

SITE INVESTIGATION FACTUAL REPORT

Report No: 169984
Client: Cunningham Lindsey - Maidstone
Site: 99 Greencroft Gardens, London
Client Ref: 7498207-
Date of Visit: 11/01/2014



Home Emergency Response - Subsidence Investigation - Drainage Services – Crack & Level Monitoring – Property Video Surveys

Unit E2 First Floor Suite, Boundary Court
Willow Farm Business Park, Castle Donington
Leicestershire, DE74 2NN

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CET is the trading name of CET Structures Ltd
Registered in England No. 02527130

Investigation Layout Plan

Sheet: 1 of 1

Job No: 169984E

Date: 11/01/2014

Site: 99 Greencroft Gardens, NW6 3PG

Work carried

out for:

Cunningham Lindsey

MD

(SI)

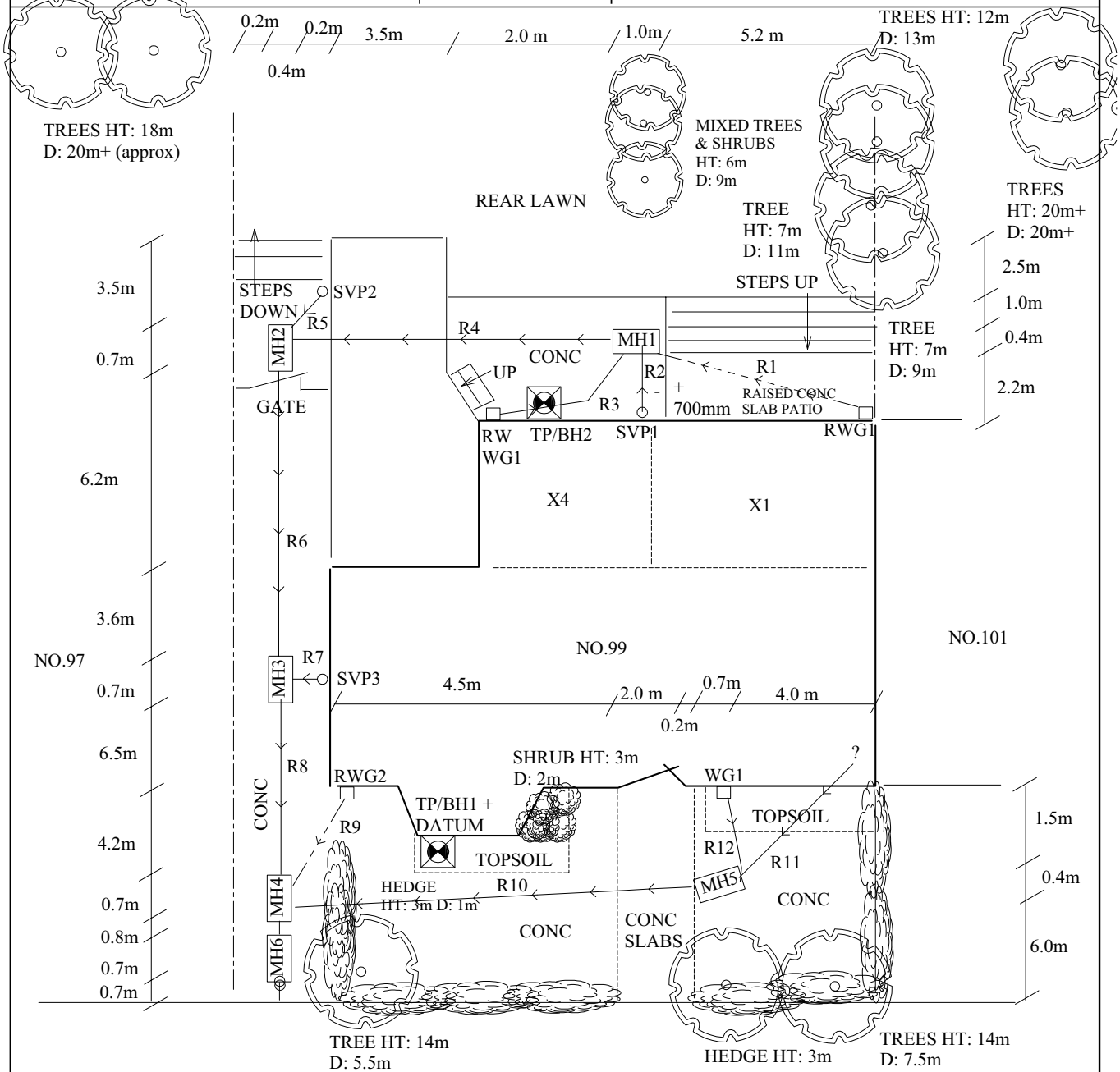
SE

(Checked)

AR

(Drawn)

Weather: DRY



ON SITE TREE IDENTIFICATION FOR GUIDANCE ONLY. NOT AUTHENTICATED.

Remarks:

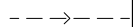
Parking - road.
Water supply - outside tap.
Site access - good.
Power - internal.

Key:

Combined Gully

RWWG

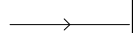
Surface Water Drain



Manhole

MH

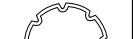
Foul Water Drain



Rain Water Pipe

RWP

Tree / Bush



Rain Water Gully

RWG

(approx. ht in m)

Soil Vent Pipe

SVP

Trial Pit



Waste Gully

WG

Borehole



Waste Pipe

WP

Scale: N.T.S.

