

Report for
Consolidated Developments Limited

commissioned by
Buro Happold

Factual Report on Ground Investigation



Denmark Place, London

Report No. 36237-001
June 2008

© STATS Limited 2008

CONTENTS

	Page
1. INTRODUCTION	5
1.1 Purpose of Investigation	5
1.2 Project Brief	5
1.3 Limitations	5
2. SITE DETAILS	7
2.1 Site Location and Description	7
3. GROUND INVESTIGATION	8
3.1 Site Work	8
3.2 Laboratory Testing	8
4. GEOTECHNICAL GROUND CONDITIONS	9
4.1 Published Geology and Hydrogeology	9
4.2 Findings of Ground Investigation	9
4.2.1 General Succession of Strata	9
4.2.2 Made Ground	9
4.2.3 River Terrace Deposits	10
4.2.4 London Clay Formation	10
4.2.5 Lambeth Group	11
4.2.6 Thanet Sand Formation	11
4.2.7 White Chalk	11
4.3 Groundwater Results	12
4.4 Ground Gas Monitoring	13

TABLES

2.1	Site Description
3.1	Summary of Ground Investigation Site Work Activities
4.1	General Succession of Strata Encountered
4.2	Summary of Soil Parameters for Made Ground
4.3	Summary of Soil Parameters for River Terrace Deposits
4.4	Summary of Soil Parameters for London Clay Formation
4.5	Summary of Soil Parameters for the Cohesive Lambeth Group
4.6	Summary of Soil Parameters for the Granular Lambeth Group
4.7	Summary of Soil Parameters for the Thanet Sand
4.8	Summary of Soil Parameters for the White Chalk
4.9	Groundwater Results
4.10	Vibrating Wire Piezometers Monitoring Results
4.11	Ground Gas Monitoring Results

FIGURES

1	Site Location Plan
2	Site Layout Plan
3	SPT 'N' Values vs Elevation
4	Undrained Shear Strength vs Elevation
5	Natural Moisture Content vs Elevation
6	Plasticity Classification Chart

APPENDICES

A	Fieldwork Records
A1	Borehole Records
A2	Core Photographs

- A3 Cambridge Insitu PressureMeter Testing Report and Data (on CD)
- A4 Gas/Water Monitoring Record Sheets
- A5 Vibrating Wire Piezometer Monitoring Record Sheet

B Geotechnical Laboratory Test Records

- B1 Moisture Content and Plasticity Index of Soil
- B2 Particle Size Distribution Results including Hydrometer Analysis (2no. sample results outstanding)
- B3 Quick Undrained Triaxial Test Results without the measurement of Pore Pressure
- B4 Failure Sketches for Triaxial Test Results without the measurement of Pore Pressure
- B5 Consolidated Undrained Triaxial Test Results with the measurement of Pore Pressure (Outstanding)
- B6 Natural Moisture Content, Dry Density, Saturation Moisture Content, Uniaxial Compressive Strength and Determination of Deformability of White Chalk
- B7 Sulfate, pH, Organic matter and Sulphur Analysis Test Results

C Chemical Laboratory Test Records

- C1 Chemical Analysis of Soils
- C2 Chemical Analysis of Water (1no. sample result outstanding)

DOCUMENT CONTROL

Document Title: Factual Report on Ground Investigation
Denmark Place, London

The Client: Consolidated Developments Limited
26 Soho Square
London
W1D 4NU

STATS Limited (STATS) has prepared this report in accordance with the instructions of Buro Happold acting on behalf of the Consolidated Developments Limited ("the Client"). This report is confidential and non-assignable by the Client and STATS shall not be responsible for any use of the report or its contents for any purpose other than that for which it was prepared and provided. Should the Client require to pass copies of the report to other parties for information, the whole of the report should be so copied, but no professional liability or warranty shall be extended to other parties by STATS in this connection without the explicit written agreement thereto by STATS.

Report Number	Status	Date of issue
36237-001	FINAL	26 th June 2008

Prepared by Julia Bota
Geotechnical Engineer



Reviewed by Svetislav Trajkovski
Senior Geotechnical Engineer



Approved by Jon Bailey
Associate Director



Page no 4 of 13

STATS Limited

Porterswood House
Porters Wood
St Albans
Hertfordshire, AL3 6PQ
United Kingdom

Tel: +44 (0) 1727 833261
Fax: +44 (0) 1727 835682
Email: info@stats.co.uk
Website: www.stats.co.uk

Offices also at
Coventry and Swansea

- Environment
- Geophysics
- Geotechnics
- Land Quality & Remediation
- Materials
- Structures
- Asbestos & Water Management
- Inspection & Quality Assurance
- UKAS Laboratory

Directors

Adrian Marsh
BSc MSc CEng FIMMM MIHT CGeol FGS

Gareth Jones
BSc MSc CEng MICE

Ian Sims
BSc PhD CEng FIMMM CGeol FGS FRSA MICT MCQI MEWI

Shon Williams
BSc PhD CEng MICE

Fergus Collie
CEng MIMMM FICT MRKIE MCQI FGS

Paul Stearns
BSc MSc DIC CGeol FGS Mtd

Jon Clark
BSc MSc CGeol FGS MIMMM

Jason Hodgkiss
CEnv MIEEnvSc CQP

Andrew Grafton

George Tuckwell
BSc PhD CSci CGeol FGS

Alan Ryder
BSc PhD

Nigel Porter
BSc CEng FICE MCenSE

Associate Directors

Robert Elches
BEng IEng MIE MIHT

Janet Farr

Michael Allen

Barry Guildford

Jon Bailey
BEng FGS

Vince Warwick

Mark Steward
BSc MSc FGS CGeol CSci EurGeol

Company Secretary
Steven Mills
FCA FCT



Lloyd's Register certified
for ISO 9001 Quality Management and
ISO 14001 Environmental Management



Registered in England No. 2833839
Spring Lodge, 172 Chester Road,
Helsby, Cheshire, WA6 0AR

A member of the RSK Group plc

1. INTRODUCTION

1.1 Purpose of Investigation

On the instructions of Buro Happold on behalf of Consolidated Developments Limited, STATS has carried out a ground investigation at Denmark Place, London. The project was commissioned in order to obtain information on the ground conditions in relation to the proposed development of the site, which includes the demolition of the current structures while incorporating the interaction with the proposed Northern Line escalator for the Tottenham Court Road Station Congestion Relief Scheme and proposed Crossrail tunnels. The proposed construction will comprise a twelve-storey structure with a deep basement.

