

WARDROP Engineering Inc.

COPY FOR THE INFORMATION OF

Mr. Rick Lemoine

C.1097

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Mr. Rod Kakowchyk, B.A.
Manager, Industrial Engineering
Carte International Inc.
1995 Logan Avenue
Winnipeg, Manitoba R2R 0H8

Dear Mr. Kakowchyk:

**Re: Site Monitoring and Ground Water Sampling Following Site Remediation
Carte International Inc., Winnipeg, Manitoba**



961292-03-00
January 17, 1997

Site monitoring undertaken at the above site between October 24 and December 7, 1996, indicated no significant environmental concerns. Petroleum hydrocarbon vapour concentrations within each of the monitoring wells are much lower than prior to remediation of the site. A trace amount of free product was observed on the water surface in recovery well RW-1 prior to winter freeze-up. Free product was not observed in any of the monitoring wells or recovery well RW-2. Laboratory analyses of a ground water sample collected from RW-1, following pumping of the well, revealed only trace concentrations of Benzene and Total Extractable Hydrocarbons.

The following report details the site monitoring and sampling undertaken on October 24, November 5, November 22, November 26, and December 7, 1996 (i.e., all environmental work undertaken following the submission of our October 30, 1996 report entitled "Site Remediation").

A site plan is provided as Figure 1, attached.

SITE MONITORING

The monitoring well inspection data are listed in Table 1, attached and summarized below.

Petroleum Hydrocarbon Vapours

Hydrocarbon vapour monitoring was undertaken by Carte personnel with a portable GMI combustible gas detector on November 5, and December 7, 1996. The hydrocarbon vapour concentrations ranged from 3 to 814 ppm in each of the accessible monitoring wells during the respective monitoring inspections. The outdoor monitoring wells were not accessible on December 7, 1996. Generally, the hydrocarbon vapours in the outdoor wells show a decreasing trend since remediation of the site and are much lower than prior to site

...2

40 Years of Progress

Mr. Rod Kakowchuk, B.A.
Carte International Inc.

January 17, 1997

Petroleum Hydrocarbon Vapours (cont'd)

remediation. The hydrocarbon vapours in the indoor wells are much lower than prior to remediation of the site, but show a slight overall increase in concentrations since site remediation. The November 5, 1996 hydrocarbon vapour data are contoured on Figure 2 and the December 7, 1996 hydrocarbon vapour data are listed on Figure 3, attached (the December 7 data could not be contoured due to the limited amount of data points).

Static Ground Water Levels

Static ground water level monitoring was undertaken by Carte personnel with a Solinist interface probe on October 24, November 5, November 22, and December 7, 1996. The overall ground water levels in each of the monitoring wells decreased by an average of 0.2 m during this period. The October 24 and November 5, 1996, monitoring data indicate variable ground water flow directions at the site with ground water flow toward the excavation, inside the plant; toward Logan Avenue to the west of the plant; and, toward Ada street to the east of the plant. The October 5 and November 5, 1996 monitoring data are contoured on Figures 4 and 5, respectively. Since only the indoor monitoring wells could be monitored on November 22, and December 7, 1996, the ground water data could not be contoured; these data are listed on Figures 6 and 7, respectively.

Free Product Monitoring

Free product level monitoring was undertaken by Carte personnel with a Solinist interface probe and by visual observation with a dedicated disposable bailer on October 24, November 5, November 22, and December 7, 1996. Free product was not detected by the interface probe or observed in any of the bailer samples; however, a rainbow sheen was observed on the surface of recovery well RW-1 prior to winter freeze-up.

A-1 sewage pumped approximately 4000 L from RW-1 on November 25, 1996, and transported the ground water off-site for treatment and disposal. Approximately 8 cm of ice was broken by Carte personnel to allow for pumping. Ice build-up, following pumping, prevented the visual observation of any returning free product.

GROUND WATER SAMPLING

A ground water sample was collected from RW-1 on November 26, 1996 by Wardrop personnel and submitted to Enviro-Test Laboratories in Winnipeg. The ground water sample analytical results indicated a Benzene concentration of 0.0009 mg/L and a Total Extractable Hydrocarbon concentration of 0.350 mg/L. Toluene, Ethylbenzene, and Xylenes were not detected in the water sample. These concentrations are less than the Canadian Council of Ministers of the Environment Guidelines for Drinking Water Quality; therefore, the ground water in the vicinity of RW-1 does not currently pose an environmental concern.

Mr. Rod Kakowchyk, B.A.
Carte International Inc.

January 17, 1997

The analytical results are listed in Table 2, attached.

Our next monitoring report will detail the December 18, 1996, and January 14, 1997 monitoring inspections.

Please call if you have any questions.

Sincerely,

WARDROP ENGINEERING INC.



