target Date	21-OCT-90

Report Date	26-JUL-90
Type of Report Received	Correction Action Design
Assigned Hydrologist	3188
Review Complete Date	
Responding Staff	3296
MPCA Response Type	Inactive - Request RI
Response Date	31-DEC-90
Target Date	30-JAN-91

Report Date	01-MAY-95
Type of Report Received	Inactive - Remedial Investig
Assigned Hydrologist	
Review Complete Date	
Responding Staff	3296
MPCA Response Type	Closure
Response Date	22-AUG-95
Target Date	

Report Date	26-MAY-95
Type of Report Received	Petro App. Rec'd from Commerce
Assigned Hydrologist	
Review Complete Date	
Responding Staff	3296
MPCA Response Type	CSR-Adequate Sent by PM
Response Date	27-JUN-95
Target Date	28-JUN-95

Close Window

Underground Storage Tank Information

FOOD SERVICE OF AMERICA

An MPCA Leaking Underground Storage Tank Site.
ID Number: 2094

Groundwater | Cleanup Actions | Legal Entity | Treatments | Reporting

Thermal Treatments

Approval Date	16-NOV-89
Completed Date	30-NOV-89
Soil Volume (Tons)	640

Land Treatments

Approval Date	
Completed Date	
Soil Volume (Cubic Yards)	

Miscellaneous Treatments

Miscellaneous Soil Action	
Completed Date	
Soil Volume (Cubic Yards)	

Close Window

Definitions of Groundwater Terms

Thermal Treatments
The heating of soil which removes and destroys the contaminants contained within the soil.Thermal Treatments

Thermal Treatment Approval Date
Date MPCA approved the soil to be treated.

Thermal Treatment Completed Date
Date thermal treatment was completed.

Ton(s) of Soil
The number of tons of soil which will be thermally treated.

Land Treatment

The incorporation of petroleum contaminated soil into the top four to six inches of native soil. This method takes advantage of naturally occurring soil micro-organisms to biodegrade petroleum.

Land Treatment Approval Date
Date MPCA approved the soil to be treated by the land treatment method.

Land Treatment Completed Date
The date the land treatment was completed.

Volume of Soil
The total volume in cubic yards of soil which was treated.

Miscellaneous Treatments
Other less commonly used methods of soil treatment.

Miscellaneous Soil Action
The method of soil treatment being used.

Miscellaneous Treatments Completed Date
The date the miscellaneous treatments where completed.

Volume of Soil
The total volume in cubic yards of soil which was treated using Miscellaneous treatments.

Underground Storage Tank Information

FOOD SERVICE OF AMERICA

An MPCA Leaking Underground Storage Tank Site.
ID Number: 2094

Groundwater | Cleanup Actions | Legal Entity | Treatments | Reporting

Contact Type	Responsible Party
Legal Entity Name	FOOD SERVICE OF AMERICA/B SCHNOBRICH
Address	325 S LAKE AVE
Additional Address	
City Name	DULUTH
State	Minnesota
Zip	55802

Close Window

Definitions of Legal Entity Terms

Contact Type
Describes the type of Legal Entity takin action at this site.

Legal Entity Name
Name of the person or business that is taking action at this site.

Underground Storage Tank Information

FOOD SERVICE OF AMERICA

An MPCA Leaking Underground Storage Tank Site.
ID Number: 2094

Groundwater | Cleanup Actions | Legal Entity | Treatments | Reporting

Drinking Water Contamination	
Free Product Observed	
Free Product Thickness	
Groundwater Contamination	Y
Cleanup Goal (X HRL)	0
Cleanup Goal Achieved	
Impacted Aquifer	
Well Type	

Close Window

Definitions of Legal Entity Terms

Contact Type
Describes the type of Legal Entity takin action at this site.

Legal Entity Name
Name of the person or business that is taking action at this site.

Minnesota Pollution Control Agency

Site ID	Site Name	County
4987	FOOD SERVICE OF AMERICA	St. Louis

This page was last updated Thursday May 22th, 2003

If you have suggestions on how we can improve this site, or if you have questions or problems, please contact us.
If you have questions or problems, contact webmaster@pca.state.mn.us
Minnesota Pollution Control Agency, 520 Lafayette Road, St. Paul, MN 55155-4194
Phone: 651-296-6300, 800-657-3864; 24-hour emergency number: 651-649-5451 or 800-422-0798; TTY: 651-282-5332, TTY 24-hour emergency number: 651-297-5353 or 800-627-3529

Minnesota Pollution Control Agency

Site information:

FOOD SERVICE OF AMERICA
800 RAILROAD ST
DULUTH, Minnesota 55801
St. Louis

1 tanks are (or were) located at this site.

To find out full infomation on the tank, click on the tank number.

Tank Number	Last Action Date	Registration Date	Tank Capacity	Tank Status	Stored Product	Above or Undergound
001	Jan 01, 00	Feb 27, 86	1000	Removed	Gasoline	Under Ground

This page was last updated Thursday May 22th, 2003

If you have suggestions on how we can improve this site, or if you have questions or problems, please contact us.
If you have questions or problems, contact webmaster@pca.state.mn.us
Minnesota Pollution Control Agency, 520 Lafayette Road, St. Paul, MN 55155-4194
Phone: 651-296-6300, 800-657-3864; 24-hour emergency number: 651-649-5451 or 800-422-0798; TTY: 651-282-5332, TTY
24-hour emergency number: 651-297-5353 or 800-627-3529

Minnesota Pollution Control Agency

Tank Site Address

FOOD SERVICE OF AMERICA
800 RAILROAD ST
DULUTH, Minnesota 55801
St. Louis County

General Tank Information

Site tank #001

Tank Registration Date	27-FEB-86
Tank Storage Capacity	1000
Tank Status	Removed
Tank Stored Product	Gasoline

Tank Construction

Tank Material Type	Bare/Paint/Asph Coat Steel
Tank Corrosion Protection	None
Pipe Corrosion Protection	None
Pipe Material Type	Steel/Iron
Secondary Containment Tank Type	Doublewall Tank
Secondary Containment Pipe Type	Doublewall Pipe
Tank Dispenser Type	Suction
Spill Containment	None

Overfill Protection

Overfill Protection (None Indicated)	None
Overfill Protection Ball Float	None
Overfill Protection Automatic Shutoff Device	None
Overfill Protection Type Unknown	None
Overfill protection alarm	None

Tank Release Detection Measures

Release detection daily sticking	Yes
Release Detection Tightness Test	Yes
Release Detection Manual Tank Gauging	Yes
Release detection automatic tank gauging	No
Release detection soil vapor monitoring	None
Release detection groundwater monitoring	None

Release detection interstitial monitoring	None
Statistical inventory reconciliation (SIR) tank leak detection	None
Release Detection Statistical Inventory Reconciliation (SIR) report date	
Release Detection Other	None

Piping Release Detection Measures

Piping release detection automatic line leak detectors	None
Piping release detection annual tightness test	None
Piping Release Detection Vapor Monitoring	None
Piping Release Detection Ground Water Monitoring	None
Piping release detection interstitial monitoring	None
Piping Release Detection Three-year Tightness Test	None
Piping Release Detection European Suction	Yes
Piping Release Detection Other	None
Statistical Inventory Reconciliation (SIR) Piping Leak Detection	None