1.2 Project Brief

The project was carried out to an agreed brief, as set out in Buro Happold Consulting Engineers Ground Investigation Specification 009942 Rev 01 dated January 2008 and STATS proposal letter of 22nd February 2008, Ref: 79845/01stquo. This included the following tasks:

Desk Study

A Desk Study has been carried out by the third party (instructing client).

Site Investigation

- Sinking of 2No. light cable percussive boreholes to a maximum of 7.60m depth.
- Extension of one of the light cable percussive boreholes to 54.00m by open hole rotary drilling techniques.
- Extension of the second light cable percussive borehole to 63.50m depth by Geobore-S rotary coring techniques.
- 9No. in-situ pressuremeter tests.
- Associated sampling and on-site testing.
- Installation of 1No. 50mm diameter soil gas/water monitoring well to 7m depth.
- Installation of 4No. vibrating wire piezometers to 15.0m, 24.1m, 35.05m and 55.0m depths.
- 4No. weekly visits to site to undertake gas and water monitoring and sampling and vibrating wire monitoring.
- Laboratory chemical testing of soil samples for common contaminants.
- Laboratory geotechnical testing of soil samples for classification purposes.
- Factual reporting

1.3 Limitations

The opinions expressed in this report are based on the ground conditions encountered during the site work, the results of field and laboratory testing and interpretation between exploratory holes. The material encountered and samples obtained represent only a small proportion of the materials present on-site, therefore other conditions may prevail at the site which have not been revealed by this investigation.

The results of STATS laboratory tests are covered by UKAS accreditation, but opinions and interpretations expressed in the report and on the site work records are outside the scope of this accreditation. Where laboratory testing has been carried out at a sub-contractor

laboratory, this laboratory is an approved sub-contractor in accordance with the requirements of STATS' quality management system and is UKAS accredited for the relevant range of tests undertaken.

2. SITE DETAILS

2.1 Site Location and Description

The site, which may be located at National Grid reference TQ298812, is situated within the London Borough of Camden on the southeast corner of Charing Cross Road and Andrew Borde Street in Central London, south of Centre Point Plaza on the eastern side of Charing Cross Road. An extract of the 1:50 000 Ordnance Survey map showing the location of the site is included in **Figure 1**.

The site is currently occupied by several low-rise buildings currently used as offices, shops, cafes and a nightclub. The external areas of the site comprise pavements and tarmac with a tarmac and concrete courtyard to the rear of Denmark Place.

The characteristics of the site observed during the site work period and obtained from current Ordnance Survey maps are summarised in **Table 2.1**.

Table 2.1 – Site Description

Feature	Description
<i>Physical characteristics</i>	
Area of site	Approximately 0.25 hectares.
Ground levels	The site is generally flat. Ground levels at the site ranged between 25.00m to 25.50m AOD.
Depressions in the ground surface	None observed.
Waterlogged or marshy ground	None observed
Surface water	The nearest surface watercourse/feature to the site is the River Thames approximately 1km to the south of the site.
Trees and hedges	None observed.
Existing buildings on site	The site is essentially fully occupied by low to mid-rise buildings dating from the 1800s.
Basements on site	There is a basement towards the rear of 144 Charing Cross Road, which is a nightclub. Basements were also evident from street level along Denmark Place.
External hardstanding	The external areas are entirely covered with hardstanding, primarily of tarmac with some concrete areas.
Made ground, earthworks and quarrying	A cover immediately adjacent to the borehole positions indicated a chamber 3.50m deep and therefore made ground to a minimum of 3.50m depth immediately adjacent to that location. Made ground is estimated to be at least 2.00m thick across the remainder of the site given the depth of existing basements.
Potentially unstable slopes on or close to site	None observed.
Buried services present	All of the main statutory services are present on site.

3. GROUND INVESTIGATION

3.1 Site Work

The site work was carried out between 8th April and 16th May 2008 and comprised the activities summarised in **Table 3.1**. The exploratory hole logs and other site work records, as listed in the Contents, are presented in **Appendix A**.

Table 3.1 Summary of ground investigation site work activities

Investigation Type	Number	Location/ Designation
Boreholes - by light cable percussive methods	2	BH101 and BH102
Boreholes by rotary open hole methods	1	BH102
Borehole by rotary coring Geobore-S methods	1	BH101
In-situ pressuremeter tests	9	BH102
Monitoring well installations	1	BH101
Vibrating wire piezometer installations	4	BH101 and BH102
Ground gas and water level monitoring in monitoring well installations	4	BH101
Vibrating wire piezometer monitoring	4	BH101 and BH102
Obtain water sample from monitoring well installations after purging well	1	BH101

The investigation points were determined by the instructing client (Buro Happold) and located by reference to physical features present on the site at the time of investigation and giving consideration to the presence of buried and overhead services. The locations of the exploratory holes are given on the Site Layout Drawing in **Figure 2**.

One light cable percussion borehole with rotary follow on (BH103) scheduled to 60m depth was omitted from the investigation on the instruction of Buro Happold. This revision was due congested buried services at the proposed location along Denmark Place.

Two additional pressuremeter tests were undertaken as instructed by Buro Happold in order to ensure results were obtained within the Thanet Sands.

3.2 Laboratory Testing

A programme of geotechnical and chemical laboratory testing, scheduled by Buro Happold, was carried out on selected samples taken from various strata. The laboratory results, as listed in the Contents, are presented in **Appendices B** and **C**, respectively.

4. GEOTECHNICAL GROUND CONDITIONS

4.1 Published Geology and Hydrogeology

The published 1:50,000 scale geological map (Sheet No 256 “North London”) indicates that the site is underlain by Quaternary River Terrace Deposits overlying the London Clay Formation over the Lambeth Group over the Thanet Sand Formation, which in turn overlie the White Chalk Subgroup at depth.

The existing topography and history of development of the site suggests that in addition to these natural strata, made ground may be present on the site.

The hydrogeology of the site is likely to be characterised by the presence of a shallow unconfined aquifer present in the superficial River Terrace Deposits, and a deep aquifer comprising the White Chalk. The Environment Agency Groundwater Vulnerability Map of the area (Sheet No. 40 “Thames Estuary”) classifies the River Terrace Deposits as a Minor Aquifer with a High (Urban) Vulnerability rating. The shallow groundwater is anticipated to flow generally towards or sub-parallel to the direction of flow of the River Thames.

4.2 Findings of Ground Investigation

4.2.1 General Succession of Strata

The exploratory holes revealed that the site is underlain by a variable thickness of Made Ground overlying the River Terrace Deposits over London Clay Formation overlying the Lambeth Group, Thanet Sand and White Chalk at depth. This generally appears to confirm the stratigraphical succession suggested by the published geological records. For the purpose of discussion, the ground conditions are summarised in **Table 4.1** below.

