1.2 Location

The site was located at 258-262 Belsize Road, London NW6, at O.S. Grid Reference TQ 255 837. The general site location is given on Figure 1. The approximate location of the boreholes are shown on Figure 2, which is a reduced copy of the site plan supplied by R.T. James and Partners.

1.3 Proposed Development

It is proposed to develop the site with a four to five storey steel framed office accommodation with basements.

We understand that there are to be large spans between columns resulting in high foundation loads. At the time of the preparation of this report foundation loads for the proposed structures were not known by Soils Limited.

1.4 Scope of Work

The scope of work was as outlined by Castle Trading and R.T James and Partners.

Briefly, this was for a borehole site investigation, with two boreholes, both drilled to a depth of 25 metres below existing ground level. The drilling was carried out using a cable percussion shell and auger drilling rig.

The field investigation was performed in accordance with the recommended practices of B.S. 5930:1981 and B.S. 1377:1990:Part 9.

The laboratory testing was performed in accordance with the methods given in B.S. 1377:1975 and 1377:1990:Parts 1-8.

The engineering analyses, conclusions and recommendations relate to the proposed development at 258-262 Belsize Road, London NW6. Attention is drawn to the fact that these analyses are based on data obtained from the boreholes and associated

in-situ and laboratory testing. The possibility of variation in ground conditions around and between the boreholes should not be overlooked. Any opinion or diagram of a possible configuration of strata beyond the boreholes or extrapolated to greater depth is conjectural and given for guidance only. No liability can be accepted for such variations.

It should be noted that the investigation was made for the form of development described in Section 1.3 and may be inappropriate to another form of development or scheme.

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2.0 Site Conditions

2.1 Local Geology

The 1:63360 Geological Survey of Great Britain (England and Wales), sheet number 256 of the North London area, showed the site to be located on the London Clay.

London Clay

London Clay comprises a stiff grey fissured clay, weathering to brown near surface. Concretions of argillaceous limestone in nodular form (Claystones) occur throughout the formation. Crystals of gypsum (Selenite) are often found within the weathered part of the London Clay, and precautions against sulphate attack to concrete are sometimes required.

The lowest part of the formation is a sandy beds with black rounded gravel and occasional layers of sandstone and is known as the Basement Beds.

2.2 Surface Condition

The site was situated to the north of Belsize Road, and comprised an area of flat level land formerly developed with a three to four storey Victorian terrace block.

At the time of the field works (September 1993), the whole of the former building had been demolished with the exception of the facade onto Belsize Road. At the time of preparing the report, we understand that the whole of the site has been cleared.

The surface of the site was covered partly with demolition debris and concrete hardstanding.

There was a basement on the south western portion of the site fronting onto Belsize Road. The basement was observed through a gap in a timber floor at site surface level and appeared to be approximately 3.0 metres deep.

The site was bounded to the north by a recently constructed brick built building; to the east and west by substantial three and four storey brick built buildings and to the south by Belsize Road.

Access to the site was off Kilburn Place located to the north of the site.

2.3 Ground Conditions

The ground conditions were as anticipated from the desk study, with the exception that a substantial thickness of Made Ground was found to overlie the London Clay in Borehole 2.

Made Ground was found to a maximum depth of 0.8 metres and 3.6 metres below existing ground level in Boreholes 1 and 2 respectively.

For detailed information regarding ground conditions, reference should be made to the borehole logs.

2.4 Ground Water

Ground water was encountered at a minimum strike depth of 7.7 metres below existing ground level in Borehole 1. A minimum standing groundwater depth of 7.6 metres was recorded in Borehole 1. The ground water is likely to represent a localised pocket of water within the area of a claystone. After drilling continued, the ground water ceased to ingress into the borehole.

Pockets of ground water may be found perched within the Made Ground

The speed of the drilling operation is such that there may be insufficient time for ground water to flow into the borehole and hence be detected, particularly within cohesive strata.

Ground water equilibrium conditions may only be conclusively established by means of a series of measurements made in a standpipe, or piezometer, installed in the ground after drilling. Changes in ground water level do occur for a number of reasons including seasonal effects and variations in drainage.

3.0 Discussion Of Test Results

3.1 Standard Penetration Test Results

The results of the S.P.T. Tests carried out in the Made Ground showed the soils tested to be in a loose to medium dense state of compaction

The results of the tests carried out in the London Clay indicate the soils to have a stiff to very stiff consistency (ref:Stroud and Butler) with a trend of increasing stiffness with depth.

The results are given on the borehole logs.

3.2 Triaxial Test Results

The results of the quick undrained single-stage triaxial tests made on 100mm diameter samples of the cohesive soils of the London Clay showed the soils tested to be generally of a stiff to very stiff consistency.

Low cohesions were established in some of the samples which has been attributed to the fissured fabric of the soil.

There was a general trend of increasing strength with depth.

Figure 3 is a plot of undrained cohesions vs the depth at which the were samples taken.

The test results are given in Tables 1-5, Appendix B.

3.3 Atterberg Limit Test Results

The tests made on samples of the London Clay showed the soils tested to fall into Class CV on the British Soil Classification System. These are fine grained soils of a very high plasticity and as such generally have moderate bearing and settlement char-

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acteristics; are non-frost susceptible; have a very low permeability and have a high shrinkage potential with changes in moisture content, requiring special foundation precautions near trees.

The test results are given in Table 6, Appendix B.

3.4 Sulphate Analyses

The significance of the Sulphate Test results are discussed later in this report.

The test results are given in Table 7, Appendix B.

4.0 Foundation Design

4.1 General

Made Ground is, by the nature of its variable composition, usually unpredictable in terms of bearing capacity and settlement characteristics. Foundations should, therefore, be taken through any Made Ground and into or onto the underlying natural strata.

It is considered that due to the presence of basements and the anticipated high loadings of the proposed structure that a piled foundation should be adopted on this site.

