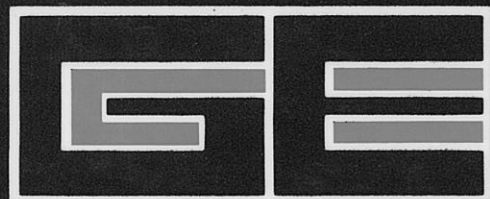


Ground Engineering



TITLE: ADDITIONAL INSTALLATION OF
PIEZOMETERS - PHASE 1 - ENVIRONMENTAL
IMPACT ASSESSMENT OF LANDFILL SITE

LOCATION: SASKATOON, SASKATCHEWAN

CLIENT: UNIVERSITY OF SASKATCHEWAN

JOB NO: GE-911 DATE: DECEMBER 18, 1987



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CIVIL & GEOTECHNICAL ENGINEERS

415 - 7th AVENUE • REGINA • SASKATCHEWAN • CANADA
S4N 4P1
TELEPHONE: (306) 569-9075

FILE GE-911

January 8, 1988

University of Saskatchewan
201 Administration Building
SASKATOON, Saskatchewan
S7N 0W0

ATTENTION: MS. BETH BILSON, ASSISTANT VICE-PRESIDENT (ADMINISTRATION)

Dear Ms. Bilson:

SUBJECT: ENVIRONMENTAL IMPACT ASSESSMENT OF LANDFILL SITE
UNIVERSITY OF SASKATCHEWAN

Enclosed is the report on Additional Installation of Piezometers for Phase 1 -
Engineering Assessment of Landfill Site.

Should there be any questions with regards to this report, please contact this
office.

Yours very truly,

GE GROUND ENGINEERING LTD.

for WALTER BUETTNER, P.ENG.

WB/mw

Enclosure

Distribution: University of Saskatchewan (15 Copies)
0586A Office (1 copy)



A MEMBER ORGANIZATION OF THE ASSOCIATION OF CONSULTING ENGINEERS OF CANADA

AFFILIEE A LA FIDIC MEMBER



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☐ SPECIFICATIONS ☐ CONSTRUCTION SUPERVISION ☐ INSPECTION AND LABORATORY TESTING SERVICES
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☐ SEEPAGE CONTROL BARRIERS FOR MUNICIPAL AND INDUSTRIAL WASTE CONTAINMENT

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2.0 FIELD INVESTIGATION	1
3.0 DISCUSSION	2
3.1 Stratigraphy	2
3.2 Groundwater	3
3.3 Vertical Hydraulic Gradients	3
3.4 Flow Rate	4

APPENDIX A

Drawing No. GE-911-5	- Elevation of Piezometric Surface, Forestry Farm Aquifer
Drawing No. GE-911-6	- Contours of Top of Unoxidized Till, Forestry Farm Aquifer
Drawing No. GE-911-7	- Thickness of Saturated Zone of Forestry Farm Aquifer
Drawing No. GE-911-8 Piezometer Details	- Stratigraphic Cross-Section

REPORT ON ADDITIONAL INSTALLATION OF PIEZOMETERS
PHASE 1 - ENGINEERING ASSESSMENT OF LANDFILL SITE
UNIVERSITY OF SASKATCHEWAN
SASKATOON, SASKATCHEWAN

1.0 INTRODUCTION

This report contains a summary of the installation of additional piezometers carried out in November, 1987, on the adjoining property of the University of Saskatchewan Landfill located in Saskatoon, Saskatchewan. This report is a supplement to the report entitled "Test Drilling and Installation of Piezometers," dated July 7, 1987 which described the soil conditions and summarized piezometers installed on University of Saskatchewan property around the chemical and general landfill site. The following report summarizes the installation of piezometers to the north and west of the University property. The purpose of these additional piezometers was to establish in greater detail, the direction and rate of groundwater flow in the Forestry Farm Aquifer located beneath the site. From this information, it is possible to estimate the direction and rate of leachate flow from the chemical landfill.

2.0 FIELD INVESTIGATION

A total of twenty-seven (27) standpipe piezometers were installed between November 17 and 23, 1987 on the properties to the north and west of the University of Saskatchewan Landfill. Details of the piezometer installation are shown in Appendix A. Most of the piezometers were installed in the top 1.5 metres of the Forestry Farm Aquifer, with two piezometers installed at the base of the Aquifer to establish vertical gradients.

Twenty-four (24) of the piezometers were constructed of PVC pipe and were intended mostly for water level measurements, and for the future sampling of water for general water chemistry. The remaining three (3) piezometers (P5, P27 and P28) were constructed with stainless steel screens and were intended for future sampling for detailed water chemistry as well as water

level measurements. The installation of piezometers with stainless steel screens were conducted under "clean" conditions.

In addition to the 27 piezometers installed, all existing standpipe piezometers in the area were monitored. These existing piezometers included the 23 piezometers installed by GE Ground Engineering Ltd. around the University of Saskatchewan Landfill, the four (4) piezometers installed by P. Machibroda Engineering Ltd. as a preliminary investigation of the landfill site, and eight (8) additional piezometers installed by others around Petursson's Ravine. The twelve (12) additional piezometers installed by P. Machibroda Engineering Ltd. and others were given the designations E1 to E12, inclusive. Details of these peizometers are shown in Table A1, Appendix A.

The ground surface elevations at the test hole locations were established by representatives of GE Ground Engineering Ltd. and are referenced to an assumed bench mark elevation at 100.00 metres which is described as the top of the property pin located in the southwest corner of the University of Saskatchewan property.

3.0 DISCUSSION

3.1 Stratigraphy

The soil stratigraphy was established at the piezometer locations with most test borings being extended to the base of the Forestry Farm Aquifer. The drilling information indicated that the soil stratigraphy was similar to that encountered earlier on the University of Saskatchewan Landfill site.

The soils encountered generally consisted of a surficial layer of hard glacial till, which was predominantly silty clay, oxidized, highly fractured and which extended to a maximum depth of 5.4 metres. Occasionally near the edge of Petursson's Ravine, the glacial till was missing. Below the surficial glacial till, the Forestry Farm Aquifer was encountered, which extended to a depth of 7.6 to 13.7 metres. The Aquifer consisted of a fine to medium grained sand,

which was oxidized becoming unoxidized at a depth of 6.7 to 13.7 metres. Below the Forestry Farm Aquifer, an unoxidized glacial till was encountered.

Two drawings have been prepared to show the soil stratigraphy. Drawing No. GE-911-6 shows the elevation contours of the top of the unoxidized till (i.e. base of Forestry Farm Aquifer), while Drawing No. GE-911-8 shows a stratigraphic cross-section. Both drawings are shown in Appendix A.

3.2 Groundwater

Two drawings have been prepared to indicate the groundwater encountered. Drawing No. GE-911-5 indicates the piezometric surface within the Forestry Farm Aquifer, while Drawing No. GE-911-7 indicates the thickness of the saturated zone within the Aquifer.

The contours of the piezometric surface (Drawing No. GE-911-5) indicates that the overall direction of groundwater flow at the University Landfill is towards the northwest, curving to the west or southwest as it approaches Petursson's Ravine. The leachate plume from the University of Saskatchewan chemical landfill would therefore enter the northeast side of Petursson's Ravine.

3.3 Vertical Hydraulic Gradients

Two (2) nests of piezometers (P10/P11 and P20/P21) were installed near Petursson's Ravine in addition to one (1) existing set (E10A/B) to monitor vertical hydraulic gradients. At the P10/P11 nest, there was essentially no vertical gradient detected. At the P20/P21 nest, a slight vertical gradient was present (0.04m drop from shallow to deep piezometer, with 2.31m elevation difference between piezometer tips). A large vertical gradient was present at the E10A/E10B nest (1.92m drop from shallow to deep piezometer with 2.78m elevation difference between piezometer tips) i.e. ~~upward flow direction indicating that the groundwater is being discharged towards the surface.~~

Eng. firm addendum - strike Cont line (Feb 10/88) *[Signature]*

3.4 Flow Rate

The average hydraulic gradient from the Chemical Landfill to Petursson's Ravine calculated from Drawing GE-911-5 is 0.014 m/m. Lissey (1987) has estimated that the Forestry Farm Aquifer has an average hydraulic conductivity of 6.1×10^{-3} cm/sec and a porosity of 30 percent. Therefore, based upon Darcy's Law, which describes fluid flow through porous media, the average lineal velocity of water movement is 0.25 m/day. The average flow time of any leachate from the Chemical Landfill to outfall into Petursson's Ravine, is therefore 880 days (i.e. 2.4 years).

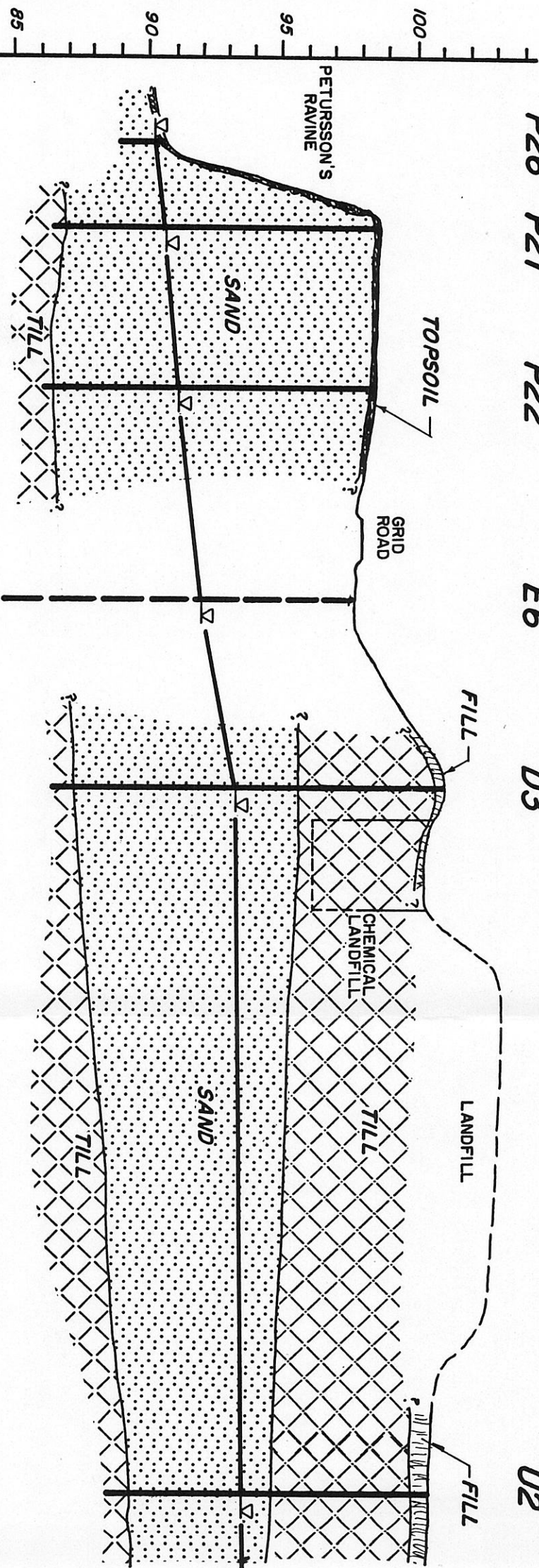
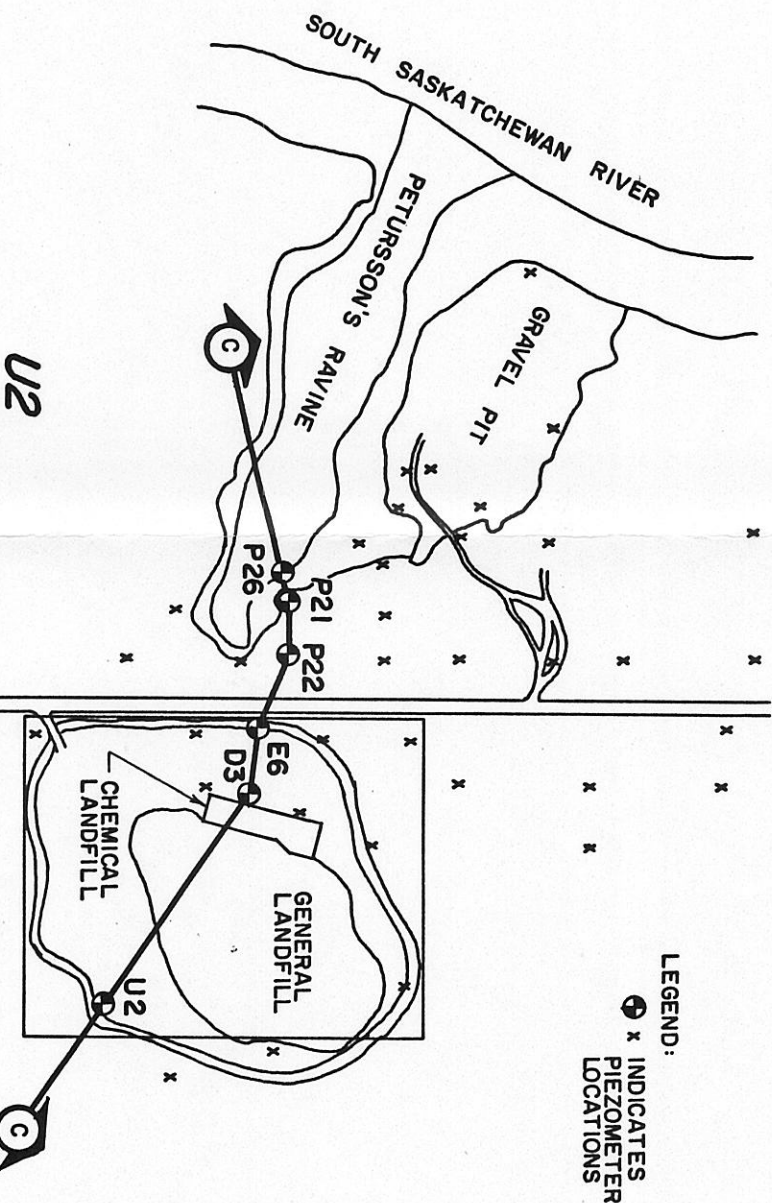
2 1.0'/day