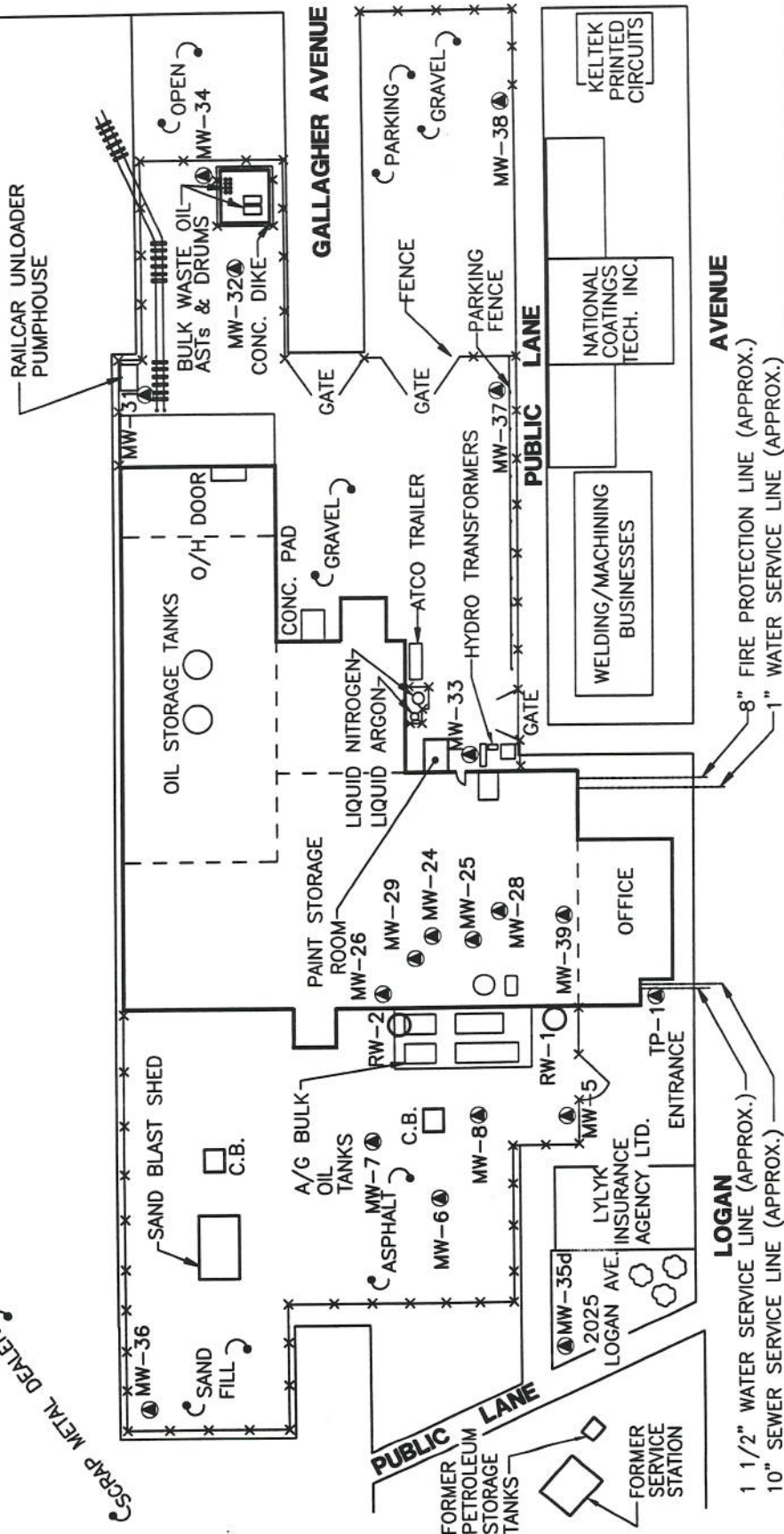
Edward A. Wolowich, M.Sc., P.Eng.
Principal and Manager
Environmental Earth Sciences

EAW/pp

Attachment

Copy Dr. Kevin Ridley, ERM-Ontario, Inc.
Mr. Harry Ethans, ENSIS
Mr. Rick Lemoine, Manitoba Environment