Table 4.1 General succession of strata encountered

Brief Description	Depth to top of stratum m.bgl (mAOD)	Thickness (m)
Made Ground	G.L. (25.10 to 25.11)	3.50 to 4.40
River Terrace Deposits	3.50 to 4.40 (20.70 to 21.61)	1.60 to 2.50
London Clay Formation	6.00 (19.10 to 19.11)	24.25 *
Lambeth Group	30.25 (-5.15)	18.55*
Thanet Sand	48.8 (-23.7)	4.00*
White Chalk	52.80 (-27.7)	10.70m (not proven)

* exact thickness proven in borehole BH101 only

4.2.2 Made Ground

Made ground was encountered at both borehole locations ranging in thickness from 3.50m to 4.40m and generally included initial thickness (0.25m) of unreinforced concrete. The made ground was variable in nature and reference should be made to the individual exploratory records for detailed descriptions. The maximum thickness of made ground (4.40m) was encountered in borehole BH101.

The measured and inferred soil parameters for the stratum are listed in **Table 4.2** overleaf.

Table 4.2 Summary of Soil Parameters for Made Ground

Soil Parameters	Range	Results
Liquid Limit (%)	32	Appendix B; Figure 6
Plastic Limit (%)	17	Appendix B
Plastic Index (%)	15	Appendix B; Figure 6
Modified Plasticity Index (%)	7.5 to 15	
Volume Change Potential (NHBC)	Low	
Moisture Content (%)	16 to 28	Appendix B; Figure 5
SPT 'N' Values	1 to 25	Appendix A; Figure 3

4.2.3 River Terrace Deposits

The River Terrace Deposits were encountered directly beneath the made ground. The stratum typically comprised dense to very dense, brown slightly silty sandy fine to coarse angular to subrounded GRAVEL.

The measured and inferred soil parameters for the stratum are listed in **Table 4.3** below.

Table 4.3 Summary of Soil Parameters for River Terrace Deposits

Soil Parameters	Range	Results
SPT 'N' Values	21 to 50	Appendix A; Figure 3
Density Term	Medium Dense to Very Dense	

4.2.4 London Clay Formation

The London Clay typically comprised firm, becoming stiff and very stiff with depth, grey fissured locally thinly laminated CLAY. Weak mudstone 'bands'/concretions were encountered within both of the boreholes at elevations ranging between 12.70m AOD and 3.55m AOD. Reference should be made to the borehole records for further details.

The measured and inferred soil parameters for the stratum are listed in **Table 4.4** below.

Table 4.4 Summary of soil parameters for London Clay Formation

Soil Parameters	Range	Results
Liquid Limit (%)	48 to 83	Appendix B; Figure 6
Plastic Limit (%)	22 to 32	Appendix B
Plastic Index (%)	25 to 51	Appendix B; Figure 6
Modified Plasticity Index (%)	22.25 to 51	
Plasticity Term	Intermediate to Very High	Figure 6
Volume Change Potential (NHBC)	Medium to High	
Moisture Content (%)	20 to 34	Appendix B; Figure 5
SPT 'N' Values	19 to 49	Appendix A; Figure 3
Undrained Shear Strength (kN/m ²) measured by Triaxial Testing	64 to 360	Appendix B; Figure 4
Strength Term	Firm to Very Stiff	

4.2.5 Lambeth Group

The Lambeth Group was encountered directly beneath the London Clay. The stratum typically comprised very stiff and hard, locally laminated, multicoloured CLAY and very dense laminated, locally silty, fine SAND.

The measured and inferred soil parameters for the stratum are listed in **Tables 4.5 and 4.6** below.

Table 4.5 Summary of Soil Parameters for Cohesive Lambeth Group

Soil Parameters	Range	Results
Liquid Limit (%)	46 to 74	Appendix B; Figure 6
Plastic Limit (%)	14 to 31	Appendix B
Plastic Index (%)	16 to 46	Appendix B; Figure 6
Modified Plasticity Index (%)	16 to 46	
Plasticity Term	Intermediate to Very High	Figure 6
Volume Change Potential (NHBC)	Low to High	
Moisture Content (%)	12 to 25	Appendix B; Figure 5
SPT 'N' Values	48 to 82	Appendix A; Figure 3
Undrained Shear Strength (kN/m ²) measured by Triaxial Testing	193 to 955	Appendix B; Figure 4
Strength Term	Very Stiff to Hard	

Table 4.6 Summary of Soil Parameters for Granular Lambeth Group

Soil Parameters	Range	Results
Moisture Content (%)	13	Appendix B; Figure 5
SPT 'N' Values	89 to 218	Appendix A; Figure 3
Density Term	Very dense	

4.2.6 Thanet Sand Formation

The Thanet Sand Formation was encountered directly beneath the Lambeth Group. The stratum typically comprised very dense dark green grey silty fine SAND. A layer of flint cobbles (approximately 0.7m thick) was encountered at the base of the stratum representing the Bullhead Beds.

The measured and inferred soil parameters for the stratum are listed in **Table 4.7** below.

Table 4.7 Summary of Soil Parameters for Thanet Sand Formation

Soil Parameters	Range	Results
SPT 'N' Values	125 to 188	Appendix A; Figure 3
Density Term	Very dense	

4.2.7 White Chalk

The Chalk stratum generally comprises weak to moderately weak, medium density white structured CHALK, CIRIA Grades A-B / 1-4. Core recovery was less than 20% in the top 2.70m of Chalk, probably due to the nature of the flint cobbles encountered at the surface of the Chalk.

The measured and inferred soil parameters for the stratum are listed in **Table 4.8** below.

Table 4.8 Summary of Soil Parameters for White Chalk

Soil Parameters	Range	Results
SPT 'N' Values	92 to 173	Appendix A; Figure 3
Moisture Content (%)	21.1 to 26.2	Appendix B
Saturation Moisture Content (%)	22.3 to 26	Appendix B
Dry Density (Mg/m ³)	1.55 to 1.69	Appendix B
Uniaxial Compressive Strength (MPa)	3.7 to 5.2	Appendix B
Young' Modulus (GPa)	0.08 to 0.17	Appendix B
Density Scale	Medium Density	

4.3 Groundwater Results

Groundwater was encountered in boreholes BH101 and BH102 at the depths summarised in **Table 4.9** below.