REFERENCES

1. Test Drilling and Installation of Piezometers, GE Ground Engineering Ltd., July 7, 1987.
2. Groundwater Investigation, University of Saskatchewan Landfill, P. Machibroda Engineering Ltd., May 17, 1982.
3. Al Lissey, Permeability and Flow Direction of Forestry Farm Aquifer at the University of Saskatchewan Landfill. MLM Groundwater Engineering, June 25, 1987.

THE BOUNDARIES BETWEEN SOIL STRATA HAVE BEEN ESTABLISHED ONLY AT BORE HOLE LOCATIONS. BETWEEN BORE HOLES, THE BOUNDARIES ARE INTERPOLATED AND MAY BE SUBJECT TO CONSIDERABLE ERROR.

P26 P21 P22 E6 D3



SECTION 'C-C'
SCALE: HOR. 1:500
VERT. 1:200

GROUND ENGINEERING LTD.			
CIVIL AND GEOTECHNICAL ENGINEERS			
REGINA, SASKATCHEWAN			
CLIENT		STRATIGRAPHIC CROSS-SECTION 'C-C'	
UNIVERSITY OF SASKATCHEWAN		UNIVERSITY OF SASKATCHEWAN LANDFILL	
SASKATCHEWAN		SASKATCHEWAN	
APPROVED		DATE	
DEC., 1987		DWG. No.	
GE-911-8			

TABLE A1 - SUMMARY OF "E" PIEZOMETERS

PIEZOMETER	INSTALLER	ELEVATIONS (METRES, ASSUMED DATUM)			
		TOP OF PIEZOMETER	WATER LEVEL	BASE OF PIEZOMETER	GROUND SURFACE
E1	Unknown	99.97	91.75	-----	98.84
E2	TH-4P, Machibroda Engineering	100.07	92.93	-----	99.30
E3	TH-5P, Machibroda Engineering	101.21	93.65	-----	100.62
E4	Unknown	100.56	92.51	-----	99.39
E5	Unknown	98.77	92.06	-----	97.66
E6	TH-2P, Machibroda Engineering	98.38	91.97	-----	97.67
E7	TH-3P, Machibroda Engineering	98.69	dry	-----	-----
E8	Unknown	96.51	91.61	-----	96.17
E9	TH-105	98.38	dry	90.13	97.69
E10A	TH-104	92.04	87.84	85.26	91.03
E10B	TH-104	91.87	89.76	88.04	91.03
E11	TH-106	94.15	89.17	86.95	93.18
E12	Unknown	91.62	89.98	88.35	91.30

PIEZOMETER DETAILS

PIEZOMETER No: _____

TEST HOLE No: P-1

DEPTH
ELEV.

BACKFILL
DETAIL

SOIL
DESCRIPTION

TYPE OF PIEZOMETER: CASAGRANDE

TYPE OF PIPE: 50mm PVC, SCHEDULE 40

TOP OF PIPE ELEVATION: 99.31m

GROUND SURFACE ELEV.: 98.75m

PIEZOMETER TIP ELEV.: 89.51m

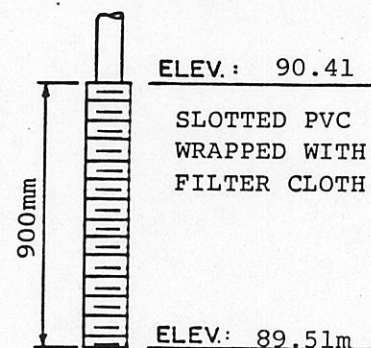
TEST HOLE DIAMETER: 150mm

INSTALLATION DATE: November 18, 1987

TYPE OF DRILL: Brat 22

TYPE OF AUGER: Solid Stem

PIEZOMETER TIP DETAILS



WATER LEVELS

DATE & TIME	DEPTH* (m)	ELEV. (m)
November 18 (am)		91.34
November 18 (pm)		91.36

*FROM TOP OF PIEZOMETER

REMARKS: Top of Piezometer is
described as the top of standpipe
following removal of cap.

MILLED BENTONITE

NATIVE SAND
BACKFILL AND
SAND SLOUGH

100mm TOPSOIL

610mm SILT-OXIDIZED

TILL-OXIDIZED

3.3m SAND-OXIDIZED

7.4m

8.5m SAND-UNOXIDIZED

10.4m TILL-UNOXIDIZED

8.3m

9.2m

10.7m
E.O.H.

10.7m
E.O.H.

GROUND ENGINEERING LTD.

GEOTECHNICAL ENGINEERS/Soil Mechanics & Foundations

PROJECT:

UNIVERSITY OF SASKATCHEWAN LANDFILL

LOCATION:

SASKATOON, SASKATCHEWAN

PLATE No: _____

PIEZOMETER DETAILS

PIEZOMETER No: _____

TEST HOLE No: P-2

DEPTH
ELEV.

BACKFILL
DETAIL

SOIL
DESCRIPTION

TYPE OF PIEZOMETER: CASAGRANDE

TYPE OF PIPE: 50mm PVC, SCHEDULE 40

TOP OF PIPE ELEVATION: 100.63m

GROUND SURFACE ELEV.: 99.21m

PIEZOMETER TIP ELEV.: 91.00m

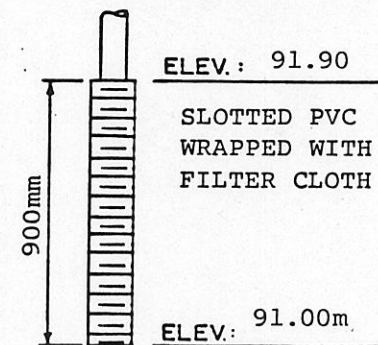
TEST HOLE DIAMETER: 150mm

INSTALLATION DATE: November 17, 1987

TYPE OF DRILL: Brat 22

TYPE OF AUGER: Solid Stem

PIEZOMETER TIP DETAILS



WATER LEVELS

DATE & TIME	DEPTH*(m)	ELEV. (m)
Nov. 18/87 (am)		92.05

*FROM TOP OF PIEZOMETER

REMARKS: Top of Piezometer
is described as top of standpipe
following removal of cap.

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PROJECT:

UNIVERSITY OF SASKATCHEWAN LANDFILL

LOCATION:

SASKATOON, SASKATCHEWAN

PLATE No: _____

PIEZOMETER DETAILS

PIEZOMETER No: _____

TEST HOLE No: P-3

DEPTH
ELEV.

BACKFILL
DETAIL

SOIL
DESCRIPTION

TYPE OF PIEZOMETER: CASAGRANDE

TYPE OF PIPE: 50mm PVC, SCHEDULE 40

TOP OF PIPE ELEVATION: 99.43m

GROUND SURFACE ELEV.: 98.18m

PIEZOMETER TIP ELEV.: 89.73m

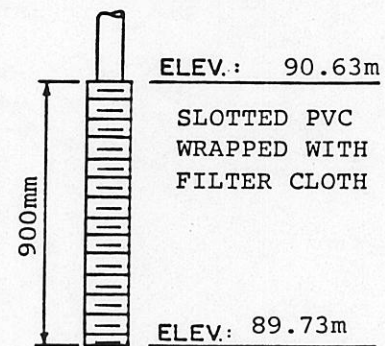
TEST HOLE DIAMETER: 150mm

INSTALLATION DATE: November 18/87

TYPE OF DRILL: Brat 22

TYPE OF AUGER: Solid Stem

PIEZOMETER TIP DETAILS



WATER LEVELS

DATE & TIME	DEPTH*(m)	ELEV. (m)
Nov. 18/87 (pm)		91.16m

*FROM TOP OF PIEZOMETER

REMARKS: Top of piezometer is
described as top of standpipe
following removal of cap.

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PROJECT:

UNIVERSITY OF SASKATCHEWAN LANDFILL

LOCATION:

