Reference

[1] Concrete in aggressive ground
BRE Special Digest 1
Building Research Establishment, 2005

PROCEDURAL NOTES for GROUND INVESTIGATIONS

General

This report is based upon data obtained from field descriptions of the strata and examination of the samples by an engineer, together with the results of in situ and laboratory tests as appropriate. Responsibility cannot be accepted for variations in ground conditions between and around any of the exploratory points that is not revealed by the data. Whilst the report may offer an opinion on the ground conditions between exploratory points and below the depth of investigation, this is for guidance only and no liability is accepted for its accuracy.

Drilling procedure

Boring by light cable percussion drilling allows the ground conditions to be reasonably well established. However, a certain amount of disturbance is inevitable and some mixing of soils can occur.

Sampling procedure

"Undisturbed" samples of predominantly cohesive soils are taken with a 100mm diameter open tube sampler, generally in accordance with BS 5930: 1999.

Where appropriate, or where an undisturbed sample is unsuccessful, disturbed samples are recovered and sealed into polythene bags.

Groundwater samples are taken when water is encountered in sufficient quantity.

Standard penetration tests

The test is conducted generally in accordance with BS 1377: Part 9: 1990. The sampler tube is subject to a seating drive of 150mm into the soil at the base of the borehole. Results are given on the Borehole Records as the number of blows required to drive the sampler tube a further 300mm and this is known as the "N" value. Where the driving resistance is such that full penetration is not achieved, the test is generally terminated after 50 blows and the actual distance penetrated is recorded.

Groundwater

Groundwater observations necessarily reflect the conditions encountered at the time of the exploratory work. Long term monitoring of standpipes is usually required to establish an equilibrium water level since the normal rate of boring is too fast to permit steady state conditions to be achieved.

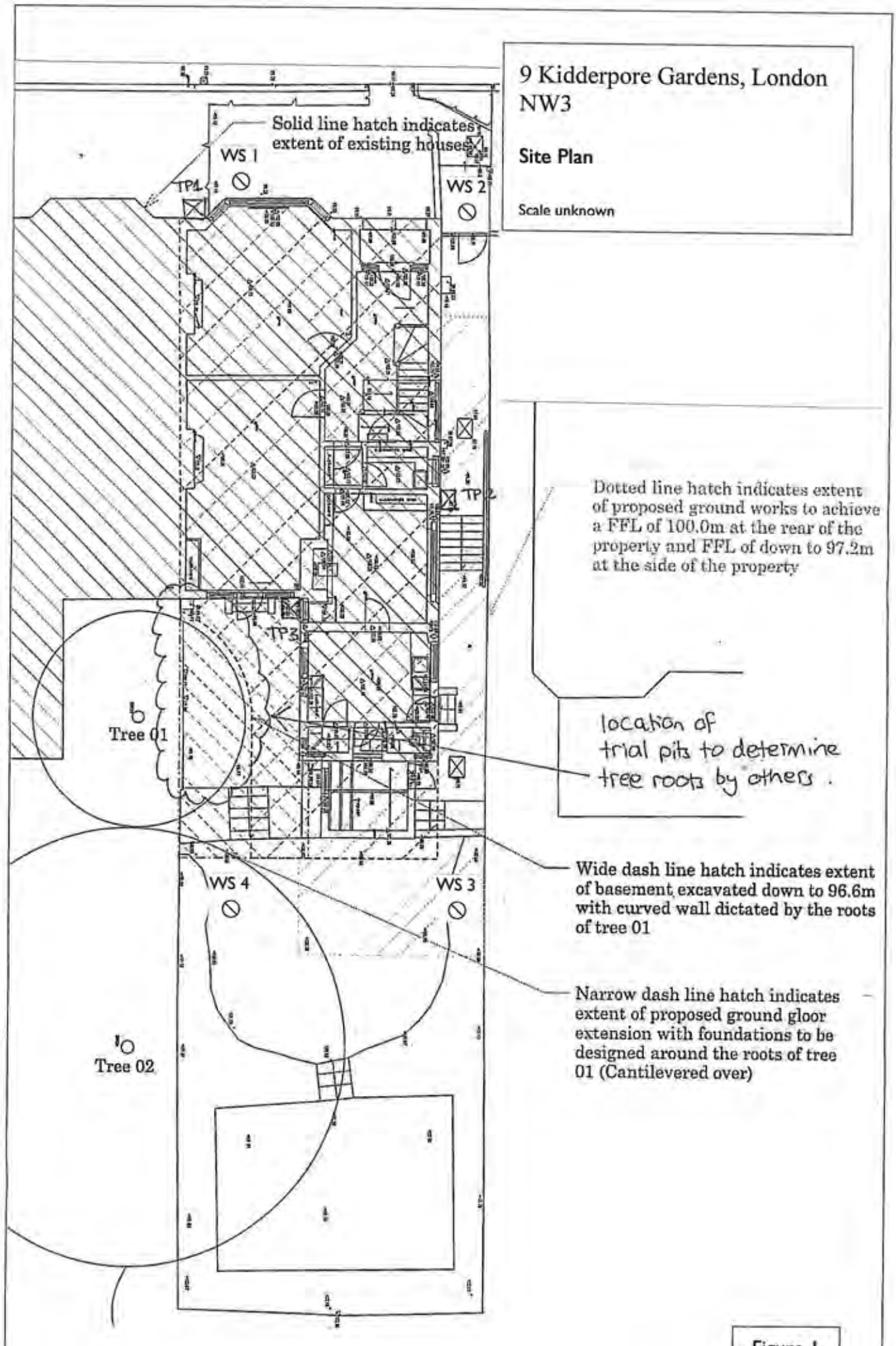
Groundwater levels are subject to variations caused by changes in drainage conditions and seasonal climatic changes.

Water may necessarily be added to advance the bore whilst casing may be required to maintain an open hole. These can both mask subsequent groundwater observations and are therefore noted on the individual Borehole Record.

APPENDICES

APPENDIX A

FIGURES


9 Kidderpore Gardens, London NW3
Site Plan
Scale unknown
Solid line hatch indicates extent of existing houses
WS 1
WS 2
TP1
TP2
TP3
Dotted line hatch indicates extent of proposed ground works to achieve a FFL of 100.0m at the rear of the property and FFL of down to 97.2m at the side of the property
location of trial pits to determine tree roots by others.
Tree 01
WS 4
WS 3
Wide dash line hatch indicates extent of basement excavated down to 96.6m with curved wall dictated by the roots of tree 01
Narrow dash line hatch indicates extent of proposed ground gloor extension with foundations to be designed around the roots of tree 01 (Cantilevered over)
Tree 02
Figure 1

SHEAR STRENGTH PROFILE
9 Kidderpore Gardens, London NW3

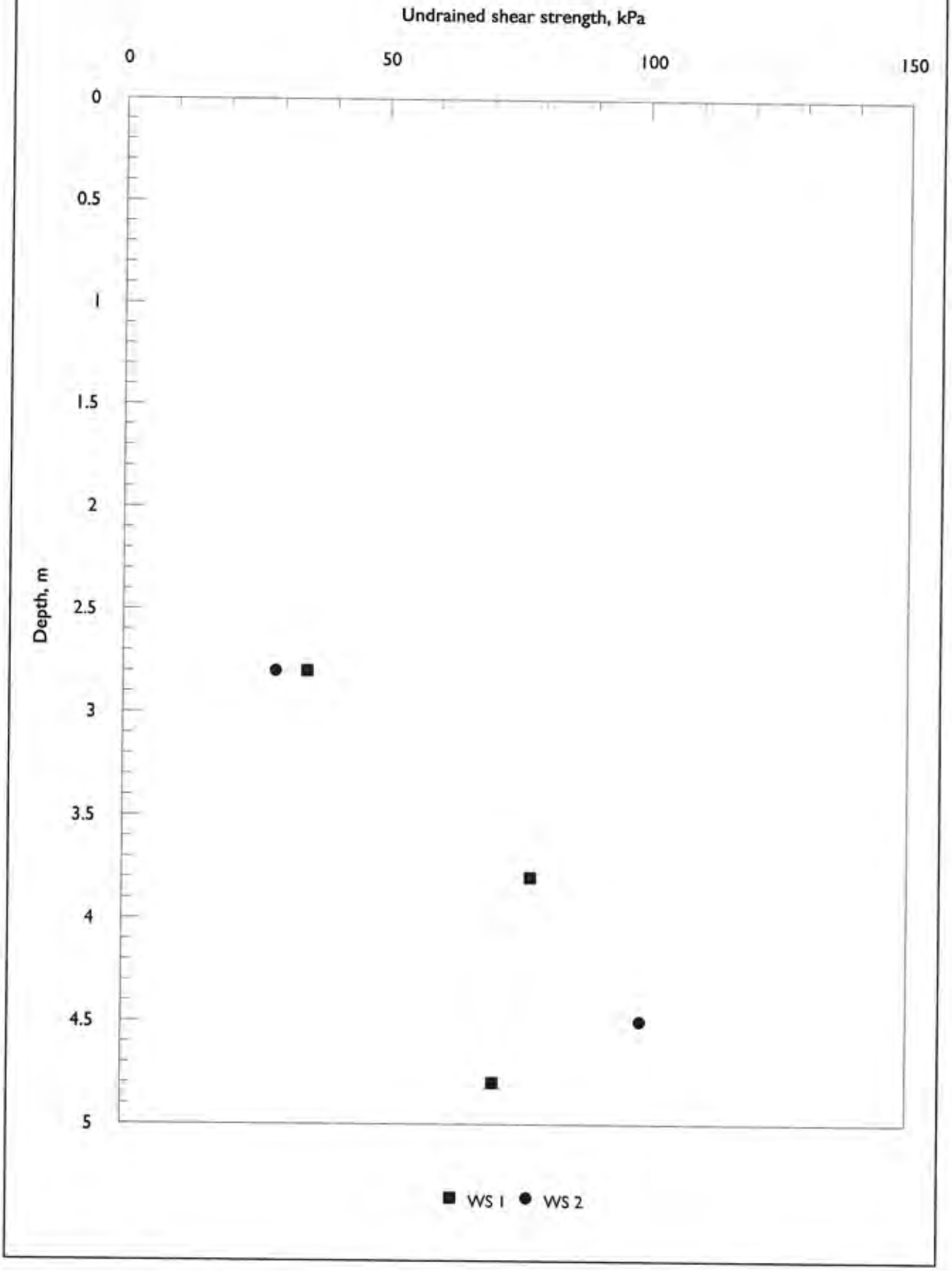


Figure 2

SYMBOLS and ABBREVIATIONS

Samples

Undisturbed

U	Standard open drive "undisturbed" 102mm dia. in boreholes 38mm dia. in trial pits, window sampler and hand auger
T	Thin wall open drive
P	Piston
C	CBR mould

Disturbed

D	Small
B	Bulk
C	Contaminants: plastic tub
J	brown glass jar
W	Water

In situ tests

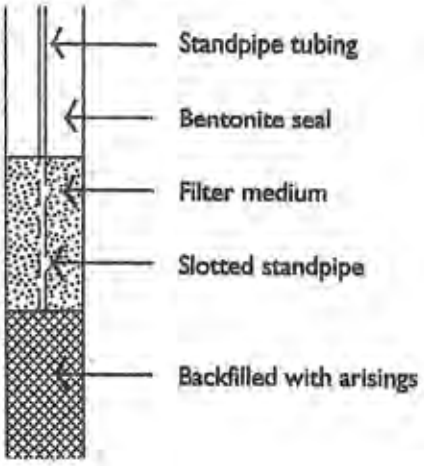
SPT	Standard Penetration Test, open shoe
CPT	solid cone
	N value is number of blows for 300mm penetration. Blow count also given as seating drive followed by four increments of 75mm.
V ( )	Vane test (c_u kPa)
P ( )	Hand penetrometer (c_u kg/cm^2)
M ( )	Mexe probe (CBR %)