Trial Pit No: 1

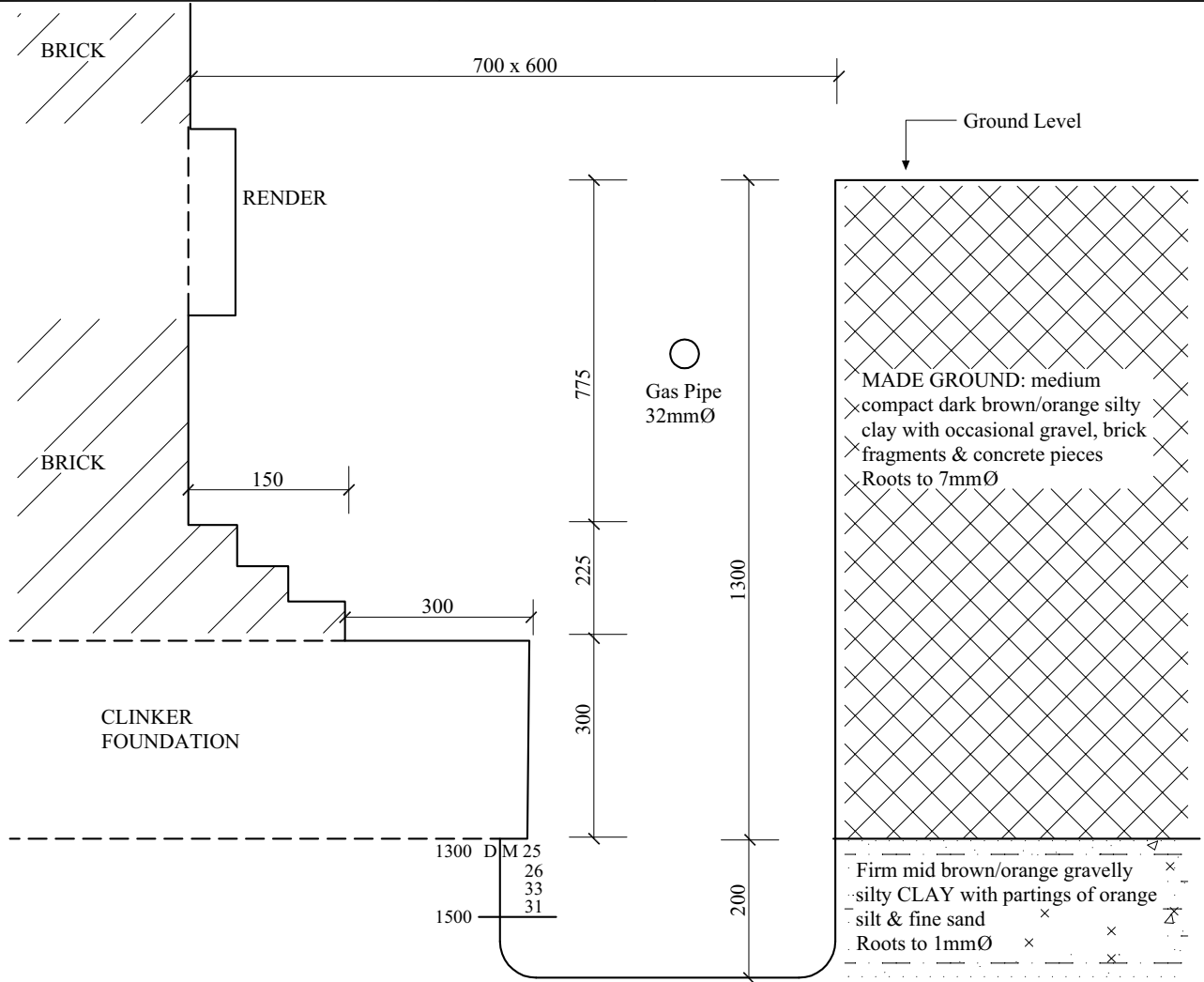
Sheet: 1 of 1
 Job No: 169984E
 Date: 11/01/14

Site: 99 Greencroft Gardens, NW6
 Work carried out for: Cunningham Lindsey

Excavation Method: Hand Tools

Drawn by: NR
 Ground Level mOD:

Weather: Dry



FOR STRATA BELOW 1500mm SEE BH LOG 1

Remarks: All measurements in millimetres.

Key:

D	Small disturbed sample	J	Jar sample
B	Bulk disturbed sample	V	Pilcon Vane (kPa)
W	Water sample	M	Mackintosh probe
TDTD	Too dense to drive		

Logged: SP

Checked: SE

Approved:

Scale: N.T.S.

