Appendix C

Ground Investigation No V0831 – Factual Report

C. J. Associates Geotechnical Limited
King Road Avenue, Avonmouth, Bristol, BS11 9HF
Tel: 0117 982 1473 Fax: 0117 982 8200

C.J. associates

JENKINS & POTTER
12 OCT 2007

DIG	
RSJ	
GB ✓	
SW ✓	

Ground Investigation No. V0831
Factual Report

Estover Community College

October 2007

Report Status:	Final		
Issue Number:	1		
Issue Date:	October 2007		
Prepared By:	S.Leat		
Signed:	SALeat		
Checked By:	R.Adams		
Signed:	RAdams		

Client:
Kier Western
27 – 37 Martin Street
Plymouth
Devon
PL1 3NE

Engineer:
Jenkins & Potter
1 Lower Compton Road
Plymouth
PL3 5DH

C. J. Associates Geotechnical Limited
King Road Avenue, Avonmouth, Bristol, BS11 9HF
Tel: 0117 982 1473 Fax: 0117 982 8200

C.J. associates

CONTENTS:

APPENDICES:

LOGSHEETS
Trial Pit Log Sheets
Trial Pit Photographs

IN SITU TEST RESULTS
Soakaway Tests

LABORATORY TESTS
Geotechnical Laboratory Tests
Contamination Laboratory Tests

DRAWINGS
Site Location Plan
Trial Pit Location Plan

C.J. associates

1.INTRODUCTION

1.1 Instruction

C.J. Associates Geotechnical Limited (CJA) was instructed by Jenkins & Potter Consulting Engineers (JPCE) acting on behalf of Kier Western (KW), to carry out a ground investigation at Estover Community College, Plymouth. Instructions to proceed are contained in KW's Purchase Order No. PL92477/45023, dated 28th August 2007.

1.2 Brief and Report Scope

The general specification for the works was provided by JPCE and included the brief to undertake trial pitting with associated sampling, in situ soakaway testing, and laboratory testing.

This report presents full factual records of the site work carried out, the ground conditions encountered in the exploratory holes, the insitu and laboratory test results.

1.3 Limitations

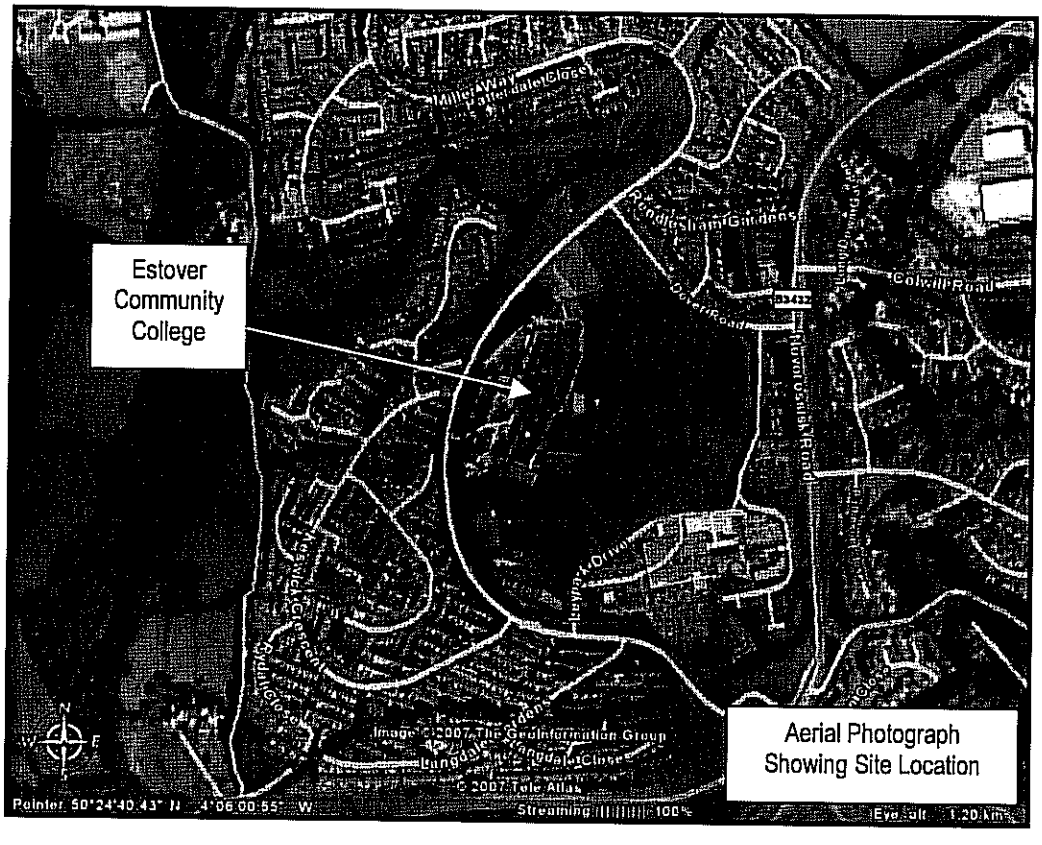
The information contained in this report is based on the strata observed in the exploratory holes and the results of the site and laboratory tests. CJA take no responsibility for conditions that have not been revealed by the exploratory holes, or which occur between them. Information provided from other sources is taken in good faith and CJA cannot guarantee its accuracy.

The report has been prepared exclusively for the above-named Client, for the site area indicated, and for the purpose stated. CJA accepts no responsibility for any site, Client or type of development not indicated in this report.

2.THE SITE

2.1 Site Location and Description

Estover Community College is located approximatey 5km northeast of Plymouth town centre, and is centred on National Grid Reference SX 510 589, and is shown on the Site Location Plan, included in the Appendices to this report, and the aerial photograph below.



At the time of the investigation, the site was occupied by school buildings with associated infrastructure, hardstanding and soft landscaping (including playing fields).

2.2 Published Geology

According to the British Geological Survey (BGS) 1:50,000 scale geological map of the area (Sheet No. 349), the site is underlain by Upper Devonian Slates.

C.J. associates

3.FIELDWORK

3.1 General

The fieldwork, scheduled by JPCE was carried out by CJA between 28th August and 30th August 2007 and comprised trial pitting and associated sampling and in situ testing.

The fieldwork was carried out generally in accordance with BS 5930:1999 *Code of Practice for Site Investigations*, and JPCE's instructions, unless otherwise stated. The exploratory hole locations were determined by JPCE, and are shown approximately on the Trial Pit Location Plan, included in the Appendices.

All exploratory hole locations were scanned for buried services using a Cable Avoidance Tool (CAT).

On completion all samples recovered from the site were taken to CJA's laboratory for further examination and testing. Details of the depths and types of samples recovered are indicated on the attached log sheets.

3.2 Trial Pitting

10 No. trial pits were excavated to depths of between 1.1m and 2.5m below existing ground level, using a wheeled excavator, under the direct and continuous supervision of CJA.

Representative disturbed samples were recovered from the excavated material as pitting proceeded. Details of groundwater conditions were noted. In situ soakaway testing was carried out in each pit, as described in the *In Situ Tests* section below.

The trial pits were backfilled immediately on completion of sampling and testing.

Trial pit photographs are presented in the Appendices to this report.

3.3 In Situ Tests - Soakaway tests

Soakaway tests were carried out in all the trial pits generally in accordance with BRE Digest 365(2003), the results of which are included in the Appendices to this Report.

C.J. associates

4. LABORATORY WORK

4.1 Geotechnical Tests

A programme of laboratory testing was carried out on samples taken from the various strata to assist in classification and determine the engineering properties of the materials underlying the site. The testing was scheduled by JPCE and carried out by CJA. The test procedures used were generally in accordance with the methods described in BS1377:1990. Details of the specific tests used in each case are given below:

TEST	STANDARD (BS1377:1990)	No.
Moisture Content	Part 2, Clause 3.2	5
Liquid Limit, Plastic Limit, Plasticity Index	Part 2, Clause 4/5	5
Particle size distribution (wet)	Part 2, Clause 9.2	2
Sedimentation by hydrometer	Part 2, Clause 9.5	2
Sulphate content of 2:1 soil:water extract	Part 3, Clause 5	4
Determination of CBR	Part 4, Clause 7	5

The results of the laboratory geotechnical tests are included in the Appendices to this Report.

4.2 Contamination tests

The environmental chemistry of the ground was investigated by specialist chemical analysis of selected samples, scheduled by JCPE and carried out by CJA. Chemical analyses were carried out on 10 soil samples and were submitted for the following suite of determinants:

Arsenic, Boron, Cadmium (total), Chromium (total), Copper, Lead, Mercury, Nickel, Selenium, Zinc, Cyanide (total), Phenol, Sulphate (SO_4), Sulphide, pH, Sulphur, and Polyaromatic Hydrocarbons (PAH).

In addition three samples were submitted for Waste Acceptance Criteria (WAC) testing.

The results of the laboratory contamination tests are included in the Appendices to this Report.

C.J. associates

5. LIST OF REFERENCES

Institution of Civil Engineers, Site Investigation Steering Group, *Site investigation in construction series, Part 3: Specification for Ground Investigation*, Thomas Telford Ltd, 1993.

British Standards Institute, *BS 5930: Code of Practice for Site Investigations*, 1999.

British Standards Institute, *BS 1377: British Standard Methods of Test for Soils for Civil Engineering Purposes*, Parts 1 - 9, 1990.

Ordnance Survey, 1:50 000 Scale, *Landranger Series, map no. 201.*

British Geological Survey, Natural Environment Research Council, *1:63360 and 1:50000 Geological maps of England and Wales, map no.349.*

Building Research Establishment (BRE), *Digest 365: Soakaway Design*, 2003.

C.J.
associates

APPENDICES

C.J.
associates

LOGSHEETS

C.J. associates

KEY TO SYMBOLS

CABLE PERCUSSIVE LOG SHEETS

S	Standard penetration test (split spoon)	U	Undisturbed sample
C	Standard penetration test (cone)	b	No. of blows to drive U100 using 160kg hammer
N	Penetration resistance: number of blows- (63.5kg hammer, 0.76m drop) for 300mm penetration	X%	Percentage recovery in U100 or SPT
D	Disturbed sample	V	Vane test
B	Bulk sample	P	Piston sample
W	Water sample	J	Jar sample
T	Small disturbed sample (plastic tub)		

ROTARY LOG SHEETS

OH	Open hole drilling	D	Disturbed sample
RR	Rock roller drilling	S	Standard penetration test (split spoon)
DTH	"Down the hole" hammer drilling	C	Standard penetration test (cone)
C	Coring		
W	Water sample		

TRIAL PIT LOG SHEETS

D	Disturbed sample	CBR(M)	California bearing ratio mould sample
B	Bulk disturbed sample	CBR(P)	California bearing ratio penetrometer method
U38	Undisturbed 38mm dia. sample	CBR(S)	California bearing ratio standard plunger method
U100	Undisturbed 100mm dia. sample	W	Water sample
BU	Block undisturbed sample	J	Jar sample
MP	Mackintosh probe test		
HSV	Hand shear vane test		
PBT	Plate bearing test		
T	Small disturbed sample (plastic tub)		

All rock and soil legends in accordance with B.S. 5930:1999 "Code of practice for site investigations".

Trial Pit Log Sheet

TP No **TPPT 01**

Site: **Estover Community College**

Job Number: **V0831**

Client: Kier Western

Machine Type: JCB 3CX

Sheet 1 of 1

Date: 30/08/2007

Vertical Scale 1:25

CJ Associates

Depth (m)	Sample Ref.	Test / Sample Depth (m)	Test Results	Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m. O.D.)
0.00								
					(0.30)		TOPSOIL with fine roots	
				0.30				
0.50							MADE GROUND: Firm, light greyish brown gravelly CLAY with a boulder size concrete fragment (500mmx200mmx200mm). Gravel is angular to subangular fine to coarse of mudstone/slate.	
					(0.80)			
1.00	T1 B2	1.00						
				1.10			END OF TRIAL PIT	
1.50								
2.00								
2.50								
3.00								
3.50								
4.00								
4.50								

Sample Types: D = Small disturbed sample; B = Bulk disturbed sample; J = Small disturbed sample (glass jar); T = Small disturbed sample (plastic tub); W = Water sample.

Co-ordinates:			
Trial Pit Side Stability :	Trial Pit Width (m) 0.60	Trial Pit Length (m)	2.90
Groundwater Observations: DRY	Logged By : LT	Checked By :	SL
General Remarks : Pit terminated due to presence of yellow plastic gas pipe.	Direction of Face A (degrees from N): -	Excavator	A B C D

Trial Pit Log Sheet

TP No **TPPT02**

Site: **Estover Community College**

Job Number: **V0831**

Client: Kier Western

Machine Type: JCB 3CX

Sheet 1 of 1

Date: 30/08/2007

Vertical Scale 1:25

CJ Associates

Depth (m)	Sample Ref.	Test / Sample Depth (m)	Test Results	Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m. O.D.)
0.00				0.15	(0.15)		TOPSOIL	
							Firm, friable in places, brown gravelly CLAY with occasional roots. Gravel is angular to subrounded fine to coarse of mudstone/slate.	
0.50					(0.85)			
	T1 B2	0.80						
1.00				1.00			Very weak to weak grey brown SLATE: recovered as angular to subrounded fine to coarse gravel and cobbles of mudstone/slate. (SLATE BEDROCK)	
1.50	T3 B4	1.60			(0.80)			
				1.80			END OF TRIAL PIT	
2.00								
2.50								
3.00								
3.50								
4.00								
4.50								

Sample Types: D = Small disturbed sample; B = Bulk disturbed sample; J = Small disturbed sample (glass jar); T = Small disturbed sample (plastic tub); W = Water sample.

Co-ordinates:		Trial Pit Width (m) 0.60	Trial Pit Length (m) 3.20
Trial Pit Side Stability :		Logged By : LT	Checked By : SL
Groundwater Observations: DRY		Direction of Face A (degrees from N): -	Excavator A B C D
General Remarks :			

Trial Pit Log Sheet

TP No **TPPT03**

Site: **Estover Community College**

Job Number: **V0831**

Sheet 1 of 1

Client: Kier Western

Date: 29/08/2007

Machine Type: JCB 3CX

Vertical Scale 1:25

CJ Associates

Depth (m)	Sample Ref.	Test / Sample Depth (m)	Test Results	Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m. O.D.)
0.00				0.15	(0.15)		TOPSOIL	
0.50	T1 B2	0.50		0.80	(0.65)		Dark brownish grey clayey subangular to subrounded tabular fine to coarse GRAVEL of mudstone/slate with occasional cobbles of same.	
1.00							Stiff brown gravelly CLAY. Gravel is subangular to subrounded fine to coarse of mudstone/slate.	
1.50	T3 B4	1.50			(1.10)		1.5m: becoming very sandy SILT	
2.00				1.90			END OF TRIAL PIT	
2.50								
3.00								
3.50								
4.00								
4.50								

Sample Types: D = Small disturbed sample; B = Bulk disturbed sample; J = Small disturbed sample (glass jar); T = Small disturbed sample (plastic tub); W = Water sample.

Co-ordinates:		Trial Pit Width (m) 0.60	Trial Pit Length (m) 3.20
Trial Pit Side Stability :		Logged By : LT	Checked By : SL
Groundwater Observations: DRY		Direction of Face A (degrees from N): -	Excavator D A B C
General Remarks :			

Trial Pit Log Sheet

TP No **TPPT04**

Site: **Estover Community College**

Job Number: **V0831**

Sheet 1 of 1

Client: Kier Western

Date: 30/08/2007

Machine Type: JCB 3CX

Vertical Scale 1:25

CJ Associates

Depth (m)	Sample Ref.	Test / Sample Depth (m)	Test Results	Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m. O.D.)
0.00				0.15	(0.15)		TOPSOIL	
							MADE GROUND: Soft light brown friable CLAY with angular to subrounded fine to coarse GRAVEL and COBBLES of light brownish grey mudstone. Occasional whole bricks and clay pipe fragments.	
0.50								
1.00					(1.85)			
1.50	T1 B2	1.50					Clay becoming gravelly with mudstone between 1.70m and 1.90m.	
2.00				2.00			END OF TRIAL PIT	
2.50								
3.00								
3.50								
4.00								
4.50								

Sample Types: D = Small disturbed sample; B = Bulk disturbed sample; J = Small disturbed sample (glass jar); T = Small disturbed sample (plastic tub); W = Water sample.

Co-ordinates:	Trial Pit Width (m) 0.60	Trial Pit Length (m)	4.80
Trial Pit Side Stability :	Logged By : LT	Checked By :	SL
Groundwater Observations:	Direction of Face A (degrees from N): -	Excavator	A B C D

General Remarks : Electric cable discovered across width of pit 1.2m from Face A, depth 1.2m, live status unknown.

Trial Pit Log Sheet

TP No **TPPT05**

Site: **Estover Community College**

Job Number: **V0831**

Client: Kier Western

Machine Type: JCB 3CX

Sheet 1 of 1

Date: 29/08/2007

Vertical Scale 1:25

CJ Associates

Depth (m)	Sample Ref.	Test / Sample Depth (m)	Test Results	Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m. O.D.)
0.00				0.15	(0.15)		TOPSOIL	
0.50	T1 B2	0.50		0.60	(0.45)		MADE GROUND: Firm friable dark brown gravelly CLAY with occasional subangular to subrounded cobbles of limestone. Gravel is subangular to subrounded fine to coarse of sandstone.	
1.00	T3 B4	1.00		1.00	(0.40)		Stiff friable dark brown multicoloured CLAY.	
1.50				2.10	(1.10)		Grey brown clayey very gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of mudstone/slate.	
2.00							END OF TRIAL PIT	
2.50								
3.00								
3.50								
4.00								
4.50								

Sample Types: D = Small disturbed sample; B = Bulk disturbed sample; J = Small disturbed sample (glass jar); T = Small disturbed sample (plastic tub); W = Water sample.

Co-ordinates:		Trial Pit Width (m) 0.60	Trial Pit Length (m) 3.20
Trial Pit Side Stability :		Logged By : LT	Checked By : SL
Groundwater Observations: DRY		Direction of Face A (degrees from N): -	Excavator D A B C
General Remarks : Shallow orange gulley drain discovered across corner of pit, depth 0.2m			

Trial Pit Log Sheet

TP No **TPPT06**

Site: **Estover Community College**

Job Number: **V0831**

Client: Kier Western

Machine Type: JCB 3CX

Sheet 1 of 1

Date: 29/08/2007

Vertical Scale 1:25

CJ Associates

Depth (m)	Sample Ref.	Test / Sample Depth (m)	Test Results	Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m. O.D.)
0.00								
					(0.40)		TOPSOIL	
				0.40				
0.50							MADE GROUND: Soft brown slightly sandy clayey subangular to subrounded medium to coarse GRAVEL of limestone with occasional cobbles of limestone.	
					(0.45)			
				0.85				
1.00							Firm to stiff friable orange brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of mudstone/slate.	
	T1 B2	1.15					. . . . 1.15m becoming very sandy SILT	
1.50					(1.35)			
2.00								
	T3 B4	2.20		2.20				
					(0.30)		Very weak to weak orangish brown SLATE with frequent black staining: recovered as a clayey subangular to subrounded fine to coarse gravel and cobbles. (SLATE BEDROCK)	
2.50				2.50				
							END OF TRIAL PIT	
3.00								
3.50								
4.00								
4.50								

Sample Types: D = Small disturbed sample; B = Bulk disturbed sample; J = Small disturbed sample (glass jar); T = Small disturbed sample (plastic tub); W = Water sample.

Co-ordinates:		Trial Pit Width (m) 0.60	Trial Pit Length (m) 3.30
Trial Pit Side Stability :		Logged By : LT	Checked By : SL
Groundwater Observations: DRY		Direction of Face A (degrees from N): -	Excavator D A B C
General Remarks :			

Trial Pit Log Sheet

TP No **TPPT07**

Site: **Estover Community College**

Job Number: **V0831**

Sheet 1 of 1

Client: Kier Western

Date: 29/08/2007

Machine Type: JCB 3CX

Vertical Scale 1:25

CJ Associates

Depth (m)	Sample Ref.	Test / Sample Depth (m)	Test Results	Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m. O.D.)
0.00								
				0.20	(0.20)		TOPSOIL	
0.50	T1 B2	0.60					MADE GROUND: Soft brown slightly sandy clayey subangular to subrounded medium to coarse GRAVEL of limestone with occasional cobbles of limestone.	
				0.85	(0.65)			
1.00	T3 B4	1.15					Greyish brown clayey subangular to subrounded tabular fine to coarse GRAVEL of mudstone/slate. (Possible SLATE BEDROCK)	
1.50				1.60	(0.75)			
	T5 B6	1.80					Very weak to weak light grey SLATE: recovered as a slightly clayey subangular to subrounded tabular fine to coarse gravel. (SLATE BEDROCK)	
2.00				2.05	(0.45)			
							END OF TRIAL PIT	
2.50								
3.00								
3.50								
4.00								
4.50								

Sample Types: D = Small disturbed sample; B = Bulk disturbed sample; J = Small disturbed sample (glass jar); T = Small disturbed sample (plastic tub); W = Water sample.

Co-ordinates:		Trial Pit Width (m) 0.60	Trial Pit Length (m) 3.20
Trial Pit Side Stability :		Logged By : LT	Checked By : SL
Groundwater Observations: DRY		Direction of Face A (degrees from N): -	Excavator A B C D
General Remarks :			

Trial Pit Log Sheet

TP No **TPPT08**

Site: **Estover Community College**

Job Number: **V0831**

Sheet 1 of 1

Client: Kier Western

Date: 28/08/2007

Machine Type: JCB 3CX

Vertical Scale 1:25

CJ Associates

Depth (m)	Sample Ref.	Test / Sample Depth (m)	Test Results	Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m. O.D.)
0.00				0.10	(0.10)		TOPSOIL	
	T1	0.30			(0.50)		Dark brown clayey sandy angular to subangular tabular fine to medium GRAVEL of mudstone/slate.	
0.50				0.60			Very weak to weak grey SLATE: recovered as a slightly clayey subangular to subrounded tabular fine to coarse gravel. (SLATE BEDROCK)	
1.00	T2 B3	1.00			(0.90)			
1.50				1.50			END OF TRIAL PIT	
2.00								
2.50								
3.00								
3.50								
4.00								
4.50								

Sample Types: D = Small disturbed sample; B = Bulk disturbed sample; J = Small disturbed sample (glass jar); T = Small disturbed sample (plastic tub); W = Water sample.

Co-ordinates:		Trial Pit Width (m) 0.60	Trial Pit Length (m) 2.60
Trial Pit Side Stability :		Logged By : LT	Checked By : SL
Groundwater Observations: DRY		Direction of Face A (degrees from N): -	Excavator D A B C
General Remarks :			

Trial Pit Log Sheet

TP No **TPPT09**

Site: **Estover Community College**

Job Number: **V0831**

Sheet 1 of 1

Client: Kier Western

Date: 29/08/2007

Machine Type: JCB 3CX

Vertical Scale 1:25

CJ Associates

Depth (m)	Sample Ref.	Test / Sample Depth (m)	Test Results	Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m. O.D.)
0.00					(0.20)		TOPSOIL	
				0.20				
	T1	0.30			(0.15)		Firm reddish brown gravelly CLAY. Gravel is subangular to subrounded,fine to coarse of mudstone/slate.	
0.50				0.35				
							Very weak to weak grey SLATE: recovered as a slightly clayey subangular to subrounded tabular fine to coarse grave and cobbles. (SLATE BEDROCK)	
1.00	T2 B3	1.00			(1.45)			
1.50								
				1.80			END OF TRIAL PIT	
2.00								
2.50								
3.00								
3.50								
4.00								
4.50								

Sample Types: D = Small disturbed sample; B = Bulk disturbed sample; J = Small disturbed sample (glass jar); T = Small disturbed sample (plastic tub); W = Water sample.

Co-ordinates:		Trial Pit Width (m) 0.60	Trial Pit Length (m) 3.30
Trial Pit Side Stability :		Logged By : LT	Checked By : SL
Groundwater Observations: DRY		Direction of Face A (degrees from N): -	Excavator

General Remarks :

Trial Pit Log Sheet

TP No **TPPT10**

Site: **Estover Community College**

Job Number: **V0831**

Sheet 1 of 1

Client: Kier Western

Date: 28/08/2007

Machine Type: JCB 3CX

Vertical Scale 1:25

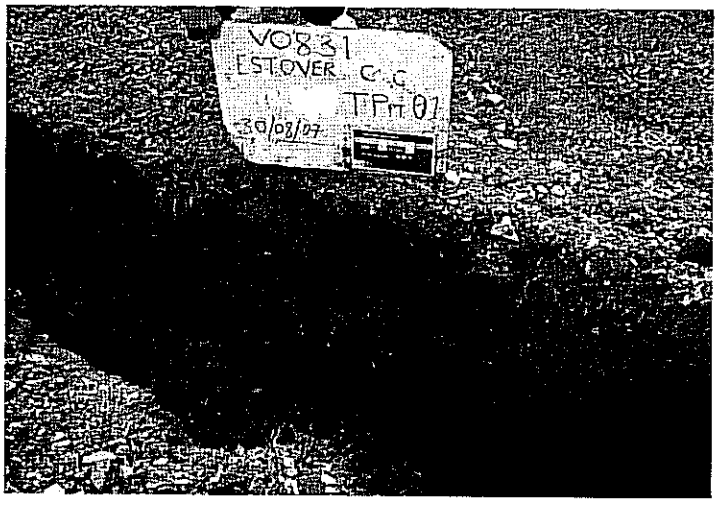
CJ Associates

Depth (m)	Sample Ref.	Test / Sample Depth (m)	Test Results	Depth (m)	Thickness (m)	Legend	Description of Strata	Reduced Level (m. O.D.)
0.00								
				0.20	(0.20)		TOPSOIL	
0.50	T1 B2	0.50					Firm brownish grey gravelly CLAY. Gravel is angular to subrounded, fine to coarse of mudstone/slate.	
					(0.85)			
1.00				1.05				
	T3 B4	1.10			(0.25)		Firm dark greyish black CLAY.	
				1.30			Very weak to weak light brown SLATE: recovered as a slightly clayey subangular to subrounded tabular fine to coarse gravel. (SLATE BEDROCK)	
1.50	T5 B6	1.50			(0.60)			
				1.90			END OF TRIAL PIT	
2.00								
2.50								
3.00								
3.50								
4.00								
4.50								

Sample Types: D = Small disturbed sample; B = Bulk disturbed sample; J = Small disturbed sample (glass jar); T = Small disturbed sample (plastic tub); W = Water sample.

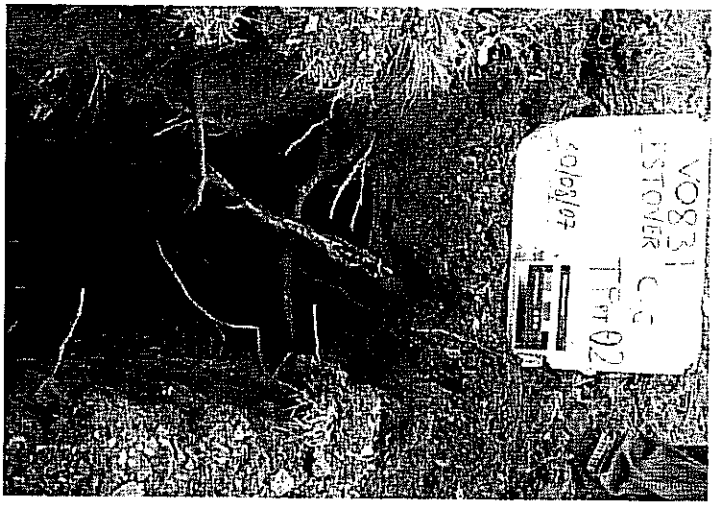
Co-ordinates:		Trial Pit Width (m) 0.60	Trial Pit Length (m) 2.70
Trial Pit Side Stability :		Logged By : LT	Checked By : SL
Groundwater Observations: DRY		Direction of Face A (degrees from N): -	Excavator D A B C

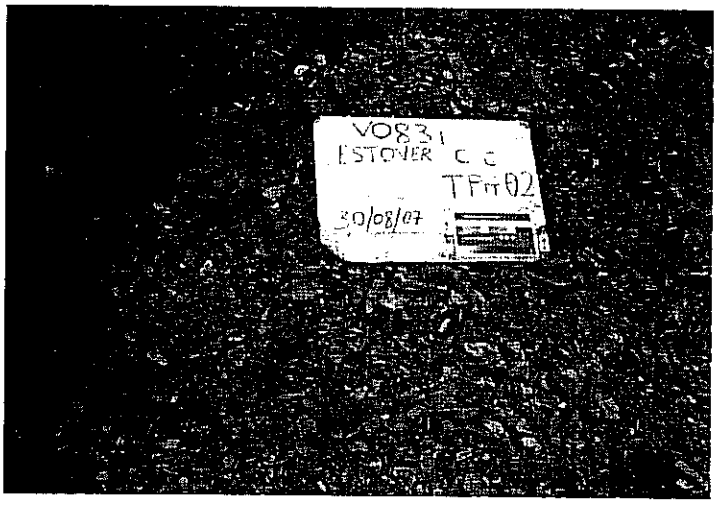
General Remarks :



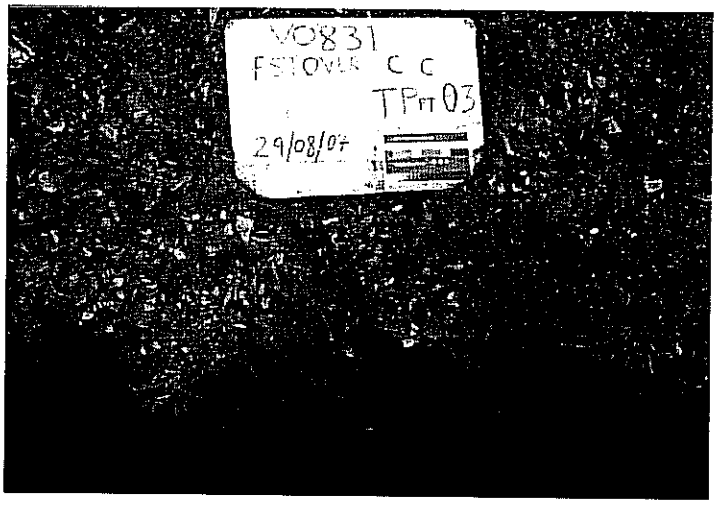
C.J. associates

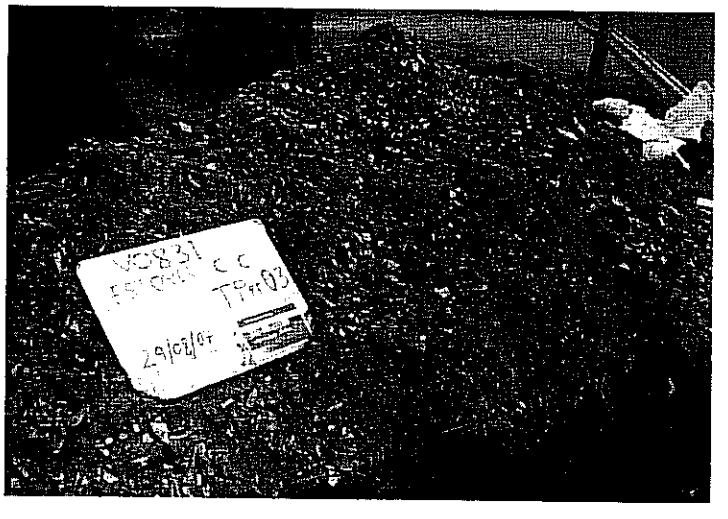
Project	Drawing Title	
ESTOVER COMMUNITY COLLEGE	Trial Pit Photographs	
Client: KIER WESTERN	Project No.: V0831	TPPT01



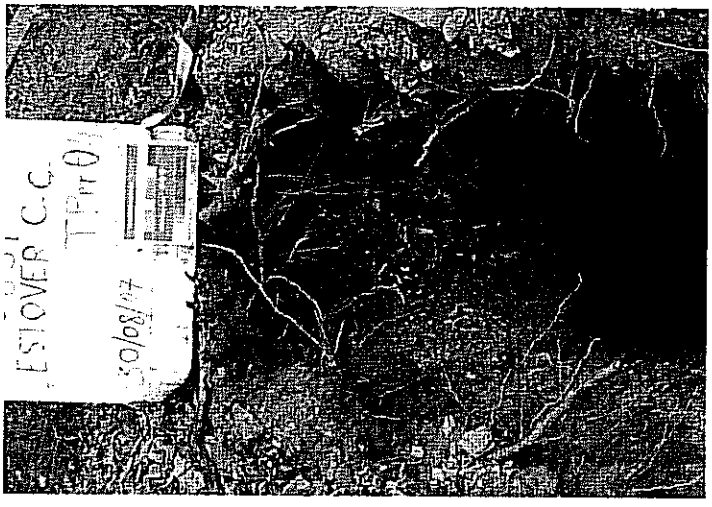


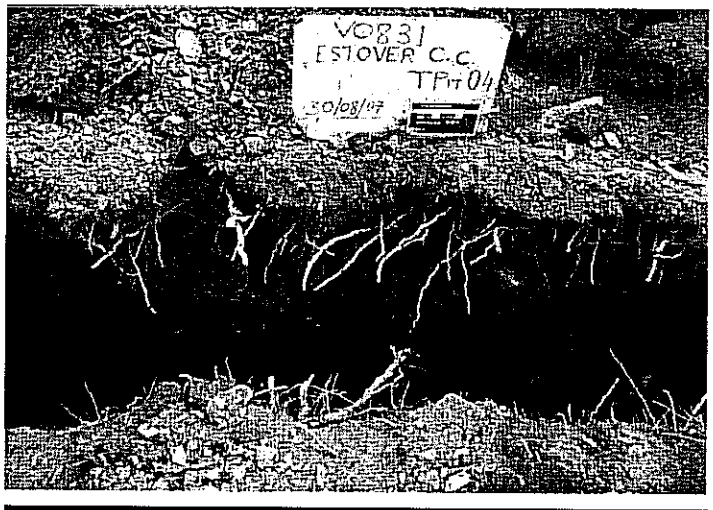
C.J. associates	Project: ESTOVER COMMUNITY COLLEGE	Drawing Title: Trial Pit Photographs	
	Client: KIER WESTERN	Project No.: V0831	TPPT02





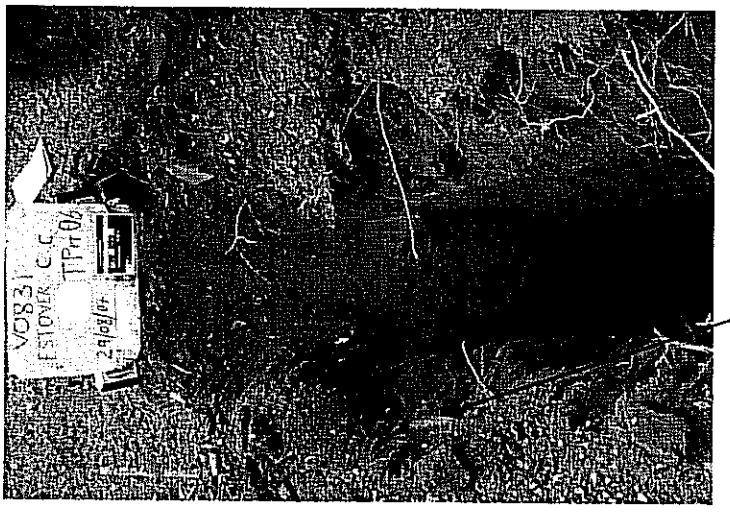
C.J. associates	Project: ESTOVER COMMUNITY COLLEGE	Drawing Title: Trial Pit Photographs	
	Client: KIER WESTERN	Project No.: V0831	TPPT03



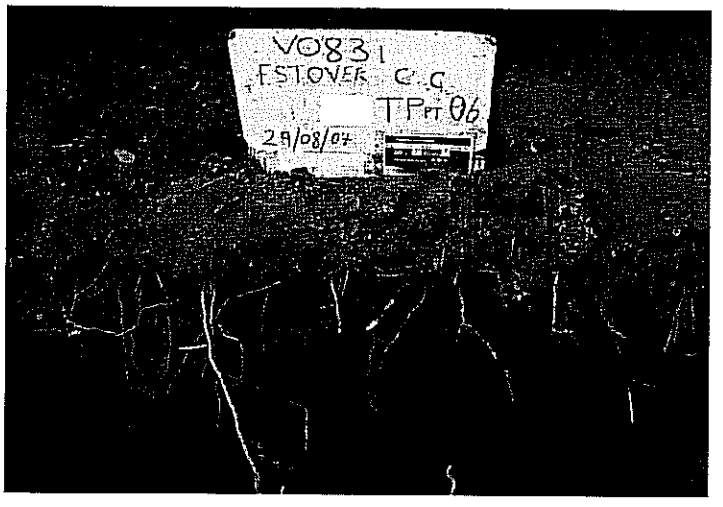


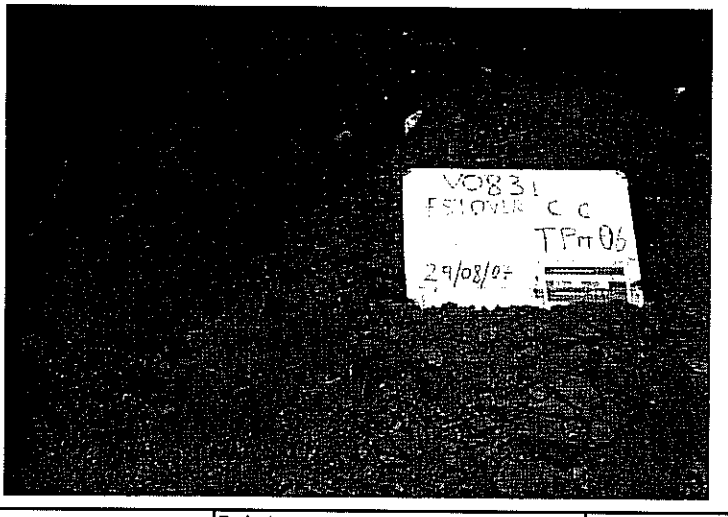
C.J. associates

Project	Drawing Title	
ESTOVER COMMUNITY COLLEGE	Trial Pit Photographs	
Client: KIER WESTERN	Project No.: V0831	TPTP04



