

**IGSL Limited**  
**Ground Investigation**  
**O'Devaney Gardens, Dublin**  
**Project No. 9606**  
**On Behalf Of**  
**Arup**  
**Consulting Engineers**

## **FOREWORD**

### **Notes on Site Investigation Procedure**

The following notes should be read in conjunction with the report. Any modifications to the procedures outlined below are indicated in the main text.

#### **GENERAL**

The recommendations made and opinions expressed in the Report are based on the "Boring Records, an examination of samples and results of the site and laboratory tests. No responsibility can be held for conditions which have not been revealed by the boreholes, for example, between borehole positions. Whilst the report may express an opinion on a possible configuration of strata both between borehole positions and below the maximum depth of the investigation, this is for guidance only and no liability can be accepted for its accuracy.

#### **BORING TECHNIQUE**

Unless otherwise stated the 'Shell and Auger' technique of soft ground boring has been employed. Whilst this technique allows the maximum data to be obtained on strata conditions, a degree of mixing of some layered soils, (e.g. thin layers of coarse and fine granular material) is inevitable. Specific attention is drawn to this factor where evidence of such a condition is available.

#### **GROUND WATER**

The ground water conditions entered on the Boring Records are those appertaining at the time of the investigation. The normal rate of boring does not usually permit the recording of an equilibrium water level for any one water strike. Moreover, ground water levels are subject to variations caused by seasonal effects or changes in local drainage conditions. The table of each Boring Record shows the ground water level at the quoted borehole and casing depths, usually at the start of the day's work. The word "none" indicates that ground water was sealed off by the borehole casing.

#### **GAS MONITORING**

Unless otherwise stated gas monitoring is carried out using a GA2000 infra red gas detector. The gases monitored for and levels noted are recorded and plotted on the relevant test data sheets. Unless stated otherwise no monitoring is carried out for gas pressure or to calculate gas flow rates.

#### **ROUTINE SAMPLING**

Undisturbed samples of predominantly cohesive soils are obtained in a 102mm diameter open-drive sampler, complying with the requirements of the British Standard Code of Practice B.S. 5930. Large disturbed samples of granular soils, or of soils in which undisturbed sampling is not possible or appropriate, are taken from the boring tools and sealed into polythene bags. Small disturbed samples are taken at frequent intervals and sealed into 0.5 kg glass jars or polythene bags for subsequent visual classification. Where encountered in sufficient quantity, samples of groundwater are taken.

Unless otherwise stated in the main text, disturbed soil samples may not be at their natural water content.

**REPORT ON A SITE INVESTIGATION  
FOR  
PROPOSED RESIDENTIAL RE-DEVELOPMENT WORKS  
AT  
O'DEVANEY GARDENS, DUBLIN  
ON BEHALF OF  
ARUP,  
CONSULTING ENGINEERS**

**REPORT NO. 9606**

**MAY 2004**

**I.INTRODUCTION**

The proposed development site is located in O'Devaney Gardens which is situated off the North Circular Road in Dublin.

It is proposed to redevelop this site and construct new multi storey residential developments along with associated commercial and community areas.

An investigation of sub-soil conditions was ordered by the projects consulting engineers, Arup Ireland, on behalf of their clients, Dublin City Council.

The programme of the investigation included,

- ✓ The construction of eleven exploratory boreholes to establish stratification. During the course of boring in-situ tests were performed at regular intervals and representative soil samples were recovered for visual examination and laboratory analysis.
- ✓ The excavation of twelve trial pits using a CAT 225 back hoe excavator. All pits were logged by an IGSL geotechnical engineer.
- ✓ The carrying out of laboratory soils testing ( Geotechnical ) as specified by the projects engineers.

This report has contains the factual information pertaining

## **II.FIELDWORK**

The site is referred to as the O'Devaney Gardens development and the locations of all of the investigation points are shown on the detailed site plan enclosed in Appendix IV to this report.

Site works were supervised by a representative of the consulting engineers and by an IGSL geotechnical engineer. The methods utilised during the course of the field investigations are outlined in the following sections.

### *Cable Tool Boreholes.*

Conventional cable tool techniques ( shell and auger ) were employed at eleven locations across the site . All field work was carried out in accordance with BS5930.

Sampling and in - situ testing were performed to BS1377. Disturbed and undisturbed soil samples were taken at regular intervals or at changes in stratification while standard penetration tests ( SPT's ) were also carried out to establish relative in - situ soil strength.

Full details of stratification, testing, sampling, comments on groundwater and notes on any obstructions to normal boring encountered are given in the detailed borehole records enclosed in Appendix I to this report.

### *Trial Pits*

A total of thirteen trial pits were excavated using a JCB back hoe excavator. Trial pits were excavated to recover visually examine the sub soils and to recover geotechnical soils samples. All of the trial pits were logged by an IGSL geotechnical engineer.

Full details of stratification, sampling, comments on groundwater and notes on pit stability are given in the detailed trial pits enclosed in Appendix II to this report.

### **III. TESTING**

During the course of the investigation samples of the sub soils were taken from the boreholes and trial pits and in situ SPT tests were carried out in the boreholes.

The disturbed soil samples were returned to IGSL's laboratory where a programme of testing was scheduled by the projects engineers.

#### **In Situ Tests**

##### ***Standard Penetration Tests***

The relative in-situ strength of the sub-soils was established at intervals by cone penetration test.

A solid conical point is hammered into the soil and the blow count for 300mm of penetration is recorded in four 75mm increments. Results are presented in the right - hand column of the boring records.

#### **Geotechnical Testing – Soils**

All of the geotechnical test data is included in Appendix III to this report.

Tests carried out included

- ✓ Moisture Content Tests
- ✓ Atterburg Limits ( Classification tests ).
- ✓ pH and SO<sup>3</sup> Tests
- ✓ Particle Size Distribution Tests ( Wet Sieve )
- ✓ Sedimentation Analysis ( by Hydrometer ).
- ✓ Loss on Ignition Tests
- ✓ Triaxial Compression Tests
- ✓ CBR Tests

## **Appendix I – Cable Tool Borehole Records**

REPORT NO: 9606

## GEOTECHNICAL BORING RECORD

IGSL Ltd.

CONTRACT: O'Devaney Gardens

BOREHOLE NO: BH1  
Sheet 1 of 1CLIENT: ARUP  
ENGINEER: ARUPGROUND LEVEL (mOD) -  
BOREHOLE DIAMETER (mm) 200  
BOREHOLE DEPTH (m) 6.00  
CASING DEPTH (m) 6.00DATE STARTED: 29/03/2004  
DATE COMPLETED: 29/03/2004CO-ORDINATES: E -  
N -

BORED BY: J.O'Hara

DEPTH (m)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES			FIELD TEST RESULTS	STAND PIPE DETAILS
					REF. NUMBER	SAMPLE TYPE	DEPTH (m)		
0	TOPSOIL			0.30					
1	MADE GROUND containing clay			1.20	3962	B	1.00	N=6	
2	Stiff brown sandy gravelly CLAY with cobbles			2.30	3963	B	2.00	N=27	
3	Hard black sandy gravelly CLAY with cobbles				3964	B	3.00	N=65/ 125mm	
4					3965	B	4.00	N=89/ 210mm	
5					3966	B	5.00	N=R	
6	End of Borehole at 6.05 m			6.00	3967	B	6.00	N=50/ 55mm	
7									
8									
9									
10									

## Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
2.30	2.80	1.00	
4.20	4.40	1.25	
6.00	6.05	2.00	

## Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
-	-	-	-	-	Dry

## Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
29/03/2004	6.05	0.00	-	BH dry, end of BH

## Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Remarks:

REPORT NO: 9606

## GEOTECHNICAL BORING RECORD

IGSL Ltd.

CONTRACT: O'Devaney Gardens

BOREHOLE NO: BH2  
Sheet 1 of 1CLIENT:  
ENGINEER: ARUP

GROUND LEVEL (mOD)

-

DATE STARTED: 18/03/2004  
DATE COMPLETED: 18/03/2004CO-ORDINATES: E -  
N -

BOREHOLE DIAMETER (mm)

200

BORED BY: J.O'Hara

BOREHOLE DEPTH (m)

7.00

CASING DEPTH (m)

6.00

DEPTH (m)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES			FIELD TEST RESULTS	STAND PIPE DETAILS
					REF. NUMBER	SAMPLE TYPE	DEPTH (m)		
0	MADE GROUND containing concrete overlying hardcore			0.30					
1	Firm brown sandy gravelly CLAY with cobbles (Possible made ground)			1.50	3901	B	1.00	N=13	
2	Firm brown sandy gravelly CLAY with cobbles			2.70	3902	B	2.00	N=11	
3	Very stiff/hard black sandy gravelly CLAY with cobbles				3903	B	3.00	N=35	
4					3904	B	4.00	N=46	
5					3905	B	5.00	N=25/55mm	
6					3906	B	6.00	N=50/150mm	
7	End of Borehole at 7.00 m			7.00	3907	B	7.00	N=R	
8									
9									
10									

## Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
0.00	0.30	1.50	.
3.30	3.50	0.50	.
5.30	5.40	0.75	.
6.00	7.00	2.00	

## Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
2.50	2.50	3.00	-	-	Slow

## Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
18/03/2004	7.00	0.00	-	BH dry, end of BH

Remarks:

REPORT NO: 9606

## GEOTECHNICAL BORING RECORD

IGSL Ltd.

CONTRACT: O'Devaney Gardens

BOREHOLE NO: BH3  
Sheet 1 of 1CLIENT: ARUP  
ENGINEER: ARUPGROUND LEVEL (mOD) -  
BOREHOLE DIAMETER (mm) 200  
BOREHOLE DEPTH (m) 6.50  
CASING DEPTH (m) 6.50DATE STARTED: 22/03/2004  
DATE COMPLETED: 22/03/2004  
BORED BY: J.O'HaraCO-ORDINATES: E -  
N -

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (M)	SAMPLES			FIELD TEST RESULTS	STANDPIPE DETAILS
					REF. NUMBER	SAMPLE TYPE	DEPTH (M)		
0	MADE GROUND containing concrete overlying hardcore			0.30					
1	Firm/stiff brown sandy gravelly CLAY with cobbles				3908	B	1.00	N=11	
2					3909	B	2.00	N=24	
3	Hard black sandy gravelly CLAY with cobbles			2.90	3910	B	3.00	N=34	
4					3911	B	4.00	N=43/ 120mm	
5					3912	B	5.00	N=R	
6					3913	B	6.30	N=25/ 75mm	
7	End of Borehole at 6.50 m			6.50					
8									
9									
10									

## Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
0.00	0.30	1.00	
3.80	4.00	1.50	
5.10	5.30	0.75	
6.40	6.50	2.00	

## Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
-	-	-	-	-	Dry

## Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

## Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
22/03/2004	6.50	0.00	-	BH dry, end of BH

Remarks:

REPORT NO: 9606

## GEOTECHNICAL BORING RECORD

IGSL Ltd.

CONTRACT: O'Devaney Gardens

BOREHOLE NO: BH4  
Sheet 1 of 1CLIENT: ARUP  
ENGINEER: ARUP

GROUND LEVEL (mOD)

-

DATE STARTED: 26/03/2004

CO-ORDINATES: E -  
N -

BOREHOLE DIAMETER (mm)

200

DATE COMPLETED: 26/03/2004

BOREHOLE DEPTH (m)

6.00

BORED BY: J.O'Hara

CASING DEPTH (m)

6.00

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES			FIELD TEST RESULTS	STAND PIPE DETAILS
					REF. NUMBER	SAMPLE TYPE	DEPTH (m)		
0	TOPSOIL			0.20					
1	MADE GROUND containing clay			1.30	3950	B	1.00	N=6	
2	Stiff brown sandy gravelly CLAY with cobbles			2.40	3951	B	2.00	N=34	
3	Hard black sandy gravelly CLAY with cobbles				3952	B	3.00	N=64/ 210mm	
4					3953	B	4.00	N=56	
5					3954	B	5.00	N=73	
6	End of Borehole at 6.00 m			6.00	3955	B	6.00	N=R	
7									
8									
9									
10									

## Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
2.40	3.00	1.50	Continuous
4.00	6.00	3.00	

## Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
-	-	-	-	-	Dry

## Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
26/03/2004	6.00	0.00	-	BH dry, end of BH

## Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Remarks:

REPORT NO: 9606

## GEOTECHNICAL BORING RECORD

IGSL Ltd.

CONTRACT: O'Devaney Gardens

BOREHOLE NO: BH5  
Sheet 1 of 1CLIENT: ARUP  
ENGINEER: ARUPGROUND LEVEL (mOD) -  
BOREHOLE DIAMETER (mm) 200  
BOREHOLE DEPTH (m) 6.20  
CASING DEPTH (m) 6.20DATE STARTED: 25/03/2004  
DATE COMPLETED: 25/03/2004CO-ORDINATES: E -  
N -

BORED BY: J.O'Hara

DEPTH (m)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES			FIELD TEST RESULTS	STAND PIPE DETAILS
					REF. NUMBER	SAMPLE TYPE	DEPTH (m)		
-0.0	MADE GROUND containing clay				3944	B	1.00	N=3	
-1.0				1.50	3945	B	2.00	N=8	
-2.0	Soft brown sandy gravelly CLAY/SILT with cobbles			2.20	3946	B	3.00	N=68	
-3.0	Hard brown sandy gravelly CLAY with cobbles			3.50	3947	B	4.00	N=53	
-4.0	Very stiff/hard black sandy gravelly CLAY with cobbles			3.50	3948	B	5.00	N=46/ 250mm	
-5.0				6.20	3949	B	6.20	N=R	
-6.0	End of Borehole at 6.20 m								
-7.0									
-8.0									
-9.0									
-10.0									

## Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
3.50	3.80	0.50	
6.00	6.20	2.00	

## Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
1.50	1.50	2.20	-	-	Slow

## Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
25/03/2004	6.20	0.00	4.30	End of BH

## Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Remarks:

REPORT NO: 9606

## GEOTECHNICAL BORING RECORD

IGSL Ltd.