Trial Pit No: 2

Sheet: 1 of 1
 Job No: 169984E
 Date: 11/01/14

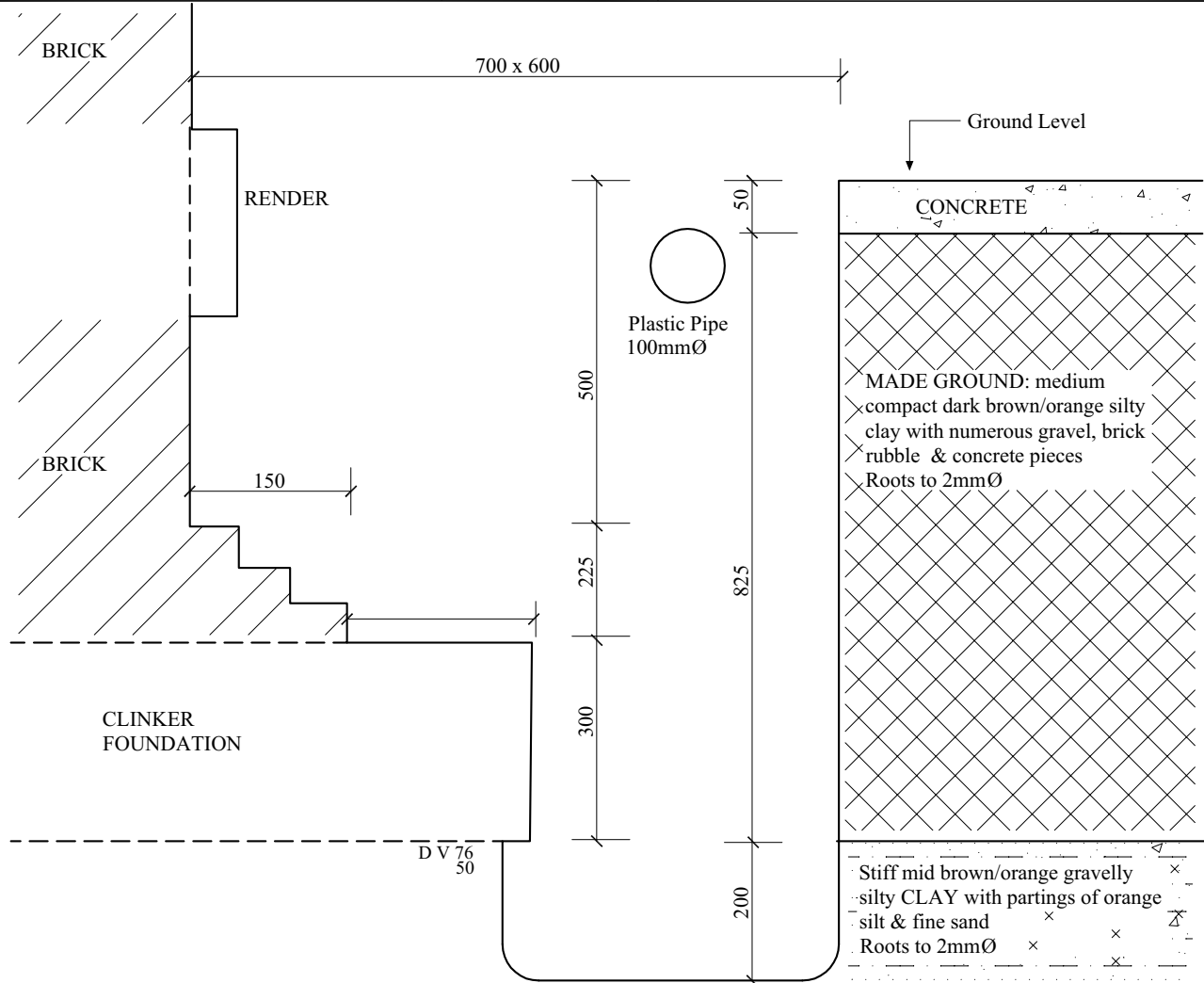
Site: 99 Greencroft Gardens, NW6
 Work carried out for: Cunningham Lindsey

Excavation Method: Hand Tools

Drawn by: NR

Weather: Dry

Ground Level mOD:



FOR STRATA BELOW 1125mm SEE BH LOG 2

Remarks: All measurements in millimetres.

Key:

D	Small disturbed sample	J	Jar sample
B	Bulk disturbed sample	V	Pilcon Vane (kPa)
W	Water sample	M	Mackintosh probe
TDTD	Too dense to drive		

Logged: SP

Checked: SE

Approved:

Scale: N.T.S.

Laboratory Testing Results

Our Ref: 169984
 Location: 99, Greencroft Gardens, MW6
 Work carried out for: Cunningham Lindsey - Maidstone

Date Sampled: 11/01/2014
 Date Received: 13/01/2014
 Date Tested: 13/01/2014
 Date of Report: 22/01/2014

TP/BH No.	Sample Ref. Depth (m)	Moisture Content (%) [1]	Soil Fraction > 0.425mm (%) [2]	Liquidity Index (%) [3]	Plastic Limit (%) [4]	Plasticity Index (%) [5]	Modified Plasticity Index (%) [6]	Soil Class [7]	Filter Paper Contact Time (h) [8]	Soil Sample Suction (kPa)	In situ Shear Vane Strength (kPa) [9]	Organic Content (%) [10]	pH Value [11]	Sulphate Content (g/l)		Class
														SO ₃ [12]	SO ₄ [13]	
2	0.93(U/S)	23	32	74	26	48	32	CV	168	76	78					
	1.5	27	26	68	27	42	31	CH	168	36	85					
	2.0	29	<5								100					
	2.5	29	<5	66	25	40	40	CH	168	132	> 130					
	3.0	33	<5								> 130					
	3.5	33	<5	76	29	47	47	CV	168	124	> 130					
	4.0	32	<5								> 130					
	4.5	32	<5						168	165	> 130					
	5.0	31	<5						168	225	> 130					

Test Methods / Notes

- [1] BS 1377: Part 2: 1990, Test No 3.2
- [2] Estimated if <5%, otherwise measured
- [3] BS 1377: Part 2: 1990, Test No 4.4
- [4] BS 1377: Part 2: 1990, Test No 5.3
- [5] BS 1377: Part 2: 1990, Test No 5.4
- [6] BRE Digest 240: 1993
- [7] BS 5930: 1981: Figure 31 - Plasticity Chart for the classification of fine soils
- [8] In-house method S9a, adapted from BRE IP 493
- [9] Values of shear strength were determined in situ by CET using a Picon hand vane or Geonor vane (GV).
- [10] BS 1377: Part 3: 1990, Test No 4
- [11] BS 1377: Part 2: 1990, Test No 9
- [12] BS 1377: Part 3: 1990, Test No 5.6
- [13] SO₄ = 1.2 x SO₃
- [14] BRE Special Digest One (Concrete in Aggressive Ground) August 2005