CSRAP METAL DEALER



CARTE-1

CLIENT CARTE CARTE INTERNATIONAL INC.	DESCRIPTION SITE REMEDIATION 1995 LOGAN AVENUE - WINNIPEG, MANITOBA SITE PLAN SHOWING RECOVERY WELL AND MONITORING WELL LOCATIONS DESIGNED BY: J.E.B. DRAWN BY: P.C.F. DWG. NO. CHECKED BY: E.A.W. DATE: 96/12/19 961292-03-00 FIG.1
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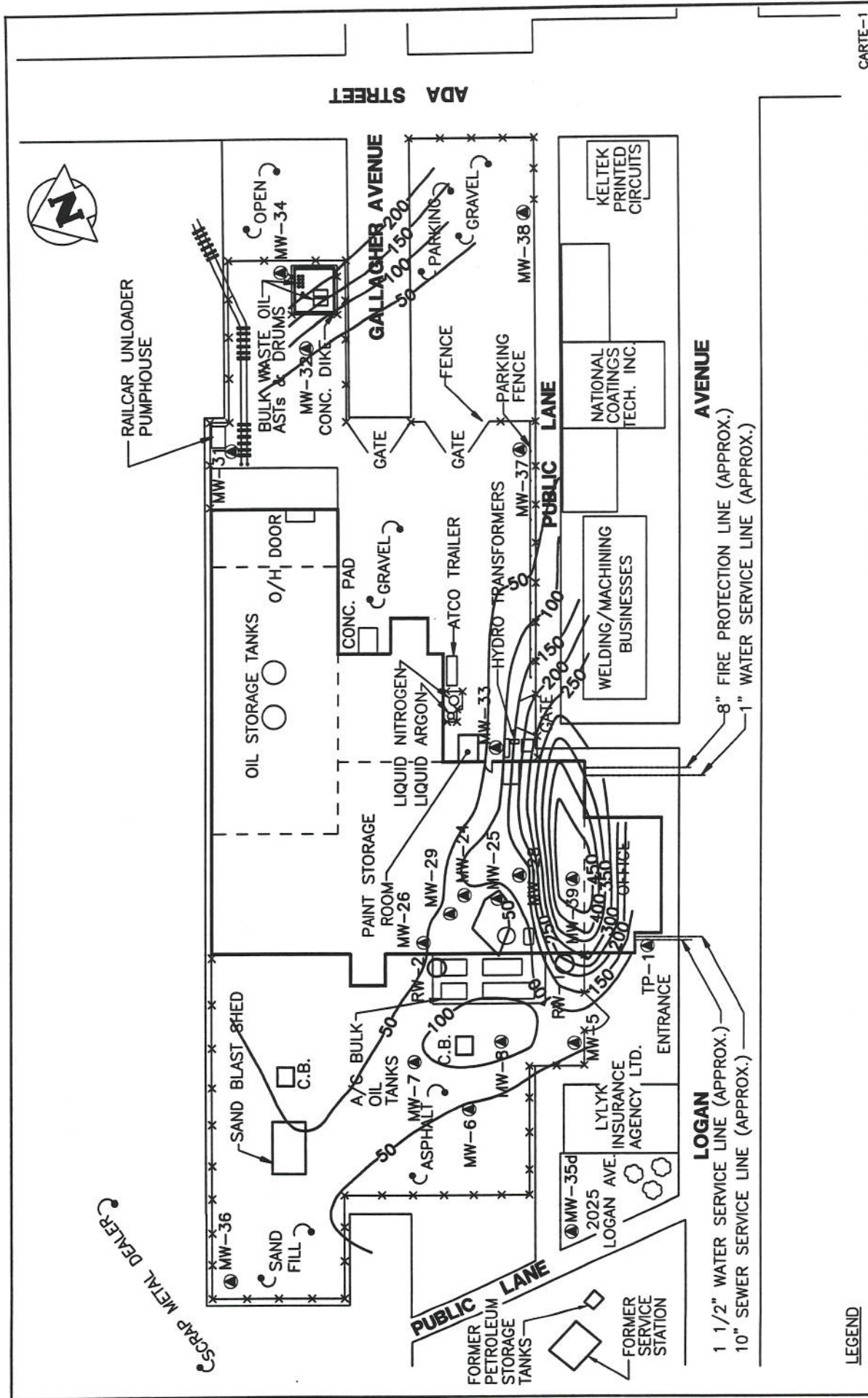


LEGEND

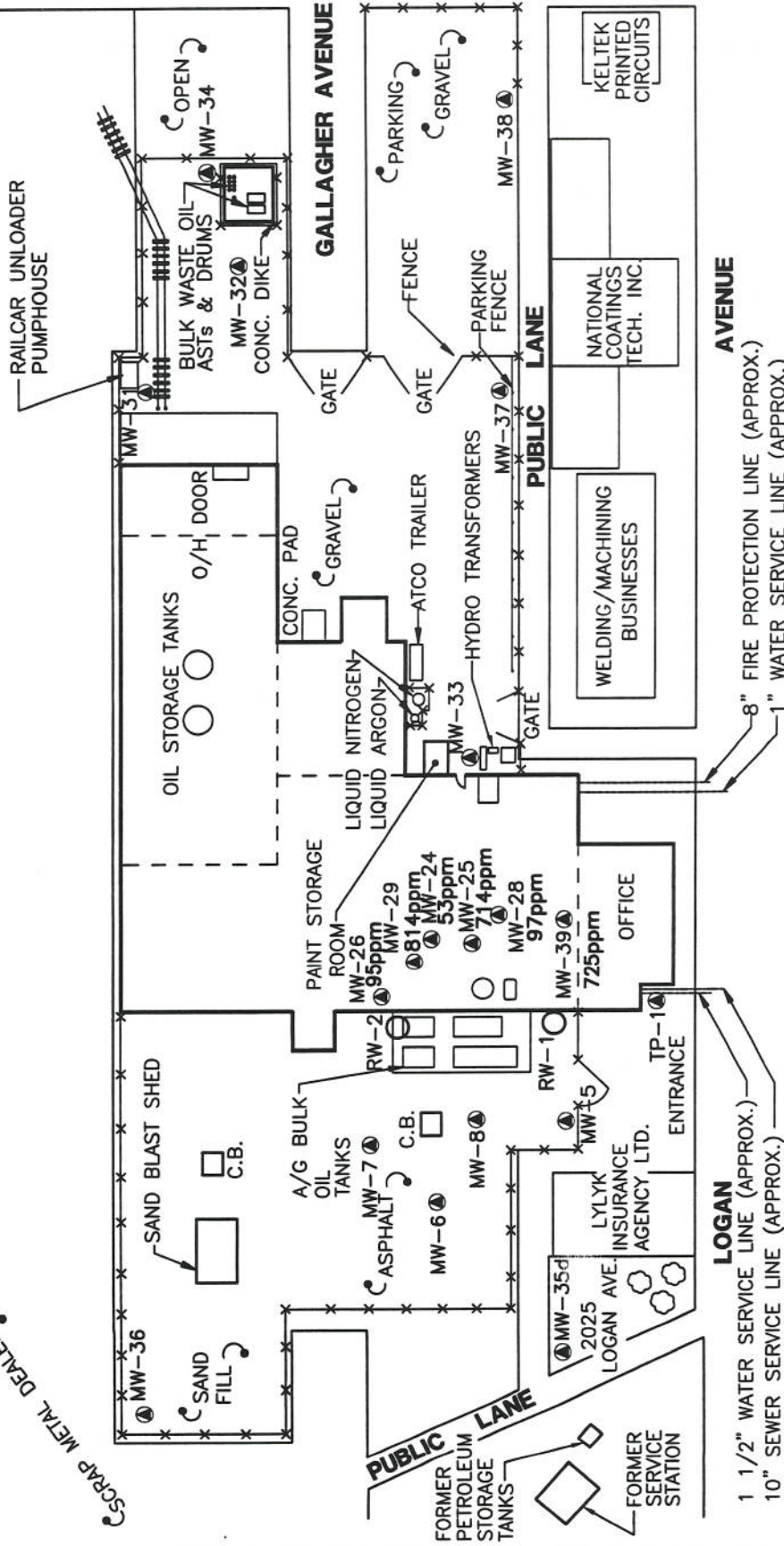
- MONITORING WELL
- RECOVERY WELL
- C.B. CATCH BASIN (LOCATION APPROX.)
- *— FENCE