4.2 Piled Foundations

The construction of a piled foundation is a specialist job, and the advice of a reputable contractor, familiar with the type of ground and ground water conditions encountered on this site, should be sought prior to finalising the foundation design, as the actual pile working load will depend on the particular type of pile and method of installation adopted.

Should a bored pile be used then it would be necessary to case or otherwise support the shaft of the pile passing through the Made Ground, to prevent necking of the pile shaft whilst the concrete was fresh or green.

In Figure 3, a plot is given of undrained cohesion versus the depth from which samples were taken in each of the boreholes.

In Table A, preliminary load capacities calculated for varying diameters and lengths of pile taken into the London Clay are presented, for vertical loaded piles. These values have been calculated for the ground conditions found in the boreholes and

are based on Figure 3, and should be used for preliminary design purposes only as the actual working load is dependent on the type of pile and the method of installation.

Table A
Preliminary Driven Pile Working Loads
(Vertical Loads In kN)

Depth (m)	Diameter (m) .3	.45	.6
4.0	20 00 20	40 00 40	80 00 80
7.0	20 40 60	50 70 120	100 90 190
10.0	30 90 120	60 150 210	110 200 310
13.0	30 150 180	70 240 310	130 320 450
16.0	40 220 260	80 340 420	140 460 600
19.0	40 290 330	90 450 540	150 610 760

Notes

40	Pile Base Working Load
290	Pile Shaft Working Load
330	Total Working Load

The depth of pile is measured from existing ground surface and the upper four metres of the pile shaft has been ignored in the calculation of pile shaft resistance to take account of the thickness of Made Ground.

The pile working loads given in Table A incorporate a factor of safety of 3.0 on both the ultimate base and ultimate skin frictional values. In the calculations for end bearing in the London Clay, a bearing capacity factor (Nc) of 9 was adopted. An adhesion value of 0.45 was adopted in the London Clay for the calculation of the skin friction value.

The factors are typical of those for the soils found, though it may be possible to justify an increase, depending on the results of pile loading tests made on site. To be of value such tests need to be carried out in advance of the main piling contract and this should be discussed with the piling contractor.

Generally a minimum pile spacing of at least three pile diameters should be adopted for vertically loaded piles. This can be reduced to a minimum pile spacing of one metre for small diameter piles.

The bearing values given in Table A are applicable to single piles. Where piles are to be constructed in groups the bearing value of each individual pile should be reduced by a factor of about 0.8 and a calculation made to check the factor of safety against block failure.

No allowance for negative skin friction has been made in the pile bearing values given in Table A. It is considered that a negative skin friction of 10kN/m^2 should be adopted in the Made Ground, should the Made Ground be subject to surcharge such as ground bearing slabs. This value should be subtracted from the pile working load and not subjected to a factor of safety.

4.3 Ground Floor Slabs

Slabs cast directly onto untreated Made Ground are likely to undergo both total and differential settlement. Loadings from ground bearing slabs would result in negative skin friction forces acting on the shafts of the piles, within the Made Ground, and this should be allowed for in the determination of the pile working loads.

4.4 Excavations

Excavations in the Made Ground are likely to be unstable requiring suitable support. There is a possibility that old concrete or brick footings and basement walls are present below the surface of the site, which may hamper trenches excavated by light excavating machinery.

Excavations in the London Clay should remain stable in the short term.

Overdig is anticipated in the Made Ground.

Normal safety precautions should be adopted if excavations should be entered.

4.5 Sulphates

The total sulphate concentration in the soil tested fell into Class 1 and in excess of Class 1 of the Building Research Establishment Digest 363. Determinations of water soluble sulphate concentrations measured in a 2:1 water:soil extract showed the soil samples tested to fall into Class 1 of the Digest.

The pH of the soil was near neutral.

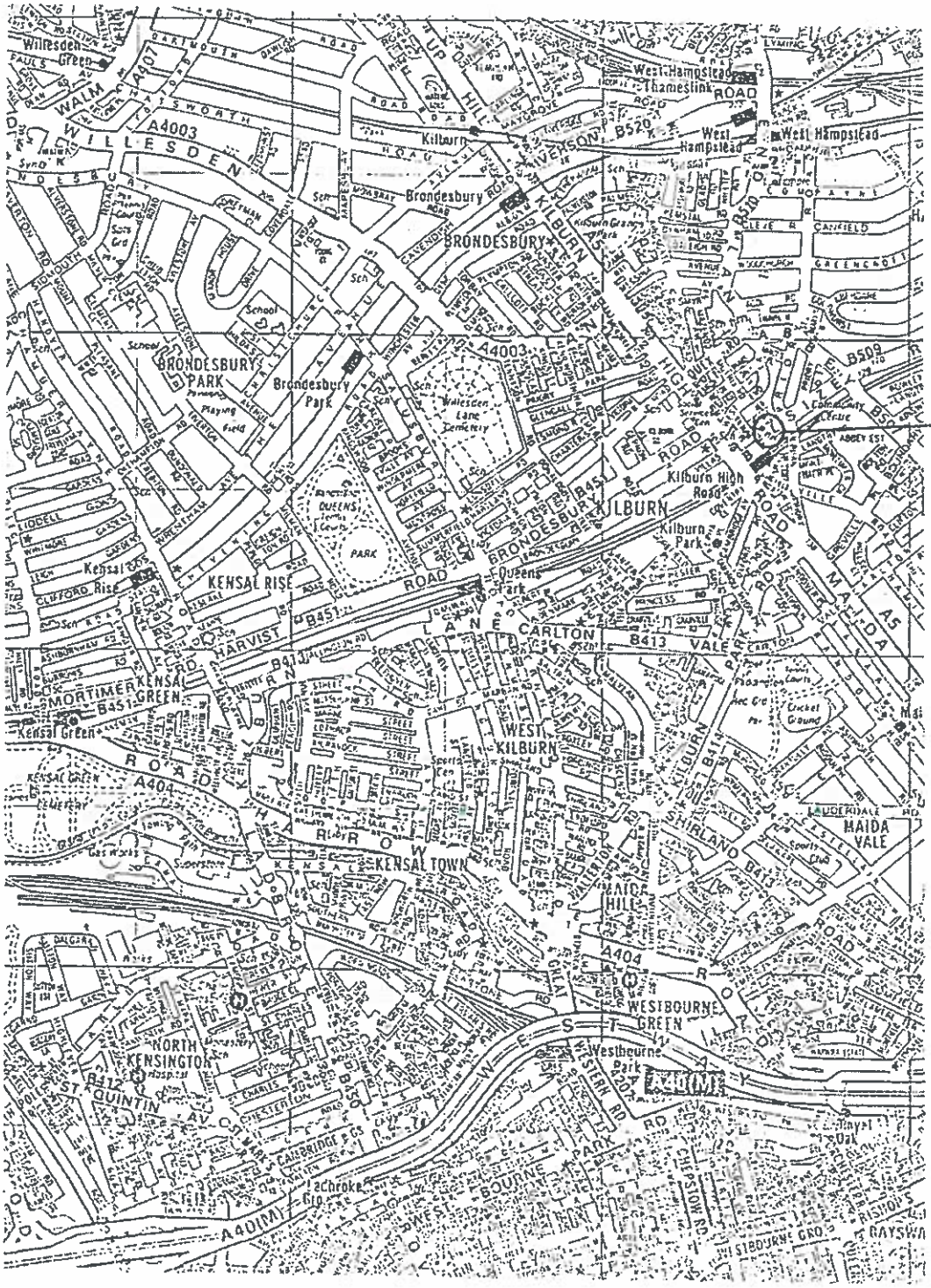
Concrete in contact with the soil or ground water should be designed in accordance with Class 1 of the B.R.E. Digest.

