

A

“ BASEMENT IMPACT ASSESSMENT ”

AT A PROPERTY SITUATED AT

22 FERNCROFT AVENUE, HAMPSTEAD,

LONDON

NW 3 7 PH.

REPORT PREPARED FOR

21st. CENTURY ARCHITECTURE.

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Project No	Revision	Date	Prepared By	Checked By	Status
1250	-----	10-12-13	K. Zablocki	Initials:	Prelim.

INTRODUCTION

Soarbond received E Mail instructions on Thursday 28th. November 2013, from Mr. Roger Meadows, a director of the Architect's Company, "21st. Century", on behalf of the Owner of 22 Ferncroft Avenue, NW3, to carry out a site inspection of the rear garden trees, the house fabric walling integrity and any other material information that could be added to this Basement Impact Assessment report.

Part 1

Available Information:

The property is a large, detached house built during the Edwardian period; about 110 years ago. The whole area is residential with many rows of houses of similar construction and of similar age. In the last few years, many neighbouring properties have been extended and converted into flats or returned to their original single dwelling use following the granting of planning permissions that appear to need careful consideration by Camden before planning is granted. The present application will include an application for a full basement construction, as shown on the Architect's drawings, with a small corner patio area in the basement. This area will be to the rear of the house, will be open to the elements so that there will be a rectangular shape to the new construction of basement and also it will allow a rear garden access to the basement. Similarly, there will be a well area to the front of the house to allow access and light to the basement here.

This area in Hampstead has a substantial slope from rear garden to frontage. There are typical step details employed to overcome varying levels from front to back. Additionally, there is a pronounced slope down from the two neighbouring detached houses that form 24 and 26 to the next two blocks along; i.e. 18 and 20.

The Architectural drawings show major renovation to ground, first and second floor, albeit, the existing distinct room layouts will remain on each floor.

A site investigation was carried out for one of the neighbouring properties recently and this determines in London the nature, the make-up and the basic details of the nearby ground. It is understood that exact details of the soil to the underside of this property can only be fully checked using a dedicated report for this site. But, in the absence of such dedicated material, it is safe, in London, with its monolithic Clay strata, to use information from nearby areas to base sensible conclusions on the likely soil strata that will be met on such a site. Such confirmation is always needed. The caveat that there may be significant changes within 20 to 30 metres has been noted but, we feel, not likely to occur in this hilly area.

The neighbouring soil information is given in Appendix 1 of this report and has been reproduced by courtesy of the Owner of 18 Ferncroft Avenue, two doors away.

We can confirm that the soil to the underside of the ground floor of the house is a stiff, slightly silty with sand lenses, weathered London Brown Clay overlying London Blue Clay and getting much firmer with depth down to 5 metres. It would appear that there is a deep band of dense sand below the 5 metre level i.e. the level to which the Contractor will be digging and there appears to be a possibility of a lot of water at this level. Care in forming the foundations will need to be taken.

Initial structural checks were carried out on the fabric of the house on 10th. December 2013 so that a fuller picture could be given in this assessment. Some details, but not a

full and final structural assessment, are given in Appendix 2 along with a typical sketch of the site. In short, there were various settlement cracks at the front of the house and many towards the rear, especially close by the PLANE tree whose roots evidently have a great impact on the strip, ground floor, concrete footings. The plane tree is less than three metres away from the house construction and there is discontinuity in the walling, some overturning and cracking appears to have been repaired recently i.e. within the last 9 months.

Part 2

Extent of the Works:

The bulk of the main works will involve the full excavation to minus 4.0 metres of the footprint of the house with a new rectangular, patio section at the rear and a full width increase of basement forward of the principal front elevation. There will also be a partial demolition of internal stud or common brick walling together with alterations to the ground, first and second layouts, including stairs

The basement construction will be generally in concrete flooring and walls; formed as individual underpins but tied to each other using reinforcement in the concrete. The new ground floor will be either in new timber joists and a floating floor to separate basement from ground floor levels or a concrete beam and block construction.

Internally, the remainder of the structural work will be in traditional timber joists, masonry, stud walling and steel beams where necessary. Finishes will be as dictated in the Architect's schedules etc.

Part 3

Qualifications:

We confirm that this Report has been prepared for the purpose it was intended for i.e. as an indicative assessment of the impact that a basement construction will have on the state of that part of the neighbouring structures that could only be surmised at this stage.

This report is also for the attention of the addressee and can be given to other interested parties after the written permission of Soarbond Ltd.

