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*Engineers and Scientists Serving
the Built and Natural Environments*

February 9, 1995

Project CNEX-95-504A

Mr. Jay Clark
B & F Distributing, Inc.
3706 Enterprise Drive SW
Rochester, MN 55902-1257

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FEB 21 1995

MPCA, HAZARDOUS
WASTE DIVISION

Re: Proposed Corrective Action Plan, Apollo 1 Service Station, 3010 West Oakland Avenue, Austin, Minnesota, MPCA LEAK #1221

Dear Mr. Clark:

Braun Intertec Corporation (Braun Intertec) has completed a proposed corrective action plan (CAD) for the referenced site. The purpose of the CAD is to address soil and groundwater contamination resulting from a release of petroleum at the site. Work performed included quarterly groundwater monitoring, an evaluation of potential risk to groundwater receptors, performing a limited feasibility study to determine appropriate actions for the site, and preliminary design of an active remediation system.

Braun Intertec previously performed a remedial investigation at the site which consisted of performing soil borings, installing monitoring wells, and conducting soil and groundwater sampling. Results of the investigation indicated that groundwater at the site had been significantly impacted, and that contamination extended vertically to depths below 40 feet. Refer to the previously submitted Remedial Investigation report (Braun Intertec, September 23, 1992) and Site Status/Groundwater Monitoring report (Braun Intertec, January 11, 1994) for details.

During the most recent phase of work, Braun Intertec installed a deep monitoring well (MW-4D) to evaluate the presence of vertical gradients and contaminant conditions at depth within the aquifer. Preliminary results of this work are presented in the Supplemental Remedial Investigation report (Braun Intertec, November 4, 1994).

In summary, it does not appear that the underlying Cedar Valley-Maquoketa aquifer is at risk from the release. Although a downward vertical gradient is present at the site, monitoring results from nested wells MW-4/MW-4D indicate that significant contaminant attenuation is occurring at depth within the aquifer. In addition, no groundwater receptors which may be at risk of being impacted by the release have been identified in the immediate area downgradient of the site.

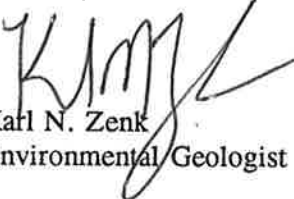
Therefore, Braun Intertec is proposing a CAD consisting of groundwater monitoring to address the dissolved plume, and passive bio-remediation (no further action) regarding soil contamination. The proposed monitoring program would include one year of quarterly


monitoring events conducted at all seven existing wells, followed by two additional years of semi-annual monitoring at MW-3, MW-4 and MW-4D.

Groundwater samples collected during the monitoring period would be analyzed for benzene, ethyl benzene, toluene and xylenes (BETX), methyl tertiary butyl ether (MTBE), and gasoline range organics (GRO). Following the completion of the proposed monitoring program, groundwater quality trends will be evaluated to determine if the plume is static or receding. If it does not appear that the plume is migrating in either the horizontal or vertical plane, then Braun Intertec will recommend site file closure.

If you have any questions regarding the attached report, or any other project-related issues, please contact Karl Zenk at (608) 781-7277.

Sincerely,


Karl N. Zenk
Environmental Geologist


James E. Doten
Branch Manager/Geologist

Attachments:
Proposed Corrective Action Design Report

c: Mr. Mark Koplitz
MPCA Tanks and Spills Section

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WASTE DIVISION

Table of Contents

A.	Site Conditions	1
B.	Groundwater Monitoring	2
C.	Groundwater Flow	2
D.	Evaluation of Corrective Action Alternatives	3
	D.1. Soil Contamination	3
	D.2. Groundwater Contamination	3

Tables:

Table 1	-	Groundwater Monitoring Results MW-1
Table 2	-	Groundwater Monitoring Results MW-2
Table 3	-	Groundwater Monitoring Results MW-3
Table 4	-	Groundwater Monitoring Results MW-4
Table 5	-	Groundwater Monitoring Results MW-5
Table 6	-	Groundwater Monitoring Results MW-6
Table 7	-	Groundwater Monitoring Results MW-4D
Table 8	-	Groundwater Elevation Summary

Figures:

Figure 1	-	Site Location Map
Figure 2	-	Site Plan
Figure 3	-	Contaminant Trends MW-3
Figure 4	-	Contaminant Trends MW-4
Figure 5	-	Monitoring Well Hydrograph
Figure 6	-	Hydrogeologic Cross Section
Figure 7	-	Groundwater Contours 10/6/94
Figure 8	-	Inferred Lateral Extent of Soil Contamination
Figure 9	-	Inferred Lateral Extent of Groundwater Contamination

Appendices:

Appendix A	-	Water Sampling Data Sheets
Appendix B	-	Groundwater Chemistry Laboratory Report

Braun Intertec Corporation (Braun Intertec) has completed a proposed corrective action design (CAD) for the Apollo 1 Jiffy Mart petroleum release site, located at 3010 West Oakland Avenue in Austin, Minnesota. The site location is depicted on Figure 1. The scope of work performed included groundwater monitoring, risk evaluation, and development of an appropriate CAD to address the release.

A. Site Conditions

The site is located in an area characterized by a complex assemblage of end moraine glacial deposits overlying bedrock. Unconsolidated sediments at the site consist of gray calcareous glacial till underlain by approximately 10 to greater than 15 feet of poorly graded sand outwash. Beneath the outwash is a non-calcareous sandy clay glacial till with sand lenses and stringers.

During the remedial investigation, groundwater was encountered within the upper till unit at an approximate depth of 8 to 10 feet below grade. Based on field observations and grain size distribution, this till unit did not appear to readily transmit water (low permeability). However, the underlying sand unit was waterbearing and exhibited relatively high permeability. Because the sand unit appeared to form the uppermost aquifer, monitoring wells were screened below the water table in the zone of relatively high permeability. Refer to Figure 2 for locations of borings and monitoring wells installed during the investigation.

Previous groundwater monitoring results indicated that petroleum contaminants were present at depth within the sand unit in significant concentrations and are increasing over time. The groundwater plume extends off site laterally and vertically below the sand unit. Recent water quality data from monitoring well MW-4D indicates that contamination is migrating vertically within the lower till unit.

The Cedar Valley Formation which forms part of the Cedar Valley-Maquoketa aquifer is present at the site underlying the glacial deposits. The Cedar Valley formation is hydraulically connected to the overlying till and outwash deposits. Based on information provided by the Minnesota Pollution Control Agency (MPCA), downward vertical gradients have been present at petroleum release sites located in the vicinity of this site. It is reported that petroleum contaminants at the other site have migrated a distance of greater than 80 feet vertically downward within the uppermost aquifer.