SASKATOON, SASKATCHEWAN

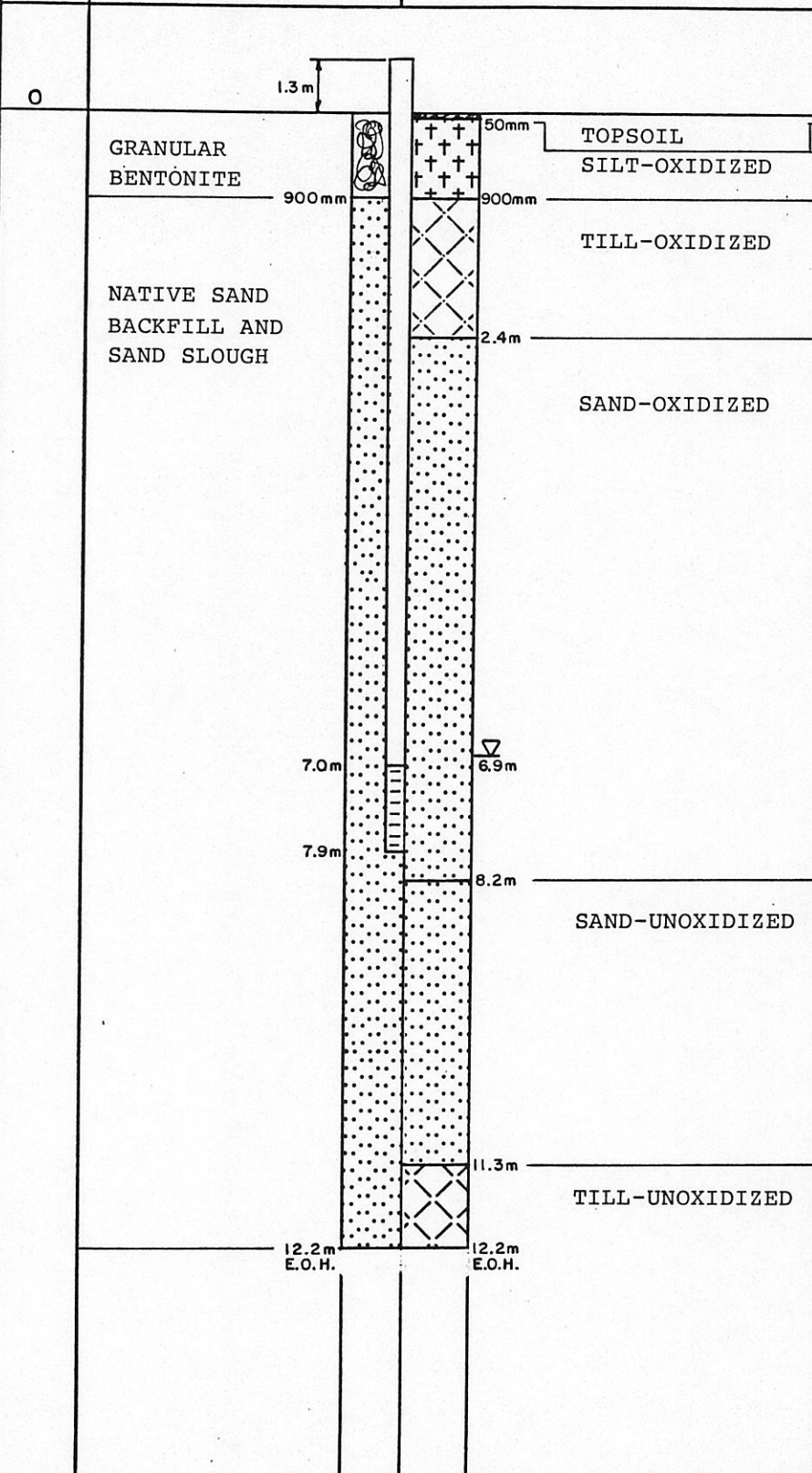
PLATE No: _____

PIEZOMETER DETAILS

PIEZOMETER No: _____

TEST HOLE No: P-4

DEPTH ELEV.	BACKFILL DETAIL	SOIL DESCRIPTION
----------------	--------------------	---------------------



TYPE OF PIEZOMETER: CASAGRANDE
 TYPE OF PIPE: 50mm PVC, SCHEDULE 40

TOP OF PIPE ELEVATION: 100.17m

GROUND SURFACE ELEV.: 98.84m

PIEZOMETER TIP ELEV.: 90.93m

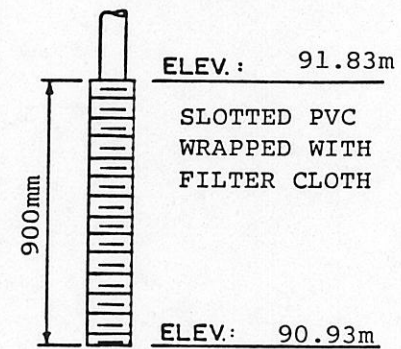
TEST HOLE DIAMETER: 150mm

INSTALLATION DATE: November 17/87

TYPE OF DRILL: Brat 22

TYPE OF AUGER: Solid Stem

PIEZOMETER TIP DETAILS



WATER LEVELS

DATE & TIME	DEPTH* (m)	ELEV. (m)
Nov. 18/87 (am)		91.98

*FROM TOP OF PIEZOMETER

REMARKS: Top of piezometer is described as top of standpipe following removal of cap.

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GEOTECHNICAL ENGINEERS/Soil Mechanics & Foundations

PROJECT: UNIVERSITY OF SASKATCHEWAN LANDFILL

LOCATION: SASKATOON, SASKATCHEWAN

PLATE No: _____

PIEZOMETER DETAILS

PIEZOMETER No: _____

TEST HOLE No: P-5

DEPTH ELEV.	BACKFILL DETAIL	SOIL DESCRIPTION	TYPE OF PIEZOMETER: <u>CASAGRANDE</u>																		
			TYPE OF PIPE: <u>50mm PVC, SCHEDULE 40</u>																		
			TOP OF PIPE ELEVATION: <u>99.93m</u>																		
			GROUND SURFACE ELEV.: <u>99.84m</u>																		
			PIEZOMETER TIP ELEV.: <u>91.10m</u>																		
			TEST HOLE DIAMETER: <u>150mm</u>																		
			INSTALLATION DATE: <u>November 23/87</u>																		
			TYPE OF DRILL: <u>Brat 22</u>																		
			TYPE OF AUGER: <u>Solid Stem</u>																		
			PIEZOMETER TIP DETAILS 																		
			WATER LEVELS <table border="1"> <thead> <tr> <th>DATE & TIME</th> <th>DEPTH*(m)</th> <th>ELEV. (m)</th> </tr> </thead> <tbody> <tr> <td>Nov. 24/87</td> <td></td> <td>92.24</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>	DATE & TIME	DEPTH*(m)	ELEV. (m)	Nov. 24/87		92.24												
DATE & TIME	DEPTH*(m)	ELEV. (m)																			
Nov. 24/87		92.24																			
			*FROM TOP OF PIEZOMETER																		
			REMARKS: <u>Top of piezometer is described as top of standpipe following removal of 1.0m extension</u>																		

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GEOTECHNICAL ENGINEERS/Soil Mechanics & Foundations

PROJECT: UNIVERSITY OF SASKATCHEWAN LANDFILL

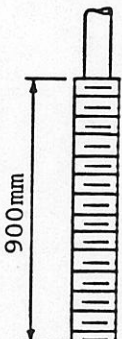
LOCATION: SASKATOON, SASKATCHEWAN

PLATE No: _____

PIEZOMETER DETAILS

PIEZOMETER No: _____

TEST HOLE No: P-6

DEPTH ELEV.	BACKFILL DETAIL	SOIL DESCRIPTION	TYPE OF PIEZOMETER: <u>CASAGRANDE</u>																		
0			TYPE OF PIPE: <u>50mm PVC, SCHEDULE 40</u>																		
			TOP OF PIPE ELEVATION: <u>98.77m</u>																		
			GROUND SURFACE ELEV.: <u>97.60m</u>																		
			PIEZOMETER TIP ELEV.: <u>89.00</u>																		
			TEST HOLE DIAMETER: <u>150mm</u>																		
			INSTALLATION DATE: <u>November 20/87</u>																		
			TYPE OF DRILL: <u>Brat 22</u>																		
			TYPE OF AUGER: <u>Solid Stem</u>																		
			PIEZOMETER TIP DETAILS  ELEV.: <u>89.90m</u> SLOTTED PVC WRAPPED WITH FILTER CLOTH ELEV.: <u>89.00m</u>																		
			WATER LEVELS <table border="1"> <thead> <tr> <th>DATE & TIME</th> <th>DEPTH* (m)</th> <th>ELEV. (m)</th> </tr> </thead> <tbody> <tr> <td>Nov. 20/87 (am)</td> <td></td> <td>89.89</td> </tr> <tr> <td>Nov. 20/87 (pm)</td> <td></td> <td>89.93</td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	DATE & TIME	DEPTH* (m)	ELEV. (m)	Nov. 20/87 (am)		89.89	Nov. 20/87 (pm)		89.93									
DATE & TIME	DEPTH* (m)	ELEV. (m)																			
Nov. 20/87 (am)		89.89																			
Nov. 20/87 (pm)		89.93																			
			*FROM TOP OF PIEZOMETER REMARKS: <u>Top of piezometer</u> <u>is described as top of standpipe</u> <u>following removal of cap.</u>																		

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PROJECT:
UNIVERSITY OF SASKATCHEWAN LANDFILL

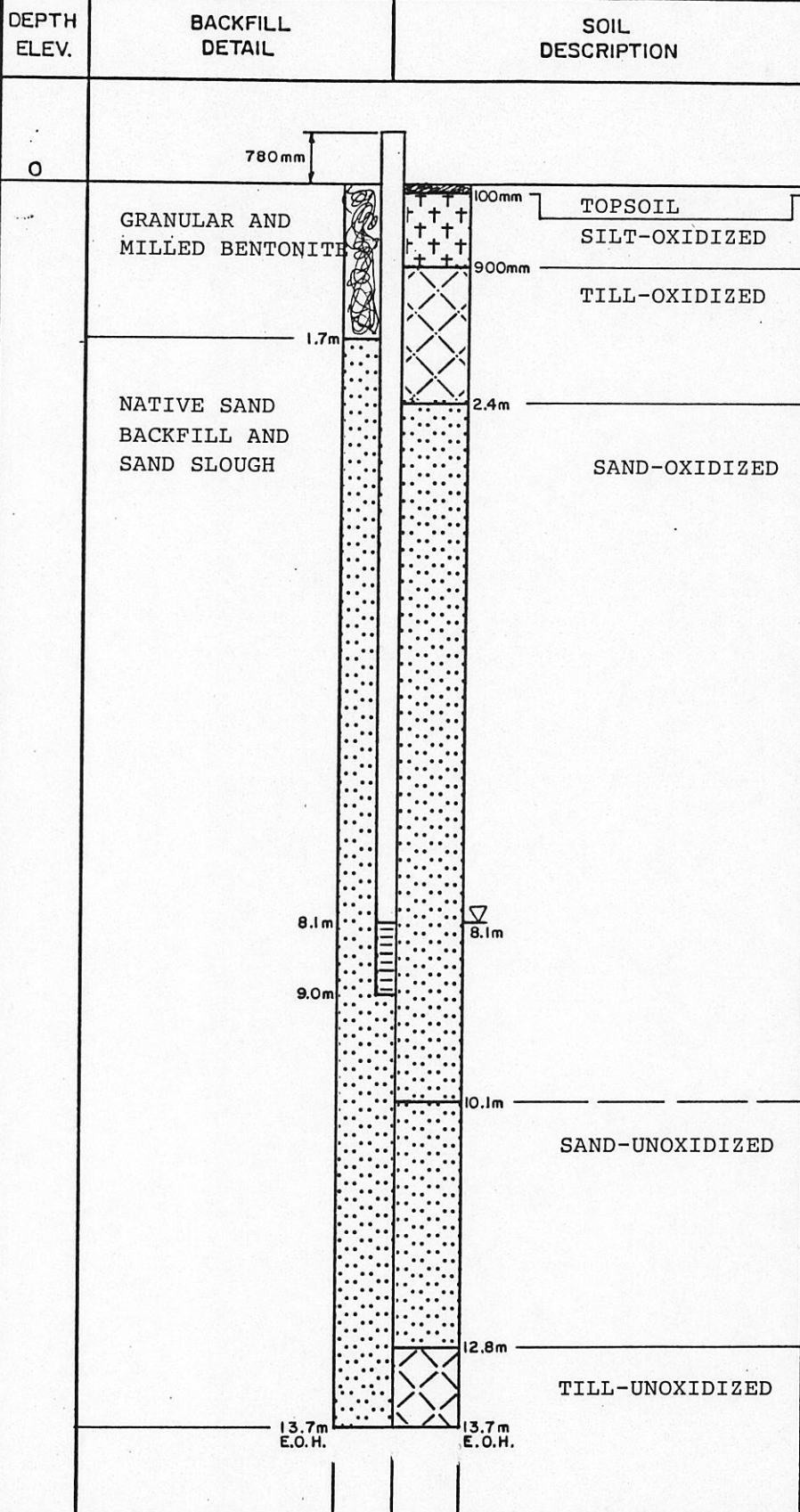
LOCATION:
SASKATOON, SASKATCHEWAN

PLATE No: _____

PIEZOMETER DETAILS

PIEZOMETER No: _____

TEST HOLE No: P-7



TYPE OF PIEZOMETER: CASAGRANDE
 TYPE OF PIPE: 50mm PVC, SCHEDULE 40

TOP OF PIPE ELEVATION: 99.31m

GROUND SURFACE ELEV.: 98.53m

PIEZOMETER TIP ELEV.: 89.57m

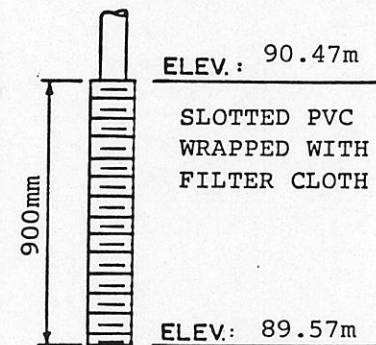
TEST HOLE DIAMETER: 150mm

INSTALLATION DATE: Nov. 20/87

TYPE OF DRILL: Brat 22

TYPE OF AUGER: Solid Stem

PIEZOMETER TIP DETAILS



WATER LEVELS

DATE & TIME	DEPTH*(m)	ELEV. (m)
Nov. 20/87 (am)		90.43
Nov. 20/87 (pm)		90.47

*FROM TOP OF PIEZOMETER

REMARKS: Top of piezometer is
described as top of standpipe
following the removal of cap.

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GEOTECHNICAL ENGINEERS/Soil Mechanics & Foundations

PROJECT:
 UNIVERSITY OF SASKATCHEWAN LANDFILL

LOCATION:
 SASKATOON, SASKATCHEWAN

PLATE No: _____

PIEZOMETER DETAILS

PIEZOMETER No: _____

TEST HOLE No: P-8

DEPTH
ELEV.