This page was last updated Wednesday Sep. 17th, 2003

If you have suggestions on how we can improve this site, or if you have questions or problems, please contact us.
If you have questions or problems, contact webmaster@pca.state.mn.us
Minnesota Pollution Control Agency, 520 Lafayette Road, St. Paul, MN 55155-4194
Phone: 651-296-6300, 800-657-3864; 24-hour emergency number: 651-649-5451 or 800-422-0798; TTY: 651-282-5332, TTY 24-hour emergency number: 651-297-5353 or 800-627-3529

Minnesota Pollution Control Agency

Underground Storage Tank Information

NORTHLAND CONSTRUCTORS

An MPCA Leaking Underground Storage Tank Site.
ID Number: 7597

Groundwater | Cleanup Actions | Legal Entity | Treatments | Reporting

Search

Index

Glossary

Home

Site Address:	7TH AVE W AND RR ST
City:	DULUTH
Site Zip Code:	55803
County:	St. Louis
Release Discovered Date:	07-AUG-91
Release Report Date:	
Leaksite Conditional Closure Date:	
Leaksite Complete Site Closure Date:	23-JUN-92
Contaminated Soils Remaining:	U
Offsite Contamination	U
Product Released:	Unknown
Project Manager:	Serier, Kathryn

| Search | Index | Ask MPCA | Home |

Underground Storage Tank Information

NORTHLAND CONSTRUCTORS

An MPCA Leaking Underground Storage Tank Site.
ID Number: 7597

Groundwater | Cleanup Actions | Legal Entity | Treatments | Reporting

Report Date	14-JAN-92
Type of Report Received	Site Assessment
Assigned Hydrologist	
Review Complete Date	
Responding Staff	3400
MPCA Response Type	Request More Work
Response Date	20-MAR-92
Target Date	19-APR-92

Report Date	11-JUN-92
Type of Report Received	Site Assessment
Assigned Hydrologist	
Review Complete Date	
Responding Staff	3400
MPCA Response Type	Closure
Response Date	23-JUN-92
Target Date	

Close Window

Definitions of Reporting Terms

April 1992, Barr Limited Phase I Assessment
(Historical Records Review)

Barr
Engineering Company

8300 Norman Center Drive
Minneapolis, MN 55437-1026
Phone: (612) 832-2600
Fax: (612) 835-0186

April 14, 1992

Mr. Thomas Cotruvo
Duluth Economic Development Authority
400 City Hall
Duluth, MN 55802-1196

Re: Limited Phase I Site Assessment
(Historical Records Review)
Bayfront Property
Duluth, Minnesota

Dear Mr. Cotruvo:

Barr Engineering Company (Barr) has prepared this historical records review for Lot 9, Block 4, and all of Block 5, Bayfront Division of Duluth (Property). The Property is owned by Northland Constructors, Inc. and is located on the Duluth bayfront.

SCOPE OF WORK

This investigation was conducted for real estate transaction purposes. Barr's scope involved the review of available historical records for evidence indicating activities that may have resulted in a release of hazardous substances or petroleum products to the Property and the review of the results from previous investigations conducted at the Property.

The historical review consisted of an inspection of Duluth city directories, available aerial photographs, Sanborn Fire Insurance maps, real estate atlases, and historical photographs of the Property and the immediately surrounding area. Interviews were conducted with a previous property owner, a consultant for the current owner, a consultant for one of the previous owners, and staff of the Minnesota Pollution Control Agency. The scope of the investigation did not include a review of regulatory documents or a site visit. These tasks were reportedly completed by others during two previous investigations.

PROPERTY LOCATION

The Property is located on the Duluth harbor waterfront, southeast of the intersection of Railroad Street and 7th Avenue West. The Property is bordered on the northwest by Railroad Street, on the southwest by 7th Avenue West, and on the northeast and southeast by Slip No. 1 and the Duluth harbor,

respectively. The Property is rectangular in shape and is roughly 1,000 feet by 170 feet. The Property is described as Lot 9, Block 4, and all of Block 5, Bayfront Division of Duluth. The general site layout is shown on Figure 1.

PROPERTY DESCRIPTION AND HISTORY

The Property consists of the northeastern half of a low-lying, relatively flat pier lying between slips No. 1 and No. 2 in the Duluth harbor. The pier is manmade and reportedly has been historically used for the storage and transfer of products between rail and water vessels and the storage and heat treating of pipe. The pier may have also been used for docking and refueling of tugboats.

The Property is currently owned by Northland Constructors, Inc. Reportedly, no structures presently exist, but piles of what appear to be fill material and/or demolition debris are present on the Property.

Prior to development, the Property was likely a water-covered area of the St. Louis River bay area. Between 1871 and 1883, a wooden pier was constructed at the current property location. A Northern Pacific warehouse and railroad tracks were built on the pier. Between 1888 and 1909, fill was placed around the wood piles that supported the pier. The results from previous investigations conducted at the property suggest that the fill was primarily sand dredge spoil with some wood, cinders, and brick.

The Northern Pacific warehouse and railroad tracks extended nearly the entire length of the pier (adjacent to Slip No. 1). The railroad tracks were located on the southwestern side of the warehouse. The 1909 Sanborn map also indicates the presence of a small building located on the southwestern corner of the Property. The Sanborn maps for this time period did not contain any information which could typically be interpreted as an indicator of potential environmental liability. The oblique photographs of the site did not show images suggesting that a chemical release had occurred. The locations of the Northern Pacific warehouse, railroad tracks, and the small building are shown on Figure 1.

The Northern Pacific warehouse and the nearby small building are visible on the 1939, 1952, and 1953 aerial photographs. The small building may have been the Union Towing and Wrecking Company. Boxcars are visible on the railroad tracks. A dock was visible in the northeastern corner of the Property. Images typically interpreted as indicators of potential chemical release were not observed on the 1939, 1952, or 1953 aerial photographs.

Between 1953 and 1955, the Northern Pacific warehouse was either partially demolished, or replaced with a smaller warehouse, located at the half-way point of the peninsula. The 1955 Sanborn Map indicates that this warehouse remained the property of Northern Pacific Railway. The 1955 Sanborn map did not contain information suggesting the presence of a potential environmental liability.

Changes to the Property observed on the 1958 aerial photograph image were the addition of an aboveground storage tank (likely petroleum product storage)

located near the small building at the end of the pier and what appears to be soil staining near the rail terminus northwest of the main warehouse building. The tank is an indicator of a potential environmental liability. The soil staining is an indicator of a potential chemical release.

Changes to the property observed on the 1964 aerial photograph were two areas of what appear to be soil staining. One of the areas was located northwest of the warehouse building, and the second area of staining was located near the end of the pier under a set of railroad tracks. An object which may be an aboveground storage tank was also observed in the northeast part of the Property. The presence of soil staining may indicate that a chemical release had occurred. The areas of soil staining are shown on Figure 1.

The 1966 aerial photograph is of insufficient quality to determine the presence of soil staining. General site conditions appear similar to 1964.

Between 1966 and 1969, the small building at the end of the peninsula was removed. This building may have been used between 1956 and 1967 by the Great Lakes Towing Company. One of the soil stains observed on the 1964 aerial photograph was still visible on the 1969 photograph.

A single railroad tanker car is visible on the 1971 aerial photograph of the Property. Other site features appear to be generally unchanged. Images suggesting that chemical releases had occurred were not observed.

The 1973 aerial photograph image shows that the Northern Pacific warehouse and the railroad tracks had been removed and the site is vacant. Two objects that may be aboveground storage tanks were observed on the southwestern side of the Property. These objects were not observed on the 1971 or 1975 aerial photographs. Images suggesting that chemical releases had occurred were not observed.