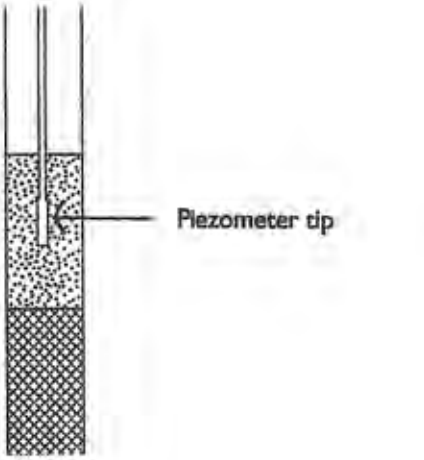
Water records

Σ_1	Standing level
∇_1	Depth encountered

suffix identifies separate strikes

Standpipes





APPENDIX B

BOREHOLE RECORDS

AP GEOTECHNICS
T 01784 438038
F 01784 472870
E mail@apgeotechnics.co.uk

Site 9 KIDDERPORE GARDENS, LONDON NW3				**Number** 1
Excavation Method Drive-in Window Sampler	**Dimensions** 1mm to 115.00m	**Ground Level (mOD)**	**Client** Nir Wegrzyn	**Job Number** 3341
	Location See site plan	**Dates** 16/11/2009	**Engineer** RCK Architects	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-1.00	L1		80 % recovery		(0.30)	FILL: Paving over loose brown clayey sand with brick fragments			
0.20	D1				0.30	FILL: Soft orange brown silty sandy clay with brick fragments			
					(0.60)				
					0.90	FILL: Firm orange brown mottled sandy clay with brick fragments			
1.00-2.00 1.00-1.45	L2 CPT N=9		100 % recovery 3/2,2,2,3		(0.30)				
					1.20	Soft becoming firm orange brown and grey mottled sandy CLAY			
2.00-3.00	L3		80 % recovery		(1.80)				
3.00-4.00	L4		100 % recovery		3.00	Firm becoming stiff orange brown and grey mottled slightly sandy CLAY with sand lenses and rare gravel			
4.00-5.00	L5		80 % recovery		(2.00)				
			16/11/2009:4.80m		5.00				

Remarks
Hand excavated to 0.30 m depth

Scale (approx)	Logged By
1:25	

Figure No. 3341.1

AP GEOTECHNICS
T 01784 438038
F 01784 472870
E mail@apgeotechnics.co.uk

Site	Number
9 KIDDERPORE GARDENS, LONDON NW3	2

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler			Nir Wegrzyn	3341
	Location	**Dates**	**Engineer**	**Sheet**
	See site plan	16/11/2009	RCK Architects	1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					0.10	FILL: Paving over loose orange fine sand		
0.30	D1				(0.90)	FILL: Soft orange brown silty sandy clay with occasional brick fragments		
0.60	D2							
0.90	D3							
1.00-2.00	L1		80 % recovery		1.00	Soft orange brown and grey mottled sandy CLAY		
2.00-3.00	L2		80 % recovery		(2.00)			
3.00-4.00	L3		80 % recovery		3.00	Firm becoming stiff orange brown and grey mottled slightly sandy CLAY with sand lenses and rare gravel		
4.00-5.00	L4		80 % recovery		(2.00)			
					5.00			

Remarks
Borehole dry
Hand excavated to 1.0 m depth

Scale (approx)	Logged By
1:25	

Figure No. 3341.2

AP GEOTECHNICS
T 01784 438038
F 01784 472870
E mail@apgeotechnics.co.uk

Site 9 KIDDERPORE GARDENS, LONDON NW3			**Number** 3
Excavation Method Drive-in Window Sampler	**Dimensions**	**Ground Level (mOD)**	**Client** Nir Wegrzyn	**Job Number** 3341
	Location See site plan	**Dates** 05/01/2010	**Engineer** RCK Architects	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	Turf over TOPSOIL		
					0.30	FILL: Firm brown clay with brick fragments		
0.50	D1				(0.40)			
					0.70	Soft to firm orange brown sandy CLAY		
					(0.30)			
1.00	D2				1.00	Firm brown and orange brown slightly sandy CLAY		
1.50	D3				(1.00)			
2.00	D4				2.00	Complete at 2.00m		

Remarks
No further progress - clay adhering to auger
Hole advanced by hand auger

Scale (approx)	Logged By
1:25	

Figure No. 3341.3

AP GEOTECHNICS
T 01784 438038
F 01784 472870
E mail@apgeotechnics.co.uk

Site	Number
9 KIDDERPORE GARDENS, LONDON NW3	4

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler			Nir Wegrzyn	3341
	Location See site plan	**Dates** 05/01/2010	**Engineer** RCK Architects	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20) 0.20	Turf over TOPSOIL		
0.50	D1				(1.00)	Soft to firm orange brown sandy CLAY		
1.00	D2				1.20			
1.50	D3				(0.80)	Firm brown and orange brown slightly sandy CLAY		
2.00	D4				2.00	Complete at 2.00m		

Remarks
No further progress - clay adhering to auger
Hole advanced by hand auger

Scale (approx)	Logged By
1:25	

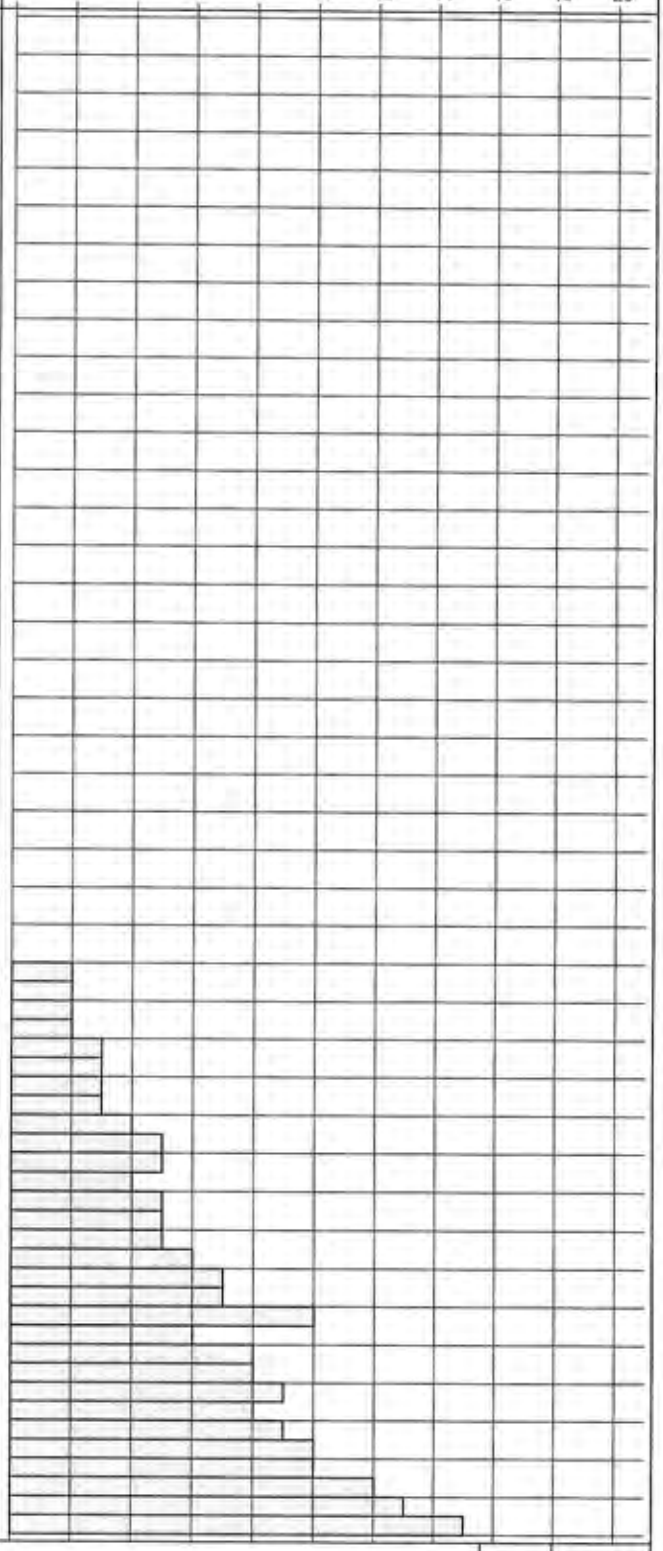
Figure No. 3341.4

AP GEOTECHNICS
T 01784 438038
F 01784 472870
E mail@apgeotechnics.co.uk

Site	Probe Number
9 KIDDERPORE GARDENS, LONDON NW3	DP1

Method	Cone Dimensions	Ground Level (mOD)	Client	Job Number
Dynamic Probe			Nir Wegrzyn	3341
	Location	**Dates**	**Engineer**	**Sheet**
	See site plan	16/11/2009	RCK Architects	1/1

Depth (m)	Blows for Depth Increment	Field Records	Level (mOD)	Depth (m)
		Window sampled to 5.0 m depth		0.00
				0.50
				1.00
				1.50
				2.00
				2.50
				3.00
				3.50
				4.00
				4.50
5.00-5.10	2			5.00
5.10-5.20	2			
5.20-5.30	2			
5.30-5.40	2			
5.40-5.50	3			
5.50-5.60	3			5.50
5.60-5.70	3			
5.70-5.80	3			
5.80-5.90	4			
5.90-6.00	5			
6.00-6.10	5			6.00
6.10-6.20	4			
6.20-6.30	5			
6.30-6.40	5			
6.40-6.50	5			
6.50-6.60	6			6.50
6.60-6.70	7			
6.70-6.80	7			
6.80-6.90	10			
6.90-7.00	6			
7.00-7.10	8			7.00
7.10-7.20	8			
7.20-7.30	9			
7.30-7.40	8			
7.40-7.50	9			
7.50-7.60	10			7.50
7.60-7.70	10			
7.70-7.80	12			
7.80-7.90	13			
7.90-8.00	15			8.00



Remarks

Scale (approx)	Logged By
1:40	

Figure No. 3341.DP1

APPENDIX C

STANDPIPE RECORDS

STANDPIPE RECORDS

WATER LEVELS

Project: 9 KIDDERPORE GARDENS, LONDON NW3
Client: Nir Wegrzyn
Agent: RCK Architects

Project No: 3341
Sheet No: 1/1

Date	Measurement	Units	Location							
05/01/2010			WS1							
Weather conditions			Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady
Temp. °C	Flow rate	l/hr								
Atmos. mb	Methane	%								
	Carbon dioxide	%								
Cloud	Carbon monoxide	ppm								
Sun	Hydrogen sulphide	ppm								
Rainfall	Oxygen	%								
	Water level	m bgl	2.58							

Date	Measurement	Units	Location							
19/01/2010			WS1							
Weather conditions			Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady
Temp. °C	Flow rate	l/hr								
Atmos. mb	Methane	%								
	Carbon dioxide	%								
Cloud	Carbon monoxide	ppm								
Sun	Hydrogen sulphide	ppm								
Rainfall	Oxygen	%								
	Water level	m bgl	2.31							

Date	Measurement	Units	Location							
Weather conditions			Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady
Temp. °C	Flow rate	l/hr								
Atmos. mb	Methane	%								
	Carbon dioxide	%								
Cloud	Carbon monoxide	ppm								
Sun	Hydrogen sulphide	ppm								
Rainfall	Oxygen	%								
	Water level	m bgl								

Date	Measurement	Units	Location							
Weather conditions			Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady
Temp. °C	Flow rate	l/hr								
Atmos. mb	Methane	%								
	Carbon dioxide	%								
Cloud	Carbon monoxide	ppm								
Sun	Hydrogen sulphide	ppm								
Rainfall	Oxygen	%								
	Water level	m bgl								

Readings taken with GA 2000 manufactured by Geotechnical Instruments Ltd.