B. Groundwater Monitoring

On October 6, 1994, groundwater samples were collected from all seven existing wells (MW-1 through MW-6 and MW-4D). Sampling was performed in accordance with MPCA guidelines. Prior to sample collection, stabilization tests were performed at each well to ensure that samples were representative of aquifer conditions. Samples were collected in clean, 40-milliliter, VOA glass vials, labelled and transported to the Braun Intertec laboratory under standard chain-of-custody procedures. Stabilization and sampling data are included as Appendix A.

Samples collected during the monitoring event were analyzed for benzene, ethyl benzene, toluene and xylenes (BETX), methyl tertiary butyl ether (MTBE) and gasoline range organics (GRO). In summary, elevated levels of petroleum constituents were detected in MW-3 and MW-4. Volatile organic contaminant levels (BETX) were not present in MW-4D above method detection limits. GRO was present in this well at 330 micrograms per liter ($\mu\text{g/L}$). With the exception of MTBE, targeted parameters were not present in MW-1, MW-2, MW-5 and MW-6. Groundwater results are summarized in Tables 1 through 7. A Complete laboratory analytical report is contained in Appendix B.

Contaminant levels in MW-3 have remained relatively stable during 1994 with slight decreases in some compounds. Benzene and GRO concentrations averaged 350 $\mu\text{g/L}$ and 10,250 $\mu\text{g/L}$, respectively. Contaminant concentrations at MW-4 exhibited a steady increase from September 15, 1993, through May 12, 1994, followed by a short term decrease before returning to relatively high levels. Concentration versus time graphs for MW-3 and MW-4 are attached on Figures 3 and 4.

C. Groundwater Flow

Water levels were measured in all seven wells on October 6, 1994. Groundwater elevations are summarized in Table 8. A monitoring well hydrograph (Figure 5) is also attached. As shown in the hydrograph, hydraulic head in the aquifer fluctuates significantly over time, ranging in average elevation from 1,222 feet AMSL to 1,229 feet NGVD. The average elevation of the upper till/outwash unit interface is approximately 1,223 feet NGVD. As shown on Figure 6 (hydrogeologic cross section), the sand unit is fully saturated the majority of time.

Water level measurements taken on October 6, 1994, are contoured on Figure 7. The observed groundwater flow direction beneath the site on this date was southwest, consistent with flow measured during periods when the water table was higher. On the vacant property west of the site, groundwater flow is consistently westward. Horizontal hydraulic gradient on October 6, 1994, was 0.023, which is consistent with previous observations.

Only one round of water level measurements have been collected since MW-4D was installed and developed. Groundwater elevations measured at well nest MW-4 and MW-4D on October 6, 1994, were used to calculate vertical gradient. Gradient was calculated by dividing the difference in hydraulic head at MW-4 and MW-4D by the vertical distance between mid-screen elevations, resulting in a downward vertical gradient of 0.13.

D. Evaluation of Corrective Action Alternatives

D.1. Soil Contamination

As discussed in the Remedial Investigation report (Braun Intertec, September 23, 1992), a significant volume of contaminated soil is present at the site. Based on boring results, it appears that the zone of contamination extends laterally from the frontage road south beyond the tank basin including the pump islands. The estimated limits of contamination are depicted on Figure 6. The majority of soil contamination is restricted to the smear zone, encountered between 7.5 and 10 feet below grade. However, relatively high level vadose zone contamination is present in a limited area in the northern portion of the site (see Figure 8).

Several remedial alternatives were evaluated for applicability at the site, including excavation and disposal, soil vapor extraction and passive bio-remediation. Based on results of the limited risk assessment performed by Braun Intertec, it appears that this site can be assigned a low-risk status. Therefore, in accordance with MPCA regulations, passive bio-remediation (no further action) has been chosen as the soil corrective action alternative.

D.2. Groundwater Contamination

As previously discussed, a laterally and vertically extensive groundwater contaminant plume has developed at the site. Groundwater monitoring results indicate that the plume extends several hundred feet west of the apparent source, and vertically beyond 50 feet below the surface. Groundwater contamination appears to be preferentially migrating within the



saturated sand unit present at an average depth of 15 feet below grade. The inferred lateral limits of groundwater contamination are illustrated on Figure 9.

Although a comparison of groundwater elevation measurements taken at nested wells MW-4/MW-4D indicate the presence of a downward vertical gradient at the site, based on water quality results, significant downward migration of petroleum contaminants is not occurring. Contaminant levels at MW-4D were at or near detection limits, indicating that the underlying Cedar-Valley Makoqueta aquifer is not at significant risk of being impacted.

Because elevated levels of dissolved contaminants remain on site, it is unlikely that site file closure would be approved at this time. Therefore, Braun Intertec proposes that a two-year groundwater monitoring program be implemented at the site to evaluate contaminant trends. Water quality data obtained during this period will be used to determine if the groundwater plume is continuing to migrate either laterally or vertically, potentially increasing the risk of impacts to groundwater receptors.

A total of four quarterly monitoring events are proposed during the first year of monitoring. During each event, water quality samples and water levels will be collected from all seven existing wells (MW-1, MW-2, MW-3, MW-4, MW-4D, MW-5 and MW-6). Samples will be analyzed for BETX, MTBE and GRO. Water levels will be used to construct contour maps and evaluate vertical gradients. Monitoring results will be forwarded to the MPCA quarterly during the first year.

During the second year of monitoring, samples will be collected from MW-3, MW-4, and MW-4D semi-annually and analyzed for B, MTBE and GRO. Water levels will continue to be measured at all wells and hydrologic data analyzed. Semi-annual monitoring reports will be submitted to the MPCA as required.

Water quality and groundwater flow results will be evaluated during the monitoring period. If, following completion of the two-year program, it appears that contaminant levels have exhibited a decreasing trend or have remained stable (indicated a stagnant plume), Braun Intertec will submit a site closure request to the MPCA.

If the plume appears to continue migrating, as exhibited by increasing contaminant trends in downgradient wells, Braun Intertec will discuss possible additional work which may be required to address the release.