Table 4.9 Groundwater Results

BH	Strike m.bgl	Rise m.bgl	Monitoring Results m.bgl (mAOD)				Strata
			22/05/08	29/05/08	05/06/08	12/06/08	
BH101	5.60	5.60	4.73 (20.37)	4.75 (20.35)	4.88 (20.22)	Not yet undertaken	River Terrace Deposits
BH102	5.00	4.00	Not installed				River Terrace Deposits

The records of the groundwater monitoring visits are summarised in **Appendix A**.

The groundwater monitoring results generally reflect the perched groundwater present in the River Terrace Deposits.

The monitoring results of the vibrating wire piezometers installed in BH101 and BH102 are shown in **Table 4.10** below.

Table 4.10 Vibrating Wire Monitoring Results

BH	Depth of piezometer m.bgl (mAOD)	Monitoring Results		
		Date	Pore Pressure kN/m ²	Piezometric Level (mAOD)
BH101	24.10 (1.00)	15/05/08	52.27	6.33
		16/05/08	43.08	5.39
		22/05/08	35.43	4.61
		29/05/08	34.88	4.56
		05/06/08	33.77	4.44
		12/06/08	34.32	4.50
BH102	15.00 (10.11)	25/04/08	62.49	16.48
		02/05/08	82.84	18.56
		12/05/08	63.26	16.56
		16/05/08	75.02	17.76
		22/05/08	73.52	17.6
		29/05/08	72.76	17.53
		05/06/08	72.39	17.49
12/06/08	72.77	17.53		

BH	Depth of piezometer m.bgl (mAOD)	Monitoring Results		
		Date	Pore Pressure kN/m ²	Piezometric Level (mAOD)
BH102	35.05 (-9.94)	25/04/08	47.54	-5.09
		02/05/08	63.58	-3.46
		12/05/08	78.54	-1.93
		16/05/08	73.28	-2.47
		22/05/08	75.04	-2.29
		29/05/08	75.04	-2.29
		05/06/08	76.79	-2.11
		12/06/08	79.42	-1.84

The detailed records of the vibrating wire monitoring visits are presented in **Appendix A**.

The vibrating wire piezometer installed in borehole BH101 at 55.0m depth has not responded since the backfilling of the borehole was completed.

It should be noted that groundwater levels might fluctuate for a number of reasons including seasonal variations. On-going monitoring would be required to establish both the full range of conditions and any trends in groundwater levels.

4.4 Ground Gas Monitoring

The presence of ground gases has been monitored on 4No. weekly visits to the site following the completion sitework. The results of the monitoring of gas concentrations are given in **Appendix A** and summarised in **Table 4.11** below.

Table 4.11 Ground Gas Monitoring Results

BH	Depth of installation (mbgl)	No. of Visits	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	Flow Rate (l/hr)	Atm. Pressure (mbar)
BH101	7.0	4	<0.1-0.1	1.6-4.6	4.6-11.4	-0.2-0.1	1009-1014

FIGURES

(this section contains 7 pages, including this one)



Site: Denmark Place

Client: Consolidated Developments Limited

National Grid Reference: TQ298812

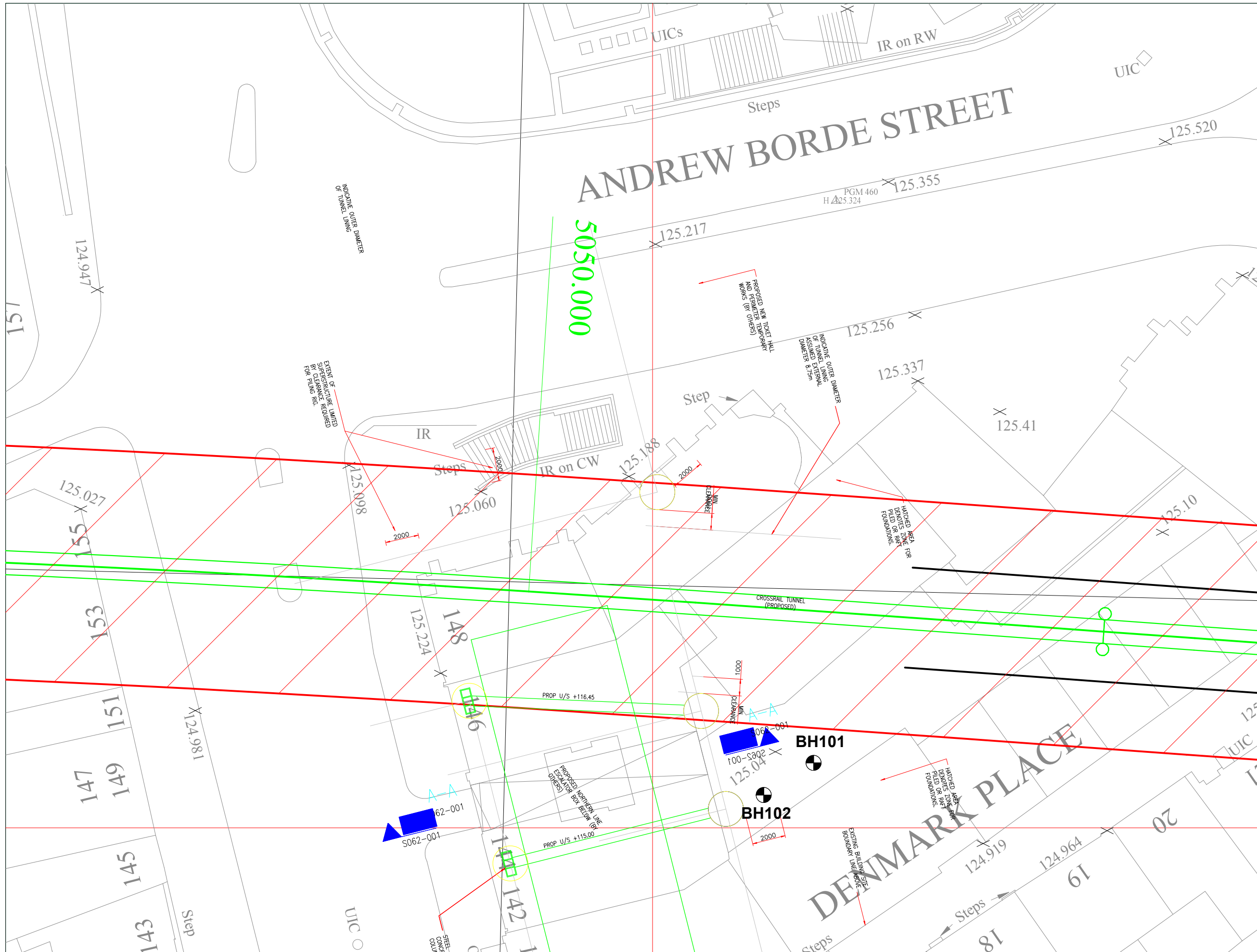
Scale: 1:50,000 (reduced)