CONTRACT: O'Devaney Gardens

BOREHOLE NO: BH6  
Sheet 1 of 1CLIENT: ARUP  
ENGINEER: ARUPGROUND LEVEL (mOD) -  
BOREHOLE DIAMETER (mm) 200  
BOREHOLE DEPTH (m) 5.90  
CASING DEPTH (m) 5.90DATE STARTED: 25/03/2004  
DATE COMPLETED: 25/03/2004  
BORED BY: J.O'HaraCO-ORDINATES: E -  
N -

DEPTH (m)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES			FIELD TEST RESULTS	STANDPIPE DETAILS
					REF. NUMBER	SAMPLE TYPE	DEPTH (m)		
0	TOPSOIL MADE GROUND containing clay			0.20					
1	Very stiff brown sandy gravelly CLAY with cobbles			1.20	3938	B	1.00	N=36	
2	Hard black sandy gravelly CLAY with cobbles			2.30	3939	B	2.00	N=45	
3					3940	B	3.00	N=45/145mm	
4					3941	B	4.00	N=44/125mm	
5					3942	B	5.00	N=35/150mm	
6	End of Borehole at 5.90 m			5.90	3943	B	5.90	N=R	
7									
8									
9									
10									

## Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
1.20	2.30	0.50	
4.30	4.50	0.75	
5.70	5.90	2.00	

## Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
-	-	-	-	-	Dry

## Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
25/03/2004	5.90	0.00	-	BH dry, end of BH

## Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Remarks:

REPORT NO: 9606

## GEOTECHNICAL BORING RECORD

IGSL Ltd.

CONTRACT: O'Devaney Gardens

BOREHOLE NO: BH7

Sheet 1 of 1

CLIENT: ARUP  
ENGINEER: ARUP

GROUND LEVEL (mOD)

BOREHOLE DIAMETER (mm)

200

DATE STARTED: 23/03/2004

DATE COMPLETED: 23/03/2004

CO-ORDINATES: E -  
N -

BOREHOLE DEPTH (m)

6.50

BORED BY: J.O'Hara

CASING DEPTH (m)

6.50

DEPTH (m)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES			FIELD TEST RESULTS	STANDPIPE DETAILS
					REF. NUMBER	SAMPLE TYPE	DEPTH (m)		
0	MADE GROUND containing concrete overlying clay								
1	Stiff brown sandy gravelly CLAY with cobbles			1.00	3920	B	1.00	N=23	
2					3921	B	2.00	N=27	
3	Hard black sandy gravelly CLAY with cobbles			2.50					
4					3922	B	3.00	N=74/ 245mm	
5					3923	B	4.00	N=43/ 125mm	
6					3924	B	5.00	N=71	
7					3925	B	6.00	N=25/ 25mm	
8	End of Borehole at 6.50 m			6.50					
9									
10									

## Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
2.50	2.80	0.75	
4.20	4.60	1.25	
6.30	6.50	1.75	

## Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
-	-	-	-	-	Dry

## Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
23/03/2004	6.50	0.00	-	BH dry, end of BH

## Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Remarks: Excavated down to 1m

REPORT NO: 9606

## GEOTECHNICAL BORING RECORD

IGSL Ltd.

CONTRACT: O'Devaney Gardens

BOREHOLE NO: BH8

Sheet 1 of 1

CLIENT:  
ENGINEER: ARUP

GROUND LEVEL (mOD)

BOREHOLE DIAMETER (mm) 200

DATE STARTED: 24/03/2004

CO-ORDINATES: E -  
N -

BOREHOLE DEPTH (m) 6.10

CASING DEPTH (m) 6.10

DATE COMPLETED: 24/03/2004

BORED BY: J.O'Hara

DEPTH (m)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES			FIELD TEST RESULTS	STANDPIPE DETAILS
					REF. NUMBER	SAMPLE TYPE	DEPTH (m)		
0	MADE GROUND containing tarmacadam overlying hardcore			0.20					
1	MADE GROUND containing clay/silt							N=8	
2	Soft brown sandy gravelly CLAY with cobbles			1.30	3926	B	1.00		
3					3927	B	2.00	N=9	
3	Hard brown black sandy gravelly CLAY with cobbles			2.80	3928	B	3.00	N=59/ 220mm	
4	Hard black sandy gravelly CLAY with cobbles			3.20	3929	B	4.00	N=61	
5					3930	B	5.00	N=63	
6	End of Borehole at 6.10 m			6.10	3931	B	6.00	N=R	
7									
8									
9									
10									

## Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
0.00	0.20	0.50	:
4.00	4.60	1.25	
6.00	6.10	1.50	

## Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
2.20	2.20	2.80	-	-	Slow

## Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
24/03/2004	6.10	0.00	-	BH dry, end of BH

## Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Remarks:

REPORT NO: 9606

## GEOTECHNICAL BORING RECORD

IGSL Ltd.

CONTRACT: O'Devaney Gardens

BOREHOLE NO: BH9  
Sheet 1 of 1CLIENT: ARUP  
ENGINEER: ARUP

GROUND LEVEL (mOD)

BOREHOLE DIAMETER (mm)

200

DATE STARTED: 22/03/2004  
DATE COMPLETED: 22/03/2004CO-ORDINATES: E -  
N -

BOREHOLE DEPTH (m)

6.30

BORED BY: J.O'Hara

CASING DEPTH (m)

6.30

DEPTH (m)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES			FIELD TEST RESULTS	STANDPIPE DETAILS
					REF. NUMBER	SAMPLE TYPE	DEPTH (m)		
1	TOPSOIL			0.20					
	MADE GROUND containing clay			0.60					
	Firm/stiff brown sandy gravelly CLAY with cobbles				3914	B	1.00	N=18	
2					3915	B	2.00	N=21	
3	Hard black sandy gravelly CLAY with cobbles			2.70	3916	B	3.00	N=35	
4					3917	B	4.00	N=75/ 295mm	
5					3918	B	5.00	N=71	
6					3919	B	6.30	N=25/ 25mm	
7	End of Borehole at 6.30 m								
8									
9									
10									

## Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
2.70 6.00	2.90 6.30	1.50 2.00	

## Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
2.60	2.60	2.90	-	-	Slow

## Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
22/03/2004	6.30	0.00	-	BH dry, end of BH

## Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Remarks:

REPORT NO: 9606

## GEOTECHNICAL BORING RECORD

IGSL Ltd.

CONTRACT: O'Devaney Gardens

BOREHOLE NO: BH10  
Sheet 1 of 1CLIENT:  
ENGINEER: ARUPGROUND LEVEL (mOD)  
BOREHOLE DIAMETER (mm) 200  
BOREHOLE DEPTH (m) 5.90  
CASING DEPTH (m) 5.90DATE STARTED: 24/03/2004  
DATE COMPLETED: 24/03/2004  
BORED BY: J.O'HaraCO-ORDINATES: E -  
N -

DEPTH (m)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES			FIELD TEST RESULTS	STANDPIPE DETAILS
					REF. NUMBER	SAMPLE TYPE	DEPTH (m)		
0	TOPSOIL MADE GROUND containing clay			0.20					
1	Stiff brown sandy gravelly CLAY with cobbles			1.10	3932	B	1.00	N=16	
2				2.50	3933	B	2.00	N=30	
3	Hard black sandy gravelly CLAY with cobbles				3934	B	3.00	N=63/ 200mm	
4					3935	B	4.00	N=50/ 50mm	
5					3936	B	5.00	N=62/ 275mm	
6	End of Borehole at 5.90 m			5.90	3937	B	5.90	N=R	
7									
8									
9									
10									

## Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
4.30	4.50	0.75	
5.30	5.90	2.00	

## Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
-	-	-	-	-	Dry

## Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
24/03/2004	6.00	0.00	-	BH dry, end of BH

## Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Remarks:

REPORT NO: 9606

## GEOTECHNICAL BORING RECORD

IGSL Ltd.

CONTRACT : O'Devaney Gardens

BOREHOLE NO: BH11  
Sheet 1 of 1CLIENT :  
ENGINEER : ARUPGROUND LEVEL (mOD)  
BOREHOLE DIAMETER (mm) 200  
BOREHOLE DEPTH (m) 6.00  
CASING DEPTH (m) 6.00DATE STARTED: 29/03/2004  
DATE COMPLETED: 29/03/2004CO-ORDINATES : E -  
N -

BORED BY: J.O'Hara

DEPTH (m)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES			FIELD TEST RESULTS	STAND PIPE DETAILS
					REF. NUMBER	SAMPLE TYPE	DEPTH (m)		
0.00	MADE GROUND containing concrete			0.20					
0.20	MADE GROUND containing clay								
1.00					3956	B	1.00	N=5	
1.30	Stiff brown sandy gravelly CLAY with cobbles				3957	B	2.00	N=28	
2.00					3958	B	3.00	N=71/ 285mm	
2.40	Hard black sandy gravelly CLAY with cobbles				3959	B	4.00	N=69	
3.00					3960	B	5.00	N=83	
4.00									
5.00									
6.00	End of Borehole at 6.00 m			6.00	3961	B	6.00	N=R	
7.00									
8.00									
9.00									
10.00									

## Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
0.00 5.80	0.20 6.00	1.00 2.00	

## Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
2.20	2.20	2.50	-	-	Slow

## Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
29/03/2004	6.00	0.00	-	BH dry, end of BH

## Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Remarks:

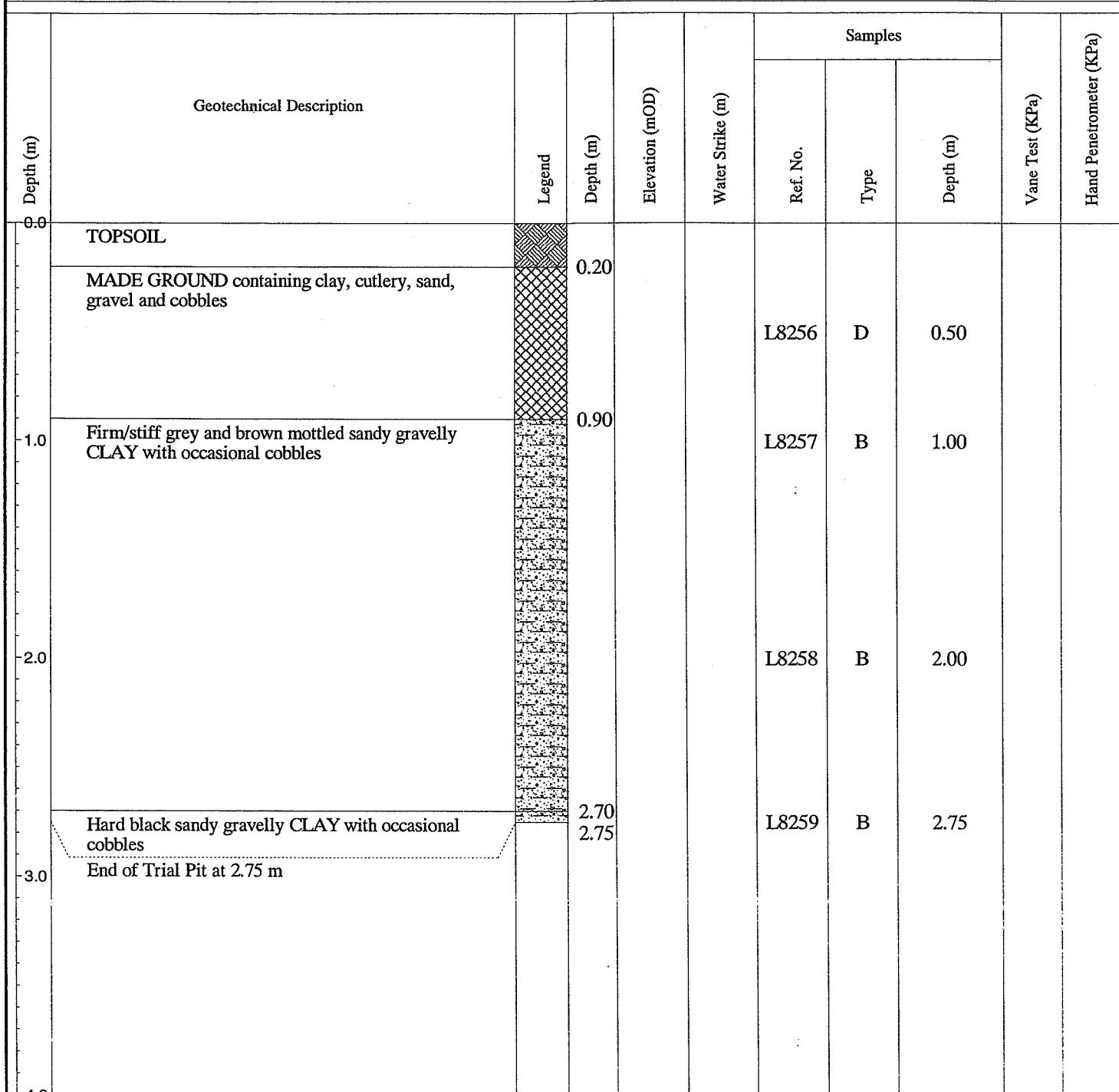
## **Appendix II – Trial Pit Records**

REPORT NO. 9606

## TRIAL PIT RECORD

IGSL Ltd.

