HERTS & ESSEX SITE INVESTIGATIONS

'THE OLD POST OFFICE', WELLPOND GREEN, STANDON, WARE, HERTS, SG11 1NJ

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GEOTECHNICAL ASSESSMENTS - ENVIRONMETAL ASSESSMENT - DESKTOP STUDY - CONTAMINATED LAND

22nd March 2010

Our ref : CSG/9534

XUL Architecture
102 Belsize Lane,
London.
NW3 5BB

For the attention of S.Sandler Esq.,

Dear Sir,

Re: Site at 32 Eton Avenue, London NW3 : Site Investigation

SECTION 1 INTRODUCTION

1.01 In accordance with your instructions, we visited the above site during March 2010.

1.02 The purpose of our visit was to carry out an investigation into the subsoil conditions in order to assess the suitability of the site to develop a basement below the existing building within the site.

1.03 The comments and opinions expressed are based purely on the conditions encountered and the subsequent laboratory testing. The location of the investigative works was based on the site conditions.

1.04 Some special condition may be present on site that, to date, has not been encountered within the scope of the site investigation works and therefore will not have been taken into account within this report.

1.05 All ground water recordings or their absence relate to short term observations and do not allow for fluctuations due to seasonal or other effects.

SECTION 2 DESCRIPTION OF SITE

2.01 The site is located off Eton Avenue and forms a large building set in extensive grounds. The building has been converted into apartments with the structure / area in question located to the rear of the building.

2.02 At the time of the walk over of the site, the site was laid to a combination of both grassed landscaping, shrub planting areas and tarmac surfaces. Surrounding the site, residential land and garages are recorded in place.

SECTION 3 FIELDWORK

3.01 The fieldwork for the site involved excavation of a number of trial pits and boreholes across the site using hand held equipment, in order to ascertain details of the subsoil over depth.

3.02 The location of these works is indicated on the site plan-forming appendix one.

3.03 The various strata encountered were noted and are recorded on the borehole logs forming appendix two.

3.04 Full ranges of samples were recovered as noted and retained for subsequent laboratory testing.

SECTION 4 LABORATORY TESTING

4.01 All samples were tested in accordance with BS:1377:1990, methods for test for civil engineering purposes.

4.02 Selected samples were recovered to determine their Atterberg Limits, Strength and Soluble Sulphate value pH.

4.02 The results of this laboratory testing are enclosed and form appendix three

SECTION 5 CONCLUSIONS

5.01 By examination of the borehole logs, it can be seen that the subsoil encountered formed a made ground which was present to a depth of 0.50m. This was seen to overlie a clay soil which was present to the close of boreholes at a maximum depth of 3m.

5.02 Laboratory testing has been undertaken in accordance with BS 1377:1990, (Methods for Tests for Soils for Civil Engineering Purposes), the results of which are enclosed.

5.03 Atterberg Limits tests proved the lower clay soil to be of intermediate plasticity, (PI=39-58%), which indicates a moderate to high susceptibility to movement associated with moisture content change.

5.04 Included within the laboratory testing was sulphate analysis, which can determine the use of sulphate resisting cement within the foundation design for the development. The results are enclosed and prove the classification in accordance with ACEC to be ***DS-1/AC-1^{S}***.

5.05 Insitu testing has been undertaken From the information gathered, it is recorded that cohesion values of between ***96-130 kN/m^2*** were achieved.

5.06 When considering the foundation proposals for the site, we make the following recommendations.

(i) Foundation Assessment

The existing foundations within the site are recorded as stepped brickwork over a brick FILL founded at a depth of 1.15m. This formed the older part of the building. Within the rear section of the site, (where the proposed development will take place), a conventional concrete foundation if recorded as in place which is founded at depths of between 1.35-1.55 meters below the existing ground level.

Considering the proposal for the development of a basement within the site, the formation of the basement will be undertaken by underpinning the existing building to an appropriate depth to allow the new underpinned section to form the proposed basement walls. This is likely to form the optimum foundation solution for the site.

Taking into account the existing trees and vegetation surrounding the site, there influence will have some part in the design, however, the proposal to place / develop a basement will likely extend to depths in excess of the influence of trees.

Certain concerns are in place which form the development of these foundations which will obviously severing existing root systems which not only extend under the proposed development site, (and will therefore be removed), but also sever root systems which extends under the main building to the front of the house. As such, possible future movements will occur relating to a heave scenario under the existing building. As such, future risk may be in place which will be difficult to predict as a result of the following :-

- Predicting heave where roots systems will not only be removed / severed from the development, but will be retained where the root systems are in place that do not extend through the development area. As such, some moisture loss will occur from ongoing demands of the trees and also potential moisture increases from severed roots;
- Differential movements will occur between the new basement area and the existing flats and as such, future risk may be in place;
- Existing crack patterns are in place within the site which confirm ongoing movement to date.