STATS

SITE LOCATION PLAN

Job No: 36237

Fig No: 1



NOTES:

BH101 (529867.9 E; 181290.3 N)

BH102 (529866.3 E; 181289.8 N)

Project:
**Denmark Place
 London**

Title:
Site Layout Plan

Client:
**Consolidated Developments
 Limited**

STATS
 Specialist Engineering, Materials
 and Environmental Consultants

Porterswood House
 Porters Wood
 St Albans
 Hertfordshire, UK
 AL3 6PQ

Tel: +44 (0) 1727 833261
 Fax: +44 (0) 1727 811528
 Email: info@stats.co.uk
 Website: www.stats.co.uk

By: BZ	Date: 9/06/08	Scale: NTS
Checked: JB	Report/Job Number: 36237/01	Figure: 2
DRAWING NUMBER: 36237/01		REV: 0



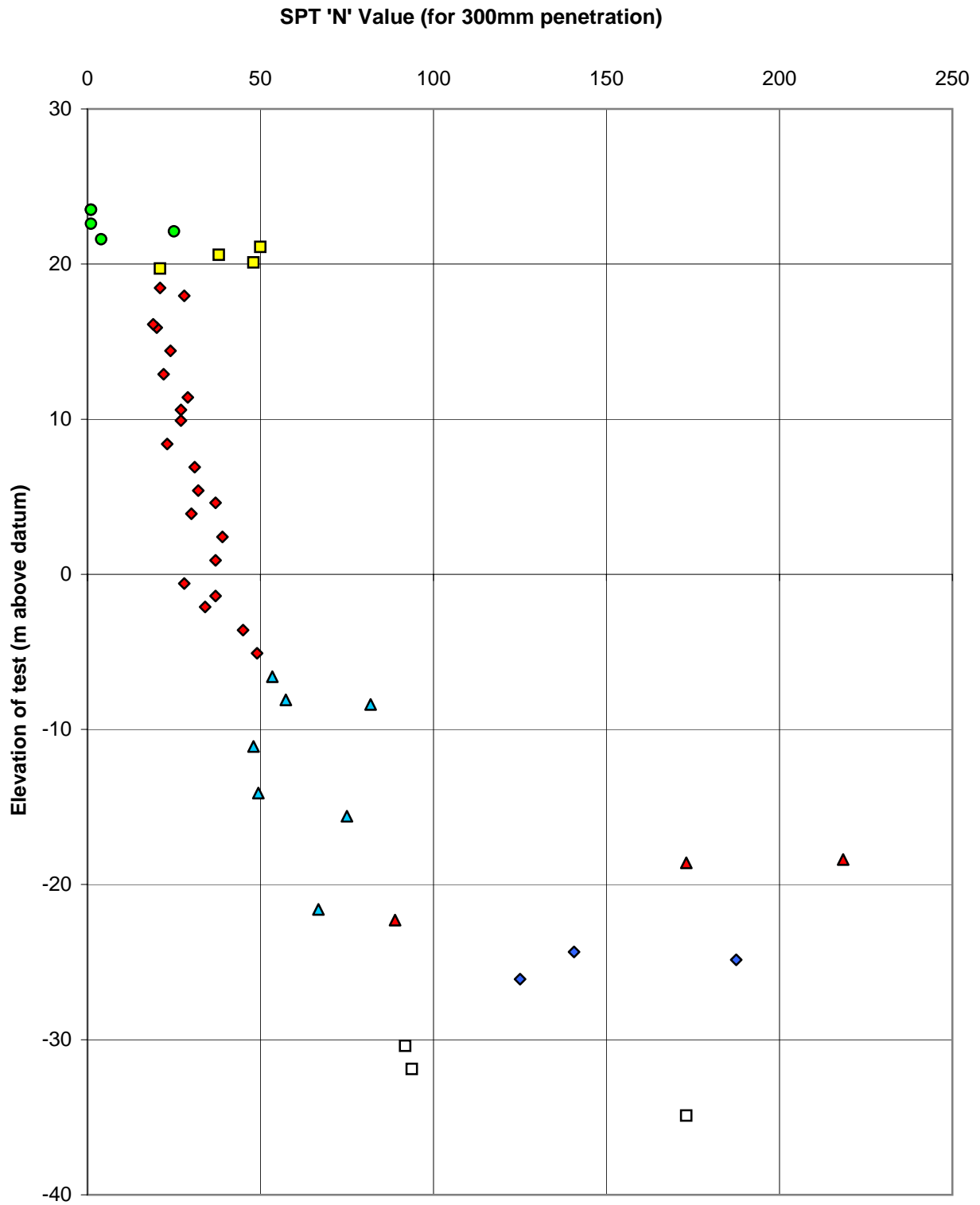
Specialist Engineering, Materials and Environmental Consultants