The following figures and appendices complete this report:

Figure 1	Site Location
Figure 2	Borehole Location
Figure 3	Cohesion vs. Depth
Appendix A	Field Work
Appendix B	Laboratory Testing

Eur Ing R. B. Higginson B.Sc.,PG.Dip.,C Eng.,MICE.,FGS.

G. Evans B.Sc, PG.Dip.,FGS.



PROJECT 256-262 Belsize Road, London NW6.	DATE Sept 1993	DIAM 150mm	
CLIENT R.T James and Partners	REF J3306		
Site Location	Fig 1	Engineer	Checked

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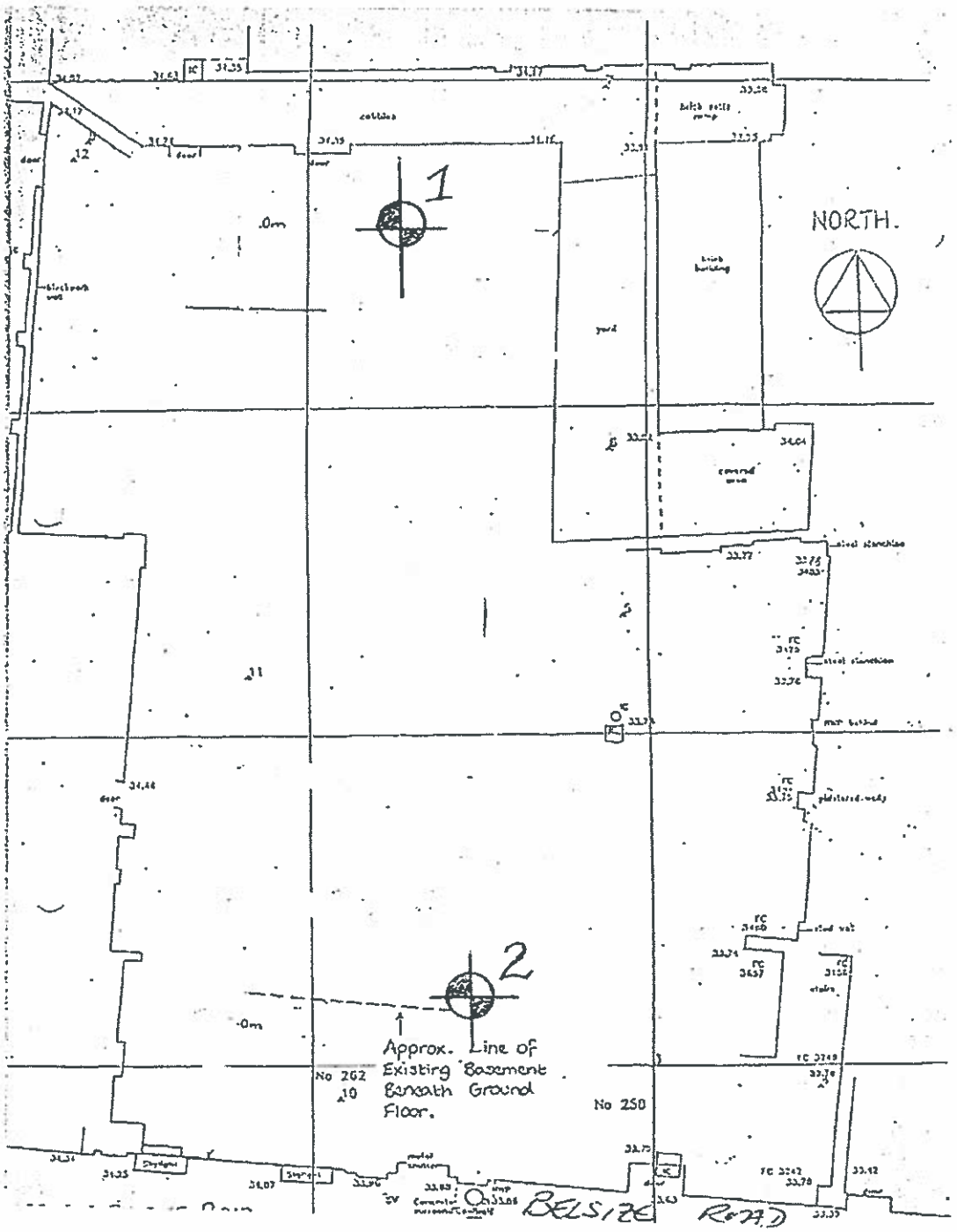