WARDROP ENGINEERING INC.

WINNIPEG TORONTO THUNDER BAY



SCRAP METAL DEALER



LEGEND

- MONITORING WELL
- RECOVERY WELL

HYDROCARBON VAPOUR
CONCENTRATIONS (ppm)

C.B.
(LOCATION APPROX.)

—*— FENCE



CLIENT



CARTE INTERNATIONAL INC.

DESCRIPTION

SITE REMEDIATION

1995 LOGAN AVENUE - WINNIPEG, MANITOBA
SITE PLAN SHOWING HYDROCARBON VAPOUR
CONCENTRATIONS (PPM) - DECEMBER 7, 1996

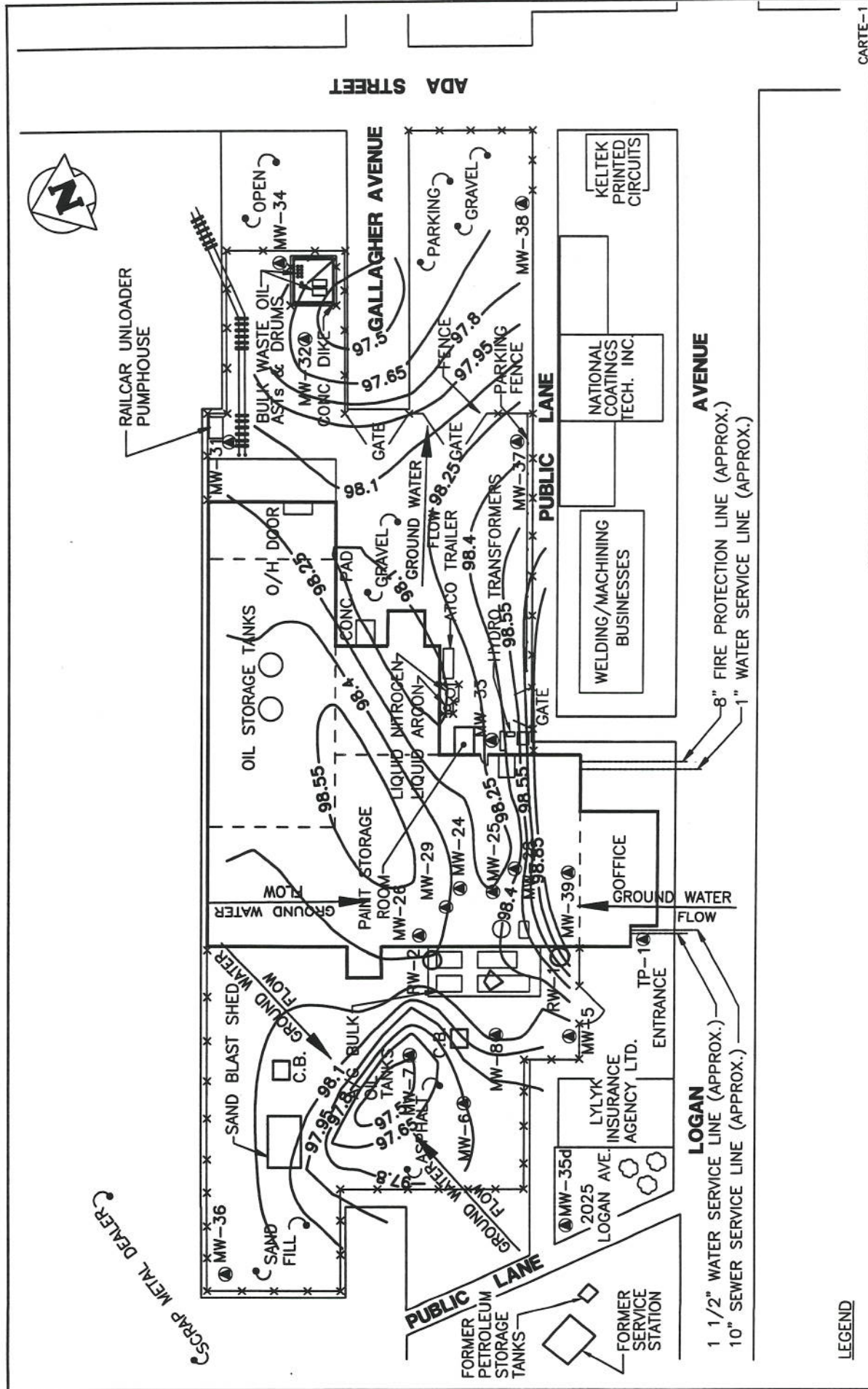
DESIGNED BY: J.E.B. DRAWN BY: P.C.F. DWG. NO.