No liability to any other party can be accepted by this firm for the whole part or any part of this report. Moreover, we have not inspected those parts of the property which are covered, unexposed or were inaccessible at the time of our inspection for 22 Ferncroft Avenue but have made deductions which are based on common sense and may require further testing. For those areas of neighbouring properties that are of interest to us but could be uncovered or inspected at a later stage, a fuller report may have to be provided then. Furthermore, we have not carried out any specialist tests on the foundations, the walling, the drains or on any other obvious critical damage areas. Consequently, we are unable to report authoritatively on the condition of any such material or formation and this report is not to be read for such items. We would, nevertheless, recommend that further testing is instigated if any of the parties feels that the reason for damage to the fabric could have a significant effect on the design or construction of the redevelopment.

The following table addresses the specific requirements of Camden's Planning Guidance with added information added to this basement impact assessment:-

Subterranean (ground water) flow		Answers
Q1a	Is the site located directly above an aquifer?	No
Q1b	Will the proposed basement extended beneath the water table surface?	No
Q2	Is the site within 100m of a watercourse, well or potential spring line?	No
Q3	Is the site within the catchment of the pond chains on Hampstead Heath?	No
Q4	Will the proposed basement development result in a change in the proportion of hard surface/paved areas?	Yes
Q5	As part of the site drainage will more surface water than at present be discharged to the ground?	No
Q6	Is the lowest point of the basement excavation close to or lower than the mean water level in any local pond or spring line	No

Q4 At the rear there will be an approximate increase of 63% in hard surfaced areas (from 16% to 26%) which corresponds to a total proportion of 26% of the rear garden area being hard surfaced. These proportions are similar to those permitted. In addition there will be the area of the front light well and basement access that will be hard surfaced.

Slope stability screening flowchart

Q1	Does the site include slopes, natural or manmade, greater than 7°?	No
Q2	Will the proposed re-profiling of landscaping at site change slopes at the property boundary to more than 7° ?	No
Q3	Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7° ?	No
Q4	Is the site within a wider hillside setting in which the general slope is greater than 7° ?	No
Q5	Is London Clay the shallowest strata at the site?	Yes (refer to the attached site investigation)
Q6	Will any trees be felled as part of the development or are any works proposed within any tree protection zones where trees are retained	No

Q7	Is there a history of shrink/swell subsidence in the local area or evidence of such effects on site	Yes(refer to the attached structural report)
Q8	Is the site within 100m of a watercourse or potential spring line	No
Q9	Is the site within an area of previously worked ground	No
Q10	Is the site within an aquifer	No
Q11	Is the site within 50m of the Hampstead Ponds	No
Q12	Is the site within 5m of a highway or pedestrian right of way	No
Q13	Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties.	Yes
Q14	Is the site over or within the exclusion Zone of any tunnels	No

Q5 & Q7 The soils report for a neighbouring property confirms that the soil is a stiff to a very stiff, silty clay becoming firmer with depth down to 5m. This soil should provide adequate bearing for the new underpinning foundations. Below 4 metre depth at the rear the soil becomes more sandy and water bearing. At the front the boreholes were not sufficiently deep to reach the sand strata, which is probably dipping to a greater depth because of the general slope of the ground bearing strata. Tests on the clay below the foundations showed it to have a high modified plasticity index (above 40 %) which, together with the presence of tree roots beneath the existing basement foundations, accounts for the recent settlement cracking that has been reported by neighbouring properties and confirmed here as well. There is cracking to the front corners causing cracks to category 2 to BRE Digest 251 : 1991 in the walls over. The proposed basement construction will have foundations below the tree roots and the desiccated clay. It should eliminate the settlement problem although the cracks in the superstructure will still require repairing. Recent redecoration appears to have hidden a lot of the cracking as the externals at higher levels rely on white painted rough render to hide distress in the fabric.

Q13 The foundations will be up to 3m deeper than those of adjacent properties. There are no party wall details to concern us as the basement construction can proceed after the issue of the 3m / 6m notices. It may be prudent to carry out a photographic survey of the paths to the boundary lines for future reference. All walling will be away from the boundary lines between Nos. 20 and 22 as well as 22 and 24. The basement will be formed using underpins with a reinforced concrete, 250 mm thick, retaining wall to the underside of the existing brick walls and constructed in 1.2m lengths connected with either steel dowel bars or continuous reinforcement to tie all of the underpins together. The side wall of No. 22 is separated from No. 24 by a passage way about 1.2m wide which will remain in place so this will avoid any effect on the foundations to No. 24. This same situation occurs between 22 and 20.