The Property appeared to be covered with stacks of pipe at the time of the 1975 and 1977 photographs. Images suggesting that chemical releases had occurred were not observed.

The only change observed on the 1978, 1979, 1980, 1981, 1982, 1988, and 1989 aerial photographic images was the presence of one or two structures located at the northwestern end of the Property. These structures appear to be associated with Pipe Benders, Inc., a pipe heat-treating operation. Two unidentified cylindrical objects are visible on the southeast side of the Property on the 1979 aerial photograph.

The 1990 aerial photograph image (partial site coverage) shows that the Property contains piles of what appear to be fill material and a storage tank. No buildings were observed. Evidence indicating that the storage tank was in use was not observed. Evidence of chemical release was not observed.

Surrounding Properties

The western half of the pier was developed at about the same time as the Property. Known uses of the neighboring property were a cold storage business and the Duluth Roller Mill. Other companies listed (in the Duluth city directories) in the general area were: a bottling firm, creameries, a wire goods manufacturer, oil companies, a paint company, a transfer company garage, wholesale grocers, plywood manufacturers, hardware wholesalers, an insulation contractor, a towing and wrecking company, and several marine and contracting firms.

Previous Investigations

Previous subsurface investigations conducted at the Property have indicated that the fill material used in the pier consists of sand, wood, cinders, and brick. The wood is likely associated with the pilings used to support the pier. The wood reportedly had a creosote odor. Creosote is a common wood preservative and the odor likely indicates that the piles were treated with this material to slow decay. The presence of treated wood in the form of pilings, railroad ties, telephone poles, and old bridge abutment structures is common throughout the state.

The previous investigations also reported the presence of petroleum product soil contamination near the southeastern end of the pier. This contamination was attributed to a surface spill. The historical data review suggests that the contaminated soil was located approximately 50 feet from the location of the suspected petroleum storage tank (1958 aerial photograph). This suggests that the presence of contaminated soil could have been the result of a tank release. The locations of the borings placed during the previous investigations are shown on Figure 1.

SUMMARY

The following evidence of potential environmental liability or chemical release were observed in the course of the historical record review:

- The wood pilings supporting the pier appear to have been treated with creosote. The pilings are most likely still present at the Property, and have likely released measurable concentrations of semivolatile organic compounds to the adjacent soil and/or groundwater. Releases of this nature are common throughout the state. Barr believes that the MPCA is aware that these releases commonly occur, but is unaware of an instance where the MPCA has pursued a cleanup of such a release.

- The results from previous investigations suggest that the materials used as fill at the pier were largely dredge material (sand) with some wood, cinders, and brick. Dredge spoil originating from some locations of the Duluth harbor have been found to contain concentrations of contaminants at levels of concern to the MPCA. Use of dredge spoil as fill in and around the Duluth harbor, however,

appears to be ubiquitous. As a result, an MPCA decision to address this issue will likely impact most properties surrounding the harbor, as well as any work conducted in the harbor, such as channel maintenance. Cleanup, if required, could be extremely costly. Therefore, it would likely be focused on the most serious problems identified. We suspect that slips constructed of dredge spoil from the 1800s, if contaminated, would not receive a high priority.

- Soil staining was visible on several aerial photographs at several locations on the Property. Although the aerial extent of staining was relatively limited, a likelihood exists that these stains are indicative of a chemical release.

- Petroleum products have likely been used and stored on the Property. Evidence also exists that releases of petroleum products to soils on the Property have occurred. Investigation of these releases will be required by the MPCA. The cost of investigations and any required cleanup of petroleum contaminants, however, will be reimbursable by the State PETROFUND (at a rate of 90 cents on the dollar) if the release is determined to be a release (leak) from a stationary petroleum storage tank system (dispenser pipes or tank).

- The historical records suggest that storage and use of petroleum products have occurred on adjacent properties. If releases have occurred, soil and/or groundwater quality at the Property may have been impacted. State and federal law, however, specifies that the responsibility for investigation and cleanup of chemical or petroleum releases rests with the owner or operator of the land at the source of the release.

RECOMMENDATIONS

Barr recommends placement of soil borings at locations identified as potential sources of chemical release (soil-stained areas and petroleum storage tank). Information collected will establish if a release requiring cleanup has occurred at those locations.

The proposed boring locations are shown on Figure 1. We recommend advancing the soil borings to the surface of the water table and collection of soil samples continuously throughout the depth of the boring. The soil samples should be screened in the field for the presence of volatile organic compounds, odor, oil sheen, and staining. Soil samples collected from the vicinity of the former petroleum storage tank (Boring SB-101) should be analyzed for total petroleum hydrocarbons, benzene, ethyl benzene, toluene, and xylenes. Soil samples collected from the vicinity of the stained soil areas (Borings SB-102 and SB-103 should only be submitted for laboratory analyses if evidence of contamination is observed.

LIMITATIONS

Barr Engineering Co. has performed its work in a manner consistent with the care and skill ordinarily exercised by members of the environmental engineering profession under similar scope, budget, and time constraints. Within this context, Barr assumes responsibility for its observations and for interpretation of the information gathered by Barr. However, Barr does not assume responsibility for the accuracy or the reliability of the information provided by other parties. In no event does Barr represent or guarantee that this property is free of contamination. Such a representation cannot be made regardless of the scope of the site investigation.

If there are questions or additional information is necessary, please contact Dale Wikre or me.

Sincerely,

Mark T. Hagley
Hydrogeologist

MTH:crs
23\69\076\C20.LTR

LIST OF REFERENCES

United States Geological Survey Topographic Map, Duluth, Minnesota Quadrangle dated 1953. Photograph revised 1969 and 1975.

Aerial photographs from 1939, 1952, 1953, 1958, 1961, 1964, 1966, 1969, 1971, 1973, 1975, 1977, 1978, 1979, 1980, 1981, 1982, 1988, 1989, and 1990.

Historical photographs (oblique) from the St. Louis County Historical Society files. Included photographs of the Property in the 1870s, 1880s, 1890s, 1930s, 1940s, 1950s, and 1960s.

Roe's Real Estate Atlas, 1890.

Frank's Map (Plate 25), 1902.

Duluth Real Estate Atlas, 1924.

Sanborn Fire Insurance Maps, 1884, 1885, 1888, 1909, and 1955.

Duluth City Directories, 1930 to 1991, except 1933, 1945, 1947, 1949 (not published).

LIST OF CONTACTS

Mr. William Mierhoff, previous property owner (as part of two separate partnerships, approximately 1970 to 1988).

Mr. Randy Debolt, Twin Ports Testing, Inc. Current owner's consultant.

Mr. Tim Musick, Minnesota Pollution Control Agency, Duluth Regional office.

Ms. Lynne Grigor, Minnesota Pollution Control Agency, Site Response Section.

Mr. Robert Nielson, formerly of Twin City Testing, (on-site geologist during drilling of five Twin City Testing/Lakehead Testing soil borings).