CHECKED BY: E.A.W. DATE: 96/12/19 961292-03-00 **FIG.3**

WARDROP ENGINEERING INC.

WINNIPEG TORONTO THUNDER BAY

CARTE-1



LEGEND

- MONITORING WELL
- RECOVERY WELL
- C.B. CATCH BASIN (LOCATION APPROX.)
- 98.4- GROUND WATER ELEVATIONS (m ABOVE DATUM)
- * FENCE



CLIENT

CARTE International Inc.
CARTE INTERNATIONAL INC.

DESCRIPTION

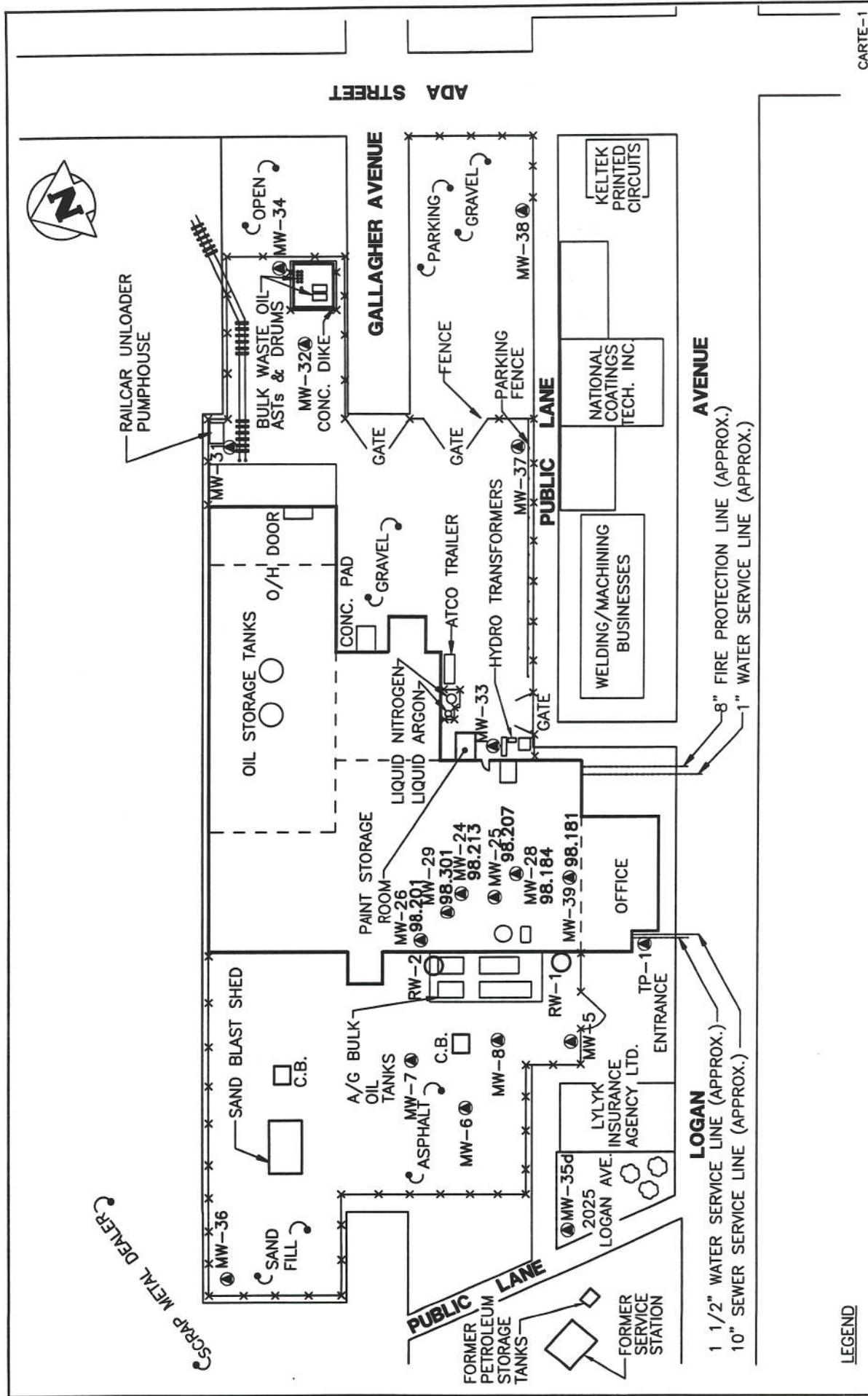
SITE REMEDIATION
1995 LOGAN AVENUE - WINNIPEG, MANITOBA
SITE PLAN SHOWING GROUND WATER ELEVATIONS
OCTOBER 24, 1996