In order to adequately design foundations, the following scenarios should be considered :-

Any new foundations should be taken to depths in excess of the influence of any surrounding trees or vegetation, (recently removed, existing or proposed). An assessment has been recorded as to the depth of the existing root system within the site. This cannot be utilized across the site due to limited observations and as such, a guideline should be used to determine the depth of foundations required in order to overcome the influence of any surrounding vegetation.

As a result, we would suggest that any new foundations should be taken to a minimum depth of 1.00m. The use of NHBC Chapter 4.2, (Building Near Trees), should be incorporated in the design of any foundations, which dictates species, clay type and, ultimately, foundation depth. This is only a guideline that should be implemented as a method of costing the substructure within the development. The depth of any root systems within the subsoil will dictate the actual in-situ depth of any foundations across the site. It is envisaged that NHBC Chapter 4.2 will provide a reasonable assessment of actual foundation depths.

Where trees are to be removed or have recently been removed from the site in order to provide new landscaping or to enable the development to take place, the existing height of the trees and vegetation to be/or that has been removed should be used in assessing the proposed foundation depths local to those specific trees.

Where trees are to remain and will undergo some degree of growth to reach maturity, the mature height of the tree should be used within NHBC Chapter 4.20.

All foundations should be designed by a suitably qualified engineer with regard loading for the proposed structure.

Where foundation depths exceed 1.50m as a result of the influence of surrounding trees and vegetation, protection against heave and shrinkage should be incorporated in the design.

With the above in mind, we can confirm that the probability of a conventional foundation being used will be possible. The depth of made ground is unlikely to cause a conventional foundation technique to be excessive and therefore could be adopted. The main feature that would cause foundation depths to increase will form the presence of trees and as such, this should be the primary calculation to undertake.

I hope the foregoing is sufficient for your requirements, although please do not hesitate to contact us should require any further information regarding the above.

Yours Faithfully

C.S.Gray M.Sc
Contract Engineer

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Appendix No.	1
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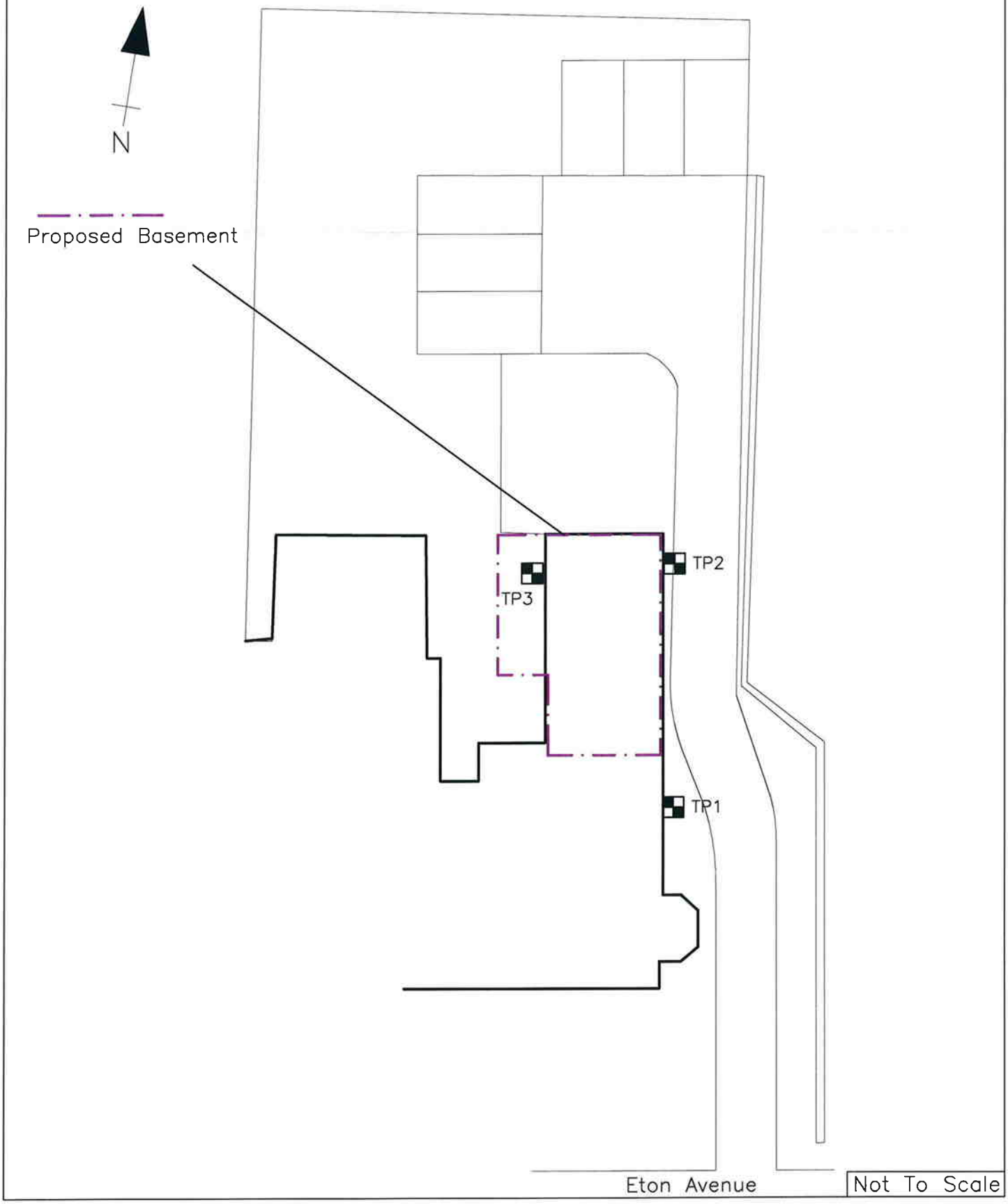
Job No.	9534
Date	March 2010