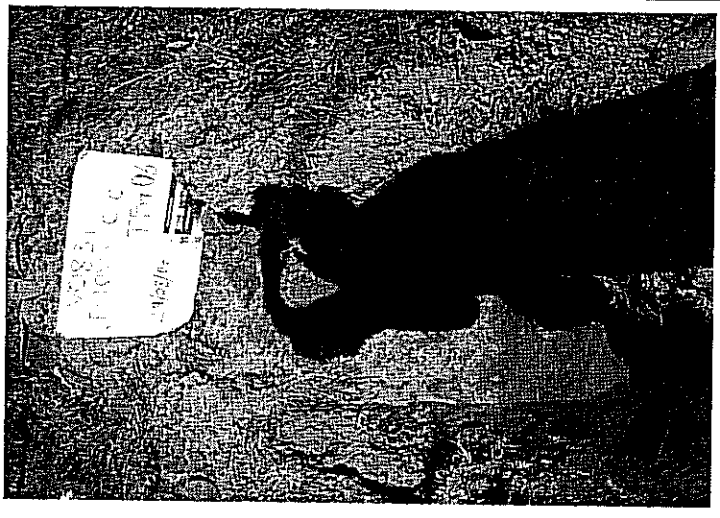
SERVICE PIPE

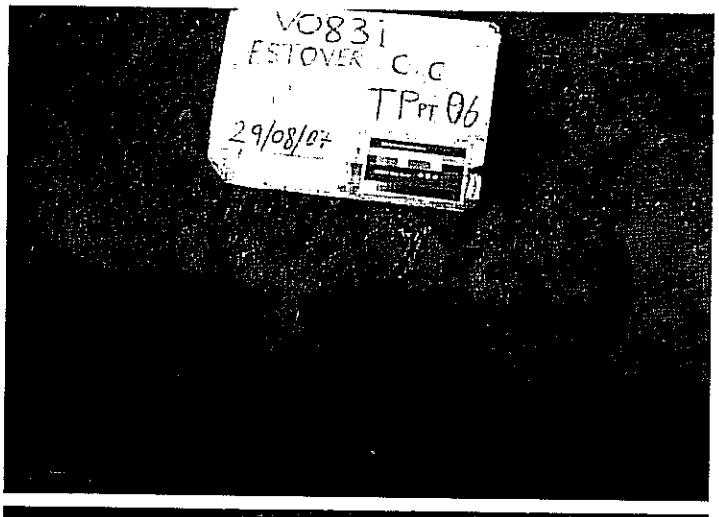


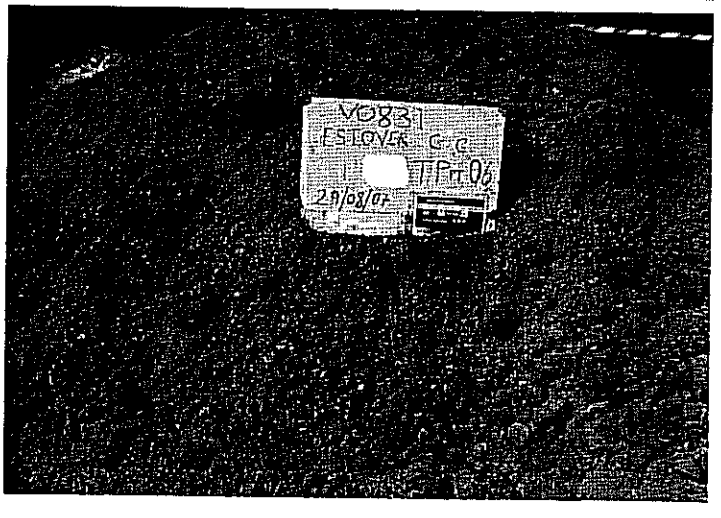


NB: PITS LABELLED AS TP06
IN ERROR

C.J. associates	Project: ESTOVER COMMUNITY COLLEGE	Drawing Title: Trial Pit Photographs	
	Client: KIER WESTERN	Project No.: V0831	TPPT05



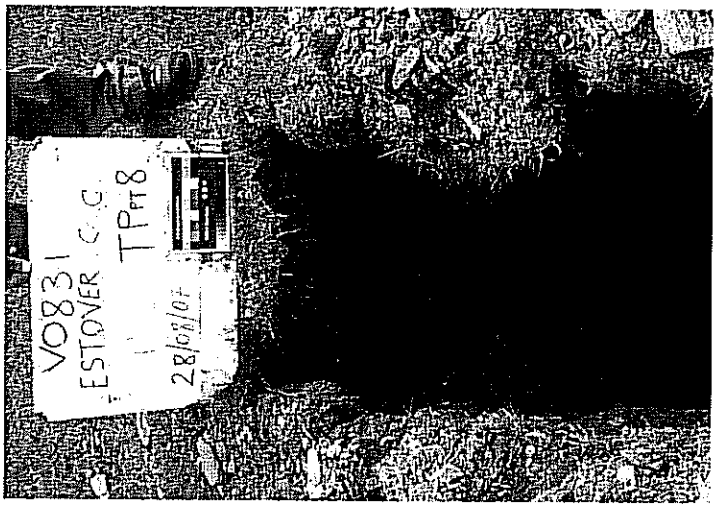


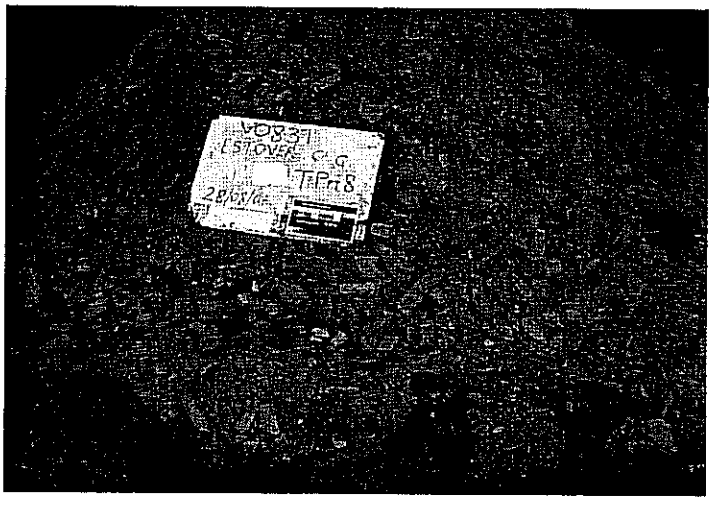


C.J. associates	Project: ESTOVER COMMUNITY COLLEGE	Drawing Title: Trial Pit Photographs	
	Client: KIER WESTERN	Project No.: V0831	TPPT06

C.J. associates

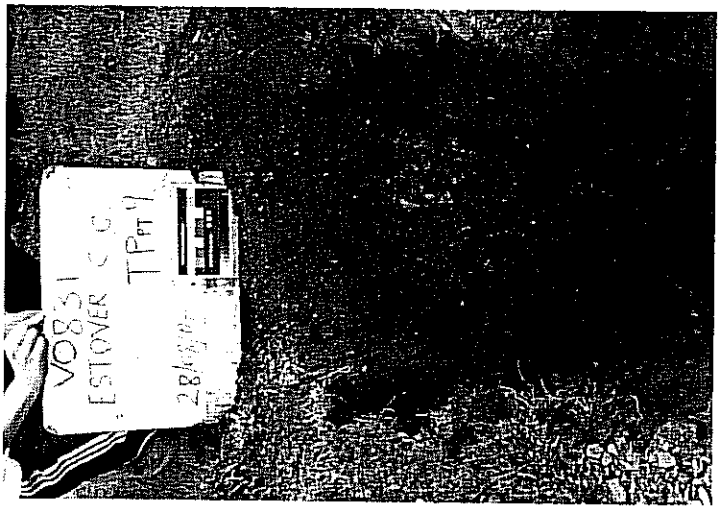
Project	Drawing Title	
ESTOVER COMMUNITY COLLEGE	Trial Pit Photographs	
Client	Project No.	
KIER WESTERN	V0831	TPPT07

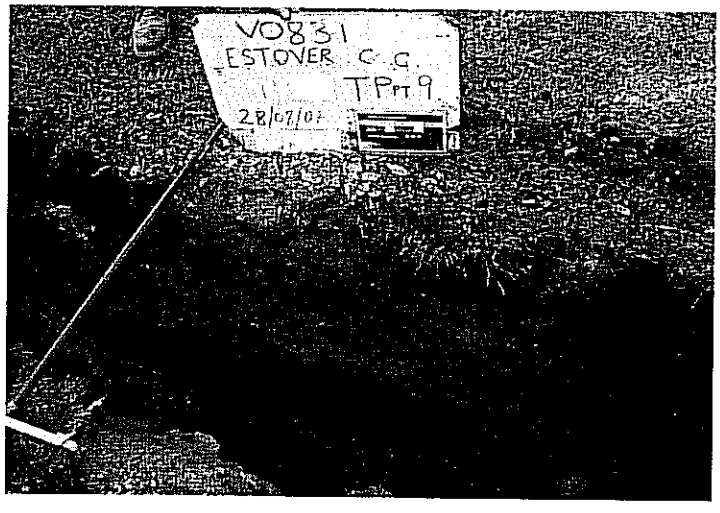




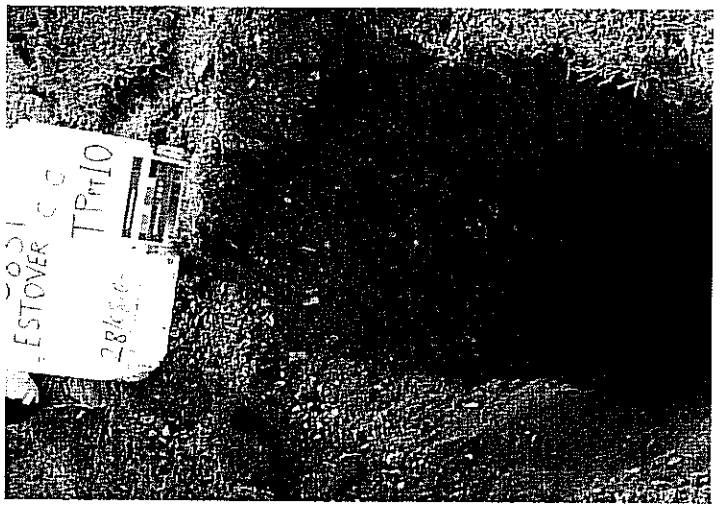
C.J. associates

Project: ESTOVER COMMUNITY COLLEGE	Drawing Title: Trial Pit Photographs	
Client: KIER WESTERN	Project No.: V0831	TPPT08





C.J. associates	Project: ESTOVER COMMUNITY COLLEGE	Drawing Title: Trial Pit Photographs	
	Client: KIER WESTERN	Project No.: V0831	TPPT09



C.J. associates	Project: ESTOVER COMMUNITY COLLEGE	Drawing Title: Trial Pit Photographs	
	Client: KIER WESTERN	Project No.: V0831	TPPT10

C.J.
associates

IN SITU TEST RESULTS

C.J. ASSOCIATES GEOTECHNICAL LTD.

SOIL INFILTRATION RATE TEST

See B.R.E. Digest 365, 1991, Soakaway Design.

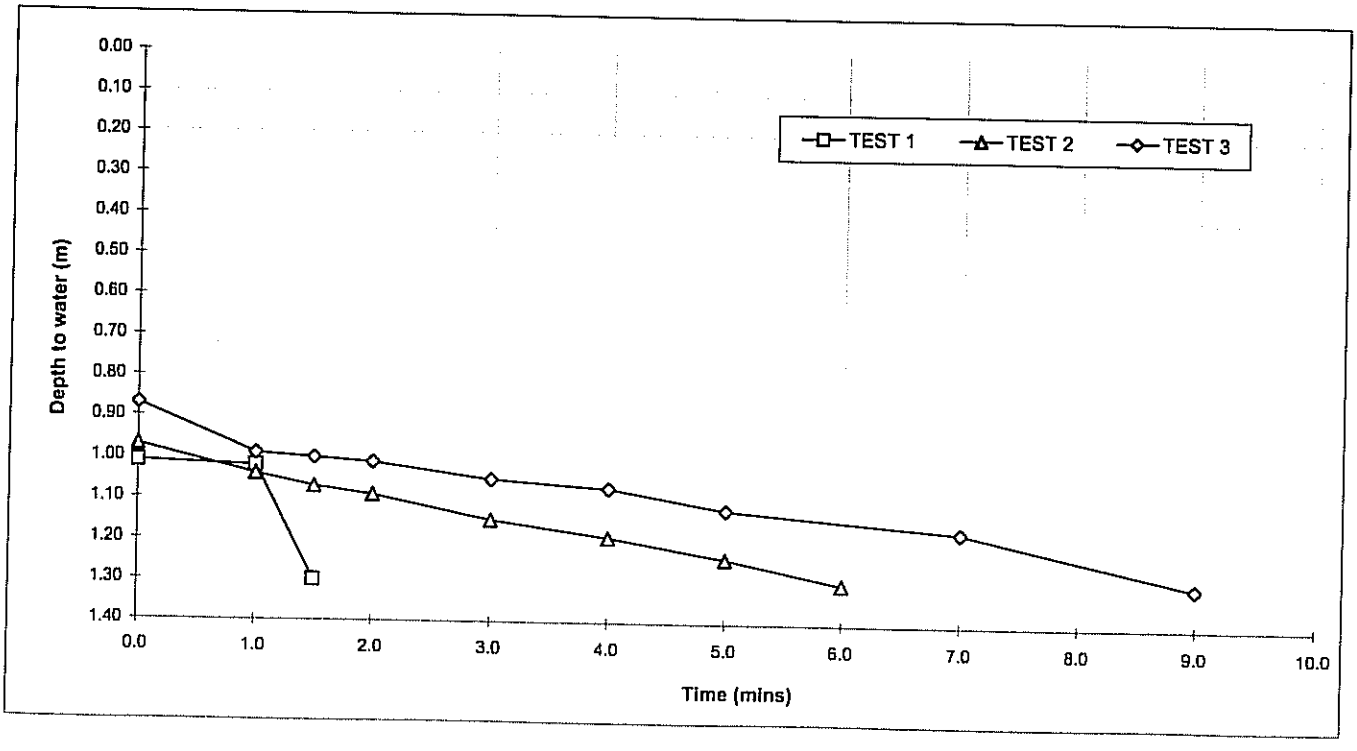
Site	Estover College
Job Number	V0831
Date of Test	30/08/2007

Trial Pit Number	TPPT01	
Length	2.75	m
Width	0.60	m
Depth	1.30	m
Groundwater Level	NA	m

Remarks -

	TEST 1		TEST 2		TEST 3	
	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
	0.0	1.01	0.0	0.97	0.0	0.87
	1.0	1.02	1.0	1.04	1.0	0.99
	1.5	1.30	1.5	1.07	1.5	1.00
			2.0	1.09	2.0	1.01
			3.0	1.15	3.0	1.05
			4.0	1.19	4.0	1.07
			5.0	1.24	5.0	1.12
			6.0	1.30	7.0	1.17
					9.0	1.30
Effective Storage Depth	m	0.29		0.33		0.43
75% Effective Storage Depth	m	0.22		0.25		0.32
(i.e. depth below GL)	m	1.08		1.05		0.98
25% Effective Storage Depth	m	0.07		0.08		0.11
(i.e. depth below GL)	m	1.23		1.22		1.19
Effective Storage Depth 75%-25%	m	0.15		0.17		0.22
Time to fall to 75% effective depth	mins	1.00		1.30		0.80
Time to fall to 25% effective depth	mins	1.40		4.40		7.30
V (75%-25%)	m3	0.24		0.27		0.35
a (50%)	m2	2.62		2.76		3.09
t (75%-25%)	mins	0.40		3.10		6.50
SOIL INFILTRATION RATE	m/s	**3.80E-03**		**5.31E-04**		**2.94E-04**

DESIGN SOIL INFILTRATION RATE, f **2.94E-04**



C.J. ASSOCIATES GEOTECHNICAL LTD.

SOIL INFILTRATION RATE TEST

See B.R.E. Digest 365, 1991, Soakaway Design.

Site	Estover College
Job Number	V0831
Date of Test	30/08/2007

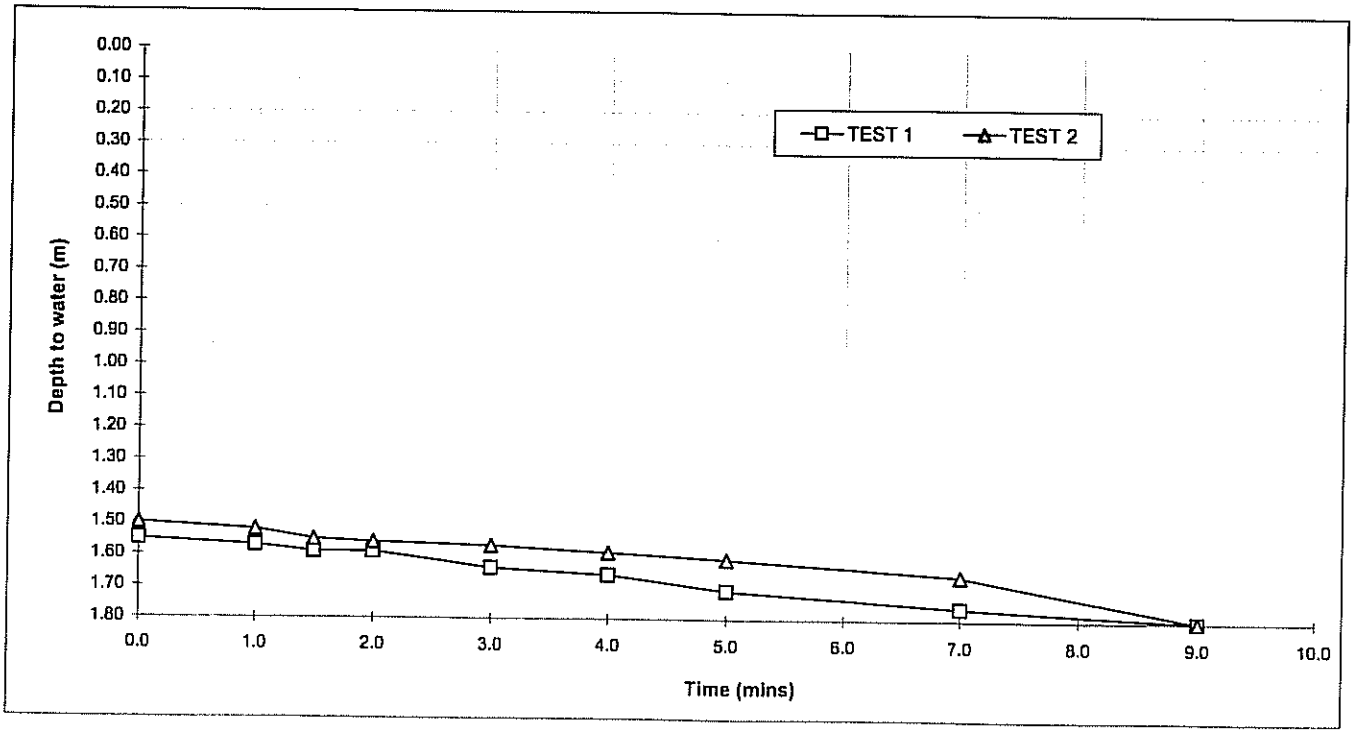
Trial Pit Number	TPPT02	
Length	2.95	m
Width	0.60	m
Depth	1.80	m
Groundwater Level	NA	m

Remarks -

TEST 1		TEST 2		TEST 3	
Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
0.0	1.55	0.0	1.50		
1.0	1.57	1.0	1.52		
1.5	1.59	1.5	1.55		
2.0	1.59	2.0	1.56		
3.0	1.64	3.0	1.57		
4.0	1.66	4.0	1.59		
5.0	1.71	5.0	1.61		
7.0	1.76	7.0	1.66		
9.0	1.80	9.0	1.80		

Effective Storage Depth	m	0.25	0.30	
75% Effective Storage Depth	m	0.19	0.23	
(i.e. depth below GL)	m	1.61	1.58	
25% Effective Storage Depth	m	0.06	0.08	
(i.e. depth below GL)	m	1.74	1.73	
Effective Storage Depth 75%-25%	m	0.13	0.15	
Time to fall to 75% effective depth	mins	2.30	3.80	
Time to fall to 25% effective depth	mins	6.30	7.80	
V (75%-25%)	m3	0.22	0.27	
a (50%)	m2	2.66	2.84	
t (75%-25%)	mins	4.00	4.00	
SOIL INFILTRATION RATE	m/s	**3.47E-04**	**3.90E-04**	

DESIGN SOIL INFILTRATION RATE, f **3.47E-04**



C.J. ASSOCIATES GEOTECHNICAL LTD.

SOIL INFILTRATION RATE TEST

See B.R.E. Digest 365, 1991, Soakaway Design.

Site	Estover College
Job Number	V0831
Date of Test	29/08/2007

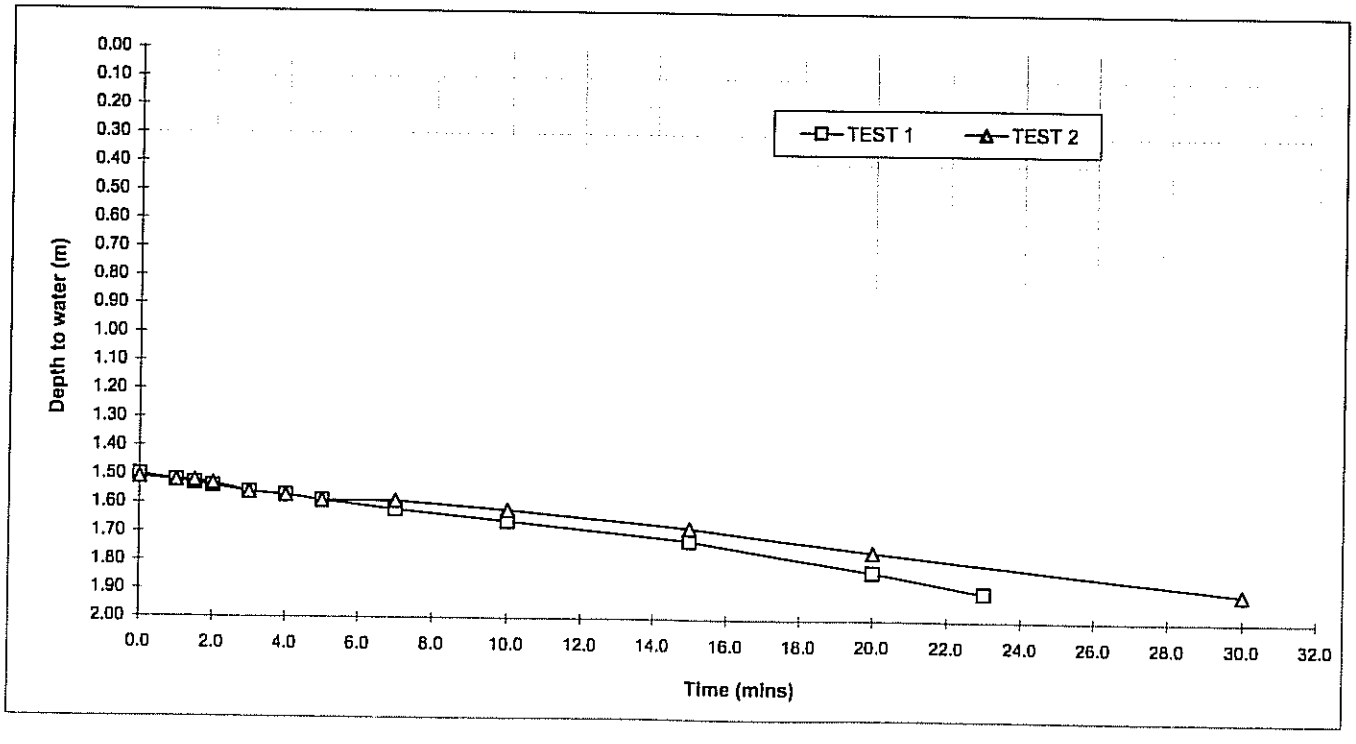
Trial Pit Number	TPPT03	
Length	2.90	m
Width	0.60	m
Depth	1.90	m
Groundwater Level	NA	m

Remarks -

TEST 1		TEST 2		TEST 3	
Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
0.0	1.50	0.0	1.51		
1.0	1.52	1.0	1.52		
1.5	1.53	1.5	1.52		
2.0	1.54	2.0	1.53		
3.0	1.56	3.0	1.56		
4.0	1.57	4.0	1.57		
5.0	1.59	5.0	1.59		
7.0	1.62	7.0	1.59		
10.0	1.66	10.0	1.62		
15	1.73	15	1.68		
20	1.83	20	1.76		
23	1.90	30	1.90		

Effective Storage Depth	m	0.40	0.39	
75% Effective Storage Depth	m	0.30	0.29	
(i.e. depth below GL)	m	1.60	1.61	
25% Effective Storage Depth	m	0.10	0.10	
(i.e. depth below GL)	m	1.80	1.80	
Effective Storage Depth 75%-25%	m	0.20	0.20	
Time to fall to 75% effective depth	mins	5.00	5.00	
Time to fall to 25% effective depth	mins	18.00	22.00	
V (75%-25%)	m3	0.35	0.34	
a (50%)	m2	3.14	3.11	
t (75%-25%)	mins	13.00	17.00	
SOIL INFILTRATION RATE	m/s	**1.42E-04**	**1.07E-04**	

DESIGN SOIL INFILTRATION RATE, f **1.07E-04**



C.J. ASSOCIATES GEOTECHNICAL LTD.

SOIL INFILTRATION RATE TEST
See B.R.E. Digest 365, 1991, Soakaway Design.

Site..... Estover College
Job Number..... V0831
Date of Test..... 28/08/2007

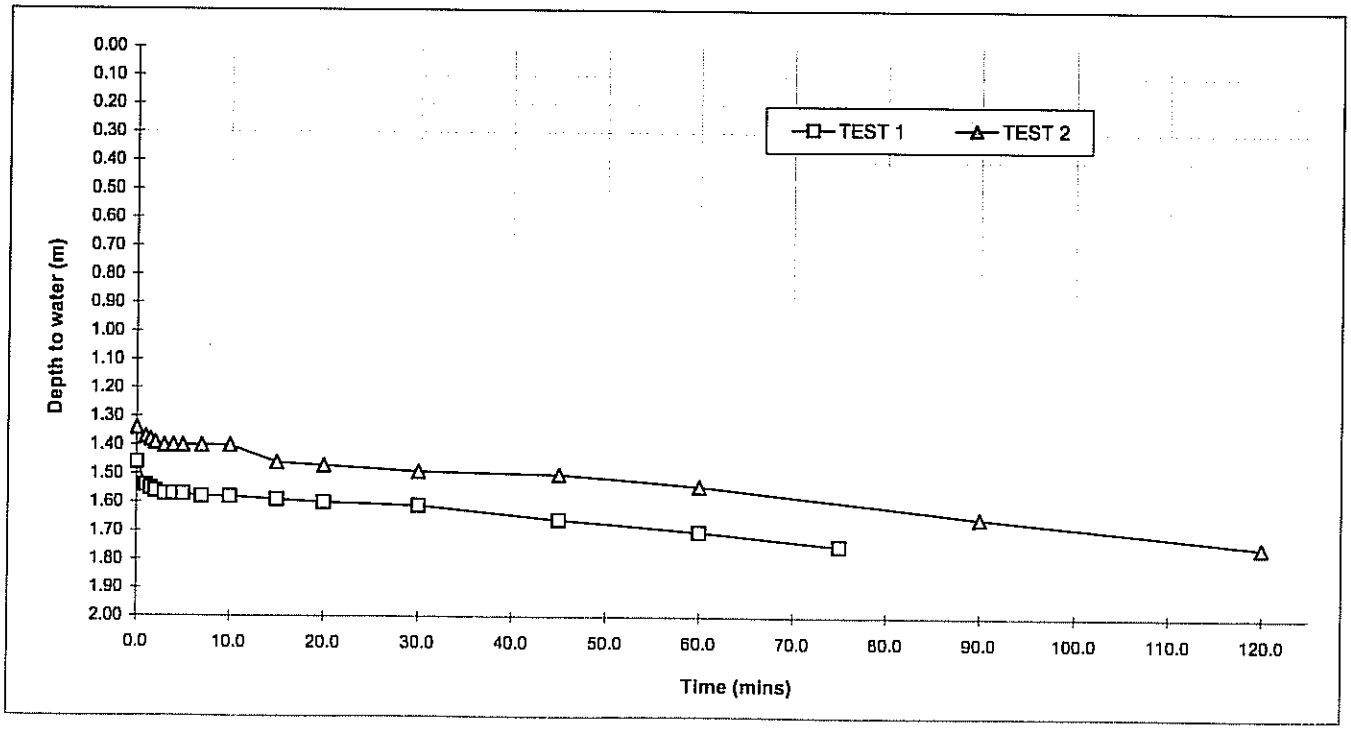
Trial Pit Number..... TPPT04
Length..... 2.80 m
Width..... 0.60 m
Depth..... 1.75 m
Groundwater Level..... NA m

Remarks -

TEST 1		TEST 2		TEST 3	
Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
0.0	1.46	0.0	1.34		
1.0	1.54	1.0	1.37		
1.5	1.55	1.5	1.38		
2.0	1.56	2.0	1.39		
3.0	1.57	3.0	1.40		
4.0	1.57	4.0	1.40		
5.0	1.57	5.0	1.40		
7.0	1.58	7.0	1.40		
10.0	1.58	10.0	1.40		
15	1.59	15	1.46		
20	1.60	20	1.47		
30	1.61	30	1.49		
45	1.66	45	1.50		
60	1.70	60	1.54		
75	1.75	90	1.65		
		120	1.75		

Effective Storage Depth	m	0.29	0.41	
75% Effective Storage Depth	m	0.22	0.31	
(i.e. depth below GL)	m	1.53	1.44	
25% Effective Storage Depth	m	0.07	0.10	
(i.e. depth below GL)	m	1.68	1.65	
Effective Storage Depth 75%-25%	m	0.15	0.21	
Time to fall to 75% effective depth	mins	2.00	13.00	
Time to fall to 25% effective depth	mins	49.00	90.00	
V (75%-25%)	m3	0.24	0.34	
a (50%)	m2	2.67	3.07	
t (75%-25%)	mins	47.00	77.00	
SOIL INFILTRATION RATE	m/s	**3.24E-05**	**2.43E-05**	

DESIGN SOIL INFILTRATION RATE, f **2.43E-05**



C.J. ASSOCIATES GEOTECHNICAL LTD.

SOIL INFILTRATION RATE TEST

See B.R.E. Digest 365, 1991, Soakaway Design.

Site	Estover College
Job Number	V0831
Date of Test	29/08/2007

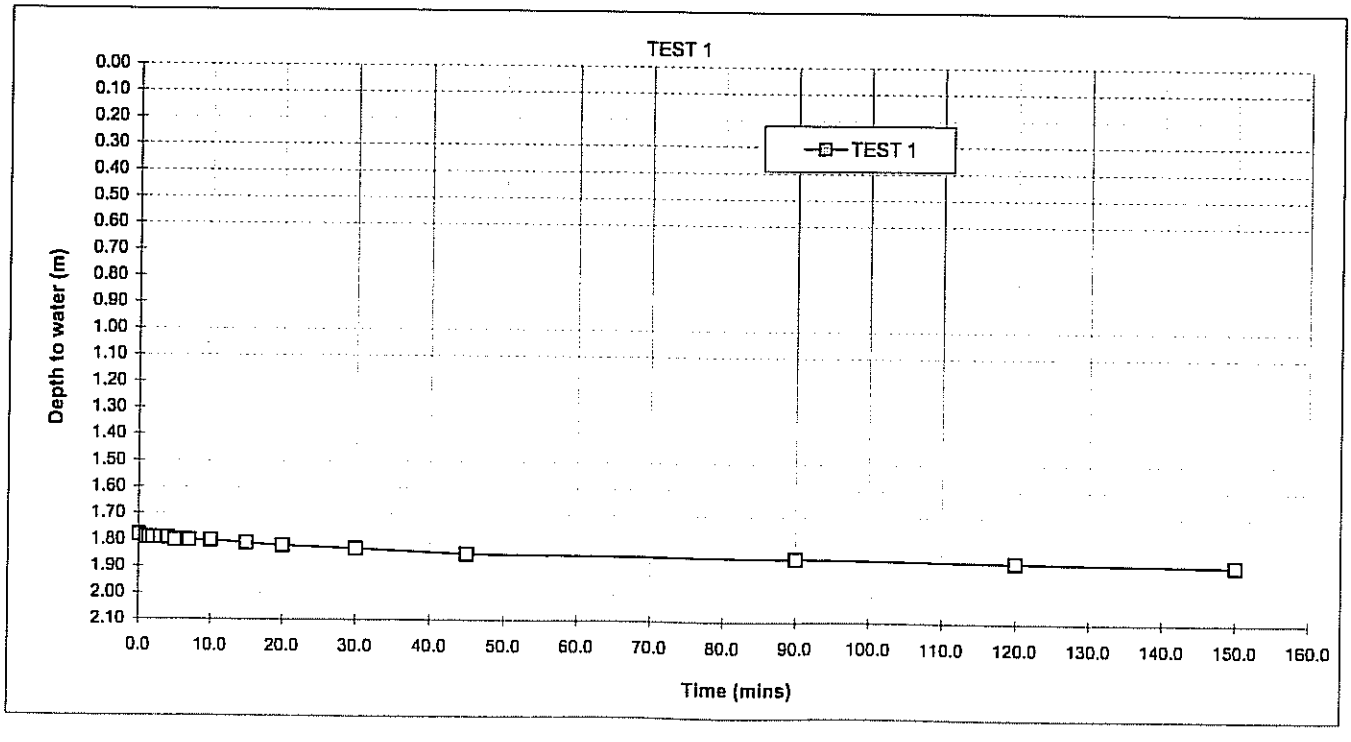
Trial Pit Number	TPPT05	
Length	2.85	m
Width	0.60	m
Depth	2.10	m
Groundwater Level	NA	m

Remarks -

TEST 1		TEST 2		TEST 3	
Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
0.0	1.78				
1.0	1.79				
1.5	1.79				
2.0	1.79				
3.0	1.79				
4.0	1.79				
5.0	1.80				
7.0	1.80				
10.0	1.80				
15	1.81				
20	1.82				
30	1.83				
45	1.85				
90	1.86				
120	1.87				
150	1.88				

Effective Storage Depth	m	0.32		
75% Effective Storage Depth	m	0.24		
(i.e. depth below GL)	m	1.86		
25% Effective Storage Depth	m	0.08		
(i.e. depth below GL)	m	2.02		
Effective Storage Depth 75%-25%	m	0.16		
Time to fall to 75% effective depth	mins	90.00		
Time to fall to 25% effective depth	mins	800.00		
V (75%-25%)	m3	0.27		
a (50%)	m2	2.81		
t (75%-25%)	mins	710.00		
SOIL INFILTRATION RATE	m/s	**2.28E-06**		

DESIGN SOIL INFILTRATION RATE, f **2.28E-06**



C.J. ASSOCIATES GEOTECHNICAL LTD.

SOIL INFILTRATION RATE TEST

See B.R.E. Digest 365, 1991, Soakaway Design.