PROJECT 258-262 Belsize Road, London NW6.	DATE Sept 1993	DIAM 150mm
CLIENT R.T James and Partners	REF J3306	Approx Positions
BH Location	Fig 2	Engineer / Checked

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COHESION DEPTH PLOT

Belloize Road, London NW6.
J3306

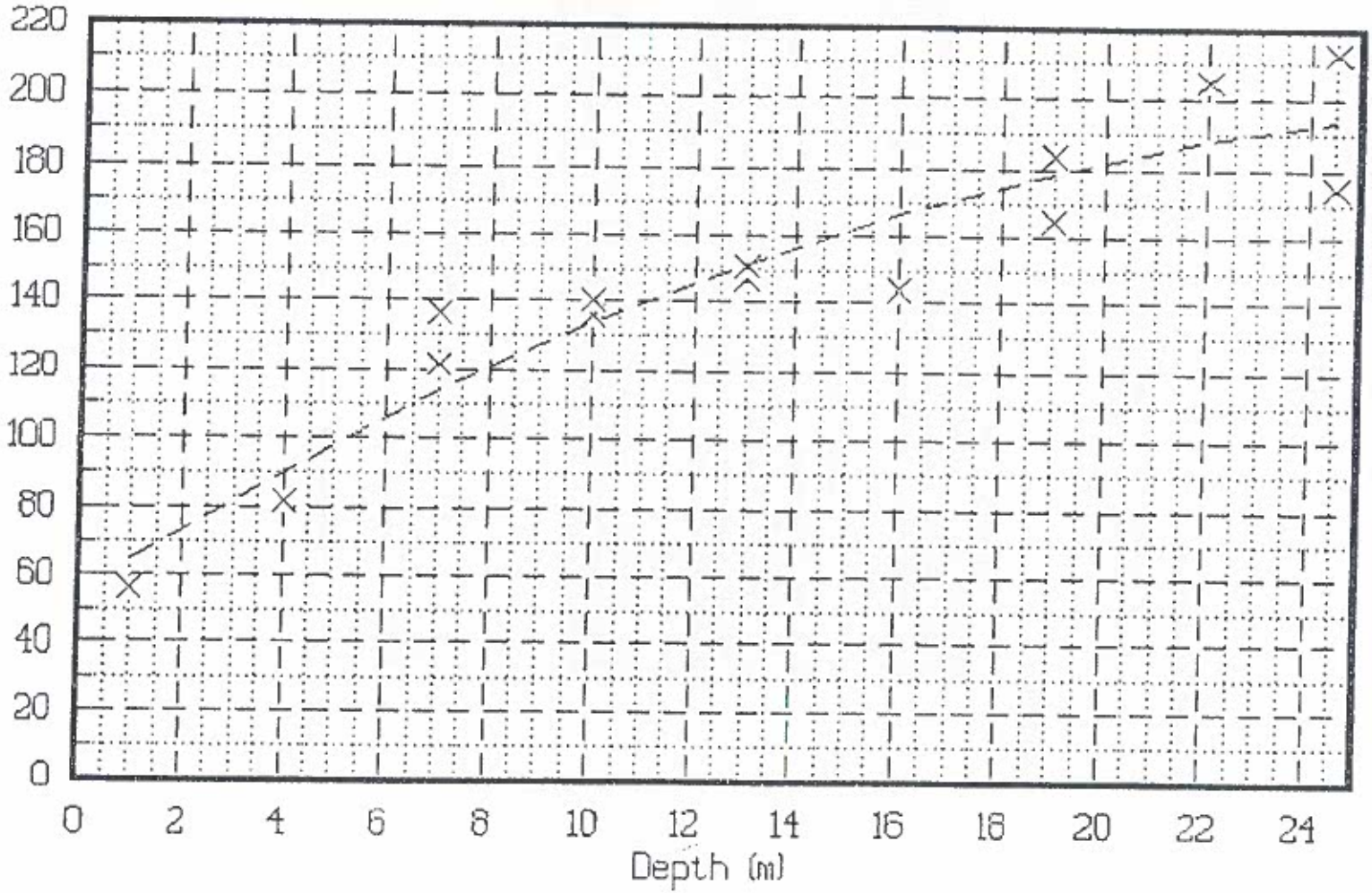

Fig 3

Soils (kPa)

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Appendix A
Site Testing

Excavation Method

The boreholes were drilled using hydraulic percussion window-sampling equipment.

Sampling

1. Disturbed Samples

Representative samples of the different strata encountered are taken from the hand auger holes and placed in jars with tight-fitting lids. These samples are examined for soil description.

2. Undisturbed Core Samples

Samples of cohesive soils are taken in 38mm diameter sample tubes driven into the ground by hand. The samples are thus obtained in a relatively undisturbed condition. The sample tubes are sealed with wax and capped to minimise moisture content changes prior to testing in the laboratory.

3. Bulk Samples

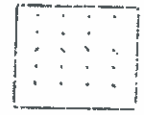
Bulk samples of cohesionless soils are taken, the amount being dependent on the grading of the soil. The samples are placed in stout plastic bags to prevent loss of the fine fraction.