Figures

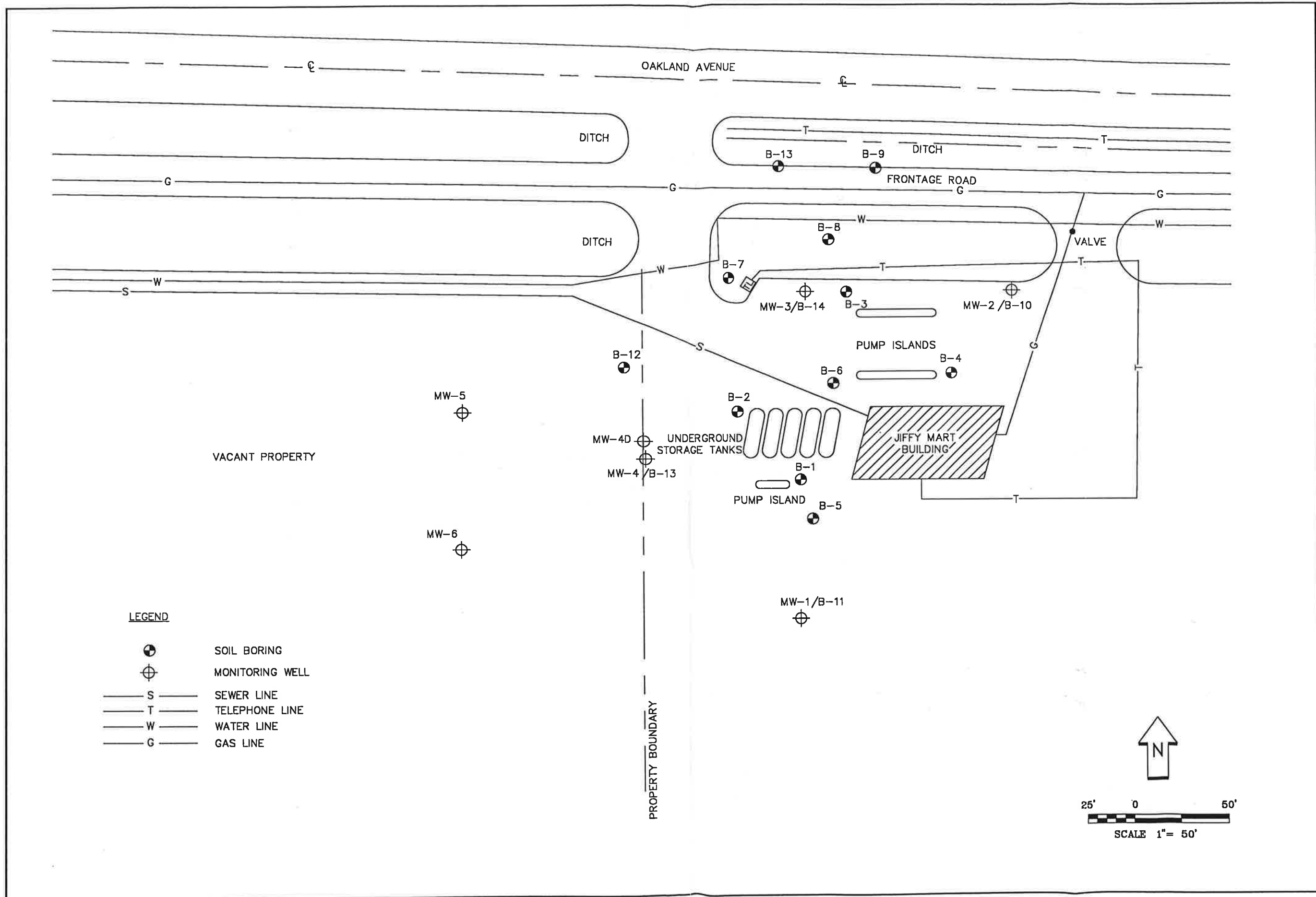


AUSTIN WEST, MINN.
 NE/4 HAYWARD 15' QUADRANGLE
 N4337.5-W9300/7.5
 1982
 DMA 7371 II NE-SERIES V872







SITE LOCATION MAP
 REMEDIAL INVESTIGATION
 JIFFY MART
 AUSTIN, MN.

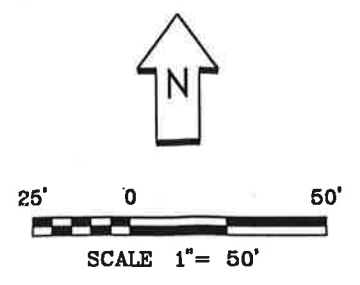
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DRAWN BY: KNZ	11/22/91	1
APP'D BY:		OF
JOB No. CMKX-91-0319		2
DWG.No.	FIGURE#	1
SCALE 1"=2000'		