Surface Flow and Flooding

Q1	Is the site within the catchment of the pond chains on Hampstead Heath	No
Q2	As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak run-off) be materially changed from the existing route?	No
Q3	Will the proposed basement development result in a change in the proportion of hard surfaced/paved external areas?	Yes (see comments on Q4 above)
Q4	Will the proposed basement result in changes to the profiles of the inflows of surface water being received by adjacent properties or downstream watercourses?	No
Q5	Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	No

Design and Construction:

The demolition works will be carried out generally within the demise of the existing house and will not require any altered access or cause difficulties for the neighbours. There will be scaffolding erected within the site boundary to give access to higher levels of the property to allow completion works to windows, balconies, doors, walls and roofs.

There will be a requirement to positively fix the scaffolding to the shell of the house by using drill fixings and non-ferrous expanded bolt combinations into the brickwork. With short scaffolding tubes and circular bolt connectors, these can be used as restraints to the scaffold and allow it to carry storage loads and access ways.

This work will not affect adjacent properties although permission may be requested for the erection of protecting hoardings, allowance for some over-sailing and some access.

The walls of the basement will be designed as reinforced concrete cantilevers from a spread, thickened footing as traditional construction. The design parameters for pressure on the walls will be in accordance with those recommended values given in the Reinforced Concrete Designer's Handbook (by Charles E. Reynolds and James C. Steedman) for the relevant clay soil type. In addition it will be assumed that pressure from ground water could be present to a level of minus 0.75 metres below ground level as this could easily happen after backfilling with clay instead of sand to a depth of retained material. The walls will also be designed to support a surcharge load of 2.5kN/m^2 on the surface of the ground adjacent to the wall as well as the effects of pressure from any existing foundations (especially to the neighbours). Each wall section will be checked for overturning and sliding in the temporary case and the reinforcement adjusted as necessary to take the worst case loading.

The underpin walls and basement edge thickening beneath the house will be constructed in traditional hit and miss lengths of not more than 1.2m with the top of the wall packed with sand / 10 mm pea shingle : cement 3 : 1, dry mix with non shrink additive, rammed hard into the 75 mm gap between the concrete underpin and the cleaned bottom of the spread brick footing. Adjacent lengths will be connected with high tensile steel dowel bars or reinforcement. It is anticipated that these walls will be cast against the face of the excavated soil or against a rendered face.

The walls to the rear side boundaries will be of similar construction except that the upper parts in top soil will require double shuttering. This procedure will maintain the stability of the ground and neighbouring properties at all times apart from minor disturbance of the soil at surface level.

The floor of the basement will be checked for uplift due to possible water pressure and designed to span between the walls. It is likely that the slab will require reinforcing on each face and, depending on the ground conditions, it will probably be necessary to provide a layer of hardcore or MOT type 1 compacted stone and a layer of 50 mm blinding concrete before casting the basement slab on 1000 gauge polythene and 100 mm heavy duty insulation board.

The ground floor construction will be a combination of structural steel beams spanning between basement walls and "beam and block" precast concrete floor units or timbered joists and infill " noise reduction" insulation and flooring.

Flooding:

The site is not in a location that is subject to flooding and with the ground sloping away from the site in two directions, future flooding does not appear to be a possibility.

Springs:

At this elevational level, Ferncroft Avenue in Hampstead may be susceptible to the possibility of springs occurring where there is sufficient sand or gravel in the soil. The trial bore holes at 18 indicated that the soil below ground level was a stiff silty clay becoming stiffer with depth. There was also no sign of water or water bearing strata down to a depth of 4m. Below this, there was standing water in the boreholes. This type of soil is unlikely to carry springs and there were no signs or any indication of surface disturbance giving evidence of spring water arising in the rear garden of 22.

Trees:

There are 6 significant, mature trees close by. A mature, plane tree grows less than 3 metres from the north west corner of the house. Its girth is very large but it has been severely pollarded over the years and only four or five main branches remain. Again, this tree will need specialist attention to reduce its water intake. In the neighbour's garden to the north, there are three specimen trees, one ash and, apparently, two elder trees. These are 20 metres away and their influence is minimal at best. In number 24's garden there appears to be two mature fir trees with the nearest one some 15 metres away. The root system for these cylindrical conifers does not apparently influence the proposed basement slab or retaining walls. The front of the house does not have any significant influences from pavement trees or front garden bushes and the like.

Neighbouring Properties

The property at No. 20 Ferncroft Avenue is a detached house with its walling being some 2.2 metres away.

The boundary line, will, in all probability, see the reinstatement of an existing timber fence after the basement has been constructed.