APPENDIX D

LABORATORY TEST RESULTS

SUMMARY OF GEOTECHNICAL TESTS

Project: 9 KIDDERPORE GARDENS, LONDON NW3
Client: Nir Wegrzyn
Agent RCK Architects

Project No: 3341
Sheet No: 1/1

Location	Sample No	Depth m	Description	CLASSIFICATION							TRIAXIAL COMPRESSION - TOTAL STRESS							CHEMICAL		
				Natural Moisture Content %	Liquid Limit %	Plastic Limit %	Plast. Index %	Passing 425µm %	Mod. Plast. Index %	Class	Type	Moisture Content %	Bulk Density Mg/m³	Radial Stress kPa	Deviator Stress kPa	Cohesion cu, kPa assuming Øu = 0	Cohesion cu, kPa Øu, deg	Sulphate (SO4) Water g/l	Sulphate (SO4) Soil (Sol) g/l	pH
WS1	L3	2.80	Soft orange brown and grey mottled sandy CLAY	21	38	18	20	100		CI	UU 38	21	2.02	56	70	35			0.22	7.84
	L4	3.80	Stiff orange brown and grey mottled slightly sandy CLAY with sand lenses and rare gravel	32	69	28	41	100		CH	UU 38	32	1.93	76	155	78			0.22	8.63
	L5	4.80	Firm orange brown and grey mottled slightly sandy CLAY with sand lenses and rare gravel								UU 38	35	1.91	96	142	71				
WS2	L2	2.80	Soft orange brown and grey mottled sandy CLAY	25	39	19	20	100		CI	UU 38	25	1.98	56	58	29			0.19	7.77
	L4	4.50	Stiff orange brown and grey mottled slightly sandy CLAY with sand lenses and rare gravel								UU 38	32	1.95	90	198	99				

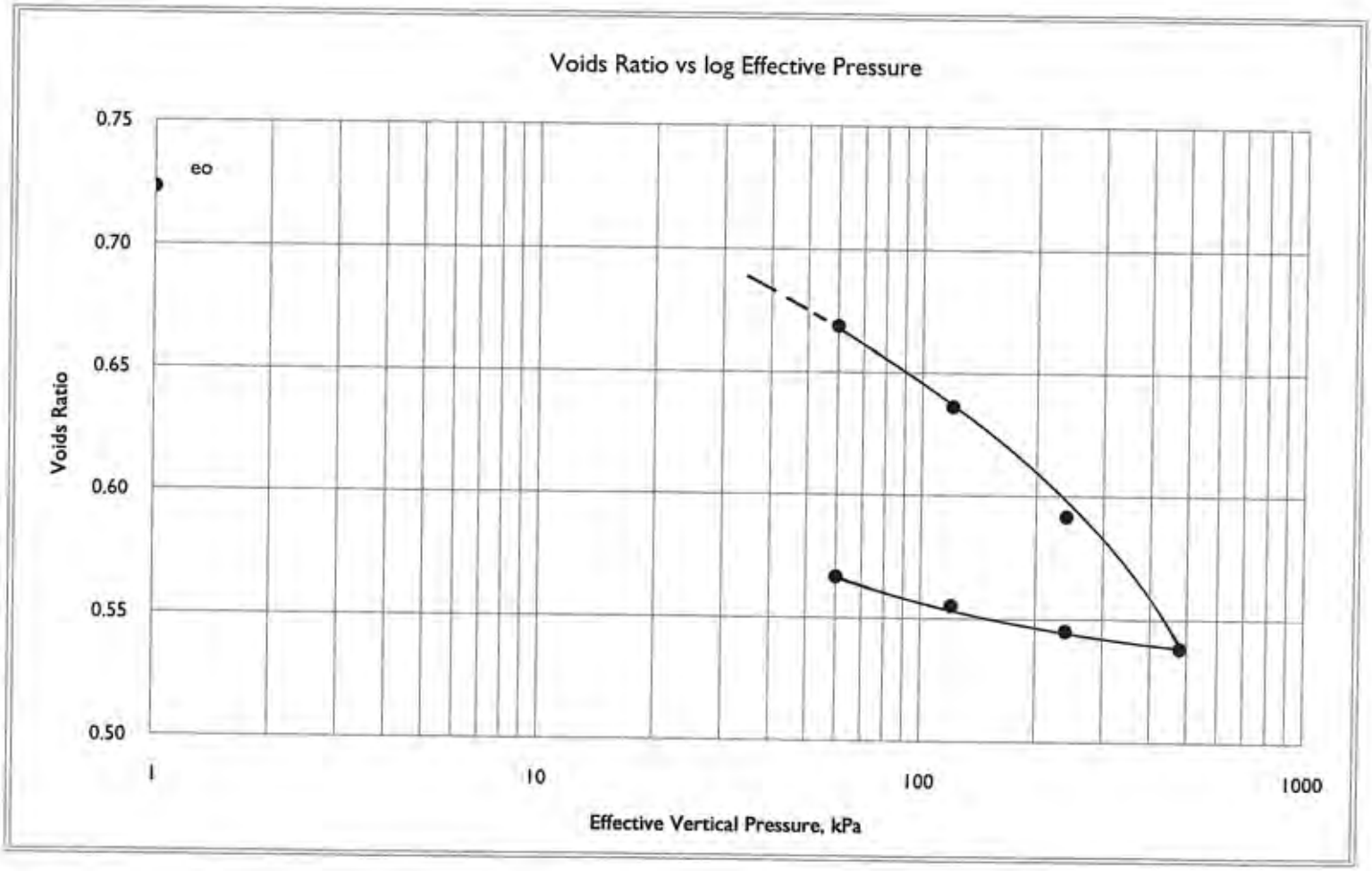
Note: Soil Classification based upon unmodified Plasticity Index

ONE - DIMENSIONAL CONSOLIDATION TEST

Project: 9 KIDDERPORE GARDENS, LONDON NW3
Client: Nir Wegrzyn
Agent: RCK Architects

Project No: 3341
Sheet No. 1/2

Borehole	Sample	Depth, m
1	L3	2.80
Description		
Soft orange brown and grey mottled sandy CLAY		
Specific Gravity	Moisture Cont. %	Dry Density Mg/m³
2.710 measured	start 22 finish 20	1.573
Pressure kPa	Coefficient of Consolidation m²/year	Coefficient of Compressibility m²/MN
0		
	0.728	0.527
60		
	0.959	0.325
120		
	0.945	0.227
240		
	0.833	0.140
480		
	2.475	0.019
240		
	1.297	0.054
120		
	0.477	0.122
60		

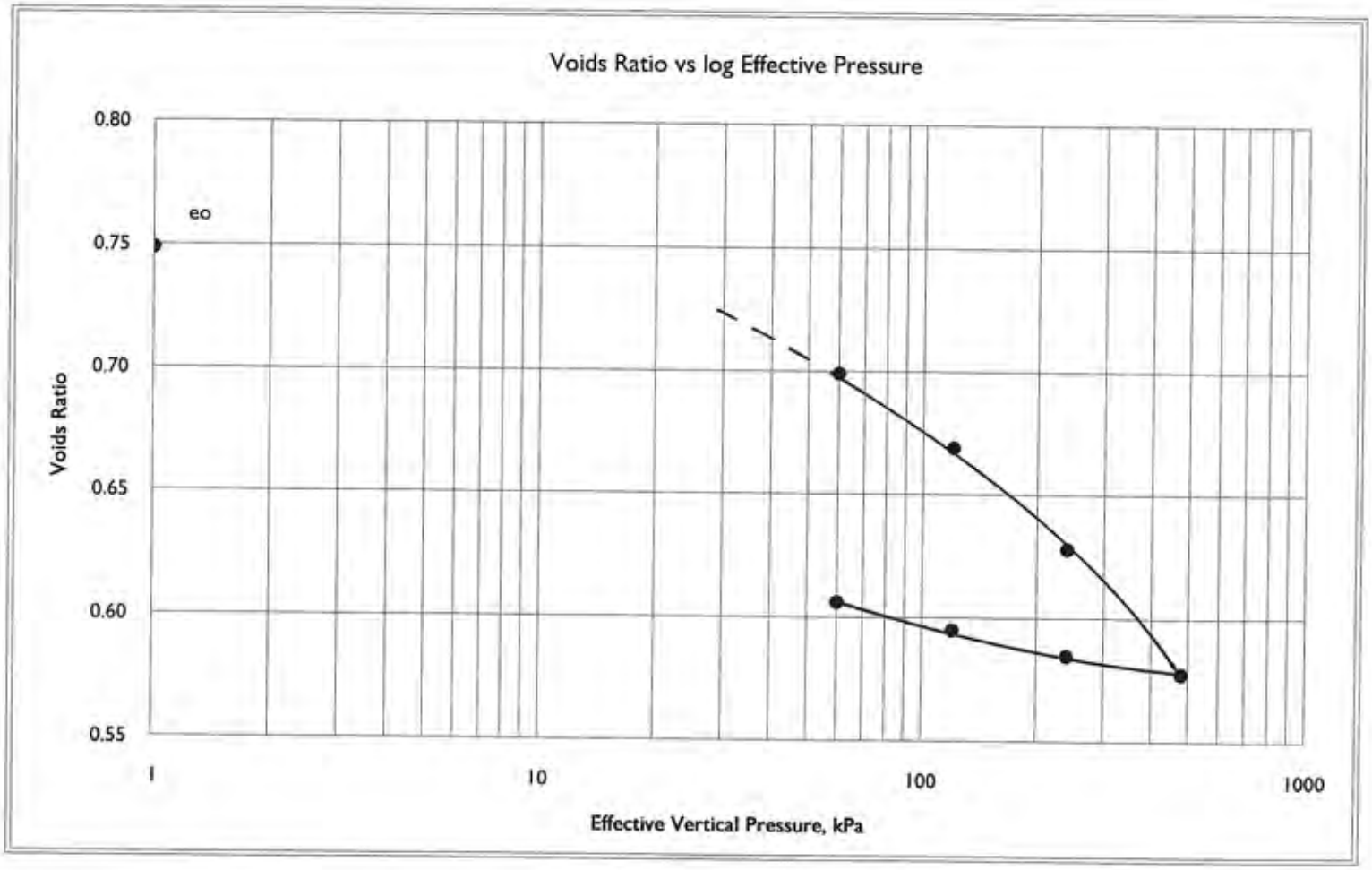


ONE - DIMENSIONAL CONSOLIDATION TEST

Project: 9 KIDDERPORE GARDENS, LONDON NW3
Client: Nir Wegrzyn
Agent: RCK Architects

Project No: 3341
Sheet No. 2/2

Borehole	Sample	Depth, m
2	L3	2.80
Description		
Soft orange brown and grey mottled sandy CLAY		
Specific Gravity	Moisture Cont. %	Dry Density Mg/m³
2.750 measured	start 24 finish 22	1.573
Pressure kPa	Coefficient of Consolidation m²/year	Coefficient of Compressibility m²/MN
0		
	0.818	0.474
60		
	0.643	0.295
120		
	0.706	0.205
240		
	0.797	0.129
480		
	1.166	0.019
240		
	0.862	0.054
120		
	0.873	0.115
60		



ELAB

UKAS TESTING 2683

mCERTS 2683

The Harley Reed Building
Unit C, Drury Lane
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BA
Telephone (01424) 718618
Facsimile (01424) 729911

THE ENVIRONMENTAL LABORATORY LTD

F.A.O. Richard Chapman
AP Geotechnics Ltd
Brunel Science Park
Coopers Hill Lane, Englefield Green
TW20 0JZ

Reporting Date: 14/12/09

ANALYTICAL REPORT No. AR24142

Samples Received By:-	Laboratory Courier
Samples Received:-	03/12/09
Your Ref No:	3341
Site Location:-	Hampstead
No Samples Received:-	1

Report Checked By:-

Steve Knight
Director

Authorised By:-

Cliff P.V. Knight BSc, EurChem, CChem FRSC
Managing Director

Any comments, opinions, or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)

The Harley Reed Building
Unit C, Drury Lane
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BA
Telephone (01424) 718618
Facsimile (01424) 729911