SPT 'N' VALUES vs Elevation

Site:
Denmark Place, London

Client:
Consolidated Developments Limited

Job Number:	36237
Figure:	3

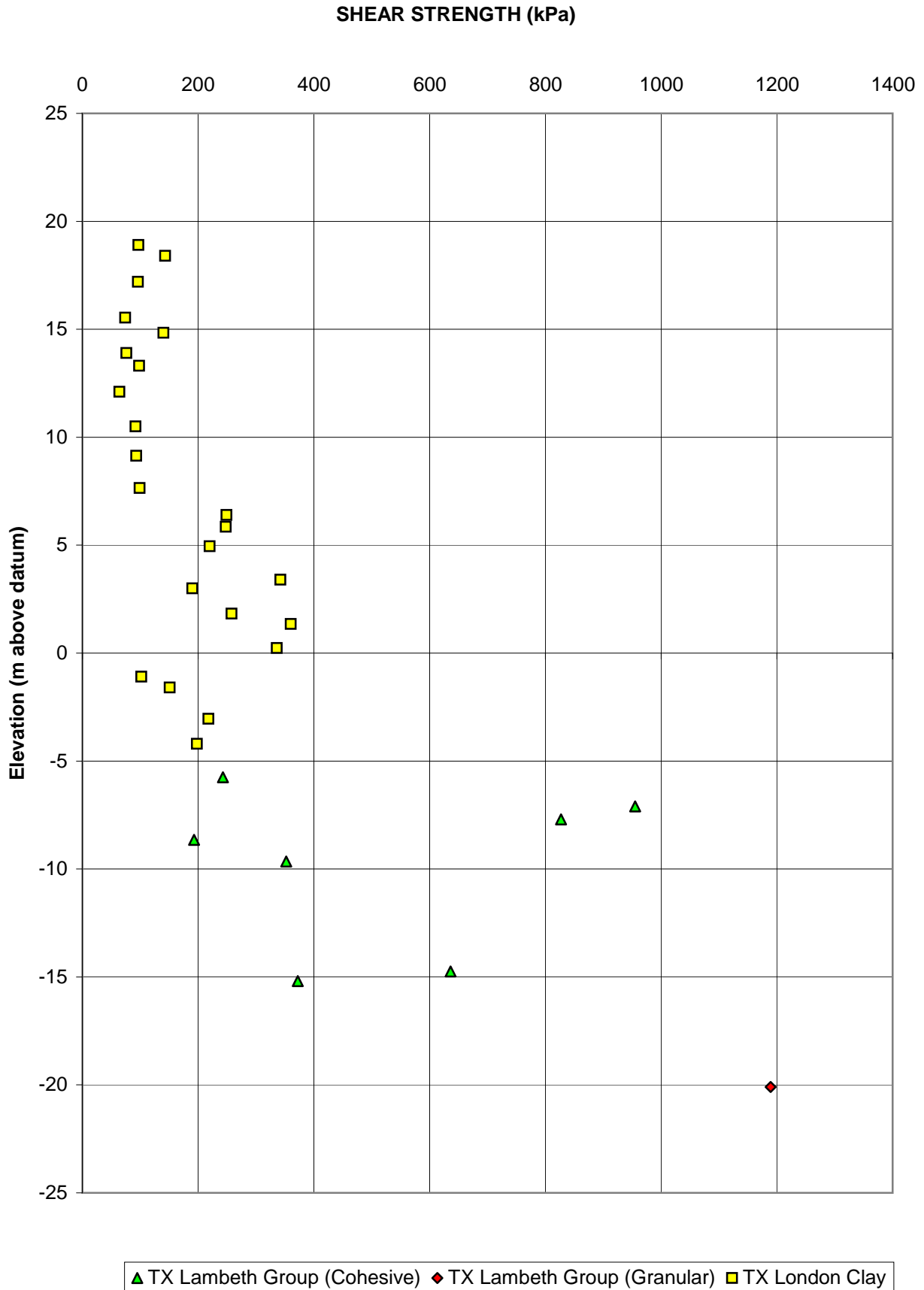


- ▲ Lambeth Group (Cohesive) ▲ Lambeth Group (Granular) ◆ London Clay
- Made Ground ■ River Terrace Deposits ◆ Thanet Sand Formation
- White Chalk

Site:
Denmark Place, London

Client:
Consolidated Developments Limited

Job Number:	36237
Figure:	4



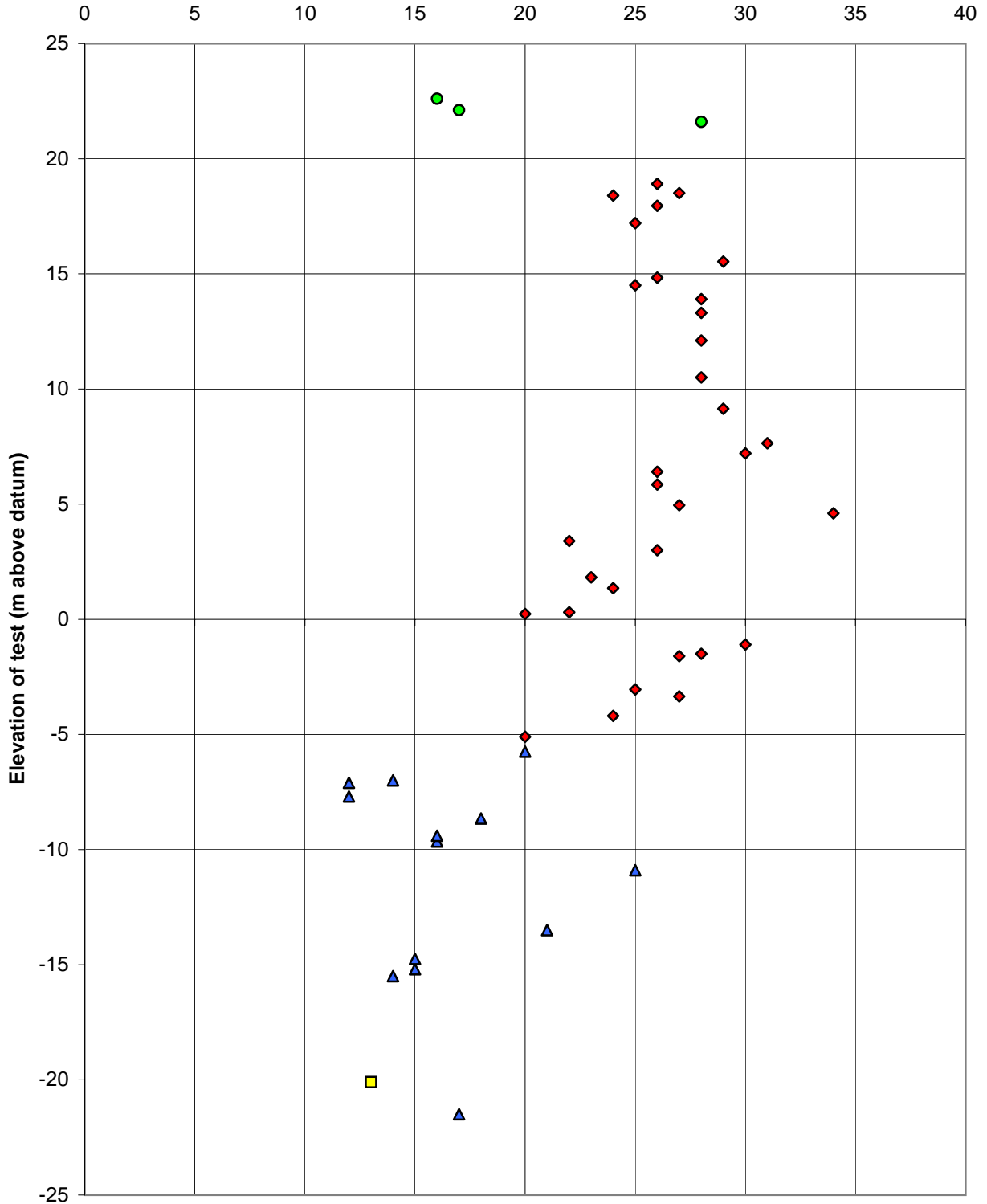
MOISTURE CONTENT vs ELEVATION

Site:
Denmark Place, London

Client:
Consolidated Developments Limited

Job Number: 36237
Figure: 5

Natural Moisture Content (%)