Site	Estover College
Job Number	V0831
Date of Test	29/08/2007

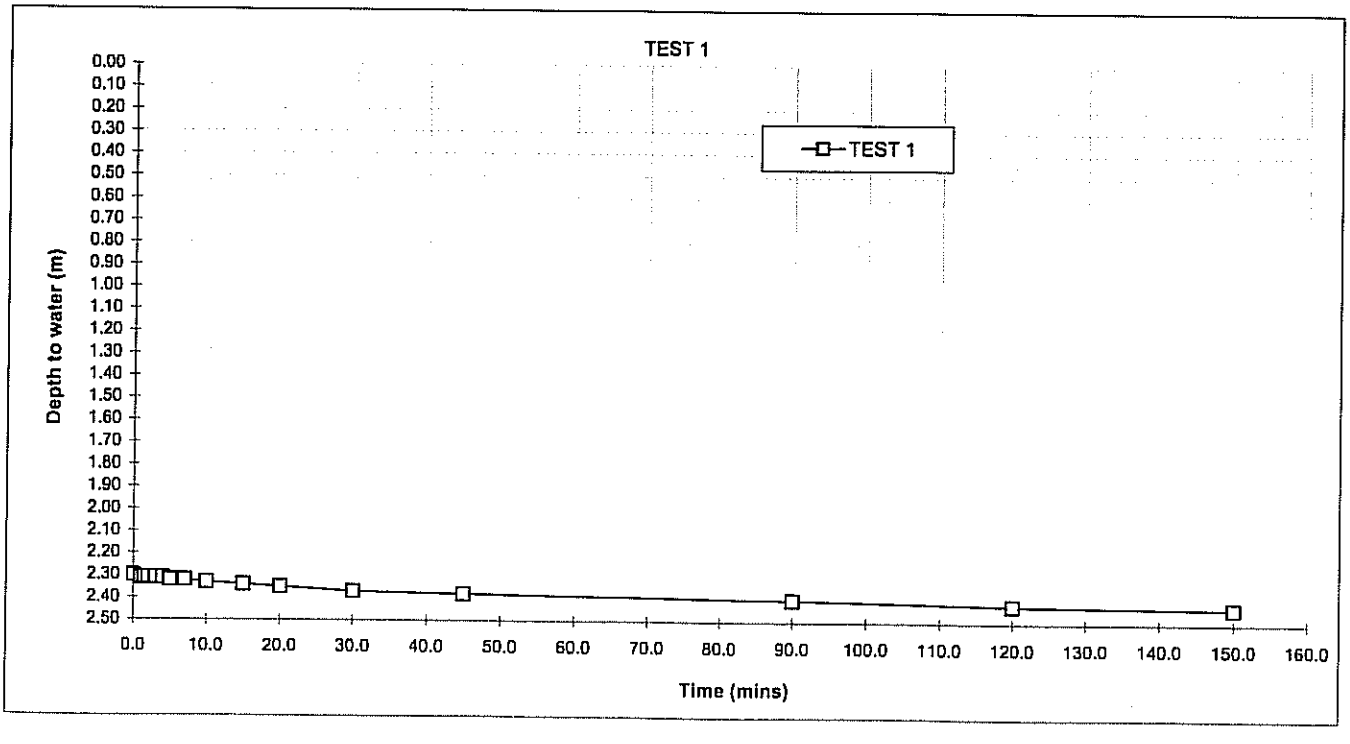
Trial Pit Number	TPPT06	
Length	2.95	m
Width	0.60	m
Depth	2.50	m
Groundwater Level	NA	m

Remarks -

TEST 1		TEST 2		TEST 3	
Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
0.0	2.30				
1.0	2.31				
1.5	2.31				
2.0	2.31				
3.0	2.31				
4.0	2.31				
5.0	2.32				
7.0	2.32				
10.0	2.33				
15	2.34				
20	2.35				
30	2.37				
45	2.38				
90	2.40				
120	2.42				
150	2.43				

Effective Storage Depth	m	0.20		
75% Effective Storage Depth	m	0.15		
(i.e. depth below GL)	m	2.35		
25% Effective Storage Depth	m	0.05		
(i.e. depth below GL)	m	2.45		
Effective Storage Depth 75%-25%	m	0.10		
Time to fall to 75% effective depth	mins	20.00		
Time to fall to 25% effective depth	mins	165.00		
V (75%-25%)	m3	0.18		
a (50%)	m2	2.48		
t (75%-25%)	mins	145.00		
SOIL INFILTRATION RATE	m/s	**8.20E-06**		

DESIGN SOIL INFILTRATION RATE, f **8.20E-06**



C.J. ASSOCIATES GEOTECHNICAL LTD.

SOIL INFILTRATION RATE TEST

See B.R.E. Digest 365, 1991, Soakaway Design.

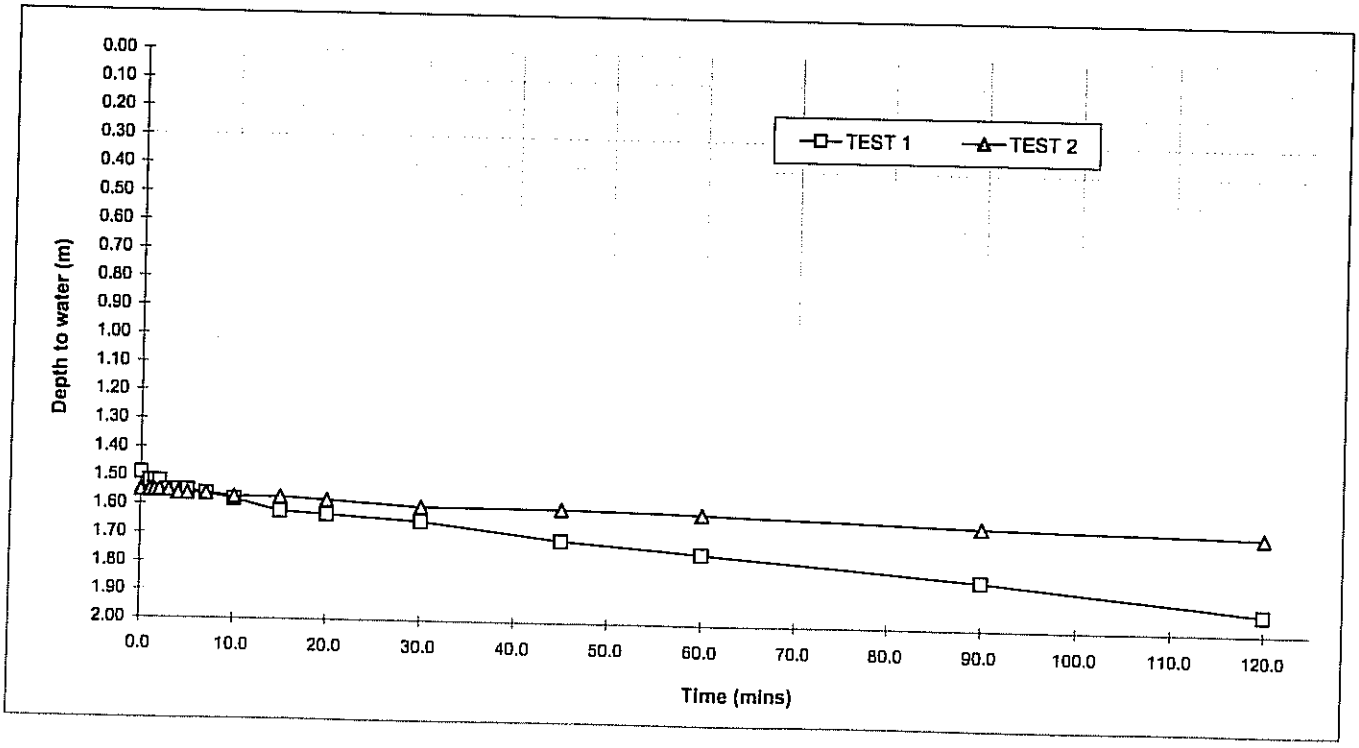
Site	Estover College
Job Number	V0831
Date of Test	29/08/2007

Trial Pit Number	TPPT07	
Length	2.85	m
Width	0.60	m
Depth	2.05	m
Groundwater Level	NA	m

Remarks -

	TEST 1		TEST 2		TEST 3	
	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
	0.0	1.49	0.0	1.55		
	1.0	1.52	1.0	1.55		
	1.5	1.52	1.5	1.55		
	2.0	1.52	2.0	1.55		
	3.0	1.55	3.0	1.55		
	4.0	1.55	4.0	1.56		
	5.0	1.55	5.0	1.56		
	7.0	1.56	7.0	1.56		
	10.0	1.58	10.0	1.57		
	15	1.62	15	1.57		
	20	1.63	20	1.58		
	30	1.65	30	1.60		
	45	1.71	45	1.60		
	60	1.75	60	1.61		
	90	1.83	90	1.64		
	120	1.93	120	1.66		
Effective Storage Depth	m	0.56		0.50		
75% Effective Storage Depth	m	0.42		0.38		
(i.e. depth below GL)	m	1.63		1.68		
25% Effective Storage Depth	m	0.14		0.13		
(i.e. depth below GL)	m	1.91		1.93		
Effective Storage Depth 75%-25%	m	0.28		0.25		
Time to fall to 75% effective depth	mins	20.00		140.00		
Time to fall to 25% effective depth	mins	115.00		400.00		
V (75%-25%)	m3	0.48		0.43		
a (50%)	m2	3.64		3.44		
t (75%-25%)	mins	95.00		260.00		
SOIL INFILTRATION RATE	m/s	**2.31E-05**		**7.98E-06**		

DESIGN SOIL INFILTRATION RATE, f **7.98E-06**



C.J. ASSOCIATES GEOTECHNICAL LTD.

SOIL INFILTRATION RATE TEST

See B.R.E. Digest 365, 1991, Soakaway Design.

Site	Estover College
Job Number	V0831
Date of Test	28/08/2007

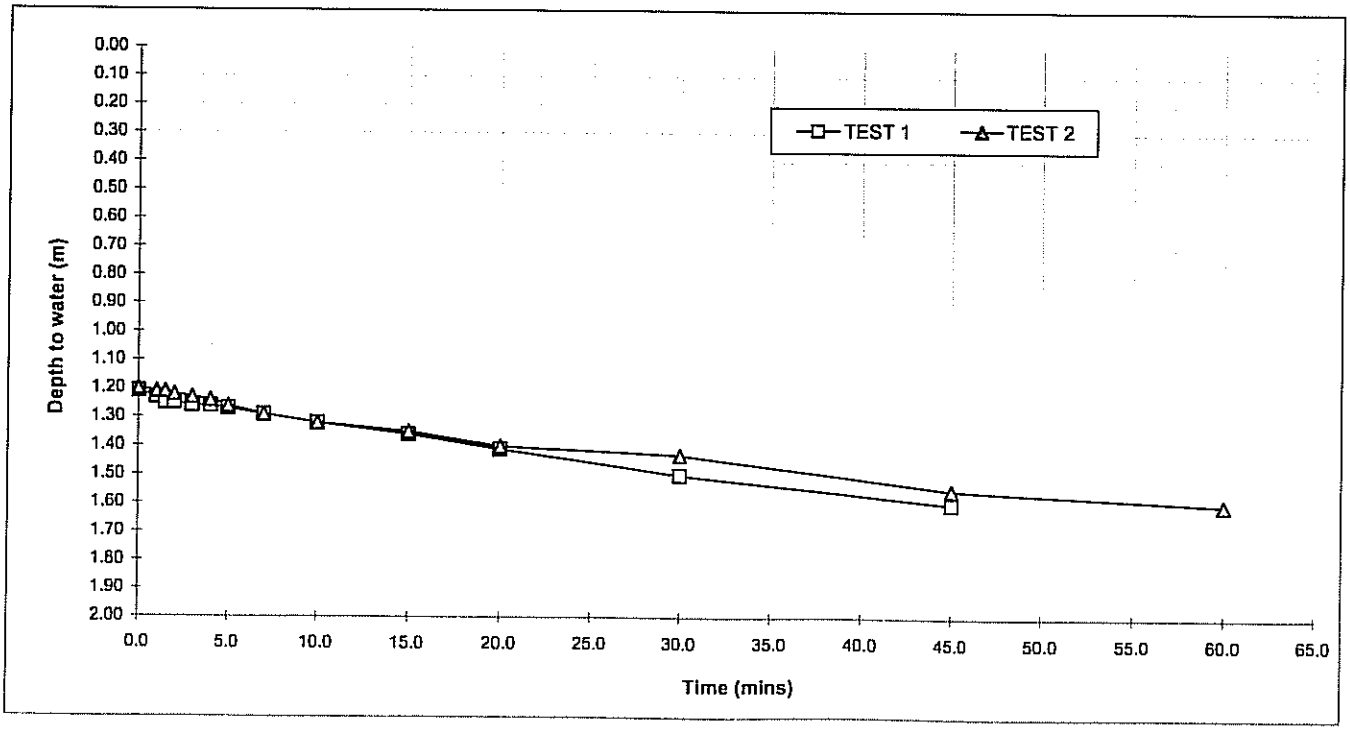
Trial Pit Number	TPPT08	
Length	2.45	m
Width	0.60	m
Depth	1.60	m
Groundwater Level	NA	m

Remarks -

TEST 1		TEST 2		TEST 3	
Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
0.0	1.21	0.0	1.20		
1.0	1.23	1.0	1.21		
1.5	1.25	1.5	1.21		
2.0	1.25	2.0	1.22		
3.0	1.26	3.0	1.23		
4.0	1.26	4.0	1.24		
5.0	1.27	5.0	1.26		
7.0	1.29	7.0	1.29		
10.0	1.32	10.0	1.32		
15	1.36	15	1.35		
20	1.41	20	1.40		
30	1.50	30	1.43		
45	1.60	45	1.55		
		60	1.60		

Effective Storage Depth	m	0.39	0.40	
75% Effective Storage Depth	m	0.29	0.30	
(i.e. depth below GL)	m	1.31	1.30	
25% Effective Storage Depth	m	0.10	0.10	
(i.e. depth below GL)	m	1.50	1.50	
Effective Storage Depth 75%-25%	m	0.20	0.20	
Time to fall to 75% effective depth	mins	5.00	5.00	
Time to fall to 25% effective depth	mins	29.00	38.00	
V (75%-25%)	m3	0.29	0.29	
a (50%)	m2	2.66	2.69	
t (75%-25%)	mins	24.00	33.00	
SOIL INFILTRATION RATE	m/s	**7.48E-05**	**5.52E-05**	

DESIGN SOIL INFILTRATION RATE, f **5.52E-05**



C.J. ASSOCIATES GEOTECHNICAL LTD.

SOIL INFILTRATION RATE TEST

See B.R.E. Digest 365, 1991, Soakaway Design.

Site	Estover College
Job Number	V0831
Date of Test	29/08/2007

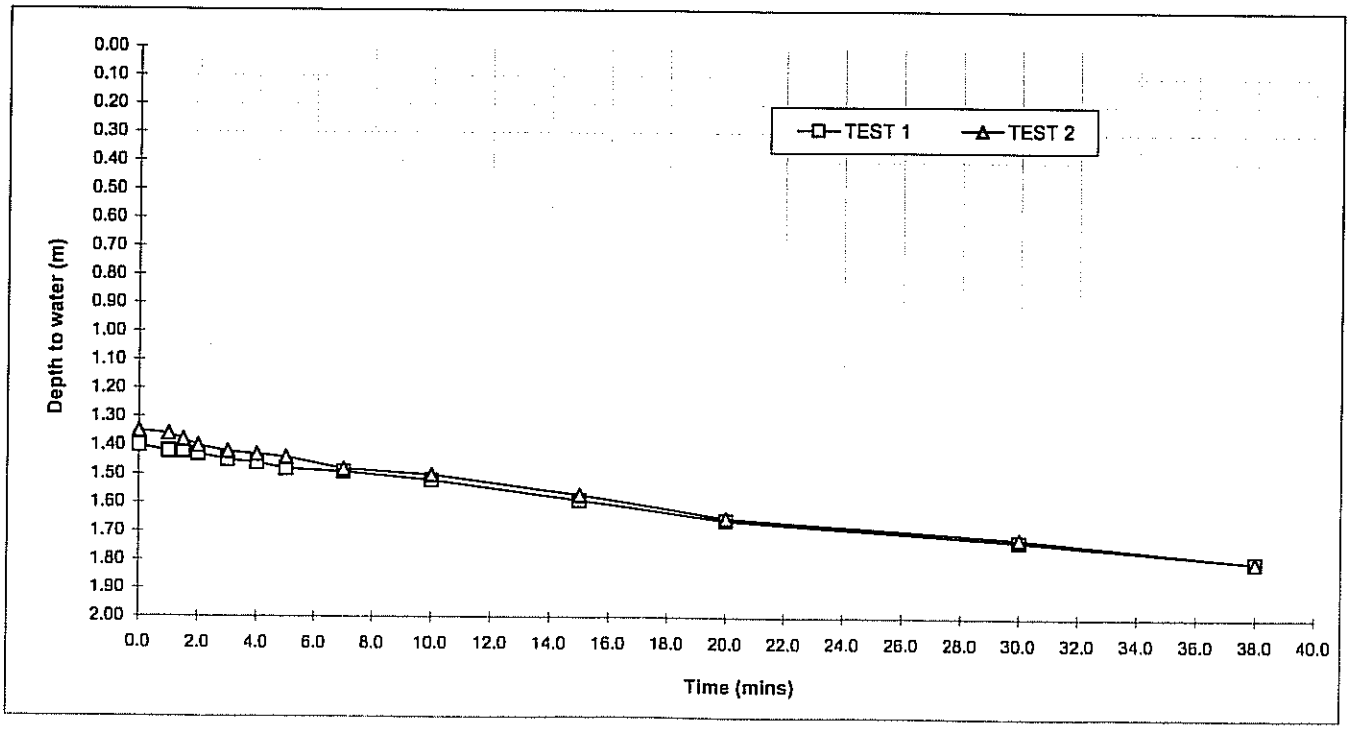
Trial Pit Number	TPPT09	
Length	2.45	m
Width	0.60	m
Depth	1.80	m
Groundwater Level	NA	m

Remarks -

TEST 1		TEST 2		TEST 3	
Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
0.0	1.40	0.0	1.35		
1.0	1.42	1.0	1.36		
1.5	1.42	1.5	1.36		
2.0	1.43	2.0	1.40		
3.0	1.45	3.0	1.42		
4.0	1.46	4.0	1.43		
5.0	1.48	5.0	1.44		
7.0	1.49	7.0	1.48		
10.0	1.52	10.0	1.50		
15	1.59	15	1.57		
20	1.66	20	1.65		
30	1.73	30	1.72		
38	1.80	38	1.80		

Effective Storage Depth	m	0.40	0.46	
75% Effective Storage Depth	m	0.30	0.34	
(i.e. depth below GL)	m	1.50	1.46	
25% Effective Storage Depth	m	0.10	0.11	
(i.e. depth below GL)	m	1.70	1.69	
Effective Storage Depth 75%-25%	m	0.20	0.23	
Time to fall to 75% effective depth	mins	6.00	6.00	
Time to fall to 25% effective depth	mins	24.00	24.00	
V (75%-25%)	m3	0.29	0.33	
a (50%)	m2	2.69	2.84	
t (75%-25%)	mins	18.00	18.00	
SOIL INFILTRATION RATE	m/s	**1.01E-04**	**1.08E-04**	

DESIGN SOIL INFILTRATION RATE, f **1.01E-04**



C.J. ASSOCIATES GEOTECHNICAL LTD.

SOIL INFILTRATION RATE TEST

See B.R.E. Digest 365, 1991, Soakaway Design.

Site	Estover College
Job Number	V0831
Date of Test	28/08/2007

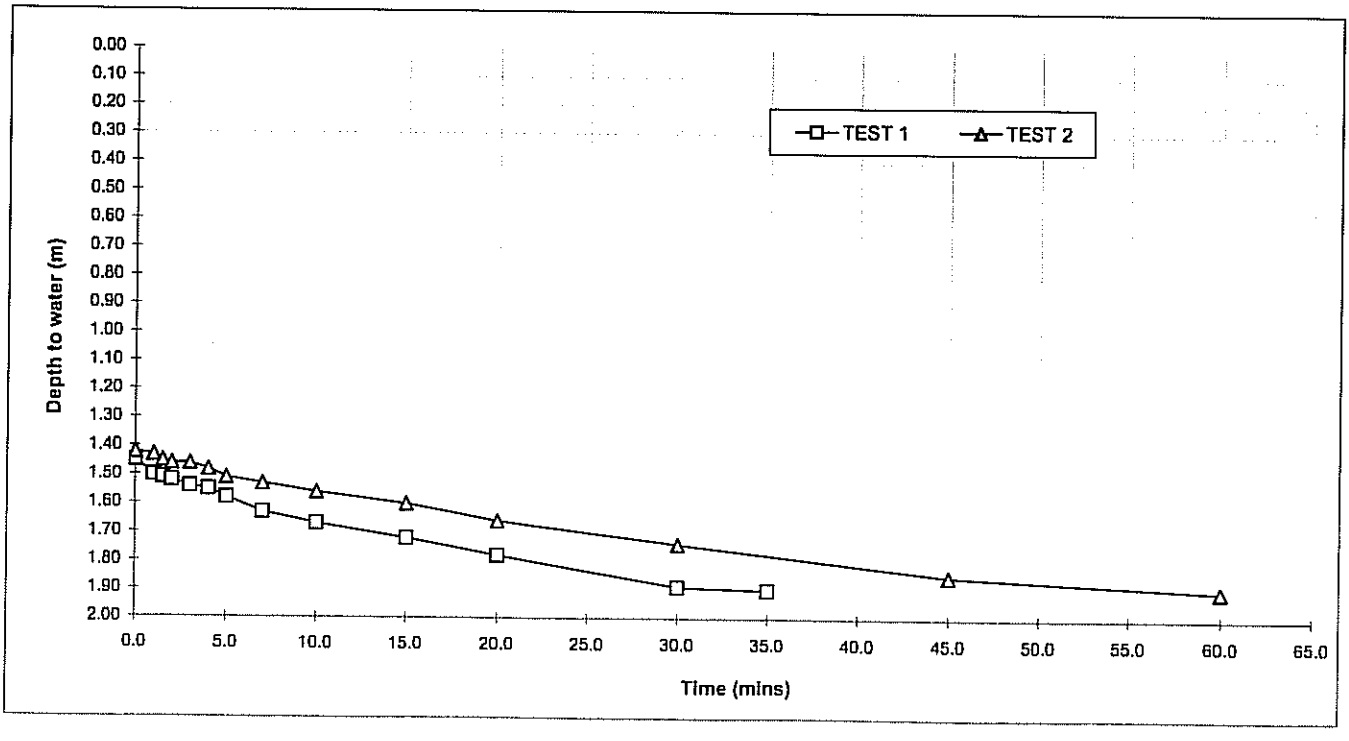
Trial Pit Number	TPPT10	
Length	2.50	m
Width	0.60	m
Depth	1.90	m
Groundwater Level	NA	m

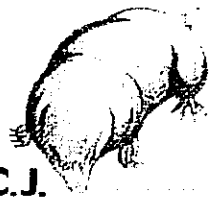
Remarks -

TEST 1		TEST 2		TEST 3	
Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
0.0	1.45	0.0	1.42		
1.0	1.50	1.0	1.43		
1.5	1.51	1.5	1.45		
2.0	1.52	2.0	1.46		
3.0	1.54	3.0	1.46		
4.0	1.55	4.0	1.48		
5.0	1.58	5.0	1.51		
7.0	1.63	7.0	1.53		
10.0	1.67	10.0	1.56		
15	1.72	15	1.60		
20	1.78	20	1.66		
30	1.89	30	1.74		
35	1.90	45	1.85		
		60	1.90		

Effective Storage Depth	m	0.45	0.48	
75% Effective Storage Depth	m	0.34	0.36	
(i.e. depth below GL)	m	1.56	1.54	
25% Effective Storage Depth	m	0.11	0.12	
(i.e. depth below GL)	m	1.79	1.78	
Effective Storage Depth 75%-25%	m	0.23	0.24	
Time to fall to 75% effective depth	mins	4.00	8.00	
Time to fall to 25% effective depth	mins	20.00	37.00	
V (75%-25%)	m3	0.34	0.36	
a (50%)	m2	2.90	2.99	
t (75%-25%)	mins	16.00	29.00	
SOIL INFILTRATION RATE	m/s	**1.21E-04**	**6.92E-05**	

DESIGN SOIL INFILTRATION RATE, f **6.92E-05**





LABORATORY TESTS

Moisture Content Test Results

Site **Estover Community College**

Client **Jenkins & Potter**

Job Number V0831

Lab Number

Hole	Sample	Depth (m)	MC (%)	Description
TPPT02	B2	0.60	20	Refer to log sheets
TPPT03	B2	0.50	13	Refer to log sheets
TPPT04	B2	1.50	12	Refer to log sheets
TPPT07	B2	0.60	14	Refer to log sheets
TPPT08	B3	1.00	12	Refer to log sheets

Key

MC - Moisture content

Method

(1) - BS1377:Part2:1990:Methods 3.2

Samples were prepared in accordance with BS1377:Part1:1990

Checked

Approved

Index Property Test Results

Site **Estover Community College**

Client **Jenkins & Potter**

Job Number V0831

Lab Number

C.J. associates

UKAS Testing Laboratory 1429

Hole	Sample	Depth (m)	Method	History	MC (%)	LL (%)	Ret (%)	PL (%)	Pa (%)	PI (%)	Class	Description
TPPT04	T1	1.50	1	2	9	44	19	30	81	14	MI	Refer to log sheets
Tppt05	T3	1.00	1	2	23	50	38	33	62	17	MI	Refer to log sheets
TPPT06	T1	1.15	1	2	25	45	49	30	51	15	MI	Refer to log sheets
TPPT07	T3	1.15	1	2	12	51	59	44	41	7	MH	Refer to log sheets
TPPT08	T1	0.30	1	2	11	37	0	26	100	11	MI	Refer to log sheets

Key

MC - Moisture content
LL - Liquid Limit
Ret - Percentage retained on 425 micron test sieve
PL - Plastic limit
Pa - Percentage passing the 425 micron test sieve
PI - Plasticity Index

History

(1) Sample was tested from the natural state. Particles greater than 425 microns removed by hand (BS1377:Part2:1990:4.2.3)
(2) Sample was wet sieved through 425 micron test sieve (BS1377:Part2:1990:4.2.4)
(3) Sample was air dried at less than 50 degrees Centigrade and passed through the 425 micron sieve
(4) Unknown

Methods

[1] BS1377:Part2:1990: Methods 3.2/4.4/5.3 - Liquid Limit by One point Cone Penetrometer
[2] BS1377:Part2:1990: Methods 3.2/4.4/5.3 - Liquid Limit by Four Point Cone Penetrometer

Samples were prepared in accordance with BS1377:Part1:1990

Classification is based on the plasticity chart - Fig 2.6 of Manual of Soil Laboratory Testing - Volume 1 by K.H.Head.
NOTE - 'O' is added to the symbol for soils containing a significant amount of organic material (determined by visual inspection) e.g. MHO

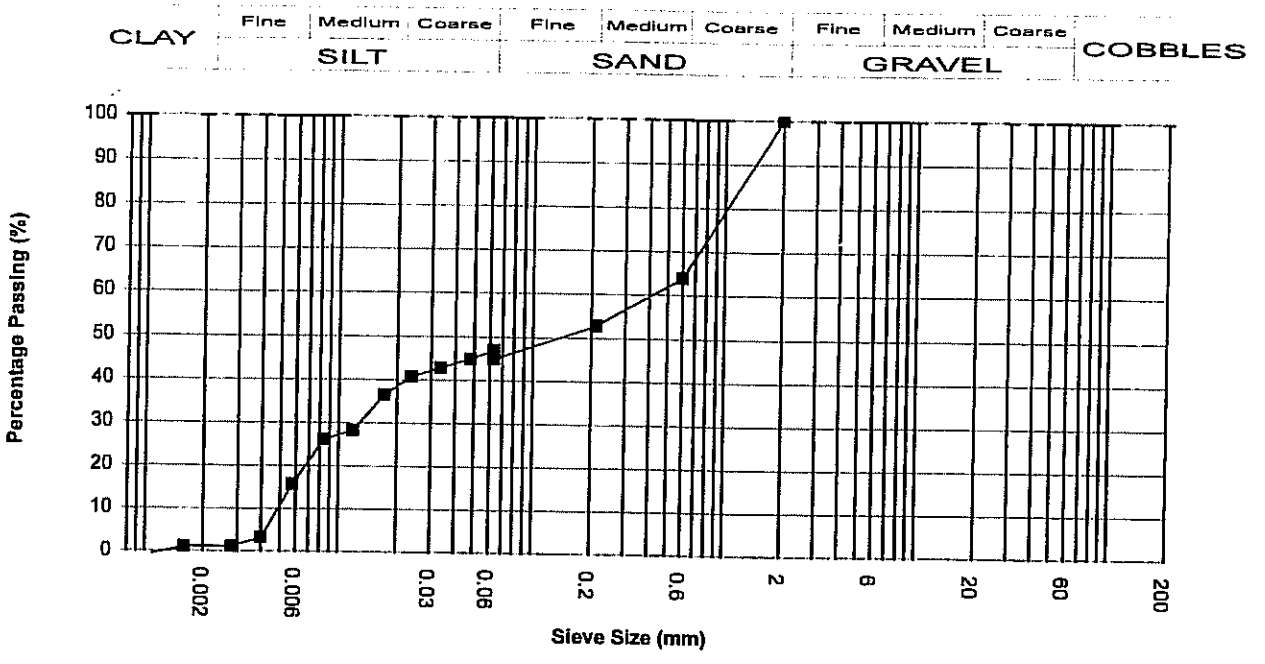
Checked

Approved

Particle Size Distribution Analysis

Site	**Estover Community College**
Client	**Jenkins & Potter**
Job Number	V0831
Lab Number	L8036
Hole	TPPT03
Sample	T3
Depth (m)	1.50

C.J. associates



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
2	100	0.063	47
0.6	64	0.063	45
0.212	53	0.048	45
0.063	45	0.034	43
		0.024	41
		0.017	36
		0.012	28
		0.008	26
		0.006	16
		0.004	3
		0.003	1
		0.002	0
		0.001	-1

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	Clause 9.5

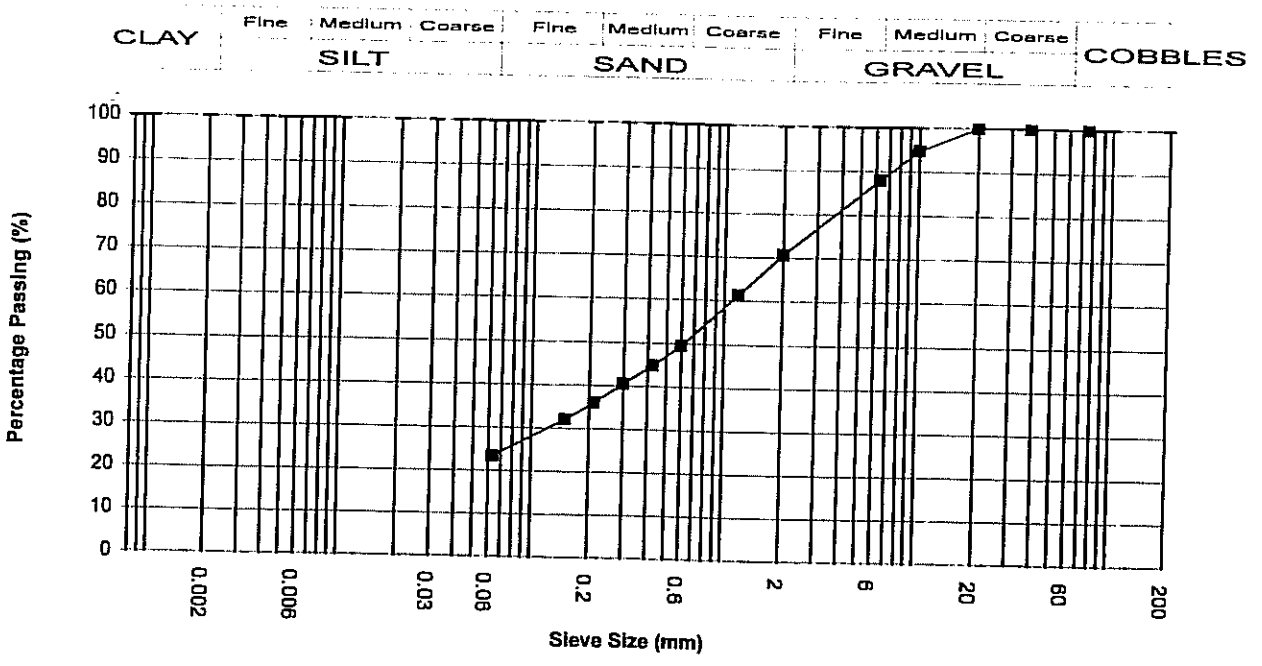
Sample Proportions	
Cobbles	0.0
Gravel	0.0
Sand	53.6
Silt	45.4
Clay	1.0

Grading Analysis	
D100	2.0
D60	0.5
D10	0.0
Uniformity Coefficient	94

Particle Size Distribution Analysis

Site	**Estover Community College**
Client	**Jenkins & Potter**
Job Number	V0831
Lab Number	L8036
Hole	Tppt05
Sample	T3
Depth (m)	1.00

C.J. associates



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100		
37.5	100		
20	100		
10	95		
6.3	88		
2	71		
1.18	61		
0.6	49		
0.425	45		
0.3	40		
0.212	36		
0.15	32		
0.063	23		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	N/A

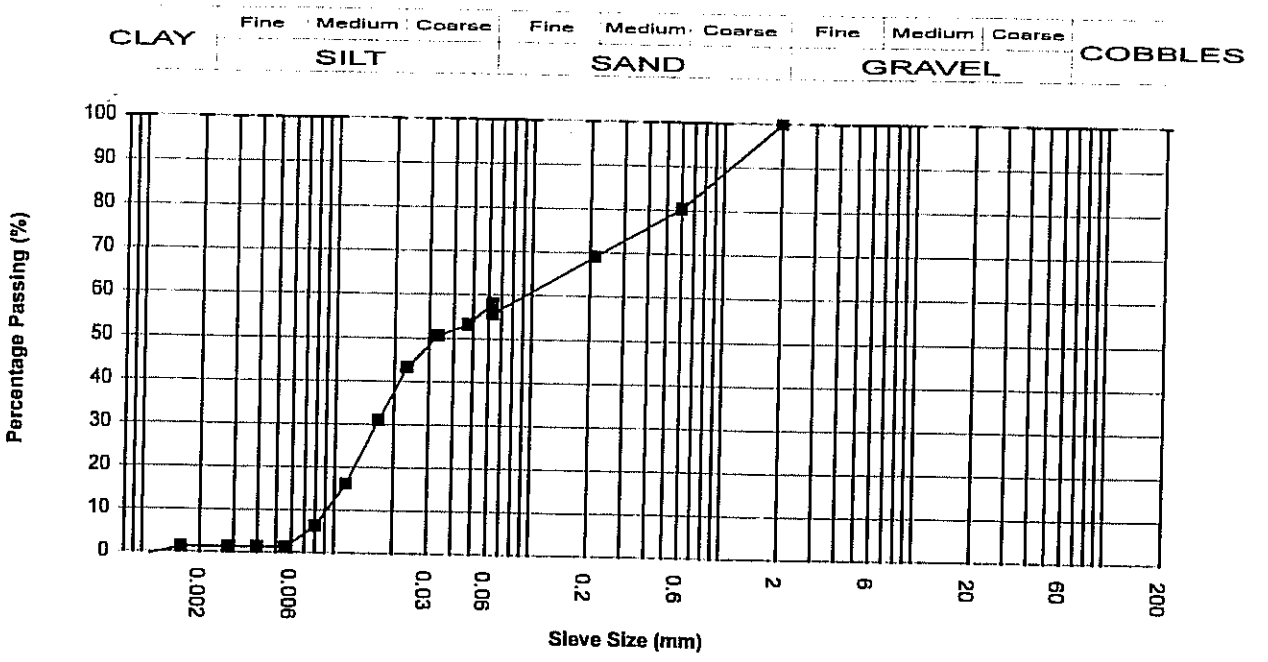
Sample Proportions	
Cobbles	0.0
Gravel	29.4
Sand	47.4
Silt & Clay	23.2

Grading Analysis	
D100	20.0
D60	1.1
D10	
Uniformity Coefficient	N/A

Particle Size Distribution Analysis

Site	**Estover Community College**
Client	**Jenkins & Potter**
Job Number	V0831
Lab Number	L8036
Hole	TPPT06
Sample	T1
Depth (m)	1.15

C.J. associates



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
2	100	0.063	58
0.6	80	0.063	55
0.212	69	0.047	53
0.063	56	0.033	51
		0.023	43
		0.017	31
		0.012	16
		0.008	6
		0.006	1
		0.004	1
		0.003	1
		0.002	1
		0.001	0

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	Clause 9.5

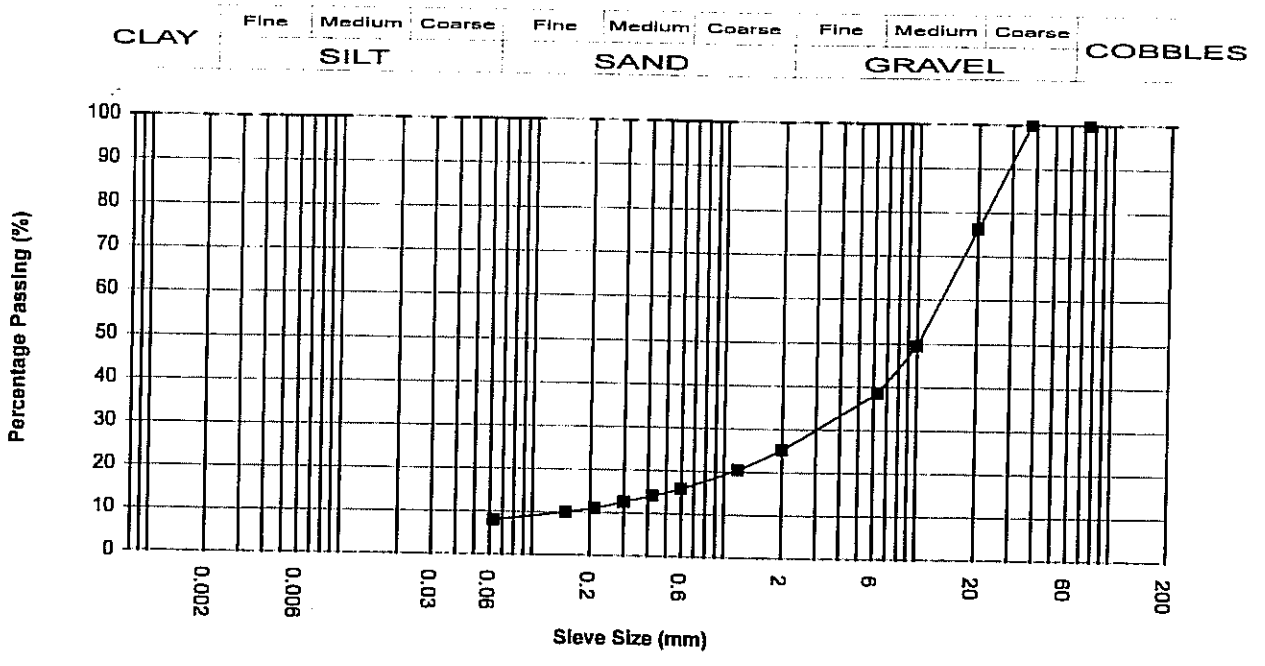
Sample Proportions	
Cobbles	0.0
Gravel	0.0
Sand	43.0
Silt	55.8
Clay	1.2