Garden House, 32 Eton Avenue, London NW3 3HL

Site Plan



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Appendix No.	2
Sheet No.	1
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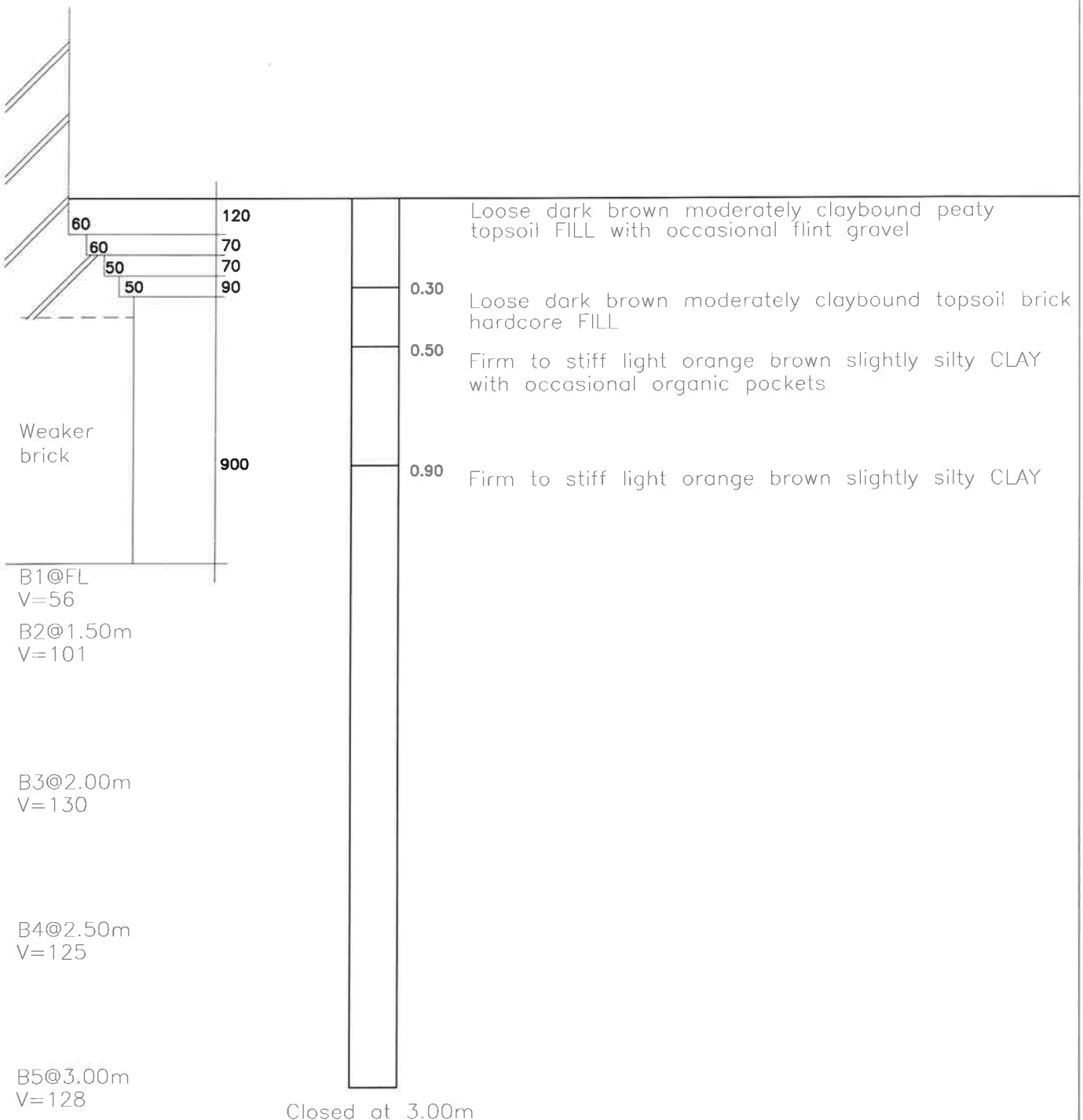
Existing Footing Detail