On both sides, i.e. the 20 and the 24 sides, the wall of the proposed basement underpinning will be along the edge of the side of the passage. The basement wall can be constructed from the inside of the house in an underpinning sequence without affecting Nos. 20 and 24. For the basement extension at the rear, the back face of the new basement wall will be on the line of the gable wall and the 1.2 metre gap to boundary will be maintained.

Foul and Surface Water:

The proposed basement construction is below the existing part house basement. Consequently, all surface water arisings, be they from front well area, rear patio area (both rainwater) or from water penetration through the underpins or basement slab,

will be directed to a new basement sump and water, thus accrued, will be pumped out to surface water main drainage manhole within the front house garden and then to the existing surface water drainage outfall into the road. New foul water arising will be similarly dealt with i.e. from collection in a second sump in the basement to the foul manhole in the front garden and away to the outfall into the road.

Summary:

The subject property is a large, imposing, single family, detached dwelling formed, initially on 3 usable floors including a small basement for coal storage and food cold room. It had nominally four bedrooms but now could be considered to have six bedrooms. It is a medium-sized, typical, prestigious London house in a more affluent part of the suburbs. These properties do not have garages linked to the fronts or sides of the houses as there would have been stabling and a private family "landau" coach housing nearby. The formation of a basement, at this stage, is not surprising but we would have expected it to have been included when the house plans were drawn up ready for construction originally. It is, that a basement is now proposed when it would have been eminently simpler to form it at the beginning. This does not preclude such works; just that it could be more difficult at this stage.

Prepared by

**Konstanty Zablocki B.Sc. (Hons.), C. Eng. MICE
for and on behalf of
SOARBOND LTD.,**

**Reference: 1250/Report File BIA 1
11th. December 2013**

Appendix 1

Soil Investigation

A

“ DESK TOP STUDY ”

FOR A SOIL ASSESSMENT REPORT

FOR A PROPERTY AT

22 FERNCROFT AVENUE, HAMPSTEAD,

LONDON NW 3 7 PH.

REPORT PREPARED FOR

21st. CENTURY ARCHITECTURE.

Soarbond Limited,
17, Clarendon Road,
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Date : 4th. January 2014.

Project No	Revision	Date	Prepared By	Checked By	Status
1250	-----	04-01-14	K. Zablocki	Initials:	Final.

1.0 Introduction

- 1.1** On the instructions received from Mr. Roger Meadows of 21st. Century Architecture Ltd., the Architects, Soarbond Ltd. were requested to carry out a desk top study of the probable soil conditions that could be expected to 95 % certainty at a house at 22 Ferncroft Avenue, Hampstead, London NW3.
- 1.2** A soils investigation was carried out at the “ next door but one “ property i.e. 18 Ferncroft Avenue in 2011. This report has been made available to our Client by the beneficiary of that report, as we understand it, and is included as a full document in this desk top study because it is vitally relevant to any statements made concerning the clay, sands silts and sandy gravels that may be encountered.
With the background knowledge within this company of the likely soil profiles in Hampstead, as well as the testing carried out nearby, this would allow us to give what we would consider an authoritative comment on the likely soil profile at 22 Ferncroft Avenue.
- 1.3** This desk top study is not to be construed as a full and final survey of the whole of the soil profile. To do that would require a separate and independent soils report with an adequate spread of bore holes to cover any likely VARIATION of soil profiles at the site.
- 1.4** However, the monolithic nature of weathered brown Clay overlying London Blue Clay in hilly areas of London reduces the uncertainty within London concerning soil profiles and gives Engineers more design capacity to reduce risk etc.
- 1.5** This report has been prepared for one specific reason, namely, to give the Client and Architect a fair and accurate assessment of the assumed soil profile that we are likely to meet in Hampstead, i.e. firm to stiff to very stiff brown clay overlying London blue clay.