Grading Analysis	
D100	2.0
D60	0.1
D10	0.0
Uniformity Coefficient	12

Particle Size Distribution Analysis

Site	**Estover Community College**
Client	**Jenkins & Potter**
Job Number	V0831
Lab Number	L8036
Hole	TPPT08
Sample	T1
Depth (m)	0.30

C.J. associates



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100		
37.5	100		
20	76		
10	49		
6.3	38		
2	25		
1.18	20		
0.6	16		
0.425	14		
0.3	12		
0.212	11		
0.15	10		
0.063	8		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.2
Sedimentation	N/A

Sample Proportions	
Cobbles	0.0
Gravel	74.9
Sand	17.2
Silt & Clay	7.9

Grading Analysis	
D100	37.5
D60	14.0
D10	0.2
Uniformity Coefficient	92

Laboratory CBR Test Results

BS1377:Part 4 : 1990:Test 7: Method 5 - Rammer compaction with specified effort
Preparation - BS1377:Part 1:1990:7.6.5

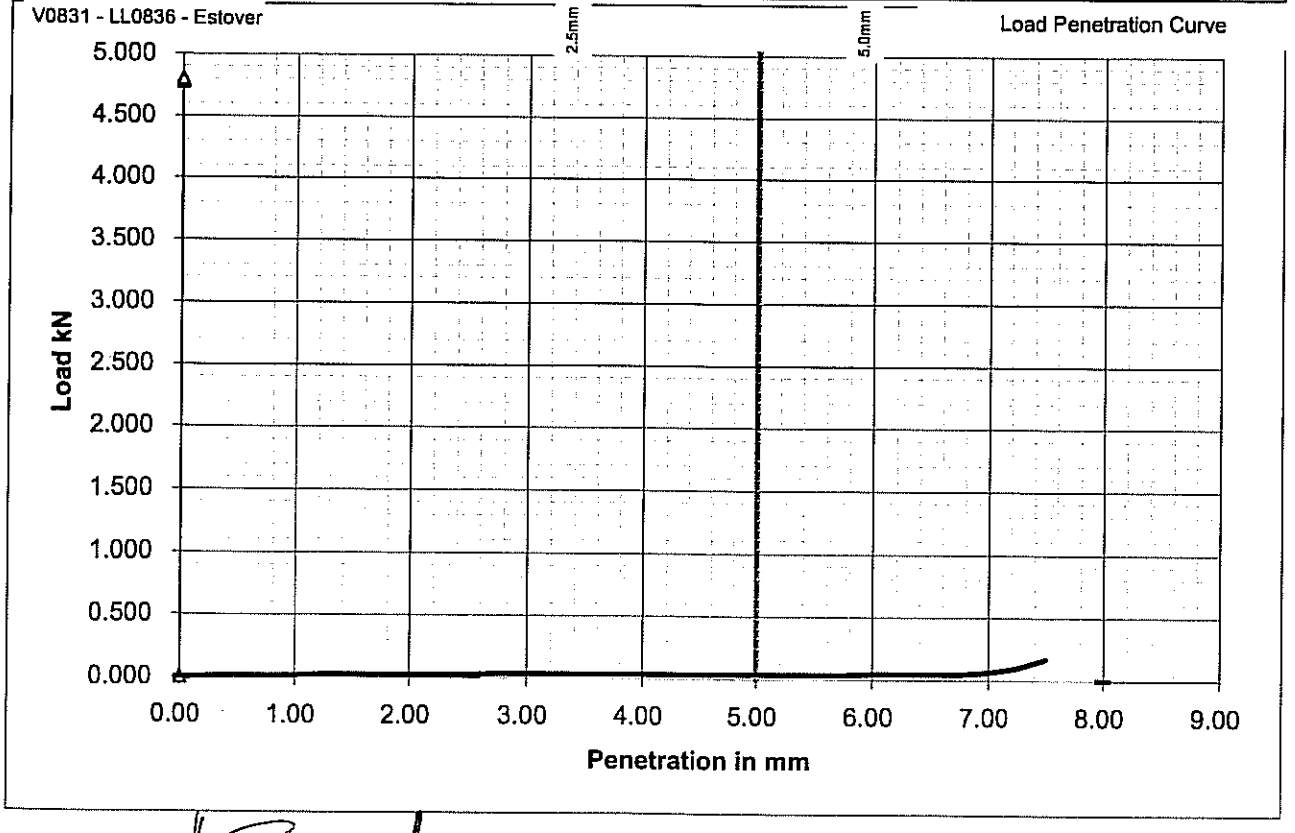
Site	**Estover**
Client	Jenkins & Potter
Job Number	V0831
Lab Number	L0836

UKAS Testing Laboratory 1429

Hole	TPPT01
Sample	B2
Depth [m]	1.0

Soaked	[Y/N]	N	
Percentage > 20mm	[%]	23	
Initial Moisture Content	[%]	10	
Initial Bulk Density	[Mg/m3]	2.24	
Initial Dry Density	[Mg/m3]	2.04	
Surface Tested		Top	
Correction Applied	[Y/N]	N	
Final Moisture Content	[%] at plunger	10	Corrected CBR
CBR 2.5mm	[%]	0.2	0.0
CBR 5.0mm	[%]	0.2	0.0
DESIGN CBR	[%]	0.2	0.0

Description/Comments
Brown CLAY with gravels



Checked

Approved

Laboratory CBR Test Results

BS1377:Part 4 : 1990:Test 7: Method 5 - Rammer compaction with specified effort
Preparation - BS1377:Part 1:1990:7.6.5

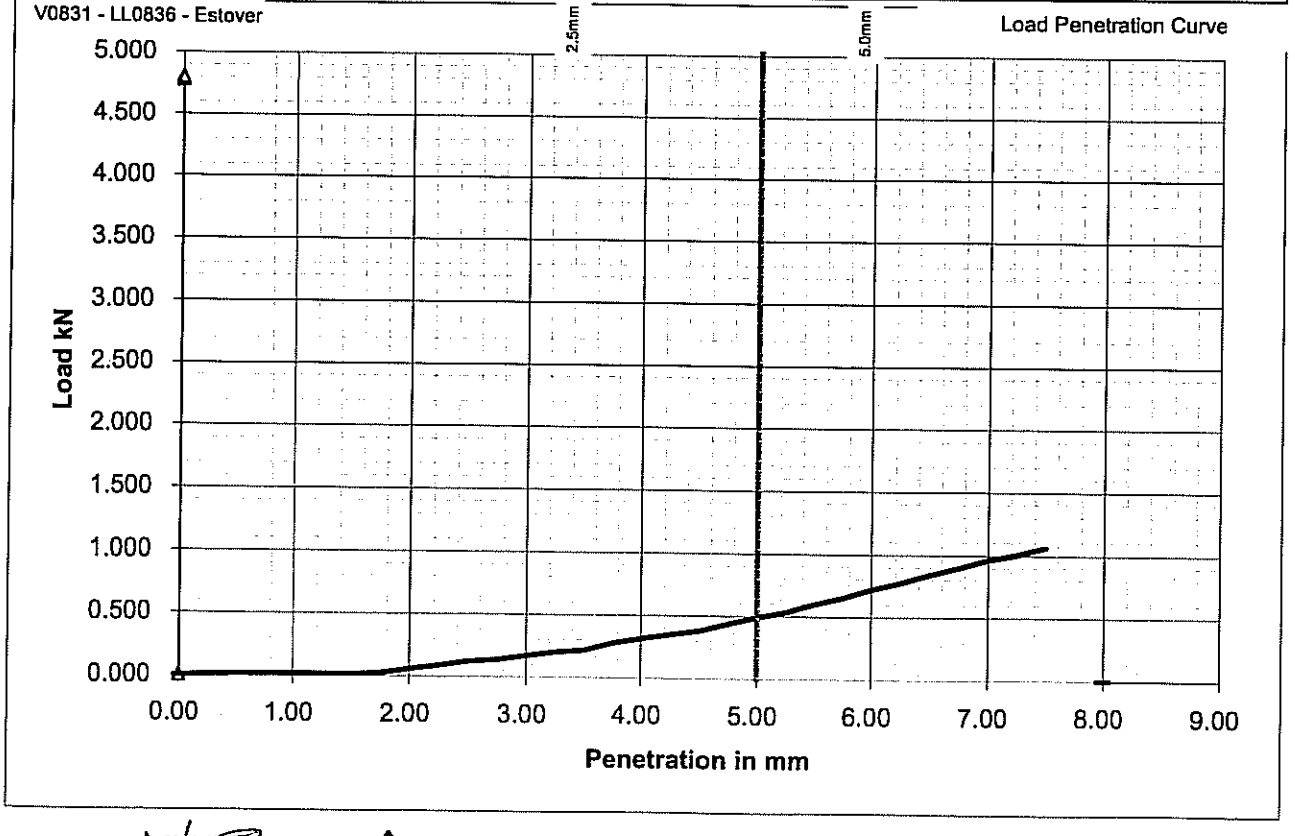
Site	**Estover**
Client	Jenkins & Potter
Job Number	V0831
Lab Number	L0836

UKAS Testing Laboratory 1429

Hole	TPPT02
Sample	B2
Depth [m]	0.6

Soaked	[Y/N]	N	
Percentage > 20mm	[%]	0	
Initial Moisture Content	[%]	22	
Initial Bulk Density	[Mg/m3]	1.95	
Initial Dry Density	[Mg/m3]	1.63	
Surface Tested		**Top**	
Correction Applied	[Y/N]	N	
Final Moisture Content	[%] at plunger	20	Corrected CBR
CBR 2.5mm	[%]	0.9	0.0
CBR 5.0mm	[%]	2.5	0.0
DESIGN CBR	[%]	2.5	0.0

Description/Comments
Brown SOIL with some fine gravels



Checked
Approved

Laboratory CBR Test Results

BS1377:Part 4 : 1990:Test 7: Method 5 - Rammer compaction with specified effort
Preparation - BS1377:Part 1:1990:7.6.5

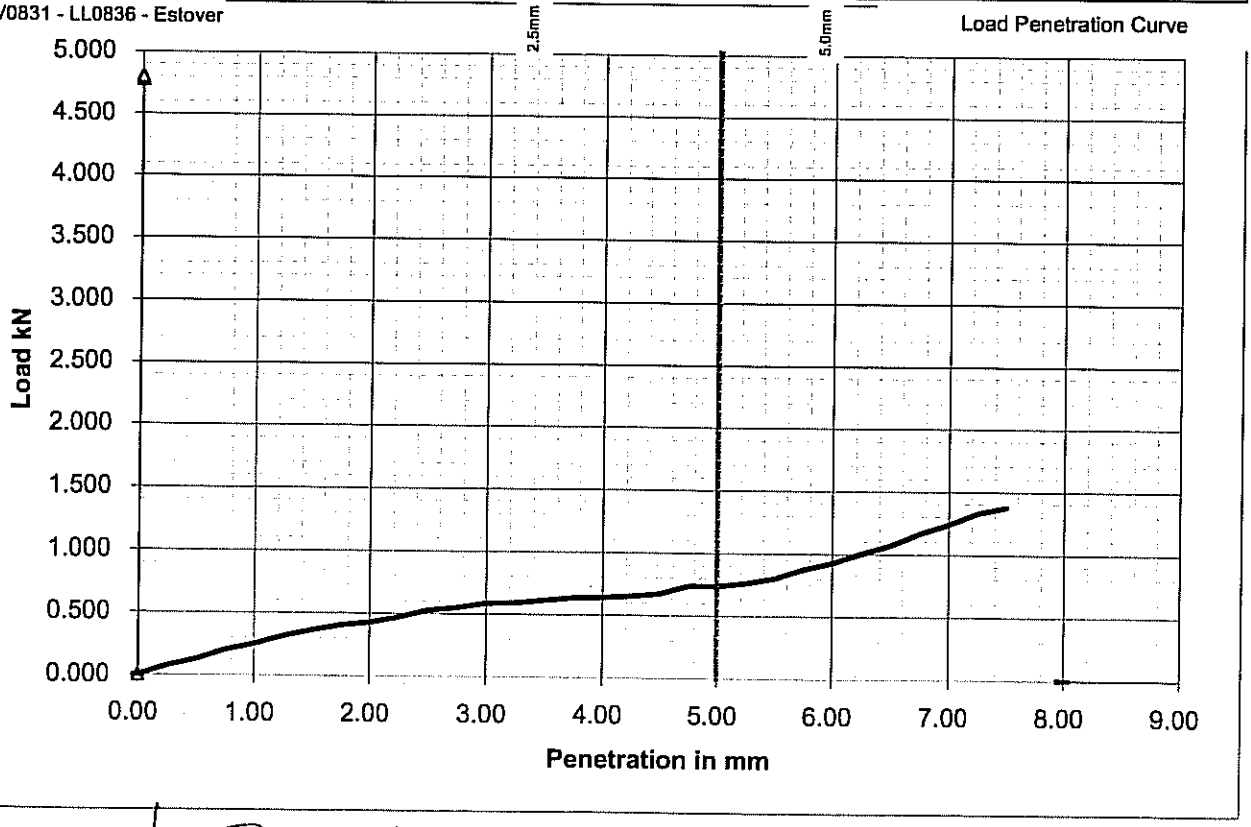
Site	**Estover**
Client	Jenkins & Potter
Job Number	V0831
Lab Number	L0836

UKAS Testing Laboratory 1429

Hole	TPPT04
Sample	B2
Depth [m]	1.5

Soaked	[Y/N]	**N**	
Percentage > 20mm	[%]	**26**	
Initial Moisture Content	[%]	**9**	
Initial Bulk Density	[Mg/m3]	**2.03**	
Initial Dry Density	[Mg/m3]	**1.86**	
Surface Tested		**Top**	
Correction Applied	[Y/N]	**N**	
Final Moisture Content	[%] at plunger	**9**	Corrected CBR
CBR 2.5mm	[%]	**4.0**	0.0
CBR 5.0mm	[%]	**3.7**	0.0
DESIGN CBR	[%]	**4.0**	**0.0**

Description/Comments
Brown grey CLAY with some gravels



Checked

Approved

Laboratory CBR Test Results

BS1377:Part 4 : 1990:Test 7: Method 5 - Rammer compaction with specified effort
Preparation - BS1377:Part 1:1990:7.6.5

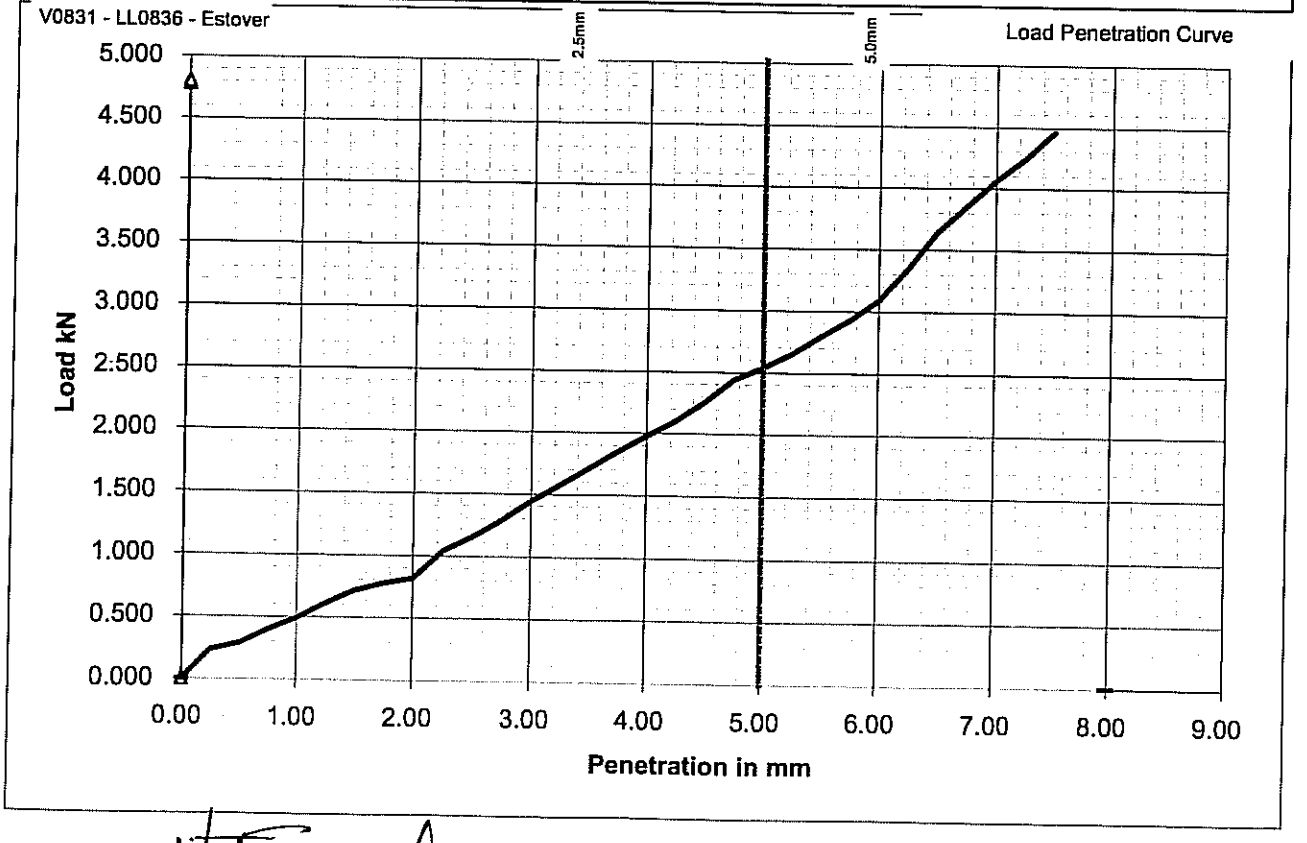
Site	**Estover**
Client	Jenkins & Potter
Job Number	V0831
Lab Number	L0836

UKAS Testing Laboratory 1429

Hole	TPPT07
Sample	B2
Depth [m]	0.6

Soaked	[Y/N]	**N**	
Percentage > 20mm	[%]	**35**	
Initial Moisture Content	[%]	**12**	
Initial Bulk Density	[Mg/m3]	**2.02**	
Initial Dry Density	[Mg/m3]	**1.82**	
Surface Tested		**Top**	
Correction Applied	[Y/N]	**N**	
Final Moisture Content	[%] at plunger	**11**	Corrected CBR
CBR 2.5mm	[%]	**8.7**	0.0
CBR 5.0mm	[%]	**12.7**	0.0
DESIGN CBR	[%]	**12.7**	**0.0**

Description/Comments
Orange brown CLAY with some fine gravel and occasional pebbles



Checked

Approved

Laboratory CBR Test Results

BS1377:Part 4 : 1990:Test 7: Method 5 - Rammer compaction with specified effort
Preparation - BS1377:Part 1:1990:7.6.5

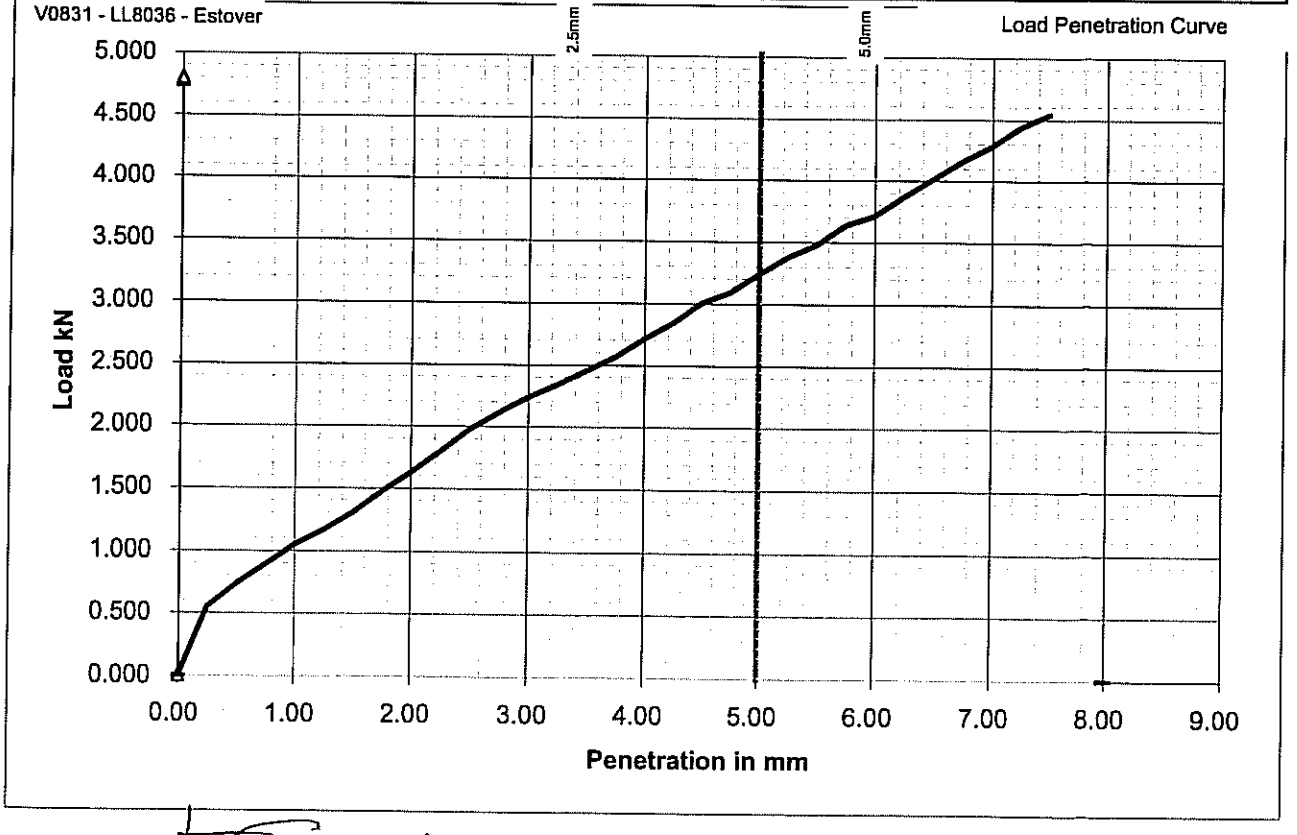
Site	**Estover**
Client	Jenkins & Potter
Job Number	V0831
Lab Number	L8036

UKAS Testing Laboratory 1429

Hole	TPPT08
Sample	B3
Depth [m]	1.0

Soaked	[Y/N]	**N**	
Percentage > 20mm	[%]	**41**	
Initial Moisture Content	[%]	**9**	
Initial Bulk Density	[Mg/m3]	**2.42**	
Initial Dry Density	[Mg/m3]	**2.19**	
Surface Tested		**Top**	
Correction Applied	[Y/N]	**N**	
Final Moisture Content	[%] at plunger	**10**	Corrected CBR
CBR 2.5mm	[%]	**15.0**	0.0
CBR 5.0mm	[%]	**16.2**	0.0
DESIGN CBR	[%]	**16.2**	**0.0**

Description/Comments
Brown CLAY with gravels and fragments of slate.



Checked

Approved

ELAB

UKAS TESTING 2683

mCERTS 2683

The Harley Reed Building
Unit C, Drury Lane
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BA
Telephone (01424) 718618
Facsimile (01424) 729911

THE ENVIRONMENTAL LABORATORY LTD

F.A.O. Vince Simmonds
CJ Associates Geotechnical Ltd
King Road Avenue
Avonmouth
Bristol
BS11 9HF

Reporting Date: 2/10/2007

ANALYTICAL REPORT No. AR10560

Samples Received By:-	Courier
Samples Received:-	18/09/07
Your Job No:	V0831
Your Lab No:	L8036
Your Subcontract No:	S2683
Site Location:	Estover Community College
No Samples Received:-	10

Report Checked By:-

Steve Knight
Director

Authorised By:-

Cliff P.V. Knight BSc, EurChem, CChem FRSC
Managing Director

Any comments, opinions, or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)

THE ENVIRONMENTAL LABORATORY LTD

The Harley Reed Building, Unit C, Drury Lane, Ponswood Industrial Estate, St Leonard's on Sea, East Sussex, TN38 9BA
Tel: 01424 718618 Fax: 01424 729911

UKAS TESTING 2683 mCERTS 2683

ELAB

ANALYTICAL REPORT No. AR10560

Location: Estover Community College

F.A.O. Vince Simmonds
CJ Associates Geotechnical Ltd
King Road Avenue
Avonmouth
Bristol
BS11 9HF

Your Job No: V0831
Your Lab No: L8036
Your Subcontract No: S2683
Reporting Date: 02/10/07

Soils

	Characteristic	Silt loam	Silt loam	Silt loam	Silt loam	Silt loam	Silt loam	Silt loam	Silt loam	Silt loam	Silt loam
	TP/BH	TPPT01	TPPT02	TPPT03	TPPT04	TPPT09	TPPT05	TPPT06	TPPT07	TPPT08	TPPT10
	Depth (m)	1.00	0.60	0.50	1.50	1.00	0.50	1.15	0.60	1.00	0.50
	Our ref	54954	54955	54956	54957	54958	54959	54960	54961	54962	54963
Arsenic**	(mg/kg)	8.6	18.8	7.9	9.0	28.4	14.3	16.2	15.8	6.3	13.3
Cadmium**	(mg/kg)	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	<0.5	2.0	<0.5	<0.5
Chromium**	(mg/kg)	45	47	32	44	33	131	203	48	43	59
Lead**	(mg/kg)	20	64	18	13	18	648	254	54	18	78
Mercury**	(mg/kg)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel**	(mg/kg)	68	55	48	68	62	155	135	49	68	73
Copper**	(mg/kg)	45	46	28	37	53	126	108	35	38	46
Zinc**	(mg/kg)	126	130	92	133	108	378	279	117	130	157
Selenium	(mg/kg)	<0.5	1.4	<0.5	<0.5	1.2	0.8	2.2	0.5	0.5	1.3
Hexavalent Chromium	(mg/kg)	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Water Soluble Boron	(mg/kg)	0.9	0.7	<0.5	<0.5	<0.5	<0.5	0.7	0.7	1.8	1.1
pH Value**	(Units)	7.9	8.1	8.0	7.9	7.7	7.4	7.4	8.0	8.0	8.0
Total Sulphate	(% as SO_4)	0.02	0.02	0.01	0.03	0.02	<0.01	0.02	0.03	0.02	<0.01
Total Cyanide**	(mg/kg)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Free Cyanide	(mg/kg)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Complex Cyanide	(mg/kg)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Sulphide	(mg/kg)	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Elemental Sulphur**	(mg/kg)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Thiocyanate	(mg/kg)	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Monohydric Phenols**	(mg/kg)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Water Soluble Sulphate	(g/l as SO_4)	n/t	n/t	0.05	n/t	n/t	0.05	0.04	0.05	0.07	n/t

All results expressed on dry weight basis
** - MCERTS accredited test
n/t - not tested
sf

THE ENVIRONMENTAL LABORATORY LTD

The Harley Read Building, Unit C, Drury Lane, Ponswood Industrial Estate, St Leonard's on Sea, East Sussex, TN38 9BA
Tel: 01424 718618 Fax: 01424 729911

ELAB

2883 2883

ANALYTICAL REPORT No. AR10560

Location: Estover Community College

F.A.O. Vince Simmonds
CJ Associates Geotechnical Ltd
King Road Avenue
Avonmouth
Bristol
BS11 9HF

Your Job No: V0831
Your Lab No: L8036
Your Subcontract No: S2683
Reporting Date: 02/10/07

Soils

	Characteristic	Silt loam	Silt loam	Silt loam	Silt loam	Silt loam	Silt loam	Silt loam	Silt loam	Silt loam	Silt loam
	TP/BH	TPPT01	TPPT02	TPPT03	TPPT04	TPPT05	TPPT06	TPPT07	TPPT08	TPPT09	TPPT10
	Depth (m)	1.00	0.60	0.50	1.50	1.00	0.50	1.15	0.60	1.00	0.50
	Our ref	54954	54955	54956	54957	54958	54959	54960	54961	54962	54963
Naphthalene**	(mg/kg)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene**	(mg/kg)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene**	(mg/kg)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene**	(mg/kg)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene**	(mg/kg)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene**	(mg/kg)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene**	(mg/kg)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene**	(mg/kg)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene**	(mg/kg)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene**	(mg/kg)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene**	(mg/kg)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene**	(mg/kg)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene**	(mg/kg)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(123-cd)pyrene**	(mg/kg)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(ah)anthracene**	(mg/kg)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene**	(mg/kg)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total PAH**	(mg/kg)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

All results expressed on dry weight basis

** - MCERTS accredited test

SF

ELAB

2683

The Harley Reed Building
Unit C, Drury Lane
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BA
Telephone (01424) 718618
Facsimile (01424) 729911

THE ENVIRONMENTAL LABORATORY LTD

Waste Acceptance Criteria ANALYTICAL *RESULTS*

Report No:	ANALYTICAL REPORT No. AR10560						
					CLIENT:	CJ Associates Geotechnical Ltd	
Project Name:	Location: Estover Community College						
Lab Reference	54955				Landfill Waste Acceptance Criteria Limits		
Sampling Date	n/a				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	TPPT02						
Depth	0.60						
Solid Waste Analysis							
TOC (%)	2.3				3%	5%	6%
Loss on Ignition (%)**	7.7				-	-	10%
BTEX (mg/kg)	<0.01				6	-	-
Sum of PCBs (mg/kg)	<0.01				1	-	-
Mineral Oil (mg/kg)*	10				500	-	-
Total PAH (mg/kg)*	<0.5				100	-	-
pH (Units)**	7.5				-	-	-
Acid Neutralisation Capacity (mol/kg)	<0.1				-	To be evaluated	To be evaluated
Eluate Analysis	2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
	mg/l	mg/l		mg/kg			
Arsenic*	<0.005	<0.005		<0.1	0.5	2	25
Barium*	0.022	0.037		0.2	20	100	300
Cadmium*	<0.001	<0.001		<0.01	0.04	1	5
Chromium*	<0.005	<0.005		<0.1	0.5	10	70
Copper*	<0.005	<0.005		<0.1	2	50	100
Mercury*	<0.0001	<0.0001		<0.001	0.01	0.2	2
Molybdenum*	<0.005	<0.005		<0.1	0.5	10	30
Nickel*	<0.005	<0.005		<0.1	0.4	10	40
Lead*	<0.005	<0.005		<0.1	0.5	10	50
Antimony*	<0.005	<0.005		<0.01	0.06	0.7	5
Selenium*	<0.005	<0.005		<0.01	0.1	0.5	7
Zinc*	0.019	0.014		<0.1	4	50	200
Chloride*	7	5		28	800	15000	25000
Fluoride*	<1	<1		<1	10	150	500
Sulphate*	6	2		16	1000	20000	50000
TDS	240	210		1158	4000	60000	100000
Phenol Index	<0.5	<0.5		<0.5	1	-	-
DOC	10.6	8.9		50	500	800	1000
Leach Test Information							
pH *	7.6	7.5					
EC*	201	127					
Sample Mass (kg)	0.208						
Dry Matter (%)	84						
Moisture (%)	19						
Stage 1							
Volume Eluate L2 (litres)	0.316						
Filtered Eluate VE1 (litres)	0.226						

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ELAB cannot be held responsible for any discrepencies with current legislation

* = UKAS accredited

ELAB

UKAS TESTING
2683

The Harley Reed Building
Unit C, Drury Lane
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BA
Telephone (01424) 718618
Facsimile (01424) 729911

THE ENVIRONMENTAL LABORATORY LTD

Waste Acceptance Criteria ANALYTICAL *RESULTS*

Report No:	ANALYTICAL REPORT No. AR10560				Page 5 of 9		
					CLIENT:	CJ Associates Geotechnical Ltd	
Project Name:	Location: Estover Community College						
Lab Reference	54958				Landfill Waste Acceptance Criteria Limits		
Sampling Date	n/a				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	TPPT09						
Depth	1.00						
Solid Waste Analysis							
TOC (%)	0.3				3%	5%	6%
Loss on Ignition (%)**	2.2				-	-	10%
BTEX (mg/kg)	<0.01				6	-	-
Sum of PCBs (mg/kg)	<0.01				1	-	-
Mineral Oil (mg/kg)*	<5				500	-	-
Total PAH (mg/kg)*	<0.5				100	-	-
pH (Units)**	7.5				-	-	-
Acid Neutralisation Capacity (mol/kg)	<0.1				-	To be evaluated	To be evaluated
Eluate Analysis	2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
	mg/l	mg/l		mg/kg			
Arsenic*	<0.005	<0.005		<0.1	0.5	2	25
Barium*	0.019	0.044		0.3	20	100	300
Cadmium*	<0.001	<0.001		<0.01	0.04	1	5
Chromium*	<0.005	<0.005		<0.1	0.5	10	70
Copper*	<0.005	<0.005		<0.1	2	50	100
Mercury*	<0.0001	<0.0001		<0.001	0.01	0.2	2
Molybdenum*	<0.005	<0.005		<0.1	0.5	10	30
Nickel*	<0.005	<0.005		<0.1	0.4	10	40
Lead*	<0.005	<0.005		<0.1	0.5	10	50
Antimony*	<0.005	<0.005		<0.01	0.06	0.7	5
Selenium*	<0.005	<0.005		<0.01	0.1	0.5	7
Zinc*	<0.005	0.007		<0.1	4	50	200
Chloride*	5	4		36	800	15000	25000
Fluoride*	<1	<1		<1	10	150	500
Sulphate*	4	2		17	1000	20000	50000
TDS	120	90		736	4000	60000	100000
Phenol Index	<0.5	<0.5		<0.5	1	-	-
DOC	6.7	8.2		63	500	800	1000
Leach Test Information							
pH *	7.8	7.8					
EC*	41	28					
Sample Mass (kg)	0.186						
Dry Matter (%)	94						
Moisture (%)	7						
Stage 1							
Volume Eluate L2 (litres)	0.338						
Filtered Eluate VE1 (litres)	0.280						

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ELAB cannot be held responsible for any discrepencies with current legislation

* = UKAS accredited

ELAB

2683

The Harley Reed Building
Unit C, Drury Lane
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BA
Telephone (01424) 718618
Facsimile (01424) 729911

THE ENVIRONMENTAL LABORATORY LTD

Waste Acceptance Criteria ANALYTICAL *RESULTS*

Report No:	ANALYTICAL REPORT No. AR10560				Page 6 of 9		
					CLIENT: CJ Associates Geotechnical Ltd		
Project Name:	Location: Estover Community College						
Lab Reference	54961				Landfill Waste Acceptance Criteria Limits		
Sampling Date	n/a				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	TPPT07						
Depth	0.60						
Solid Waste Analysis							
TOC (%)	1.5				3%	5%	6%
Loss on Ignition (%)**	5.5				-	-	10%
BTEX (mg/kg)	<0.01				6	-	-
Sum of PCBs (mg/kg)	<0.01				1	-	-
Mineral Oil (mg/kg)*	<5				500	-	-
Total PAH (mg/kg)*	<0.5				100	-	-
pH (Units)**	7.7				-	-	-
Acid Neutralisation Capacity (mol/kg)	<0.1				-	To be evaluated	To be evaluated
Eluate Analysis	2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
	mg/l	mg/l		mg/kg			
Arsenic*	<0.005	<0.005		<0.1	0.5	2	25
Barium*	0.014	0.048		0.3	20	100	300
Cadmium*	<0.001	<0.001		<0.01	0.04	1	5
Chromium*	<0.005	<0.005		<0.1	0.5	10	70
Copper*	<0.005	<0.005		<0.1	2	50	100
Mercury*	<0.0001	<0.0001		<0.001	0.01	0.2	2
Molybdenum*	<0.005	<0.005		<0.1	0.5	10	30
Nickel*	<0.005	<0.005		<0.1	0.4	10	40
Lead*	<0.005	<0.005		<0.1	0.5	10	50
Antimony*	<0.005	<0.005		<0.01	0.06	0.7	5
Selenium*	<0.005	<0.005		<0.01	0.1	0.5	7
Zinc*	0.007	0.051		0.3	4	50	200
Chloride*	6	7		45	800	15000	25000
Fluoride*	<1	<1		<1	10	150	500
Sulphate*	3	4		26	1000	20000	50000
TDS	210	170		1215	4000	60000	100000
Phenol Index	<0.5	<0.5		<0.5	1	-	-
DOC	7.5	8.9		59	500	800	1000
Leach Test Information							
pH *	7.5	7.5					
EC*	164	103					
Sample Mass (kg)	0.193						
Dry Matter (%)	91						
Moisture (%)	10						
Stage 1							
Volume Eluate L2 (litres)	0.332						
Filtered Eluate VE1 (litres)	0.262						

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ELAB cannot be held responsible for any discrepencies with current legislation

* = UKAS accredited

ELAB

UKAS TESTING 2683

MCERTS 2683

The Harley Reed Building
Unit C, Drury Lane
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BA
Telephone (01424) 718618
Facsimile (01424) 729911