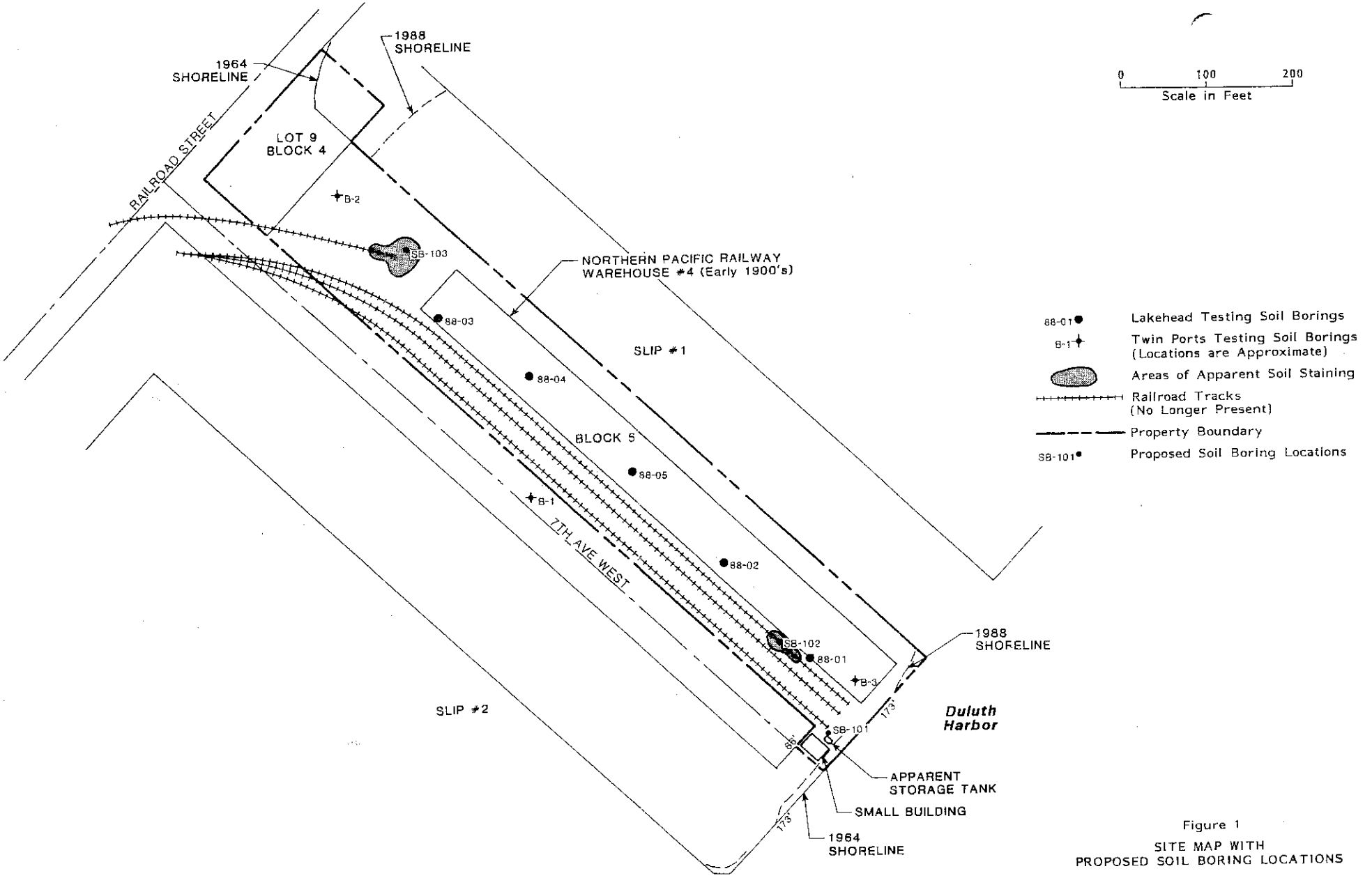


Figure 1

SITE MAP WITH
PROPOSED SOIL BORING LOCATIONS

Hydrogeology

The property is located in the St. Louis River watershed. The property is located on the harbor of the St. Louis River, surface drainage from the property flows into the harbor. The regional groundwater flow direction is to the south-southeast. Based on site reconnaissance, it appears as though the local groundwater flow direction is also to the south-southeast. The depth to the groundwater table at the site is between 3.0 and 5.0 feet. Information about the groundwater flow direction is based on the USGS Hydrogeologic Atlas HA-586 (1979), the Duluth Quadrangle, and from information collected from geotechnical drilling for the City of Duluth.

REVIEW OF PREVIOUS WORK

Tank Excavation

In July 1989, J & D completed a tank excavation at the Food Services of America property. Approximately 457 cubic yards of contaminated soil was removed during the excavation of a 1000 gallon gasoline tank. The soil was thermally treated. AET does not have any other information about the excavation of the contaminated soil. AET requested information regarding the UST removal from Mr. Wilson of the Development Corporation of America, however, legal complications have interfered with the transfer of that information. A diagram of the site showing the UST location and any additional information about the tank removal was requested from the MPCA project manager. That information has been included in Appendix B. The information indicates that the UST excavation was 39 feet wide by 36 feet long by 5 feet deep. Headspace analyses were completed by Twin Ports Testing, Inc.

REMEDIAL INVESTIGATION RESULTS

Soil Borings

The fieldwork for the remedial investigation on the site was completed August 30, 1993 and January 7, 1994. Soil borings SB-1 through SB-3 were drilled by a CME-550C and soil borings SB-4 and SB-5 were drilled by a truck mounted CME-55. The soil boring locations can be found in Figure 3. The environmental soil borings, designated SB-1 through SB-5, were drilled

to depths ranging from 9.0 to 15.0 feet (5.0 feet below the contamination or 5.0 feet below the water table if the soil was contaminated). The soils were sampled every 2.5 feet by the split barrel method (ASTM:D1586). The split barrel sampler was washed in tri-sodium phosphate and rinsed with water prior to the collection of each sample. An AET geologist conducted headspace tests to screen organic vapors in the soil. The soil boring locations were surveyed by the AET drilling crew for horizontal and vertical control. The bench mark used during the survey was the top of the cement relieving wall near the corner of the LaFarge building. The wall was assigned an arbitrary elevation of 100.0 feet. The elevations of the soil borings were surveyed relative to that arbitrary elevation. The boring logs and their relative elevations can be found in Appendix C. The soil boring log for the geotechnical boring (soil boring 93-25) has also been included in Appendix C. The location of boring 93-25 is shown on Figure 3.

Soil boring SB-1 was drilled south of the geotechnical boring where contamination was detected. Soil boring SB-2 was drilled to the southwest of the geotechnical boring. Soil boring SB-3 was drilled between soil borings SB-1 and SB-2. After receiving information from the MPCA regarding the UST removal and contaminated soil excavation, AET was able to approximate the excavation limits. Soil boring SB-4 was drilled through the center of that excavation and boring SB-5 was drilled upgradient of the excavation. All of the borings were drilled to depths between 9.0 and 15.0 feet.

Fill consisting of silty sand, sand and gravel was encountered in every boring. Native material was not encountered in any of the borings. Soil borings SB-2 and SB-3 were drilled approximately 5.0 feet below the base of the contamination in order to define the vertical extent of the contamination. Soil borings SB-4 and SB-5 were drilled to 5.0 feet below the water table. Soil boring SB-1 was drilled as far as the hole would stay open without jetting (water was encountered at 2.5 feet). Soil samples were collected for chemical analyses from the base of soil boring SB-1 and from that portion of soil boring SB-3 that had the highest headspace readings. Soil samples were also collected from soil boring SB-4 and SB-5 from the most contaminated zone and the base of the borings.