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INTERTEC



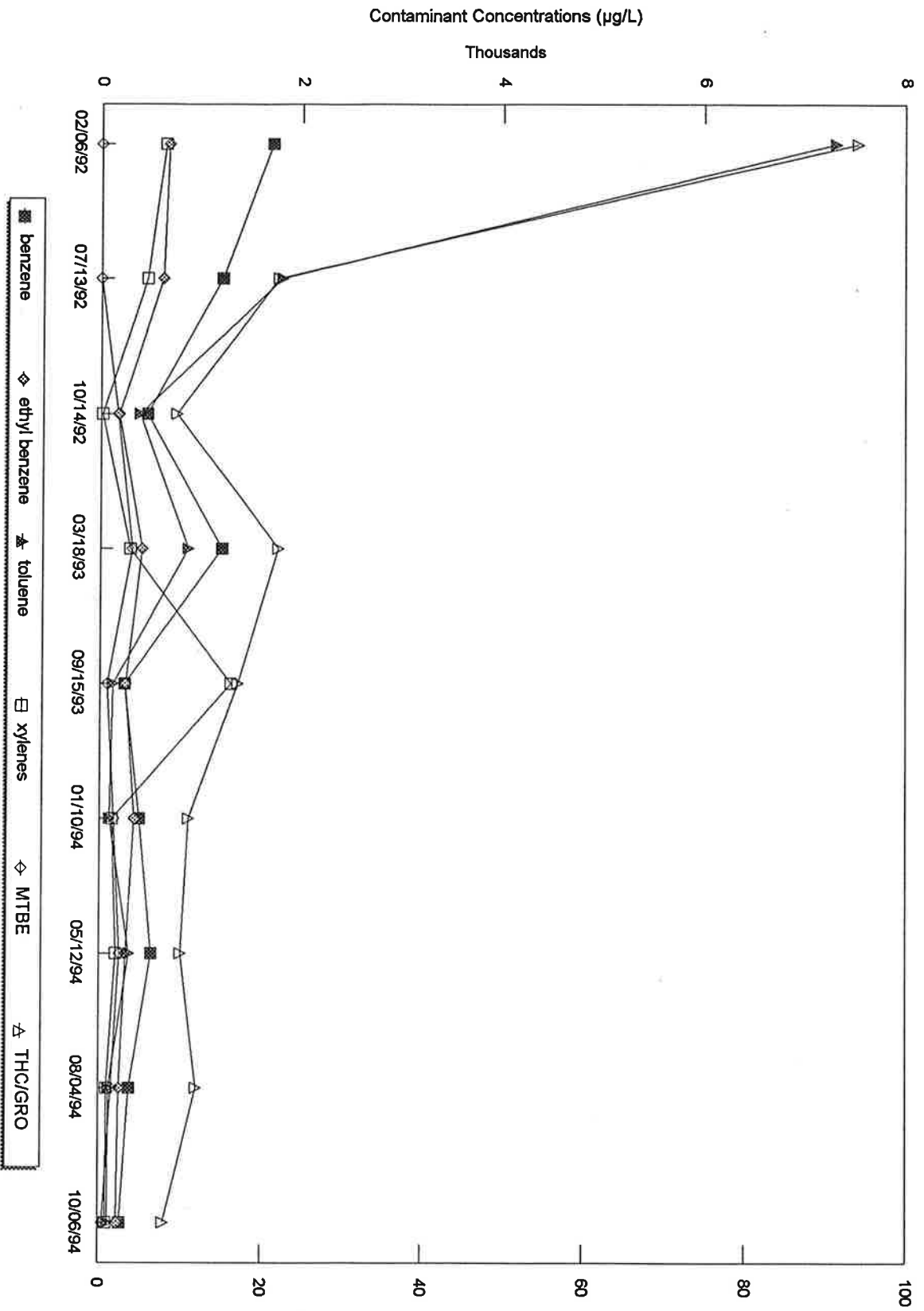
LEGEND

-  SOIL BORING
-  MONITORING WELL
-  SEWER LINE
-  TELEPHONE LINE
-  WATER LINE
-  GAS LINE



INT	DATE
DRAWN BY: LOL	10-24-94
APP'D BY: KMZ	1-31-95
JOB No. CNEX-95-504A	
DWG. No. NE5504A1	SHEET OF 11
SCALE 1" = 50'	2

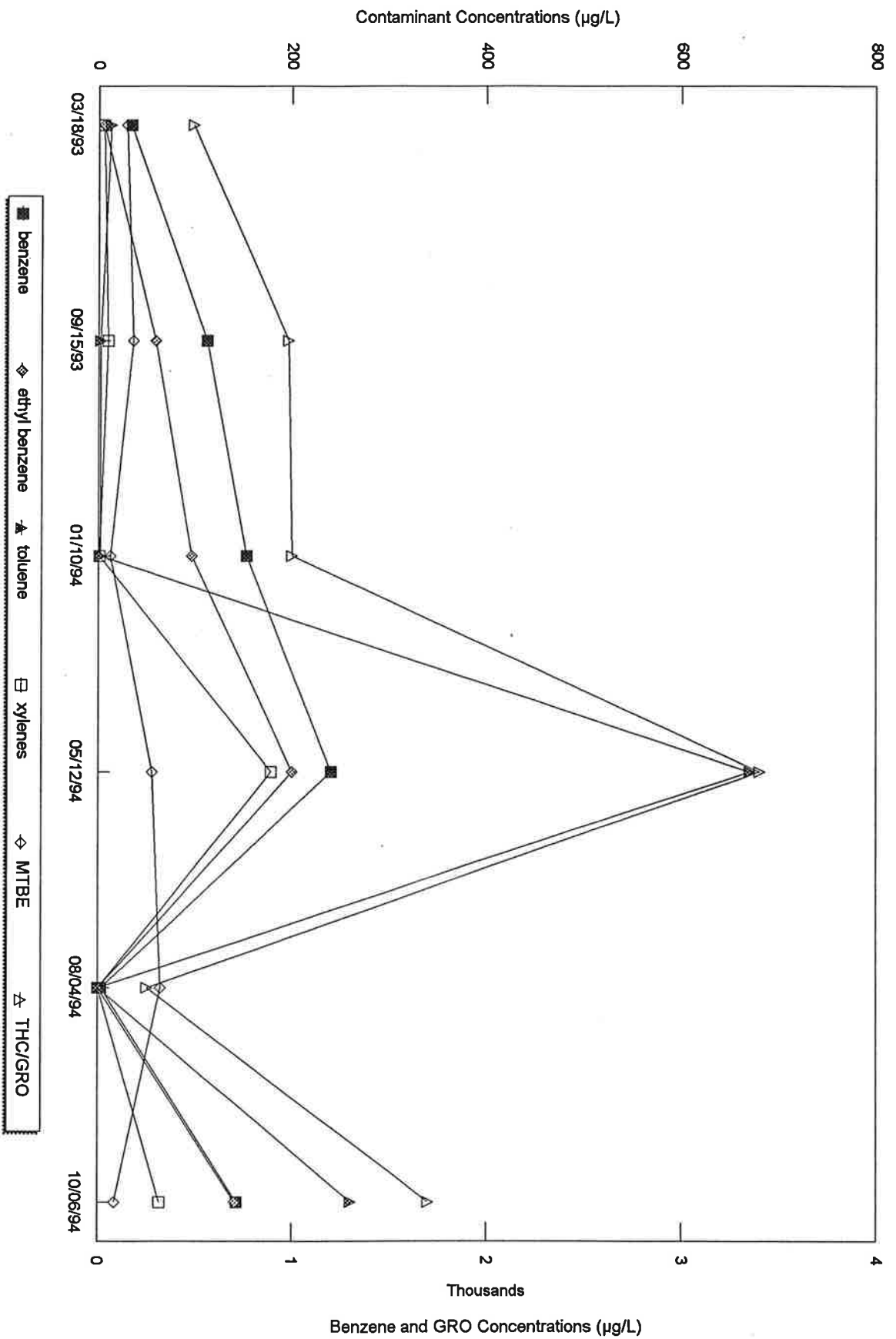
FIGURE NO. 2



INT	DATE	SHEET
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APPD BY: KNZ	01/26/95	OF
JOB No. CNEK-95-504A		
DWG. No.	FIGURE#	
SCALE		3

GROUNDWATER CONTAMINATION TRENDS FOR MW-3
 Groundwater Monitoring Summary
 Apollo 1/Jiffy Mart/Petroleum Release Site
 Austin, Minnesota