A Report of the
Site Investigation Undertaken

at

18 Ferncroft Avenue
London NW3

CSI Ref: 2553

On

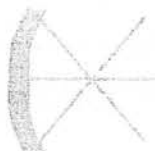
23rd March 2011



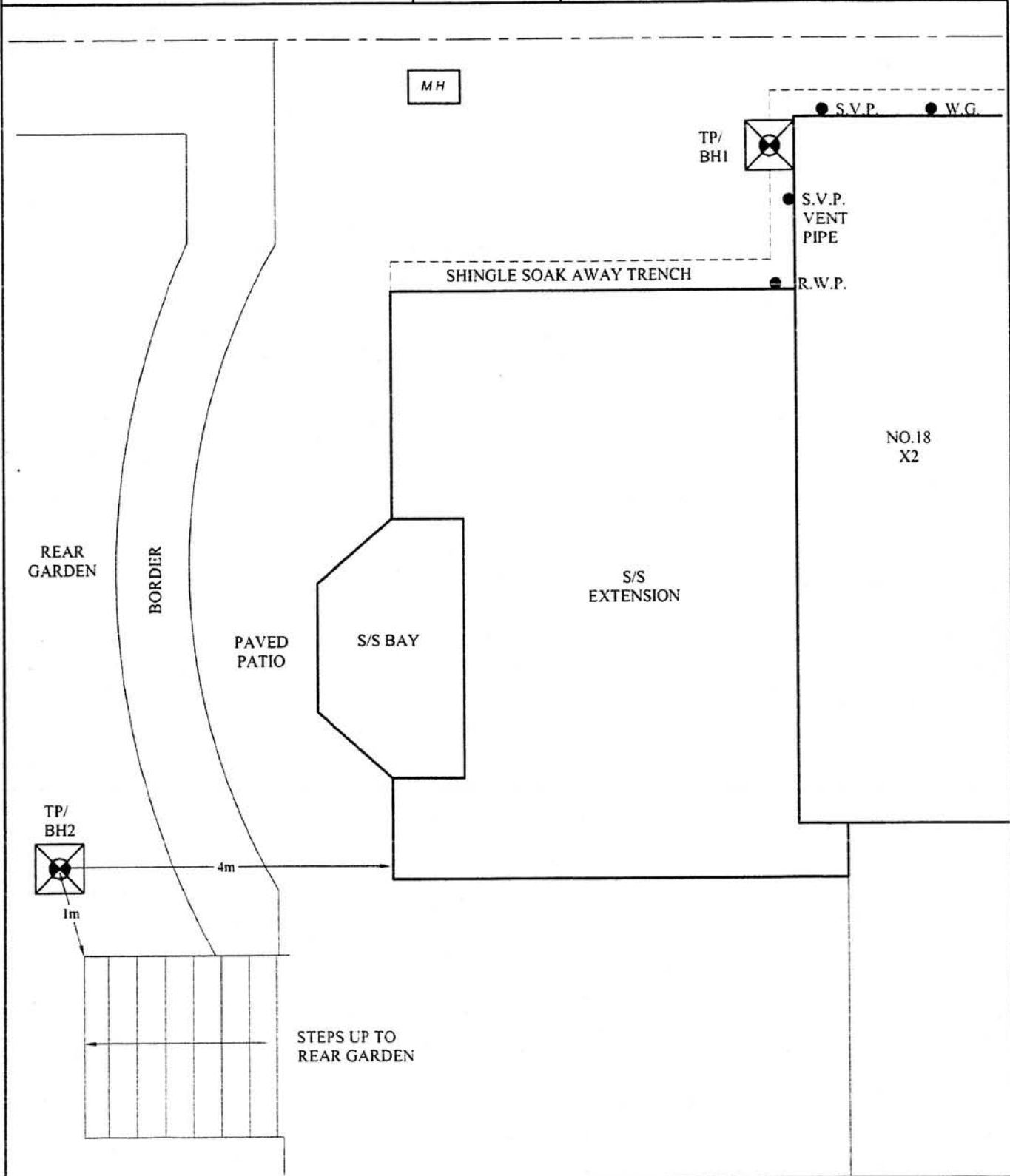
Chelmer Site Investigations

Unit 15 East Hanningfield Industrial Estate
 Old Church Road, East Hanningfield, Essex CM3 8AB
 Telephone: 01245 400930 Fax: 01245 400933

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Client: J D Bennett	Scale: N.T.S.	Sheet: 1 of 1	Date: 23.3.11
Location: 18 Ferncroft Avenue, London NW3	Job No: 2553	Weather: Fine	Drawn by: JG Checked by: ME



Notes: LARGE SYCAMORE IN REAR GARDEN APPROX. Ht.20m AND APPROX. 15m FROM REAR OF PROPERTY.
 On site tree identification for guidance only. Not authenticated.