A headspace analysis (procedure outlined in the MPCA Guideline Documents) was completed on representative portions of the soil sample collected from each 2.5 foot interval. An OVM (Model 580B) photoionization detector (10.6 Ev lamp) was used to measure the amount of petroleum-related vapors in the headspace of an eight ounce jar. The headspace results are summarized in Table 1. The OVM meter yielded organic vapor readings ranging from 0.0 to 240.0 parts per million (ppm) on the soil samples collected from the five borings. In addition to the headspace analysis, human senses (olfactory and visual) were also used to determine the extent of the contamination. The highest OVM readings were found in the zone between 9.0 and 11.0 feet in soil boring SB-4 (in the center of the excavation). A zone of contamination was found between 4.5 and 15.0 in boring SB-1, and between 2.0 and 6.5 feet deep in soil boring SB-3. Boring SB-2 contained no contamination. The OVM readings from soil boring SB-1 appeared to be somewhat high compared to the odor of the sample (the soil samples collected below 2.5 feet were saturated with water, which can adversely effect the OVM readings).

TABLE 1.
HEADSPACE RESULTS-REMEDIAL INVESTIGATION

Soil Boring	Depth (ft)	Head-space*	Soil Boring	Depth (ft)	Head-space*
SB-1	0-1	1.1	SB-2	0-2	0.0
	2-4	24.1		2-4	0.0
	4.5-6.5	71.1		4.5-6.5	0.0
	7-9	8.3		7-9	0.0
	9.5-11.5	21.3	SB-3	2-4	18.9
	13-15	52.0		4.5-6.5	14.6
				7-9	5.3
				9.5-11.5	0.0
SB-4	0-2	0.0			
	2-4	8.0	SB-5	2-4	1.5
	9-11	240.00		7-9	15.0

*headspace results in parts per million (ppm)

Chemical Analyses

Two soil samples were collected from soil borings SB-1 and SB-3 for chemical analyses. A sample was collected for chemical analysis from soil boring SB-3 from the most contaminated portion of that boring. One sample was also collected from the base of boring SB-1 (the most contaminated soil boring) to confirm the vertical extent of the contamination. Soil samples were also collected from the most contaminated zone and the boring base in SB-4 and SB-5. After collection, the samples were placed in a cooler. The samples were submitted to Legend Technical Services (Legend) in St. Paul for chemical analysis.

The suite of chemical analyses requested by AET for the August sampling (SB-1 through SB-3) included DRO, BTEX, and total petroleum hydrocarbons (TPH) as gasoline. The TPH analysis was requested of the laboratory after discussions with the Development Services of America indicated that the UST contained gasoline and not fuel oil, as originally informed. The second suite of samples (SB-4 and SB-5) were also sent to Legend for GRO, BTEX, and MTBE. The results of the DRO, TPH as gasoline/GRO and BTEX analyses have been summarized in Table 2. The laboratory report and the chain of custody have been included in Appendix C.

TABLE 2.
SOIL CHEMISTRY RESULTS
DRO, TPH as Gasoline/GRO and BTEX*
LEGEND TECHNICAL SERVICES
9/17/93

BORING/ DEPTH	DRO (ppm)	TPHgas/ GRO (ppm)	BENZENE (ppm)	ETHYL BENZENE	TOLUENE	XYLENE (ppm)
SB-1 (14.5)	<8.0	<0.13	0.009	<0.001	0.001	0.012
SB-3 (3.5)	<8.0	7.6**	0.005	<0.001	<0.001	0.001
SB-4 (4.0)		<5.0	<0.05	<0.05	<0.05	<0.05
SB-4 (11.0)		19	0.27	0.28	0.57	2.9
SB-5 (4.0)		<5.0	<0.05	<0.05	<0.05	<0.05
SB-5 (9.0)		<5.0	<0.05	<0.05	0.16	<0.05

*results listed in ppm
**chromatographic profile resembles that of fuel oil

The chemical results of the diesel range organics analysis indicate that the contamination is below the laboratory method detection limit (MDL). The results of the TPH as gasoline analyses indicated that there was gasoline detected in the soil sample from soil boring SB-3 (3.5 feet deep) in concentrations of 7.6 mg/kg (ppm). The laboratory flagged the result as having a chromatographic profile resembling fuel oil. AET personnel discussed this with laboratory manager at Legend, who indicated that the sample from SB-3 appeared to be more typical of fuel oil because it was lacking the lighter components commonly found in gasoline. She also indicated that the sample from SB-1 could be very weathered gasoline because it contained some

of the lighter components typical of gasoline, like the BTEX components. GRO was detected in the sample collected from the center of the excavation (SB-4, 11.0 feet) in a concentration of 19 parts per million (ppm), which is below the MPCA recommended action limit of 50 ppm for sandy soil. Contamination (toluene) was also detected in boring SB-5 at the 9.0 foot sample

REMEDIAL INVESTIGATION DISCUSSION

This remedial investigation was completed in order to define the horizontal and vertical extent of the contamination related to the UST located on the Food Services of America property. Five soil borings were drilled in various locations around the geotechnical soil boring 93-25 which was completed during work for the proposed Bayfront Festival Stores. Contamination was encountered in that soil boring, and in the environmental borings SB-1, SB-3, SB-4 and SB-5.

The limit of the contamination was defined by data collected from field observations, headspace readings and chemical results. The horizontal and vertical limits represent limits of contamination that are below the MPCA Recommended Action Limit of 50 ppm of contamination in sandy soil (from headspace data and chemical analyses). Contamination was not detected in this investigation in concentrations above the MPCA limit of 50 ppm.

The approximate horizontal limit of the contamination is outlined in Figure 4. The horizontal limits were defined from data collected from the environmental borings as well as from the headspace data from the geotechnical soil boring 93-25. The horizontal limit of the contamination was defined to the west and to the south with data from soil borings SB-1, SB-2 and SB-3 and to the north with boring SB-5. The margin of the contamination was not defined to the east because of the garage. The approximate vertical limit of the contamination remaining on site is outlined on the cross section in Figure 5. Information regarding the vertical limit was collected from the chemical analyses as well as headspace data from soil borings SB-1 and SB-3

and the geotechnical boring 93-25. Based on data from chemical analyses, none of the contamination occurs in concentrations above the MPCA action limits.

The contamination is located between 2.0 and 14.5 feet in soil boring SB-1, where headspace readings varied from 24.0 to 71.1 ppm. DRO and TPH as gasoline were not detected above the MDL at the base of that boring (14.5 feet). BTEX compounds were present in the following concentrations: benzene (0.009 ppm), ethyl benzene (<0.001 ppm), toluene (0.001 ppm), and total xylenes (0.012 ppm). The absence of TPH as gasoline and DRO above the MDL and the low concentrations of BTEX compounds indicates that the sample probably represents the base of the contaminant plume (vertical limit of the contamination).

The most contaminated zone of soil boring SB-3 is located from 2.0 to 6.5 feet deep. The OVM readings for the most contaminated zone varied from 14.6 to 18.9 ppm. TPH as gasoline was detected in concentrations of 7.6 ppm in a sample collected from the most contaminated part of that boring (3.5 feet deep). DRO was not detected above the MDL. The BTEX compounds were present in the following concentrations: benzene (0.005 ppm), ethyl benzene (<0.001 ppm), toluene (<0.001 ppm), and total xylenes (0.001 ppm). Based on the chromatographic profile of the samples, it appears as though there may be low-level fuel oil and gasoline contamination on the site.