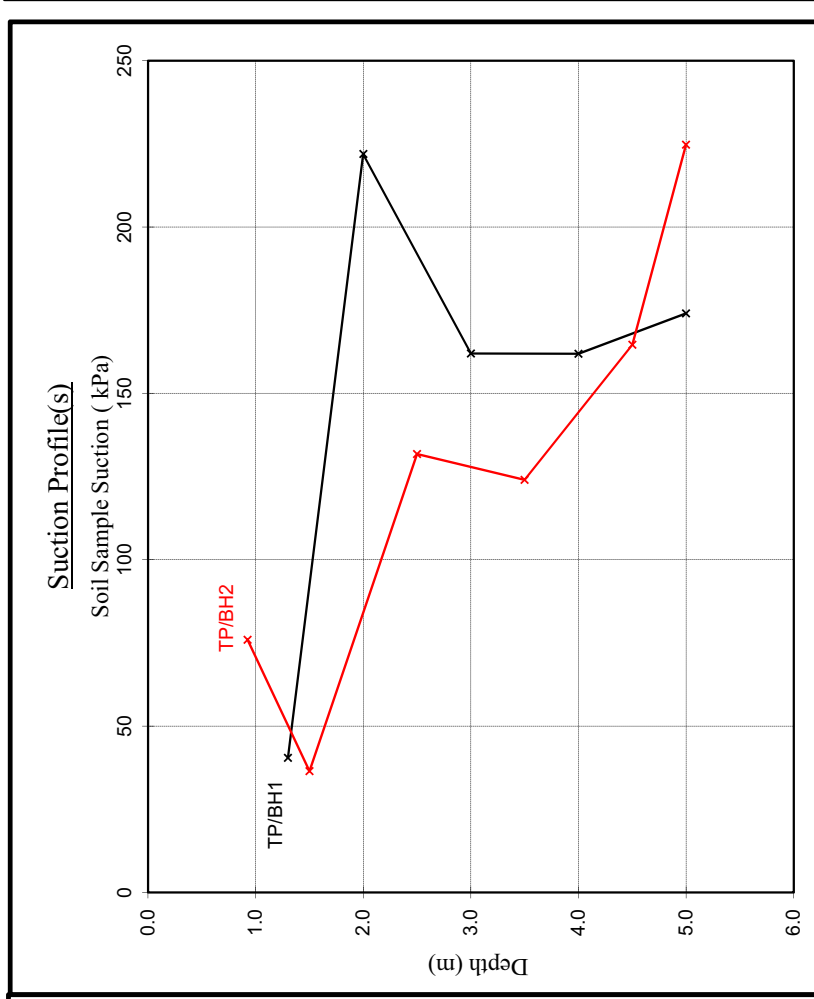
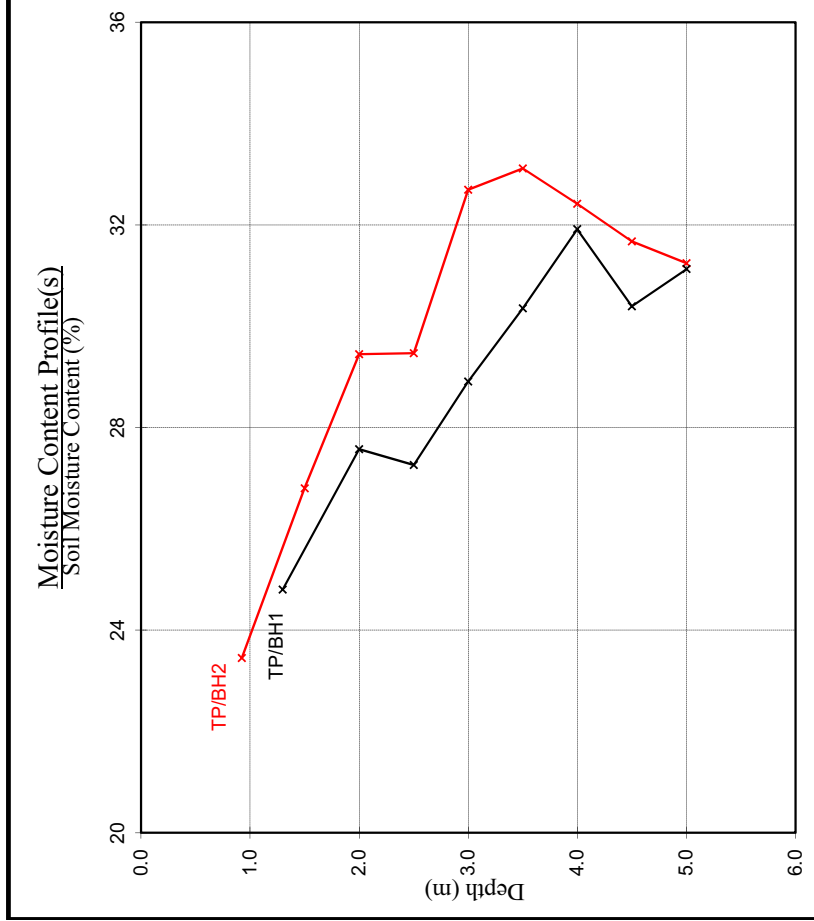
Note that if the SO₄ content falls into the DS-4 or DS-5 class, it would be prudent to consider the sample as falling into the DS-4n or DS-5n class respectively unless water soluble magnesium testing is undertaken to prove otherwise

Key

- D Disturbed sample (small)
- B Disturbed sample (bulk)
- U Undisturbed sample
- W Groundwater sample
- ENP Essentially Non-Plastic by inspection
- U/S Underside of Foundation

Moisture Content and Suction Profiles

Our Ref: 169984 Date Sampled: 11/01/2014
 Location: 99, Greencroft Gardens, MW6 Date Received: 13/01/2014
 Work carried out for: Cunningham Lindsey - Maidstone Date Tested: 13/01/2014
 Note: Unless specifically noted the profiles have not been related to a site datum. Date of Report: 22/01/2014