CONTRACT:	O'Devaney Gardens	Trial Pit No.:	TP1
		Sheet:	Sheet 1 of 1
CLIENT:		Excavation Method:	CAT
		Date Started:	26/03/2004
ENGINEER:	ARUP	Date Completed:	26/03/2004
CO-ORDINATES:	E - N -	Ground Level (mOD):	-



Groundwater Conditions: No groundwater encountered

Stability: Stable

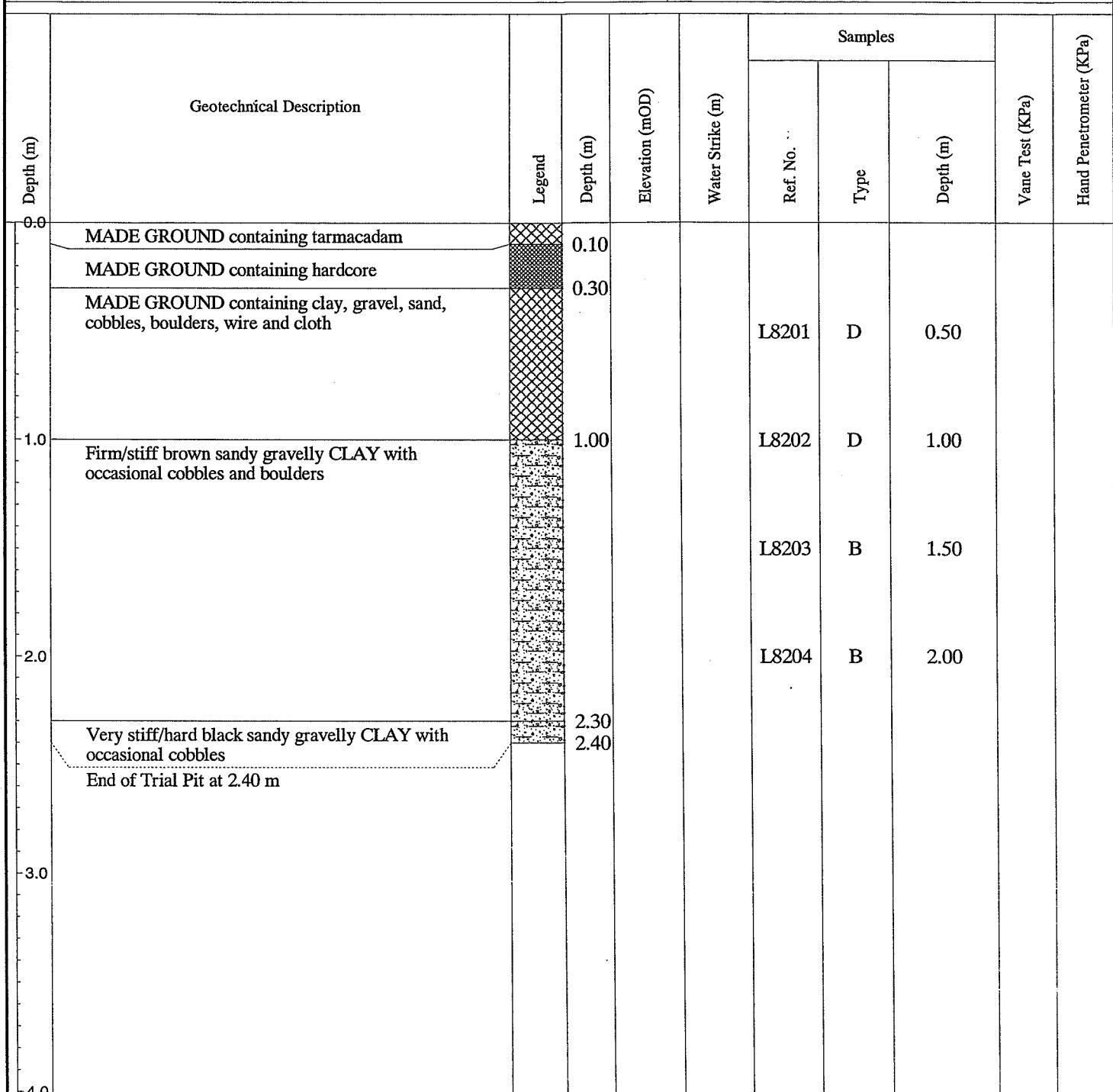
Remarks:

REPORT NO. 9606

## TRIAL PIT RECORD

IGSL Ltd.

CONTRACT:	O'Devaney Gardens	Trial Pit No.:	TP2
CLIENT:		Sheet:	Sheet 1 of 1
ENGINEER:	ARUP	Excavation Method:	CAT
CO-ORDINATES:	E - N -	Date Started:	25/03/2004
		Date Completed:	25/03/2004
		Ground Level (mOD):	-



Groundwater Conditions: No groundwater encountered

Stability: Stable

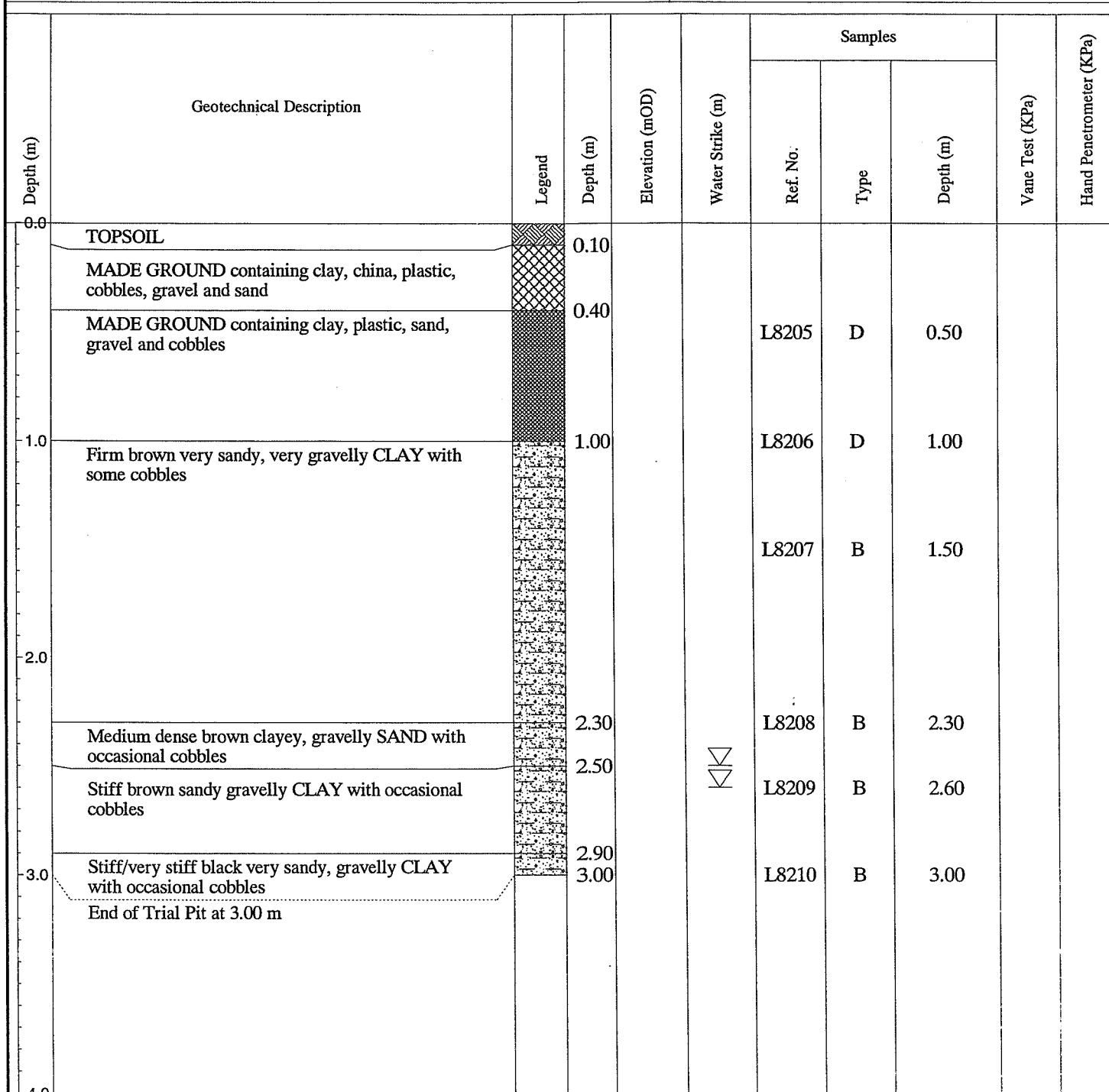
Remarks:

REPORT NO. 9606

## TRIAL PIT RECORD

IGSL Ltd.

CONTRACT:	O'Devaney Gardens	Trial Pit No.:	TP3
CLIENT:		Sheet:	Sheet 1 of 1
ENGINEER:	ARUP	Excavation Method:	CAT
CO-ORDINATES:	E - N -	Date Started:	25/03/2004
		Date Completed:	25/03/2004
		Ground Level (mOD):	-



Groundwater Conditions: Seepage at 2.5m and slow ingress at 2.6m

Stability: Collapse of pit

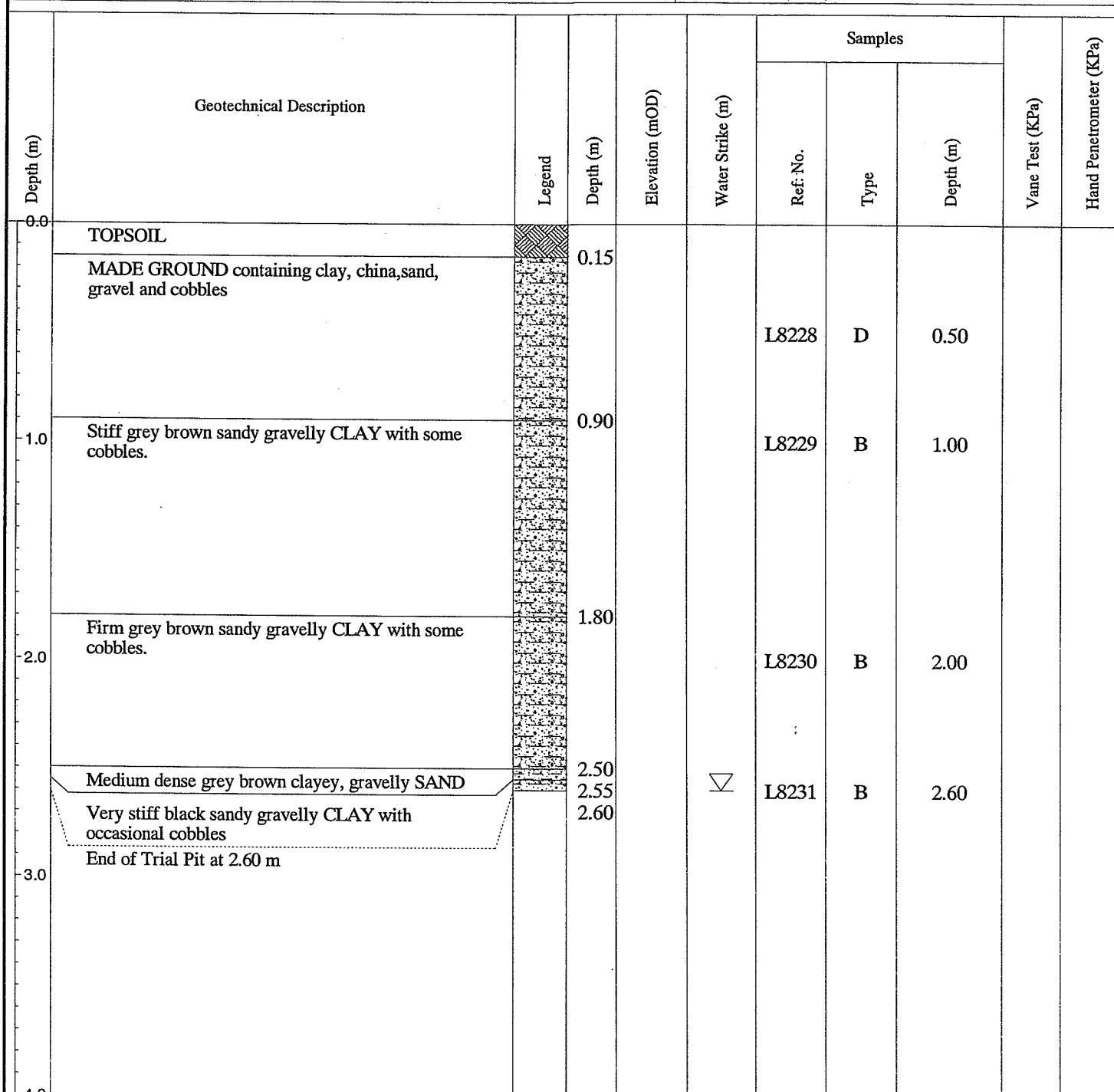
Remarks:

REPORT NO. 9606

## TRIAL PIT RECORD

IGSL Ltd.

CONTRACT:	O'Devaney Gardens	Trial Pit No.:	TP4
CLIENT:		Sheet:	Sheet 1 of 1
ENGINEER:	ARUP	Excavation Method:	CAT
CO-ORDINATES:	E - N -	Date Started:	25/03/2004
		Date Completed:	25/03/2004
		Ground Level (mOD):	-



Groundwater Conditions: Seepage at 2.6m

Stability: Stable

Remarks:

REPORT NO. 9606

## TRIAL PIT RECORD

IGSL Ltd.

CONTRACT: O'Devaney Gardens		Trial Pit No.:	TP5
		Sheet:	Sheet 1 of 1
CLIENT:		Excavation Method:	CAT
		Date Started:	25/03/2004
ENGINEER: ARUP		Date Completed:	25/03/2004
		Ground Level (mOD):	-
CO-ORDINATES: E - N -			

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation (mOD)	Water Strike (m)	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Ref. No.	Type	Depth (m)		
0.0	MADE GROUND containing ash, clay, glass and cobbles			0.90		L8216	D	0.50		
1.0	Firm brown very sandy, very gravelly CLAY with some cobbles			1.90		L8217	B	1.00		
2.0	Stiff/very stiff brown sandy, very gravelly CLAY with occasional cobbles			2.60		L8218	B	2.00		
2.60	Medium dense brown clayey, very sandy GRAVEL with some cobbles			2.90		L8219	B	2.50		
3.0	Very stiff/hard black sandy gravelly CLAY End of Trial Pit at 3.00 m		3.00			L8220	B	3.00		
4.0										