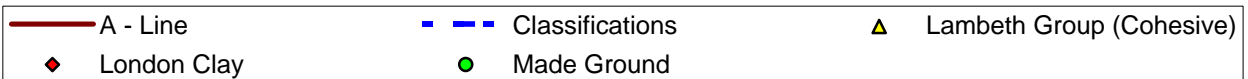
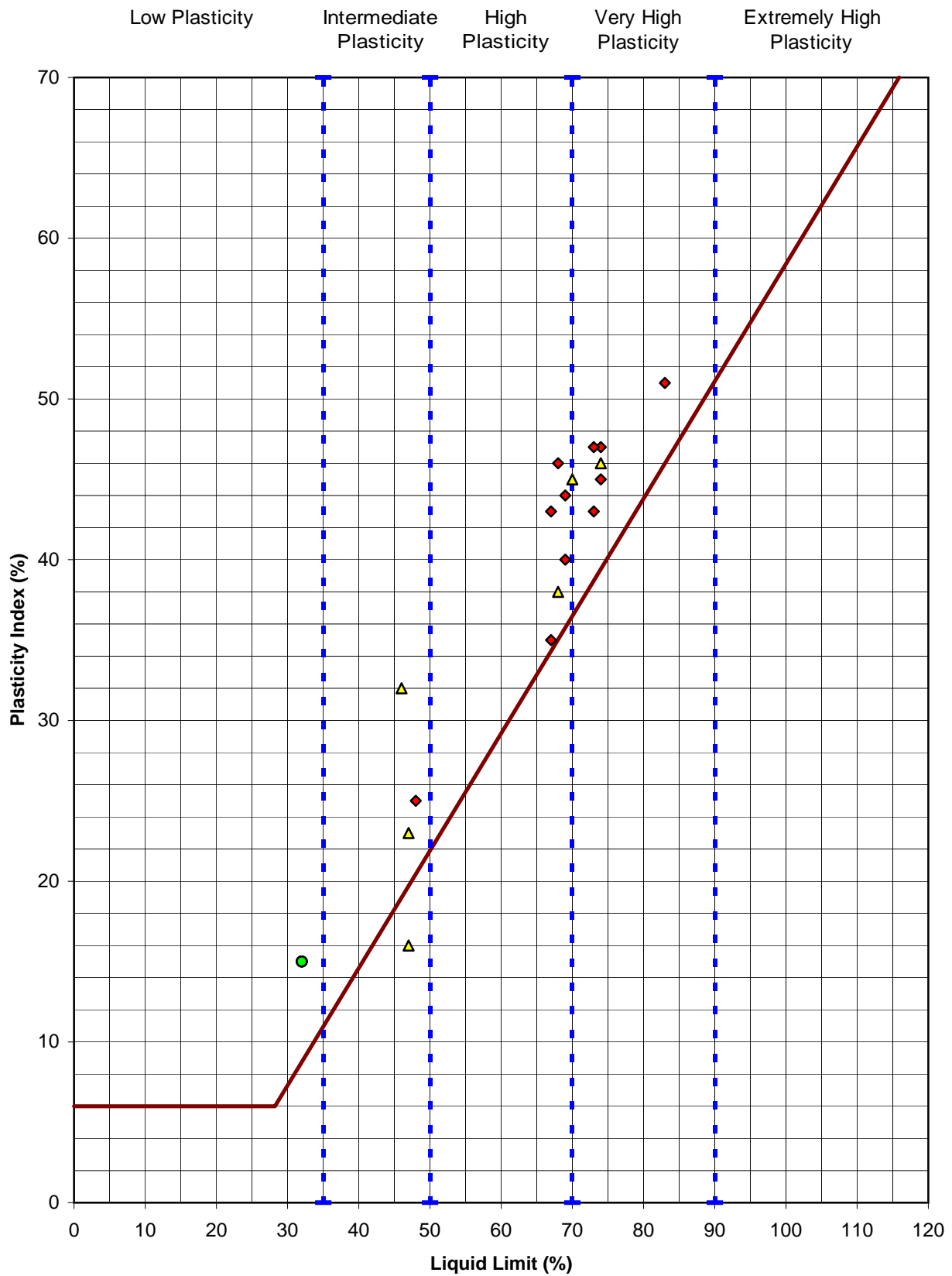
▲ Lambeth Group (Cohesive) ■ Lambeth Group (Granular) ◆ London Clay ● Made Ground

PLASTICITY CLASSIFICATION CHART

Site:
Denmark Place, London

Client:
Consolidated Developments Limited

Job Number:	36237
Figure:	6



APPENDIX A
Fieldwork Records

APPENDIX A1

Borehole Records

(this appendix contains 14 pages including this one)

BOREHOLE RECORD (Rotary)