Notes

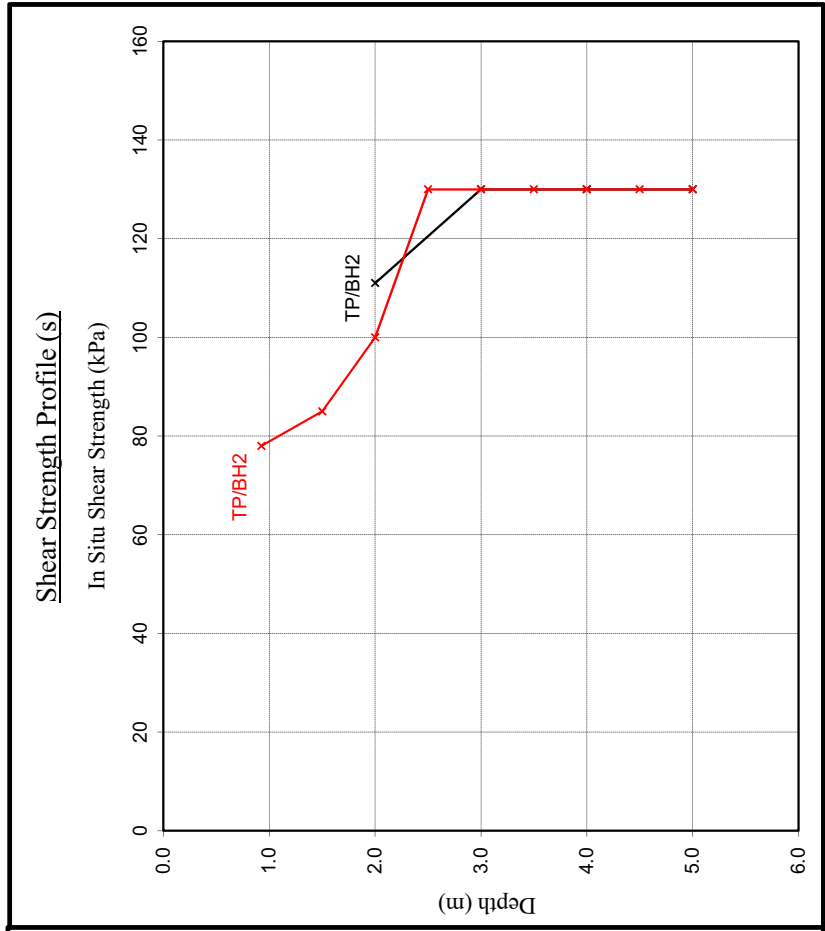
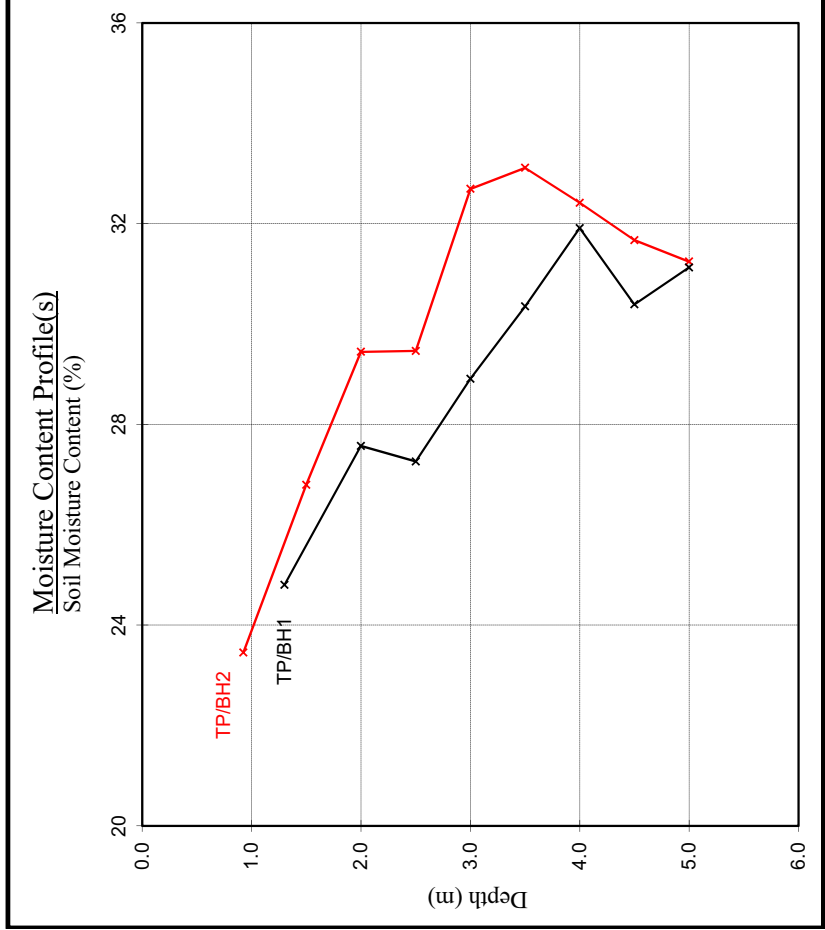
1. If plotted, 0.4 LL and PL+2 (after Driscoll, 1983) should only be applied to London Clay (and similarly overconsolidated clays) at shallow depths.

Note

When shown, the theoretical equilibrium suction profiles are based on conventional assumptions associated with London Clay (and similarly overconsolidated clays) at shallow depths. Note that the sample disturbance component is dependant on the method of sampling and any subsequent recompaction. The above plots show this to be 100kPa which is the value suggested by the BRE on the basis of their limited number of tests on recompacted samples. This may or may not be appropriate in this instance and judgement should be exercised.