Trial Pit One



SCALE: 1:20

B	BULK SAMPLE
D	DISTURBED SAMPLE
U	UNDISTURBED SAMPLE
V	SHEAR VANE TEST (Kn/m²)
▼	WATER STRUCK
▽	WATER STANDING
W	WATER SAMPLE
N	SPT 'N' VALUE

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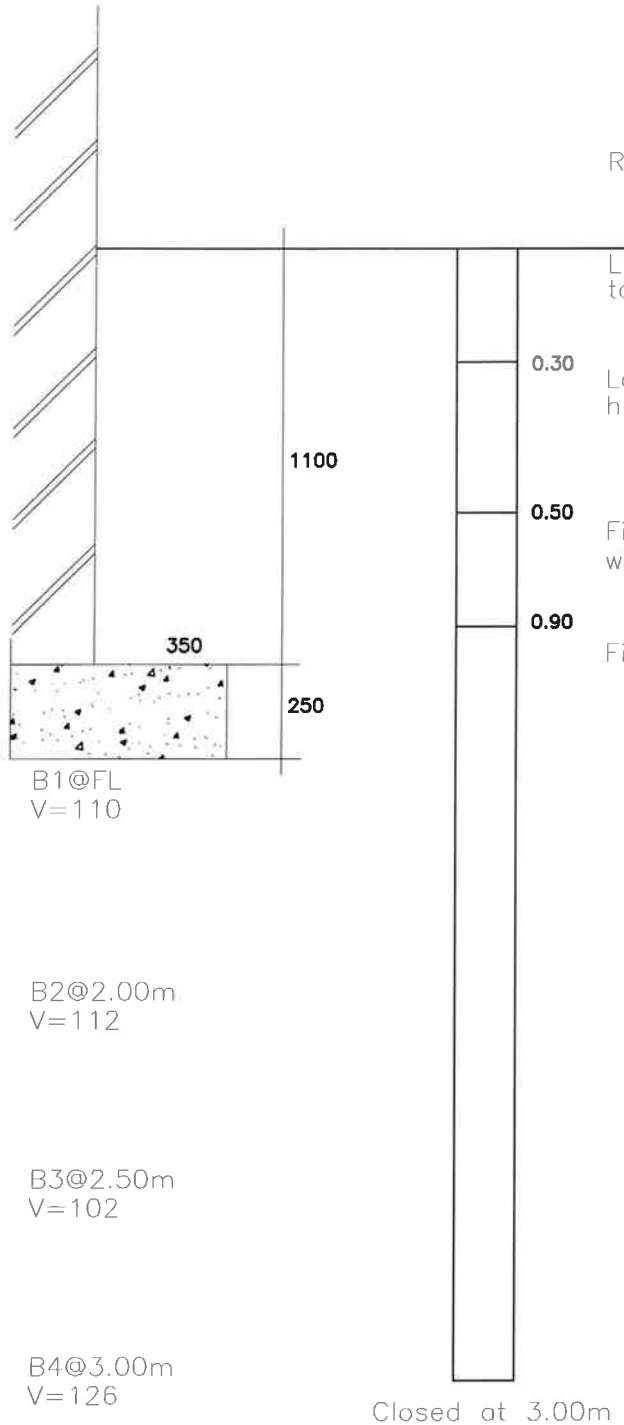
Existing Footing Detail