THE ENVIRONMENTAL LABORATORY LTD

SAMPLE RECEIPT AND TEST DATES

Our Analytical Report Number	AR10560
Your Job No:	V0831
Your Lab No:	L8036
Your Subcontract No:	S2683
Sample Receipt Date:	18/09/07
Reporting Date:	02/10/07
Registered:	18/09/07
Prepared:	19/09/07
Analysis complete:	02/10/07

TEST METHOD SUMMARY

PARAMETER	Analysis Undertaken on	Date Tested	Method Number	Technique
Arsenic**	Air dried sample	24/09/07	118	ICPMS
Cadmium**	Air dried sample	24/09/07	118	ICPMS
Chromium**	Air dried sample	24/09/07	118	ICPMS
Lead**	Air dried sample	24/09/07	118	ICPMS
Mercury**	Air dried sample	24/09/07	118	ICPMS
Nickel**	Air dried sample	24/09/07	118	ICPMS
Copper**	Air dried sample	24/09/07	118	ICPMS
Zinc**	Air dried sample	24/09/07	118	ICPMS
Selenium	Air dried sample	24/09/07	118	ICPMS
Hexavalent Chromium	As submitted sample	21/09/07	110	Colorimetry
Water Soluble Boron	Air dried sample	25/09/07	112	Colorimetry
pH Value**	Air dried sample	24/09/07	113	Probe
Total Sulphate	Air dried sample	24/09/07	115	Turbidity
Total Cyanide**	As submitted sample	20/09/07	106	Colorimetry
Free Cyanide	As submitted sample	20/09/07	107	Colorimetry
Complex Cyanide	As submitted sample	20/09/07	145	Colorimetry
Sulphide	As submitted sample	24/09/07	109	Colorimetry
Elemental Sulphur**	Air dried sample	24/09/07	122	HPLC
Thiocyanate	As submitted sample	21/09/07	146	Colorimetry
Total Monohydric Phenols**	As submitted sample	22/09/07	121	HPLC
Speciated PAH**	As submitted sample	21/09/07	133	Gas Chromatography
Water Soluble Sulphate	Air dried sample	24/09/07	172	Turbidity

Accredited for TPH only, not banding

** - MCERTS Accredited test

MCERTS accreditation covers samples which are predominantly sand, clay, loam or combinations of these three soil types

Any comments, opinions, or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)

ELAB

UKAS TESTING 2683

MCERTS 2683

The Harley Reed Building
Unit C, Drury Lane
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BA
Telephone (01424) 718618
Facsimile (01424) 729911

THE ENVIRONMENTAL LABORATORY LTD

SAMPLE RECEIPT AND TEST DATES

Our Analytical Report Number	AR10560
Your Job No:	V0831
Your Lab No:	L8036
Your Subcontract No:	S2683
Sample Receipt Date:	18/09/07
Reporting Date:	02/10/07
Registered:	18/09/07
Prepared:	19/09/07
Analysis complete:	02/10/07

TEST METHOD SUMMARY

PARAMETER	Undertaken on	Date Tested	Method Number	Technique
pH Value**	Air dried sample	20/09/07	113	Electrometric
Total Organic Carbon	Air dried sample	20/09/07	111	Titrimetry
Loss on Ignition	Air dried sample	20/09/07	129	Gravimetric
Neutralization Capacity to pH 7	Air dried sample	20/09/07	-	EA
Benzene	As submitted sample	20/09/07	154	GCMS
Toluene	As submitted sample	20/09/07	154	GCMS
Ethyl Benzene	As submitted sample	20/09/07	154	GCMS
Xylenes	As submitted sample	20/09/07	154	GCMS
Mineral Oil**	As submitted sample	20/09/07	117	GCFID
PCB 28	As submitted sample	21/09/07	97	GCMS
PCB 52	As submitted sample	21/09/07	97	GCMS
PCB 101	As submitted sample	21/09/07	97	GCMS
PCB 118	As submitted sample	21/09/07	97	GCMS
PCB 138	As submitted sample	21/09/07	97	GCMS
PCB 153	As submitted sample	21/09/07	97	GCMS
PCB 180	As submitted sample	21/09/07	97	GCMS
Speciated PAH**	As submitted sample	21/08/07	133	GCFID

The analysts' guide for sampling, analysis and clearance procedures
** - MCERTS Accredited test

MCERTS accreditation covers samples which are predominantly sand, clay, loam or combinations of these three soil types

Any comments, opinions, or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)

ELAB

2683

The Harley Reed Building
Unit C. Drury Lane
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BA
Telephone (01424) 718618
Facsimile (01424) 729911

THE ENVIRONMENTAL LABORATORY LTD

LEACHATE SAMPLE RECEIPT AND TEST DATES

Our Analytical Report Number	AR10560
Your Job No:	V0831
Your Lab No:	L8036
Your Subcontract No:	S2683
Sample Receipt Date:	18/09/07
Reporting Date:	02/10/07
Registered:	18/09/07
Prepared:	19/09/07
Analysis complete:	02/10/07

LEACHATE TEST METHOD SUMMARY

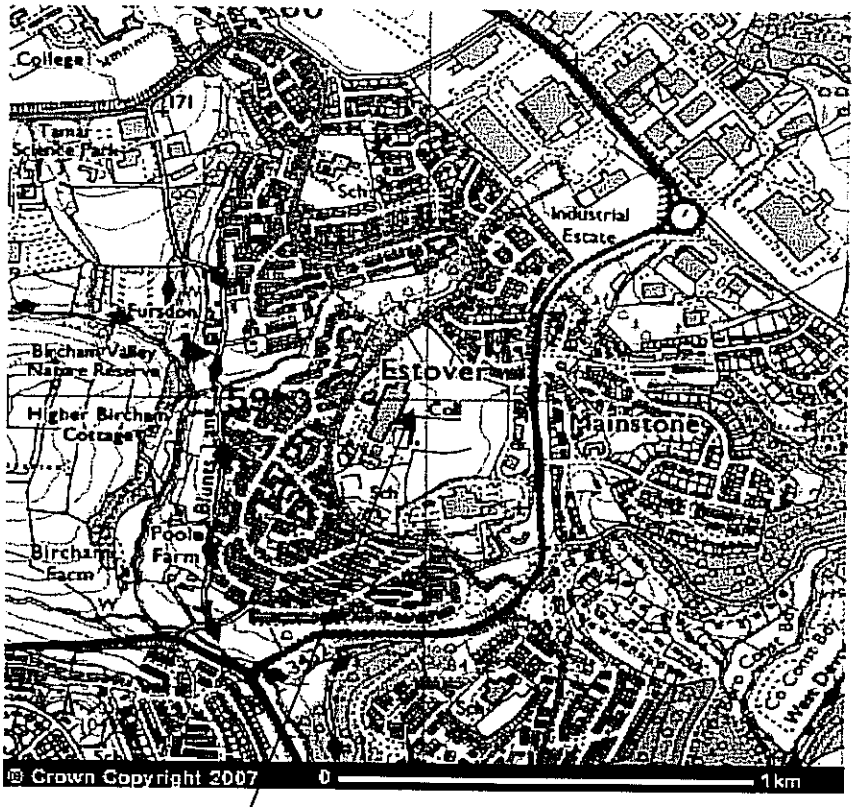
PARAMETER	Method Number	Technique
Arsenic*	101	ICPMS
Cadmium*	101	ICPMS
Chromium*	101	ICPMS
Lead*	101	ICPMS
Nickel*	101	ICPMS
Copper*	101	ICPMS
Zinc*	101	ICPMS
Mercury*	101	ICPMS
Selenium*	101	ICPMS
Antimony*	101	ICPMS
Barium*	101	ICPMS
Molybdenum*	101	ICPMS
pH Value*	113	Electrometric
Electrical Conductivity*	136	Probe
Dissolved Organic Carbon	102	TOC analyser
Chloride*	131	Ion Chromatography
Fluoride*	131	Ion Chromatography
Sulphate*	131	Ion Chromatography
Total Dissolved Solids	163	Gravimetric
Phenol Index	121	HPLC

* = UKAS Accredited test

C.J.
associates

DRAWINGS

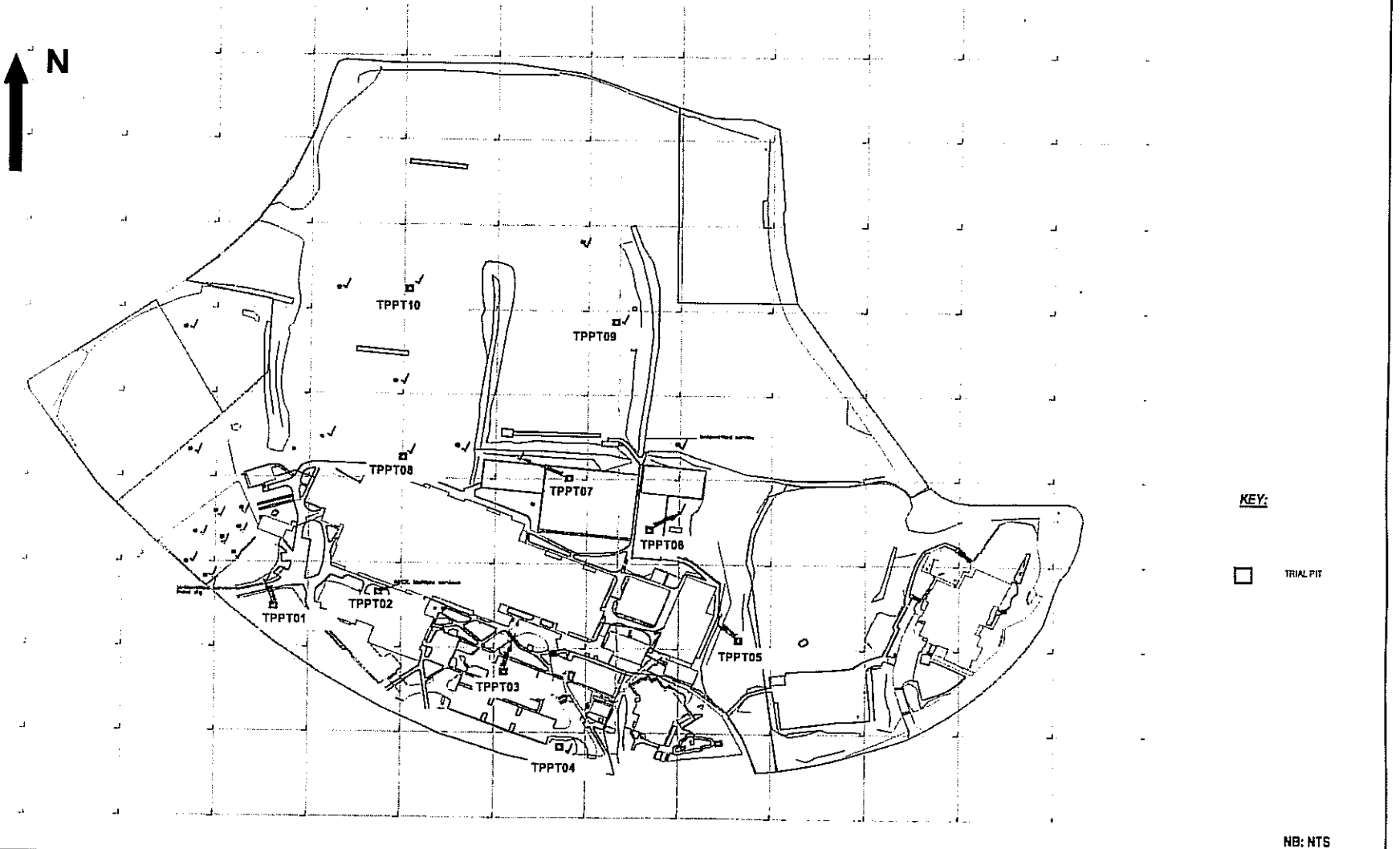
N



SITE

C.J. associates

Project: ESTOVER COMMUNITY COLLEGE	Drawing Title: SITE LOCATION PLAN
Client: KIER WESTERN	Project No.: V0831



NB: NTS

CJ Associates Geotechnical Limited
King Road Avenue
Avonmouth
Bristol. BS11 9HF
Tel 0117 982 1473
Fax 0117 982 8200

C.J. associates

Project: ESTOVER COMMUNITY COLLEGE	Drawing Title: TRIAL PIT LOCATION PLAN
Client: KIER WESTERN	Project No: V0831

Appendix D

Environmental Report

Prepared by: ..... Approved by:

Mark Boobyer
Graduate Engineer

Craig Edwards
Principal Engineer

Estover College

Rev No	Comments	Date
1	First Issue	April 2007
2	Second Issue	May 2007

Bush House, Prince Street, Bristol, BS1 4QD
Telephone: 0117 901 7000 Fax: 0117 901 7099 Website: http://www.fabermaunsell.com

Job No 53692 IBRG Reference Revision B (IR) Date Created May 2007

f:\projects\lenvironmental\53692ibrg - estover pathfinder\documents\interpretative report\apr 07 - estover geo-env report (rev 18-05-07).doc

Table of Contents

1 Introduction

1.1 **Reason for report**

On the instructions of EC Harris, acting on behalf of Plymouth City Council, Faber Maunsell has undertaken a combined desk study and interpretative report for the proposed development at Estover Community College. The project was commissioned in order to obtain and collate information on the geotechnical and environmental characteristics of the site in relation to the proposed development and assess the potential liabilities associated with the development.

1.2 **Brief to the Project**

The project was carried out to an agreed brief and has included the following tasks:

- A site walkover aimed at identifying any obvious geo-environmental or geotechnical hazards on site.
- A review of historical Ordnance Survey maps aimed at identifying the development of the site and possible environmental hazards;
- A review of published British Geological Survey maps;
- A review of published hydrology and hydrogeology maps and data;
- A review of geotechnical risks, including current / historic mining;
- A preliminary qualitative assessment of the environmental liability issues associated with the site;
- A limited ground investigation to determine the depth to suitable bearing strata.

1.3 **Proposed Development**

It is proposed to re-develop the existing campus and replace the majority of the existing buildings. It is proposed to combine the primary and secondary schools on one site and the existing music block is proposed to be retained as part of the re-build. The existing primary school may be sold for future residential development.

1.4 **Limitations to the report**

This document has been prepared by Faber Maunsell Limited ("Faber Maunsell") for the sole use of the client entity detailed above (the "Client") in accordance with generally accepted consultancy principles, the budget for fees and the terms and reference agreed between Faber Maunsell and the Client.

Any information provided by third parties and referred to herein has not been checked or verified by Faber Maunsell, unless otherwise expressly stated in this document.

No third party may rely upon this document without the prior and express written agreement of Faber Maunsell.

The information reviewed as part of this report should not be considered exhaustive and has been accepted in good faith by Faber Maunsell as providing a true indication of the site conditions. However, no liability can be accepted for the detailed accuracy or otherwise of any of the reports or documents prepared by others for the Client or for third parties, or for any associated errors or omissions.

The exploratory holes carried out during the fieldwork which investigate only a small volume of the ground in relation to the size of the site, can only provide a general indication of the site conditions. The comments made and recommendations given in this report are based on the ground conditions apparent at the site of the exploratory holes. There may be exceptional ground conditions elsewhere on the site which have not been disclosed by this investigation and which have therefore not been taken into account in this report.

The comments made on the groundwater conditions are based on observations made at the time that site work and subsequent monitoring were carried out. It should be noted that ground water levels would vary owing to seasonal or other effects.

It should be noted that the environment and contaminated land guidance and legislation are constantly under review, with authoritative guidance documents subject to change. The conclusions presented herein are based on guidance and legislation available at the time of issuing this report, and no liability can be accepted for the retrospective effects of any changes or amendments to such guidance and/or legislation.

Environmental liability issues associated with the site and/or its sale/purchase have not been covered by this report.

1.5 Sources of Information

Various sources of Information have been utilised during this report in order to identify historical and environmental changes. These sources include the following: -

- Landmark Envirocheck Report, ref: 21330175_1_1;
- British Geological Survey solid and drift 1:50000 scale map of Ivybridge (sheet 349);
- The BRE 211 report "Radon: guidance on protective measures for new dwellings", (1999);
- National Radiological Protection Board (NRPB) "Radon Atlas for England and Wales", (2002);
- Faber Maunsell Interpretative Report for Plymouth Hospital School, Estover, Plymouth, reference 48672 IBRG/A (August 2006);
- Tomlinson "The General Principles of Foundation Design", 7th edition (2001);
- Department for Environment, Food and Rural Affairs (DEFRA) "CLR 8 - Potential contaminants for the assessment of land" (2002);
- Contaminated land legislation: Environmental Protection Act 1990, Part 2A.

2 Site Conditions

2.1 Site Location & Description

The site is located in Estover to the northwest of Plymouth city centre and is 700m to the southeast of Plymouth airport. The site is accessed by and bounded to the west by Miller Way; Donner Road bounds the north of the site, Leypark Drive the south of the site and Leypark Walk the east of the site. The National Grid reference for the centre of the site is 250980, 58920 and a site location plan is provided as Figure 1.

The site is predominantly occupied by a nursery, primary school and comprehensive school with associated playing fields, tennis courts and car parking and other buildings. The structures are located in the western half of the site with the eastern half comprised of (sports) fields. The site boundary is defined by a metal fence which is partially screened with trees/hedgerows.

2.2 Geology

With reference to the British Geological Survey 1:50000 solid and drift map of Ivybridge (sheet 349), the site is underlain by slate and igneous tuffs / volcanic ash deposits of Devonian age. Two east/west orientated igneous dyke intrusions are located adjacent to / on the northern site boundary. The site is not located in an area of faulting. No superficial deposits are indicated on the map.

The current investigation across the site and the previous investigation to the north of the site both confirmed the published geology. The investigations identified the presence of sandy clay underlain by clayey sandy gravel on top of moderately weak to moderately strong mudstone; an intrusive igneous rock (suspected as granite) was identified in one location in the southern section of the site.

2.3 Radon

The National Radiological Protection Board (NRPB) "Radon Atlas of England and Wales" indicates that the site is situated in an area where 3% to 10% of dwellings have average radon levels above the recommended action level of 200Bq/m^3 of air per year. With reference to the BRE 211 "Guidance on Protective Measures for New Dwellings" it is indicated that basic measures may be required. Furthermore, a standard British Geological Survey assessment has been undertaken at the college and identifies the requirement for basic radon protection measures for new developments.

2.4 Hydrogeology

The Envirocheck report indicates that the site is underlain by a minor aquifer. The soils are classified as having a high leaching potential although this is based on a limited dataset due to the urban setting. There are no Source Protection Zones indicated in the area surrounding the site.

There are three water abstraction locations identified within 1000m of the site boundary; they are located at 259m & 399m to the southwest and 685m, to the northwest for agricultural use, private use and industrial use respectively.

2.5 Hydrology

The nearest surface water feature is located 148m to the northwest of the site which is a tributary of the River Plym; further tributaries are located 150m to the west and 250m to the southeast/east of the site. There are no Source Protection Zones in force within the Plymouth area.

A flood risk map, provided as part of the Envirocheck report, indicates that the site is not at risk from normal or extreme flooding. The areas immediately surrounding the tributaries of the River Plym are identified as susceptible to flooding in areas without flood defences.

3 Site Development

3.1 General

A series of Ordnance Survey and County historical maps from 1867 to 1994 and Russian military maps from 1981 have been obtained as part of the Envirocheck report. The mapping has been used to build a summary of the changing land uses on the site and in the surrounding area; copies of the plans are included in Appendix A. The information has been used as a guideline to facilitate an assessment of the geotechnical and environmental ground conditions; it is not possible to identify the presence of specific contamination from historical mapping although potentially contaminative industries in the vicinity of the site can be identified.

A summary of the available information is given in Table 3.1.1 but it must be noted that the indication of a development relates only to the date the particular map was published, and that any features noted may have become present prior to that date. All distances are taken from the site boundary as indicated on the historical maps and only the features considered to be relevant to the site have been included.

3.1.1 Summary of Historical Development

Date & Scale	Summary of Development
1867 1:2500	The site is occupied by open fields with no notable development identified. A small area of woodland is also identified within the site boundary. A river is located 170m to the north and west and a well is located 230m to the southwest. An unnamed tunnel, running approximately northeast/southwest, is located 240m to the south of the site. Higher Leignham is located 180m to the south and Thornbury Cottages and Estover House are located 180m and 220m to the north. A quarry is situated 170m to the north.
1886 1:10560	The tunnel, located to the south of the site, is identified as part of the *Plymouth & Dartmoor Tramway.* A spring is located 450m to the southwest. Quarries are situated 300m west, 500m northwest, 650m to the east, 800m to the southeast and 1000m to the southeast of the site.
1906/07 1:2500 1:10560	An unlabelled building is situated immediately adjacent to the eastern site boundary. A spring is identified 160m to the north, between the previously identified quarry and Thornbury Cottages, and at 700m to the northwest. A further pit (unnamed/unidentified) is present 160m to the west, adjacent to the river.
1933/1938 1:10560	No significant change.

1951/52 1:2500 1954 1:10560	There are two air shafts located 240m and 290m to the south of the site, associated with the previously identified tunnel. The tunnel itself is identified as Leigham Tunnel and is labelled as disused; a dismantled tramway is noted running into the tunnel. Maidstone wood and quarry are located 800m to the east. The river valley to the west is identified as *Forder Valley*. *Forder Battery* is located 900m to the southwest; a number of air shafts are identified to the north of the battery.
1968 1:10560	No significant change. A third air shaft is identified to the south, associated with the disused tunnel.
1971/1979 1:2500	Estover Primary School is identified in the southern section of the site with adjacent playing fields and a 'tank' to the east. Novorossick Road is identified to the east of the site and Dover Road is labelled to the north. Residential development has occurred to the north and south of the site. Residential development has advanced up to the site boundary to the north, west and south. Miller Way is identified adjacent to the west of the site. Leypark Drive and an industrial estate have been developed adjacent to the south of the site. An electrical sub station is noted in the area at approximately 40m to the south of the site boundary.
1981 (Russian) 1:10000	No significant change.
1980/1981/ 1982/1983/1984 1:2500 1982 1:10000	Estover Comprehensive School has been developed in the western section of the site, immediately to the north of the infants school. A further industrial area has been developed 400m to the northeast of the site. An airport runway is located 700m to the north of the site. Derriford Hospital is located at 900m to the northwest of the site and a college has been developed 1000m to the northwest.
1992/1993 1:2500	An electricity sub-station is located 80m to the northwest of the site.
1994 1:2500 1:10000	The industrial estate to the northeast is labelled as Estover Industrial Estate. The runway, identified in 1982, is labelled as Plymouth City Airport.
1999 1:10000	No significant change.
2004 1:10000	No significant change.

3.2 Environmental Information

Local nature reserves are located within the river valley to the west, located at 276m south, 433m west and 747m southwest of the site. The areas 781m northeast and 900m northwest of the site are designated as a Site of Special Scientific Interest (SSSI) for the occurrence of the only known wild populations of Plymouth Pear.

A landfill site is identified 827m to the northwest of the site on Derriford Road; the type of waste is not identified from the available data contained within the Envirocheck report. However, previous intrusive investigations adjacent to the identified landfill indicated the presence of heterogeneous domestic waste.

4 Previous Ground Investigation

4.1 **Previous Investigation – Estover Hospital School (August 2006)**
An intrusive ground investigation was undertaken by Faber Maunsell in August 2006 for the proposed development of Estover Hospital School. The investigation was undertaken on the overflow car park, which was constructed with gravel hard-standing, to the north of the comprehensive school. The scope of works comprised of six trial pits to a maximum depth of 2.7m bgl and two soakaway tests. Geotechnical and geo-chemical laboratory testing was undertaken on samples recovered.

The general ground conditions were found to be relatively consistent across the site and comprised of made ground underlain by clay, gravel and slate.

4.1.1 *Made Ground*
The made ground was located to a maximum depth of 0.6m bgl and typically comprised of gravel of mudstone, limestone and tarmac in a clay matrix; a geotextile membrane was identified at 0.25m bgl to 0.6m bgl in locations immediately adjacent to the northern boundary of the comprehensive school.

4.1.2 *Clay and Gravel*
The clay was only encountered in half of the trial pits to a maximum depth of 0.9m bgl; it comprised of slightly sandy clay with a little gravel of mudstone. The gravel was found directly underlying the made ground or underlying the clay; it comprised of slightly clayey gravel of slate lithorelics to a maximum depth of 2.3m bgl.

4.1.3 *Slate*
Slate was encountered between 1.3m bgl and 2.3m bgl and comprised of moderately weak to moderately strong slate with closely spaced sub-vertical fracturing.

4.1.4 *Groundwater*
Groundwater was not encountered in any location during the works. The soakaway testing was undertaken within the gravel stratum and returned a design infiltration rate of 2.4×10^{-5} m/s.

4.1.5 *Geotechnical Testing*
Laboratory testing was undertaken on representative samples recovered from the clay in TP2, TP5 and TP6 at depths of 0.3m bgl to 0.7m bgl; the testing included Atterberg limit testing and Proctor testing.

The Atterberg results indicated that the tested samples are classified as high to very high plasticity silts. The modified plasticity, according to guidance outlined in NHBC Chapter 4.2 (2006), is calculated as a low volume change potential.

Compaction testing was undertaken with a 2.5kg rammer and returned an optimum moisture content of 19%; the natural moisture content of soils from the same location was found to be slightly wet of optimum at 21%.

4.1.6 *Sulphate and pH*
Three samples were analysed for sulphate content and pH for classification according to BRE SD1 "concrete in aggressive ground" (2005). The samples were recovered from the made ground, gravel and slate strata at depths of 0.35m bgl to 2.2m bgl. A maximum sulphate content of <0.1mg/l was returned corresponding with a Design Sulphate Class of DS-1 and an Aggressive Chemical Environment for Concrete class of AC-1.

4.1.7 *Geo-chemical Testing*
Three samples were recovered from the made ground and gravel at depths of 0.3m bgl to 0.9m bgl. The samples were tested for solid determinands including heavy metals, Total Petroleum Hydrocarbons and Poly-Aromatic Hydrocarbons.

The concentrations were compared against a commercial end use using adopted guideline values based on the CLEA model, and where these were not available, adjusted Dutch Intervention Values. The results indicated that heavy metal and hydrocarbon determinands were below the adopted guideline concentrations. Hydrocarbons were indicated at very low maximum concentrations of 1mg/kg for poly-aromatics and 4.29mg/kg for total aliphatics and aromatics.

Two samples were tested, from a depth of 0.3m bgl, for Waste Acceptance Criteria classification. The results returned determinand concentrations below the leaching limit values for inert waste in both samples. However, the logs indicate the presence of tarmac in the samples which would not be classified as inert.

5 Ground Conditions

5.1 **General**

An intrusive ground investigation was undertaken by Geotechnical Engineering Ltd, under guidance from Faber Maunsell, from 17th to 19th April 2007. The works were undertaken to obtain an understanding of the general ground conditions across the site and the scope comprised of seven boreholes spread across the site to a maximum depth of 4.5m. A copy of the logs and an exploratory hole location plan showing the position of each borehole is included in Appendix B.

The ground conditions were found to comprise of topsoil, underlain by sandy gravely clay, underlain by mudstone/slate or, in the extreme south of the site, suspected granite. The bedrock was proven by at least 2m to prove the extent and competency of the strata. A summary of the ground conditions is provided below.

5.2 **Topsoil**

The topsoil was encountered form ground level to a maximum depth of 0.4m bgl. It comprised of grass over brown sandy clay with a little sub-angular gravel of sandstone and mudstone.

5.3 **Sandy clay**

The clay was encountered to a depth of between 0.6m and 1.0m across the site. The stratum comprised of brown sandy clay with sub-angular gravel of mudstone and siltstone; occasional cobbles and boulders of diorite were encountered in BH9 only. The stratum was absent in BH4, BH5, BH6, BH7 and BH8 where topsoil was encountered directly overlying bedrock.

5.4 **Mudstone/Slate**

The mudstone was encountered all holes, except for BH9, from 0.6m bgl and proven in extent to the base of the hole. The stratum comprised of very weak orange-brown to grey micaceous mudstone and siltstone. Fracturing was noted as sub-vertical >65° and extremely to very closely spaced sub-horizontal irregular. Occasional laminations of clay and sub-angular quartz gravel were noted in some locations. Rare randomly orientated secondary quartz veins were noted in BH4, BH5 and BH6.

5.5 **Granite**

The granite was encountered from 1.2m bgl in BH9 directly underlying the sandy clay stratum. The rock comprised of moderately strong grey, mottled black crystalline granite. The stratum was noted to become very weak and highly weathered between 1.4m bgl and 4.2m bgl with locally moderately weathered areas at 4.2m bgl to 4.5m bgl.

5.6 **Groundwater**

No groundwater strikes were encountered before the addition of water for rotary coring.

5.7 **Standard Penetration Testing (SPT)**

SPT testing was undertaken within the boreholes at the base of the inspection pit and after each coring run. After the identification of bedrock no further SPT tests were undertaken after an initial refusal result was returned.

The results indicated SPT N values of 23 to 50 in the weathered mudstone at depths of 1.2m bgl to 2.2m bgl. Refusal was encountered in the more competent mudstone and granite at depths of 1.1m bgl to 4.5m bgl.

6 Background to Legislation on Contaminated Land

6.1 **Contaminated Land**

Part IIA of the Environmental Protection Act 1990, defines Contaminated Land as follows:

"Any land which appears to the Local Authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that –

a) SIGNIFICANT HARM is being caused or there is a SIGNIFICANT POSSIBILITY of such harm being caused;

Or

b) SIGNIFICANT* POLLUTION OF CONTROLLED WATERS is being caused, or there is a SIGNIFICANT POSSIBILITY of such pollution being caused."

*To be implemented under the Water Framework Directive and Water Act

6.2 **Risk Assessment**

The definition of Contaminated Land under Part IIA of the Environmental Protection Act 1990 is based upon the principles of risk assessment. For the purposes of this guidance, "risk" is defined as the combination of:

a) The probability, or frequency, of occurrence of a defined hazard (for example, exposure to a property of a substance with the potential to cause harm);

And

b) The magnitude (including the seriousness) of the consequences.

6.3 **Pollutant Linkage**

The basis of an environmental risk assessment involves:

- Identifying a source of contamination;
- Identifying a pathway/media through which the contamination may migrate; and
- Identifying a receptor or target at risk from the contamination.

Current legislation gives the following the definitions:

A contaminant is a substance which is in, on or under the land and which has the potential to cause harm or to cause pollution of controlled waters.

A pathway is one or more routes or means by, or through, which a receptor:

a) is being exposed to, or affected by, a contaminant, or
b) could be so affected.

A receptor is either:

a) a living organism, an ecological system or a piece of property; or
b) controlled waters.

The term 'pollutant linkage' indicates that all three elements (i.e. contaminant / pathway / receptor) have been identified. The site can only be designated as Contaminated Land if there is a pollutant linkage and the contamination meets the criteria.

7 Environmental Assessment

7.1 **General**

The following review is aimed at identifying the possible environmental risk to the site arising from substances present in, on and surrounding the site. The assessment takes into consideration the geo-chemical results (as discussed in Section 6), sources of possible risk and the presence of any plausible pathways or receptors as outlined in the Environmental Protection Act 1990 (Part 2A). An assessment of risk has been undertaken using a risk matrix system which is included in Appendix C.

7.2 **Assessment of Sources**

The assessment of the available historical maps identifies that the site was not developed until 1979 when Estover Primary School was developed in the southwest of the site. The comprehensive school is identified to the north of the primary school from 1980 onwards.

Prior to the development of the school buildings, the site is identified as open fields with a tramway tunnel located 250m to the south of the southern site boundary pre-1867; the tunnel is noted as disused form 1951 onwards. Two surface air shafts are identified above the tunnel but are later obscured by residential development. The residential development advanced up to the site boundary in 1979 with an industrial area 50m to the southeast of the site developed in the same period.

There are no significant industries identified from the historical maps or from the data supplied as part of the Envirocheck report. Current trades are identified as comprising of builders merchants to the west, car mechanics to the south and north and ironworkers to the northeast. A petrol station, associated with a major supermarket, is located on the industrial estate adjacent to the southeast of the site. The nearest landfill is located 827m to the northwest of the site; intrusive data identifies the waste as general domestic. A waste transfer site is identified at the Hospital, located 900m to the northwest; the site is permitted to accept clinical, pharmaceutical and paper wastes.

The majority of potentially contaminative sources (Landfill and Industrial estate) are located 400m to 900m from the site and are positioned beyond transport corridors that may potentially act as barriers to migration. The petrol station to the south is located down slope, and is topographically lower than the site. It is therefore unlikely that migration of any contaminants from these areas will impact on the site.

The site is underlain by a minor aquifer and there are tributaries of the River Plym 250m and 500m to the east and 150m to the west. There are a number of minor pollution incidents noted in the area surrounding the site although it is unlikely that they would impact the site due to their location on rivers downstream of the site or on public highways over 250m from the site.

7.3 **Summary of Potential Sources**

The risk to the site from the identified land use is considered to be low due to the absence of any significant industrial activity. However, with reference to guidelines presented in the Environment Agency publication "CLR 8: Potential Contaminants for the Assessment of Land" (2002), a list of possible contaminants that may be encountered on site are summarised in Table 7.4: -

7.4 **Potential Sources and Associated Contamination**

Land Use	Distance form site boundary	Potential Contaminants
Construction & demolition materials (e.g. Tunnel construction)	On site & Tunnel 240m south	General heavy metals and hydrocarbons.
Electricity Sub-Station	40m south & 80m northwest	Poly-chlorinated Bi-Phenyls (PCB)
Transport	Perimeter Roads	Heavy metals (cadmium, chromium, copper, lead, nickel, vanadium) asbestos, sulphate PAH, TPH

7.5 **Conclusion**

The site is located in a predominantly residential area and the site boundary is bounded by roadways on all sides; industrial areas are located to the south (supermarket) and 400m to the northeast (Industrial Estate). However, due to the absence of any significant, potentially contaminative, industrial processes it is considered that the likelihood of a significant source is low.

7.6 **Pathways for Migration**

It is considered that, assuming the presence of suitable sources, the potential pathways for migration of contamination include the following:

- Dermal contact and ingestion of contaminants within the made ground through direct contact to construction workers and end users;
- Aqueous migration of contaminants through the soil and bedrock to the minor aquifer.
- Deposition of airborne metal particulates from surrounding industries and road network.

However, as discussed previously in Section 7.2, the potential sources are predominantly located down gradient of the site or at a significant distance from the site. Therefore the likelihood of significant pathways being present that will impact upon the site is considered to be low.

7.7 **Assessment of Plausible Pollutant Linkages**

A conceptual model of the plausible pollutant linkages has been undertaken according to guidance outlined in current Environment Agency guidelines for contaminated land, as summarised in Section 6. A table summarising the identified pollutant linkages is provided in Table 7.7.1:

7.7.1 *Summary of identified plausible pollutant linkages*

Plausible Pollutant Linkages Assuming Current Conditions / Proposed Development					
Source	**Pathway**	**Receptor**	**Consequence**	**Probability**	**Risk**
Hazards to Human Health					
Heavy metals / hydrocarbons from airborne particulates and surface water run off	Dermal, ingestion and inhalation	Construction workers and end users	Low	Low	Low
Radon	Soils	End Users	Medium	Likely	Moderate
Hazards to the Water Environment					
None anticipated	Surface water infiltration and groundwater	Minor aquifer	Low	Low	Very Low
Hazards to Flora and Fauna					
None Anticipated	Flora uptake Fauna ingestion	Flora & Fauna	Low	Low	Very Low
Hazards to Building Fabric, Structures and Services					
Sulphates	Direct Contact	Building structure / foundations	Minor	Unlikely	Very Low

7.7.2 *End Users*

The previous ground investigation did not identify any elevated concentrations of tested determinands. Although no testing was undertaken during the recent investigation, there are no significant contaminative industries that have been identified from historical mapping and the site is predominantly surrounded by residential development and roads. It is therefore considered that a significant source is not likely to be present and therefore the risk to end users is very low.

7.7.3 *Water Environment*

The site is identified as being underlain by a minor aquifer with high leachability soils. However, a significant source has not been identified and there appears to be no potentially contaminative areas on the site itself. Therefore it is considered that the threat to the water environment is very low.

7.7.4 *Building Structures*

Substances that can be involved in chemical attack on building material include sulphates and general contaminants within the made ground. The intrusive investigation undertaken at the overflow car park has not identified any contamination. However, there is a potential for sulphate minerals to be present within the slate and dolerite bedrock which may present a low risk to concrete foundations.

An assessment of radon risk to the site has identified the likely presence of radon. However, basic protection measures can be implemented into the new development to mitigate the risk.

Considering the potential for the presence of sulphates and the risk of radon gas, it is considered that the risk to structures is medium to low.

7.8 Conclusions

The information collected from desk study material and intrusive investigations, and assessed in this section of the report, indicates that the overall preliminary environmental risk to the site is considered to be low.

8 Conclusions & Recommendations

8.1 General

The site is situated to the northeast of Plymouth City centre and approximately 700m southeast of Plymouth Airport. The site is bounded by roads on all sides of the college campus with Miller Way to the west, Leypark Drive to the south, Leypark Walk to the east and Donner Road to the north. There are no water courses on the site itself and the nearest water bodies (tributaries of the River Plym) are located 148m to the northwest and 250m to the east.

The analysis of the available historical maps has not identified any significant industrial activities or potentially contaminative land uses on or surrounding the site. The site itself was not developed prior to the development of the present primary school and comprehensive school. The primary school first appears on the 1971 map while the comprehensive school is first identified on the 1992 map.