BACKFILL
DETAIL

SOIL
DESCRIPTION

TYPE OF PIEZOMETER: CASAGRANDE

TYPE OF PIPE: 50mm PVC, SCHEDULE 40

TOP OF PIPE ELEVATION: 98.95m

GROUND SURFACE ELEV.: 98.24m

PIEZOMETER TIP ELEV.: 89.25m

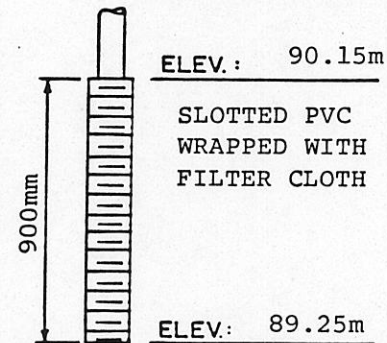
TEST HOLE DIAMETER: 150mm

INSTALLATION DATE: November 18/87

TYPE OF DRILL: Brat 22

TYPE OF AUGER: Solid Stem

PIEZOMETER TIP DETAILS



WATER LEVELS

DATE & TIME	DEPTH*(m)	ELEV. (m)
Nov. 18/87 (pm)		91.17

*FROM TOP OF PIEZOMETER

REMARKS: Top of piezometer is
described as top of standpipe
following removal of cap.

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GEOTECHNICAL ENGINEERS/Soil Mechanics & Foundations

PROJECT:

UNIVERSITY OF SASKATCHEWAN LANDFILL

LOCATION:

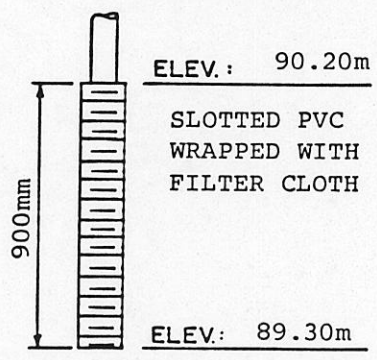
SASKATOON, SASKATCHEWAN

PLATE No: _____

PIEZOMETER DETAILS

PIEZOMETER No: _____

TEST HOLE No: P-9

DEPTH ELEV.	BACKFILL DETAIL	SOIL DESCRIPTION	TYPE OF PIEZOMETER: <u>CASAGRANDE</u>																		
0			TYPE OF PIPE: <u>50mm PVC, SCHEDULE 40</u>																		
			TOP OF PIPE ELEVATION: <u>99.03m</u>																		
			GROUND SURFACE ELEV.: <u>98.39m</u>																		
			PIEZOMETER TIP ELEV.: <u>89.30m</u>																		
			TEST HOLE DIAMETER: <u>150mm</u>																		
			INSTALLATION DATE: <u>November 20/87</u>																		
			TYPE OF DRILL: <u>Brat 22</u>																		
			TYPE OF AUGER: <u>Solid Stem</u>																		
			PIEZOMETER TIP DETAILS 																		
			WATER LEVELS <table border="1"> <thead> <tr> <th>DATE & TIME</th> <th>DEPTH*(m)</th> <th>ELEV. (m)</th> </tr> </thead> <tbody> <tr> <td>Nov. 20/87 (pm)</td> <td></td> <td>90.48</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>	DATE & TIME	DEPTH*(m)	ELEV. (m)	Nov. 20/87 (pm)		90.48												
DATE & TIME	DEPTH*(m)	ELEV. (m)																			
Nov. 20/87 (pm)		90.48																			
			*FROM TOP OF PIEZOMETER REMARKS: <u>Top of piezometer is described as top of standpipe following removal of cap.</u>																		

GROUND ENGINEERING LTD.

GEOTECHNICAL ENGINEERS/Soil Mechanics & Foundations

PROJECT: UNIVERSITY OF SASKATCHEWAN LANDFILL

LOCATION: SASKATOON, SASKATCHEWAN

PLATE No: _____

PIEZOMETER DETAILS

PIEZOMETER No: _____

TEST HOLE No: P-10

DEPTH
ELEV.

BACKFILL
DETAIL

SOIL
DESCRIPTION

TYPE OF PIEZOMETER: CASAGRANDE

TYPE OF PIPE: 50mm PVC, SCHEDULE 40

TOP OF PIPE ELEVATION: 98.02m

GROUND SURFACE ELEV.: 96.77m

PIEZOMETER TIP ELEV.: 86.63m

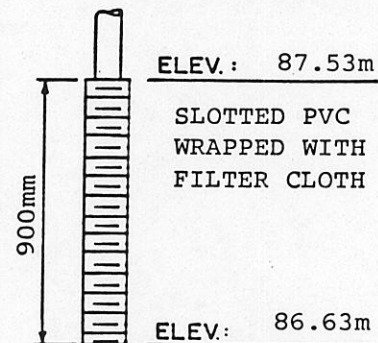
TEST HOLE DIAMETER: 150mm

INSTALLATION DATE: November 19/87

TYPE OF DRILL: Brat 22

TYPE OF AUGER: Solid Stem

PIEZOMETER TIP DETAILS



WATER LEVELS

DATE & TIME	DEPTH* (m)	ELEV. (m)
Nov. 20/87 (pm)		90.32

*FROM TOP OF PIEZOMETER

REMARKS: Top of piezometer is
described as top of standpipe
following removal of cap.

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GEOTECHNICAL ENGINEERS/Soil Mechanics & Foundations

PROJECT:
UNIVERSITY OF SASKATCHEWAN LANDFILL

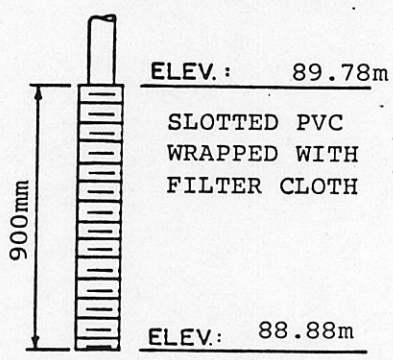
LOCATION:
SASKATOON, SASKATCHEWAN

PLATE No: _____

PIEZOMETER DETAILS

PIEZOMETER No: _____

TEST HOLE No: P-11

DEPTH ELEV.	BACKFILL DETAIL	SOIL DESCRIPTION	TYPE OF PIEZOMETER: <u>CASAGRANDE</u>																		
0			TYPE OF PIPE: <u>50mm PVC, SCHEDULE 40</u>																		
			TOP OF PIPE ELEVATION: <u>97.93m</u>																		
			GROUND SURFACE ELEV.: <u>96.77m</u>																		
			PIEZOMETER TIP ELEV.: <u>88.88m</u>																		
			TEST HOLE DIAMETER: <u>150mm</u>																		
			INSTALLATION DATE: <u>November 19/87</u>																		
			TYPE OF DRILL: <u>Brat 22</u>																		
			TYPE OF AUGER: <u>Solid Stem</u>																		
			PIEZOMETER TIP DETAILS 																		
			WATER LEVELS <table border="1"> <thead> <tr> <th>DATE & TIME</th> <th>DEPTH*(m)</th> <th>ELEV. (m)</th> </tr> </thead> <tbody> <tr> <td>Nov. 20/87(pm)</td> <td></td> <td>90.31</td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	DATE & TIME	DEPTH*(m)	ELEV. (m)	Nov. 20/87(pm)		90.31												
DATE & TIME	DEPTH*(m)	ELEV. (m)																			
Nov. 20/87(pm)		90.31																			
			*FROM TOP OF PIEZOMETER REMARKS: <u>Top of piezometer is described as top of standpipe following removal of cap.</u>																		

GROUND ENGINEERING LTD.

GEOTECHNICAL ENGINEERS/Soil Mechanics & Foundations

PROJECT:
UNIVERSITY OF SASKATCHEWAN LANDFILL

LOCATION:
SASKATOON, SASKATCHEWAN

PLATE No: _____

PIEZOMETER DETAILS

PIEZOMETER No: _____

TEST HOLE No: P-12

DEPTH
ELEV.

BACKFILL
DETAIL

SOIL
DESCRIPTION

TYPE OF PIEZOMETER: CASAGRANDE

TYPE OF PIPE: 50mm PVC, SCHEDULE 40

TOP OF PIPE ELEVATION: 93.81m

GROUND SURFACE ELEV.: 92.50m

PIEZOMETER TIP ELEV.: 89.16m

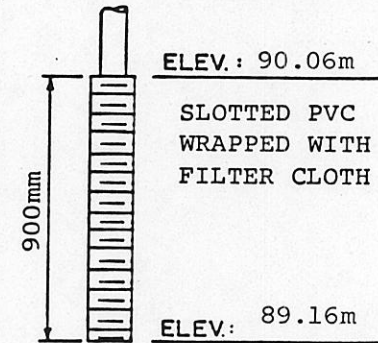
TEST HOLE DIAMETER: 150mm

INSTALLATION DATE: November 23/87

TYPE OF DRILL: Brat 22

TYPE OF AUGER: Solid Stem

PIEZOMETER TIP DETAILS



WATER LEVELS

DATE & TIME	DEPTH*(m)	ELEV. (m)
Nov. 24/87		90.27

*FROM TOP OF PIEZOMETER

REMARKS: Top of piezometer is
described as top of standpipe
following removal of cap.

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GEOTECHNICAL ENGINEERS/Soil Mechanics & Foundations

PROJECT:

UNIVERSITY OF SASKATCHEWAN LANDFILL

LOCATION:

SASKATOON, SASKATCHEWAN

PLATE No: _____

PIEZOMETER DETAILS

PIEZOMETER No: _____

TEST HOLE No: P-13

DEPTH
ELEV.

BACKFILL
DETAIL

SOIL
DESCRIPTION

TYPE OF PIEZOMETER: CASAGRANDE

TYPE OF PIPE: 50mm PVC, SCHEDULE 40

TOP OF PIPE ELEVATION: 99.27m

GROUND SURFACE ELEV.: 98.43m

PIEZOMETER TIP ELEV.: 90.07m

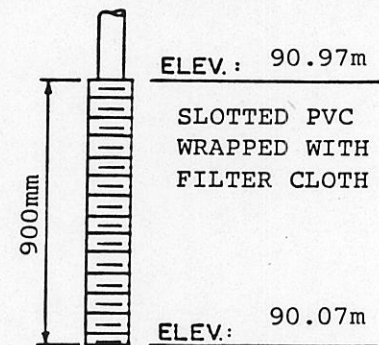
TEST HOLE DIAMETER: 150mm

INSTALLATION DATE: November 18/87

TYPE OF DRILL: Brat 22

TYPE OF AUGER: Solid Stem

PIEZOMETER TIP DETAILS



WATER LEVELS

DATE & TIME	DEPTH*(m)	ELEV. (m)
Nov. 18/87 (pm)		91.01
Nov. 19/87 (am)		91.00
Nov. 20/87 (pm)		91.00

*FROM TOP OF PIEZOMETER

REMARKS: Top of piezometer is
described as top of standpipe
following removal of cap.

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GEOTECHNICAL ENGINEERS/Soil Mechanics & Foundations

PROJECT:

UNIVERSITY OF SASKATCHEWAN LANDFILL

LOCATION:

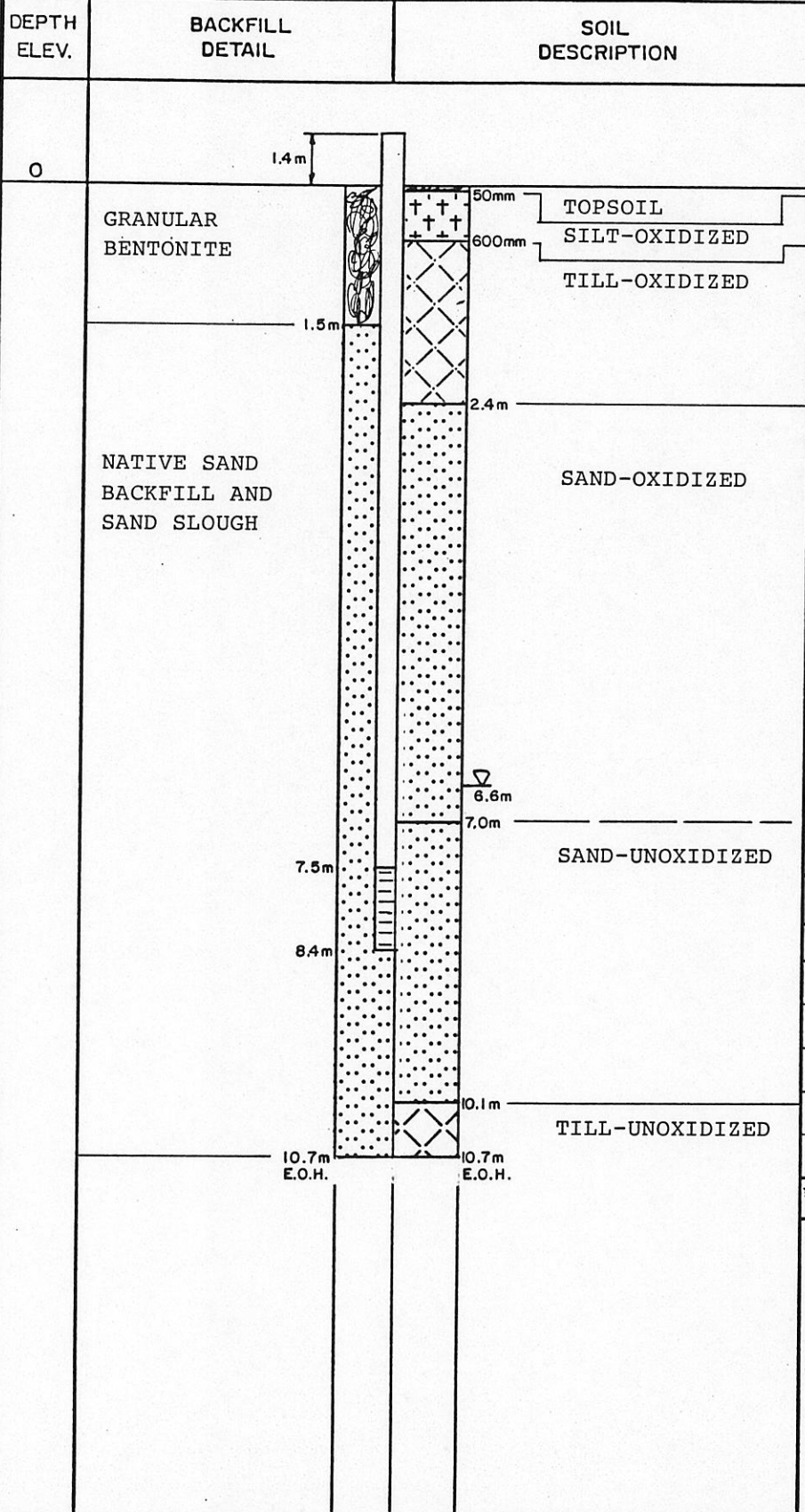
SASKATOON, SASKATCHEWAN

PLATE No: _____

PIEZOMETER DETAILS

PIEZOMETER No: _____

TEST HOLE No: P-14



TYPE OF PIEZOMETER: CASAGRANDE

TYPE OF PIPE: 50mm PVC, SCHEDULE 40

TOP OF PIPE ELEVATION: 99.90m

GROUND SURFACE ELEV.: 98.52m

PIEZOMETER TIP ELEV.: 90.10m

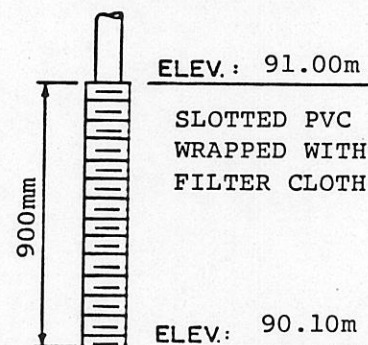
TEST HOLE DIAMETER: 150mm

INSTALLATION DATE: November 17/87

TYPE OF DRILL: Brat 22

TYPE OF AUGER: Solid Stem

PIEZOMETER TIP DETAILS



WATER LEVELS

DATE & TIME	DEPTH*(m)	ELEV. (m)
Nov. 18/87 (am)		91.92

*FROM TOP OF PIEZOMETER

REMARKS: Top of piezometer is described as top of standpipe following removal of cap.

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GEOTECHNICAL ENGINEERS/Soil Mechanics & Foundations

PROJECT: UNIVERSITY OF SASKATCHEWAN LANDFILL

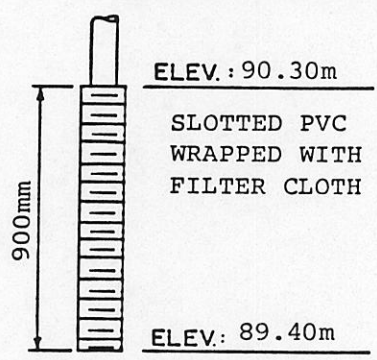
LOCATION: SASKATOON, SASKATCHEWAN

PLATE No: _____

PIEZOMETER DETAILS

PIEZOMETER No: _____

TEST HOLE No: P-15

DEPTH ELEV.	BACKFILL DETAIL	SOIL DESCRIPTION	TYPE OF PIEZOMETER: <u>CASAGRANDE</u>																		
0			TYPE OF PIPE: <u>50mm PVC, SCHEDULE 40</u>																		
			TOP OF PIPE ELEVATION: <u>98.90m</u>																		
			GROUND SURFACE ELEV.: <u>97.73m</u>																		
			PIEZOMETER TIP ELEV.: <u>89.4m</u>																		
			TEST HOLE DIAMETER: <u>150mm</u>																		
			INSTALLATION DATE: <u>November 19/87</u>																		
			TYPE OF DRILL: <u>Brat 22</u>																		
			TYPE OF AUGER: <u>Solid Stem</u>																		
			PIEZOMETER TIP DETAILS  ELEV.: <u>90.30m</u> SLOTTED PVC WRAPPED WITH FILTER CLOTH ELEV.: <u>89.40m</u>																		
			WATER LEVELS <table border="1"> <thead> <tr> <th>DATE & TIME</th> <th>DEPTH*(m)</th> <th>ELEV. (m)</th> </tr> </thead> <tbody> <tr> <td>Nov. 19/87(pm)</td> <td></td> <td>80.49</td> </tr> <tr> <td>Nov. 20/87(pm)</td> <td></td> <td>90.50</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>	DATE & TIME	DEPTH*(m)	ELEV. (m)	Nov. 19/87(pm)		80.49	Nov. 20/87(pm)		90.50									
DATE & TIME	DEPTH*(m)	ELEV. (m)																			
Nov. 19/87(pm)		80.49																			
Nov. 20/87(pm)		90.50																			
			*FROM TOP OF PIEZOMETER REMARKS: <u>Top of piezometer is described as top of standpipe following removal of cap.</u> _____ _____ _____ _____																		

GROUND ENGINEERING LTD.

GEOTECHNICAL ENGINEERS/Soil Mechanics & Foundations

PROJECT:
UNIVERSITY OF SASKATCHEWAN LANDFILL

LOCATION:
SASKATOON, SASKATCHEWAN

PLATE No: _____

PIEZOMETER DETAILS

PIEZOMETER No: _____

TEST HOLE No: P-16

DEPTH
ELEV.

BACKFILL
DETAIL

SOIL
DESCRIPTION

TYPE OF PIEZOMETER: CASAGRANDE

TYPE OF PIPE: 50mm PVC, SCHEDULE 40

TOP OF PIPE ELEVATION: 99.47m

GROUND SURFACE ELEV.: 98.16m

PIEZOMETER TIP ELEV.: 89.18m

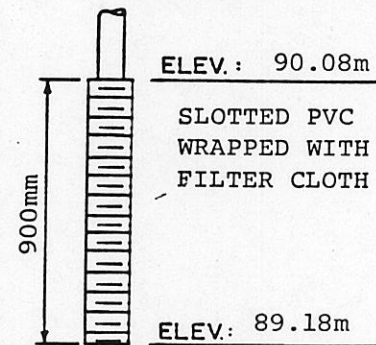
TEST HOLE DIAMETER: 200mm

INSTALLATION DATE: November 23/87

TYPE OF DRILL: Brat 22

TYPE OF AUGER: Hollow Stem

PIEZOMETER TIP DETAILS

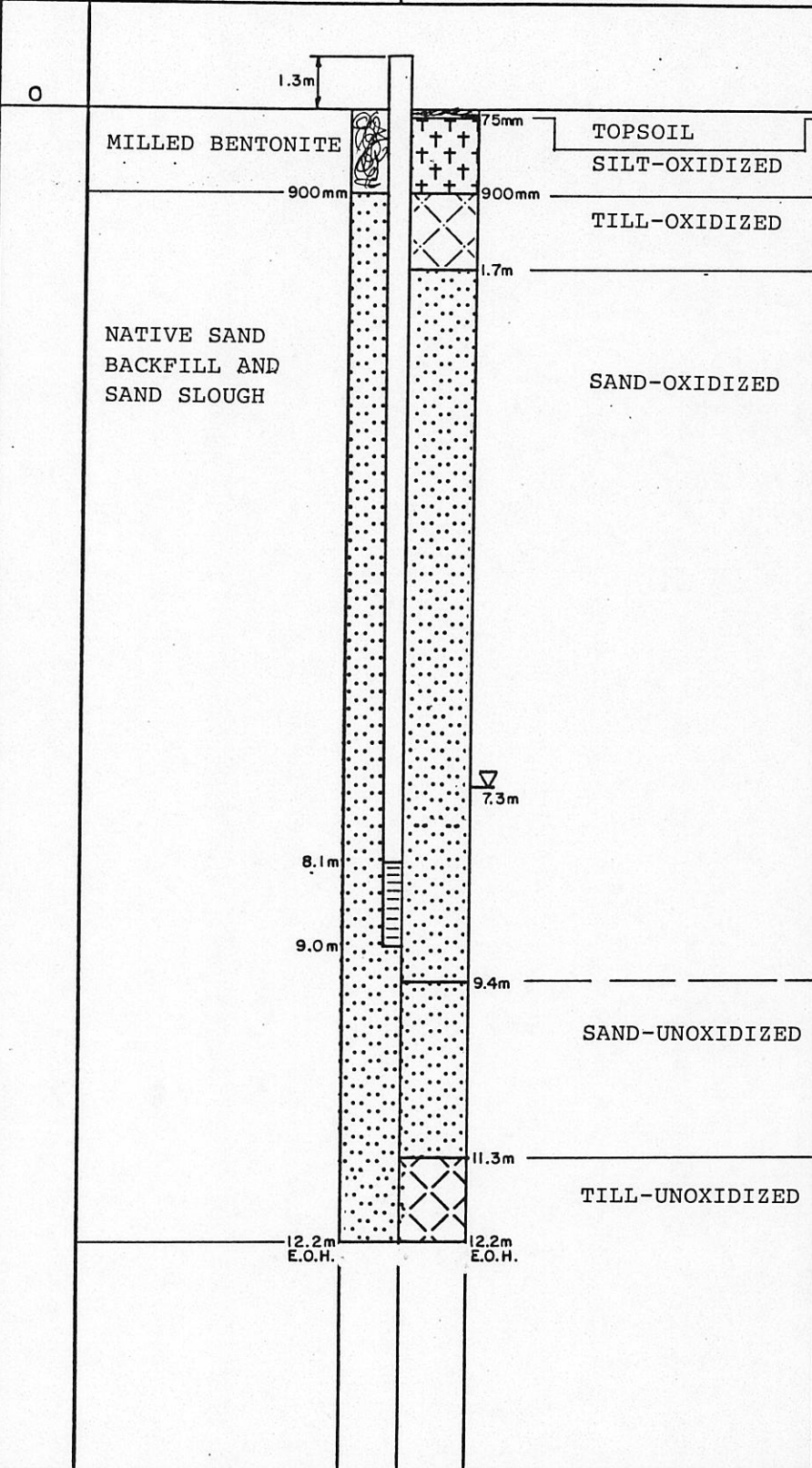


WATER LEVELS

DATE & TIME	DEPTH*(m)	ELEV. (m)
Nov. 24/87		90.85

*FROM TOP OF PIEZOMETER

REMARKS: Top of piezometer is
described as top of standpipe
following removal of cap.



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GEOTECHNICAL ENGINEERS/Soil Mechanics & Foundations

PROJECT:

UNIVERSITY OF SASKATCHEWAN LANDFILL

LOCATION:

SASKATOON, SASKATCHEWAN

PLATE No: _____

PIEZOMETER DETAILS

PIEZOMETER No: _____

TEST HOLE No: P-17

DEPTH
ELEV.

BACKFILL
DETAIL

SOIL
DESCRIPTION

TYPE OF PIEZOMETER: CASAGRANDE

TYPE OF PIPE: 50mm PVC, SCHEDULE 40

TOP OF PIPE ELEVATION: 99.42m

GROUND SURFACE ELEV.: 98.61m

PIEZOMETER TIP ELEV.: 89.69m

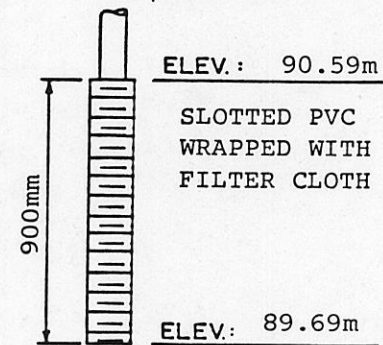
TEST HOLE DIAMETER: 200mm

INSTALLATION DATE: November 18/87

TYPE OF DRILL: Brat 22

TYPE OF AUGER: Hollow Stem

PIEZOMETER TIP DETAILS



WATER LEVELS

DATE & TIME	DEPTH*(m)	ELEV. (m)
Nov. 19/87 (am)		91.10
Nov. 20/87 (pm)		91.10

*FROM TOP OF PIEZOMETER

REMARKS: Top of piezometer is
described as top of standpipe
following removal of cap.