Borehole
Number

Site:
Denmark Place

Easting:
529867.9

Northing:
181290.3

BH101

Client:
Consolidated Developments Limited

Ground Level:
25.10m AOD

Dates:
8 Apr 08
15 May 08

Job No.:
36237

BOREHOLE		CORE SAMPLES							STRATA RECORD		Sheet 1 of 7
Strike & Well	Samples & Testing	SPT 'N' Value	FI (per m)	TCR (%)	SCR (%)	RQD (%)	Depth (m)	Level (mAOD)	Key	Description	
	B1 0.25 J1 TB1						0.25	24.85		MADE GROUND: Grey unreinforced concrete.	
	J2 TB2						0.70	24.40		MADE GROUND: Brick wall and brick wall rubble with occasional blue and white china fragments, ceramic tiles and clay smoking pipe fragments. Bricks are predominantly red with occasional yellow sandstone bricks towards the base.	
	D1 0.90 B2 1.00 J3 TB3						1			MADE GROUND: Brown slightly sandy very clayey angular to subangular fine to coarse gravel of red brick fragments with occasional concrete, whole bricks and coal fragments. Sand is medium to coarse. ...at 0.75m depth, animal bone. ...at 1.20m depth, bone fragments. ...below 1.60m depth, very loose dark brown.	
	J4 1.50 TB4 D2 1.60 B3	S N=1					2			...below 2.50m depth, grey brown with occasional angular fine yellow sandstone brick fragments.	
	D3 2.50 B4 J5 TB5	S N=1					3			...below 3.00m depth, occasional subangular fine to medium flint gravel. Locally graded to sandy slightly gravelly clay.	
	D4 3.00						3.50	21.60		MADE GROUND: Very soft to soft slightly sandy slightly gravelly clay. Sand is fine to coarse. Gravel is angular to subangular fine to medium flint and red/yellow brick fragments.	
	B5 3.50 D5 J6 TB6	S N=4					4			Dense brown slightly silty sandy angular to subrounded fine to coarse flint GRAVEL. Sand is medium to coarse. (RIVER TERRACE DEPOSITS)	
	D6 4.00						4.40	20.70		...below 5.40m depth, medium dense.	
	B6 4.50 J7 TB7	C N=38					5			Firm locally thinly laminated orange brown CLAY with occasional dark brown/black laminae <1mm. (LONDON CLAY)	
	D7 5.00						5.40	19.10		Firm and stiff indistinctly fissured locally thinly laminated grey CLAY with occasional shiny speckles <1mm of selenite and occasional partings up to 1mm of light grey silt. (LONDON CLAY)	
	B7 5.40 J8 TB8	C N=21					6.00	18.60		Stiff locally thinly laminated closely to very closely fissured grey CLAY with occasional shiny speckles <1mm of selenite and occasional light grey silt partings <1mm. (LONDON CLAY)	
	D8 6.00						6.50	17.40			
	J9 TB9						6.70				
	D9 6.50 U1 6.70						7				
	D10 7.10 D11 7.15	S N=28					7.70				
	U2 7.90						8				
	D12 8.30						9				
	U3 9.57	S N=20									
	D13 9.90										

Continued next sheet

Remarks and Water Observations

Hand dug inspection pit to 1.50m - no services encountered. Cable percussion BH diameter 200mm to 7.60m depth and casing diameter 200mm to 7.00m depth. 30 gallons water added 4.40 - 6.00m. Water encountered at 5.60m depth - no rise. Casing left in the hole for rotary follow on. Geobore S rotary cored with water from 7.10m to 63.50m depth.

Scale: 1:50

Logged by: JB

Figure: A1

Site:
Denmark Place

Easting:
529867.9

Northing:
181290.3

Client:
Consolidated Developments Limited

Ground Level:
25.10m AOD

Dates:
8 Apr 08
15 May 08

Job No.:
36237

BOREHOLE	CORE SAMPLES	STRATA RECORD	Sheet 2 of 7
----------	--------------	---------------	--------------

Strike & Well	Samples & Testing	SPT 'N' Value	FI (per m)	TCR (%)	SCR (%)	RQD (%)	Depth (m)	Level (mAOD)	Key	Description
	U4 10.27									<p>Stiff locally thinly laminated closely to very closely fissured grey CLAY with occasional shiny speckles <1mm of selenite and occasional light grey silt partings <1mm. (LONDON CLAY)</p> <p>...below 11.50m depth, closely to extremely closely fissured</p> <p>...at 12.40m depth, 50mm fragment of moderately weak grey mudstone</p> <p>...between 15.62m and 15.70m depth, occasional fragments of very weak light grey mudstone</p> <p>...between 16.3m and 16.38m depth, moderately strong light grey mudstone</p> <p>...between 16.42m and 16.5m depth, moderately weak to moderately strong light grey mudstone</p> <p>...below 18.70m depth, very stiff</p>
	D14 10.60	S								
	U5 11.20	N=24		100			11			
	D15 11.60									
	U6 11.80									
	D16 12.20	S					12			
	U7 13.00	N=22		91						
	D17 13.35									
	D18 14.30	S		87			14			
	U8 14.60									
	D19 15.00	N=29					15			
	D20 15.80	S		87						
	U9 15.96						16			
	U10 17.46	N=27		71						
	D21 17.90	S					17			
	U11 18.70	N=23								
	D22 19.10	S		100			18			
	U12 19.25									
	D23 19.65	N=31					19			

Continued next sheet

Remarks and Water Observations
 Hand dug inspection pit to 1.50m - no services encountered. Cable percussion BH diameter 200mm to 7.60m depth and casing diameter 200mm to 7.00m depth. 30 gallons water added 4.40 - 6.00m. Water encountered at 5.60m depth - no rise. Casing left in the hole for rotary follow on. Geobore S rotary cored with water from 7.10m to 63.50m depth.

Scale: 1:50
Logged by: JB
Figure: A1

Site:
Denmark Place

Easting:
529867.9

Northing:
181290.3

Client:
Consolidated Developments Limited

Ground Level:
25.10m AOD

Dates:
8 Apr 08
15 May 08

Job No.:
36237

BOREHOLE		CORE SAMPLES							STRATA RECORD		Sheet 3 of 7
Strike & Well	Samples & Testing	SPT 'N' Value	FI (per m)	TCR (%)	SCR (%)	RQD (%)	Depth (m)	Level (mAOD)	Key	Description	
	U13 20.15	N=32								Stiff locally thinly laminated closely to very closely fissured grey CLAY with occasional shiny speckles <1mm of selenite and occasional light grey silt partings <1mm. (LONDON CLAY)	
	D24 20.50			100							
		S					21			...at 21.35m depth, 5mm pyrite rich nodule	
	U14 21.70	N=30								...at 21.65m depth, 5mm thick very weak light grey mudstone	
	D25 22.05 U15 22.10			100				22		...below 21.70m depth, locally hard	
		S									
	U16 23.28	N=39									
	D26 23.60 U17 23.75			93				23			
		S									
	D27 24.10	N=37								...below 24.0m depth, dark grey with occasional dark grey silt partings up to 3mm thick and occasional light brown grey infilled 'worm' holes up to 2mm thick by 20mm long	
	D28 24.80 U18 24.87			93				24			
		S									
	U19 26.20	N=28									
	D29 26.60 U20 26.70			100				25			
		S									
	D30 27.10	N=34									
		S									
	U21 28.15	N=45									
	D31 28.45			100				26			
		S									
	U22 29.30										
	D32 29.70			100				27			
		S									

Continued next sheet

Remarks and Water Observations

Hand dug inspection pit to 1.50m - no services encountered. Cable percussion BH diameter 200mm to 7.60m depth and casing diameter 200mm to 7.00m depth. 30 gallons water added 4.40 - 6.00m. Water encountered at 5.60m depth - no rise. Casing left in the hole for rotary follow on. Geobore S rotary cored with water from 7.10m to 63.50m depth.

Scale: 1:50

Logged by: JB

Figure: A1