2683 2683

THE ENVIRONMENTAL LABORATORY LTD

Waste Acceptance Criteria ANALYTICAL *RESULTS*

Report No:	ANALYTICAL REPORT No. AR24142					Page 2 of 4	
					CLIENT:	AP Geotechnics Ltd	
Project Name:	Location: Hampstead						
Lab Reference	40743				Landfill Waste Acceptance Criteria Limits		
Sampling Date	—				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS1						
Depth	0.50 - 1.00						
Solid Waste Analysis							
TOC (%)	0.4				3%	5%	6%
Loss on Ignition (%)**	1.3				–	–	10%
BTEX (mg/kg)**	<0.01				6	–	–
Sum of PCBs (mg/kg)**	<0.01				1	–	–
Mineral Oil (mg/kg)**	<5				500	–	–
Total PAH (mg/kg)**	<0.5				100	–	–
pH (Units)**	8.4				–	–	–
Acid Neutralisstion Capacity (mol/kg)	<0.1				–	To be evaluated	To be evaluated
Eluate Analysis	2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
	mg/l	mg/l		mg/kg			
Arsenic*	<0.005	<0.005		<0.1	0.5	2	25
Barium*	0.008	<0.005		<0.1	20	100	300
Cadmium*	<0.001	<0.001		<0.01	0.04	1	5
Chromium*	<0.005	<0.005		<0.1	0.5	10	70
Copper*	<0.005	<0.005		<0.1	2	50	100
Mercury*	0.0006	0.0002		0.001	0.01	0.2	2
Molybdenum*	0.018	0.013		<0.1	0.5	10	30
Nickel*	<0.005	<0.005		<0.1	0.4	10	40
Lead*	<0.005	<0.005		<0.1	0.5	10	50
Antimony	<0.005	<0.005		<0.01	0.06	0.7	5
Selenium	<0.005	<0.005		<0.01	0.1	0.5	7
Zinc*	<0.005	<0.005		<0.1	4	50	200
Chloride*	3	4		21	800	15000	25000
Fluoride*	<1	<1		<1	10	150	500
Sulphate*	6	3		16	1000	20000	50000
TDS	160	1610		7153	4000	60000	100000
Phenol Index	<0.5	<0.5		<0.5	1	-	-
DOC	22.6	21.2		112	500	800	1000
Leach Test Information							
pH *	8.1	7.3					
EC*	169	73					
Sample Mass (kg)	0.206						
Dry Matter (%)	85						
Moisture (%)	18						
Stage 1							
Volume Eluate L2 (litres)	0.318						
Filtered Eluate VE1 (litres)	0.150						

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ELAB cannot be held responsible for any discrepencies with current legislation

*= UKAS accredited
** - MCERTS accredited test

The Harley Reed Building
Unit C, Drury Lane
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BA
Telephone (01424) 718618
Facsimile (01424) 729911

2683 2683

THE ENVIRONMENTAL LABORATORY LTD

SAMPLE RECEIPT AND TEST DATES

Our Analytical Report Number	AR24142
Your Ref No:	3341
Sample Receipt Date:	03/12/09
Reporting Date:	14/12/09
Registered:	03/12/09
Prepared:	04/12/09
Analysis complete:	11/12/09

TEST METHOD SUMMARY

PARAMETER	Undertaken on	Date Tested	Method Number	Technique
pH Value**	Air dried sample	07/12/09	113	Electrometric
Total Organic Carbon	Air dried sample	10/12/09	210	Automated IR Absorption
Loss on Ignition**	Air dried sample	07/12/09	129	Gravimetric
Neutralization Capacity to pH 7	Air dried sample	07/12/09	-	EA
Benzene**	As submitted sample	07/12/09	181	GCMS
Toluene**	As submitted sample	07/12/09	181	GCMS
Ethyl Benzene**	As submitted sample	07/12/09	181	GCMS
Xylenes**	As submitted sample	07/12/09	181	GCMS
Mineral Oil**	As submitted sample	07/12/09	117	GCFID
PCB 28**	Air dried sample	09/12/09	120	GCMS
PCB 52**	Air dried sample	09/12/09	120	GCMS
PCB 101**	Air dried sample	09/12/09	120	GCMS
PCB 118**	Air dried sample	09/12/09	120	GCMS
PCB 138**	Air dried sample	09/12/09	120	GCMS
PCB 153**	Air dried sample	09/12/09	120	GCMS
PCB 180**	Air dried sample	09/12/09	120	GCMS
Speciated PAH**	As submitted sample	07/12/09	133	GCFID

The analysts' guide for sampling, analysis and clearance procedures
* = UKAS Accredited test
** - MCERTS Accredited test
Determinands not marked with a * or ** are not accredited
MCERTS accreditation covers samples which are predominantly sand, clay, loam or combinations of these three soil types

Any comments, opinions, or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)

ELAB

UKAS TESTING
2683

The Harley Reed Building
Unit C, Drury Lane
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BA
Telephone (01424) 718618
Facsimile (01424) 729911

THE ENVIRONMENTAL LABORATORY LTD

LEACHATE SAMPLE RECEIPT AND TEST DATES

Our Analytical Report Number	AR24142
Your Ref No:	3341
Sample Receipt Date:	03/12/09
Reporting Date:	14/12/09
Registered:	03/12/09
Prepared:	04/12/09
Analysis complete:	11/12/09

LEACHATE TEST METHOD SUMMARY

PARAMETER	Method Number	Technique
Arsenic*	101	ICPMS
Cadmium*	101	ICPMS
Chromium*	101	ICPMS
Lead*	101	ICPMS
Nickel*	101	ICPMS
Copper*	101	ICPMS
Zinc*	101	ICPMS
Mercury*	101	ICPMS
Selenium	101	ICPMS
Antimony	101	ICPMS
Barium*	101	ICPMS
Molybdenum*	101	ICPMS
pH Value*	113	Electrometric
Electrical Conductivity*	136	Probe
Dissolved Organic Carbon	102	TOC analyser
Chloride*	131	Ion Chromatography
Fluoride*	131	Ion Chromatography
Sulphate*	131	Ion Chromatography
Total Dissolved Solids	163	Gravimetric
Phenol Index	121	HPLC

* = UKAS Accredited test
Determinands not marked with * are not accredited

Any comments, opinions, or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)

6.4 HYDROGEOLOGICAL REPORT

Following receipt of the soil investigation, Peter Brett Associates were commissioned to produce a detailed hydrogeological report based on the findings of AP Geotechnics as well as their own survey. They concluded thus...

> . . . given the very low flow rates of the near-surface soils, it is considered that any changes will be limited and confined to the immediate vicinity of the property. On this basis, it is considered that the proposed basement can be constructed without significant detrimental effect to the groundwater regime and adjacent properties.

They recommended the following actions to mitigate and impact on the hydrogeological conditions...

> To mitigate any potential effects of the proposed basement on the groundwater regime it is recommended that a geocomposite studded drainage membrane is incorporated in the vertical face of the perimeter walls of the basement. A maintainable drainage channel should be installed to collect water and divert it to a sump pump to remove the collected water and to discharge it to the sewerage network.

This recommendation has been incorporated into the design proposals and the basement will be fully tanked with any water meeting the membrane drained and pumped or drained to the mains sewer.

Your ref:

Our ref: 24144/001/L001/CBH/MDH/SKW

23 June 2010

Peter Brett Associates LLP
Caversham Bridge House
Waterman Place, Reading
Berkshire RG1 8DN
T: +44 (0)118 950 0761
F: +44 (0)118 959 7498
E: reading@pba.co.uk

RCK Architects
6 St John's Place
London
EC1 4NP

For the attention of Tim O'Callaghan

Dear Tim

HYDROGEOLOGICAL ASSESSMENT
9 KIDDERPORE GARDENS, LONDON NW3

The purpose of this assessment is to consider the effects of a proposed basement construction at the residential property at 9 Kidderpore Gardens, West Hampstead on the local groundwater regime. For this assessment, a representative of PBA visited the property on 26 May 2010.

Planning Policy Context

Camden Planning Guidance (December, 2006) and Camden Local Development Framework (January 2010) require proposed developments to mitigate against the effects of ground and surface water flooding, and to include drainage systems that do not impact neighbouring property or the water environment by way of changing the groundwater regime.

Site Description

The property is located at National Grid Reference TQ 254 858 approximately 250 m northeast of the Finchley Road. The property is situated on the undulating land to the north of the River Thames around the headwaters of its tributary, the Westbourne, and on the southwest facing slope of Child's Hill.

The property has overall plan dimensions of about 10 by 40 m and is aligned approximately southeast to northwest. The property faces onto Kidderpore Gardens to the southeast, has neighbouring properties to the northeast and southwest, whilst to the northwest the rear garden extends to a public footpath, denoted Croft Way, that runs along the rear of the properties. In the immediate vicinity of the property ground levels fall to the southeast towards the valley of a former tributary of the Westbourne.

The existing development comprises a large semi-detached house with a single level basement under part of the existing building. The proposed development includes an extension to the basement to be constructed almost exclusively within the existing building footprint. The proposed basement floor level will be about 0.8 m below the existing basement floor level and about 2.5 m below existing ground level to the front and rear of the building. Details of the propose development are set out in RCK Architects drawing number PL-P-303, dated 15 April 2010.

Ground Conditions

The 1:50 000 scale geological sheet of the area (BGS, 2006)[1] indicates the property is underlain by the Claygate Member of the London Clay Formation with the overlying Bagshot Formation being present on the higher ground of Child's Hill to the northeast. Immediately to the southeast of the property, the Claygate Member is shown to be

[1] BGS (2006) North London, England and Wales Sheet 256, Bedrock and Superficial Deposits, 1:50 000 scale. British Geological Survey, Keyworth, Notts.

absent having been removed by erosion in the valley of the former tributary of the Westbourne. Head Deposits are shown overlying the solid geology on the lower ground to the southeast of the property.

Ground conditions at the property were investigated by AP Geotechnics Ltd between November 2009 and February 2010 (APG, 2010)[2]. The ground conditions revealed by the investigation are summarised in the following table.

Summary of Existing Ground Conditions

Strata	Base Depth, m bgl	Description
Surface	0.1 to 0.3	Surface paving overlying clayey fine sand (to front of property)
	0.2 to 0.3	Turf over topsoil (to rear of property)
Made Ground	0.2 to 1.2	Soft orange brown sandy CLAY with brick fragments.
London Clay Formation	5.0 (proven)	Soft becoming firm and stiff with depth, orange brown and grey mottled sandy CLAY with sand lenses and rare gravel.

During the investigation, a groundwater entry was noted into a single borehole, Borehole WS1, at 5.0 m depth, and was recorded as a slow inflow. Groundwater levels of 2.58 m below ground level (bgl) (5 Jan 2010) and 2.31 m bgl (19 Jan 2010) were measured in a standpipe piezometer installed in Borehole WS1 following completion of fieldwork.

During our site visit on 26 May 2010, the groundwater level in the standpipe was measured at 2.73 m bgl. Subsequently, the well was purged and the water level reduced to 3.63 m bgl. During the subsequent 15 minute period, groundwater in the well recharged as follows: after 5 minutes, 3.61m bgl; after 10 minutes, 3.58m bgl; and after 15 minutes, 3.57m bgl. Using the procedure recommended in BS 5930 (1999)[3], the effective permeability of the near-surface soils is calculated to be 4×10^{-8} m/s. This value is within the expected range for an unfissured clay or well mixed clay-silt (BS 8004, 1986)[4] and indicates that the soil has a very low permeability.

Ponded water was not observed during our site visit, although there had been little, if any, recent rainfall in the area. Examination of photographs taken during the limited excavations carried out as part of a Arboricultural Implication Assessment in October 2009, indicate that no groundwater inflows were noted despite recent rainfall.

Hydrogeology

The published groundwater vulnerability map of the area (NRA, 1994)[5] indicates the Bagshot Formation and Claygate Member are classified as a minor aquifer, which are formations of variable permeability that, although seldom producing large quantities of water for abstraction, may be important for local supplies and in supplying base flow to rivers. Although both strata are classified as minor aquifers, the basal bed of the Bagshot Formation comprises a well defined layer of "coarse grit with small well rounded pebbles" that is known for the development of spring lines where it outcrops above the less permeable Claygate Member (BGS, 2004)[6].