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GEOTECHNICAL ENGINEERS/Soil Mechanics & Foundations

PROJECT:
UNIVERSITY OF SASKATCHEWAN LANDFILL

LOCATION:
SASKATOON, SASKATCHEWAN

PLATE No: _____

PIEZOMETER DETAILS

PIEZOMETER No: _____

TEST HOLE No: P-18

DEPTH
ELEV.

BACKFILL
DETAIL

SOIL
DESCRIPTION

TYPE OF PIEZOMETER: CASAGRANDE

TYPE OF PIPE: 50mm PVC, SCHEDULE 40

TOP OF PIPE ELEVATION: 92.53m

GROUND SURFACE ELEV.: 91.60m

PIEZOMETER TIP ELEV.: 89.82m

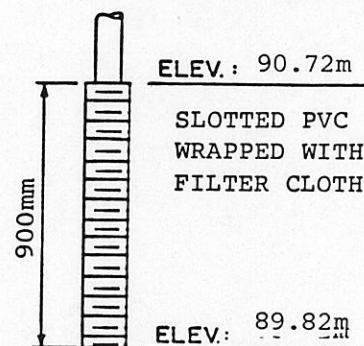
TEST HOLE DIAMETER: 100mm

INSTALLATION DATE: November 24/87

TYPE OF DRILL: Hand Auger

TYPE OF AUGER: _____

PIEZOMETER TIP DETAILS



WATER LEVELS

DATE & TIME	DEPTH*(m)	ELEV. (m)
Nov. 24/87		90.18

*FROM TOP OF PIEZOMETER

REMARKS: Top of piezometer is
described as top of standpipe
following removal of cap.

GROUND ENGINEERING LTD.

GEOTECHNICAL ENGINEERS/Soil Mechanics & Foundations

PROJECT:

UNIVERSITY OF SASKATCHEWAN LANDFILL

LOCATION:

SASKATOON, SASKATCHEWAN

PLATE No: _____

PIEZOMETER DETAILS

PIEZOMETER No: _____

TEST HOLE No: P-19

DEPTH
ELEV.

BACKFILL
DETAIL

SOIL
DESCRIPTION

TYPE OF PIEZOMETER: CASAGRANDE

TYPE OF PIPE: 50mm PVC, SCHEDULE 40

TOP OF PIPE ELEVATION: 90.94m

GROUND SURFACE ELEV.: 89.80m

PIEZOMETER TIP ELEV.: 88.67m

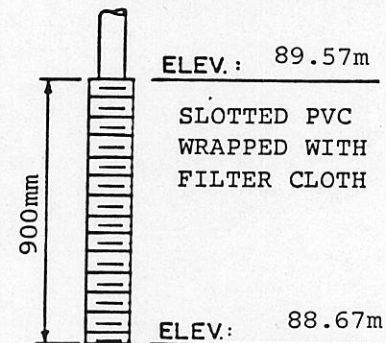
TEST HOLE DIAMETER: 100mm

INSTALLATION DATE: November 24/87

TYPE OF DRILL: Hand Auger

TYPE OF AUGER: _____

PIEZOMETER TIP DETAILS



WATER LEVELS

DATE & TIME	DEPTH*(m)	ELEV. (m)
Nov. 24/87		89.58m

*FROM TOP OF PIEZOMETER

REMARKS: Top of piezometer is
described as top of standpipe
following removal of cap.

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GEOTECHNICAL ENGINEERS/Soil Mechanics & Foundations

PROJECT:

UNIVERSITY OF SASKATCHEWAN LANDFILL

LOCATION:

SASKATOON, SASKATCHEWAN

PLATE No: _____

PIEZOMETER DETAILS

PIEZOMETER No: _____

TEST HOLE No: P-20

DEPTH
ELEV.

BACKFILL
DETAIL

SOIL
DESCRIPTION

TYPE OF PIEZOMETER: CASAGRANDE
TYPE OF PIPE: 50mm PVC, SCHEDULE 40

TOP OF PIPE ELEVATION: 99.62m

GROUND SURFACE ELEV.: 98.57m

PIEZOMETER TIP ELEV.: 87.26m

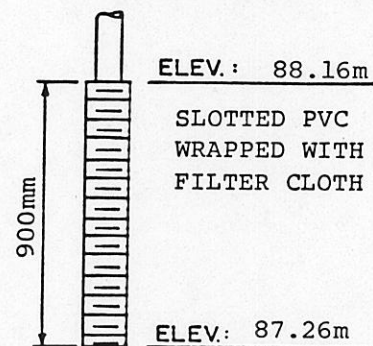
TEST HOLE DIAMETER: 150mm

INSTALLATION DATE: November 19/87

TYPE OF DRILL: Brat 22

TYPE OF AUGER: Solid Stem

PIEZOMETER TIP DETAILS



WATER LEVELS

DATE & TIME	DEPTH*(m)	ELEV. (m)
Nov. 19/87 (pm)		90.58
Nov. 19/87 (pm)		90.61
Nov. 20/87 (pm)		90.62

*FROM TOP OF PIEZOMETER

REMARKS: Top of piezometer is
described as top of standpipe
following removal of cap.

GROUND ENGINEERING LTD.

GEOTECHNICAL ENGINEERS/Soil Mechanics & Foundations

PROJECT:

UNIVERSITY OF SASKATCHEWAN LANDFILL

LOCATION:

SASKATOON, SASKATCHEWAN

PLATE No: _____

PIEZOMETER DETAILS

PIEZOMETER No: _____

TEST HOLE No: P-21

DEPTH
ELEV.

BACKFILL
DETAIL

SOIL
DESCRIPTION

TYPE OF PIEZOMETER: CASAGRANDE

TYPE OF PIPE: 50mm PVC, SCHEDULE 40

TOP OF PIPE ELEVATION: 99.33m

GROUND SURFACE ELEV.: 98.64m

PIEZOMETER TIP ELEV.: 89.57m

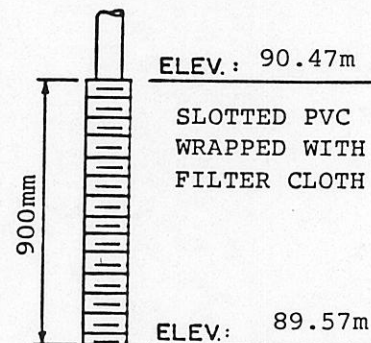
TEST HOLE DIAMETER: 150mm

INSTALLATION DATE: November 19/87

TYPE OF DRILL: Brat 22

TYPE OF AUGER: Solid Stem

PIEZOMETER TIP DETAILS

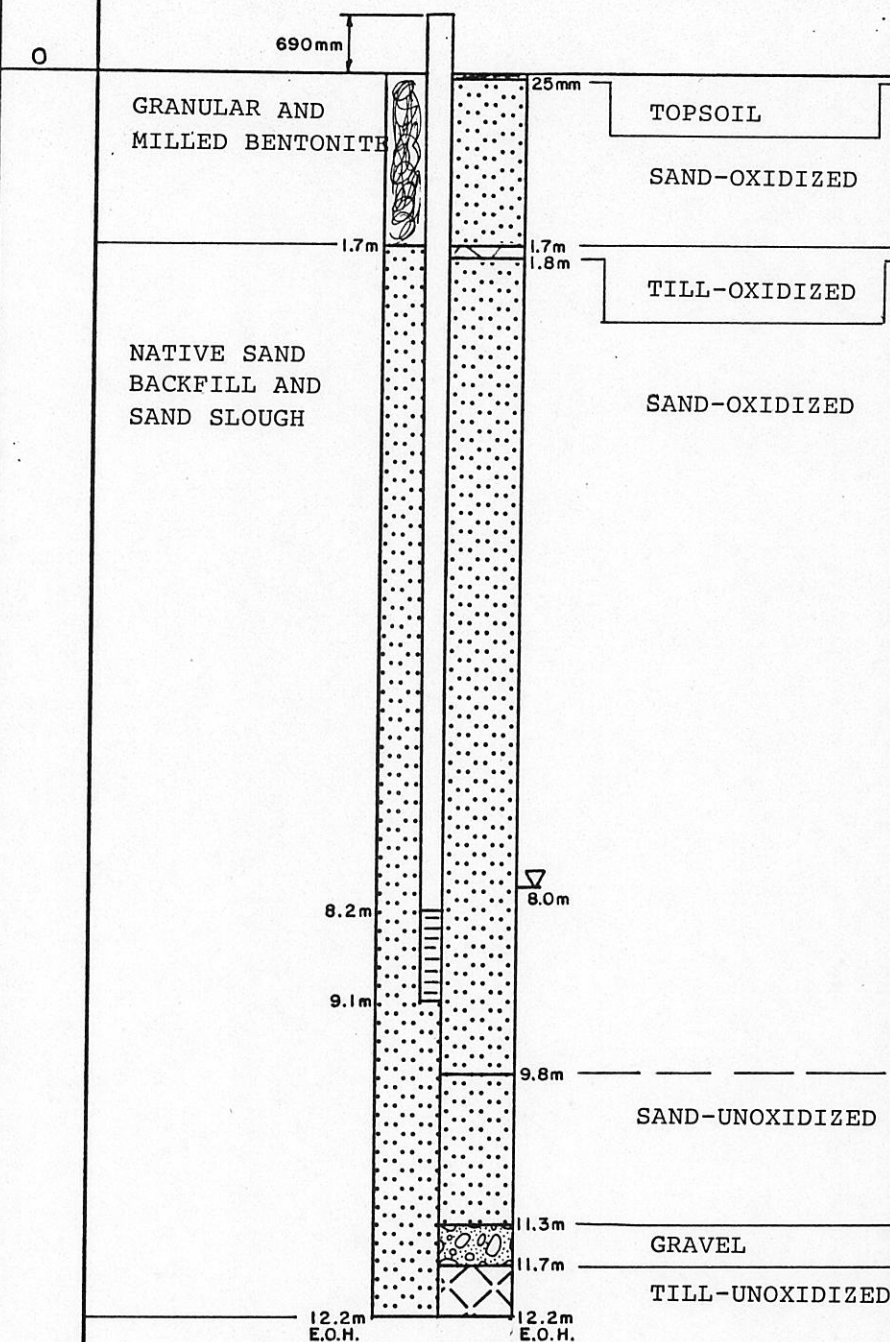


WATER LEVELS

DATE & TIME	DEPTH* (m)	ELEV. (m)
Nov. 19/87 (pm)		90.64
Nov. 19/87 (pm)		90.65
Nov. 20/87 (pm)		90.66

*FROM TOP OF PIEZOMETER

REMARKS: Top of piezometer is
described as top of standpipe
following removal of cap.