The following plates are attached and complete this Appendix:

Key to Logs
Borehole Logs

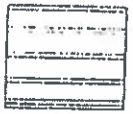
Key to Legends on Logs
Composite soil types e.g. silty clay shown as combined legend

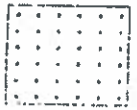
	shear surface	C	Cone Penetration Test Blows per 75mm inc
U	100mm thick-walled driven sampler. Blow counts shown under 'U'.	S	Standard Penetration Test Blows per 75mm inc
J	Small disturbed sample	100/200	Partial penetration Total Blow Counts over achieved penetration
B	Bulk disturbed sample		
W	Water sample		
V 230	Vane Test with cohesion (kPA)		
H 120	Pocket penetrometer Reading approx cu 'Z'		

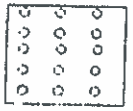

Siltstone


Void


Mudstone

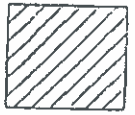

Shale

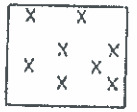

Sandstone

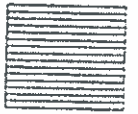

Conglomerate


Coal seam

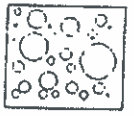

Breccia

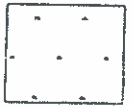

Made Ground


Silt


Clay


Sand


Gravel


Peat

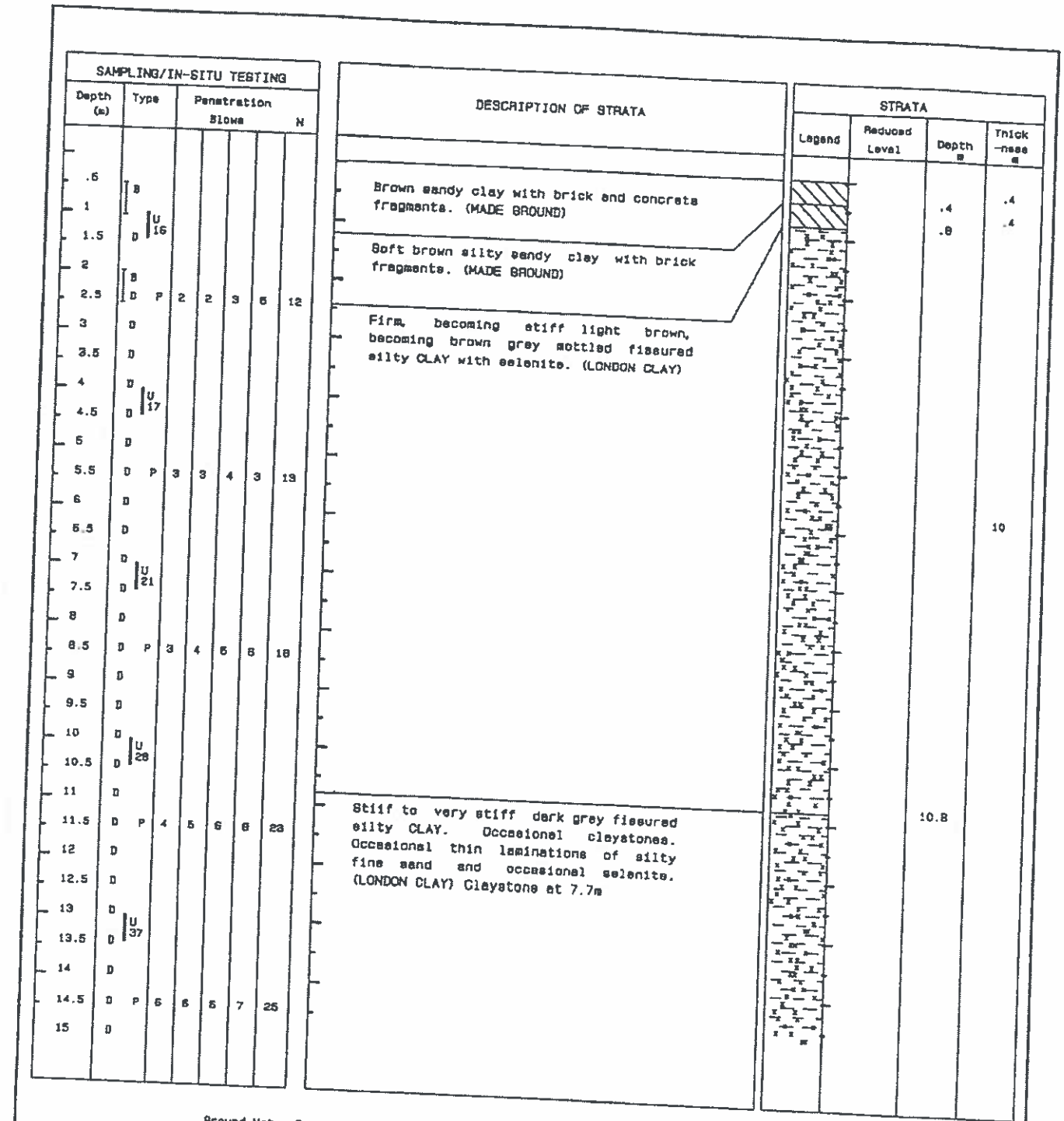

Chalk

Dwg Details

Borehole & Trial Pit Key

Date			Site
As report			General
By	Chk	App	Dwg Ref
AY			Gen/SK1

SIOS LIMITED



Ground Water Record

Date	Time	B-Hole (m)	Casing (m)	Strike (m)	Stand (m)	Time

Chiselling Record

T (hrs)	From (m)	To (m)

Casing

Diam.	Depth (m)

PROJECT
258-262 Ballsize Road, London NW6.