The underlying units of the London Clay Formation are classified as a non-aquifer, which is a formation that is generally regarded as containing insignificant quantities of mobile groundwater. However, groundwater flow through such formations, although imperceptible, does take place and needs to be considered in assessing the affect of any development on the hydrogeological regime.

---

[2] APG (2010) 9 Kidderpore Gardens, London NW23. Report 3341, A P Geotechnics Ltd, Englefield Green, Surrey.
[3] BS 5930 (1999) Code of practice for Site Investigations. British Standards Institute, London.
[4] BS 8004 (1986) Code of practice for Foundations. British Standards Institute, London.
[5] NRA (1994) Groundwater Vulnerability of West London, Sheet 39, 1:100 000 scale groundwater vulnerability map. National Rivers Authority, Bristol.
[6] BGS (2004) Geology of London: Special Memoir for 1:50 000 Geological Sheets 256 (North London), 257 (Romford), 270 (South London) and 271 (Dartford) (England and Wales). British Geological Survey, Keyworth, Notts.

The soils on the Site are shown to be soils of high leaching potential, that is soils that have little ability to attenuate diffuse source pollutants and in which non-absorbed diffuse source pollutants and liquid discharges have the potential to move rapidly to underlying strata or to shallow groundwater. However, for urban areas there is typically insufficient information for a classification other than high leaching potential to be made. As such, this assessment represents a worst-case vulnerability classification.

Hydrology

Historically, it is expected that surface water drainage was predominately by runoff to the southeast towards the valley of the former tributary of the Westbourne. Given the predominately clayey and low permeability nature of the near-surface soils, it is expected that there is very limited surface water infiltration potential, and groundwater flow rates in the vicinity of the property will be very low. The historic development of the area for housing will have further limited surface water infiltration.

Overall groundwater flow rates in the near surface soils are expected to be very low; this is confirmed by the noted general absence of groundwater inflows into excavations.

Potential Affects of Proposed Development

Water levels in the immediate vicinity of the property have been recorded above the floor level of proposed basement and, as such, construction of the proposed basement may result in some changes to the groundwater regime around the property. However, given the very low permeability of the near-surface soils, it is considered that any changes will be very limited in extent and confined to the immediate vicinity of the property. This can be illustrated by considering the theoretical steady-state radius of influence of any groundwater level changes (whether drawdown or raised). The radius of influence (R_0) can be estimated using an empirical relationship derived by Sichardt (CIRIA, 2000)[7]. For linear features, R_0 is given by:

Theoretical radius of influence of groundwater changes

$$R_0 = C\,(H - h_w)\,\sqrt{(k)}$$

$$R_0 = 3000\ (2m)\ \sqrt{(4 \times 10^{-8}\ m/s)}$$

$$R_0 = 1.2m$$

Where:
C is an empirical correlation factor taken as 3000.
$H - h_w$ is the drawdown or rise in groundwater level (say 2m in an extreme case for this site)
k is the permeability (estimated as 4×10^{-8} m/s from Site-specific data)

This gives a radius of influence (R_0) of 1.2m, which indicates that, even in extreme conditions, any changes to the groundwater table caused by the new structure will be very localised indeed. On this basis, it is considered that the proposed basement can be constructed without a detrimental effect to the groundwater regime and adjacent properties subject to the mitigation measures outlined below. It is common, in such circumstances, to attach a condition to the planning permission to ensure that these measures are designed in detail and implemented to the full satisfaction of the local planning authority.

[7] CIRIA (2007) Report C515 Groundwater Control: design and practice. Construction Industry Research and Information Association, London.

To mitigate any potential effects of the proposed basement on the groundwater regime it is recommended that a geocomposite studded drainage membrane is incorporated in the vertical face of the perimeter walls of the basement. A maintainable drainage channel should be installed to collect water and divert it to a sump pump to remove the collected water and to discharge it to the sewerage network. The membrane should be placed and connected in accordance with the manufacturer's instructions. In addition, it is recommended that the basement is designed in accordance with the requirements of BS 8102 (2009)[8] to achieve and maintain the required conditions within the proposed basement.

We trust the above comments are sufficient for your immediate requirements. However, should you require clarification or additional information, please do not hesitate to contact us.

Yours sincerely

Simon Walkley
for and on behalf of **PETER BRETT ASSOCIATES LLP**

[8] BS 8102 (2009) Code of practice for protection of below ground structures against water from the ground. British Standards Institute, London.

6.5 BASEMENT DRAINAGE

The basement will use a Delta Membrane 500 system to drain water to the mains. Water will pass through the porous concrete pins and will then be diverted by the dimpled membrane lining the internal vertical faces to a submerged pump (with backup pump in case of failure) which will divert the water to the mains drain. This will negate any impact on the groundwater conditions caused by the construction of the basement.

Details of the system are given in the following pages. It conforms to BS 8102 as set out in the Hydrogeological Report.

DELTA®-MS 500:

Cavity drainage membrane for use on walls and floors, as a waterproof system. A choice of finishes are available. Can also be used externally for waterproof protection of sub-ground structures.

Material:	high density polyethylene
Thickness:	approx. 0.6 mm
Stud height:	approx. 8 mm
Roll size:	available in clear
(With flat edge of 7 cm	2.4 x 20 m
on one side)	2.0 x 20 m
Compressive strength:	> 250 kN/m²
Drainage capacity:	approx. 2.25 l/s · m
	approx. 135 l/min · m
	approx. 8 100 l/h · m
Air volume between studs:	approx. 5.3 l/m²
Temperature resistance:	– 30°C to + 80°C
Chemical properties:	resistant to chemicals, resistant to root penetration, rotproof, neutral towards drinking water
Behaviour in fire:	B2 accord. to DIN 4102, in the case of special requirements possibly B1 accord. to DIN 4102 (test mark PA III 2.2087)

DELTA®-MS 20:

Dimpled sheeting with particularly high drainage capacity and compressive strength, suitable for high performance seepage layers in building and civil engineering construction.

Material:	high density polyethylene
Thickness:	approx. 1 mm
Stud height:	approx. 20 mm
Roll size:	2.0 x 20 m
	In the case of special requirements, also available in board format
Compressive strength:	approx. 150 kN/m²
Drainage capacity:	approx. 10 l/s · m
	approx. 600 l/min · m
	approx. 36 100 l/h · m
Air volume between studs:	approx. 14 l/m²
Temperature resistance:	– 30°C to + 80°C
Chemical properties:	resistant to chemicals, resistant to root penetration, rotproof, neutral towards drinking water
Behaviour in fire:	B2 accord. to DIN 4102, in the case of special requirements possibly B1 accord. to DIN 4102

DELTA®-PT:

Dimpled sheeting with plastic mesh welded on, suitable as a damp-proof base for plaster or shotcrete, e.g., as a seepage layer in tunnel construction, or for repairing basements internally.

Material:	high density polyethylene
Thickness:	approx. 0.5 mm
Stud height:	approx. 8 mm
Roll size:	2.0 x 20 m
	1.5 x 10 m
Compressive strength:	approx. 70 kN/m²
Drainage capacity:	approx. 5 l/s · m
	approx. 300 l/min · m
	approx. 18 100 l/h · m
Void between studs:	approx. 5.5 l/m²
Temperature resistance:	– 30°C to + 80°C
Chemical properties:	resistant to chemicals, resistant to root penetration, rotproof, neutral towards drinking water
Behaviour in fire:	B2 accord. to DIN 4102

DELTA®-FM:

DELTA®-FM is specifically designed for floor applications, to combat dampness, and contamination. The special low stud profile (3mm) minimises changes in floor levels but still provides an air gap to achieve damp pressure equalisation.

The membrane is a fast-track application that allows various floor finishes to be achieved with zero 'down time'. The R.H. levels are isolated in the air gap, and controlled. Delta-FM can be used in new build, remedial or refurbishment projects for floors, and walls.

Material:	Virgin high-performance PE-VHD
Application:	Special low stud profile for floor. Can be used on walls
Sheet thickness:	approx. 0.6 mm
Dimple height:	approx. 3 mm
Compressive strength:	approx 140 kN/m²
Roll dimensions:	20m x 2m (40m²)
Volume between dimples:	approx 2.1 1/m²
Service temperature range:	-30degC / +80degC

BBA BRITISH BOARD OF AGRÉMENT
CERTIFICATE No 00/3742
DELTA MEMBRANE SYSTEMS

Delta Membrane Systems Ltd.
Bassett Business Centre, Hurricane Way, North Weald, Epping, Essex CM16 6AA
Telephone: 01992 523 811 Fax: 01992 524 046
e-mail: info@deltamembranes.com www.deltamembranes.com

DELTA DÖRKEN

02/06

DELTA MEMBRANE SYSTEMS LTD.

DELTA SYSTEM 500

'Providing Waterproofing Solutions'

Uniclass L6814			EPIC F831
CI/SfB	(13.9)	Ln6	(L34)

February 2006

BBA BRITISH BOARD OF AGRÉMENT
CERTIFICATE No 00/3742
DELTA MEMBRANE SYSTEMS

nbsPlus

RIBA CPD PROVIDERS NETWORK

DELTA DÖRKEN

The Sealed System

In soil retaining situations such as basements and vaults etc. The **DELTA** sealed system is recommended. The membrane selection depends on the required finish and flow rate if applicable. All membrane junctions, fixing points, service entries and other protrusions are sealed with the **DELTA** range of sealing products. Where active ground water is evident or expected drainage of one form or another should be incorporated into the specification. Our technical staff are available to give advice in this respect.

The Ventilated System

In above ground situations or in areas where no free running water is expected, for example where external pavements have been built up, the ventilated system can be used. The ventilated system with air gap at top and bottom does not require sealed joints or fixings, a 200mm overlap is sufficient in this situation. This method is seen as a sympathetic solution in Heritage type properties as a general damp proofing system. The fabric of the building remains unchanged but the new internal surfaces are 'dry' and are salt and contamination free. Both dry lining or plaster direct finishes are available on the ventilated system.

Floors

As well as being a complete waterproofing and damp proofing system, the **DELTA** system is also used to upgrade damp and defective floors. With excellent crush resistance the system lends itself to a variety of different finishes which include conventional screeds, thin layer fast drying screeds and wood based floating floors. Insulation can also be used in conjunction with the system where required. The system can be linked to the D.P.C. constructed within a new wall or to an existing D.P.C.

Preparation

As the membrane systems are mechanically fixed there is no reliance on the ability of the product to bond to the substrate. The **DELTA** system can be applied

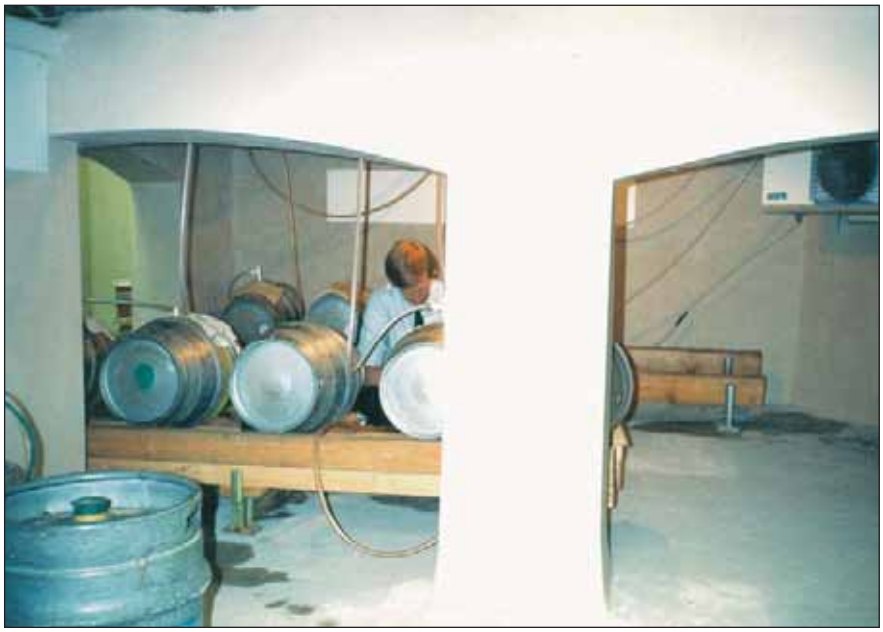
to a variety of different substrates for example over existing renders or broken down bitumen coatings, etc. This can be easily achieved without detriment to the integrity of the system.