Moisture Content and Shear Strength Profiles

Our Ref: 169984 Date Sampled: 11/01/2014
 Location: 99, Greencroft Gardens, MW6 Date Received: 13/01/2014
 Work carried out for: Cunningham Lindsey - Maidstone Date Tested: 13/01/2014
 Note: Unless specifically noted the profiles have not been related to a site datum. Date of Report: 22/01/2014



Notes

1. If plotted, 0.4 LL and PL+2 (after Driscoll, 1983) should only be applied to London Clay (and similarly overconsolidated clays) at shallow depths.

Note

Unless otherwise stated, values of Shear Strength were determined in situ by CET using a Pilecon Hand Vane the calibration of which is limited to a maximum reading of 130 kPa.

Certificate of Analysis

The following work was commissioned by CET on behalf of their client. Root samples were obtained in sealed packets from the above site with no reference given as to the types of tree or shrub from which they may have originated. The results were as follows -

<u>Trial pit/ Borehole number</u>	<u>Root diameter (mm)</u>	<u>Tree, shrub or climber from which root originates</u>	<u>Result of starch test</u>
TP1 (USF)	1 mm	Tilia spp. 2 roots	Positive
BH1 (to 3m)	<1 mm	Tilia spp. *	Negative
TP2 (USF)	1.5 mm	Platanus spp. 2 roots	Positive
BH2 (to 2.2m)	<1 mm	probably Populus spp. but possibly Salix spp. ** 3 roots	Negative

* Plus 1 other too decayed for identification.

** All in a state of decay.

Tilia spp. are limes.

Platanus spp. include London plane and Oriental plane.

Populus spp. are poplars and aspen; Salix spp. are willows.



MDM

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Head of Laboratory Services : M D Mitchell B.Sc. (Hons), M.Phil.

Plant Anatomist : Dr G S Turner B.Sc. (Hons), M.Sc., Ph.D

Consultant: Dr M P Denne B.Sc. (Hons), M.Sc., Ph.D

Registered in England. No 295427, Registered Office: 6G Greensfield Court, Alnwick, Northumberland, NE66 2DE

To: Cunningham Lindsey - Maidstone
4 North Court
South Park Business Village
Armstrong Road
Kent
ME15 6JZ

Our Ref: **169984**
Your Ref: **7498207**
Date: **13-Jan-14**

Ftiao: Yiu-Shan Wong

ESTIMATE

Site:- **99 Greencroft Gardens, London**

Item		Amount
	No recommendations required to the private drainage surveyed.	

Notes

Repairs to shared runs and off boundary pipe-work may be the responsibility of the water authority.	Total	£0.00
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Condition Grade

A - Structurally sound with no leakage evident.	plus VAT @20%	£0.00
B - Cracks and fractures observed.		
C - Structurally unsound	Total + VAT	£0.00

Quotation is binding only if accepted within 28 days from date of issue and is subject to our Standard Terms and Conditions
The price qualification notes, stated on the drainage solutions schedule of rates, apply to this quotation.
CET Structures Ltd undertakes to return to site free of charge to carry out remedial work to the drainage repairs set out above for a period of 2 months from the date of this invoice. The company standard charge rates will apply to the visit should the work requested be unrelated to the said repairs.

Underground Drainage Report

Sheet: 1 of 5

Job No: 169984

Date: 11-Jan-14

Site: 99 Greencroft Gardens, London

Work carried out for: Cunningham Lindsey - Maidstone

MANHOLE DETAILS

Manhole	Depth to Invert	Condition
MH1	350mm	As built
MH2	775mm	As built
MH3	1000mm	As built
MH4	1250mm	As built
MH5	850mm	As built
MH6	3200mm	Poor

CCTV Survey:-

1. Drainage Run:

From manhole 1 run 1 to rain water gully 1 - 100mm clay surface water - Upstream (not shared)

Metres:	Code:	Observations:	Surface Material/ Condition:
0.0		Start	Raised concrete slab patio
0.1	MC	Lined	
4.4	FH	Reached RWG1	

2 Drainage Run:

From manhole 1 run 2 to soil vent pipe 1 - 100mm plastic foul water - Upstream (not shared)

Metres:	Code:	Observations:	Surface Material/ Condition:
0.0		Start	Concrete
1.9	LU		
2.1	FH	Reached SVP	

Water Test Grade:

0 - Unable to fill	2 - Medium Loss over 2 minutes
1 - Heavy Loss	3 - Slow Loss over 5 minutes
	4 - No Loss

Underground Drainage Report

Sheet: 2 of 5

Job No: 169984

Date: 11-Jan-04

Site: 99 Greencroft Gardens, London

Work carried out for: Cunningham Lindsey - Maidstone

3 Drainage Run:

From manhole 1 run 3 to rain water waste gully 1 - 100mm plastic combined - Upstream (not shared)

Metres:	Code:	Observations:	Surface Material/ Condition:
0.0		Start	Concrete
0.2	LR	Slight	
1.2	LR		
1.8	DE	20%	
2.6	LL		
2.9	FH	Reached RWWG1	

4 Drainage Run:

From manhole 1 run 4 to manhole 2 - 100mm clay combined - Downstream (not shared)

Metres:	Code:	Observations:	Surface Material/ Condition:
0.0		Start	Concrete
0.1	MC	Cast iron	
2.0			Under house
5.5			Concrete
5.7	FH	Reached MH2	

5 Drainage Run:

From manhole 5 run 5 to soil vent pipe 2 - 100mm plastic foul water - Upstream (not shared)

Metres:	Code:	Observations:	Surface Material/ Condition:
0.0		Start	Concrete
0.1	LU		
0.8	GO	Line levels out	
3.3	LU		
3.5	FH	Reached SVP2	

Water Test Grade:

0 - Unable to fill	2 - Medium Loss over 2 minutes
1 - Heavy Loss	3 - Slow Loss over 5 minutes
	4 - No Loss

Underground Drainage Report

Sheet: 3 of 5

Job No: 169984

Date: 11-Jan-14

Site: 99 Greencroft Gardens, London

Work carried out for: Cunningham Lindsey - Maidstone

6 Drainage Run:

From manhole 2 run 6 to manhole 3 - 100mm liner combined - Downstream (not shared)

Metres:	Code:	Observations:	Surface Material/ Condition:
0.0		Start	Concrete
2.0	WL	10%	
2.8	ESL	From 5 o'clock to 7 o'clock - 10%	
4.0	ESL	From 5 o'clock to 7 o'clock - 10%	
9.7	FH	Reached MH3	

7 Drainage Run:

From manhole 3 run 7 to soil vent pipe 3 - 100mm clay foul water - Upstream (not shared)

Metres:	Code:	Observations:	Surface Material/ Condition:
0.0		Start	Concrete
0.2	LU		
0.6	FH	Reached SVP3	

8 Drainage Run:

From manhole 3 run 8 to manhole 4 - 100mm cast iron combined - Downstream (not shared)

Metres:	Code:	Observations:	Surface Material/ Condition:
0.0		Start	Concrete
8.5	WL	10%	
10.0	DE	10%	
10.4	WL	25%	
11.0	WL	50%	
11.2	CU	Due to interceptor blocked in MH6	
11.8	FH	Reached MH4	

Water Test Grade:

0 - Unable to fill	2 - Medium Loss over 2 minutes
1 - Heavy Loss	3 - Slow Loss over 5 minutes
	4 - No Loss

Underground Drainage Report

Sheet: 4 of 5

Job No: 169984

Date: 11-Jan-14

Site: 99 Greencroft Gardens, London

Work carried out for: Cunningham Lindsey - Maidstone

9 Drainage Run:

From manhole 4 run 9 to rain water gully 2 - 100mm clay surface water - Upstream (not shared)

Metres:	Code:	Observations:	Surface Material/ Condition:
0.0		Start	Concrete
0.4	LU		
0.4	LL		
1.2	GO	Line levels out	
1.5	FH	Unable to push - too many bends	

10 Drainage Run:

From manhole 4 run 10 to manhole 5 - 100mm cast iron combined - Upstream (not shared)

Metres:	Code:	Observations:	Surface Material/ Condition:
0.0		Start	Concrete
0.2			Topsoil
0.3	DE	20%	
1.0	DE	40%	Concrete
5.5	ESH	From 12 o'clock to 12 o'clock - 50%	
5.5	FH	Unable to push	
	GO	Survey completed on run 10	

11 Drainage Run:

From manhole 5 run 10 to manhole 4 - 100mm cast iron combined - Downstream (not shared)

Metres:	Code:	Observations:	Surface Material/ Condition:
0.0		Start	Concrete
0.2			Concrete slabs
2.2			Concrete
6.0			Topsoil
6.2	ESM	30%	
7.0			Concrete
7.8	FH	Reached MH4	

Water Test Grade:

0 - Unable to fill	2 - Medium Loss over 2 minutes
1 - Heavy Loss	3 - Slow Loss over 5 minutes
	4 - No Loss

Underground Drainage Report

Sheet: 5 of 5

Job No: 169984

Date: 11-Jan-14

Site: 99 Greencroft Gardens, London

Work carried out for: Cunningham Lindsey - Maidstone

12 Drainage Run:

From manhole 5 run 11 to unknown - 100mm plastic foul water - Upstream (not shared)

Metres:	Code:	Observations:	Surface Material/ Condition:
0.0		Start	Concrete
5.6	LU		
6.1	GO	Line levels out	
6.9	FH	Unable to push	

13 Drainage Run:

Break -in - waste gully 1 run 12 to manhole 5 - 100mm plastic foul water - Downstream (not shared)

Metres:	Code:	Observations:	Surface Material/ Condition:
0.0		Start	Concrete
1.0	LR		
1.5	FH	Reached MH5	

- END OF SURVEY -

Our assessment of the drainage system is based on our visual inspection and on information collated at the time of the survey. Where assumptions have been made these are based on our experience and do not constitute any form of guarantee, nor do we guarantee that further deterioration will not occur following this survey. CCTV video records will be stored for a period of 3 months from date of inspection and then destroyed.

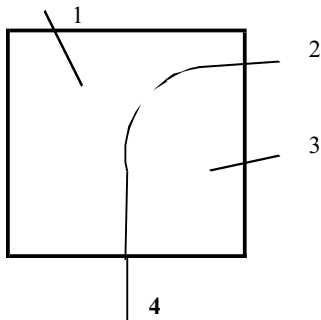
Water Test Grade:

0 - Unable to fill	2 - Medium Loss over 2 minutes
1 - Heavy Loss	3 - Slow Loss over 5 minutes
	4 - No Loss