DATE
Sept 1993

DIAM
150mm

CLIENT
R.T James and Partners

REF
J3306

BH 1
SHEET 1 OF 2

Cable Percussion BH Log

Engineer

Checked

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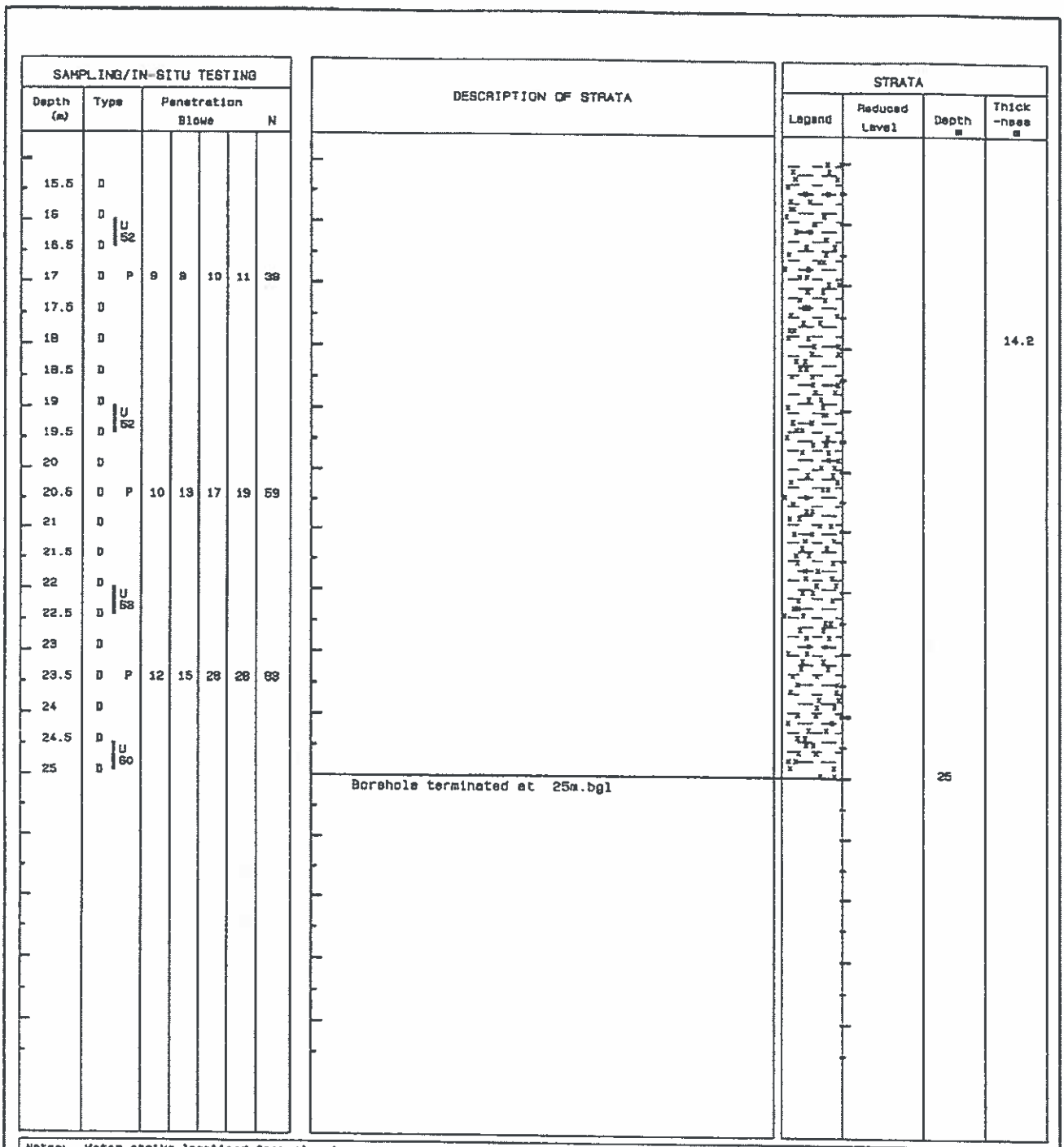

Notes: Water strike localised from claystone.

Ground Water Record

Date	Time	B-Hole(m)	Casing(m)	Strike(m)	Stand(m)	Time
02.09	pm	7.7	3.0	7.7	7.6	0.5hr

Chiselling Record

T(hrs)	From(m)	To(m)

Casing

Dia.	Depth(m)
150mm	3.0

PROJECT
258-262 Ballsize Road, London NW6.

DATE
Sept 1993

DIAM
150mm

CLIENT
R.T James and Partners

REF
J3306

BH 1
SHEET 2 OF 2

Cable Percussion BH Log

47J: 28: SU100: BSPT

Engineer

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SAMPLING/IN-SITU TESTING								DESCRIPTION OF STRATA	STRATA			
Depth (m)	Type	Penetration Blows				N			Legend	Reduced Level	Depth m	Thick-ness m
.5	B							Brick, concrete rubble.			.7	.7
1	P	16	8	9	11	44						
1.5	B D							Brown and dark grey silty sandy ash and gravel, with brick and timber fragments. (MADE GROUND)				
2	C	4	3	3	3	13						2.8
2.5	B D											
3	P	2	2	3	1	8						
3.5	B D										3.5	
4	B U 18							Firm mid to light brown, becoming grey mottled fissured silty CLAY with occasional selenite. Becoming stiff with depth. (LONDON CLAY)				
4.5	D											
5	D											
5.5	D P	3	3	5	5	16						
6	D											
6.5	D											
7	D U 24											
7.5	D											7.2
8	D											
8.5	D P	3	4	6	7	20						
9	D											
9.5	D											
10	D U 31											
10.5	D											
11	D										10.8	
11.5	D P	4	5	6	8	23		Stiff dark grey fissured silty CLAY, with occasional thin silty partings and selenite. (LONDON CLAY)				
12	D											
12.5	D											
13	D U 31											
13.5	D											
14	D											
14.5	D P	5	7	7	9	28						
15	D											

Ground Water Record

Date	Time	B-Hole (m)	Casing (m)	Strike (m)	Stand (m)	Time

Chiselling Record

T (hrs)	From (m)	To (m)

Casing

Diam.	Depth (m)

PROJECT
268-262 Belsize Road, London NW6.