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GEOTECHNICAL ENGINEERS/Soil Mechanics & Foundations

PROJECT:
UNIVERSITY OF SASKATCHEWAN LANDFILL

LOCATION:
SASKATOON, SASKATCHEWAN

PLATE No: _____

PIEZOMETER DETAILS

PIEZOMETER No: _____

TEST HOLE No: P-22

DEPTH ELEV.	BACKFILL DETAIL	SOIL DESCRIPTION	TYPE OF PIEZOMETER: CASAGRANDE TYPE OF PIPE: 50mm PVC, SCHEDULE 40 TOP OF PIPE ELEVATION: 99.45m GROUND SURFACE ELEV.: 98.24 PIEZOMETER TIP ELEV.: 90.48m TEST HOLE DIAMETER: 200mm INSTALLATION DATE: November 18/87 TYPE OF DRILL: Brat 22 TYPE OF AUGER: Hollow Stem																		
0																					
	GRANULAR AND MILLED BENTONITE	75mm TOPSOIL 900mm SILT-OXIDIZED TILL-OXIDIZED 1.8m GRAVEL 2.1m SAND-OXIDIZED																			
	NATIVE SAND BACKFILL AND SAND SLOUGH	SAND-UNOXIDIZED																			
		6.9m 7.8m 7.9m 11.9m TILL-UNOXIDIZED 12.2m E.O.H. 12.2m E.O.H.																			
			PIEZOMETER TIP DETAILS ELEV.: 91.38m SLOTTED PVC WRAPPED WITH FILTER CLOTH ELEV.: 90.48m																		
			WATER LEVELS <table><thead><tr><th>DATE & TIME</th><th>DEPTH*(m)</th><th>ELEV. (m)</th></tr></thead><tbody><tr><td>Nov. 19/87(am)</td><td></td><td>91.17</td></tr><tr><td>Nov. 20/87(pm)</td><td></td><td>91.17</td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr></tbody></table> *FROM TOP OF PIEZOMETER REMARKS: Top of piezometer is described as top of standpipe following removal of cap.	DATE & TIME	DEPTH*(m)	ELEV. (m)	Nov. 19/87(am)		91.17	Nov. 20/87(pm)		91.17									
DATE & TIME	DEPTH*(m)	ELEV. (m)																			
Nov. 19/87(am)		91.17																			
Nov. 20/87(pm)		91.17																			

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GEOTECHNICAL ENGINEERS/Soil Mechanics & Foundations:

PROJECT:

UNIVERSITY OF SASKATCHEWAN LANDFILL

LOCATION:

SASKATOON, SASKATCHEWAN

PLATE No: _____

PIEZOMETER DETAILS

PIEZOMETER No: _____

TEST HOLE No: P-24

DEPTH
ELEV.

BACKFILL
DETAIL

SOIL
DESCRIPTION

TYPE OF PIEZOMETER: CASAGRANDE

TYPE OF PIPE: 50mm PVC, SCHEDULE 40

TOP OF PIPE ELEVATION: 98.48m

GROUND SURFACE ELEV.: 97.05m

PIEZOMETER TIP ELEV.: 89.79m

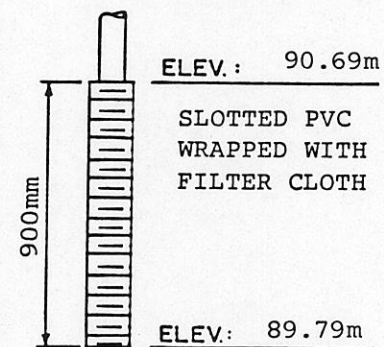
TEST HOLE DIAMETER: 150mm

INSTALLATION DATE: November 20/87

TYPE OF DRILL: Brat 22

TYPE OF AUGER: Solid Stem

PIEZOMETER TIP DETAILS



WATER LEVELS

DATE & TIME	DEPTH*(m)	ELEV. (m)
Nov. 20/87 (pm)		91.78

*FROM TOP OF PIEZOMETER

REMARKS: Top of piezometer is
described as top of standpipe
following removal of cap.

GROUND ENGINEERING LTD.

GEOTECHNICAL ENGINEERS/Soil Mechanics & Foundations

PROJECT:
UNIVERSITY OF SASKATCHEWAN LANDFILL

LOCATION:
SASKATOON, SASKATCHEWAN

PLATE No: _____

PIEZOMETER DETAILS

PIEZOMETER No: _____

TEST HOLE No: P-25

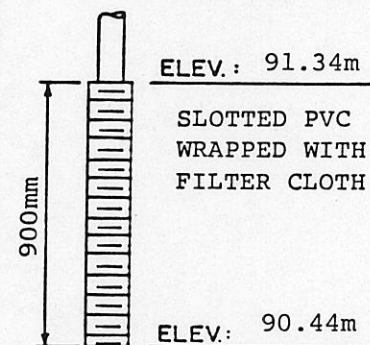
DEPTH
ELEV.

BACKFILL
DETAIL

SOIL
DESCRIPTION

TYPE OF PIEZOMETER: CASAGRANDE
 TYPE OF PIPE: 50mm PVC, SCHEDULE 40
 TOP OF PIPE ELEVATION: 98.98m
 GROUND SURFACE ELEV.: 98.02m
 PIEZOMETER TIP ELEV.: 90.44m
 TEST HOLE DIAMETER: 150mm
 INSTALLATION DATE: November 20/87
 TYPE OF DRILL: Brat 22
 TYPE OF AUGER: Solid Stem

PIEZOMETER TIP DETAILS



WATER LEVELS

DATE & TIME	DEPTH*(m)	ELEV. (m)
Nov. 20/87 (pm)		92.14

*FROM TOP OF PIEZOMETER

REMARKS: Top of piezometer is
described as top of standpipe
following removal of cap.

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GEOTECHNICAL ENGINEERS/Soil Mechanics & Foundations

PROJECT:

UNIVERSITY OF SASKATCHEWAN LANDFILL

LOCATION:

SASKATOON, SASKATCHEWAN

PLATE No: _____

PIEZOMETER DETAILS

PIEZOMETER No: _____

TEST HOLE No: P-26

DEPTH
ELEV.

BACKFILL
DETAIL

SOIL
DESCRIPTION

TYPE OF PIEZOMETER: CASAGRANDE

TYPE OF PIPE: 50mm PVC, SCHEDULE 40

TOP OF PIPE ELEVATION: 91.20m

GROUND SURFACE ELEV.: 90.50m

PIEZOMETER TIP ELEV.: 88.97m

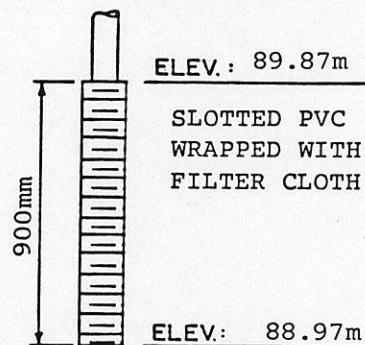
TEST HOLE DIAMETER: 100mm

INSTALLATION DATE: November 24/87

TYPE OF DRILL: Hand Auger

TYPE OF AUGER: _____

PIEZOMETER TIP DETAILS



WATER LEVELS

DATE & TIME	DEPTH*(m)	ELEV. (m)
Nov. 24/87		90.24

*FROM TOP OF PIEZOMETER

REMARKS: Top of piezometer is
described as top of standpipe
following removal of cap.

GROUND ENGINEERING LTD.

GEOTECHNICAL ENGINEERS/Soil Mechanics & Foundations

PROJECT:

UNIVERSITY OF SASKATCHEWAN LANDFILL

LOCATION:

SASKATOON, SASKATCHEWAN

PLATE No: _____

PIEZOMETER DETAILS

PIEZOMETER No: _____

TEST HOLE No: P-27

DEPTH
ELEV.

BACKFILL
DETAIL

SOIL
DESCRIPTION

TYPE OF PIEZOMETER: CASAGRANDE

TYPE OF PIPE: 50mm PVC, SCHEDULE 40

TOP OF PIPE ELEVATION: 89.89m

GROUND SURFACE ELEV: 89.80m

PIEZOMETER TIP ELEV: 88.14m

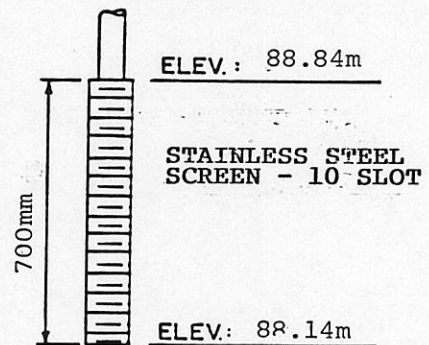
TEST HOLE DIAMETER: _____

INSTALLATION DATE: November 25/87

TYPE OF DRILL: Hand Auger

TYPE OF AUGER: _____

PIEZOMETER TIP DETAILS



WATER LEVELS

DATE & TIME	DEPTH*(m)	ELEV. (m)
Nov. 25/87(am)		89.37

*FROM TOP OF PIEZOMETER

REMARKS: Top of piezometer is
described as top of pipe
following removal of 1.0m
extension.

GROUND ENGINEERING LTD.

GEOTECHNICAL ENGINEERS/Soil Mechanics & Foundations

PROJECT:

UNIVERSITY OF SASKATCHEWAN LANDFILL

LOCATION:

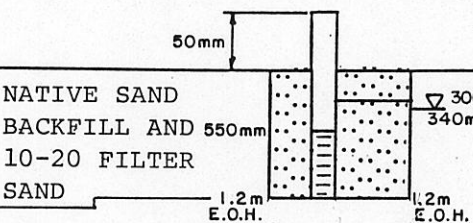
SASKATOON, SASKATCHEWAN

PLATE No: _____

PIEZOMETER DETAILS

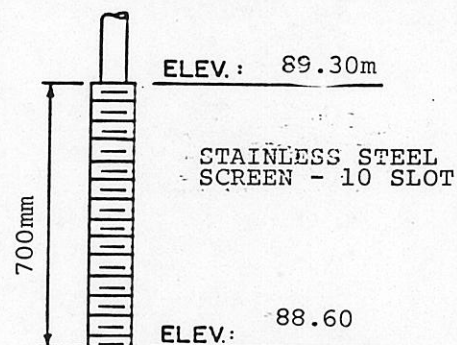
PIEZOMETER No: _____

TEST HOLE No: P-28

DEPTH ELEV.	BACKFILL DETAIL	SOIL DESCRIPTION
0		SAND-UNOXIDIZED -ORGANICS

TYPE OF PIEZOMETER: CASAGRANDE
 TYPE OF PIPE: 50mm PVC, SCHEDULE 40
 TOP OF PIPE ELEVATION: 89.90m
 GROUND SURFACE ELEV.: 89.85m
 PIEZOMETER TIP ELEV.: 88.60m
 TEST HOLE DIAMETER: 100mm
 INSTALLATION DATE: November 25/87
 TYPE OF DRILL: Hand Auger
 TYPE OF AUGER: _____

PIEZOMETER TIP DETAILS



WATER LEVELS

DATE & TIME	DEPTH* (m)	ELEV. (m)
Nov. 25/87 (am)		89.51m

*FROM TOP OF PIEZOMETER

REMARKS: Top of piezometer is
described as top of pipe
following removal of 1.0m
extension.

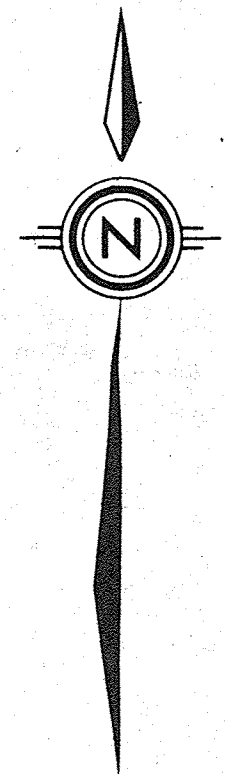
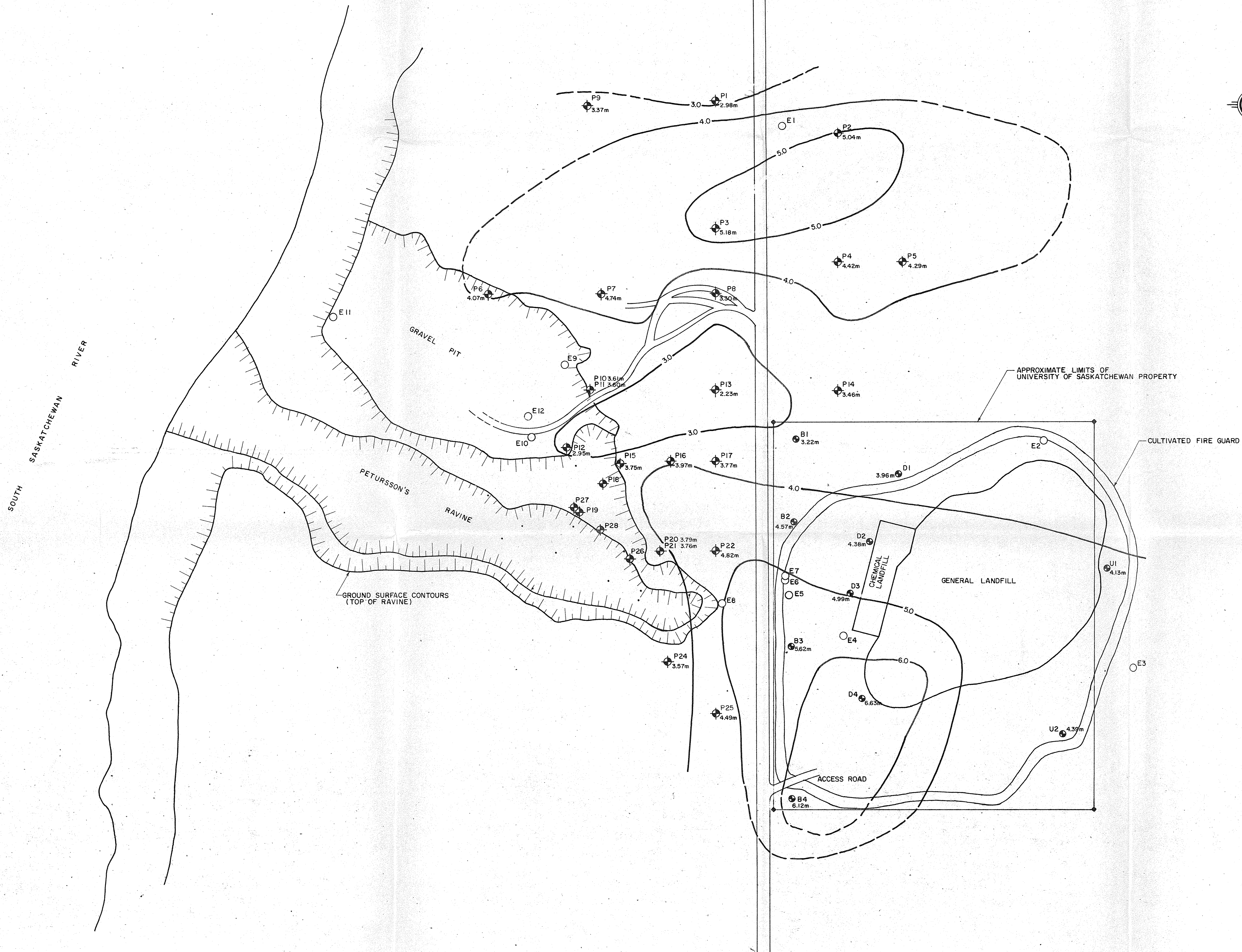
GROUND ENGINEERING LTD.