The ground conditions have been identified as generally comprising made ground or topsoil underlain by slightly sandy clay, slightly clayey gravel and mudstone/slate. Granite was identified in one location in the south of the site. The bedrock was encountered at depths of 0.6m bgl to 2.3m bgl and was proven to the base of all holes to a maximum depth of 4.5m. No groundwater was identified during the works before the use of water flush.

8.2 Recommendations

The following recommendations are based on the findings of the desk study and previous / current intrusive investigations as summarised in this report:

- With reference to available reference material from the NRPB and BRE, it is recommended that basic radon protection measures are implemented for new developments.
- It is anticipated that the majority of the site will be underlain by shale/mudstone bedrock. However, it is likely that igneous intrusions may be encountered which will be more difficult to excavate. It is not possible to identify areas of possible intrusions due to the absence of distinguishable surface features and the limited scope of the current investigation.
- Using in-situ SPT testing and published correlations from Tomlinson "Principles of Foundation Design" (2001) it is anticipated that a presumed net bearing pressure of 250 kN/m^2 will be achievable within the bedrock.
- It is anticipated, using available information, that shallow strip foundations could be utilised, founding on the bedrock at a depth of 1.0m bgl to 1.5m bgl.
- Using laboratory data from the location of the overflow car park, the soils were classified as low volume change potential. Furthermore, shallow thicknesses of made ground were identified across the site at generally <0.6m. It is therefore considered that a ground bearing slab should be suitable across the site.
- Soakaway testing, undertaken in the overflow car park, indicates a design permeability of 2.4 x 10^{-5} m/s, within the gravel. It should be noted that soakaway testing has not been undertaken over the majority of the site.
- Waste Acceptance Criteria testing, undertaken on soils taken from the overflow car park, indicates that the shallow made ground soils could be classified as inert. However, it has been noted that tarmacdam was present in the samples and this would result in the soils possibly being classified as non-hazardous. It is therefore recommended that, if soils are to be removed from site, the material is sorted. This will remove the tarmac constituents and reduce the amount of material that would need to be classified as non-hazardous.

- It should be noted that the above classification is based on a limited number of results taken from the north of the Estover campus. It is therefore recommended that, if material is to be removed from site, it is tested to ensure compliance with the above classification.

8.3 **Environmental Risk**

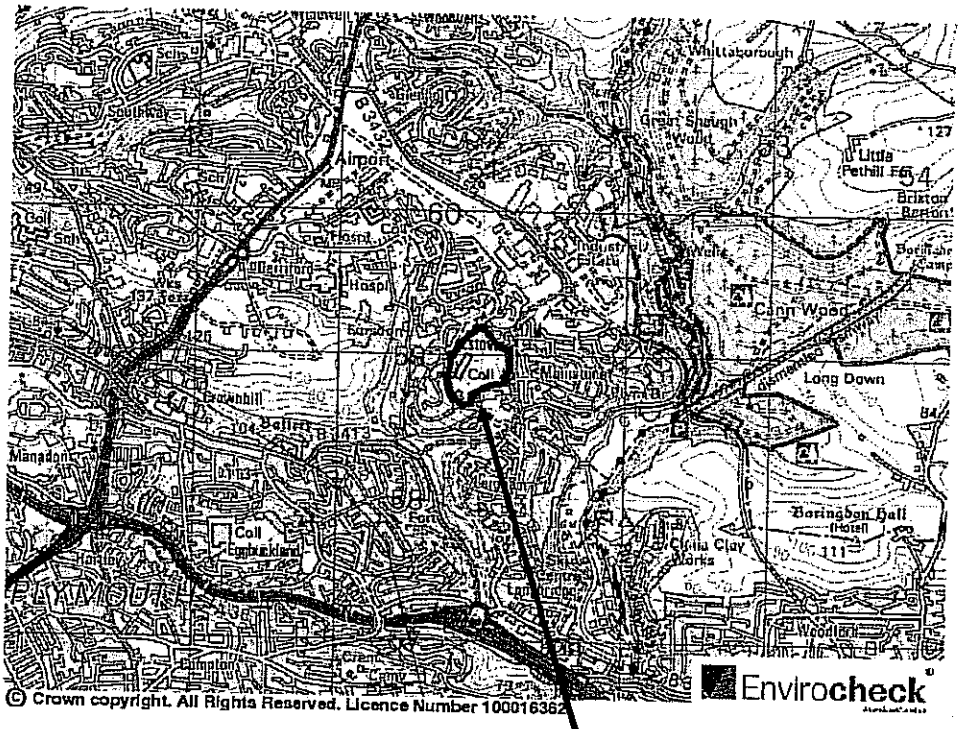
The available geochemical data does not indicate any elevated concentrations of determinands when compared to adjusted Dutch Intervention Values and published soil guideline and toxicology data available as part of the Environment Agency/DEFRA CLEA model.

Environmental data from the Envirocheck report, comprising of historical plans and records of pollution incidents and historic/current trades has not identified any potential significant sources in the area surrounding the site. The site itself has no evidence of development prior to the construction of the existing buildings and the surrounding area is predominantly comprised of residential developments together with a supermarket and nearby industrial estate.

An environmental risk assessment has been carried out using the available data and it is considered that there is a very low risk to human health and controlled waters due to the apparent absence of a significant source. However, only a very small percentage of the site has been geo-chemically tested and it cannot be confirmed that the site as a whole is free from contamination without further representative testing.

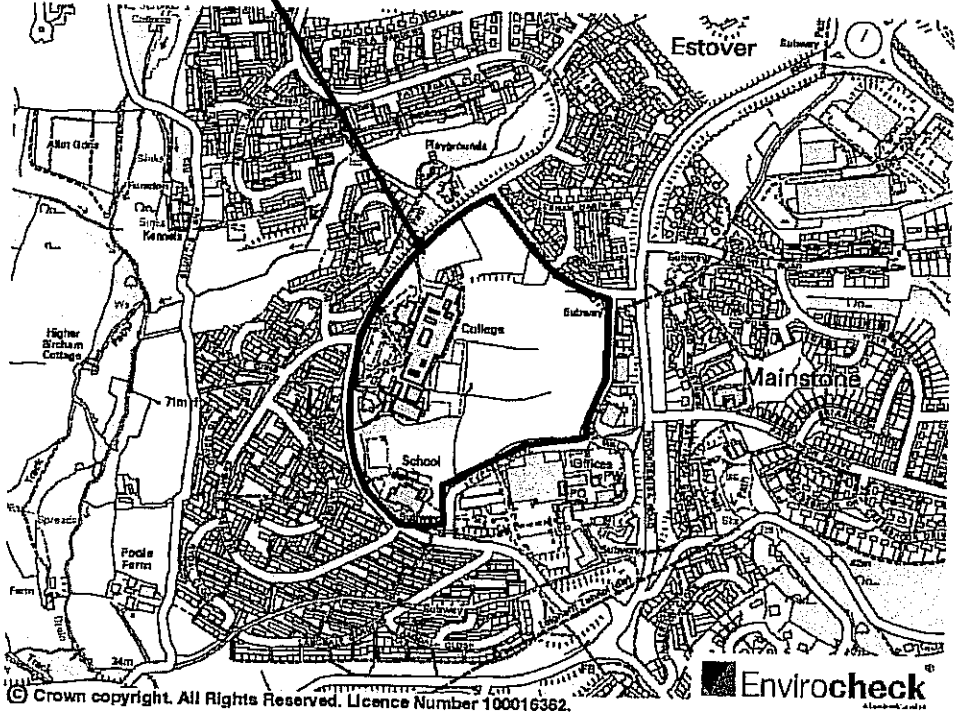
The development is planned to comprise of school buildings with internal courtyards and associated landscaping. The majority of the development will comprise of hard standing (ground slab/internal areas, car parking and paved areas) with adjacent sports pitches. The area of proposed development partially comprises of current sports fields and partially of existing school buildings. Therefore, the soils will not be accessible to end users due to there presence beneath the proposed development; the remaining soils will be exposed but the end use will remain unchanged as sports fields.

Taking into account the apparent absence of a source and the nature of the development described above; it is considered that the overall environmental risk to the site is low.



Local Setting

Regional Setting



N

Made by: MAB		**Figure 1 – Site location plan**	
Chk: CE	Scale: NTS		
App: CE	Date: May 2007		
FABER MAUNSELL | AECOM		Plymouth City Council	Estover College

Appendix E

Results of additional infiltration testing

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH

Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk

www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-10 Sheet No	AN Prepared by	GJB Approved by	21.10.2008 Date
Section	Introduction		Rev			
			Rev			

CALCULATION SHEET

Notes

The following infiltration tests were carried out on site at Estover Community college, Estover, Plymouth, PL6 8UJ between October 16th - 22nd. The weather in the few days previous had been generally quite dry. The site is bounded by Miller Way to the West and Dover Road, Leypark Walk and Leypark Drive all to the East. See site investigation by C.J. Associates (Dated 11.10.2007) for an overview of the site and results of trial and bore holes.

Percolation test pits were dug using a wheeled JCB backhole excavator. Water was provided from a 3000 gallon water bowser with a four inch outlet. Pits 9 and 4 did not reach their full depth due to thepressence of bedrock which became undigable. In the process of excavating pit 9 a land drain was intersected at 400-1000mm below ground level. Therefore the pit was not filled beyond this level as misleading results would have been obtained.

In a few instances, notably pits 9 and 3, the water level did not reach 25% of its effective depth due to time constraints. However it is possible to predict with some degree acuracy the time that these depths would have been reached using the equation for the line of best fit produced in this report.

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH
Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk
www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-11 Sheet No	AN Prepared by	Approved by	20.10.2008 Date
Section	1.1		Rev			
			Rev			

CALCULATION SHEET

In accordance with BRE Digest 365 - Soakaway Design.

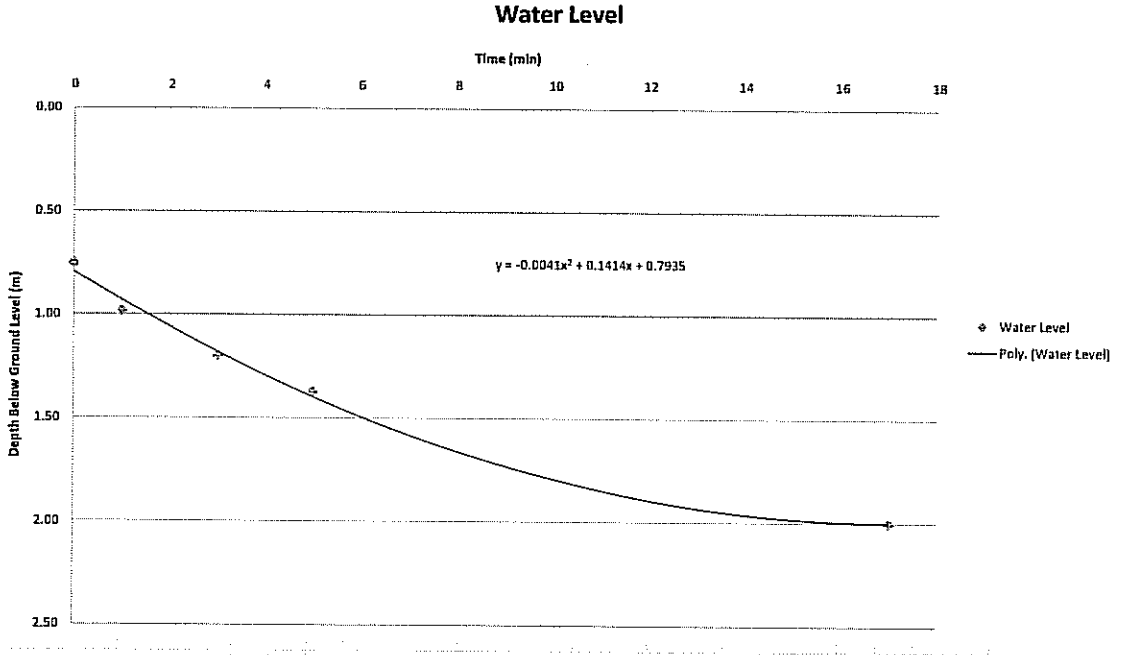
Notes

PIT 1 - Test 1		
Time	Time (min)	Depth BGL (m)
09:18:00	0	0.75
09:19:00	1	0.98
09:21:00	3	1.20
09:23:00	5	1.37
09:35:00	17	2.00

Dimensions (m)	
Width	0.7
Depth	2
Length	2.4

Effective depths				
		Depth BGL (m)	Depth BWL (m)	Time (min)
0.25	=	1.063	0.31	2
0.75	=	1.745	0.94	11
0.50	=	1.600	0.63	9

Eqn $x = 8.75y2 - 10.44y + 2.89$



Infiltration Rate Calculation			
t_{p75-25}	=	9.64	min
V_{p75-25}	=	3.88	m³
a_{p50}	=	5.56	m²
f	=	1.2E-03	m/sec

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% of the effective depth.

a_{p50} = Internal surface area up to 50% effective depth including the base

t_{p75-25} = Time for water level to fall from 75% to 25% Effective depth

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH

Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk

www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-12 Sheet No	AN Prepared by	Approved by	20.10.2008 Date
Section	1.2		Rev			
			Rev			

CALCULATION SHEET

In accordance with BRE Digest 365 - Soakaway Design.

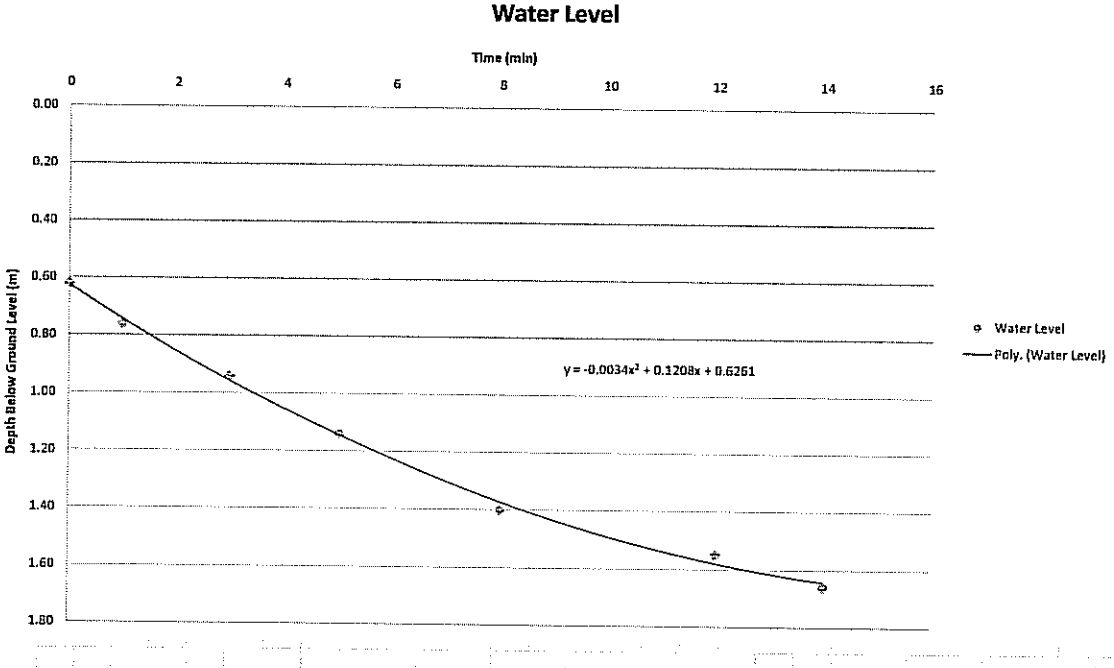
Notes

PIT 1 - Test 2		
Time	Time (min)	Depth BGL (m)
10:01:00	0	0.62
10:02:00	1	0.76
10:04:00	3	0.94
10:06:00	5	1.14
10:09:00	8	1.40
10:13:00	12	1.55
10:15:00	14	1.66

Dimensions (m)	
Width	0.7
Depth	2
Length	2.4

Effective depths				
		Depth BGL (m)	Depth BWL (m)	Time (min)
0.25	=	0.965	0.35	3
0.75	=	1.690	1.04	15
0.50	=	1.470	0.69	10

Eqn $x = 7.99y2 - 5.047y + 0.235$



Infiltration Rate Calculation			
t_{p75-25}	=	11.72	min
V_{p75-25}	=	4.28	m³
a_{p50}	=	5.96	m²
f	=	1.0E-03	m/sec

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% of the effective depth.

a_{p50} = Internal surface area up to 50% effective depth including the base

t_{p75-25} = Time for water level to fall from 75% to 25% Effective depth

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH
Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk
www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-13 Sheet No	AN Prepared by	Approved by	20.10.2008 Date
Section	1.3		Rev			
			Rev			

CALCULATION SHEET

In accordance with BRE Digest 365 - Soakaway Design.

Notes

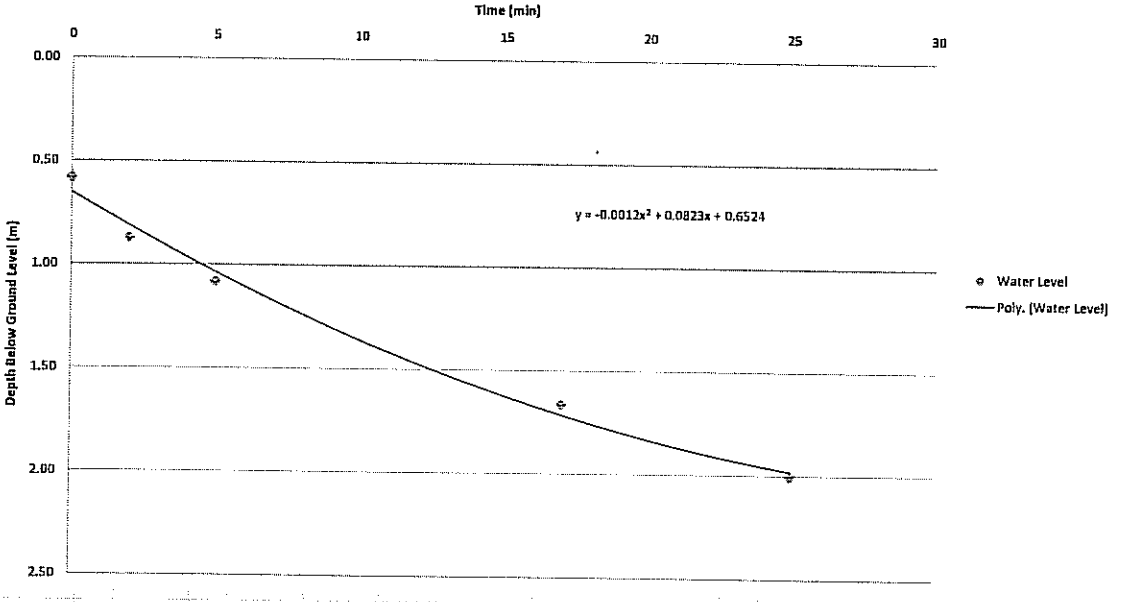
PIT 1 - Test 3		
Time	Time (min)	Depth BGL (m)
12:35:00	0	0.58
12:37:00	2	0.87
12:40:00	5	1.08
12:52:00	17	1.66
13:00:00	25	2.00

Dimensions (m)	
Width	0.7
Depth	2
Length	2.4

Effective depths				
		Depth BGL (m)	Depth BWL (m)	Time (min)
0.25	=	0.935	0.36	7
0.75	=	1.718	1.07	22
0.50	=	1.540	0.71	18

Eqn x = 7.64y2 - 1.65y + 1.923

Water Level



Infiltration Rate Calculation			
t_{p75-25}	=	14.57	min
V_{p75-25}	=	4.40	m³
a_{p50}	=	6.08	m²
f	=	8.3E-04	m/sec

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% of the effective depth.

a_{p50} = Internal surface area up to 50% effective depth including the base

t_{p75-25} = Time for water level to fall from 75% to 25% Effective depth

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH
Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk
www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-14 Sheet No	AN Prepared by	Approved by	20.10.2008 Date
Section	2.1		Rev			
			Rev			

CALCULATION SHEET

In accordance with BRE Digest 365 - Soakaway Design.

Notes

PIT 2 - Test 1		
Time	Time (min)	Depth BGL (m)
09:31:00	0	1.15
09:33:00	2	1.37
09:35:00	4	1.52
09:41:00	10	1.85
09:45:00	14	1.96
09:47:00	16	2.04

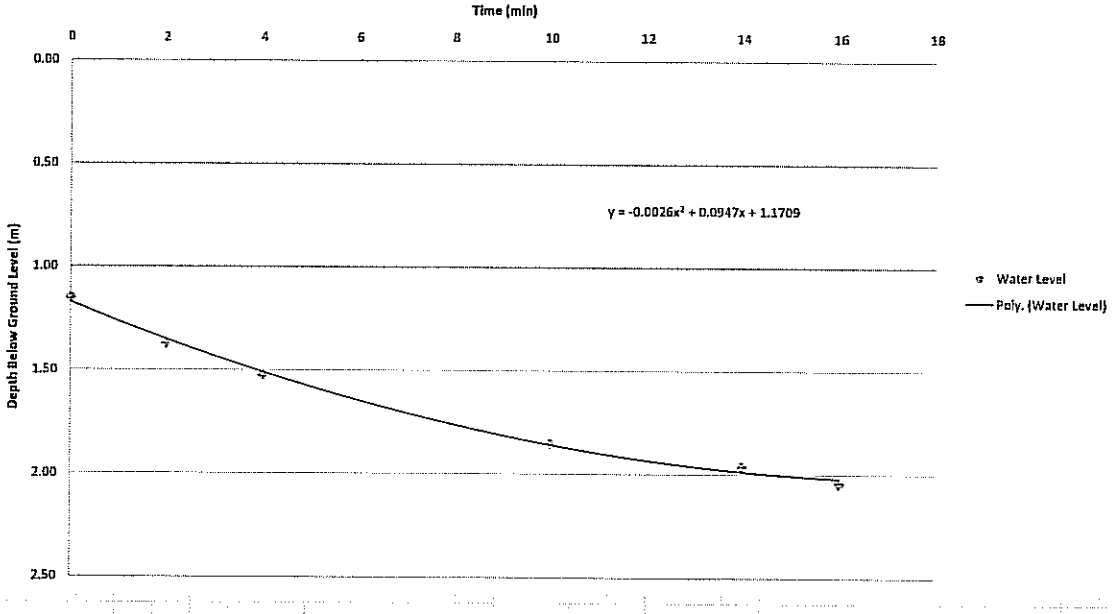
Became difficult to fill. Infiltration rate almost matching dis

Dimensions (m)	
Width	0.75
Depth	2.5
Length	2.7

Effective depths				
		Depth BGL (m)	Depth BWL (m)	Time (min)
0.25	=	1.488	0.34	3
0.75	=	2.218	1.01	22
0.50	=	2.010	0.68	15

Eqn $x = 14.99y2 - 29.98y + 14.78$

Water Level



Infiltration Rate Calculation		
t_{p75-25}	=	18.66 min
V_{p75-25}	=	4.66 m³
a_{p50}	=	6.68 m²
f	=	**6.2E-04** m/sec

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% of the effective depth.

a_{p50} = Internal surface area up to 50% effective depth including the base

t_{p75-25} = Time for water level to fall from 75% to 25% Effective depth

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH
Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk
www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-15 Sheet No	AN Prepared by	GJB Approved by	20.10.2008 Date
Section	2.2		Rev			
			Rev			

CALCULATION SHEET

In accordance with BRE Digest 365 - Soakaway Design.

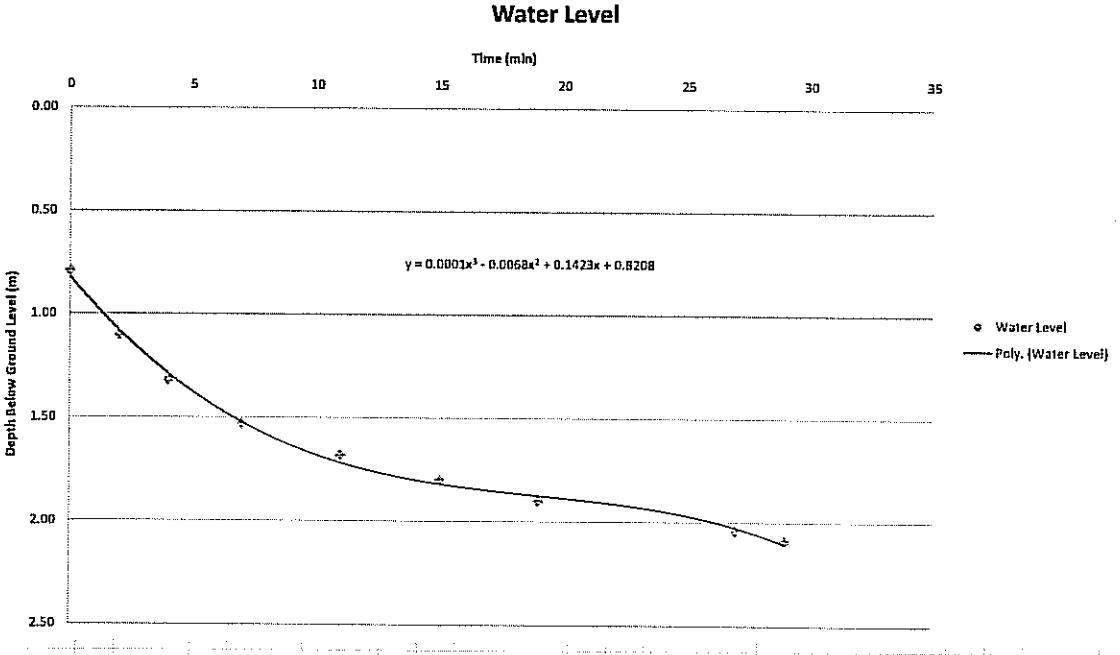
Notes

PIT 2 - Test 2		
Time	Time (min)	Depth BGL (m)
10:52:00	0	0.79
10:54:00	2	1.10
10:56:00	4	1.32
10:59:00	7	1.53
11:03:00	11	1.68
11:07:00	15	1.8
11:11:00	19	1.9
11:19:00	27	2.04
11:21:00	29	2.09

Dimensions (m)	
Width	0.75
Depth	2.5
Length	2.7

Effective depths				
		Depth BGL (m)	Depth BWL (m)	Time (min)
0.25	=	1.218	0.43	3
0.75	=	2.150	1.28	33
0.50	=	1.910	0.86	20

Eqn x = 14.95y3 - 42.89y2 + 46.85y - 17.59



Infiltration Rate Calculation			
t_{p75-25}	=	30.60	min
V_{p75-25}	=	5.90	m³
a_{p50}	=	7.92	m²
f	=	4.1E-04	m/sec

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% of the effective depth.

a_{p50} = Internal surface area up to 50% effective depth including the base

t_{p75-25} = Time for water level to fall from 75% to 25% Effective depth

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH
Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk
www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-16 Sheet No	AN Prepared by	Approved by	20.10.2008 Date
Section	2.3		Rev			
			Rev			

CALCULATION SHEET

In accordance with BRE Digest 365 - Soakaway Design.

Notes

PIT 2 - Test 3		
Time	Time (min)	Depth BGL (m)
11:26:00	0	0.78
11:28:00	2	1.00
11:35:00	9	1.43
11:45:00	19	1.78
11:55:00	29	1.98
12:05:00	39	2.10

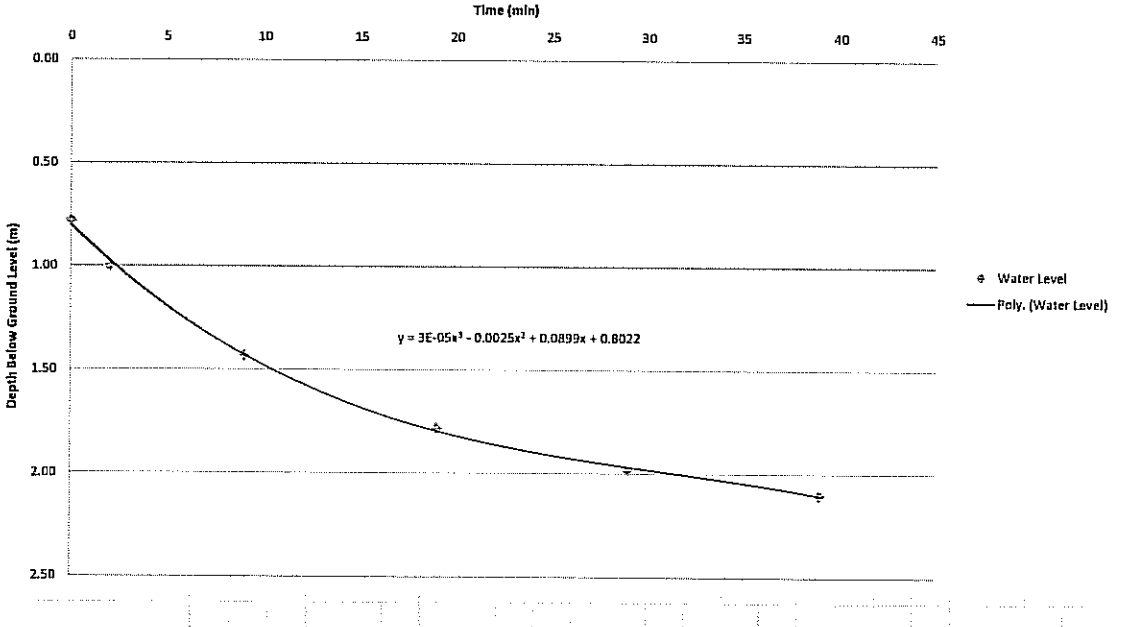
Became difficult to fill. Infiltration rate almost matching dis

Dimensions (m)	
Width	0.75
Depth	2.5
Length	2.7

Effective depths				
		Depth BGL (m)	Depth BWL (m)	Time (min)
0.25	=	1.210	0.43	5
0.75	=	2.125	1.29	40
0.50	=	1.965	0.86	29

Eqn x = 21.46y3 - 68.59y2 + 84.01y - 34.26

Water Level



Infiltration Rate Calculation			
t_{p75-25}	=	35.47	min
V_{p75-25}	=	5.93	m³
a_{p50}	=	7.96	m²
f	=	**3.5E-04**	m/sec

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% of the effective depth.

a_{p50} = Internal surface area up to 50% effective depth including the base

t_{p75-25} = Time for water level to fall from 75% to 25% Effective depth

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH
Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk
www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-17 Sheet No	AN Prepared by	Approved by	17.10.2008 Date
Section	3.1		Rev			
			Rev			

CALCULATION SHEET

In accordance with BRE Digest 365 - Soakaway Design.

Notes

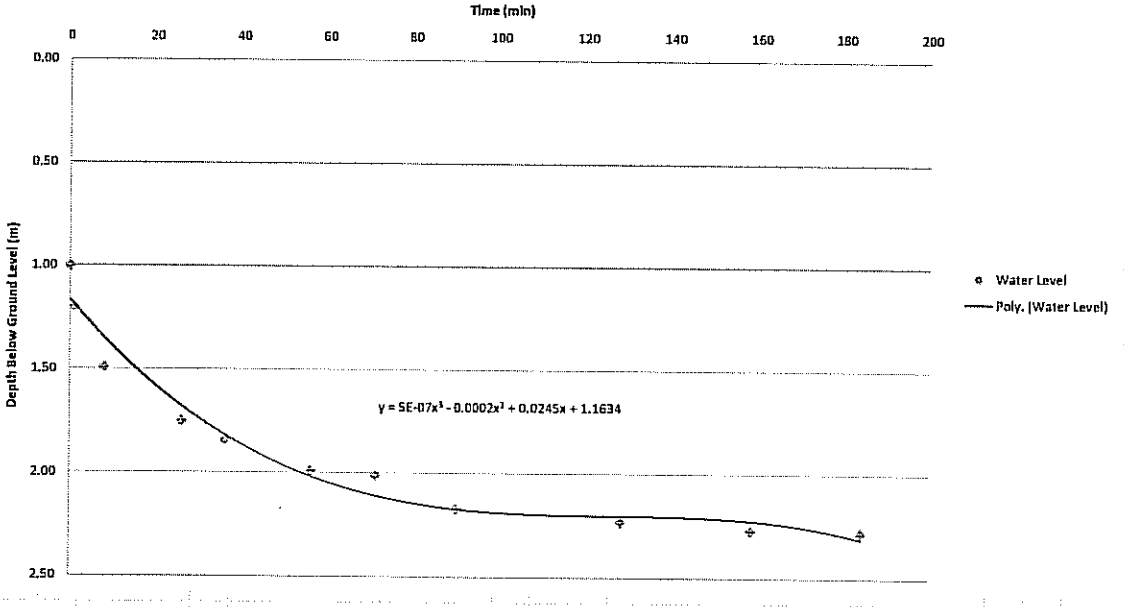
PIT 3 - Test 1		
Time	Time (min)	Depth BGL (m)
09:45:00	0	1.00
09:46:00	1	1.20
09:53:00	8	1.49
10:11:00	26	1.75
10:21:00	36	1.84
10:41:00	56	1.99
10:56:00	71	2.01
11:15:00	90	2.17
11:53:00	128	2.23
12:23:00	158	2.27
12:49:00	184	2.28

Dimensions (m)	
Width	0.8
Depth	2.7
Length	1.8

Effective depths				
		Depth BGL (m)	Depth BWL (m)	Time (min)
0.25	=	1.425	0.43	9
0.75	=	2.325	1.28	187
0.50	=	2.095	0.85	87

Eqn x = 208.08y3 - 862.98y2 + 1196.3y - 545.04

Water Level



Infiltration Rate Calculation		
t_{p75-25}	=	177.17 min
V_{p75-25}	=	4.42 m³
a_{p50}	=	5.86 m²
f	=	7.1E-05 m/sec

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% of the effective depth.

a_{p50} = Internal surface area up to 50% effective depth including the base

t_{p75-25} = Time for water level to fall from 75% to 25% Effective depth

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH
Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk
www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-18 Sheet No	AN Prepared by	Approved by	17.10.2008 Date
Section	3.2		Rev			
			Rev			

CALCULATION SHEET

In accordance with BRE Digest 365 - Soakaway Design.

Notes

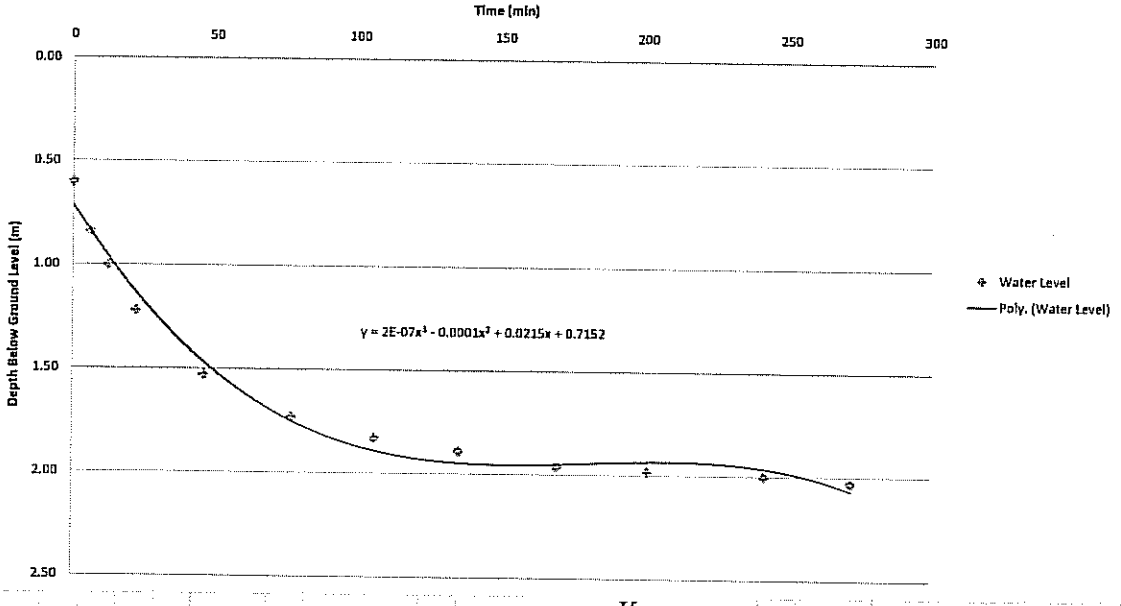
PIT 3 - Test 2		
Time	Time (min)	Depth BGL (m)
12:58:00	0	0.60
13:04:00	6	0.84
13:10:00	12	1.00
13:20:00	22	1.22
13:44:00	46	1.53
14:15:00	77	1.73
14:44:00	106	1.83
15:13:00	135	1.89
15:47:00	169	1.96
16:19:00	201	1.98
17:00:00	242	2.00
17:30:00	272	2.03

Dimensions (m)	
Width	0.8
Depth	2.7
Length	1.8

Effective depths				
		Depth BGL (m)	Depth BWL (m)	Time (min)
0.25	=	1.125	0.53	15
0.75	=	2.235	1.58	458
0.50	=	1.850	1.05	128

Eqn $x = 332.16y3 - 1097.7y2 + 1172.9y - 388.12$

Water Level



Infiltration Rate Calculation			
t_{p75-25}	=	443.34	min
V_{p75-25}	=	5.46	m³
a_{p50}	=	6.90	m²
f	=	**3.0E-05**	m/sec

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% of the effective depth.

a_{p50} = Internal surface area up to 50% effective depth including the base

t_{p75-25} = Time for water level to fall from 75% to 25% Effective depth

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH
Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk
www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-19 Sheet No	AN Prepared by	Approved by	17.10.2008 Date
Section	4.1		Rev			
			Rev			

CALCULATION SHEET

In accordance with BRE Digest 365 - Soakaway Design.