DATE
Sept 1993

DIAM
150mm

CLIENT
R.T Jones and Partners

REF
J3306

BH 2
SHEET 1 OF 2

Cable Percussion BH Log

Engineer

Checked

soils LIMITED

SAMPLING/IN-SITU TESTING							DESCRIPTION OF STRATA	STRATA			
Depth (m)	Type	Penetration Blows				N		Legend	Reduced Level	Depth m	Thick -ness m
15.5	D										
15	D	U 45									
16.5	D										
17	D										
17.5	D	P	5	7	8	7	27				
18	D										14.2
18.5	D										
19	D	U 64									
19.5	D										
20	D										
20.5	D	P	9	11	18	23	51				
21	D										
21.5	D										
22	D	U 64									
22.5	D										
23	D										
23.5	D	P	10	18	20	38	76				
24	D										
24.5	D	U 57									
25	D										

Borehole terminated at 25m.bgl

25

Notes: Water strike slow and localised

Ground Water Record

Date	Time	B-Hole(m)	Casing(m)	Strike(m)	Stand(m)	Time
07.09	am	22.7	3.0	22.7	22.5	0.5hr

Chiselling Record

T(hrs)	From(m)	To(m)

Casing

Diam.	Depth(m)
150mm	3.0

PROJECT
258-262 Belsize Road, London NW6.

DATE
Sept 1993

DIAM
150mm

CLIENT
R.T James and Partners

REF
J3306

BH 2
SHEET 2 OF 2

Cable Percussion BH Log

45J: 5B: BU100: 10SPT

Engineer

Checked

soils LIMITED

APPENDIX B
LABORATORY TESTING

Sample Preparation

Samples for laboratory testing were prepared to the requirements of B.S. 1377:Part 1:1990.

Triaxial Compression Tests

The test were quick undrained tests in accordance with B.S. 1377:Part 7:1990 Test 8.

The samples used were either 38 millimetres or 100 millimetres in diameter and 76 or 200 millimetres in length. The sample was sealed in a rubber membrane to prevent changes in moisture content during testing and compressed at a constant rate of strain (2% per minute) whilst being subjected to a constant lateral pressure. Loading was continued until the sample fails. The compressive stress is the axial load at failure divided by the cross-sectional area of the sample.

Sulphate Test

The sulphates present in the soil or ground water are determined in accordance with B.S. 1377:Part 3 Test 5. Where high total sulphate concentrations are measured the soluble sulphate concentrations is determined using a 2:1 water:soil extract.

The pH values of the soil or ground water are determined in accordance with B.S. 1377:Part 3:1990 Test 9.

Plasticity Indices

The plasticity indices was obtained in accordance with Test 4 and Test 5: BS 1377:Part 2:1990. A representative sample of cohesive soil is tested at three different moisture contents using a cone penetrometer and the liquid limit established, which is defined as the point at which the soil changes from a plastic solid to a fluid. The plastic limit which is defined as the point at which the soil changes from a plastic to a brittle solid is also determined. The results are presented as the natural moisture content the liquid limit, the plastic limit and the plasticity index.

Grading Analyses

The test were carried out in accordance with Test 8: BS1377:Part 2:1990. The bulk sample is sub-divided by riffling to attain a suitable representative sample. If the sample contains little or no fines, it is dried and passed through a series of sieves of succeedingly finer mesh in order to obtain the proportion of different sized particles. If fines are present within the sample, these are removed by washing through a 63 micron sieve and the remaining soil dried and sieved as described previously.

The following plates are attached and complete this Appendix:

Laboratory Test Results

TEST RESULTS

TRIAXIAL TEST RESULTS			
BOREHOLE		DEPTH (m)	
1		1.0	
Description			
Light brown mottled fissured silty CLAY.			
Test Type: U100 Single stage			
Cell kN/m^2	Compressive kN/m^2	Density Mg/m^3	M/C %
20	112	1.93	34
Undrained Cohesion 56 kN/m^2		ϕ	degrees

TRIAXIAL TEST RESULTS			
BOREHOLE		DEPTH (m)	
1		4.0	
Description			
Red brown mottled fissured silty CLAY with occasional selenite			
Test Type: U100 Single stage			
Cell kN/m^2	Compressive kN/m^2	Density Mg/m^3	M/C %
80	165	1.92	31
Undrained Cohesion 82 kN/m^2		ϕ	degrees

TRIAXIAL TEST RESULTS			
BOREHOLE		DEPTH (m)	
1		7.0	
Description			
Brown fissured silty CLAY with occasional selenite			
Test Type: U100 Single stage			
Cell kN/m^2	Compressive kN/m^2	Density Mg/m^3	M/C %
140	275	1.90	31
Undrained Cohesion 137 kN/m^2		ϕ	degrees

TEST RESULTS

TRIAXIAL TEST RESULTS			
BOREHOLE		DEPTH (m)	
1		10.0	
Description			
Brown orange mottled fissured silty CLAY with abundant silt pockets and partings and occasional selenite			
Test Type: U100 Single stage			
Cell kN/m^2	Compressive kN/m^2	Density Mg/m^3	M/C %
200	272	1.92	30
Undrained Cohesion 136 kN/m^2		ϕ	degrees

TRIAXIAL TEST RESULTS			
BOREHOLE		DEPTH (m)	
1		13.0	
Description			
Dark brown fissured very silty CLAY			
Test Type: U100 Single stage			
Cell kN/m^2	Compressive kN/m^2	Density Mg/m^3	M/C %
260	294	1.93	30
Undrained Cohesion 147 kN/m^2		ϕ	degrees