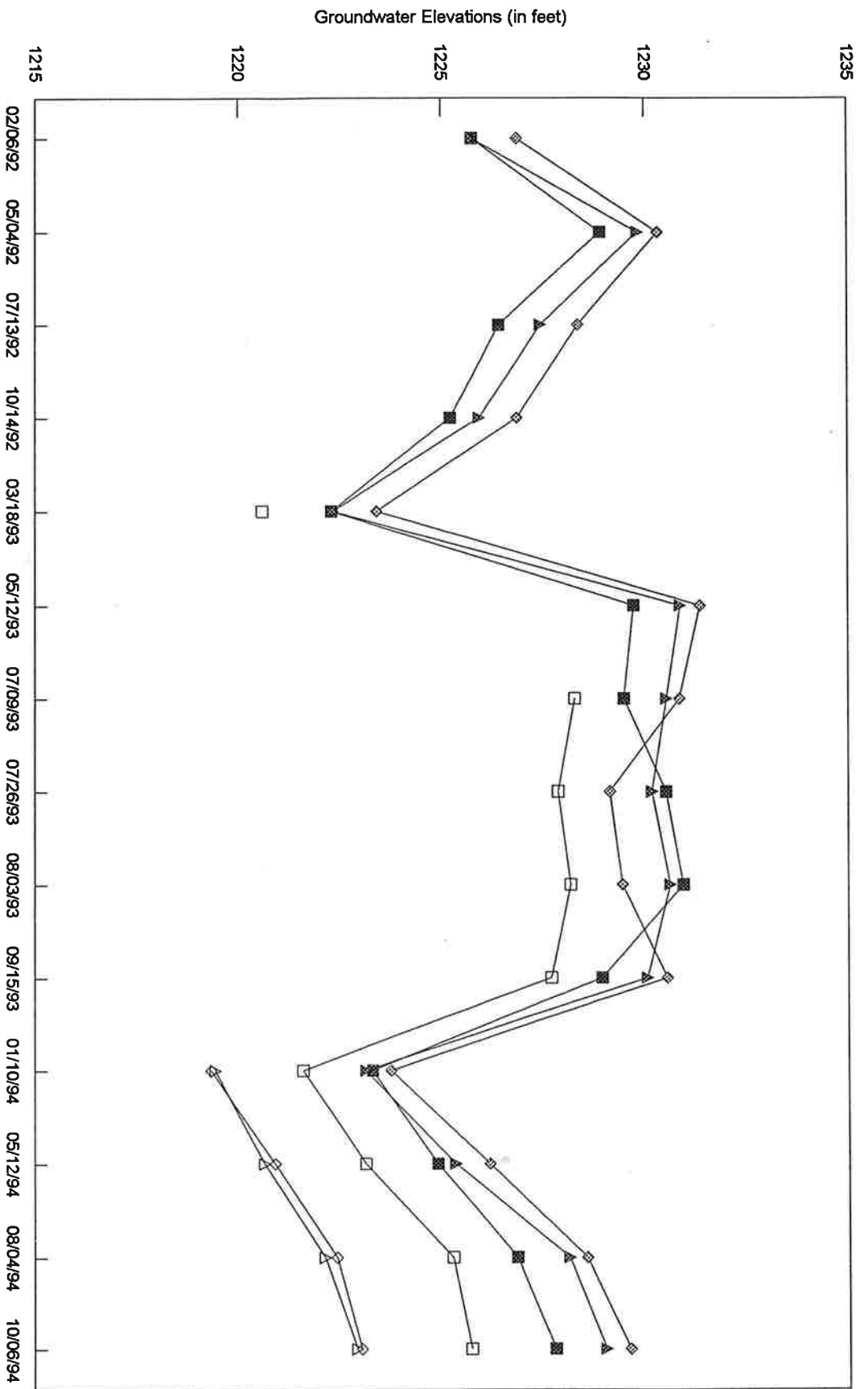




INT	DATE	SHEET
DRAWN BY: RMF	01/26/95	
APPD BY: KNZ	01/26/95	OF
JOB No. CNEX-95-504A		
DWG.No.	FIGURE#	
SCALE	4	

GROUNDWATER CONTAMINATION TRENDS FOR MW-4
 Groundwater Monitoring Summary
 Apollo 1/Jiffy Mart Petroleum Release Site
 Austin, Minnesota



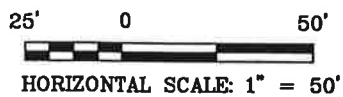
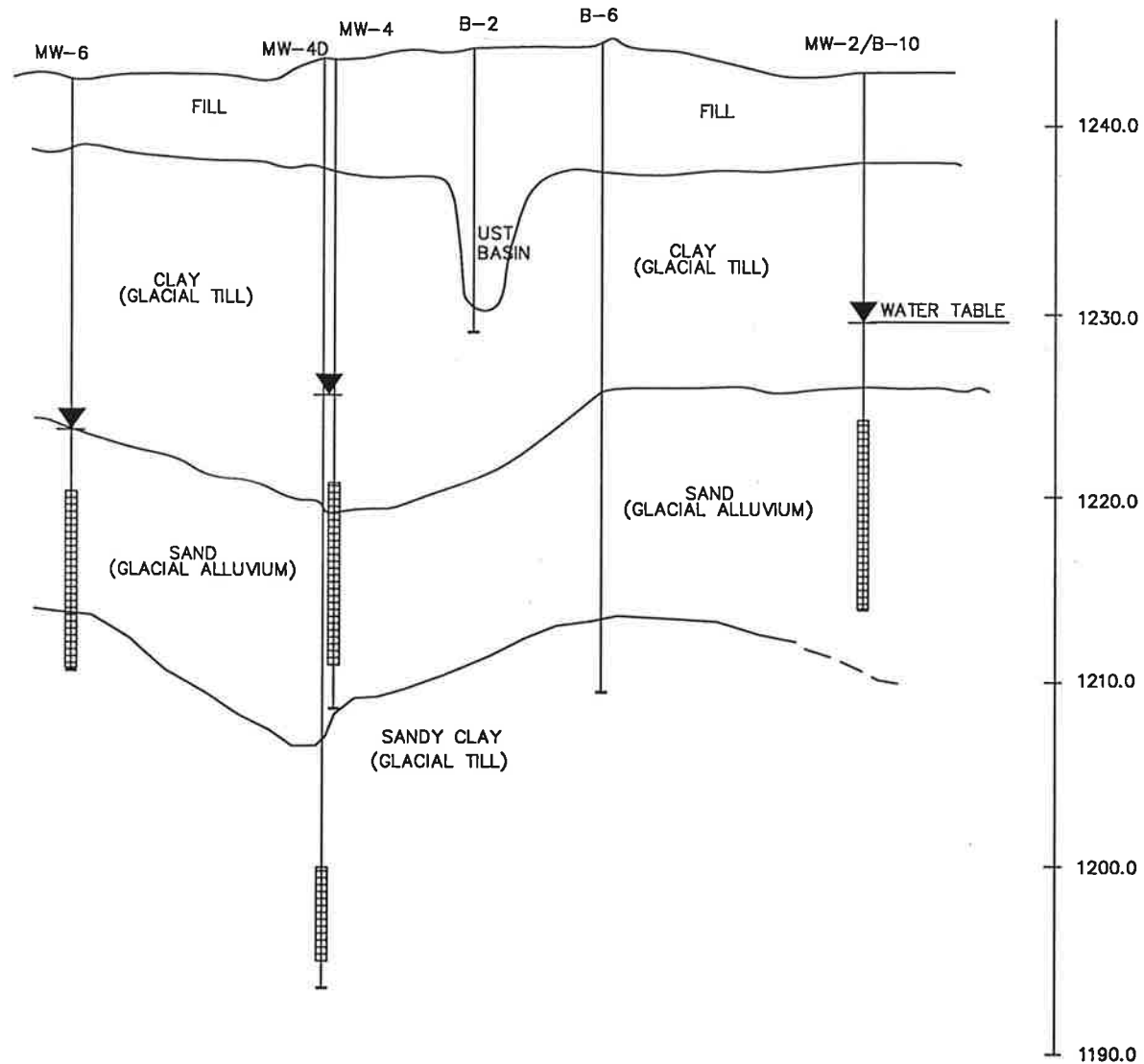