The most contaminated boring was SB-4, through the center of the tank excavation. The headspace reading for the 9.0 to 11.0 foot interval was 280.0 ppm. The chemical analyses results from the 11.0 foot section indicated GRO was detected in 19 ppm, benzene was detected in a concentration of 0.27 ppm, toluene was detected in a concentration of 0.57 ppm, ethyl benzene was detected in a concentration of 0.28 ppm, and xylenes were detected in a concentration of 2.9 ppm. Toluene was detected in boring SB-5 (9.0 feet) in a concentration of 0.16 ppm.

Based on the horizontal and vertical limits, there is approximately 300 cubic yards of contaminated material left on the FSA Property. The contamination appears to be located within and below the fill. Contaminated soil is in contact with the groundwater, in fact, most of the contamination encountered during this study is located below the groundwater table. There are no downgradient drinking water receptors. The St. Louis River harbor is the sole down-gradient receptor.

This site is located so close to the St. Louis River Harbor that a number of factors will influence the migration of the contamination. Seiches (the fluctuation of the water level in Lake Superior due to weather fronts and wind) can cause the harbor water levels to fluctuate from 3 to 25 cm per seiche event. Mr. Keith Yetter, from the Zenith Dredge Company, indicated that the relieving wall bordering the St. Louis River Harbor has been constructed so that the area approximately 2.0 feet below the water is open to the circulation of water currents. This type of relieving wall enables the "flushing" of sediments behind the wall with fluctuating water levels in the harbor. The high water period of a seiche oscillation could cause a temporary reverse in the groundwater flow direction, potentially causing the contamination to migrate to the north (away from the harbor). Based on this information, it would seem likely that contamination is still located under the building and under the concrete loading dock immediately north of the UST excavation.

VAPOR RISK ASSESSMENT

A vapor risk assessment was completed for the FSA property. The assessment was based information regarding the soil type, type of product, building locations relative to the contamination, the locations of city sewer and water lines, and on chemical analysis data. The FSA warehouse (located immediately east of the former tank basin) is not presently in use. The building has been vacant since April or May of 1990. The building is served by city water and sewer and it does not have a basement. The threat of petroleum vapors becoming a risk in the

building is low because the building is located adjacent to the contamination. The soils on the site consist of silty sands and sands (approximate permeability of 1 x 10^{-3}), which are considered to be moderately permeable. The fill is underlain by a unit of beach sands, however it was not encountered during this investigation. The chemical fingerprints of the contaminated soil indicate that the product is probably weathered gasoline and/or fuel oil. If the product is weathered gasoline, it is likely that the most volatile components of the gasoline would have migrated or diffused. Diesel fuel is relatively viscous and is not very volatile. The chemical results from the most contaminated soil sampled collected on the site indicated low amounts of TPH as gasoline, and very low amounts of the BTEX compounds.

The data collected for the vapor risk assessment indicate that the vapor risk associated with this site is very low. This opinion is based on the location of the product (adjacent to and downgradient of the warehouse on the site), the age of the product (if it is gasoline), the low volatility and viscosity of the product (if the product is fuel oil), the chemical results which show that the BTEX compounds were detected in low amounts, and the fact that the building is vacant and has no basement. As a result of the above evidence, a vapor survey was not completed for the site.

CONCLUSIONS AND RECOMMENDATIONS

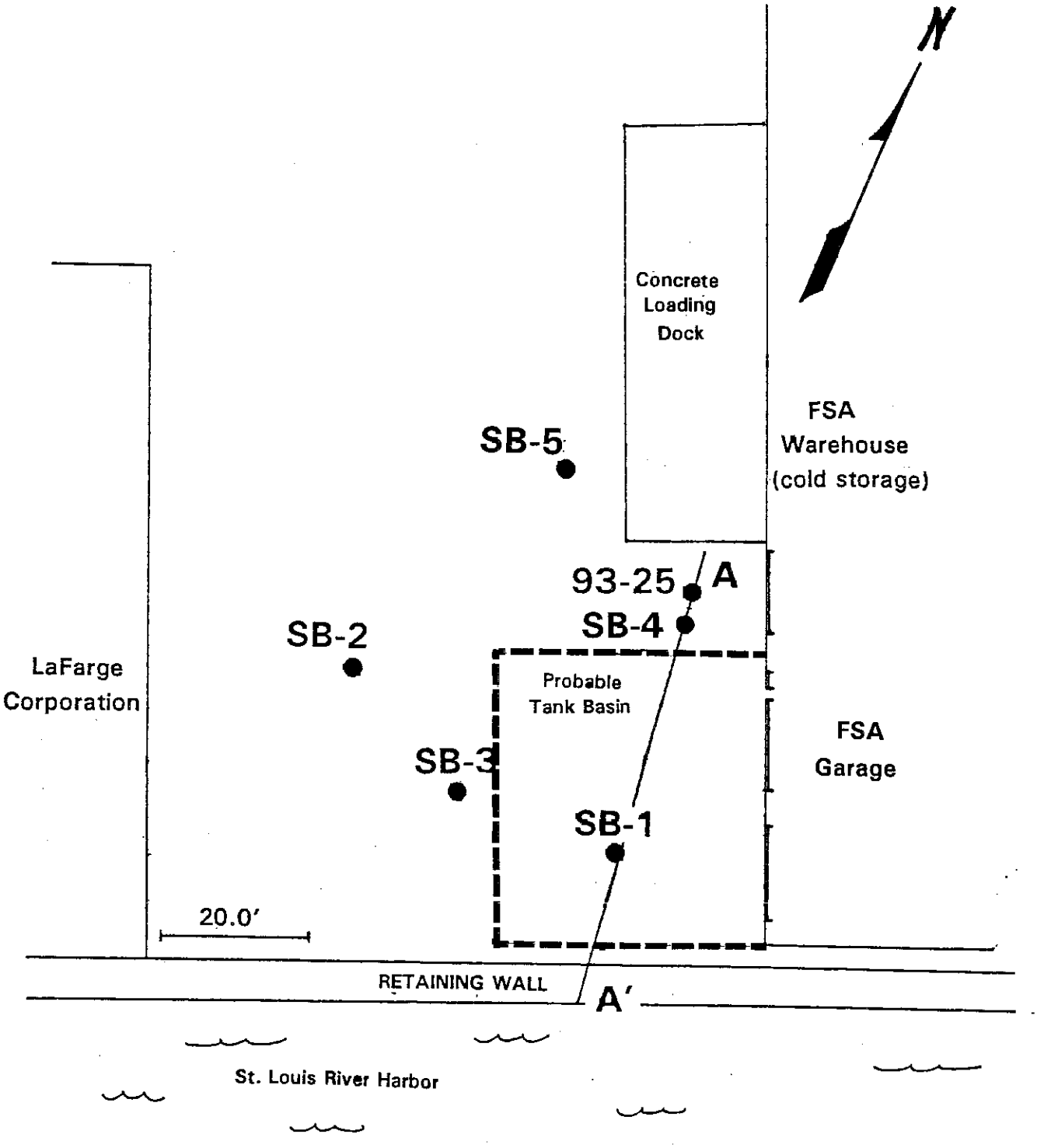
The data collected during this remedial investigation indicate that there is soil contamination remaining to the west of the FSA warehouse. The stratigraphy on the site consists of approximately 15 to 20 feet of fill which is underlain by lacustrine sands and clay. Groundwater was encountered during this investigation (estimated depth to groundwater is approximately 3.0 feet). There are no downgradient drinking water receptors. The abandoned FSA warehouse (to the east of the plume) and the LaFarge Corporation buildings are connected to city water.