TRIAXIAL TEST RESULTS			
BOREHOLE		DEPTH (m)	
1		16.0	
Description			
Dark brown fissured very silty CLAY			
Test Type: U100 Single stage			
Cell kN/m^2	Compressive kN/m^2	Density Mg/m^3	M/C %
320	289	1.98	26
Undrained Cohesion 144 kN/m^2		ϕ	degrees

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TEST RESULTS

TRIAXIAL TEST RESULTS			
BOREHOLE		DEPTH (m)	
1		19.0	
Description			
Dark brown fissured silty CLAY with silt pockets and partings			
Test Type: U100 Single stage			
Cell kN/m^2	Compressive kN/m^2	Density Mg/m^3	M/C %
380	369	1.97	27
Undrained Cohesion 184 kN/m^2		ϕ	degrees

TRIAXIAL TEST RESULTS			
BOREHOLE		DEPTH (m)	
1		22.0	
Description			
Dark brown fissured silty CLAY			
Test Type: U100 Single stage			
Cell kN/m^2	Compressive kN/m^2	Density Mg/m^3	M/C %
440	410	1.99	25
Undrained Cohesion 205 kN/m^2		ϕ	degrees

TRIAXIAL TEST RESULTS			
BOREHOLE		DEPTH (m)	
1		24.5	
Description			
Dark brown fissured silty CLAY			
Test Type: U100 Single stage			
Cell kN/m^2	Compressive kN/m^2	Density Mg/m^3	M/C %
490	427	1.99	25
Undrained Cohesion 213 kN/m^2		ϕ	degrees

TEST RESULTS

TRIAXIAL TEST RESULTS			
BOREHOLE		DEPTH (m)	
2		7.0	
Description			
Brown fissured silty CLAY with orange staining on fissure faces and occasional selenite and shell fragments			
Test Type: U100 Single stage			
Cell kN/m^2	Compressive kN/m^2	Density Mg/m^3	M/C %
200	243	1.89	21
Undrained Cohesion 121 kN/m^2		ϕ	degrees

TRIAXIAL TEST RESULTS			
BOREHOLE		DEPTH (m)	
2		10.0	
Description			
Brown fissured silty CLAY with orange staining on fissure faces and occasional selenite and shell fragments			
Test Type: U100 Single stage			
Cell kN/m^2	Compressive kN/m^2	Density Mg/m^3	M/C %
200	280	1.89	21
Undrained Cohesion 140 kN/m^2		ϕ	degrees

TRIAXIAL TEST RESULTS			
BOREHOLE		DEPTH (m)	
2		13.0	
Description			
Dark brown fissured very silty CLAY			
Test Type: U100 Single stage			
Cell kN/m^2	Compressive kN/m^2	Density Mg/m^3	M/C %
260	302	1.96	27
Undrained Cohesion 151 kN/m^2		ϕ	degrees

TEST RESULTS

TRIAXIAL TEST RESULTS			
BOREHOLE		DEPTH (m)	
2		16.0	
Description			
Dark gre brown fissured silty CLAY with silt pockets			
Test Type: U100 Single stage			
Cell kN/m^2	Compressive kN/m^2	Density Mg/m^3	M/C %
360	101	1.90	27
Undrained Cohesion 50 kN/m^2		ϕ	degrees

TRIAXIAL TEST RESULTS			
BOREHOLE		DEPTH (m)	
2		19.0	
Description			
Dark grey brown fissured silty CLAY			
Test Type: U100 Single stage			
Cell kN/m^2	Compressive kN/m^2	Density Mg/m^3	M/C %
380	330	1.98	25
Undrained Cohesion 165 kN/m^2		ϕ	degrees

TRIAXIAL TEST RESULTS			
BOREHOLE		DEPTH (m)	
2		24.5	
Description			
Dark brown fissured silty CLAY			
Test Type: U100 Single stage			
Cell kN/m^2	Compressive kN/m^2	Density Mg/m^3	M/C %
490	348	1.90	26
Undrained Cohesion 174 kN/m^2		ϕ	degrees

TEST RESULTS

ATTERBERG LIMIT TEST RESULTS				
BOREHOLE			DEPTH (m)	
1			4.0	
Description				
Red brown mottled silty CLAY with occasional selenite				
LL %	PL %	PI %	M/C %	CLASS
75	29	46	31	CV

ATTERBERG LIMIT TEST RESULTS				
BOREHOLE			DEPTH (m)	
1			19.0	
Description				
Dark brown silty CLAY with silt pockets				
LL %	PL %	PI %	M/C %	CLASS
71	29	42	27	CV

ATTERBERG LIMIT TEST RESULTS				
BOREHOLE			DEPTH (m)	
2			16.0	
Description				
Dark brown silty CLAY with silt pockets				
LL %	PL %	PI %	M/C %	CLASS
72	30	42	27	CV

TEST RESULTS

SULPHATE TEST RESULTS			
BOREHOLE	DEPTH (m)		
1	4.0		
Description			
Soil			
TOTAL CONCENTRATION	SOLUBLE CONCENTRATION	DESIGN CLASS	pH
2.056%	0.528g/l	1	6.60

SULPHATE TEST RESULTS			
BOREHOLE	DEPTH (m)		
1	19.0		
Description			
Soil			
TOTAL CONCENTRATION	SOLUBLE CONCENTRATION	DESIGN CLASS	pH
0.239%	0.178g/l	1	7.27

SULPHATE TEST RESULTS			
BOREHOLE	DEPTH (m)		
2	13.0		
Description			
Soil			
TOTAL CONCENTRATION	SOLUBLE CONCENTRATION	DESIGN CLASS	pH
0.239%	0.192g/l	1	7.17

SULPHATE TEST RESULTS			
BOREHOLE	DEPTH (m)		
2	16.0		
Description			
Soil			
TOTAL CONCENTRATION	SOLUBLE CONCENTRATION	DESIGN CLASS	pH
0.239%	0.178g/l		