Key:

 Tree/Shrub	 Borehole	 Trial Pit	 Gully	 Tree Stump	 Rain Water/Soil Pipe	 Manhole
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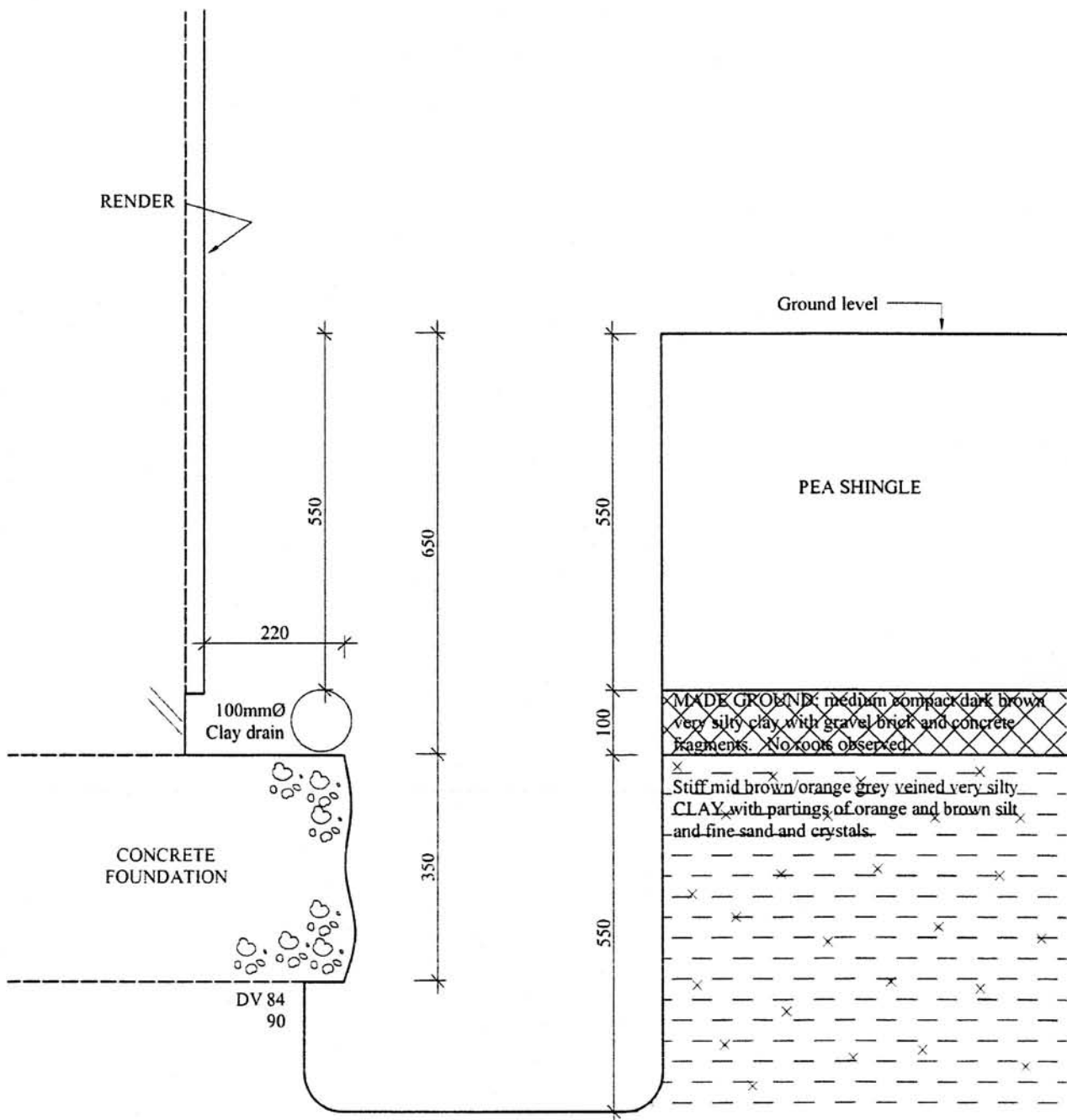
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Client: J D Bennett	Scale: N.T.S.	Sheet No: 1 of 1	Date: 23.3.11
Location: 18 Ferncroft Avenue, London NW3	Job No: 2553	Trial Pit No: 1	Weather: Fine
Excavation Method: Hand tools		Drawn by: JG	Checked by: ME



FOR STRATA BELOW 1200mm - SEE BH LOG

Remarks:

Key:

D Small disturbed sample

B Bulk disturbed sample

U Undisturbed sample (U100)