DESIGNED BY: J.E.B. DRAWN BY: P.C.F. DWG. NO.
 CHECKED BY: E.A.W. DATE: 96/12/19 961292-03-00

FIG.4

WARDROP ENGINEERING INC.
 WINNIPEG TORONTO THUNDER BAY





LEGEND

- MONITORING WELL
- RECOVERY WELL
- C.B. CATCH BASIN (LOCATION APPROX.)
- 98.213 GROUND WATER ELEVATIONS (m ABOVE DATUM)
- *— FENCE



CLIENT



CARTE INTERNATIONAL INC.

DESCRIPTION

SITE REMEDIATION

1995 LOGAN AVENUE - WINNIPEG, MANITOBA
SITE PLAN SHOWING GROUND WATER ELEVATIONS
NOVEMBER 22, 1996

DESIGNED BY: J.E.B. DRAWN BY: P.C.F. DWG. NO.

CHECKED BY: E.A.W. DATE: 96/12/19 961292-03-00

FIG.6

WARDROP ENGINEERING INC.
WINNIPEG TORONTO THUNDER BAY

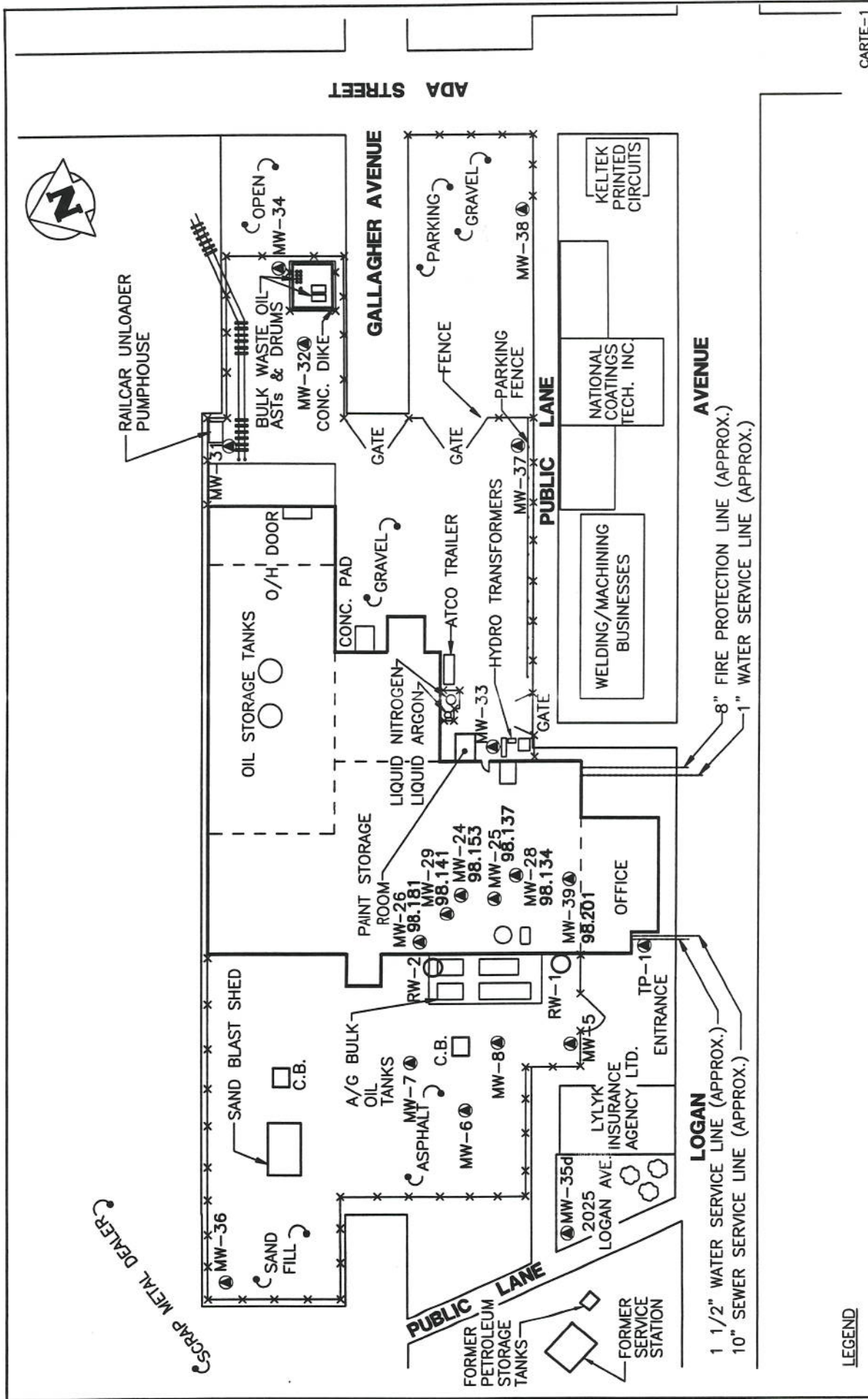


Table 1
October 24 to December 7, 1996
Site Monitoring Following Site Remediation
Carte International Inc.
1995 Logan Avenue, Winnipeg, Manitoba