Trial Pit Two



SCALE: 1:20

B	BULK SAMPLE
D	DISTURBED SAMPLE
U	UNDISTURBED SAMPLE
V	SHEAR VANE TEST (Kn/m²)
▼	WATER STRUCK
▽	WATER STANDING
W	WATER SAMPLE
N	SPT 'N' VALUE

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Appendix No.	2
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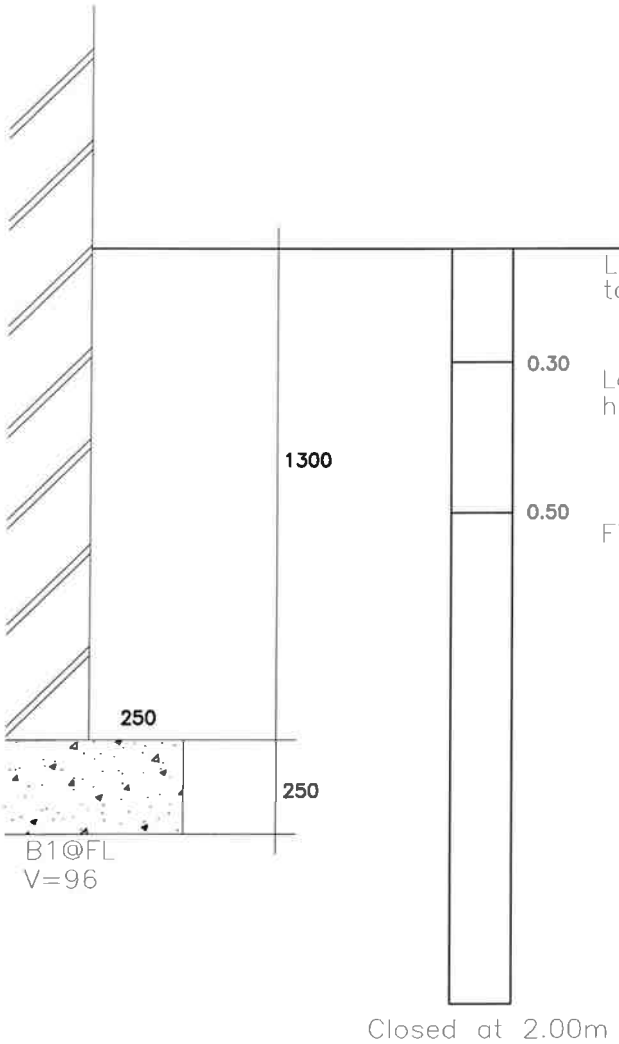
Existing Footing Detail

Trial Pit Three



SCALE: 1:20

B	BULK SAMPLE
D	DISTURBED SAMPLE
U	UNDISTURBED SAMPLE
V	SHEAR VANE TEST (Kn/m²)

▼	WATER STRUCK
▽	WATER STANDING
W	WATER SAMPLE
N	SPT 'N' VALUE

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Appendix No 3
Sheet No 1
Job No 9534
Date 22 March 2010

LOCATION *32 Garden House, Elton Avenue London NW3*

ATTERBERG LIMITS TEST

Trial Pit	Depth (m)	Sample	Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Group Symbol	Ammended Plasticity Index (%)	Roots Present	Desiccation Profile	Percentage Retained on 425 Micron Sieve (%)
TP1	1.00	B1	35	58	19	39	CH	39		No	0
	1.50	B2	34							Slight	0
	2.00	B3	30							Slight	0
	2.25	B4	31	75	20	55	CV	55		Slight	0
	2.50	B5	33							Slight	0
	3.00	B6	31	77	19	58	CV	61		Significant	0
TP2	FL	B1	31	77	20	57	CV	57		Slight	0
	2.00	B2	28							Significant	0
	2.50	B3	32	77	21	56	CV	56		Slight	0
	3.00	B4	31							Slight	0
	3.50	B5	31	76	20	56	CV	56		Slight	0
TP3	FL	B1	33	69	20	57	CH	57		Slight	0

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Appendix No	3
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LOCATION *32 Garden House, Elton Avenue London NW3*

SULPHATE ANALYSIS TEST RESULTS

Trial Pit	Depth (m)	Sample	Concentrations of Soluble Sulphate			Classification	pH
			Soil		Groundwater		
			Total SO_4 (%)	SO_4 in 2:1 Water:soil (g/l)			
TP1	2.00	B3		0.13		DS-1 / AC-1s	7.8
TP2	3.00	B4		0.27		DS-1 / AC-1s	8.3