Water Authority Sewer Condition Codes

B Broken pipe at... (or from... to...) o'clock	JN Junction at...o'clock, diameter...mm
BR Branch Major	JX Junction defective at.. o'clock, diameter.. mm
CC Crack circumferential from... to... o'clock	LC Lining of sewer changes/starts/finishes at this point
CL Crack longitudinal @... o'clock	LD Line of sewer deviates down
CM Cracks multiple from... to... o'clock	LL Line of sewer deviates left
CN Connection at... o'clock, diameter... mm	LN Line defect at (or from.. to..) o'clock
CNI Connection at... o'clock, diameter... mm, intrusion... mm	LR Line of sewer deviates right
CU Camera under water	LU Line of sewer deviates up
CX Connection defective at... o'clock	MB Missing bricks at.. (or from.. to..) o'clock
CXI Connection defective at... o'clock, diameter... mm, intrusion... mm	MC Material of sewer changes at this point
D Deformed sewer... %	MH Manhole/node
DB Displaced bricks at (or from.. to..) o'clock	MM Mortar missing medium at.. (or from.. to..) o'clock
DC Dimension of sewer changes at this point	MS Mortar missing surface at.. (or from.. to..) o'clock
DE Debris (non silt/grease)... % cross-sectional loss	MT Mortar missing total at.. (or from.. to..) o'clock
DEG Debris grease... % cross-sectional area loss	OB Obstruction... % height/diameter loss
DES Debris silt... % cross-sectional area loss	OJL Open joint large
DI Dropped invert, gap... mm	OJM Open joint medium
EHJ Encrustation heavy from.. to.. o'clock % cross-sectional area loss (at joint)	PC Length of pipe forming sewer changes at this point, new length...mm
ELJ Encrustation light from.. to.. o'clock%	RFJ Roots fine (at joint)
EMJ Encrustation medium from.. to.. o'clock %, cross-sectional area loss (at joint)	RMJ Roots mass... % cross-sectional area loss (at joint)
ESH Scale heavy... % cross-sectional area loss from... to... o'clock	RTJ Roots tap (at joint)
ESL Scale light from... to... o'clock	SA Survey abandoned
ESM Scale medium... % cross-sectional area loss from... to... o'clock	SC Shape of sewer changes at this point
FC Fracture circumferential from... to... o'clock	SSL Surface damage, spalling large at (or from.. to..) o'clock
FL Fracture longitudinal at... o'clock	SSM Surface damage, spalling medium at (or from.. to..) o'clock
FM Fractures multiple from... to... o'clock	SSS Surface damage, spalling slight at (or from.. to..) o'clock
GO General observation at this point	SWL Surface damage, wear large at... (or from.. to..) o'clock
GP General photograph number... taken at this point	SWM Surface damage, wear medium at... (or from.. to..) o'clock
H Hole in sewer at... o'clock	SWS Surface damage, wear slight at.. (or from.. to..) o'clock
IDJ Infiltration dripper at (or from... to...) o'clock (at joint)	V Vermin (rats and mice)
IGJ Infiltration gusher at (or from... to...) o'clock (at joint)	WL Water level... % height/diameter
IRJ Infiltration runner at (or from... to...) o'clock (at joint)	X Sewer collapsed... % cross-sectional area loss
ISJ Infiltration seeper at (or from... to...) o'clock (at joint)	FH End of survey
JDM Joint displaced medium	
JDL Joint displaced large	

M/H: 1 Depth: 350mm



Chamber Dimension (mm):

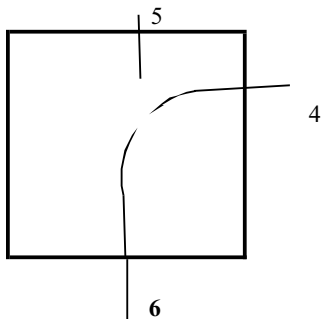
Depths of run if different to invert level:-

Run _____

Manhole Condition

As built

M/H: 2 Depth: 775mm



Chamber Dimension (mm):

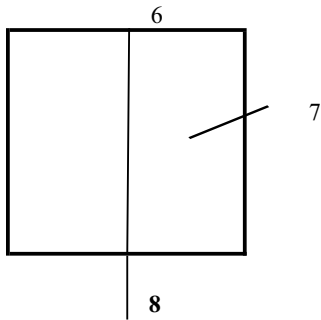
Depths of run if different to invert level:-

Run 5 500mm _____

Manhole Condition

As built

M/H: 3 Depth: 1000mm



Chamber Dimension (mm):

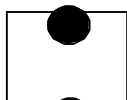
Depths of run if different to invert level:-

Run _____

Manhole Condition

As built

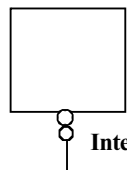
KEY...



Internal Back Drop



External Back Drop



Interceptor

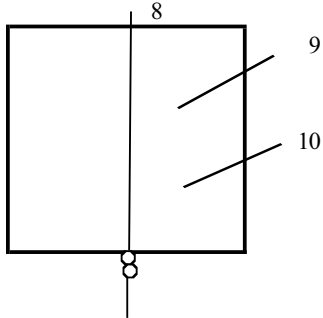
Water Pressure Test Results

From:

To:

Pass / Fail

M/H: 4 Depth: 1250mm



Chamber Dimension (mm):

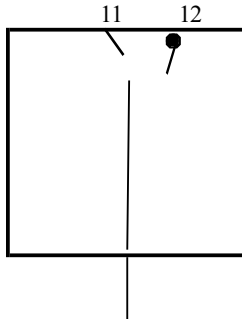
Depths of run if different to invert level:-

Run _____

Manhole Condition

As built

M/H: 5 Depth: 850mm



Chamber Dimension (mm):

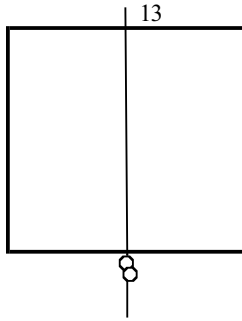
Depths of run if different to invert level:-

Run 11 300mm
 12 500mm

Manhole Condition

As built

M/H: 6 Depth: 3200mm



Chamber Dimension (mm):

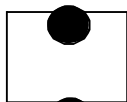
Depths of run if different to invert level:-

Run _____

Manhole Condition

Poor
Blocked at interceptor

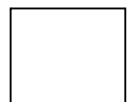
KEY...



Internal Back Drop



External Back Drop



Interceptor

Water Pressure Test Results

From:

To:

Pass / Fail