Approximately 457 cubic yards of contaminated soil were removed during the underground tank excavation in 1989. There are approximately 300 yards of contaminated soil remaining on the site. The results of the headspace analyses indicate that the highest contamination is located in the geotechnical boring 93-25. Chemical analyses were not completed on samples from that boring. The results of the chemical analyses from the additional soil borings indicate that the highest concentration of product is between 2.0 and 6.5 feet deep in soil borings that were drilled south of the geotechnical soil boring 93-25 (borings SB-4 and SB-1). The remaining contamination in the soil south of the geotechnical soil boring does not exist in concentrations above the MPCA action limit of >50 ppm (for sandy soil). The vapor risk associated with the site is very low. There are no potential drinking water receptors located downgradient from this site.

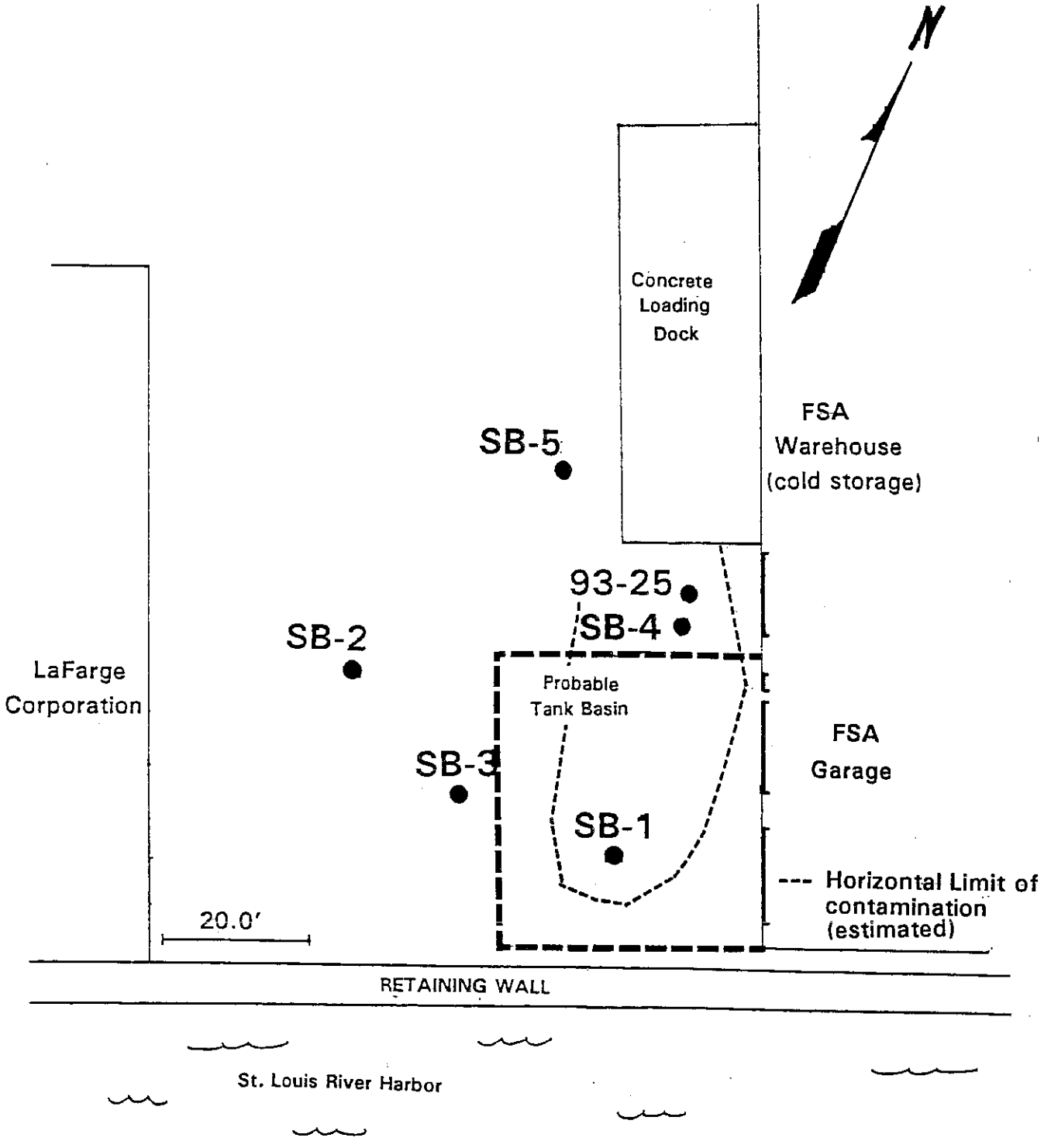
The potential for further contamination originating from the site has been significantly reduced by the removal of the UST and the removal of the most contaminated soil surrounding the tank in 1989. There may be some horizontal migration of the existing contamination, however during the course of the migration the product will attenuate and adsorb to finer particles in the soil as well as degrade naturally. The contamination on the site does not represent a threat to public health or the environment. Based on this evidence, AET recommends that the site be considered for passive bioremediation. AET recommends no further action be taken at the site and that the MPCA consider this recommendation as a request for closure.

USE OF THIS REPORT

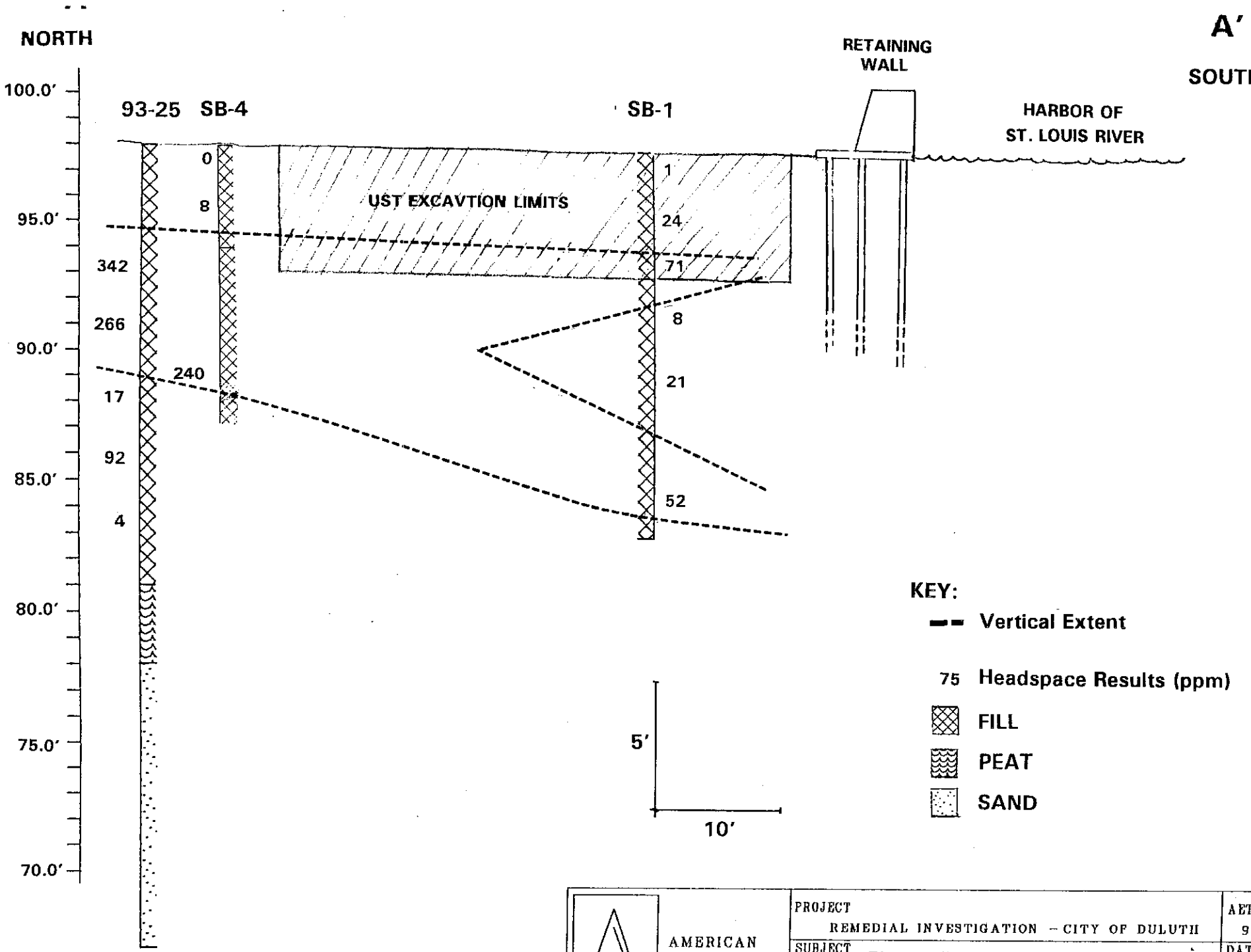
This report has been prepared for the exclusive use of the City of Duluth for specific application to the remedial investigation conducted at the Food Services of America property, 8th Avenue West and Waterfront, Duluth, Minnesota, MPCA Leak # 2094.