Groundwater Conditions: No groundwater encountered

Stability: Stable

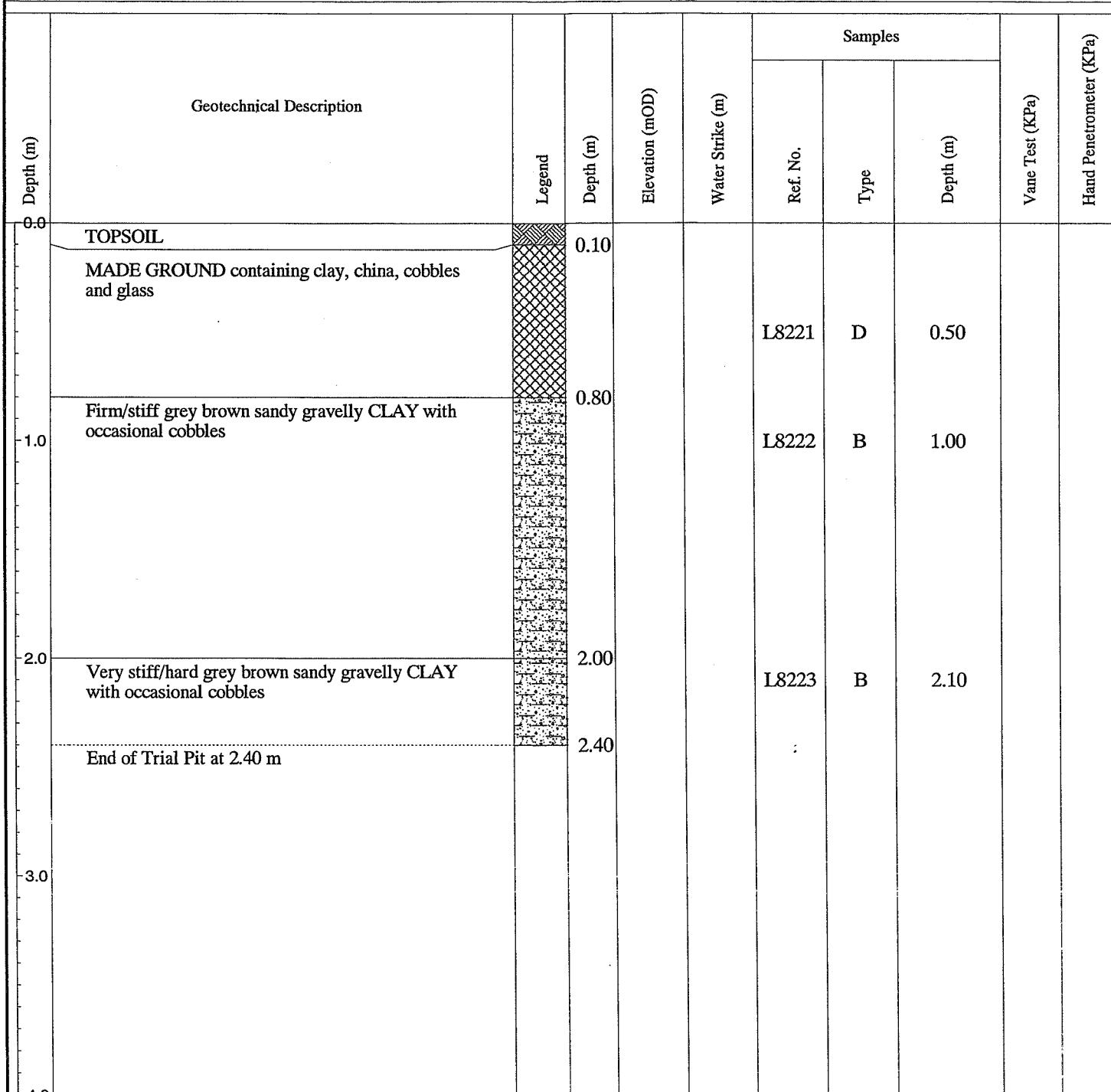
Remarks:

REPORT NO. 9606

## TRIAL PIT RECORD

IGSL Ltd.

CONTRACT: O'Devaney Gardens		Trial Pit No.:	TP6
CLIENT:		Sheet:	Sheet 1 of 1
ENGINEER: ARUP		Excavation Method:	CAT
CO-ORDINATES: E - N -		Date Started:	25/03/2004
		Date Completed:	25/03/2004
		Ground Level (mOD):	-



Groundwater Conditions: No groundwater encountered

Stability: Stable

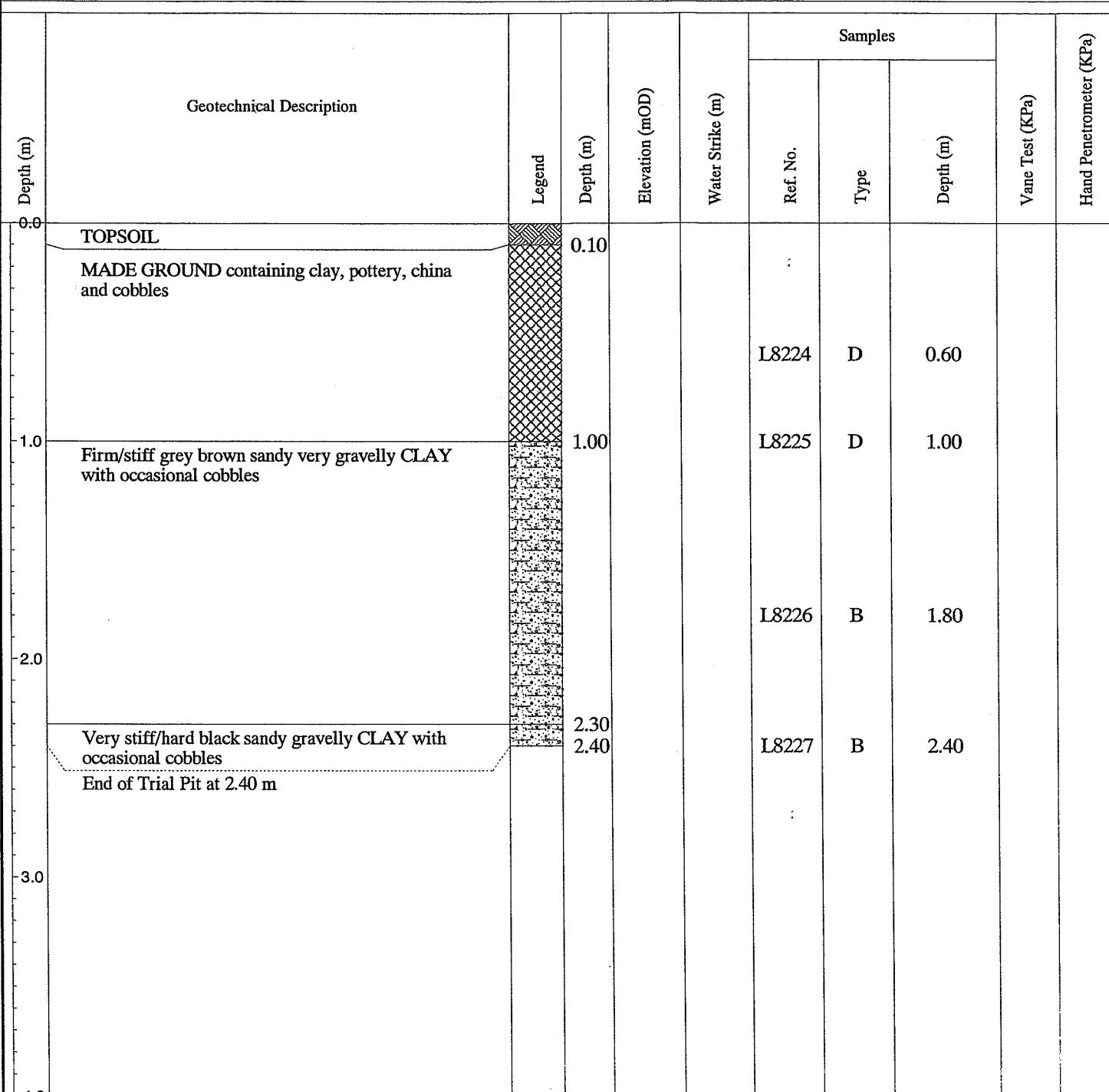
Remarks:

REPORT NO. 9606

## TRIAL PIT RECORD

IGSL Ltd.

CONTRACT: O'Devaney Gardens		Trial Pit No.: TP7
Sheet: Sheet 1 of 1		
CLIENT:		Excavation Method: CAT
ENGINEER: ARUP		Date Started: 25/03/2004
CO-ORDINATES: E - N -		Date Completed: 25/03/2004
Ground Level (mOD): -		



Groundwater Conditions: No groundwater encountered

Stability: Stable

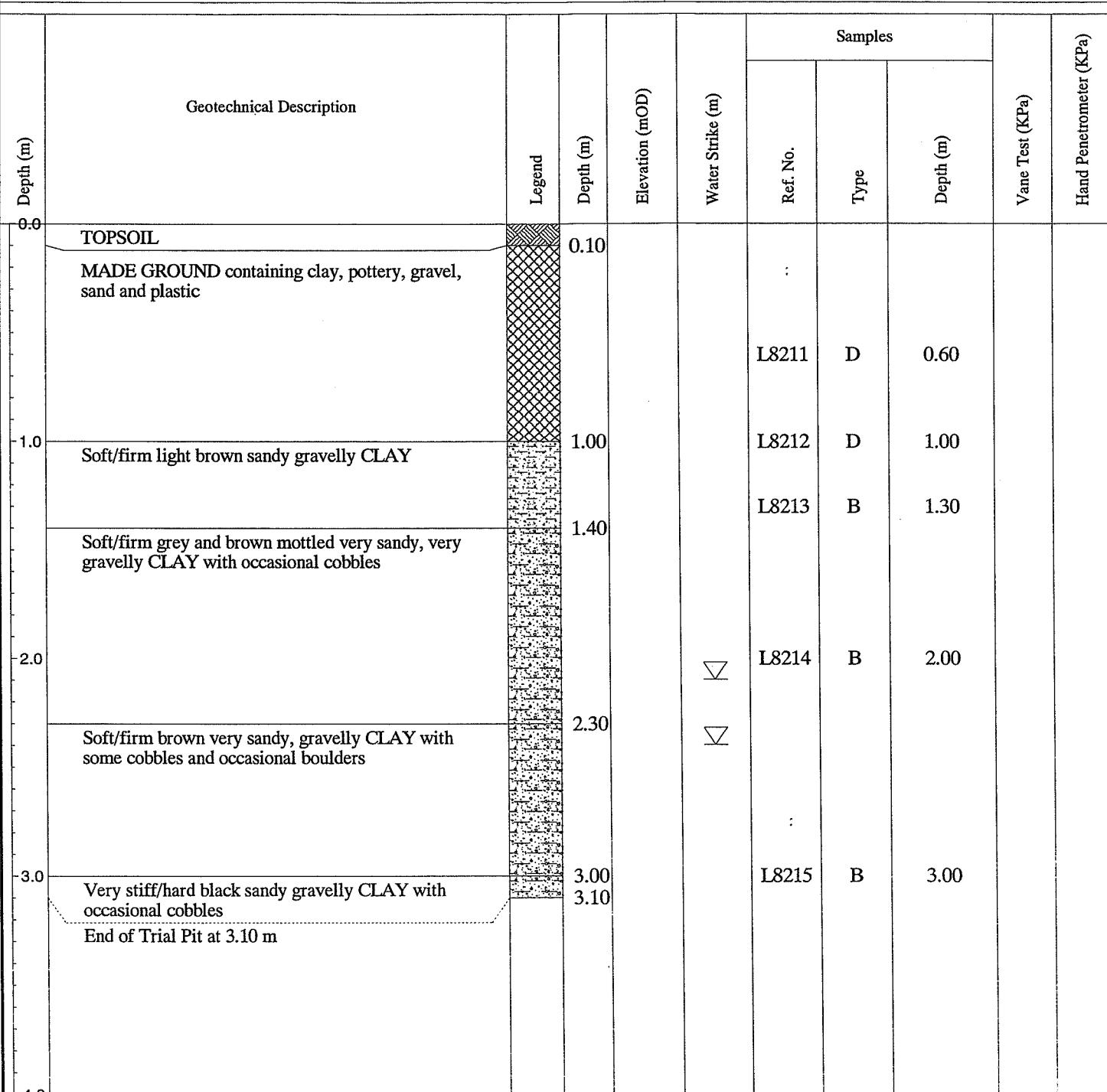
Remarks:

REPORT NO. 9606

## TRIAL PIT RECORD

IGSL Ltd.

CONTRACT:	O'Devaney Gardens	Trial Pit No.:	TP8
CLIENT:		Sheet:	Sheet 1 of 1
ENGINEER:	ARUP	Excavation Method:	CAT
CO-ORDINATES:	E - N -	Date Started:	25/03/2004
		Date Completed:	25/03/2004
		Ground Level (mOD):	-



Groundwater Conditions: Slow ingress at 2.1 and 2.4m

Stability: Collapse of pit from 2.1m

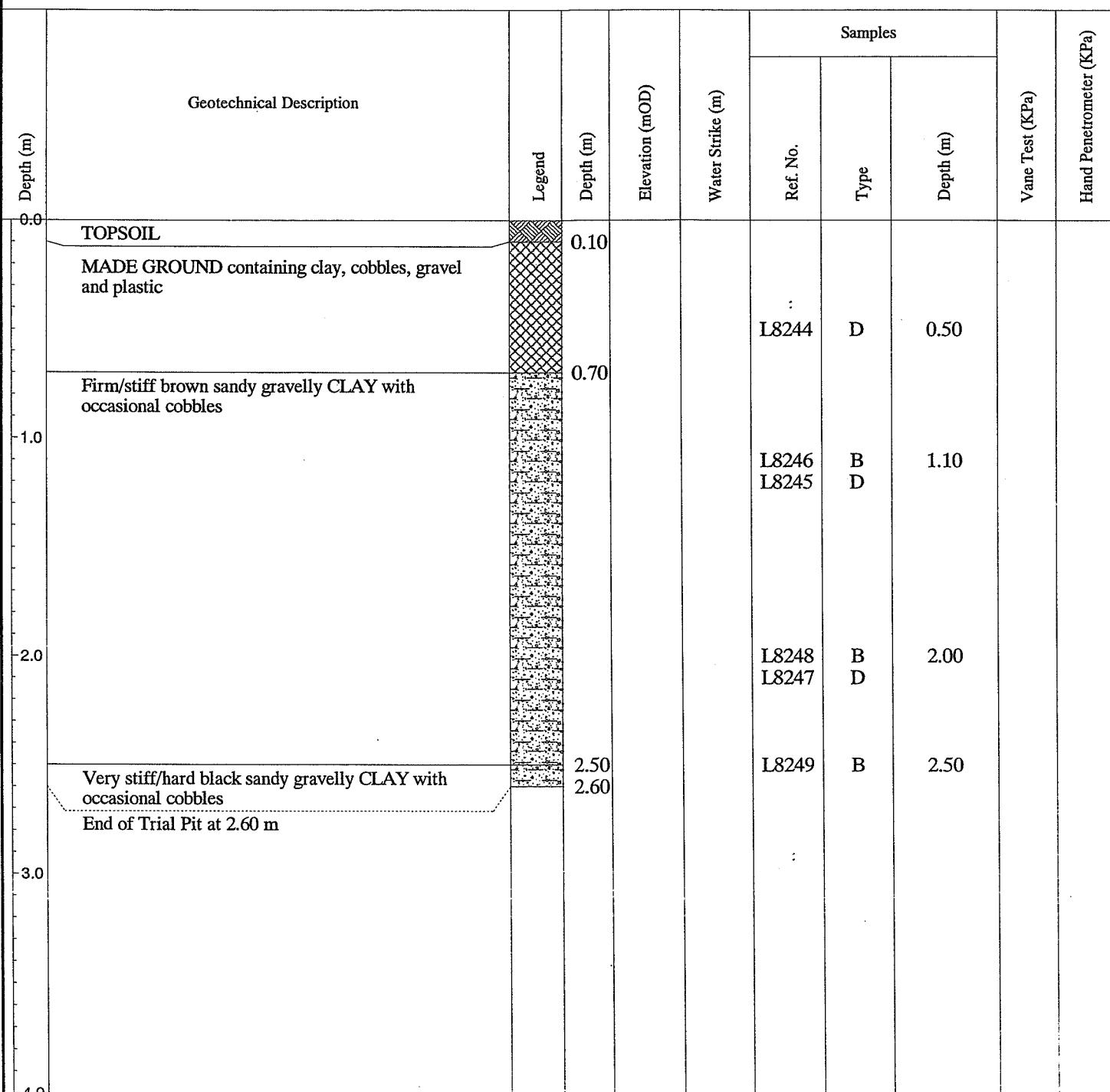
Remarks:

REPORT NO. 9606

## TRIAL PIT RECORD

IGSL Ltd.