Notes

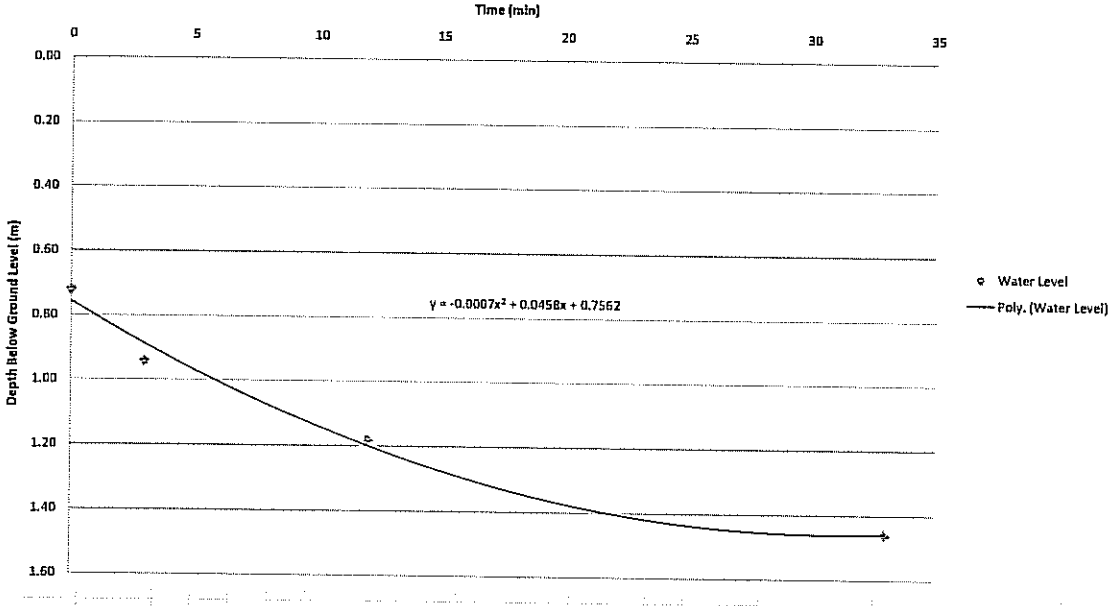
PIT 4 - Test 1		
Time	Time (min)	Depth BGL (m)
09:36:00	0	0.72
09:39:00	3	0.94
09:48:00	12	1.18
10:09:00	33	1.46

Dimensions (m)	
Width	0.6
Depth	1.6
Length	2.8

Effective depths				
		Depth BGL (m)	Depth BWL (m)	Time (min)
0.25	=	0.940	0.22	3
0.75	=	1.435	0.66	31
0.50	=	1.390	0.44	27

Eqn $x = 63.44y2 - 94.02y + 34.94$

Water Level



Infiltration Rate Calculation			
t_{p75-25}	=	28.04	min
V_{p75-25}	=	2.99	m³
a_{p50}	=	4.67	m²
f	=	**3.8E-04**	m/sec

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% of the effective depth.

a_{p50} = Internal surface area up to 50% effective depth including the base

t_{p75-25} = Time for water level to fall from 75% to 25% Effective depth

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH
Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk
www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-20 Sheet No	AN Prepared by	Approved by	17.10.2008 Date
Section	4.2		Rev			
			Rev			

CALCULATION SHEET

In accordance with BRE Digest 365 - Soakaway Design.

Notes

PIT 4 - Test 2		
Time	Time (min)	Depth BGL (m)
10:54:00	0	0.60
11:02:00	8	1.00
11:10:00	16	1.13
11:33:00	39	1.38

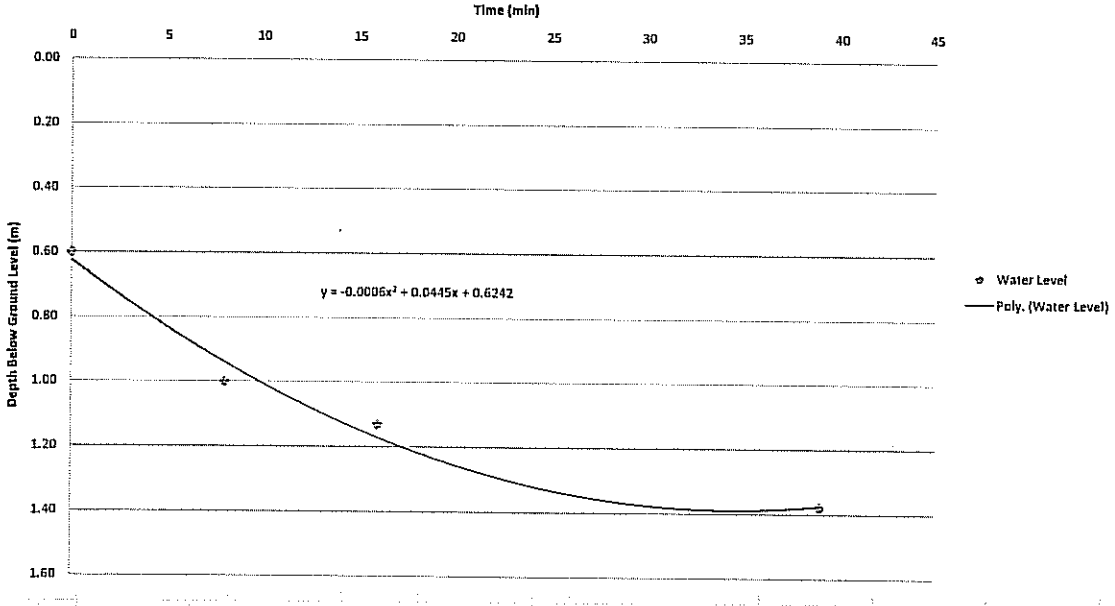
Dimensions (m)	
Width	0.6
Depth	1.6
Length	2.8

Effective depths				
		Depth BGL (m)	Depth BWL (m)	Time (min)
0.25	=	0.850	0.25	2
0.75	=	1.450	0.75	47
0.50	=	1.365	0.50	37

Reached bedrock

Eqn x = 79.06y2 - 106.55y + 35.47

Water Level



Infiltration Rate Calculation			
t_{p75-25}	=	45.17	min
V_{p75-25}	=	3.40	m³
a_{p50}	=	5.08	m²
f	=	**2.5E-04**	m/sec

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% of the effective depth.

a_{p50} = Internal surface area up to 50% effective depth including the base

t_{p75-25} = Time for water level to fall from 75% to 25% Effective depth

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH
Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk
www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-21 Sheet No	AN Prepared by	Approved by	17.10.2008 Date
Section	4.3		Rev			
			Rev			

CALCULATION SHEET

In accordance with BRE Digest 365 - Soakaway Design.

Notes

PIT 4 - Test 3		
Time	Time (min)	Depth BGL (m)
11:41:00	0	0.60
11:45:00	4	0.82
11:50:00	9	1.00
11:55:00	14	1.10
12:07:00	26	1.27
12:15:00	34	1.34
12:20:00	39	1.40

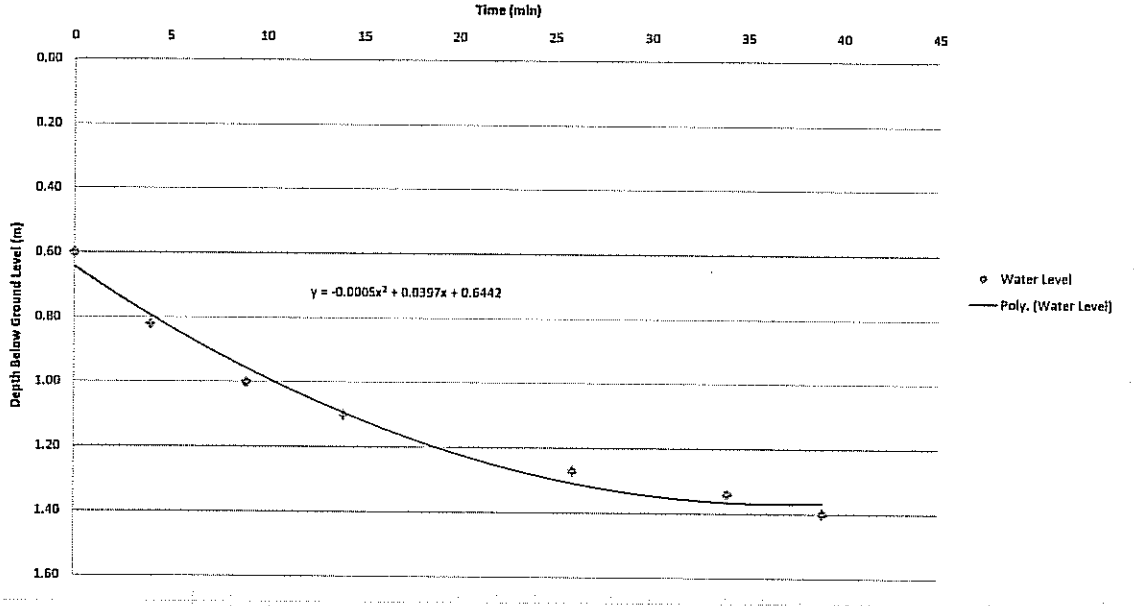
Dimensions (m)	
Width	0.6
Depth	1.6
Length	2.8

Effective depths				
		Depth BGL (m)	Depth BWL (m)	Time (min)
0.25	=	0.850	0.25	3
0.75	=	1.405	0.75	39
0.50	=	1.300	0.50	29

Reached bedrock

Eqn $x = 65.85y2 - 83.74y + 27.07$

Water Level



Infiltration Rate Calculation			
t_{p75-25}	=	35.94	min
V_{p75-25}	=	3.40	m³
a_{p50}	=	5.08	m²
f	=	3.1E-04	m/sec

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% of the effective depth.

a_{p50} = Internal surface area up to 50% effective depth including the base

t_{p75-25} = Time for water level to fall from 75% to 25% Effective depth

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH
Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk
www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-22 Sheet No	AN Prepared by	Approved by	17.10.2008 Date
Section	5.1		Rev			
			Rev			

CALCULATION SHEET

In accordance with BRE Digest 365 - Soakaway Design.

Notes

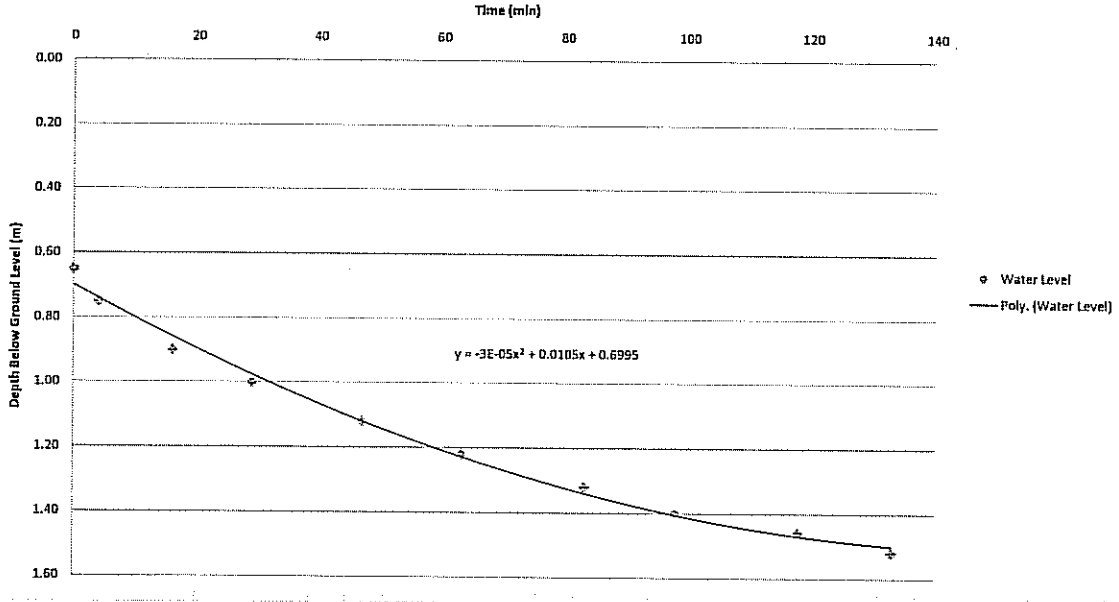
PIT 5 - Test 1		
Time	Time (min)	Depth BGL (m)
09:21:00	0	0.65
09:25:00	4	0.75
09:37:00	16	0.90
09:50:00	29	1.00
10:08:00	47	1.12
10:24:00	63	1.22
10:44:00	83	1.32
10:59:00	98	1.4
11:19:00	118	1.46
11:34:00	133	1.52

Dimensions (m)	
Width	0.65
Depth	1.8
Length	2.4

Effective depths				
		Depth BGL (m)	Depth BWL (m)	Time (min)
0.25	=	0.938	0.29	21
0.75	=	1.538	0.86	137
0.50	=	1.350	0.58	90

Eqn x = 136.87y2 - 144.98y + 36.24

Water Level



Infiltration Rate Calculation			
t_{p75-25}	=	116.26	min
V_{p75-25}	=	3.51	m³
a_{p50}	=	5.07	m²
f	=	9.9E-05	m/sec

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% of the effective depth.

a_{p50} = Internal surface area up to 50% effective depth including the base

t_{p75-25} = Time for water level to fall from 75% to 25% Effective depth

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH
Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk
www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-23 Sheet No	AN Prepared by	Approved by	17.10.2008 Date
Section	5.2		Rev			
			Rev			

CALCULATION SHEET

In accordance with BRE Digest 365 - Soakaway Design.

Notes

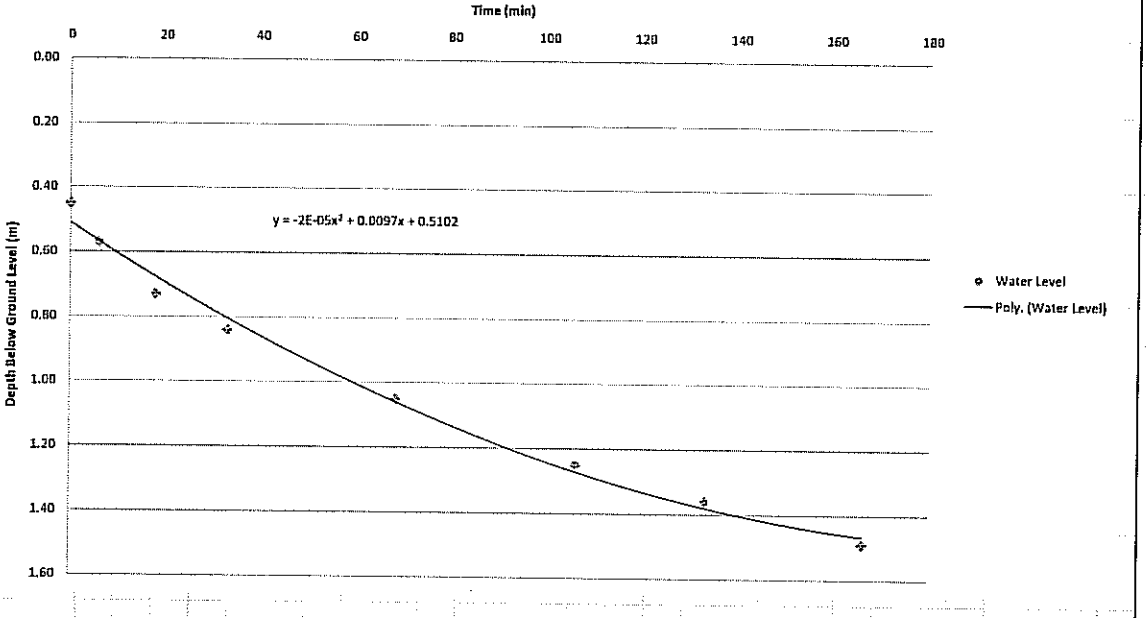
PIT 5 - Test 2		
Time	Time (min)	Depth BGL (m)
11:59:00	0	0.45
12:05:00	6	0.57
12:17:00	18	0.73
12:32:00	33	0.84
13:07:00	68	1.05
13:45:00	106	1.25
14:12:00	133	1.36
14:45:00	166	1.49

Dimensions (m)	
Width	0.65
Depth	1.8
Length	2.4

Effective depths				
		Depth BGL (m)	Depth BWL (m)	Time (min)
0.25	=	0.788	0.34	27
0.75	=	1.493	1.01	167
0.50	=	1.265	0.68	110

Eqn $x = 113y2 - 58.03y + 2.33$

Water Level



Infiltration Rate Calculation			
t_{p75-25}	=	140.73	min
V_{p75-25}	=	4.12	m³
a_{p50}	=	5.68	m²
f	=	**8.6E-05**	m/sec

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% of the effective depth.

a_{p50} = Internal surface area up to 50% effective depth including the base

t_{p75-25} = Time for water level to fall from 75% to 25% Effective depth

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH
Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk
www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-24 Sheet No	AN Prepared by	Approved by	17.10.2008 Date
Section	5.3		Rev			
			Rev			

CALCULATION SHEET

In accordance with BRE Digest 365 - Soakaway Design.

Notes

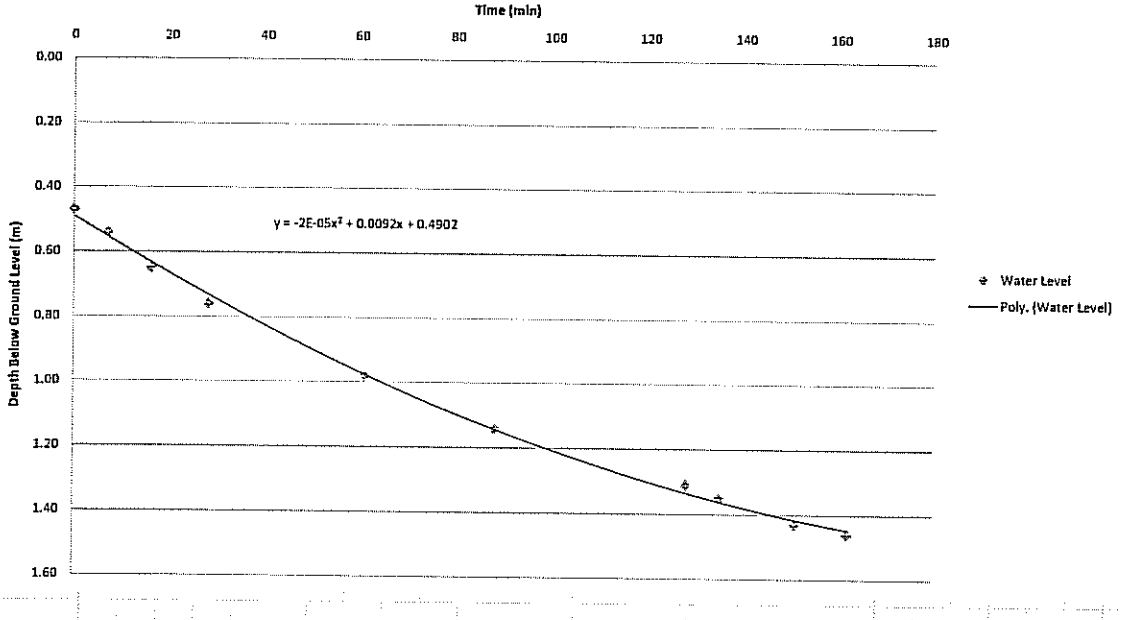
PIT 5 - Test 3		
Time	Time (min)	Depth BGL (m)
14:54:00	0	0.47
15:01:00	7	0.54
15:10:00	16	0.65
15:22:00	28	0.76
15:55:00	61	0.98
16:22:00	88	1.14
17:02:00	128	1.31
17:09:00	135	1.35
17:25:00	151	1.43
17:36:00	162	1.46

Dimensions (m)	
Width	0.65
Depth	1.8
Length	2.4

Effective depths				
		Depth BGL (m)	Depth BWL (m)	Time (min)
0.25	=	0.803	0.33	59
0.75	=	1.485	1.00	192
0.50	=	1.225	0.67	131

Eqn $x = 92.63y2 - 16.36y + 12.31$

Water Level



Infiltration Rate Calculation			
t_{p75-25}	=	133.45	min
V_{p75-25}	=	4.06	m³
a_{p50}	=	5.62	m²
f	=	**9.0E-05**	m/sec

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% of the effective depth.

a_{p50} = Internal surface area up to 50% effective depth including the base

t_{p75-25} = Time for water level to fall from 75% to 25% Effective depth

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH
Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk
www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-25 Sheet No	AN Prepared by	Approved by	22.10.2008 Date
Section	6.1		Rev			
			Rev			

CALCULATION SHEET

In accordance with BRE Digest 365 - Soakaway Design.

Notes

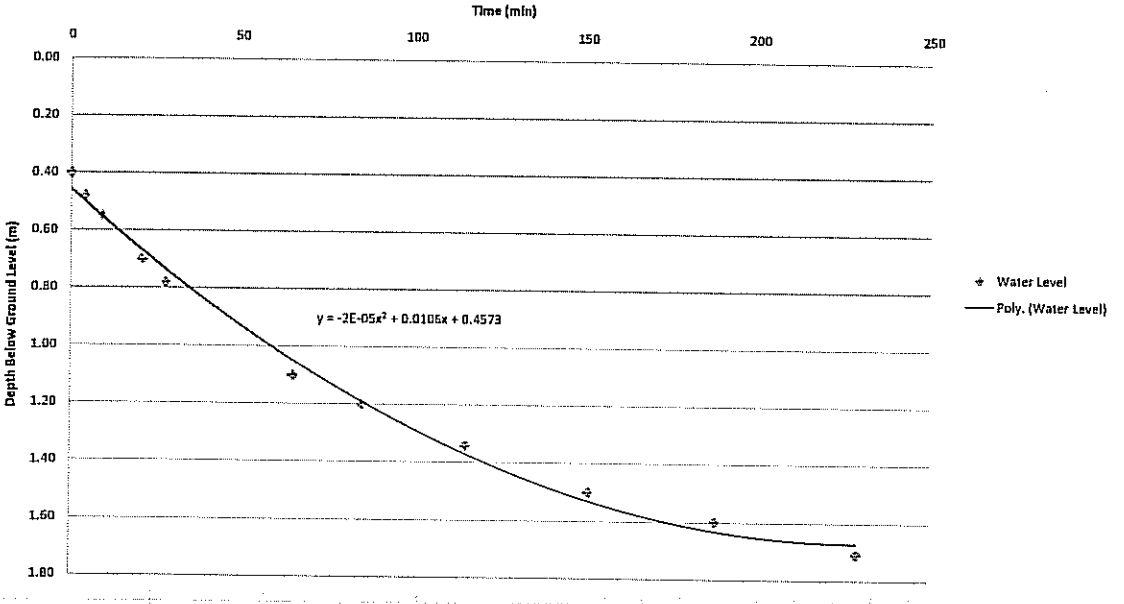
PIT 6 - Test 1		
Time	Time (min)	Depth BGL (m)
08:39:00	0	0.40
08:43:00	4	0.48
08:48:00	9	0.55
09:00:00	21	0.70
09:07:00	28	0.78
09:44:00	65	1.10
10:04:00	85	1.20
10:34:00	115	1.34
11:10:00	151	1.50
11:47:00	188	1.60
12:28:00	229	1.71

Eqn $x = 127.57y2 - 102.59y + 25.284$

Dimensions (m)	
Width	0.7
Depth	2.1
Length	2.4

Effective depths				
		Depth BGL (m)	Depth BWL (m)	Time (min)
0.25	=	0.825	0.43	27
0.75	=	1.695	1.28	218
0.50	=	1.325	0.85	113

Water Level



Infiltration Rate Calculation			
t_{p75-25}	=	190.43	min
V_{p75-25}	=	5.27	m³
a_{p50}	=	6.95	m²
f	=	**6.6E-05**	m/sec

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% of the effective depth.

a_{p50} = Internal surface area up to 50% effective depth including the base

t_{p75-25} = Time for water level to fall from 75% to 25% Effective depth

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH
Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk
www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-26 Sheet No	AN Prepared by	Approved by	22.10.2008 Date
Section	6.2		Rev			
			Rev			

CALCULATION SHEET

In accordance with BRE Digest 365 - Soakaway Design.

Notes

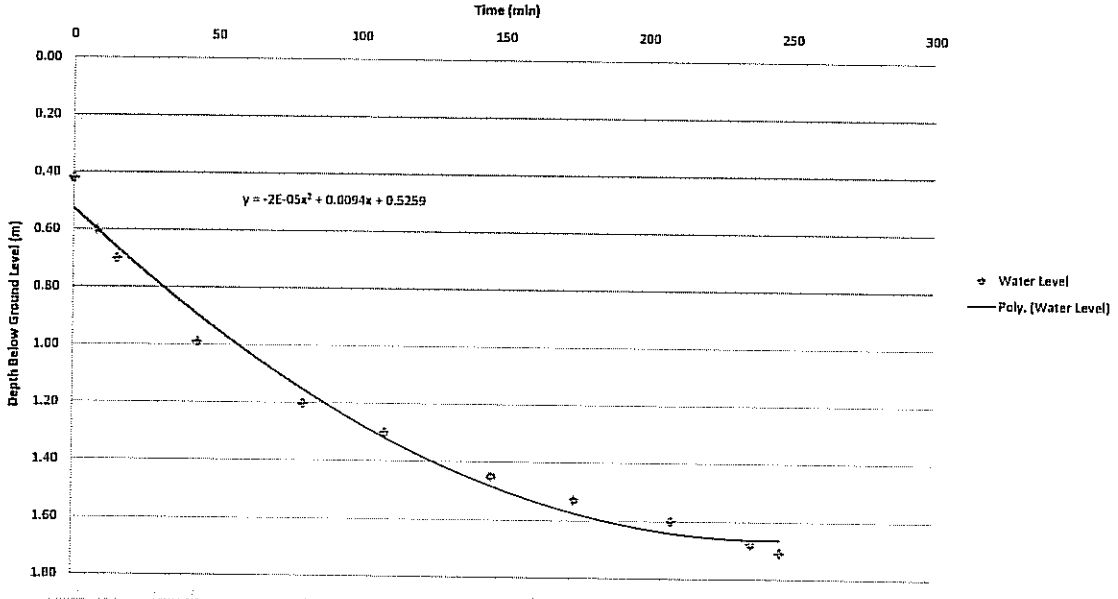
PIT 6 - Test 2		
Time	Time (min)	Depth BGL (m)
12:35:00	0	0.42
12:43:00	8	0.60
12:50:00	15	0.70
13:18:00	43	0.99
13:55:00	80	1.20
14:24:00	109	1.30
15:01:00	146	1.45
15:30:00	175	1.53
16:04:00	209	1.60
16:32:00	237	1.68
16:42:00	247	1.71

Eqn x = 170.91y2 - 177.05y + 49.592

Dimensions (m)	
Width	0.7
Depth	2.1
Length	2.4

Effective depths				
		Depth BGL (m)	Depth BWL (m)	Time (min)
0.25	=	0.840	0.42	21
0.75	=	1.725	1.26	253
0.50	=	1.400	0.84	137

Water Level



Infiltration Rate Calculation			
t_{p75-25}	=	231.28	min
V_{p75-25}	=	5.21	m³
a_{p50}	=	6.89	m²
f	=	**5.4E-05**	m/sec

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% of the effective depth.

a_{p50} = Internal surface area up to 50% effective depth including the base

t_{p75-25} = Time for water level to fall from 75% to 25% Effective depth

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH
Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk
www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-27 Sheet No	AN Prepared by	Approved by	22.10.2008 Date
Section	6.3		Rev			
			Rev			

CALCULATION SHEET

In accordance with BRE Digest 365 - Soakaway Design.

Notes

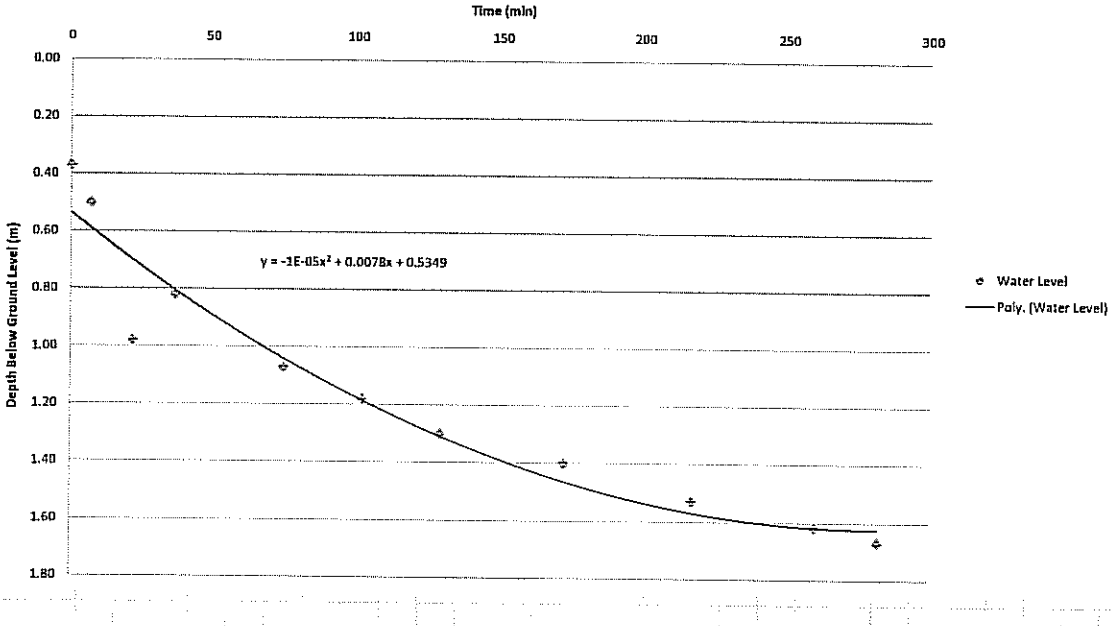
Dimensions (m)	
Width	0.7
Depth	2.1
Length	2.4

PIT 6 - Test 3		
Time	Time (min)	Depth BGL (m)
07:53:00	0	0.37
08:00:00	7	0.50
08:15:00	22	0.98
08:30:00	37	0.82
09:08:00	75	1.07
09:35:00	102	1.18
10:02:00	129	1.30
10:45:00	172	1.40
11:30:00	217	1.53
12:13:00	260	1.62
12:35:00	282	1.67

Eqn x = 205.68y2 - 206.37y + 53.399

Effective depths				
		Depth BGL (m)	Depth BWL (m)	Time (min)
0.25	=	0.803	0.43	20
0.75	=	1.700	1.30	297
0.50	=	1.540	0.87	223

Water Level



Infiltration Rate Calculation			
t_{p75-25}	=	276.74	min
V_{p75-25}	=	5.36	m³
a_{p50}	=	7.04	m²
f	=	**4.6E-05**	m/sec

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% of the effective depth.

a_{p50} = Internal surface area up to 50% effective depth including the base

t_{p75-25} = Time for water level to fall from 75% to 25% Effective depth

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH

Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk

www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-28 Sheet No	AN Prepared by	Approved by	22.10.2008 Date
Section	7.1		Rev			
			Rev			

CALCULATION SHEET

In accordance with BRE Digest 365 - Soakaway Design.

Notes

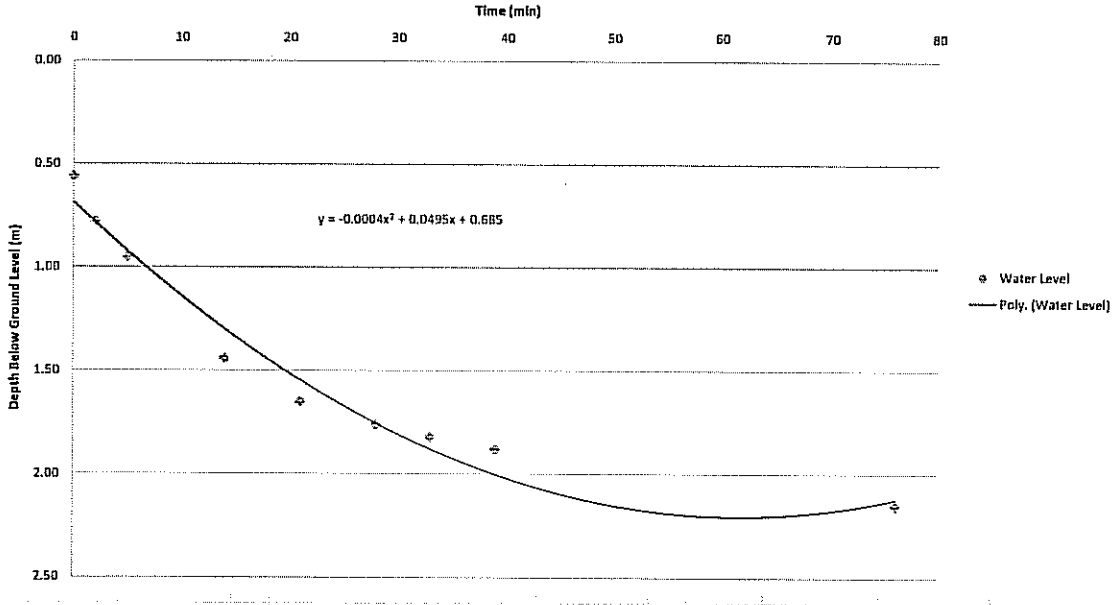
PIT 7 - Test 1		
Time	Time (min)	Depth BGL (m)
08:30:00	0	0.56
08:32:00	2	0.78
08:35:00	5	0.95
08:44:00	14	1.44
08:51:00	21	1.65
08:58:00	28	1.76
09:03:00	33	1.82
09:09:00	39	1.88
09:46:00	76	2.15

Dimensions (m)	
Width	0.7
Depth	2.2
Length	2.5

Effective depths				
		Depth BGL (m)	Depth BWL (m)	Time (min)
0.25	=	0.970	0.41	5
0.75	=	1.845	1.23	36
0.50	=	1.575	0.82	17

Eqn x = 39.945y3 - 118.62y2 + 124.12y - 40.122

Water Level



Infiltration Rate Calculation			
t_{p75-25}	=	30.84	min
V_{p75-25}	=	5.25	m³
a_{p50}	=	7.00	m²
f	=	4.1E-04	m/sec

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% of the effective depth.

a_{p50} = Internal surface area up to 50% effective depth including the base

t_{p75-25} = Time for water level to fall from 75% to 25% Effective depth

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH
Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk
www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-29 Sheet No	AN Prepared by	Approved by	22.10.2008 Date
Section	7.2		Rev			
			Rev			

CALCULATION SHEET

In accordance with BRE Digest 365 - Soakaway Design.

Notes

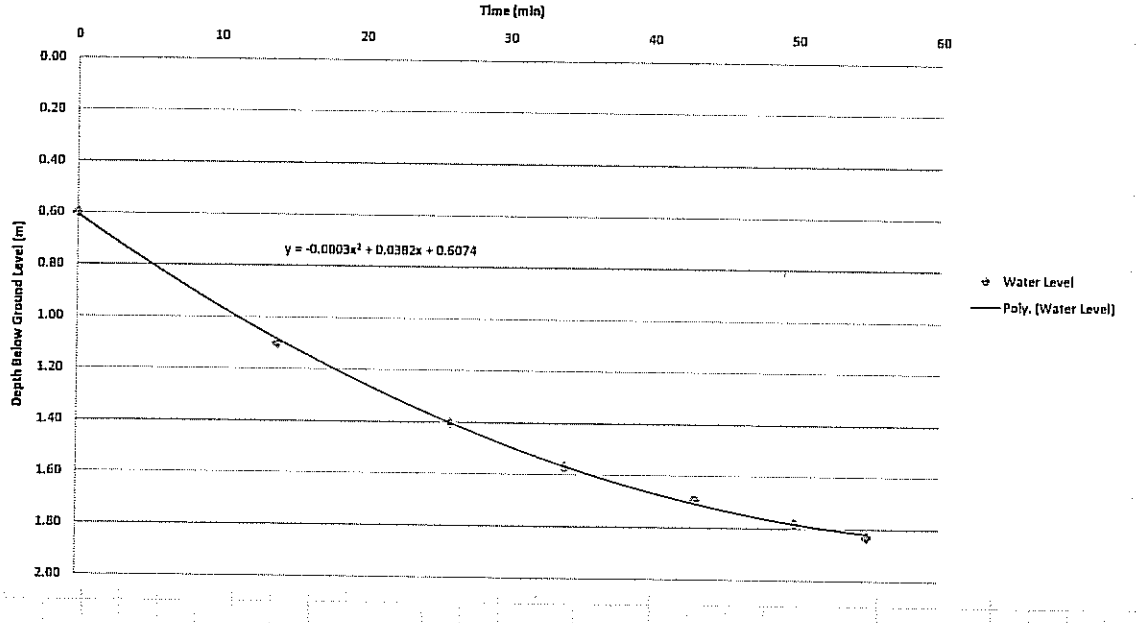
PIT 7 - Test 2		
Time	Time (min)	Depth BGL (m)
10:42:00	0	0.60
10:56:00	14	1.10
11:08:00	26	1.40
11:16:00	34	1.57
11:25:00	43	1.69
11:32:00	50	1.78
11:37:00	55	1.83

Dimensions (m)	
Width	0.7
Depth	2.2
Length	2.5

Effective depths				
		Depth BGL (m)	Depth BWL (m)	Time (min)
0.25	=	1.000	0.40	5
0.75	=	1.925	1.20	44
0.50	=	1.800	0.80	32

Eqn x = 39.945y3 - 118.62y2 + 124.12y - 40.122

Water Level



Infiltration Rate Calculation			
t_{p75-25}	=	38.87	min
V_{p75-25}	=	5.12	m³
a_{p50}	=	6.87	m²
f	=	3.2E-04	m/sec

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% of the effective depth.

a_{p50} = Internal surface area up to 50% effective depth including the base

t_{p75-25} = Time for water level to fall from 75% to 25% Effective depth

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH
Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk
www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-30 Sheet No	AN Prepared by	Approved by	22.10.2008 Date
Section	7.3		Rev			
			Rev			

CALCULATION SHEET

In accordance with BRE Digest 365 - Soakaway Design.