Well I.D.	Well Elevation	Static Water Level				Static Water Elevation				Hydrocarbon Vapour		Free Product Thickness			
		24-Oct	05-Nov	22-Nov	07-Dec	24-Oct	05-Nov	22-Nov	07-Dec	05-Nov	07-Dec	24-Oct	05-Nov	22-Nov	07-Dec
OUTDOOR MONITORING WELLS															
TP-1	N/A	1.610	1.570	N/A	N/A	N/A	N/A	N/A	N/A	5	N/A	nil	nil	N/A	N/A
MW-5	99.310	1.150	1.160	N/A	N/A	98.16	98.15	N/A	N/A	58	N/A	nil	nil	N/A	N/A
MW-6	99.145	1.350	1.270	N/A	N/A	97.795	97.875	N/A	N/A	42	N/A	nil	nil	N/A	N/A
MW-7	99.368	1.870	1.850	N/A	N/A	97.498	97.518	N/A	N/A	100	N/A	nil	nil	N/A	N/A
MW-8	99.145	0.850	0.810	N/A	N/A	98.295	98.335	N/A	N/A	123	N/A	nil	nil	N/A	N/A
MW-31	99.220	1.050	0.970	N/A	N/A	98.17	98.25	N/A	N/A	8	N/A	nil	nil	N/A	N/A
MW-32	99.124	1.600	1.030	N/A	N/A	97.524	98.094	N/A	N/A	60	N/A	nil	nil	N/A	N/A
MW-33	99.416	1.130	1.080	N/A	N/A	98.286	98.336	N/A	N/A	68	N/A	nil	nil	N/A	N/A
MW-34	99.309	1.360	1.240	N/A	N/A	97.949	98.069	N/A	N/A	244	N/A	nil	nil	N/A	N/A
MW-35	99.315	1.380	1.310	N/A	N/A	97.935	98.005	N/A	N/A	16	N/A	nil	nil	N/A	N/A
MW-36	99.155	0.775	0.735	N/A	N/A	98.38	98.42	N/A	N/A	55	N/A	nil	nil	N/A	N/A
MW-37	99.731	1.380	1.530	N/A	N/A	98.351	98.201	N/A	N/A	3	N/A	nil	nil	N/A	N/A
MW-38	99.373	1.710	1.800	N/A	N/A	97.663	97.573	N/A	N/A	46	N/A	nil	nil	N/A	N/A
RW-1	N/A	1.340	1.520	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	trace	trace	N/A	N/A
RW-2	N/A	1.550	1.000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	nil	nil	N/A	N/A

INDOOR MONITORING WELLS

MW-24	99.453	1.120	1.140	1.240	1.300	98.333	98.313	98.213	98.153	113	53	nil	nil	nil	nil
MW-25	99.457	1.130	1.150	1.250	1.320	98.327	98.307	98.207	98.137	18	714	nil	nil	nil	nil
MW-26	99.451	0.995	0.92	1.250	1.270	98.456	98.531	98.201	98.181	42	95	nil	nil	nil	nil
MW-28	99.454	1.160	1.18	1.270	1.320	98.294	98.274	98.184	98.134	121	97	nil	nil	nil	nil
MW-29	99.461	1.100	1.14	1.160	1.320	98.361	98.321	98.301	98.141	79	814	nil	nil	nil	nil
MW-39	99.571	N/A	1.21	1.390	1.370	99.571	98.361	98.181	98.201	507	725	nil	nil	nil	nil

Note: Hydrocarbon Vapours are Referenced to Hexane
trace = Less than 2mm
LEL = Lower Explosive Limit
ppm = parts per million
125 ppm = 1 % LEL

TABLE 2

November 26, 1996
 Ground Water Sample Analytical Results for Petroleum Hydrocarbons
 Carte International Inc.
 1995 Logan Avenue, Winnipeg, Manitoba

Parameter	RW-1 (mg/L)	CCME ¹ Drinking Water Criteria (mg/L)
BTEX:		
Benzene	0.0009	0.005
Toluene	<0.0005	≤0.024
Ethylbenzene	<0.0005	≤0.0024
Xylenes ²	<0.0010	≤0.300
Total Purgeable Organics (TPO)	<0.1	N.G.
Total Extractable Hydrocarbons (TEH)	0.350	N.G.
Mineral Oil and Grease	<1.0	N.G.
Note: ¹ Canadian Council of Ministers of the Environment Guideline, "Interim Canadian Environmental Quality Criteria for Contaminated Sites," 1991 ² Summation of m,o, and p xylenes N.G. = No Guideline ≤ = signifies an aesthetic objection, as well		