mw-1
 mw-2
 mw-3
 mw-4
 mw-5
 mw-6

INT	DATE	SHEET
DRAWN BY: RMF	01/26/95	
APPD BY: KNZ	01/26/95	OF
JOB No. CNEX-95-504A		
DWG.No.	FIGURE#	
SCALE		5

GROUNDWATER ELEVATION TRENDS
 Groundwater Monitoring Summary
 Apollo 1/Jiffy Mart Petroleum Release Site
 Austin, Minnesota

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LEGEND

▼ WATER LEVELS - 10/6/94

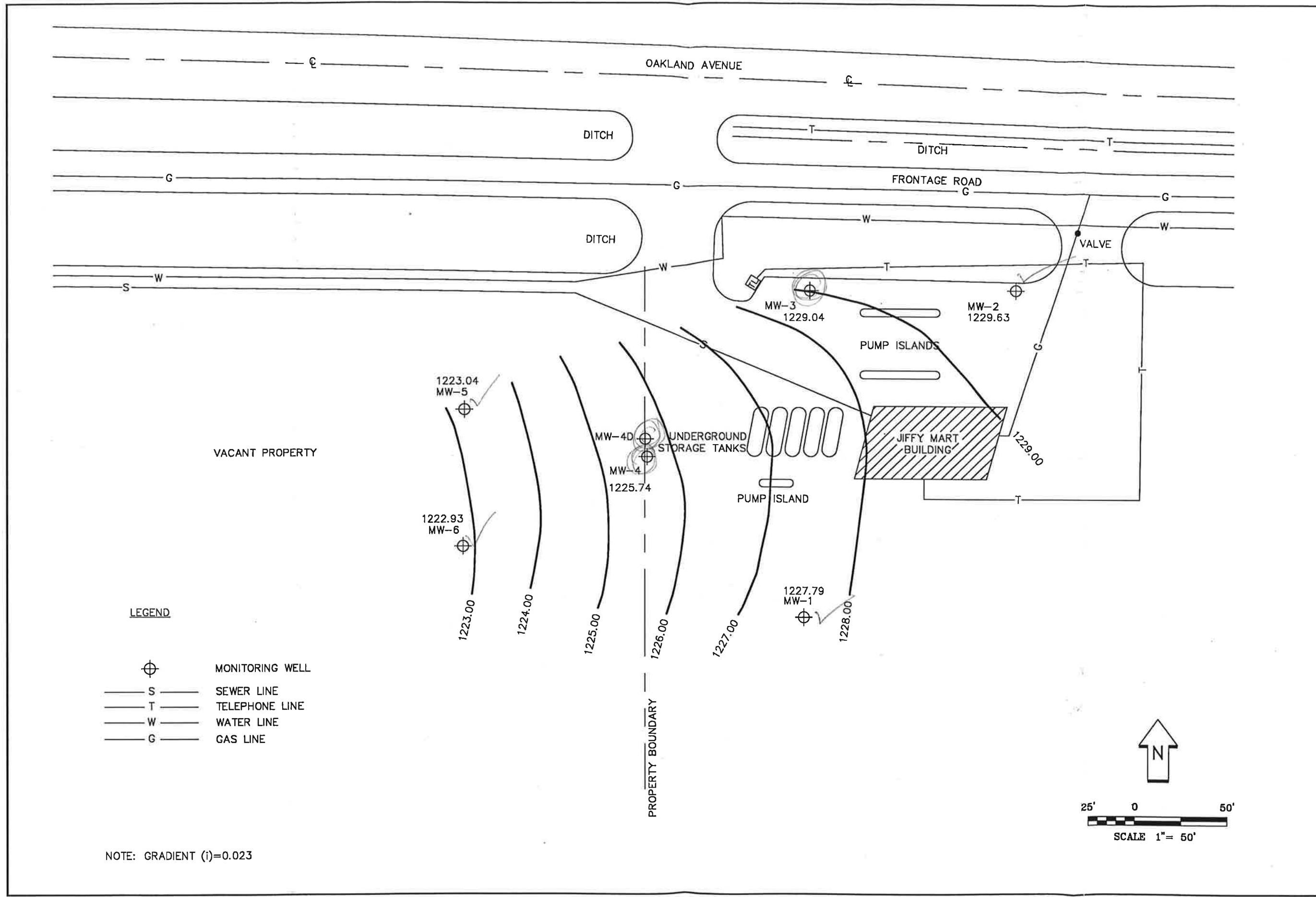
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INTERTEC

HYDROGEOLOGIC CROSS SECTION
CORRECTIVE ACTION DESIGN
APOLLO JIFFY MART
AUSTIN, MINNESOTA

INT	REVISION	SHEET
DRAWN BY: LOL	10-24-94	6
APP'D BY: KMZ	1-31-95	OF
JOB No. CNEX-95-504A		11
DWG. No. NE5504A2	FIGURE NO.	
SCALE AS SHOWN		6

INT	DATE	10-24-94
DRAWN BY: LOL	APP'D BY: KMZ	1-31-95
JOB No. CNEX-95-504A	DWG. No. NE5504A1	SHEET OF 7
SCALE 1" = 50'		11