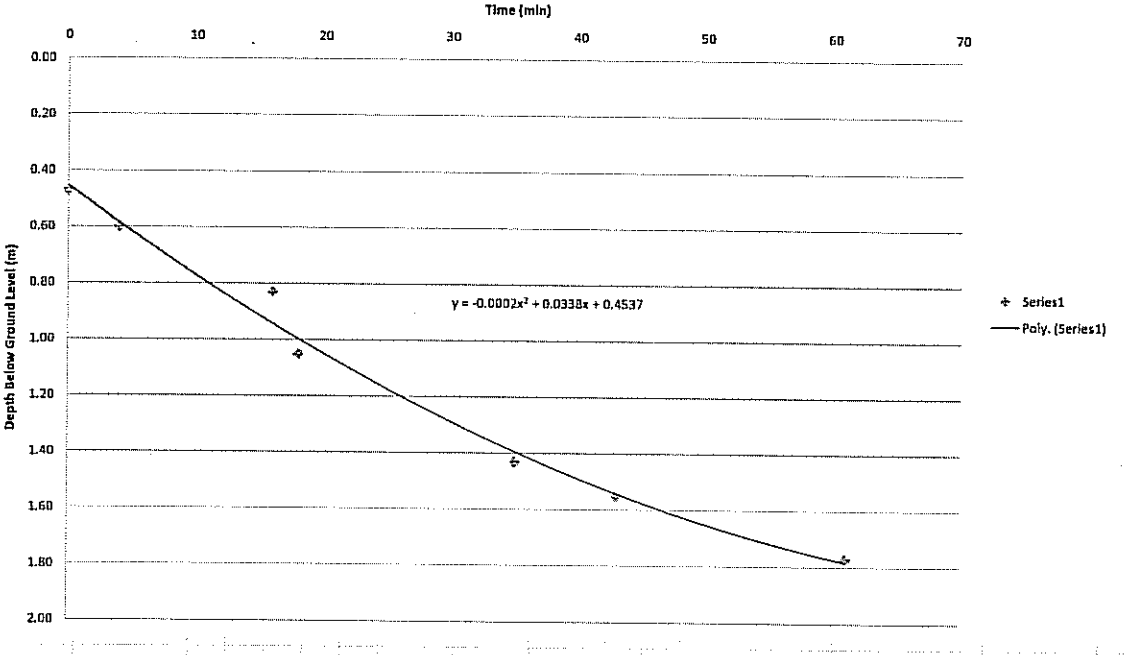
Notes

PIT 7 - Test 3		
Time	Time (min)	Depth BGL (m)
11:40:00	0	0.47
11:44:00	4	0.60
11:56:00	16	0.83
11:58:00	18	1.05
12:15:00	35	1.43
12:23:00	43	1.55
12:41:00	61	1.77

Dimensions (m)	
Width	0.7
Depth	2.2
Length	2.5

Effective depths				
		Depth BGL (m)	Depth BWL (m)	Time (min)
0.25	=	0.903	0.43	15
0.75	=	1.800	1.30	48
0.50	=	1.515	0.87	38

Eqn $x = 0.9086y2 + 33.91y - 15.908$



Infiltration Rate Calculation			
t_{p75-25}	=	32.64	min
V_{p75-25}	=	5.54	m³
a_{p50}	=	7.29	m²
f	=	**3.9E-04**	m/sec

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% of the effective depth.

a_{p50} = Internal surface area up to 50% effective depth including the base

t_{p75-25} = Time for water level to fall from 75% to 25% Effective depth

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH
Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk
www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-31 Sheet No	AN Prepared by	Approved by	22.10.2008 Date
Section	8.1		Rev			
			Rev			

CALCULATION SHEET

In accordance with BRE Digest 365 - Soakaway Design.

Notes

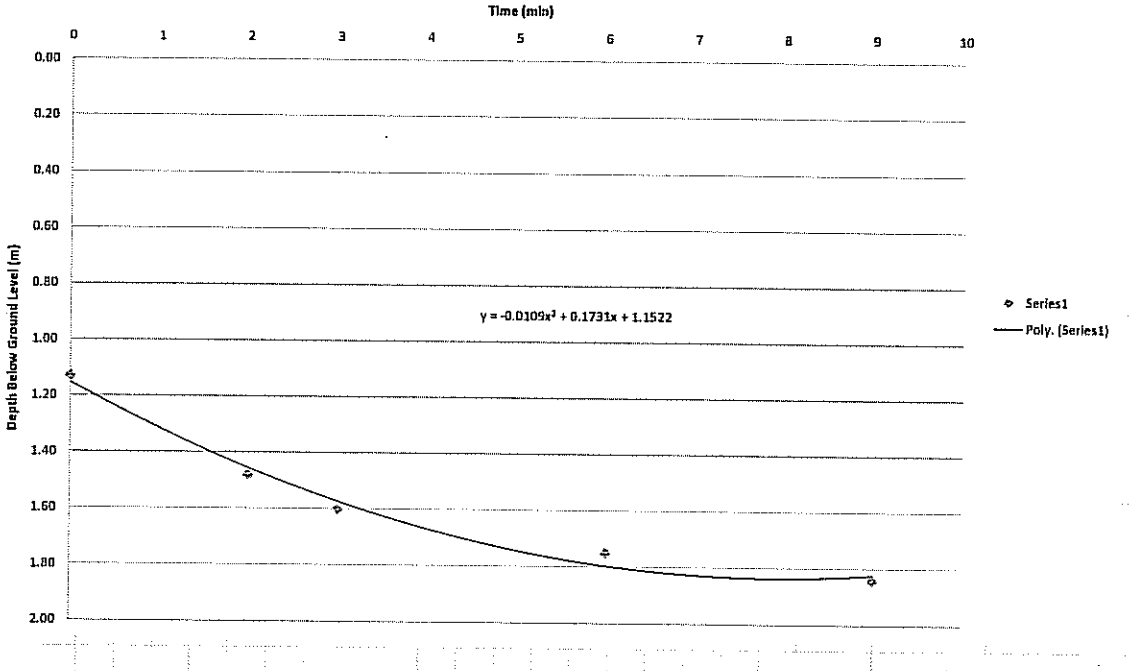
PIT 8 - Test 1		
Time	Time (min)	Depth BGL (m)
09:34:00	0	1.13
09:36:00	2	1.48
09:37:00	3	1.60
09:40:00	6	1.75
09:43:00	9	1.84

Difficulty filling beyond this level. Water inflow met water

Dimensions (m)	
Width	1
Depth	2
Length	2.8

Effective depths				
		Depth BGL (m)	Depth BWL (m)	Time (min)
0.25	=	1.348	0.22	0
0.75	=	1.870	0.65	10
0.50	=	1.800	0.44	8

Eqn $x = 21.893y2 - 52.887y + 31.879$



Infiltration Rate Calculation			
t_{p75-25}	=	9.17	min
V_{p75-25}	=	3.31	m³
a_{p50}	=	6.11	m²
f	=	9.8E-04	m/sec

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% of the effective depth.

a_{p50} = Internal surface area up to 50% effective depth including the base

t_{p75-25} = Time for water level to fall from 75% to 25% Effective depth

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH
Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk
www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-32 Sheet No	AN Prepared by	Approved by	22.10.2008 Date
Section	8.2		Rev			
			Rev			

CALCULATION SHEET

In accordance with BRE Digest 365 - Soakaway Design.

Notes

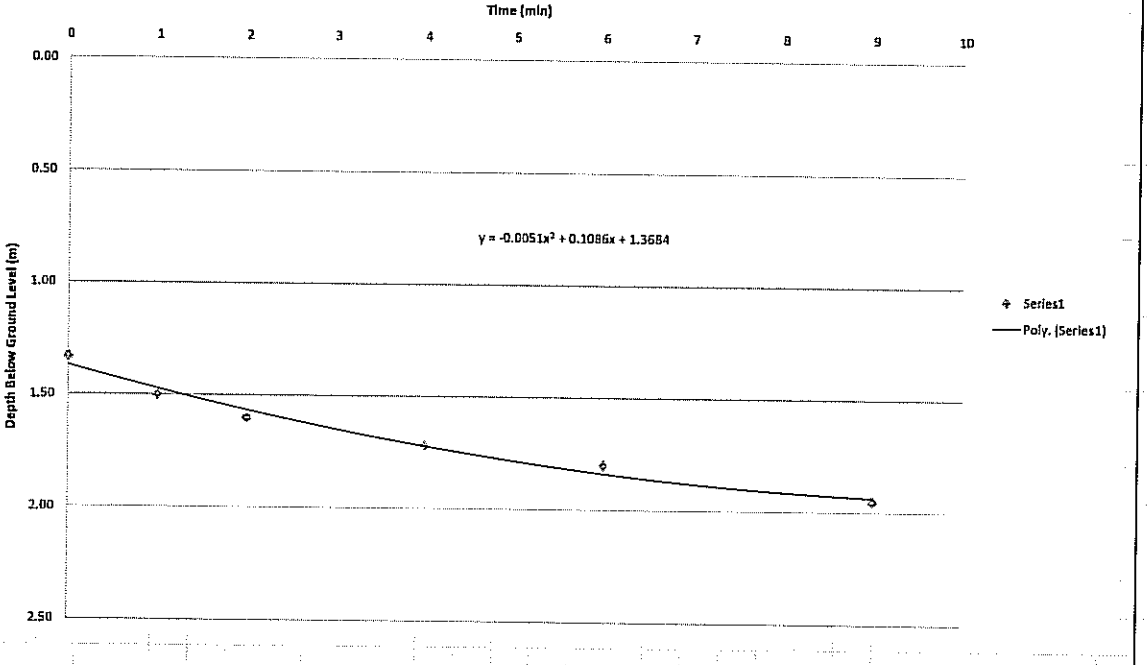
PIT 8 - Test 2		
Time	Time (min)	Depth BGL (m)
09:53:00	0	1.33
09:54:00	1	1.50
09:55:00	2	1.60
09:57:00	4	1.72
09:59:00	6	1.80
10:02:00	9	1.95

Difficulty filling beyond this level. Water inflow met water

Dimensions (m)	
Width	1
Depth	2
Length	2.8

Effective depths				
		Depth BGL (m)	Depth BWL (m)	Time (min)
0.25	=	1.498	0.17	1
0.75	=	1.875	0.50	8
0.50	=	1.800	0.34	6

Eqn $x = 25.319y2 - 66.747y + 44.026$



Infiltration Rate Calculation			
t_{p75-25}	=	7.04	min
V_{p75-25}	=	2.55	m³
a_{p50}	=	5.35	m²
f	=	1.1E-03	m/sec

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% of the effective depth.

a_{p50} = Internal surface area up to 50% effective depth including the base

t_{p75-25} = Time for water level to fall from 75% to 25% Effective depth

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH
Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk
www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-33 Sheet No	AN Prepared by	Approved by	23.10.2008 Date
Section	8.3		Rev			
			Rev			

CALCULATION SHEET

In accordance with BRE Digest 365 - Soakaway Design.

Notes

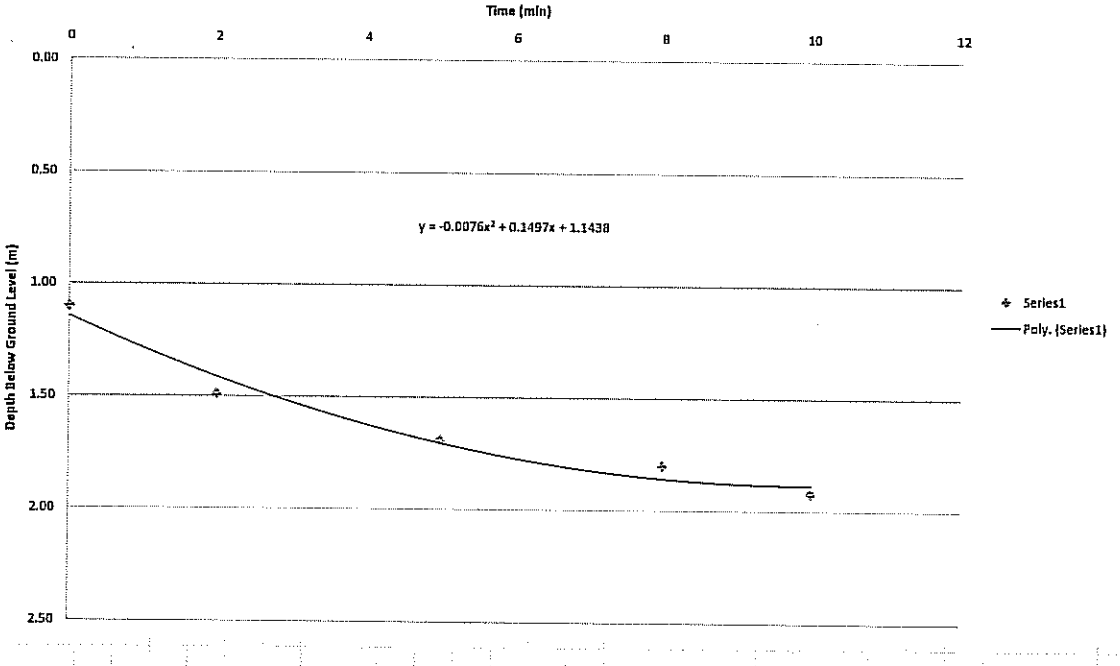
PIT 8 - Test 3		
Time	Time (min)	Depth BGL (m)
10:55:00	0	1.10
10:57:00	2	1.49
11:00:00	5	1.69
11:03:00	8	1.80
11:05:00	10	1.92

Difficulty filling beyond this level. Water inflow met water

Dimensions (m)	
Width	1
Depth	2
Length	2.8

Effective depths				
		Depth BGL (m)	Depth BWL (m)	Time (min)
0.25	=	1.325	0.23	1
0.75	=	1.873	0.68	9
0.50	=	1.845	0.45	8

Eqn $x = 16.3y2 - 36.617y + 20.515$



Infiltration Rate Calculation			
t_{p75-25}	=	8.49	min
V_{p75-25}	=	3.42	m³
a_{p50}	=	6.22	m²
f	=	1.1E-03	m/sec

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% of the effective depth.

a_{p50} = Internal surface area up to 50% effective depth including the base

t_{p75-25} = Time for water level to fall from 75% to 25% Effective depth

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH
Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk
www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-34 Sheet No	AN Prepared by	Approved by	16.10.2008 Date
Section	9.1		Rev			
			Rev			

CALCULATION SHEET

In accordance with BRE Digest 365 - Soakaway Design.

Notes

PIT 9 - Test 1		
Time	Time (min)	Depth BGL (m)
12:45:00	0	1.00
12:46:00	1	1.06
12:49:00	4	1.10
12:55:00	10	1.13
13:00:00	15	1.15
13:10:00	25	1.18
13:20:00	35	1.20
13:35:00	50	1.25
13:50:00	65	1.25
14:13:00	88	1.30
14:31:00	106	1.32
14:45:00	120	1.33
15:00:00	135	1.35
15:15:00	150	1.37

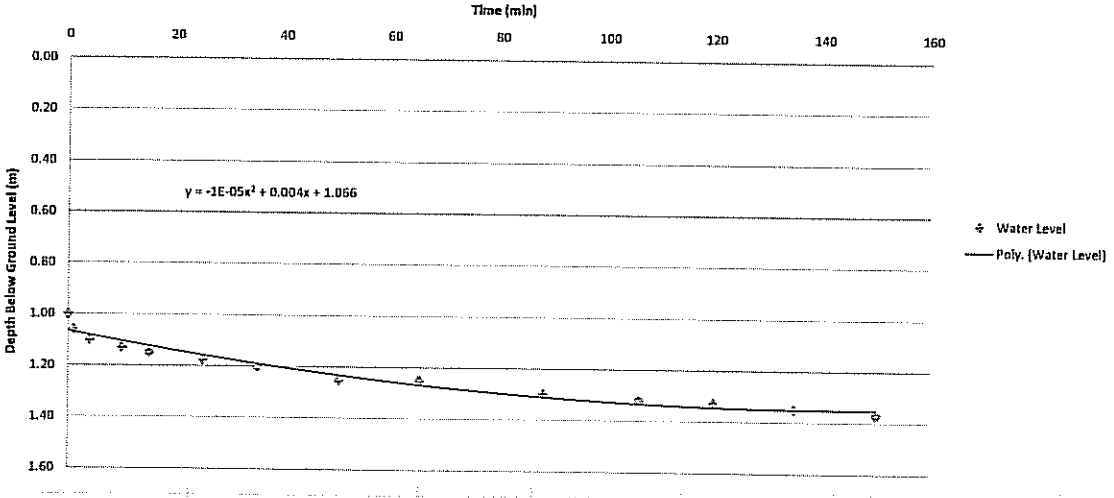
Eqn x = 1430.1y2 - 2987.2y + 1559

Dimensions (m)	
Width	0.8
Depth	1.55
Length	2.3

Existing Land drain intersected between 0.4-1m BGL. There above this point, as inacurate results would be obtained.

Effective depths				
		Depth BGL (m)	Depth BWL (m)	Time (min)
0.25	=	1.138	0.14	11
0.75	=	1.428	0.41	209
0.50	=	1.325	0.28	112

Water Level



Infiltration Rate Calculation		
t_{p75-25}	=	197.49 min
V_{p75-25}	=	1.71 m³
a_{p50}	=	3.55 m²
f	=	4.1E-05 m/sec

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% of the effective depth.

a_{p50} = Internal surface area up to 50% effective depth including the base

t_{p75-25} = Time for water level to fall from 75% to 25% Effective depth

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH
Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk
www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-35 Sheet No	AN Prepared by	Approved by	16.10.2008 Date
Section	9.2		Rev			
			Rev			

CALCULATION SHEET

In accordance with BRE Digest 365 - Soakaway Design.

Notes

PIT 9 - Test 2		
Time	Time (min)	Depth BGL (m)
15:23:00	0	0.94
15:25:00	2	0.95
15:30:00	7	0.99
15:37:00	14	1.03
15:45:00	22	1.07
16:00:00	37	1.12
16:35:00	72	1.20
16:55:00	92	1.25

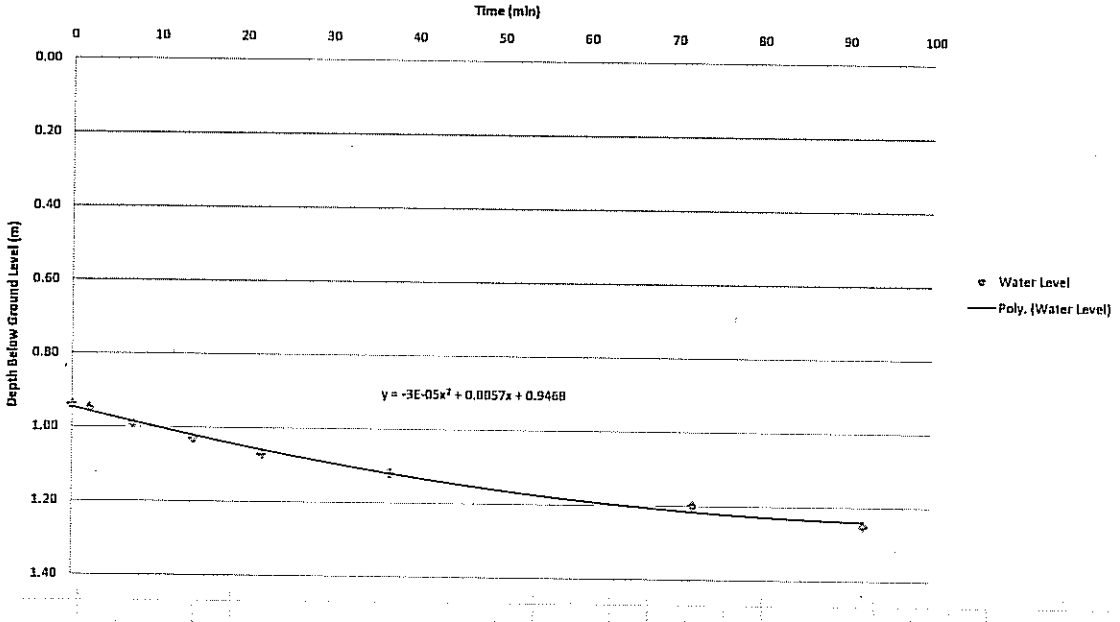
Dimensions (m)	
Width	0.8
Depth	1.55
Length	2.3

Existing Land drain intersected between 0.4-1m BGL. There above this point, as inacurate results would be obtained.

Effective depths				
		Depth BGL (m)	Depth BWL (m)	Time (min)
0.25	=	1.093	0.15	29
0.75	=	1.400	0.46	187
0.50	=	1.270	0.31	104

Eqn x = 700.63y2 - 1235y + 542.41

Water Level



Infiltration Rate Calculation			
t_{p75-25}	=	157.23	min
V_{p75-25}	=	1.89	m³
a_{p50}	=	3.73	m²
f	=	5.4E-05	m/sec

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% of the effective depth.

a_{p50} = Internal surface area up to 50% effective depth including the base

t_{p75-25} = Time for water level to fall from 75% to 25% Effective depth

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH

Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk

www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-36 Sheet No	AN Prepared by	Approved by	17.10.2008 Date
Section	9.3		Rev			
			Rev			

CALCULATION SHEET

In accordance with BRE Digest 365 - Soakaway Design.

Notes

PIT 9 - Test 3		
Time	Time (min)	Depth BGL (m)
08:11:00	0	1.07
08:15:00	4	1.10
08:25:00	14	1.15
08:40:00	29	1.19
08:50:00	39	1.21
10:01:00	110	1.27
11:25:00	194	1.36
12:37:00	266	1.45

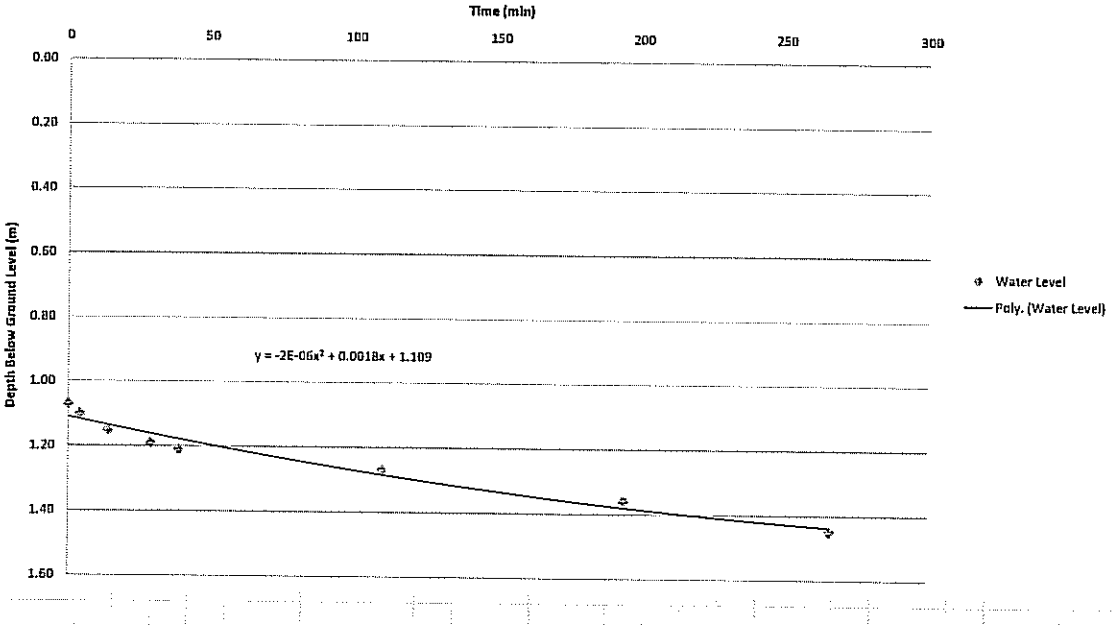
Dimensions (m)	
Width	0.8
Depth	1.55
Length	2.3

Existing Land drain intersected between 0.4-1m BGL. There above this point, as inacurate results would be obtained.

Effective depths				
		Depth BGL (m)	Depth BWL (m)	Time (min)
0.25	=	1.190	0.12	41
0.75	=	1.438	0.36	262
0.50	=	1.350	0.24	166

Eqn $x = 1288.5y2 - 2495.4y + 1186.3$

Water Level



Infiltration Rate Calculation			
t_{p75-25}	=	220.31	min
V_{p75-25}	=	1.49	m³
a_{p50}	=	3.33	m²
f	=	**3.4E-05**	m/sec

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% of the effective depth.

a_{p50} = Internal surface area up to 50% effective depth including the base

t_{p75-25} = Time for water level to fall from 75% to 25% Effective depth

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH
Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk
www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-37 Sheet No	AN Prepared by	Approved by	20.10.2008 Date
Section	11.1		Rev			
			Rev			

CALCULATION SHEET

In accordance with BRE Digest 365 - Soakaway Design.

Notes

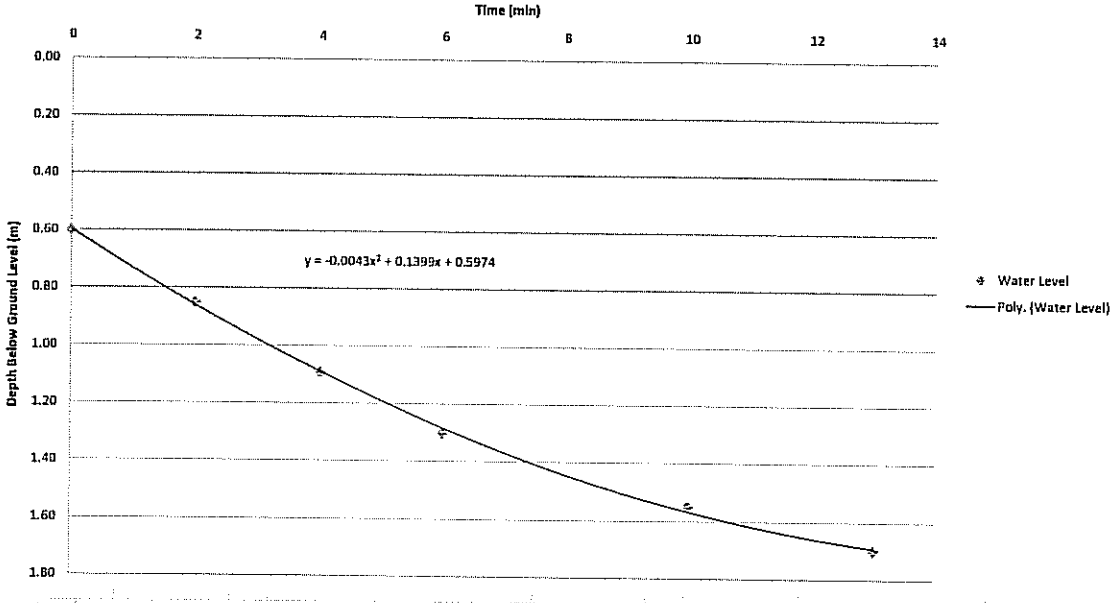
PIT 11 - Test 1		
Time	Time (min)	Depth BGL (m)
10:20:00	0	0.60
10:22:00	2	0.85
10:24:00	4	1.09
10:26:00	6	1.30
10:30:00	10	1.55
10:33:00	13	1.70

Dimensions (m)	
Width	0.75
Depth	2.1
Length	2.5

Effective depths				
		Depth BGL (m)	Depth BWL (m)	Time (min)
0.25	=	0.975	0.38	3
0.75	=	1.788	1.13	14
0.50	=	1.595	0.75	11

Eqn $x = 6.623y2 - 3.7823y + 0.0887$

Water Level



Infiltration Rate Calculation			
t_{p75-25}	=	11.79	min
V_{p75-25}	=	4.88	m³
a_{p50}	=	6.75	m²
f	=	**1.0E-03**	m/sec

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% of the effective depth.

a_{p50} = Internal surface area up to 50% effective depth including the base

t_{p75-25} = Time for water level to fall from 75% to 25% Effective depth

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH
Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk
www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-38 Sheet No	AN Prepared by	GTB Approved by	20.10.2008 Date
Section	11.2		Rev			
			Rev			

CALCULATION SHEET

In accordance with BRE Digest 365 - Soakaway Design.

Notes

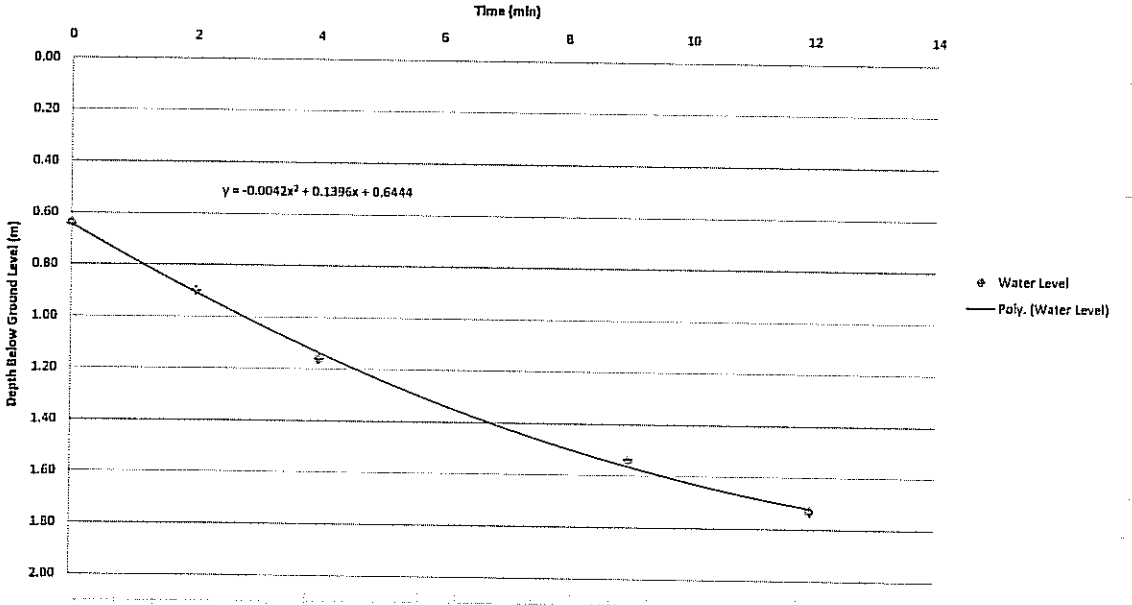
PIT 11 - Test 2		
Time	Time (min)	Depth BGL (m)
12:45:00	0	0.64
12:47:00	2	0.90
12:49:00	4	1.16
12:54:00	9	1.54
12:57:00	12	1.73

Dimensions (m)	
Width	0.75
Depth	2.1
Length	2.5

Effective depths				
		Depth BGL (m)	Depth BWL (m)	Time (min)
0.25	=	1.005	0.37	5
0.75	=	1.800	1.10	15
0.50	=	1.630	0.73	12

Eqn $x = 5.3539y2 - 1.778y + 0.968$

Water Level



Infiltration Rate Calculation			
t_{p75-25}	=	10.53	min
V_{p75-25}	=	4.75	m³
a_{p50}	=	6.62	m²
f	=	1.1E-03	m/sec

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% of the effective depth.

a_{p50} = Internal surface area up to 50% effective depth including the base

t_{p75-25} = Time for water level to fall from 75% to 25% Effective depth

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH

Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk

www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-39 Sheet No	AN Prepared by	Approved by	20.10.2008 Date
Section	11.3		Rev			
			Rev			

CALCULATION SHEET

In accordance with BRE Digest 365 - Soakaway Design.

Notes

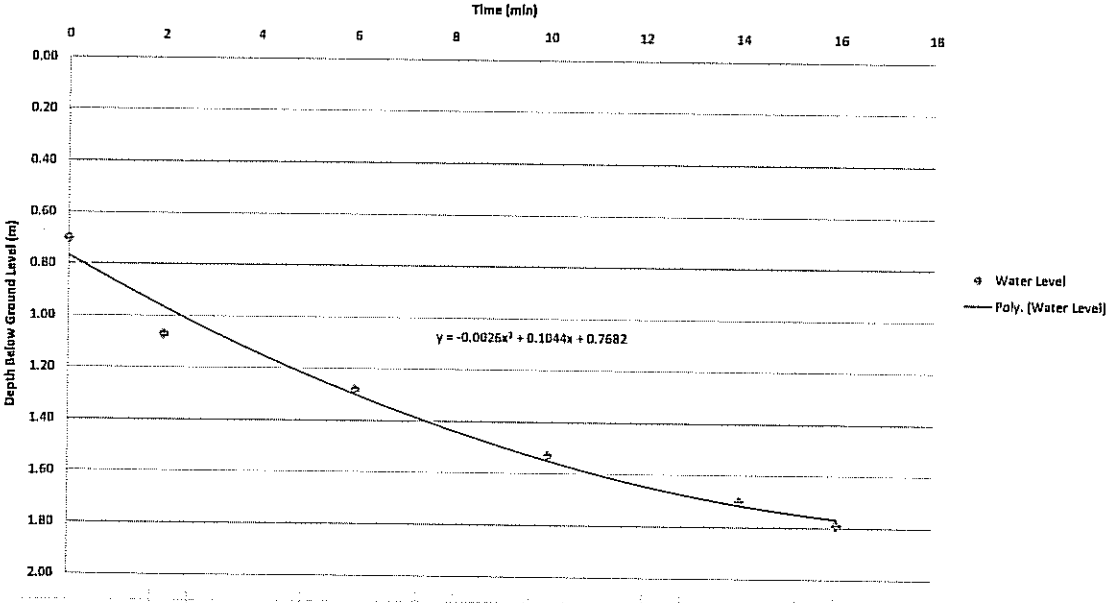
PIT 11 - Test 3		
Time	Time (min)	Depth BGL (m)
13:05:00	0	0.70
13:07:00	2	1.07
13:11:00	6	1.28
13:15:00	10	1.53
13:19:00	14	1.70
13:21:00	16	1.79

Dimensions (m)	
Width	0.75
Depth	2.1
Length	2.5

Effective depths				
		Depth BGL (m)	Depth BWL (m)	Time (min)
0.25	=	1.050	0.35	2
0.75	=	1.843	1.05	18
0.50	=	1.690	0.70	14

Eqn $x = 10.39y2 - 10.903y + 2.3887$

Water Level



Infiltration Rate Calculation			
t_{p75-25}	=	15.18	min
V_{p75-25}	=	4.55	m³
a_{p50}	=	6.43	m²
f	=	7.8E-04	m/sec

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% of the effective depth.

a_{p50} = Internal surface area up to 50% effective depth including the base

t_{p75-25} = Time for water level to fall from 75% to 25% Effective depth

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH
Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk
www.jenkinspotter.co.uk

Project Title: Estover Community College	61519 Project No	IT-40 Sheet No	AN Prepared by	Approved by	Date 10/08
Section: Summary		Rev			
		Rev			

CALCULATION SHEET

Notes

		Infiltration Rate (m/sec)	Design Infiltration Rate (m/sec) (Average of test results)
Infiltration Test 1			
Results of test 1	=	1.21E-03	
Results of test 2	=	1.02E-03	**1.02E-03**
Results of test 3	=	8.28E-04	
Infiltration Test 2			
Results of test 1	=	6.23E-04	
Results of test 2	=	4.05E-04	**4.59E-04**
Results of test 3	=	3.50E-04	
Infiltration Test 3			
Results of test 1	=	7.10E-05	
Results of test 2	=	2.97E-05	**5.04E-05**
Infiltration Test 4			
Results of test 1	=	3.81E-04	
Results of test 2	=	2.47E-04	**3.13E-04**
Results of test 3	=	3.10E-04	
Infiltration Test 5			
Results of test 1	=	9.92E-05	
Results of test 2	=	8.59E-05	**9.18E-05**
Results of test 3	=	9.02E-05	
Infiltration Test 6			
Results of test 1	=	6.64E-05	
Results of test 2	=	5.45E-05	**5.56E-05**
Results of test 3	=	4.59E-05	
Infiltration Test 7			
Results of test 1	=	4.05E-04	
Results of test 2	=	5.45E-05	**1.69E-04**
Results of test 3	=	4.59E-05	

JENKINS & POTTER Consulting Engineers

1 Lower Compton Road, Plymouth PL3 5DH

Tel: 01752 251 111 Fax: 01752 251 115 Email: post@plymouth.jenkinspotter.co.uk

www.jenkinspotter.co.uk

Project Title	Estover Community College	61519 Project No	IT-41 Sheet No	AN Prepared by	Approved by	10/08 Date
Section	Summary Cont.		Rev			
			Rev			

CALCULATION SHEET

Notes

Infiltration Test 8

		Infiltration Rate (m/sec)	Design Infiltration Rate (m/sec) (Average of test results)
Results of test 1	=	9.84E-04	
Results of test 2	=	1.13E-03	**1.06E-03**
Results of test 3	=	1.08E-03	

Infiltration Test 9

Results of test 1	=	4.06E-05	
Results of test 2	=	5.37E-05	**4.27E-05**
Results of test 3	=	3.38E-05	

Infiltration Test 11

Results of test 1	=	1.02E-03	
Results of test 2	=	1.13E-03	**9.78E-04**
Results of test 3	=	7.78E-04	