N Standard Penetration Test Blow Count

J Jar sample

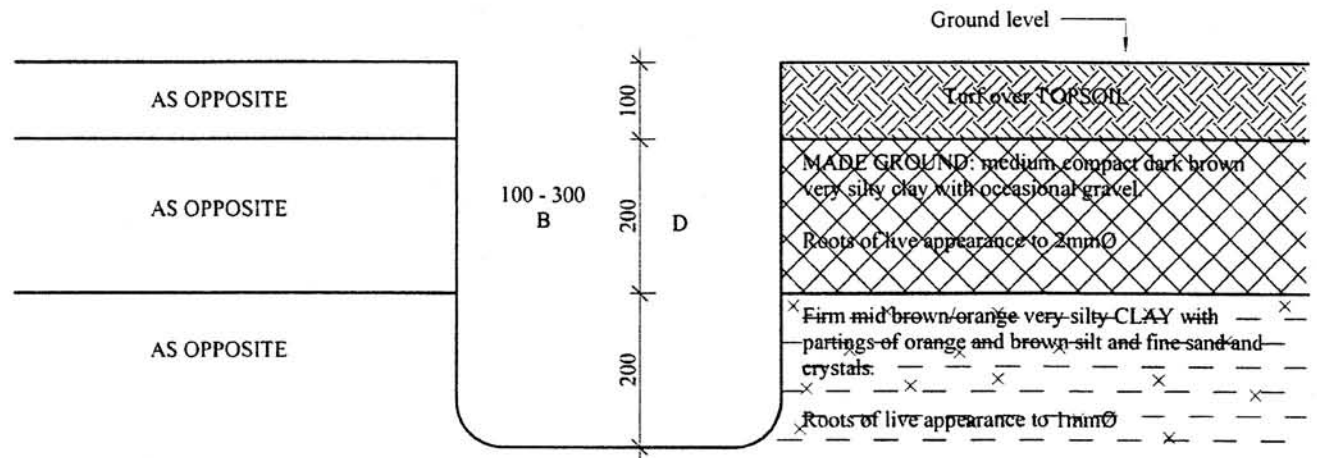
V Pilon Vane (kPa)

M Mackintosh Probe

W Water Sample



Client: J D Bennett	Scale: N.T.S.	Sheet No: 1 of 1	Date: 23.3.11
Location: 18 Ferncroft Avenue, London NW3	Job No: 2553	Trial Pit No: 2	Weather: Fine
Excavation Method: Hand tools		Drawn by: JG	Checked by: ME



FOR STRATA BELOW 500mm - SEE BH LOG

Remarks:	Key:	
	D Small disturbed sample B Bulk disturbed sample U Undisturbed sample (U100) N Standard Penetration Test Blow Count	J Jar sample V Picon Vane (kPa) M Mackintosh Probe W Water Sample

Chelmer Site Investigations

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Client: J D Bennett		Scale: N.T.S.		Sheet No: 1 of 1		Weather: Fine		Date: 23.3.11	
Site: 18 Ferncroft Avenue, London NW3		Job No: 2553		Borehole No: 1		Boring method: Hand auger			
Depth Mtrs.	Description of Strata	Thick-ness	Legend	Sample	Test Type	Result	Root Information	Depth to Water	Depth Mtrs
1.2	As trial pit one.	1.2					No roots observed.	1.9	
1.9	Stiff mid brown/orange grey veined very silty CLAY with partings of orange and brown silt and fine sand with crystals.	0.7		D	V	98 104			1.5
1.9	Stiff moist as above.	0.9		D	V	112 118			2.0
2.8				D	V	124 132			2.5
2.8				D	V	140+ 140+			3.0
4.4	Very stiff mid brown grey veined silty CLAY with partings of orange/brown silt and fine sand and crystals.	1.6		D	V	140+ 140+			3.5
4.4				D	V	140+ 140+			4.0
4.8	Medium dense mid brown/orange clayey silty fine and medium SAND with lenses of clay.	0.4		D	M	41 50(50) 50(20) T.D.T.D.			4.6
4.8	Borehole ends at 4.8m Too dense to hand auger.								
Drawn by: JG Approved by: ME		Key: T.D.T.D. Too Dense to Drive D Small Disturbed Sample J Jar Sample B Bulk Disturbed Sample V Pilcon Van (kPa) U Undisturbed Sample (U100) M Mackintosh Probe W Water Sample N Standard Penetration Test Blow Count							
Remarks: Water seepage at 1.9m. Standing water at 4.6m on completion. Borehole open on completion.									

Chelmer Site Investigations,

Unit 15, East Hanningfield Industrial Estate, Old Church Road,

East Hanningfield, Essex CM3 8AB

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Email: info@siteinvestigations.co.uk Website: www.slteinvestigations.co.uk

REPORT NOTES

Equipment Used

Hand tools, Mechanical Concrete Breaker and Spade, Hand Augers, 100mm/150mm diameter Mechanical Flight Auger Rig, GEO205 Flight Auger Rig, Window Sampling Rig, and Large or Limited Access Shell & Auger Rig upon request and/or access permitting.