GEOTECHNICAL ENGINEERS/Soil Mechanics & Foundations

PROJECT:
 UNIVERSITY OF SASKATCHEWAN LANDFILL

LOCATION:
 SASKATOON, SASKATCHEWAN

PLATE No: _____

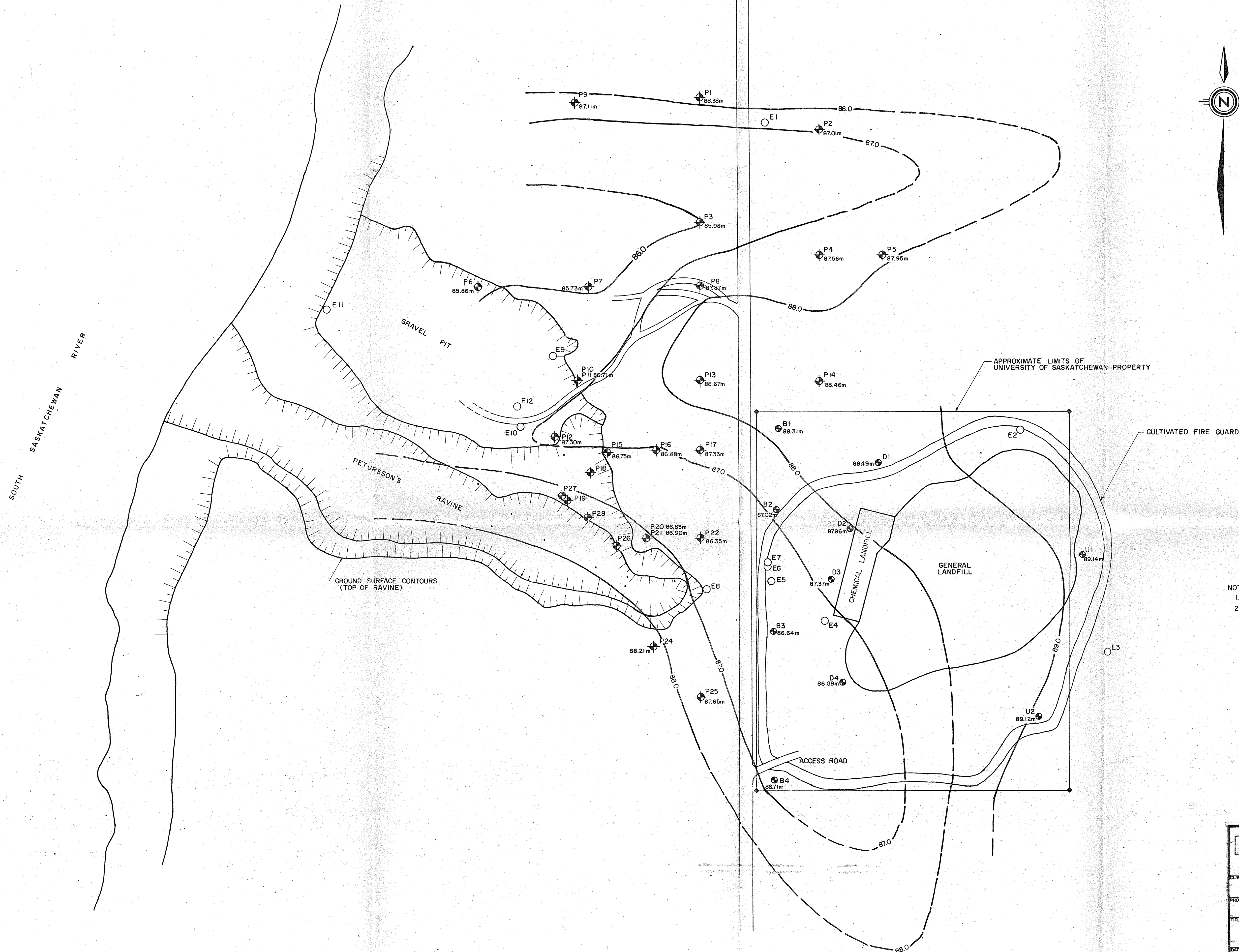


NOTE:
1. CONTOURS SHOWN IN METRES



NOTE: RAVINE AND LANDFILL BOUNDARIES
OBTAINED FROM AERIAL PHOTOGRAPH.
LOCATIONS APPROXIMATE.

GE GROUND ENGINEERING LTD. CIVIL AND GEOTECHNICAL ENGINEERS REGINA • SASKATCHEWAN • SASKATOON		
CLIENT UNIVERSITY OF SASKATCHEWAN		
PROJECT UNIVERSITY OF SASKATCHEWAN LANDFILL SASKATOON, SASKATCHEWAN		
TITLE THICKNESS OF SATURATED ZONE OF FORESTRY FARM AQUIFER NOVEMBER, 1987		
DATE NOV., 1987	PROJECT No. GE-911	DWG. No. GE-911-7

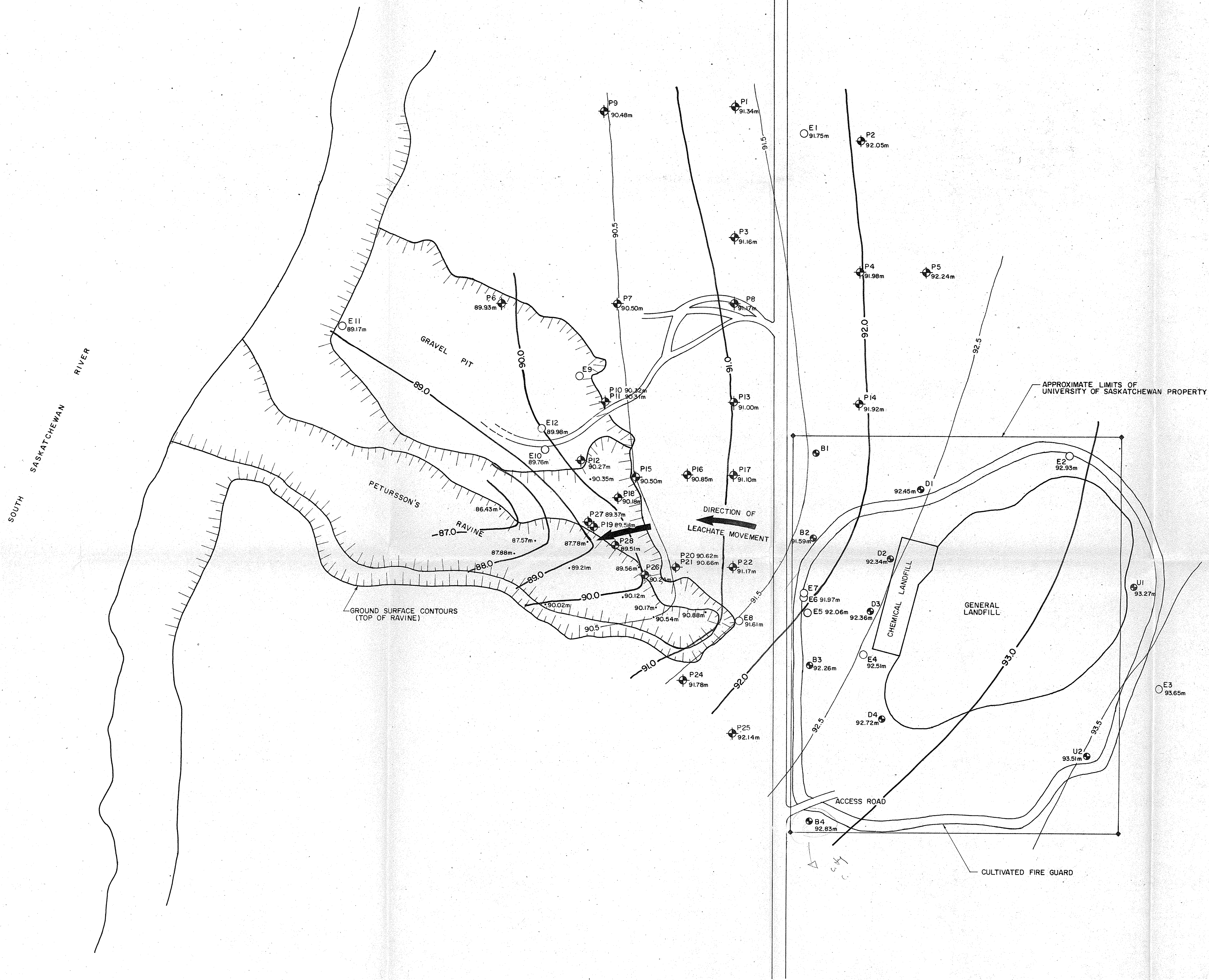


NOTE:
 1. CONTOURS SHOWN IN METRES (ASSUMED DATUM)
 2. ASSUMED DATUM IS 100.00metres, TOP OF PROPERTY PIN, SOUTH-WEST CORNER OF UNIVERSITY OF SASKATCHEWAN LANDFILL



NOTE: RAVINE AND LANDFILL BOUNDARIES OBTAINED FROM AERIAL PHOTOGRAPH. LOCATIONS APPROXIMATE.

GE GROUND ENGINEERING LTD. CIVIL AND GEOTECHNICAL ENGINEERS REGINA • SASKATCHEWAN • SASKATOON		
CLIENT: UNIVERSITY OF SASKATCHEWAN		
PROJECT: UNIVERSITY OF SASKATCHEWAN LANDFILL, SASKATOON, SASKATCHEWAN		
TITLE: ELEVATION OF TOP OF FORESTRY FARM AQUIFER, NOVEMBER, 1987		
DATE: NOV. 1987	PROJECT No:	DWG. No:
APPROVED:	GE-911	GE-911-6



NOTE:
1. CONTOURS SHOWN IN METRES (ASSUMED DATUM)
2. ASSUMED DATUM IS 100.00metres
PROPERTY PIN, SOUTH-WEST CORNER OF
UNIVERSITY OF SASKATCHEWAN LANDFILL



NOTE: RAVINE AND LANDFILL BOUNDARIES
OBTAINED FROM AERIAL PHOTOGRAPH.
LOCATIONS APPROXIMATE.

GE GROUND ENGINEERING LTD. CIVIL AND GEOTECHNICAL ENGINEERS REGINA • SASKATCHEWAN • SASKATOON		
CLIENT UNIVERSITY OF SASKATCHEWAN		
PROJECT UNIVERSITY OF SASKATCHEWAN LANDFILL SASKATOON, SASKATCHEWAN		
TITLE ELEVATION OF PIEZOMETRIC SURFACE FORESTRY FARM AQUIFER NOVEMBER, 1987		
DATE NOV, 1987	PROJECT No. GE-911	DWG. No. GE-911-5