FIGURE NO. 7



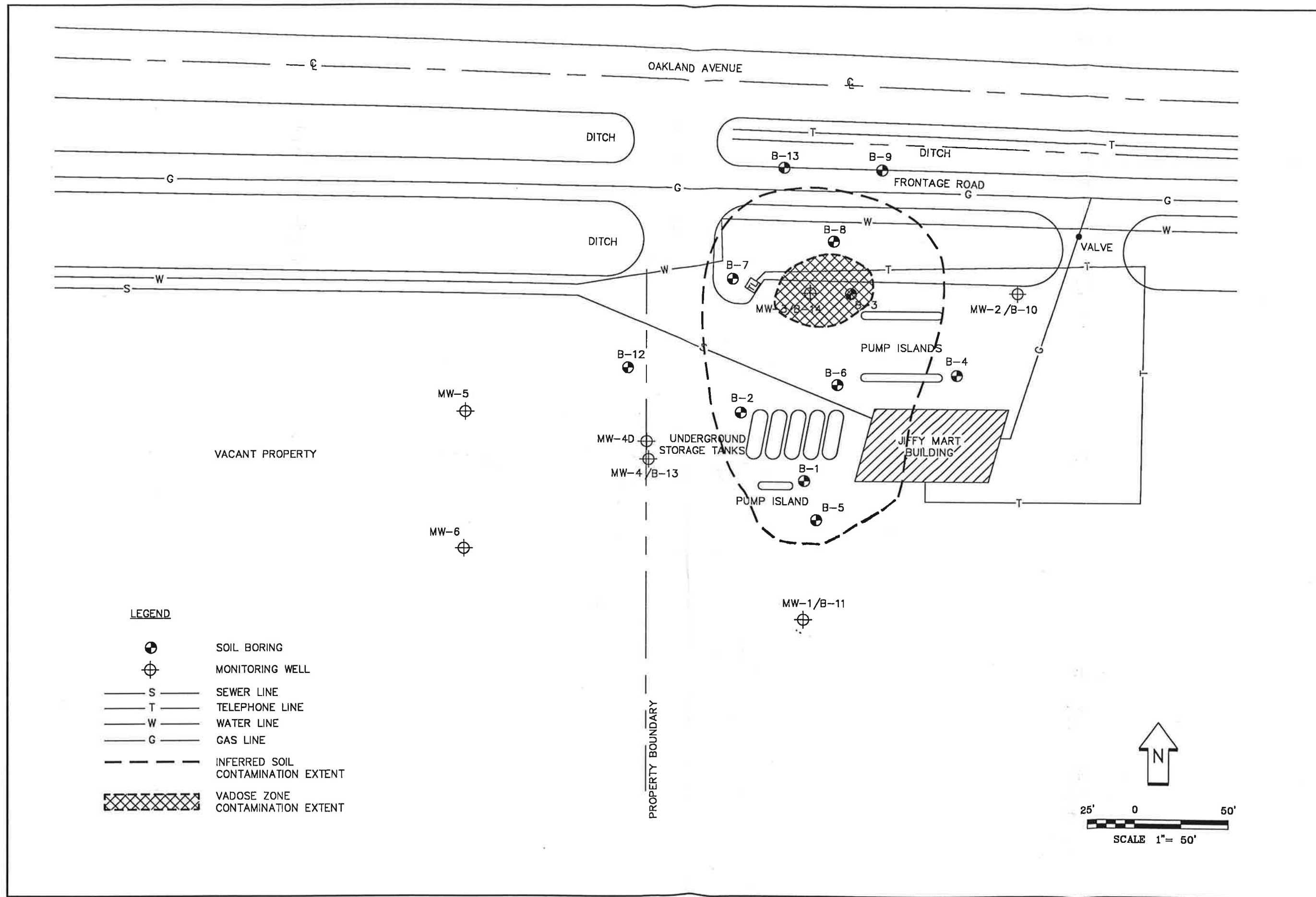
LEGEND

- ⊕ MONITORING WELL
- S — SEWER LINE
- T — TELEPHONE LINE
- W — WATER LINE
- G — GAS LINE

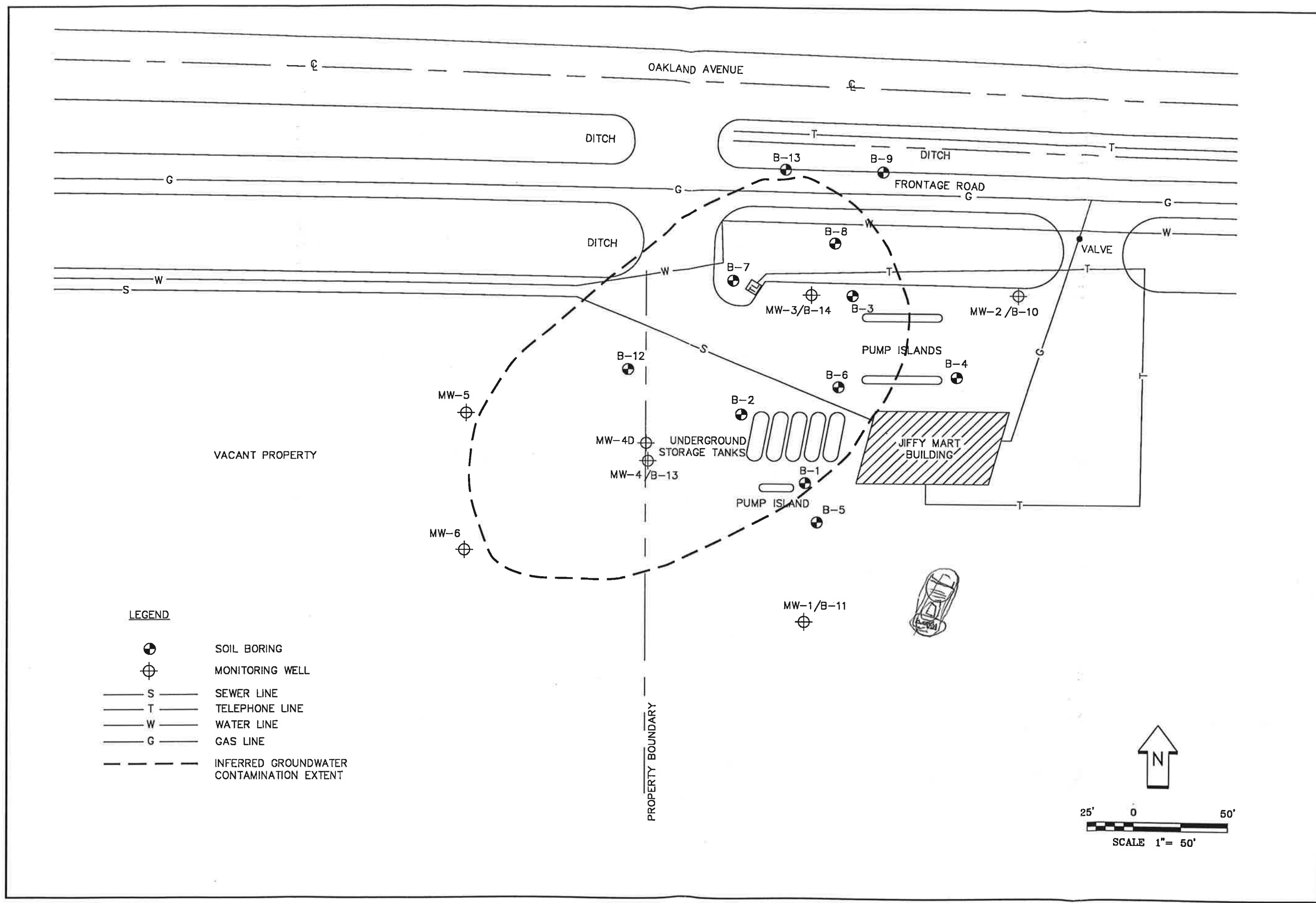
NOTE: GRADIENT (i)=0.023

INT	DATE
DRAWN BY: LOL	10-24-94
APPD BY: KMZ	1-31-95
JOB No. CNEX-95-504A	
DWG. No. NE5504A1	SHEET OF 8 11
SCALE 1" = 50'	