Damp Pressure Equalisation

The studded structure of the membrane allows the dampness behind the membrane to move in all directions unhindered, therefore the whole of the wall or floor surface takes the damp loading. Break downs created by weak points are eliminated. The product does not divert the problem to other areas.

Flexibility

In structures where movement or vibration can be a problem, examples being under street vaults, railway arches, and buildings constructed with movement joints,



the **DELTA** system can cope. The **DELTA** membrane has an elongation break of greater than 50%.

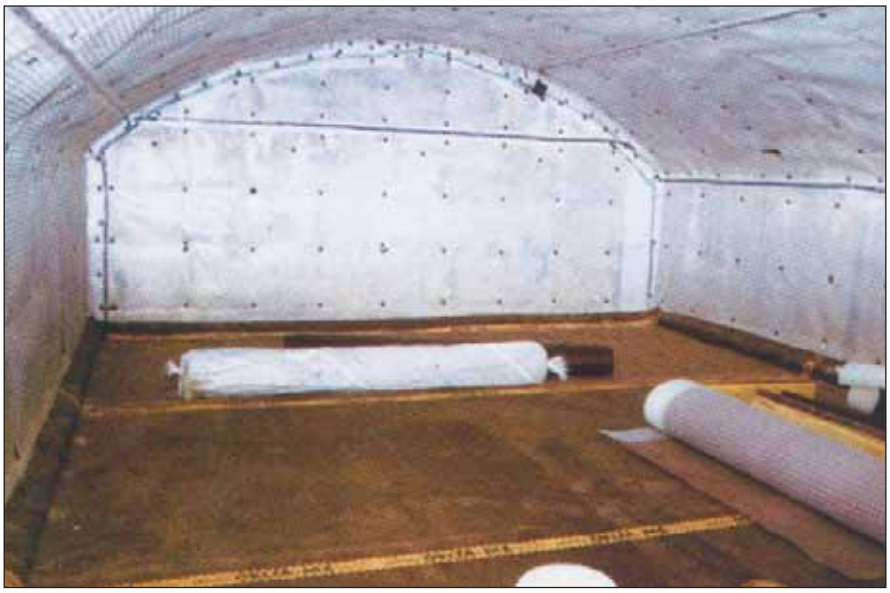
Speed

As there is little or no preparation required the system is by comparison quick to install. When dry finishes are used the system is a 'fast track' solution. Decoration does not need to be delayed as there is no drying process.
DELTA Membrane Systems are the U.K. arm of the world's largest producer of cavity drain systems. The market leading **DELTA** brand has a track record approaching three decades. The **DELTA** systems have been used successfully in many situations in the U.K, from small domestic basements up to major waterproofing projects such

as London Underground stations. There is rarely a dampness or water ingress problem that falls outside the scope of the capabilities of the **DELTA** system.

What are DELTA Systems

With the introduction of the latest Standard BS.8102:1990 'Protection of structures against water from the ground', the use of cavity



membranes has been generally accepted in the U.K. **DELTA** Systems are a complete range of products which are used together to solve many of today's problems in both new and old construction. **DELTA** Systems can easily deal with aggressive ground water conditions, where basements are liable to flooding, or indeed where simple dampness, contamination or salting problems are prevalent. Other more diverse applications include turf covered roofs, barn conversions, tunnel linings or even as a barrier against radon gas.

The main components of the system are the membranes themselves. These are manufactured from virgin high density polyethylene which is thermally and alkaline stabilised. The stud heights vary from 3mm for **DELTA-FM**, 8mm for **DELTA MS 500 & DELTA PT** to 20mm for **DELTA MS 20**. The cavity created by the membrane contains between 2.1 and 10 litres of space respectively. This is known as either the 'Air Gap' or the 'Drained Cavity', in wet situations.

The Membranes

DELTA-MS 500 This is used for walls and floors, and is supplied in 2.4, & 2m x 20m rolls. This membrane can be used for light water ingress situations, and is available yellow (**DELTA-FM**), and **clear**. The MS 500 **clear** aids the selection of good fixing points in more difficult application i.e. random stone and friable brickwork. The sealed **DELTA** - Plug is used to secure System 500, the centre shank of this fixing is also used for subsequent dry lining applications.

DELTA PT LATH This membrane has a mesh incorporated on the internal face which is attached by a thermic welding process at the time of manufacture. The sealed PT

fixing plug is used to secure the membrane at 250mm horizontal and vertical centres. The welded mesh and fixing plugs allow for direct render 1.1.6. (cement/lime/sand), or plasters: Tarmac Whitewall, Carlite Bonding, or dab fixed plasterboard for internal applications. When this grade is used for external above ground protection polymer renders can be used as a finish. These renders are polymer modified and can also have reinforcing fibres incorporated for added strength and durability. This grade is available in clear 2.0m x 20m (40m^2) or 1.5m x 10m (15m^2).

DELTA MS 20 This is a heavy gauge version of System 500 with deep 20mm studs. This is used where extra drainage capacity is required, for example on deeper structures, or where a larger flow rate is required. MS 20 can also be used as a 'cavity former' for many types of new construction. The rolls are a full 2 metre width by 20 metres in length (40m^2).

Guarantee

DELTA membrane systems come with a thirty year product guarantee. The guarantee covers the membrane and ancillary components. Based on experience, accelerated ageing tests and a quality manufacturing system to ISO 9001, the **DELTA** range can also be guaranteed with confidence.

Technical site and/or office visits

Staff are available to visit site to give advice on particularly difficult or unusual situations, where appropriate specifications are prepared to assist in the correct use of the system.

Who Installs DELTA Systems

Although **DELTA** systems are by comparison, easy to install, it must be recognised that correct diagnosis of the problem is essential so that **DELTA** systems can be designed and tailored to the needs of the building, to give the best possible performance. It is therefore recommended that only competent specialist contractors, who understand dampness, and the associated problems, be employed to survey the site, install the system and thereby ensure the best possible performance of the system. **DELTA** systems are installed by a nationwide network of specialist contractors who are holders of 'Registered Installers' Certificates. These contractors also offer guarantees for their workmanship, giving peace of mind to the client.

COMPLETED BASEMENT PROJECTS

Leisure

Study

Photography Studio

Playroom

Home Cinema

Music Room

6.6 ARBORICULTURAL REPORT

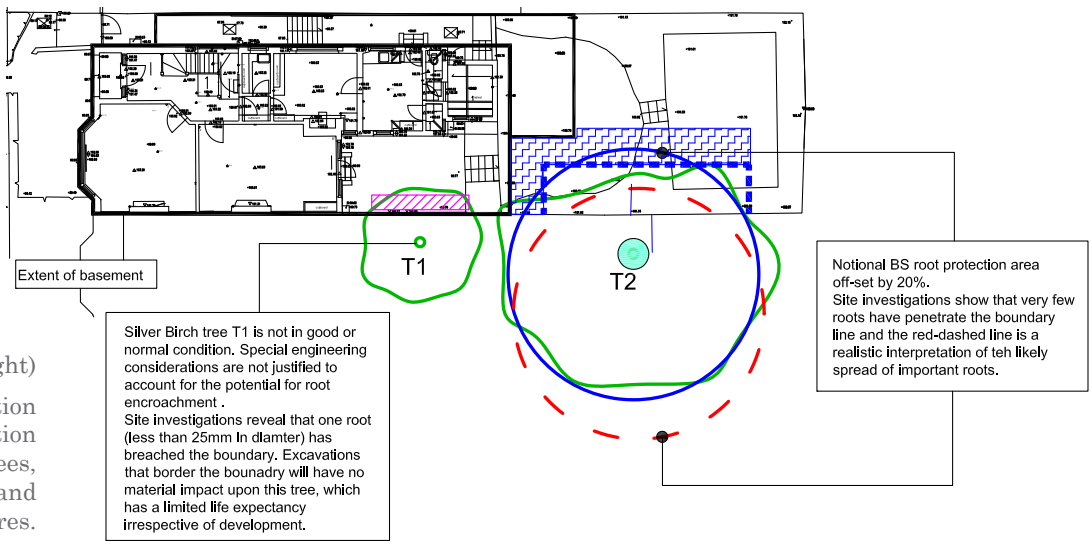
Two Silver Birch trees exist in the rear garden of the neighbouring property at 11 Kidderpore Gardens.

Root investigation trenches were carefully hand dug along the boundary to identify the extent of any root encroachment and an Arboricultural Implication Assessment and Tree Protection Method Statement Report was commissioned to determine acceptable construction parameters and ensure these trees were not harmed.

Hal Appleyard (Dip. Arb. RFS, F.Abor.A, MICFor.) A registered consultant of the Arboricultural Association from ACS Consulting produced a report based on an initial design (subsequently reduced in scale following pre-application planning advice) that concluded . . .

> In summary, there are no on-site trees in need of protection. The off-site tree T1 is in poor condition with a limited life expectancy and does not present a significant constraint to development. The few roots which may have extended into the site from T2 can be protected by implementation of the normal tree protection measures that are set out in this report. Subject to the foregoing, the proposed development work at No 9 Kidderpore Gardens will have no adverse impacts upon trees that contribute to the local landscape and conservation area.

The proposed works can therefore be completed without adverse affect to neighbouring trees. A copy of the report is included in the Appendix.



(Right)

Tree survey/protection plan, identifying location of neighbouring trees, investigation trenches and protection measures.

18th November 2009

Ref:ha/letrpt1/9kidderporegdns

Your Ref:

Mr D Kleiner
RCK Architects
6 St. John's Place
London
EC1M 4NP

Dear Mr Kleiner

Implication Assessment and Tree Protection at: 9 Kidderpore Gardens, NW3

Thank you for your instructions to inspect the above site and to prepare a tree assessment report and protection plan in relation to the proposed construction of the rear extension.

Please find attached our tree protection plan and methodology for providing effective protection to the off-site Birch trees in the rear garden of the neighbouring property.

I hope that the above is clear and helpful but if I can be of any further assistance, please do not hesitate to contact me.

Yours sincerely

Hal Appleyard
Dip. Arb. (RFS), F.Arbor.A, MICFor.
Arboricultural Association Registered Consultant

enc.

ACS Consulting (London), Grosvenor Suite 5, Justin Plaza 3, 341 London Road, Mitcham, CR4 4BE
T:020 8687 1214 ● F: 020 8687 2456 ● E: hal@treebiz.co.uk

Arboricultural Implication Assessment and
Tree Protection Method Statement

Site: 9 Kidderpore Gardens

Development: Extended basement and ground floor with general refurbishment

Date: 18.11.09

Appendices:
1. Tree Survey Schedule
2. Tree Protection Plan (TPP)
3. Recommended examples of tree protection fencing and ground protection
4. Example of Site Monitoring record

1.0 Tree Appraisal and Implication Assessment

1.1 The details of the two off-site trees are provided in Appendix 1. The trees have been assessed in accordance with BS 5837:2005 'Trees in relation to construction-Recommendations'.

1.2 T1 is a mature Silver Birch tree which shows signs of significant decline in the form of dead branched arising from the tree's apex, a generally thin canopy (not dense) and small shoot die-back. Silver Birch are not renowned for having a long life expectancy and some trees die off within forty to fifty years. The trees are very susceptible to root disorders such as Honey Fungus or droughty conditions. Weaker trees will succumb to the aggressive pathogens or adverse climatic conditions quicker than more vigorous individuals. T1 is a weak specimen and is unlikely to survive longer than ten years however it may struggle on for slightly more than this. Under these circumstances, the tree does not present a significant constraint to proposed development.