Enviro-Test Laboratories
Manitoba Technology Centre
Phone: (204) 945-3705

FAX and Mail

CHEMICAL ANALYSIS REPORT

Wardrop Engineering Inc
400 386 Broadway Ave
Winnipeg MB R3C 4M8

DATE: December 3 1996

ATTN: HYRICH J

Lab Work Order #: W961109771 Sampled By: Hyrich J

Project Reference: 961292-03-00

Project P.O. #: _____ Date Received: 96/11/26

Comments:

APPROVED BY: _____

Paul Nicolas
Project Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

ACCREDITATIONS: STANDARDS COUNCIL OF CANADA (SCC), IN COOPERATION WITH THE CANADIAN ASSOCIATION FOR
ENVIRONMENTAL ANALYTICAL LABORATORIES (CAEAL): FOR SPECIFIC TESTS AS REGISTERED BY
THE COUNCIL (EDMONTON, CALGARY, WINNIPEG)
AMERICAN INDUSTRIAL HYGIENE ASSOCIATION (AIHA): FOR INDUSTRIAL HYGIENE ANALYSIS
(EDMONTON, WINNIPEG)
AGRICULTURE CANADA: UNDER THE CANADIAN FERTILIZER QUALITY ASSURANCE PROGRAM (SASKATOON)

ENVIRO - TEST CHEMICAL ANALYSIS REPORT

LAB ID	SAMPLE ID	TEST DESCRIPTION	RESULT	D.L.	UNITS	EXTRACTED	ANALYZED	BY
96-A67943		RW-1 Carte Sample Type: Water Collected: 96/11/26						
		Chromatography						
		Hydrocarbons Total Ext.	350	< 50.	ug/L		96/11/28	RMS
		Hydrocarbons Volatile - T	< 100	< 100	ug/L		96/11/28	TJJ
		Xylene - meta and para	< 0.5	< 0.5	ug/L		96/11/28	TJJ
		Xylene - O	< 0.5	< 0.5	ug/L		96/11/28	TJJ
		Toluene	< 0.5	< 0.5	ug/L		96/11/28	TJJ
		Ethyl Benzene	< 0.5	< 0.5	ug/L		96/11/28	TJJ
		Benzene	0.9	< 0.5	ug/L		96/11/28	TJJ
COMMENTS FOR LAB NUMBER 96-A67943								
SAMPLE COMMENT (ORGANIC) BTX and total purgeable hydrocarbon analysis by purge & trap GC/P ID/FID.								
96-A67944		RW-1 Carte Sample Type: Water Collected: 96/11/26						
		Chromatography						
		Mineral Oil & Greasec	< 1.0	< 1.0	mg/L		96/11/27	IML

ANC = Analysis Not Complete
THIS IS THE LAST PAGE OF THE REPORT

ENVIRO - TEST CHEMICAL ANALYSIS REPORT

LAB ID	SAMPLE ID	TEST DESCRIPTION	RESULT	D.L.	UNITS	EXTRACTED	ANALYZED	BY
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ENVIRO-TEST LABORATORIES TEST METHODOLOGIES**Total Extractable Hydrocarbons in Water**

ETL Method Number: 782.01

Principle of Method:

This is the semi-quantitative determination of total extractable hydrocarbons (TEH) C11-C30 in water samples. A sample volume of 240 mLs in a 250 mL glass amber bottle is shaken with 2-4 mL hexane for 1 hour on a wrist action shaker. The hexane layer is drawn off and analysed using a gas chromatograph equipped with a flame ionization detector (FID). The summation of peak areas in the carbon ranges C11-C30 are calculated against a calibrated diesel standard.

BTEX and TVH in Water

ETL Method Number: 787.02

Principle of Method:

Volatile organic compounds are extracted (purged) by bubbling nitrogen through a water sample. The purged sample components are trapped in a tube containing a sorbent material. When purging is complete, the tube is heated and back flushed with helium to desorb the trapped compounds onto a gas chromatographic column. The gas chromatograph is temperature programmed to separate the method analytes which are then detected with a photoionization detector (PID) followed by a flame ionization detector (FID).

Total Recoverable Oil and Grease in Water

ETL Method Number: A602.01

Principle of Method:

One litre of sample is acidified to a low pH (less than 2) and extracted three times with 30 mLs of 1,1,2-trichloro-1,2,2-trifluoroethane (CFC-113) using separatory funnel techniques. The oil and grease is determined by comparison of the infrared absorbance of the sample extract with the absorbance of standards.

ANC = Analysis Not Complete
THIS IS THE LAST PAGE OF THE REPORT

ENVIRO - TEST CHEMICAL ANALYSIS REPORT

LAB ID	SAMPLE ID	TEST DESCRIPTION	RESULT	D.L.	UNITS	EXTRACTED	ANALYZED	BY
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ENVIRO-TEST LABORATORIES TEST METHODOLOGIES**Total Extractable Hydrocarbons in Water**

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ANC = Analysis Not Complete
THIS IS THE LAST PAGE OF THE REPORT