On Site Tests

By Pilcon Shear-Vane Tester (Kn/m^2) in clay soils, and/or Mackintosh Probe in granular soils or made ground and/or upon request Continuous Dynamic Probe Testing and Standard Penetration Testing.

Note:

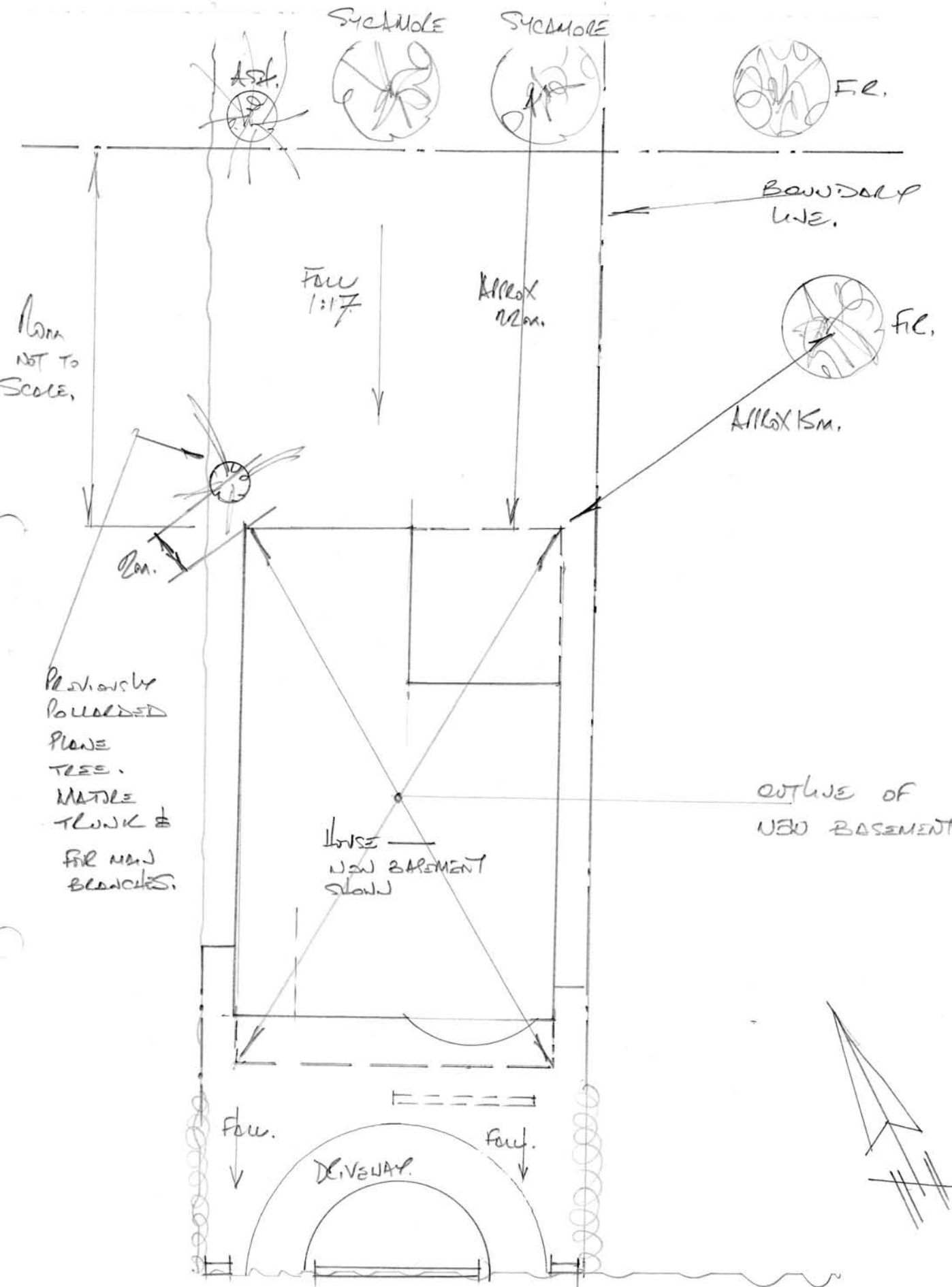
Details reported in trial-pits and boreholes relate to positions investigated only as instructed by the client or engineer on the date shown.

We are therefore unable to accept any responsibility for changes in soil conditions not investigated i.e. variations due to climate, season, vegetation and varying ground water levels.

Full terms and conditions are available upon request.

Appendix 2

Site Sketch and Structural Assessment



PLAN ON BASEMENT @ 1:200