1.3 Pre-design site works, in the form of root investigations have revealed that one root from T1 has grown under the foundations of the boundary wall and into the site. The soil under the foundations is dense and heavy clay, not conducive with the growth of roots and in particular those of sand-preferring Silver Birch. Below is an image of the root investigation works in the area of proposed piling for the basement construction and which shows the one root that has grown into the site. The removal of this root will not accelerate the demise of the weak tree T1 to any significant degree; a tree which is already in decline from natural causes.

Fig 1 – Root investigation work reveals one root less than 25mm in diameter and heavy clay soil.

1.4 T2 is a mature Silver Birch tree in normal growing condition. It is vigorous and apparently without significant defects. The tree is too remote from piling exercises to be affected. As a precaution against compaction of soil in which a few of this tree's roots may have grown, (which can be damaging), I have recommended installing effective ground protection to absorb direct pressure from construction working processes.

1.5 In summary, there are no on-site trees in need of protection. The off-site tree T1 is in poor condition with a limited life expectancy and does not present a significant constraint to development. The few roots which may have extended into the site from T2 can be protected by implementation of the normal tree protection measures that are set out in this report. Subject to the foregoing, the proposed development work at No 9 Kidderpore Gardens will have no adverse impacts upon trees that contribute to the local landscape and conservation area.

2.0 Tree Protection Methods and Sequence:

i) Erect tree protection fencing and install ground protection
ii) Mark out the area for piling with marker paint and install contiguous piles
iii) Construct basement and ground floor extension
iv) Supervise/sign off tree protection
v) Remove tree protection and undertake landscaping

3.0 Tree Protection Fencing

3.1 Owing to the confined nature of the site, the erection of BS-specific tree protection fencing cannot extend to the notional off-set root protection area (RPA) of T2, and this will not be practical. However, ground protection to protect roots will be more effective (see below) and therefore it should be robust.

4.0 Ground Protection

4.1 It will be prudent to use effective ground protection (see **Appendix 3** for suitable examples), to protect the ground from compaction, which falls outside of the fenced-off area. The location of ground protection is identified on the TPP. The position of the ground protection will prevent excessive soil compaction (crushing and asphyxiation) occurring beneath the surface, which is potentially damaging to tree roots.

5.0 Site Monitoring (Tree Protection)

5.1 In order to ensure the fencing and ground protection is in place and effective a site inspection and confirmation report will be prepared and held on record.

5.2 A further site inspection will be carried out to close the tree protection elements of the development by way a final confirmation report (see example of site supervision report at **Appendix 4**).

6.0 Construction and re-instatement

6.1 Following completion of the construction works, the ground protection and tree protection fencing is to be removed.

6.2 The need for any footpaths, turfing and other landscaping will be carried out following removal of the tree protection measures.

APPENDIX 1

ACS Consulting (London)
Tree Management Consultants
T: 020 8687 1214

ACS Consulting (London)
Tel: 020 8687 1214

Tree Survey Schedule

Site: 9 Kidderpore Gardens, Hampstead, NW3

Surveyor:H. Appleyard

Date: 14th October 2009

Ref:ts1/9kidderporegdns

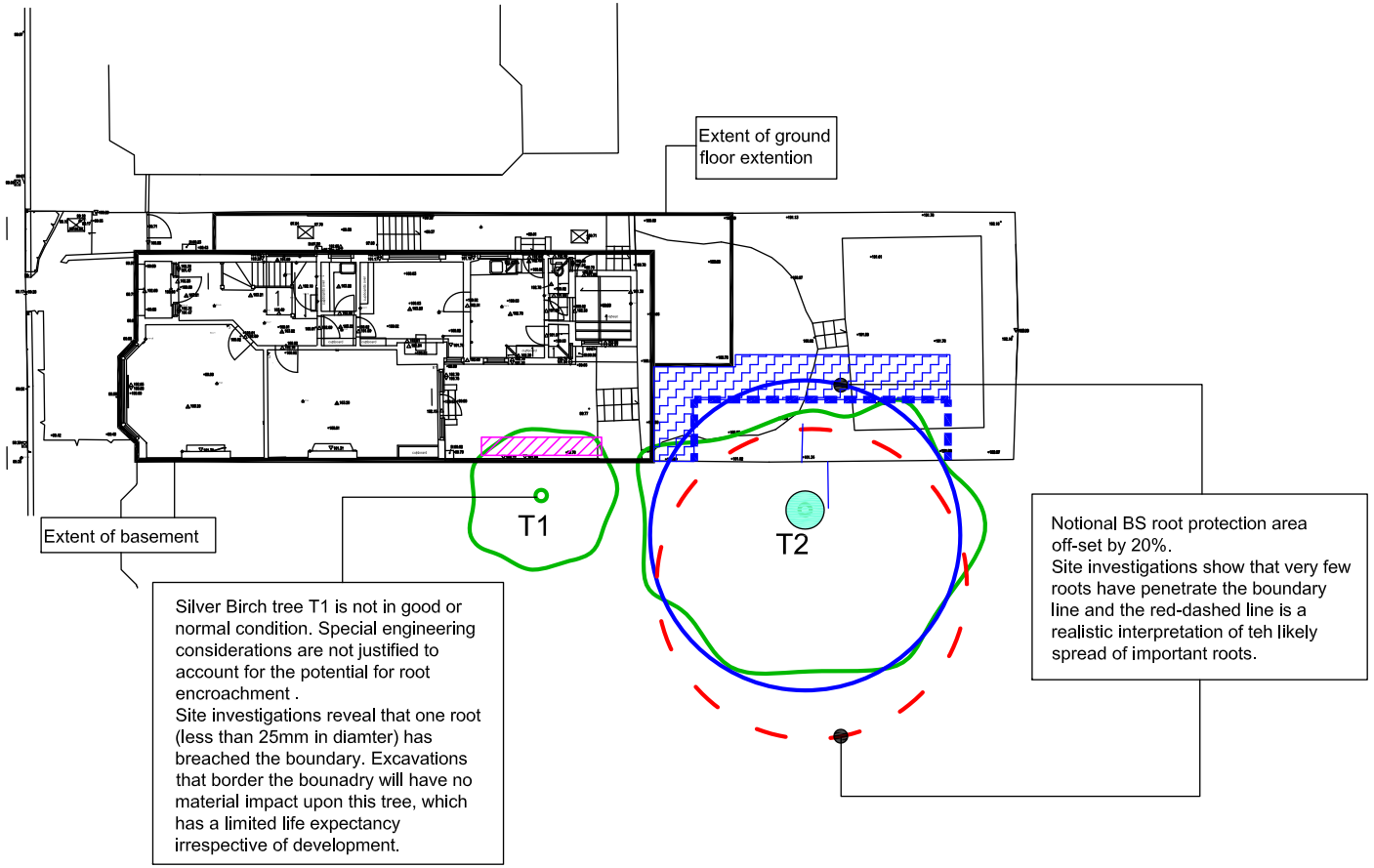
Tree No.	English Name	Height	Crown Spread	Ground Clearance	Age Class	Stem Diameter	Protection Multiplier	Protection Radius	Growth Vitality	Structural Condition	Landscape Contribution	B.S. Cat	Sub Cat	Useful Life	Observations
T1	Birch, Silver	16	3 3 3 3	6	Mature	300e	12	3.6	Poor	Fair	Low	C	1	10-20	Dying back Deadwood thoughout crown Borderline 'R' grade tree; off-ste tree with limited growth potential
T2	Birch, Silver	17	7 4 6 6	3	Mature	500e	12	6.0	Normal	Good	Medium	B	1,2	20-40	A tree with insignificant defects Off-site tree Open canopy form; overhangs boundary by 1.5m

Notes:

1. Height describes the approximate height of the tree in meters from ground level.
2. The Crown Spread refers to the crown radius in meters from the stem centre and is shown above on each of the four compass points (i.e. N, E, S, W) clockwise.
3. Ground Clearance is the height in meters of crown clearance above adjacent ground level.
4. Stem Diameter is the diameter of the stem measured in millimetres at 1.5m from ground level or just above ground level for multi stemmed trees. The diameter may be estimated (e), where access is restricted. An average (a) may be taken for tree groups. A full inspection is always recommended.
5. Protection Multiplier is 12 for single stemmed and 10 for multi-stemmed trees.
6. Protection Radius is a radial distance measured from the trunk centre and is used to calculate the BS RPA.
7. Growth Vitality - Normal growth, Moderate (below normal), Poor (sparse/weak), Dead (dead or dying tree).
8. Structural Condition - Good (no or only minor defects), Fair (remediable defects), Poor - Major defects present or suspected.
9. Landscape Contribution - High (prominent landscape feature), Medium (visible in landscape), Low (secluded/among other trees).
10. B.S. Cat. refers to British Standard 5837:2005 Table 1 category and refers to tree/group quality and value; 'A' - High, 'B' - Moderate, 'C' - Low, 'R' - Remove or very poor quality.
11. Sub Cat refers to the retention criteria values where 1 is Arboricultural, 2 is Landscape and 3 is Cultural including Conservation/ecological, historic and commemorative.
12. Useful Life is the tree's estimated remaining effective contribution in years.

APPENDIX 2

ACS Consulting (London)
Tree Management Consultants
T: 020 8687 1214



ACS Consulting (London)

TREE MANAGEMENT CONSULTANTS

Justin Plaza 3
341 London Road
Mitcham
CR4 4BE

T:020 8687 1214
F: 020 8687 2456
E: info@acstrees.co.uk

Indicative

BS Root Protection Area, (RPA) shown uniform here but site features such as roadways, kerb and foundations, may modify root patterns and therefore the RPA shape

The BS rooting areas are to remain free from construction works which has the potential to damage or remove roots to an extent which may affect the condition of the tree.

The BS rooting areas can be offset by 20% provided rooting capability is available on other sides of the tree and the whole rooting area is is not reduced.

A grade trees

B grade trees

C grade trees (clear)

R grade trees

Area of root investigation works prior to design.

Project:

9 Kiderpore Gardens
London
NW3

Drwg Title:

Tree Survey/Protection Plan

SCALE: 1:200@A.3

DATE: Oct. 09

DRAWN BY: HA

DRAWING NO: TPP1

REV:

APPENDIX 3

ACS Consulting (London)
Tree Management Consultants
T: 020 8687 1214

GreenTek
GUARANTEED TO DO WHAT IT SAYS
-OR YOUR MONEY BACK!
Tel: 0113 267 6000
Fax: 0113 267 2222

ACS CONSULTING

Example of ground protection, which is best laid over 50mm of a compressible material such as woodchips or sharp sand for optimum tree root protection.

WALK TOP - Ideal for car parks and walk ways.