CONTRACT:	O'Devaney Gardens	Trial Pit No.:	TP9
CLIENT:		Sheet:	Sheet 1 of 1
ENGINEER:	ARUP	Excavation Method:	CAT
CO-ORDINATES:	E - N -	Date Started:	26/03/2004
		Date Completed:	26/03/2004
		Ground Level (mOD):	-



Groundwater Conditions: No groundwater encountered

Stability: Stable

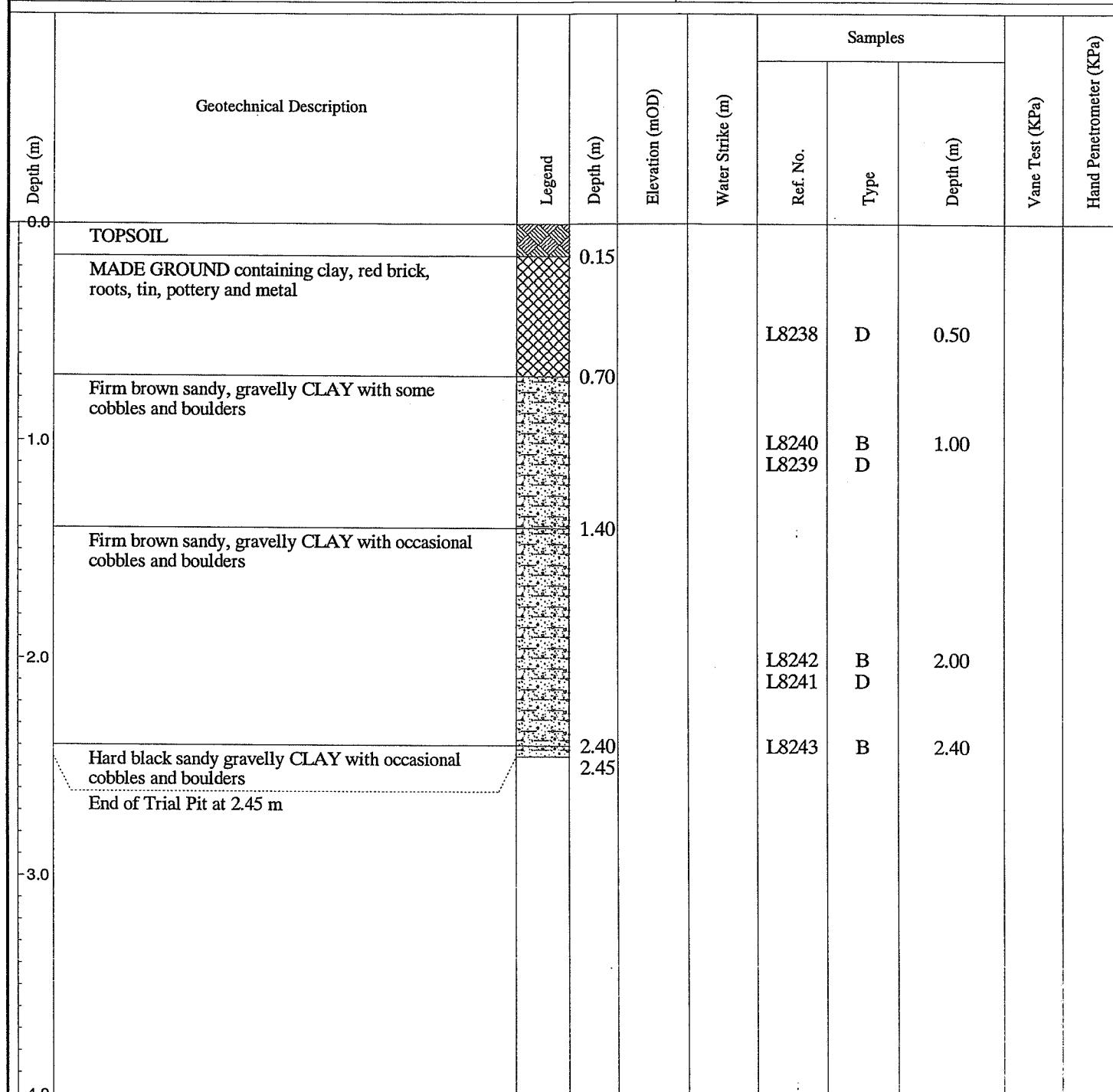
Remarks:

REPORT NO. 9606

## TRIAL PIT RECORD

IGSL Ltd.

CONTRACT: O'Devaney Gardens		Trial Pit No.:	TP10
		Sheet:	Sheet 1 of 1
CLIENT:		Excavation Method:	CAT
		Date Started:	26/03/2004
ENGINEER: ARUP		Date Completed:	26/03/2004
		Ground Level (mOD):	-
CO-ORDINATES: E - N -			



Groundwater Conditions: No groundwater encountered

Stability: Stable

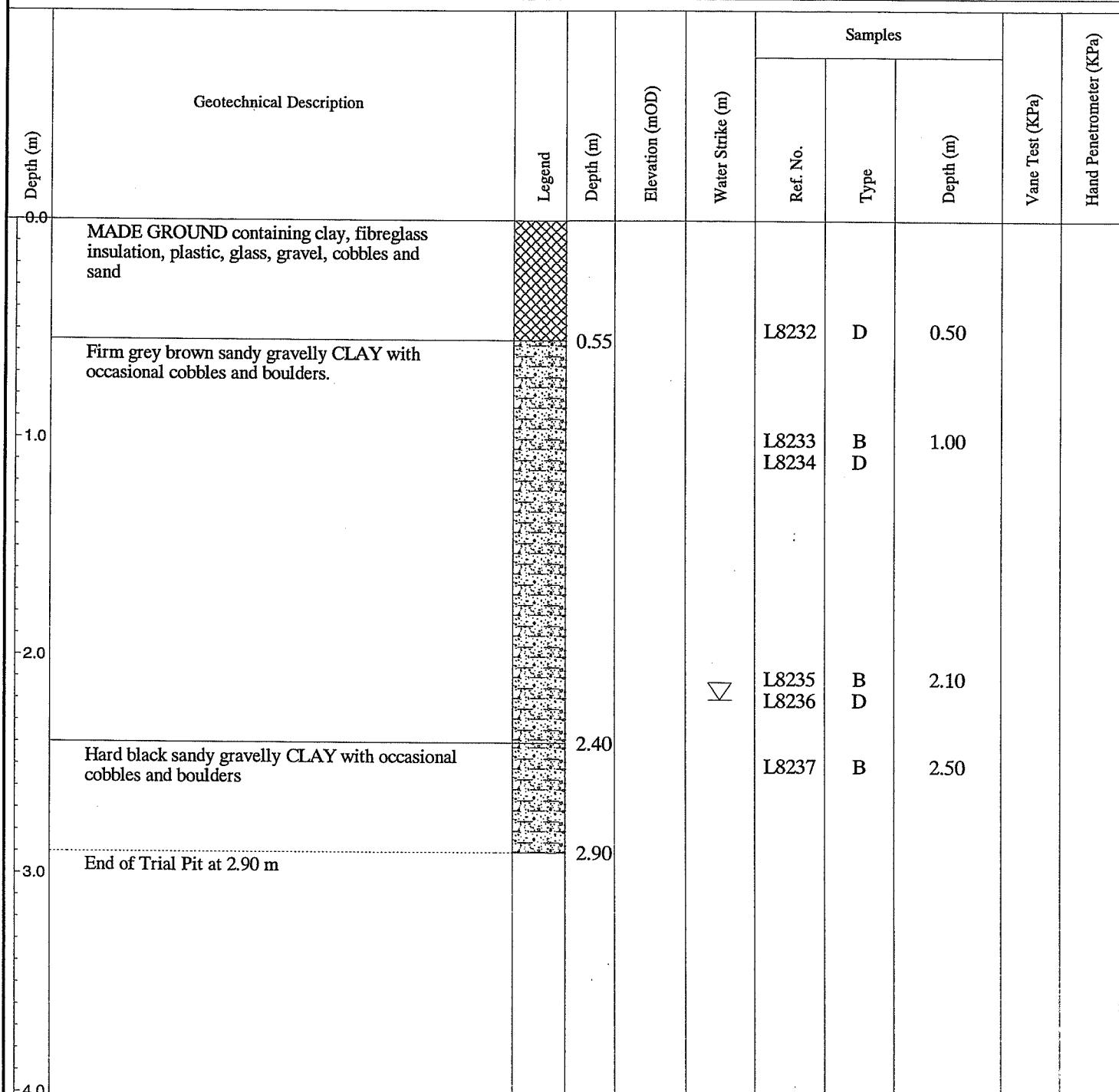
Remarks:

REPORT NO. 9606

## TRIAL PIT RECORD

IGSL Ltd.

CONTRACT: O'Devaney Gardens		Trial Pit No.:	TP11
		Sheet:	Sheet 1 of 1
CLIENT:		Excavation Method:	CAT
		Date Started:	26/03/2004
ENGINEER: ARUP		Date Completed:	26/03/2004
		Ground Level (mOD):	-
CO-ORDINATES: E - N -			



Groundwater Conditions: Slow seepage from 2.2m

Stability: Collapse of sidewalls

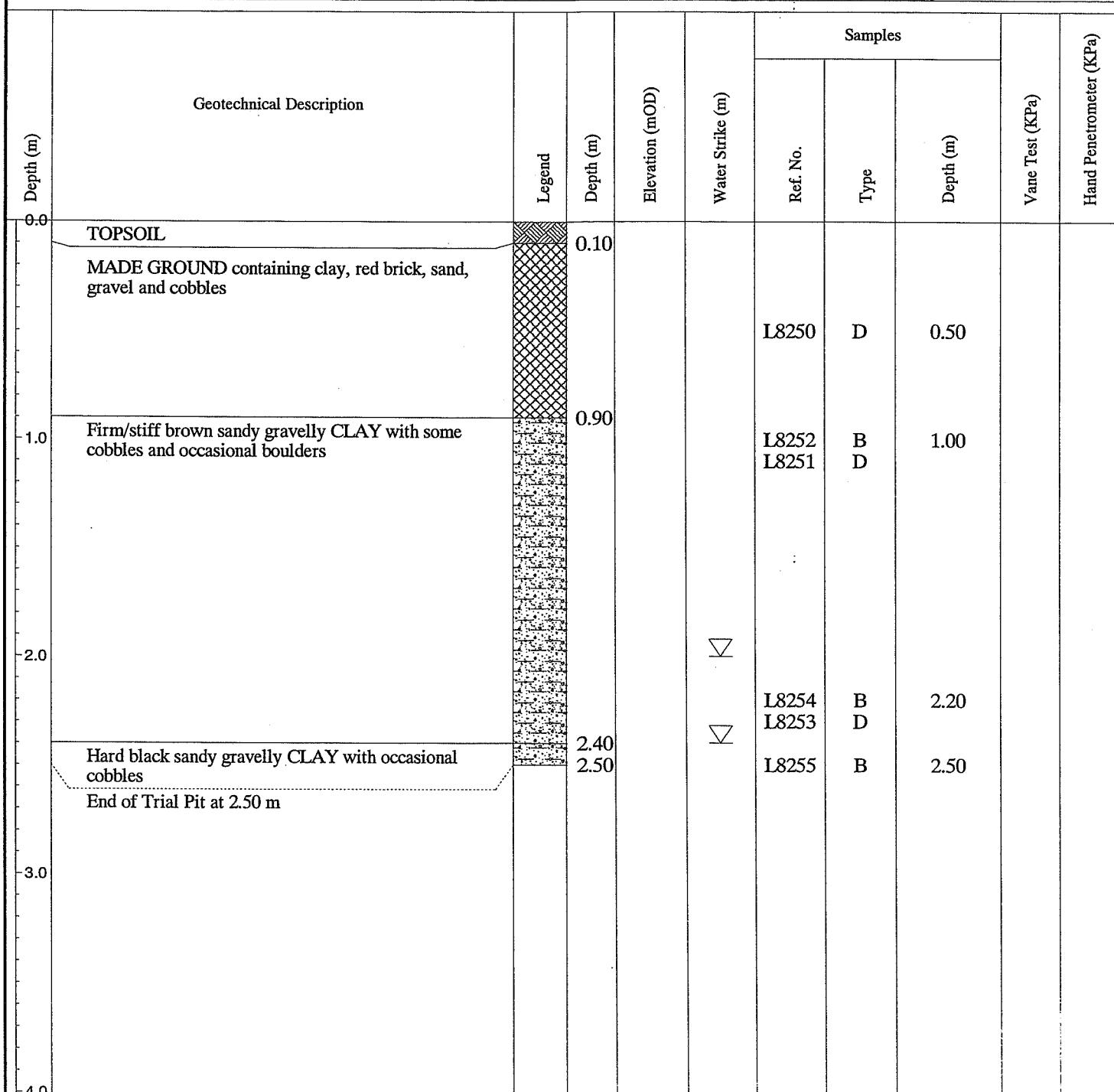
Remarks:

REPORT NO. 9606

## TRIAL PIT RECORD

IGSL Ltd.