FIGURE NO. 8



INT	DATE
DRAWN BY: LOL	10-24-94
APP'D BY: KMZ	1-31-95
JOB No. CNEX-95-504A	
DWG. No. NE5504A1	SHEET OF 11
SCALE 1" = 50'	9



Tables

CNEX-95-504A Apollo 1 Petroleum Release Site
 3010 West Oakland Avenue
 Austin, Minnesota

Groundwater Monitoring Summary

MW-1

Organics (µg/L):	02/06/92	07/13/92	10/14/92	03/18/93	09/15/93	01/10/94	05/12/94	08/04/94	10/06/94
Benzene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethyl Benzene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes, Total	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methyl Tertiary Butyl Ether	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	23
THC as Gasoline	<100	<100	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics	NA	NA	<100	<100	<100	<100	<100	<100	<100
Total Lead	<2.0	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA=Not Analyzed

Table 1

CNEX-95-504A Apollo 1 Petroleum Release Site
 3010 West Oakland Avenue
 Austin, Minnesota

Groundwater Monitoring Summary

MW-2

Organics (µg/L):	02/06/92	07/13/92	10/14/92	03/18/93	09/15/93	01/10/94	05/12/94	08/04/94	10/06/94
Benzene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethyl Benzene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes, Total	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methyl Tertiary Butyl Ether	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	29
THC as Gasoline	<100	<100	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics	NA	NA	<100	<100	<100	<100	<100	<100	<100
Total Lead	<2.0	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA=Not Analyzed

Table 2

CNEX-95-504A Apollo 1 Petroleum Release Site
 3010 West Oakland Avenue
 Austin, Minnesota

Groundwater Monitoring Summary

MW-3

Organics (µg/L):	GC/MS DUP									
	02/06/92	07/13/92	07/13/92	10/14/92	03/18/93	09/15/93	01/10/94	05/12/94	08/04/94	10/06/94
Benzene	1700	1200	710	460	1200	240	390	510	300	210
Ethyl Benzene	670	610	630	180	410	250	340	260	200	180
Toluene	7300	1800	1100	380	870	130	100	290	100	92
Xylenes, Total	8000	5700	3400	200	3660	16140	1497	2030	946	932
Methyl Tertiary Butyl Ether	<1.0	<1.0	<1.0	170	310	73	140	200	120	40
THC as Gasoline	94000	22000	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics	NA	NA	NA	9400	22000	17000	11000	10000	12000	8000
Total Lead	9	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Lead	NA	NA	NA	2	NA	NA	NA	NA	NA	NA

NA=Not Analyzed

Table 3

CNEX-95-504A Apollo 1 Petroleum Release Site
 3010 West Oakland Avenue
 Austin, Minnesota

Groundwater Monitoring Summary

MW-4

Organics (µg/L):	03/18/93	09/15/93	01/10/94	05/12/94	08/04/94	10/06/94
Benzene	170	560	760	1200	16	710
Ethyl Benzene	5.4	59	96	200	<1.0	140
Toluene	13	2.2	2.1	670	<1.0	260
Xylenes, Total	5.4	10	1.4	178	<1.0	63
Methyl Tertiary Butyl Ether	29	36	12	55	64	17
THC as Gasoline	NA	NA	NA	NA	NA	NA
Gasoline Range Organics	490	980	1000	3400	250	1700
Total Lead	NA	NA	NA	NA	NA	NA
Dissolved Lead	NA	NA	NA	NA	NA	NA

NA=Not Analyzed

Table 4

CNEX-95-504A Apollo 1 Petroleum Release Site
 3010 West Oakland Avenue
 Austin, Minnesota

Groundwater Monitoring Summary

MW-5

Organics (µg/L):	01/10/94	05/12/94	08/04/94	10/06/94
Benzene	<1.0	<1.0	<1.0	<1.0
Ethyl Benzene	<1.0	<1.0	<1.0	<1.0
Toluene	<1.0	<1.0	<1.0	<1.0
Xylenes, Total	<1.0	<1.0	<1.0	<1.0
Methyl Tertiary Butyl Ether	<1.0	1.3	<1.0	5.2
THC as Gasoline	NA	NA	NA	NA
Gasoline Range Organics	<100	<100	<100	<100
Total Lead	NA	NA	NA	NA
Dissolved Lead	NA	NA	NA	NA

NA=Not Analyzed

Table 5

CNEX-94-504A Apollo 1 Petroleum Release Site
 3010 West Oakland Avenue
 Austin, Minnesota

Groundwater Monitoring Summary

MW-6

Organics (µg/L):	01/10/94	05/12/94	08/04/94	10/06/94
Benzene	<1.0	<1.0	<1.0	<1.0
Ethyl Benzene	<1.0	<1.0	<1.0	<1.0
Toluene	<1.0	<1.0	<1.0	<1.0
Xylenes, Total	<1.0	<1.0	<1.0	<1.0
Methyl Tertiary Butyl Ether	<1.0	<1.0	<1.0	<1.0
THC as Gasoline	NA	NA	NA	NA
Gasoline Range Organics	<100	<100	<100	<100
Total Lead	NA	NA	NA	NA
Dissolved Lead	NA	NA	NA	NA

NA=Not Analyzed

Table 6

CNEX-95-504A Apollo 1 Petroleum Release Site
3010 West Oakland Avenue
Austin, Minnesota

Groundwater Monitoring Summary

MW-4D

Organics (µg/L):	10/06/94
Benzene	<1.0
Ethyl Benzene	<1.0
Toluene	<1.0
Xylenes, Total	<1.0
Methyl Tertiary Butyl Ether	13
THC as Gasoline	NA
Gasoline Range Organics	330
Total Lead	NA
Dissolved Lead	NA

NA=Not Analyzed

Table 7