AMERICAN ENGINEERING TESTING, INC. DULUTH & ST. PAUL, MN	PROJECT: REMEDIAL INVESTIGATION - CITY OF DULUTH			AET JOB "" 93-7
	SUBJECT: Figure 3. Soil Boring and X-Section Locations			DATE 10/18/93
	SCALE 1:20	DRAWN BY DER	CHECKED BY TGK	PAGE



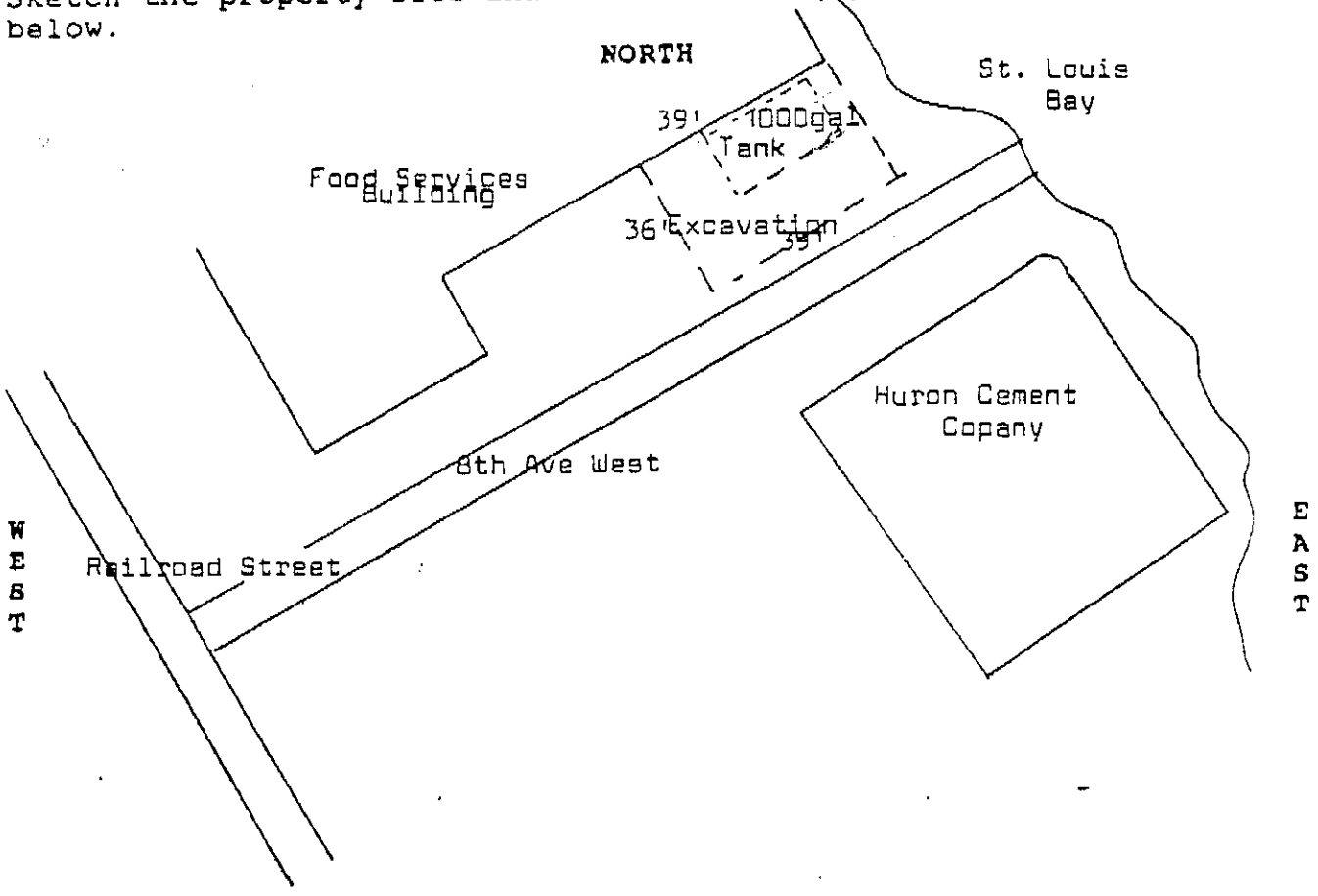
AMERICAN ENGINEERING TESTING, INC. DULUTH & ST. PAUL, MN	PROJECT REMEDIAL INVESTIGATION - CITY OF DULUTH			AET JOB NO. 93-7462
	SUBJECT Figure 4. Horizontal Extent of Contamination			DATE 10/18/93
	SCALE 1:20	DRAWN BY DER	CHECKED BY TGK	PAGE



AMERICAN ENGINEERING TESTING, INC. DULUTH & ST. PAUL, MN	PROJECT: REMEDIAL INVESTIGATION – CITY OF DULUTH			AET JOB NO. 93-7462
	SUBJECT: Figure 5. Vertical Extent of Contamination			DATE 10/18/93
	SCALE 1:24000	DRAWN BY DER	CHECKED TGK	PAGE

ADDITIONAL COMMENTS, DETAILS AND DESCRIPTIONS: The tank itself appeared to be in pretty good shape, all contaminated soil was removed to the best of the ability without destroying the standing structures. Because of high water table they were going to skim product off top of the water, then sponge off the rest before filling in with clean sand

Sketch the property site and tank location(s) in the space provided below.



SOUTH

Please fill out this form as completely as possible. Provide a copy to the local Fire Department Official and send the original form to the MPCA at the address below.

Minnesota Pollution control Agency
Tanks and Spills Section
Hazardous Waste Division
520 Lafayette Road, St. Paul, Minnesota 55155