CONTRACT:	O'Devaney Gardens	Trial Pit No.:	TP12
CLIENT:		Sheet:	Sheet 1 of 1
ENGINEER:	ARUP	Excavation Method:	CAT
CO-ORDINATES:	E - N -	Date Started:	26/03/2004
		Date Completed:	26/03/2004
		Ground Level (mOD):	-



Groundwater Conditions: Slow ingress at 2.0m and seepage at 2.4m

Stability: Stable

Remarks:

## **Appendix III – Laboratory Test Records**

## Determination of Moisture Content

BS1377:Part 2:1990, clauses 3.2

BH/TP No.	Sample No.	Depth (m)	Sample Type	Moisture Content %	Description
TP 1	8256	0.50	D	28.2	Grey brown slightly sandy slightly gravelly SILT/CLAY with root hairs
TP 2	8201	0.50	D	13.8	Brown slightly sandy slightly gravelly SILT/CLAY with shell fragments
TP 2	8202	1.00	D	12.9	Grey brown slightly sandy slightly gravelly SILT/CLAY
TP 3	8205	0.50	D	27.3	Grey brown slightly sandy slightly gravelly SILT/CLAY with shell fragments
TP 3	8206	1.00	D	19.0	Brown slightly sandy slightly gravelly SILT/CLAY with shell fragments
TP 4	8228	0.50	D	23.7	Grey brown slightly sandy slightly gravelly SILT/CLAY with root hairs
TP 5	8216	0.50	D	23.1	Grey brown slightly sandy slightly gravelly SILT/CLAY
TP 6	8221	0.50	D	22.6	Brown slightly sandy slightly gravelly SILT/CLAY with red brick
TP 7	8224	0.50	D	16.5	Grey brown slightly sandy slightly gravelly SILT/CLAY
TP 7	8225	1.00	D	14.6	Mottled brown slightly sandy slightly gravelly SILT/CLAY
TP 8	8211	0.50	D	25.0	Grey brown slightly sandy slightly gravelly SILT/CLAY with red brick
TP 8	8712	1.00	D	30.2	Grey brown slightly sandy slightly gravelly SILT/CLAY with red brick
TP 9	8244	0.50	D	18.4	Grey brown slightly sandy slightly gravelly SILT/CLAY with root hairs
TP 9	8245	1.10	D	14.8	Grey brown slightly sandy slightly gravelly SILT/CLAY
TP 9	8247	2.00	D	13.5	Grey brown slightly sandy slightly gravelly SILT/CLAY
TP 10	8238	0.50	D	27.6	Grey brown slightly sandy slightly gravelly SILT/CLAY with root hairs
TP 10	8239	1.00	D	16.2	Grey brown slightly sandy slightly gravelly SILT/CLAY
TP 10	8241	2.00	D	15.1	Grey brown slightly sandy slightly gravelly SILT/CLAY with red brick
TP 11	8232	0.50	D	32.5	Grey black slightly sandy slightly gravelly SILT/CLAY with red brick
TP 11	8236	2.10	D	22.3	Grey brown slightly sandy slightly gravelly SILT/CLAY
TP 12	8250	0.50	D	22.5	Grey brown slightly sandy slightly gravelly SILT/CLAY with root hairs
TP 12	8251	1.00	D	11.1	Grey brown slightly sandy slightly gravelly SILT/CLAY
TP 12	8253	2.00	D	11.8	Grey brown slightly sandy slightly gravelly SILT/CLAY
	Contract		O'DEVANEY GARDENS		Contract No. 9606
	Compiled By			Date	Page
	IGSL	Estate Newbridge Co. Kildare	D CONNOLLY	MC.xls	15/5/04

## Summary of Classification Tests

BS1377:Part 2:1990, clauses 3.2, 4.3, 5.3 & 5.4

WAT Water WSC West Scotland ACE ND Non Plastic

15

O'DEVANEY GARDENS  
Checked By

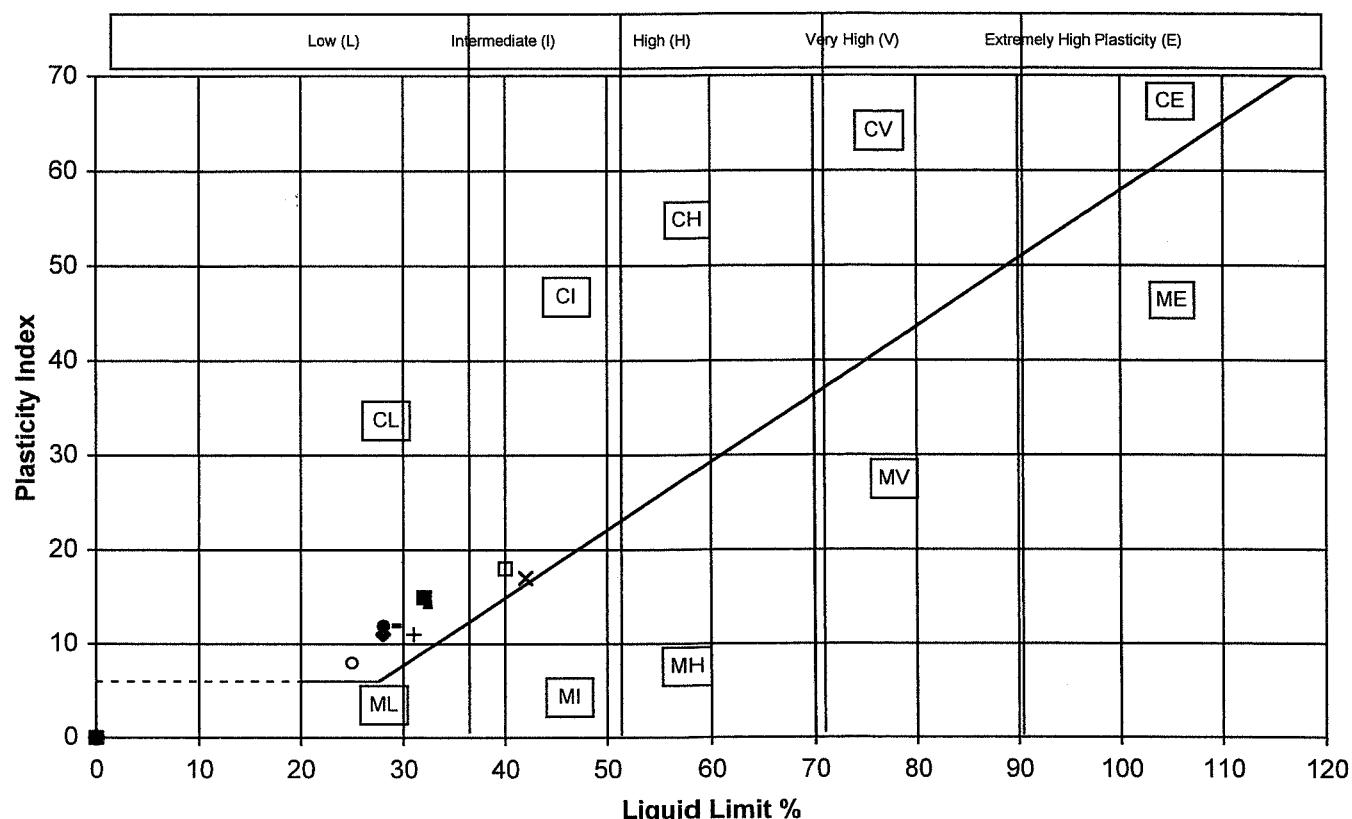
Contract No. 9606  
Page

**Plasticity Chart - Summary of Liquid & Plastic Limit Tests**

BS1377:Part 2:1990, clauses 3.2, 4 & 5

Chart in accordance with BS5930:1999, fig.18

Contract No. 9606 Contract: O'DEVANEY GARDENS



Code	BH/TP	Sample	Depth (m)	MC%	LL%	PL%	PI%	%<425µm	Description
-	BH 1	3965	4.00	9.4	29	17	12	33.1	Brown slightly sandy slightl gravelly CLAY
■	BH 7	3923	4.00	8.3	32	17	15	52.2	Grey slightly sandy slightl gravelly CLAY
●	BH 8	3927	2.00	9.2	28	16	12	49.1	Brown slightly sandy slightl gravelly CLAY
◆	BH 9	3915	2.00	11.2	28	17	11	60	Brown slightly sandy slightl gravelly CLAY
X	TP 5	8217	1.00	17.3	42	25	17	61	Brown slightly sandy slightl gravelly CLAY
+	TP 8	8213	1.30	20.7	31	20	11	56.2	Grey brown slightly sandy slightl gravelly CLAY
○	TP 8	8214	2.00	14.9	25	17	8	53.2	Mottled grey brown slightly sandy slightl gravelly CLAY
□	TP 9	8246	1.10	22.1	40	22	18	50.5	Mottled grey brown slightly sandy slightl gravelly CLAY
-	TP 11	8237	2.50	8.8	32	18	14	53.8	Grey slightly sandy slightl gravelly CLAY
■									
●									
◆									
X									
+									
○									
□									

NP denotes specimen is non-plastic.

IGSL	Compiled by	Date	Checked by	Date	Page
	D CONNOLLY	5/1/04			

REPORT NO.	SULPHATE ANALYSIS							IGSL	
CONTRACT:	O'DEVANEY GARDENS							CONTRACT NO	
BH/TP NO.	DEPTH (M)	SAMPLE NO.	SAMPLE TYPE	TEST CODE	% Passing 2mm	WATER SO <sub>3</sub> g/L	SULPHUR TRIOXIDE TOTAL SOIL SO <sub>3</sub> %	(so3 X 1.2) TOTAL SOIL SO <sub>4</sub> %	pH VALUE
TP 5	3.00	8218	D	S	67.6		0.001	0.001	7.7
TP 7	1.80	8226	D	S	74.7		0.002	0.002	7.7
TP 9	2.00	8248	D	S	59.7		0.002	0.002	7.7
TP 12	1.00	8252	D	S	68.9		0.001	0.001	7.6

TEST CODE: W = WATER      S = SOIL      A = AQUEOUS SOIL EXTRACT(2:1)

REPORT NO. **SULPHATE ANALYSIS**

CONTRACT: <b>33-34 Sir John Rogersons Quay Dublin</b>							CONTRACT NO <b>9639</b>	
BH/TP NO.	DEPTH (M)	SAMPLE NO.	SAMPLE TYPE	TEST CODE	% Passing 2mm	SULPHUR TRIOXIDE		pH VALUE
						WATER SO <sub>3</sub> g/L	TOTAL SOIL SO <sub>3</sub> %	
BH 1	2.00	6305	D	S	57.3		0.047	7.4
BH 2	2.00	6315	D	S	43.9		0.080	6.9

TEST CODE:

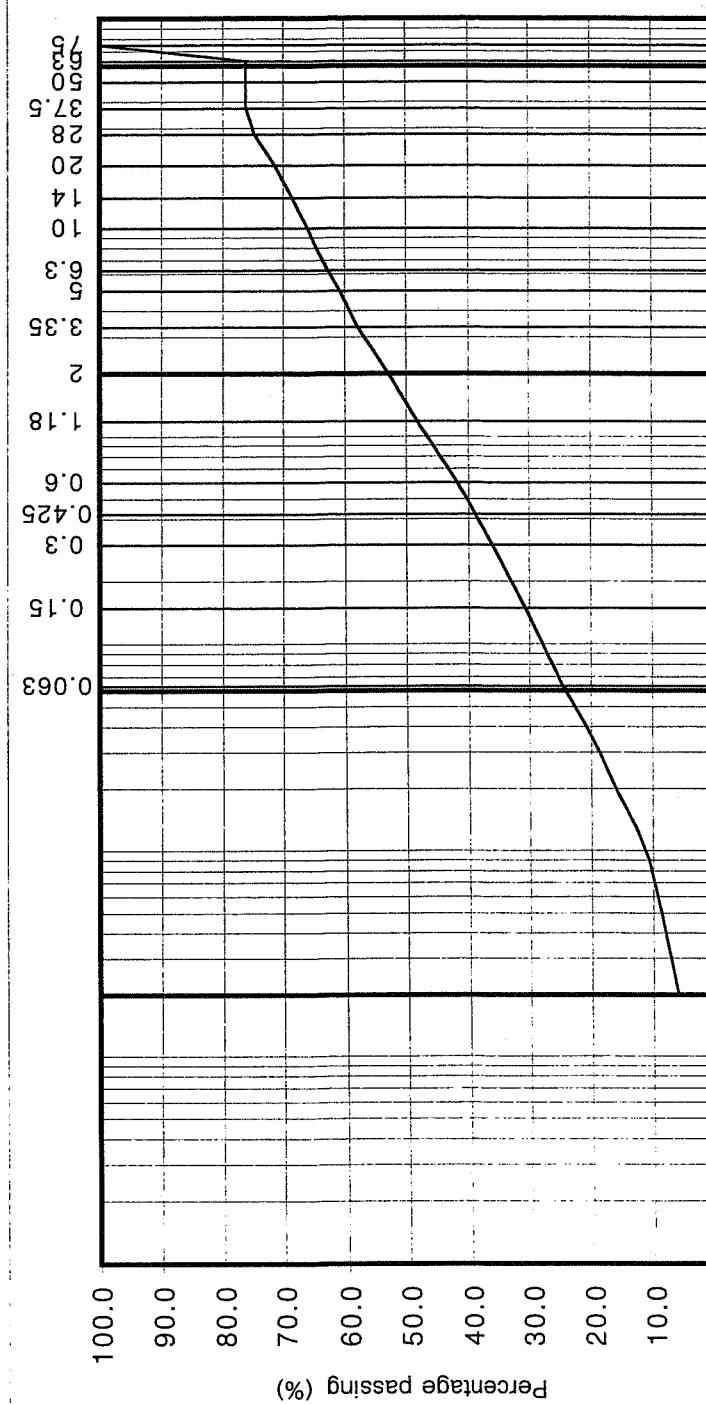
W = WATER

S = SOIL A = AQUEOUS SOIL EXTRACT(2:1)

## Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing		Contract No:	9606		
7.5	100.0	COBBLES	O'DEVANEY GARDENS			
6.3	76.2	BH/TP No:				
5.0	76.2	SAMPLE No.:				
37.5	76.2	DEPTH (m):				
2.8	74.8	TEST METHOD:				
20	71.3	DESCRIPTION:				
14	68.5	GRAVEL				
10	66.0					
6.3	62.8					
5	60.7					
3.35	57.9					
2	52.9					
1.18	48.3					
0.6	41.7	SAND				
0.425	38.8					
0.3	36.0					
0.15	30.7					
0.063	24.6					
0.04	20.8					
0.03	18.6					
0.02	16.1	SILT/CLAY				
0.013	12.7					
0.009	10.6					
0.005	8.6					
0.002	5.8					



Compiled by:	Date:	Checked by:
D CONNOLLY	5/1/04	
		Date: _____
		Page no: _____

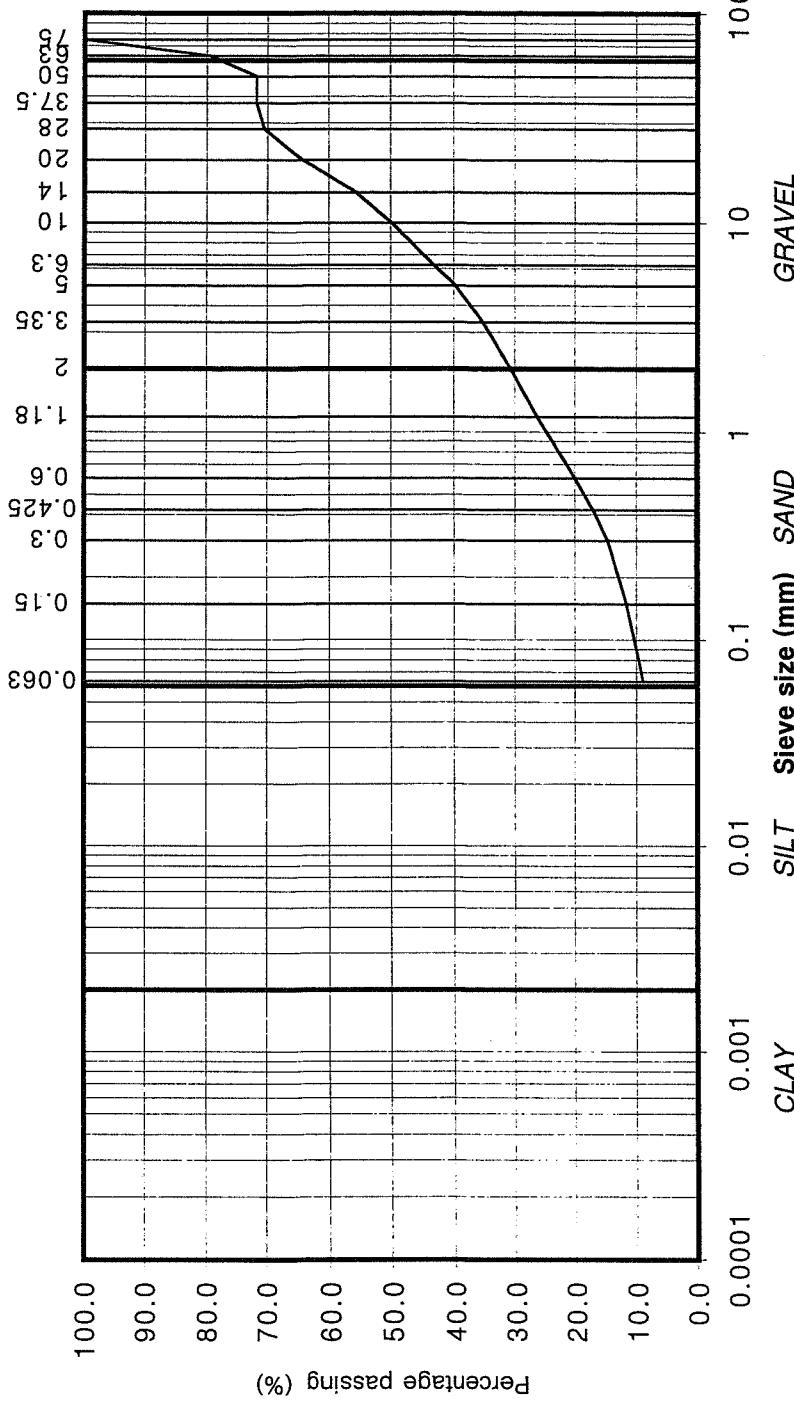
**IGSL**

Irish Geotechnical Services Ltd., Industrial Estate, Newbridge, Co Kildare  
PSD V3.1 12.01

## Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing		
75	100.0	COBBLES	
63	79.4		
50	71.8		
37.5	71.8		
28	70.5		
20	64.1	GRAVEL	
14	55.5		
10	49.8		
6.3	43.2		
5	39.7		
3.35	35.1		
2	30.7		
1.18	26.3		
0.6	20.1	SAND	
0.425	17.1		
0.3	14.7		
0.15	11.6		
0.063	8.8		
0.04	#N/A		
0.03	#N/A		
0.02	#N/A		
0.013	#N/A	SILT/CLAY	
0.009	#N/A		
0.005	#N/A		
0.002	#N/A		



16

dy:

te:

checked by: \_\_\_\_\_ Date: \_\_\_\_\_ Page no: \_\_\_\_\_

Date:

Irish Geotechnical Services Ltd., Industrial Estate, Newbridge, Co. Kildare

## Determination of Particle Size Distribution

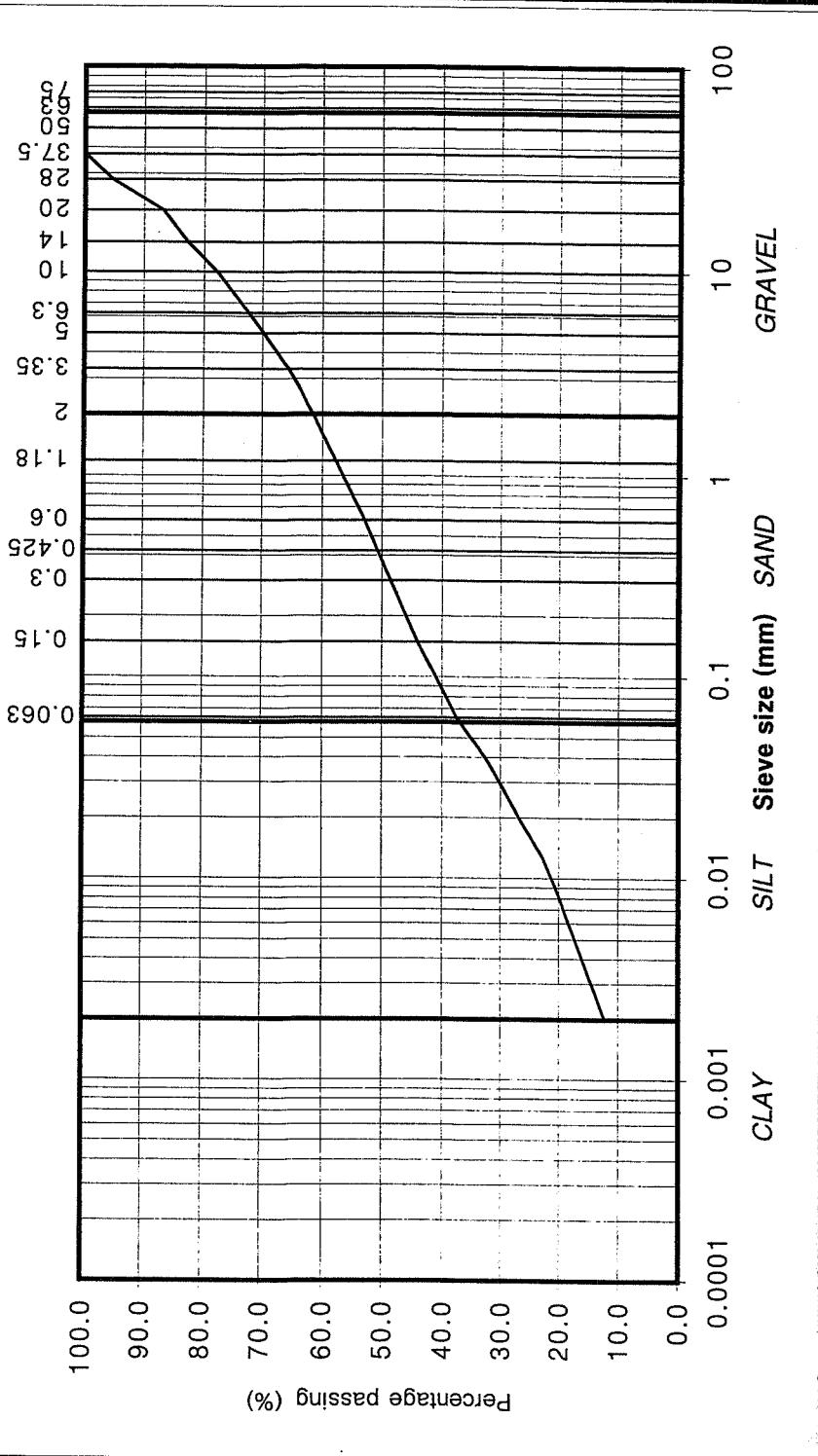
BS1377:Part2:1990 , clauses 9.2

particle size	% passing		Contract No:	9606
75	100.0	COBBLES	Contract:	O'DEVANEY GARDENS
63	100.0		BH/TP No:	TP 3
50	100.0		SAMPLE No.:	8207
37.5	93.8		DEPTH (m):	1.50
28	84.0		TEST METHOD:	Wet sieve and hydrometer
20	73.3	GRAVEL	DESCRIPTION:	Brown slightly sandy, gravelly, SILT/CLAY
14	67.9			
10	63.7			
6.3	58.2			
5	55.4			
3.35	51.4			
2	46.7			
1.18	42.6			
0.6	37.0	SAND		
0.425	34.4			
0.3	31.8			
0.15	27.0			
0.063	20.0			
0.04	16.5			
0.03	14.2			
0.02	11.8	SILT/CLAY		
0.013	9.9			
0.009	8.3			
0.005	6.2			
0.002	3.8			
Percentage passing (%)				
D CONNOLLY	Date:	Checked by:	1	100
IGSL	5/1/04			
Irish Geotechnical Services Ltd., Industrial Estate, Newbridge, Co Kildare	Page no:			
PSD V3.1 12.01				

## Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing		Contract No:	9606
			Contract:	O'DEVANEY GARDENS
75	100.0	COBBLES	BH/TP No:	TP 9
63	100.0		SAMPLE No.:	8247
50	100.0		DEPTH (m):	2.00
37.5	100.0		TEST METHOD:	Wet sieve and hydrometer
28	95.3		DESCRIPTION:	Grey brown slightly sandy, gravelly, SILT/CLAY
20	86.8	GRAVEL		
14	82.7			
10	77.7			
6.3	72.3			
5	69.8			
3.35	65.6			
2	61.6			
1.18	57.8			
0.6	52.9	SAND		
0.425	50.8			
0.3	48.5			
0.15	44.1			
0.063	37.5			
0.04	32.6			
0.03	30.2			
0.02	26.8	SILT/CLAY		
0.013	23.0			
0.009	20.6			
0.005	17.3			
0.002	12.2			



**IGSL**

Compiled by: DCONNOLLY Date: Checked by: Date: Page no:

REPORT NO.

**LOSS ON IGNITION ANALYSIS**

REPORT NO.	IGSL
------------	------

CONTRACT: **O'DEVANEY GARDENS**

CONTRACT NO. 9606

BOREHOLE NO.	SAMPLE NO.	DEPTH (METRES)	SAMPLE TYPE	% PASSING 2mm	L.O.I %	REMARKS
BH 8	3927	2.00	D	59.7	2.26	
TP 8	8214	2.00	D	68.6	2.34	

## UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITH MULTISTAGE LOADING

## WITHOUT PWP - SINGLE SPECIMEN

BS1377:Part 7:1990, clause 9

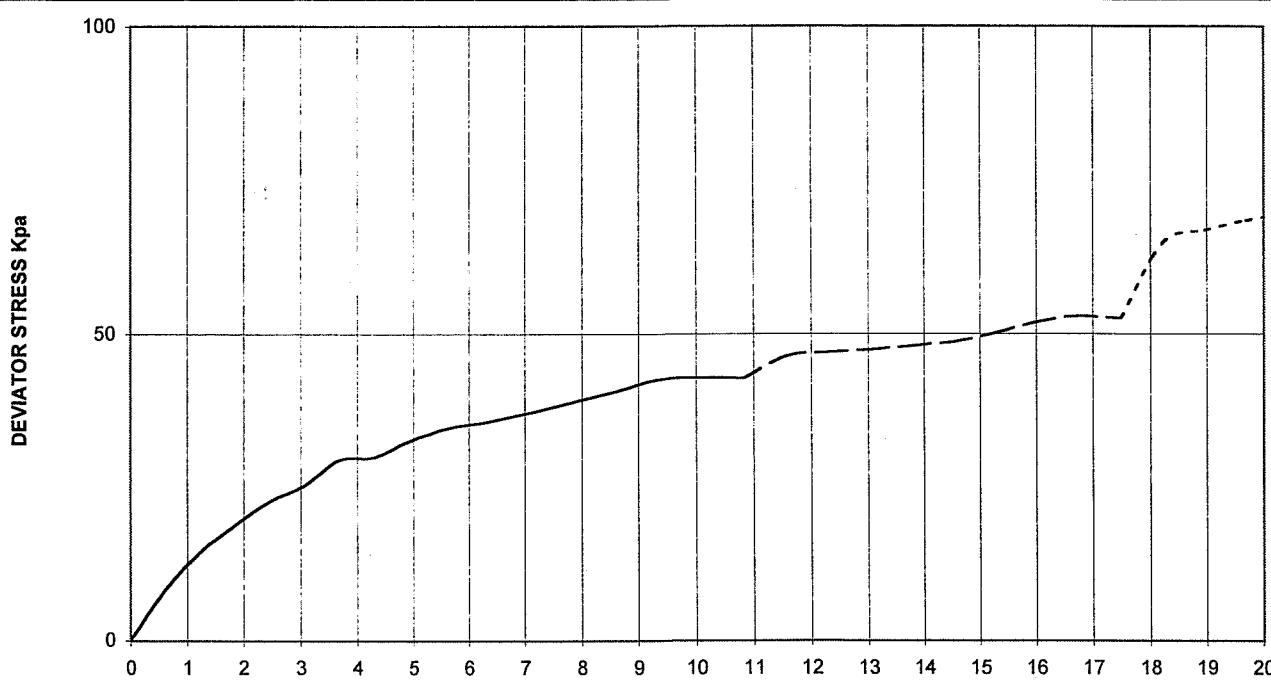
Contract No. 9606

Contract: O'DEVANEY GARDENS

BH/TP No. BH 11

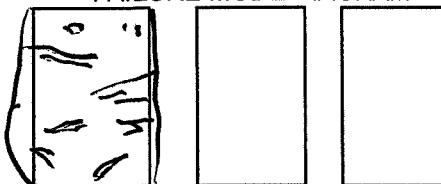
Sample No. 3957

Depth (M) 2.00



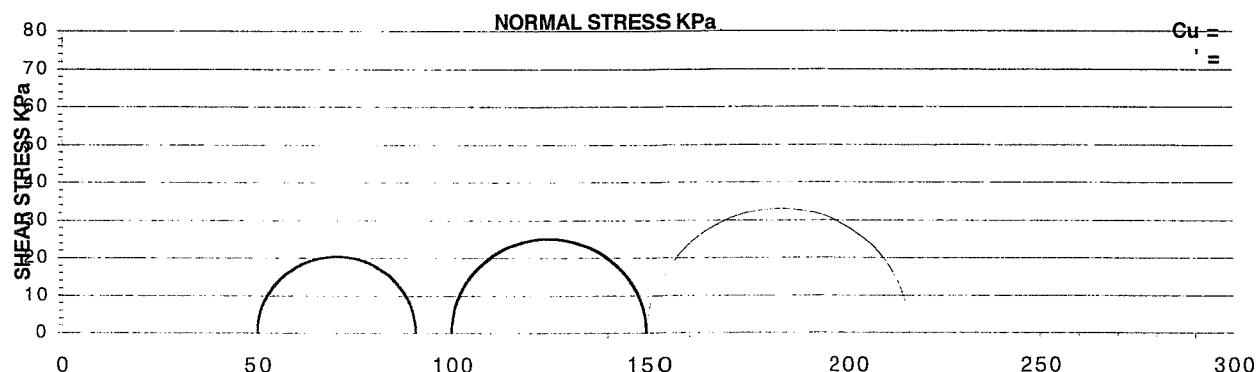
FAILURE MODE DIAGRAM

Description:  
Brown slightly sandy slightly gravelly SILT/CLAY



Membrane thickness(mm) 0.3  
Undisturbed Recompacted 2.5kg  
 Rate of strain %/min 2%

	1	2	3
CELL PRESSURE KPa	50	100	150
DEVIATOR STRESS KPa	42.8	52.8	69.0
DEVIATOR STRESS CORRECTED KPa	40.6	50.0	66.0
MEMBRANE CORRECTION KPa	2.2	2.8	3.0
MOISTURE CONTENT %	14.3		
BULK DENSITY Mg/m <sup>3</sup>	2.22		
DRY DENSITY Mg/m <sup>3</sup>	1.94		
DIAMETER mm	102		
LENGTH mm	203		
STRAIN AT FAILURE %	10.1	16.7	20.0
Cu KPa	20.3	25.0	33.0



IGSL

Compiled By  
D CONNOLLY

Date

15/5/04

Checked By

Date

Page No.

**UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITH MULTISTAGE LOADING  
WITHOUT PWP - SINGLE SPECIMEN**

BS1377:Part 7:1990, clause 9

Contract No. **9606**

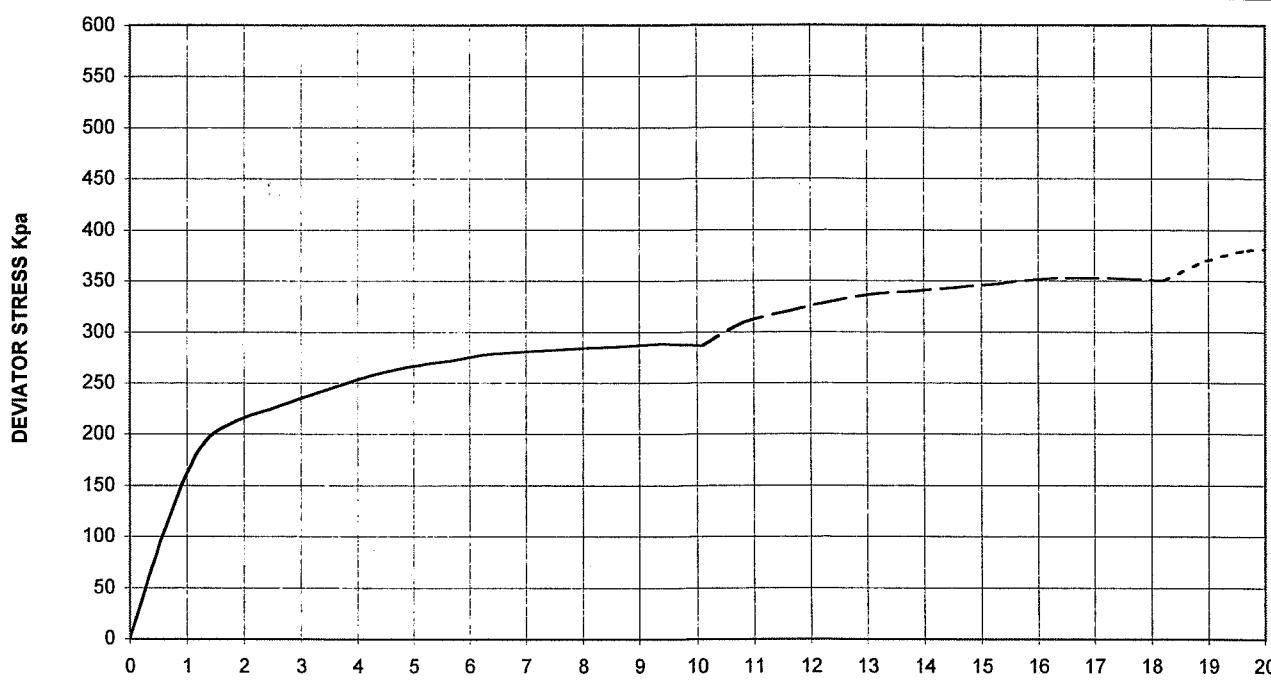
Contract: **O'DEVANEY GARDENS**

BH/TP No. **BH 4**

Sample No. **3952**

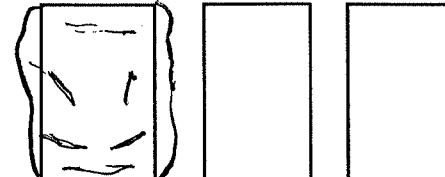
Depth (M)

**3.00**



**FAILURE MODE DIAGRAM**

Description:  
Dark grey slightly sandy slightly gravelly SILT/CLAY

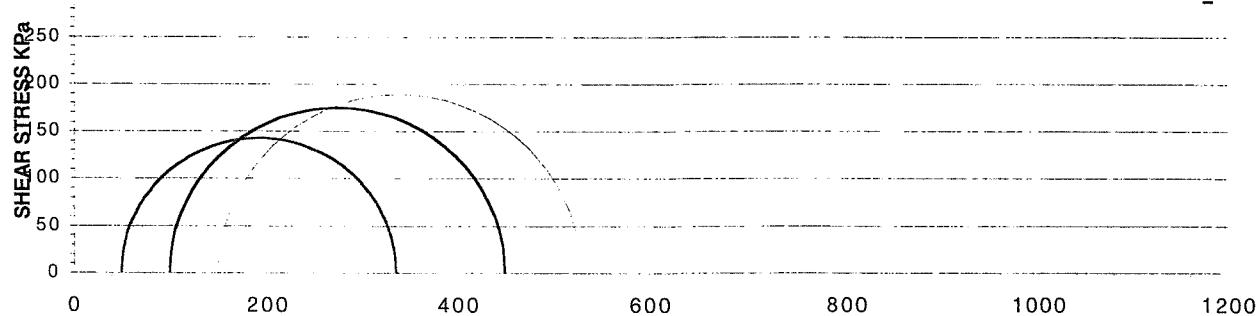


Membrane thickness(mm) **0.3**  
 Undisturbed Recompacted **2.5kg**  
 Rate of strain %/min **2%**

	<b>1</b>	<b>2</b>	<b>3</b>	
CELL PRESSURE KPa	<b>50</b>	<b>100</b>	<b>150</b>	
DEVIATOR STRESS KPa	<b>287.5</b>	<b>352.3</b>	<b>381.2</b>	
DEVIATOR STRESS CORRECTED KPa	<b>285.3</b>	<b>349.5</b>	<b>378.2</b>	
MEMBRANE CORRECTION KPa	<b>2.2</b>	<b>2.8</b>	<b>3.0</b>	
MOISTURE CONTENT %	<b>9.9</b>			
BULK DENSITY Mg/m <sup>3</sup>	<b>2.18</b>			
DRY DENSITY Mg/m <sup>3</sup>	<b>1.98</b>			
DIAMETER mm	<b>102</b>			
LENGTH mm	<b>203</b>			
STRAIN AT FAILURE %	<b>9.4</b>	<b>16.7</b>	<b>20.0</b>	
Cu KPa	<b>142.6</b>	<b>174.8</b>	<b>189.1</b>	

**NORMAL STRESS KPa.**

Cu =



**IGSL**

Compiled By

D CONNOLLY

Date

15/5/04

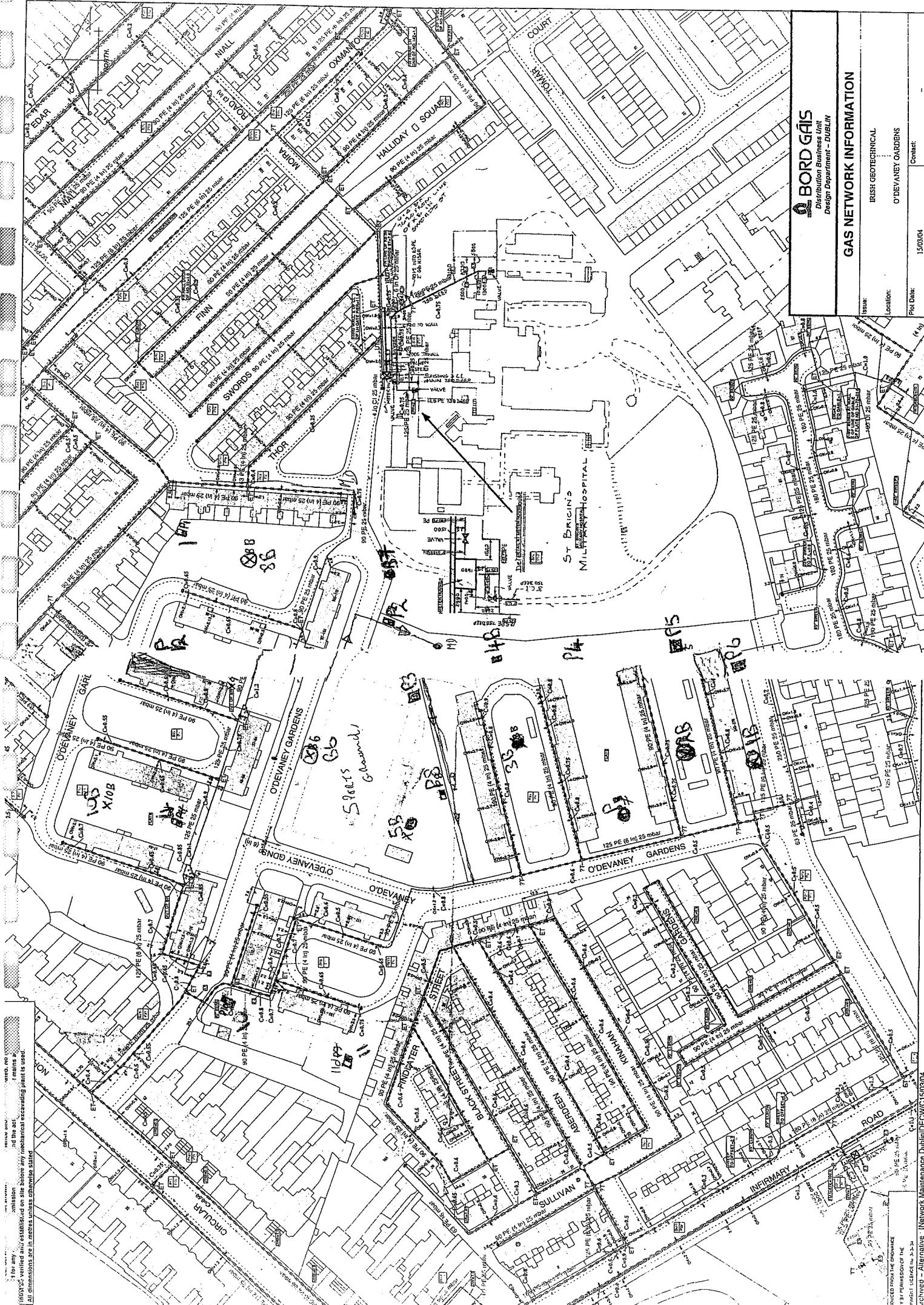
Checked By

Date

Page No.

Report No.	CALIFORNIA BEARING RATIO							I.G.S.L.			
Contract:	O'DEVANEY GARDENS			DATE: 15 / 5 / 04		CONTRACT No 9606					
Location	Sample No.	Depth of Sample	Sample Description	Water Content %	Test Code	Water Content %	Bulk Density Mg/M <sup>3</sup>	% Passing 20mm	C.B.R.		
BH 1	3963	2.00	Light brown slightly sandy very gravelly SILT/CLAY	16.7	L/St	17.5	15.9	2.20	75.3	0.7	0.7
BH 7	3921	2.00	Brown black slightly sandy gravelly SILT/CLAY	12.8	L/St	11.9	13.7	2.19	83.5	4.7	4.3
TP 10	8240	1.00	Brown black slightly sandy gravelly SILT/CLAY	16.7	L/St	16.4	17.0	2.08	88.2	5.3	5.0

## **Appendix IV – Site Plan**



**BORD GÁIS**  
*Distribution Business Unit*  
*Design Department - DUBLIN*

אנו מודים לך ייְהוָה

WORK INFO

IRISH GEOTECHNICAL

200

O'DEVANEY GARDENS

Contact:

—

13/03/04

1

04

J/C15/034

DECW

Volume 12 Number 1

intenanc

work Ma

we • Net

### *Alternatives*

- 14 -

Arch