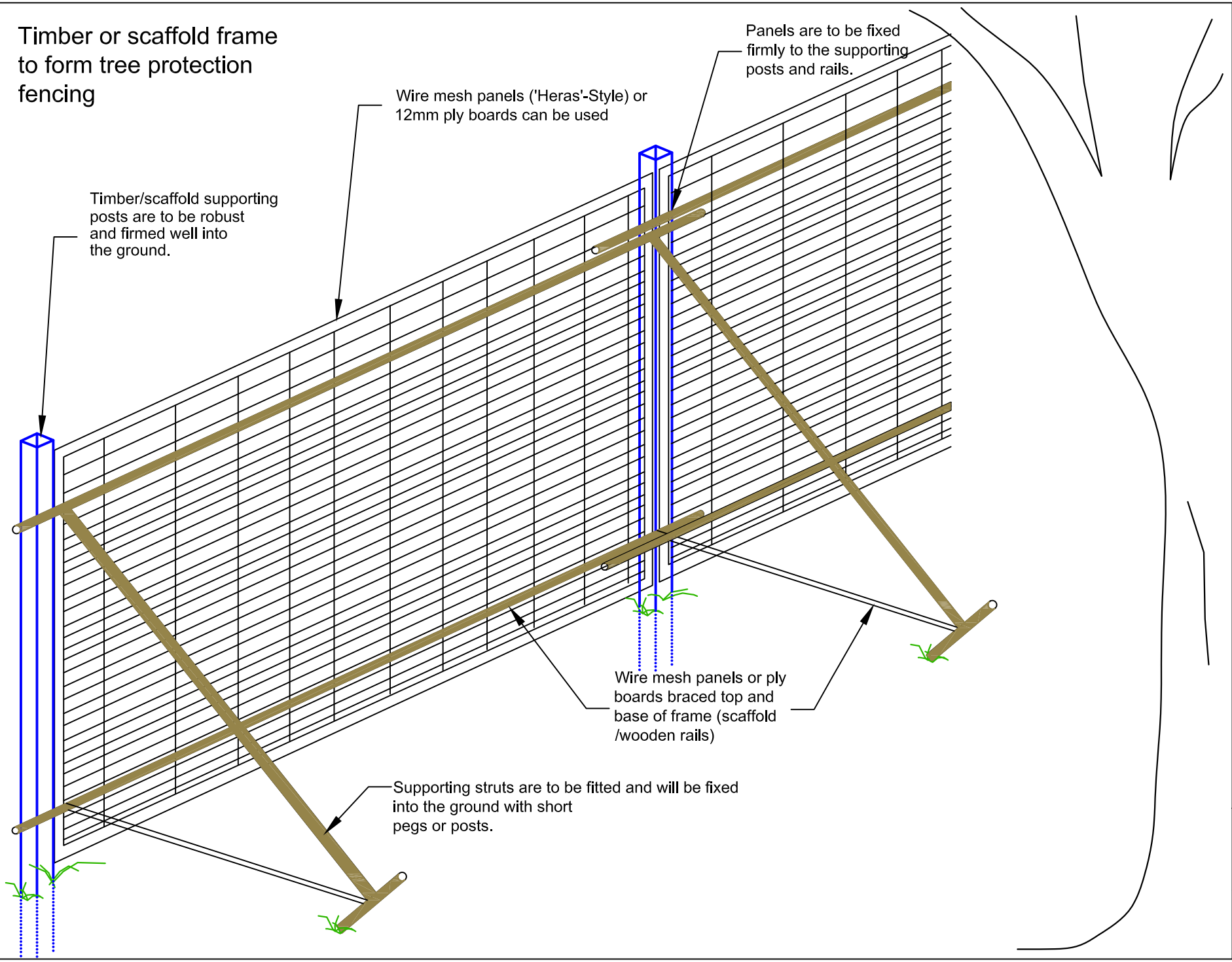
Ground plates can be useful for dissipating loads, at sensitive construction locations.

DOUBLE LINK JOINERS - lock Ground-Guards into one large working platform.

OSB boarding fixing scaffold Boards below can be very effective ground protection for lighter traffic such as pedestrians, wheel-barrow and occasional passes with light dumper vehicles for example.

Tree Management Consultants
T: 020 8687 1214
www.treebiz.co.uk

Timber or scaffold frame to form tree protection fencing



ACS Consulting (London)

Tree Management Consultants

Justin Plaza 3
341 London Road
Mitcham
CR4 4BE

T: 020 8687 1214
F: 020 8687 2456
E: info@treebiz.co.uk

Title:

Example of Tree Protection Fencing

Note:

Steel scaffold or timber can be used to support boards or wire mesh panels

Date: Jan. 07

Ref:

Note: Sketch Plan Only - Not to Scale

Tree Protection Fencing

Scaffold Framework supporting ‘Heras’ type panels with signs attached.

Wooden Framework with ‘Heras’ type panels attached.

Tree Management Consultants
T: 020 8687 1214
www.treebiz.co.uk

APPENDIX 4

ACS Consulting (London)
Tree Management Consultants
T: 020 8687 1214

ACS Consulting
T: 020 8687 1214

Arboricultural Site Supervision

ACS CONSULTING

Site: 1 Hyde Park, London
Inspected By: H .Applevard
Client: RPC
Site Agent: Shaun Clark

Date of Inspection: 15/02/2007
Time of Inspection: 3:30pm

Tree Protective Fencing

Tree protection in correct location

Comments/Action
No action at this time

Effective fencing in position

Agreed Construction Exclusion Zone

No debris within construction exclusion zone

Comments/Action
No action at this time

Amendments to Documentation Required

No amendments required

Comments/Action
Building works outside scope of Method Statement

Fencing with signs

Remedial Works

General Comments

Tree protection and on-site supervsion effective and understood.

6.7 STRUCTURAL REPORT

Concerns were raised by the neighbour regarding the affect of basement extension construction works on the stability of their conjoining semi-detached property.

The client commissioned a soil report by AP Geotechnics to determine the ground condition characteristics, the digging of trial holes to identify the depth and condition of existing foundations and Reaction Engineers to produce a detailed specification for the specialist basement contractor to adhere to, which included the following statement . . .

> The contractor must carry out the works in a manner to minimise any immediate settlement to the adjoining property. Similarly the designer must allow sufficient provision within the design and structural concept to safeguard the adjoining property from any potential long-term or differential settlements which may arise as a result of the works.

The London Basement Company are a reputable contractor with a wealth of local knowledge and experience, having successfully constructed many basements in the area and to semi-detached properties. The client therefore selected LBC, whose specialist groundworks engineer confirmed acceptance of Reaction Engineer's specification and in their own report stated that . . .

> Construction of the basement will be carried out in a controlled, pre-sequenced manner. The sequence will follow a traditional hit and miss underpinning pattern. The controlled construction will ensure that settlement within the fabric of both this and the adjoining property is negligible. The controlled construction will also ensure that differential settlements arising from the different depths of foundations between the two adjoining property's will be limited too. London Basement Company has considerable experience and has achieved successful completion of such projects without complications arising out of settlements to adjoining property .

The specialist reports conclude that the proposed works can be completed without de stabilising the adjoining property and differential settlement will be negligible.

A party wall surveyor has been appointed to manage any matters arising from the works and is in early discussions with neighbours.

Copies of all reports are included in the appendix.

Kidderpore Gardens

STRUCTURAL DESIGN STATEMENT

REACTION
engineers
Structural Consultants

68 Glasford Street
Tooting
London
SW17 9HN

Issue/revision	Issue 1	Revision 1	Revision 2	Revision 3
Status	For Comment	For Comment		
Date	21/03/2010	23/03/2010		
Prepared by Signature	Rahul Patalia 	Rahul Patalia 		
Checked by Signature	Dean Ricks 	Dean Ricks 		
Project number	191	191		

Structural Design Statement

1. Introduction

This report has been produced to provide structural commentary on the proposed development at 9 Kidderpore Gardens, London NW3. Contained within the report are assumed performance parameters for the structural design and identification of key interfaces between the superstructure design by Reaction Engineers Ltd. and the basement/ substructure design by others.

Any ambiguities within the report are to be discussed with the author prior to works commencing on site.

This report is to be read in conjunction with all Reaction Engineers drawings and specifications.

2. Site and surroundings

The building is a Victorian semi-detached residential property fronting onto Kidderpore Gardens and to the rear a garden backs onto Croft Way. The site slopes down along its length by approximately 2m from Croft Way.

The building is in general two storeys high with three levels of accommodation. The 2nd floor level is in the roof space. At the rear of the house the building is partial width and single storey with an adjoining porch which appears to be of original construction.

On one side of the property a narrow path provides access from Kidderpore Gardens down a sloping path to a small 'coal-cellar'. This path, via stairs, then continues and provides access to the rear garden via the porch.

The adjoining owner appears to have a similar site configuration but in the rear garden a 15m high Silver Birch Tree is located within 4m of the property and is subject to tree preservation.

3. Existing Structure

The existing building comprises a traditional pitched roof (front to back) with a sloping hip. The roof structure comprises timber rafters and what appears to be clay tiles.

The structure in general comprises timber floor joists spanning onto solid load-bearing brickwork. In the roof space some load-bearing stud walls appear to be present which support the roof rafters.

Opening-up works on site will be required to determine the width of existing brick walls. From the survey drawings it appears that the brickwork from ground to 1st floor is 330mm thick; from 1st to Roof is 225mm thick and all internal walls are 100mm thick. This needs to be confirmed.

The foundations comprise 300mm wide corbelled brickwork on lean-mix concrete/ lime at varying depths below ground. Refer to trial pit data dated 5th November 2009 in Appendix B

4. Proposed Development

The proposed development comprises the following:

- Some structural alterations to the internal ground and 1st floor layouts and reconfiguration of the existing internal main access stairs.
- Demolition of the single storey rear section of the existing building and porch. Construct a new single storey infill extension which extends into the rear garden.
- Construction of a single level, habitable basement which extends along the foot-print of the existing house and under the part of the existing rear garden.
- Lowering of the existing side access path to provide direct access to the new basement level.

5. Ground Conditions and Substructure Design

Refer to AP Geotechnics Ground Investigation Report dated 1st February 2010 for full details.

In general the fieldwork comprised windowless sampler holes excavated to depths of 5m, with recovery of soil samples and groundwater monitoring.

In general the ground conditions comprise 1.2m (max) of fill over Claygate Beds (London Clay) at depth.

A net allowable bearing capacity of 130kPa is considered available at depths of 3.5m below ground level.

Contaminant analyses were carried out which proved in general that the excavation arisings are inert with the exception of the Total Dissolved Solids (TDS), which exceeded the limit for stable non-reactive hazardous waste in non-hazardous landfill**. It is however recommended that the contractor carry out appropriate Waste Acceptance Criteria tests on a representative number of samples during the works to confirm that the waste for disposal is inert.**

Laboratory tests revealed that the sulphate concentrations yielded results in Design Sulphate Class DS1 and the concrete ACEC is classed as AC-1.

6. Groundwater Considerations

The ground investigation report states that groundwater was not encountered in the boreholes during the investigations but when left for 2 months the water pressures had equalised to a level of 2.3m below existing ground level within the clay substrate. Clay being a cohesive material implies that in the 'short term' i.e. during the excavation, it retains water and any inflows of groundwater will be limited to seepage. This means that during the excavation works no specific measures will be required to prevent groundwater inflows, however precautionary measures, in the form of a sump and package pump, should be taken to allow for temporary dewatering should this be required locally.

In the permanent case, where groundwater levels have reached equilibrium there will be active groundwater at approximately 1m above the proposed basement level.

Given the groundwater levels and the cohesive ground conditions, it is our view that the construction of the basement will have very limited impact on groundwater flows and hence the groundwater will have negligible effect on the adjoining owner's foundations. This needs to be considered and verified by the basement specialist design/ contractor.

7. Basement/ Substructure Design

7.1 Design Responsibility

The basement and substructure design including all temporary works requirements is a contractor designed item. All designs and method statements are subject to review by Reaction Engineers Ltd. prior to fabrication/ construction and a minimum period of 10 working days is to be allowed for within the programme for commenting.

The contractor is responsible for issuing designs and method statements to building control for approval prior to any construction activity.

The contractor must provide the necessary reports and sketches to allow the progress of any party wall awards which may be required prior to construction.

The designer must carry appropriate Professional Indemnity Insurance which must be in place for a minimum period of 6 years or as stipulated within the contract.

Reaction Engineers Ltd. is responsible for the design of all permanent superstructure designs i.e. above basement.

7.2 Basement Design and Construction

The construction methodology of the basement is to be provided in detail by the specialist designer/ contractor.

It is anticipated that the basement walls adjacent to the footprint of the adjoining building will be constructed by sequential underpinning of all the primary perimeter walls and progressive propping of all the upper floor internal walls which are to be retained and propping of the underpinning works whilst excavating.

Beyond the footprint of the adjoining building and into the rear garden, it is anticipated that trench-sheeting will be used to temporarily support the sides during excavation. It is likely that this will be propped during the construction but further details will be needed from the basement specialist. Specific protection is needed at the boundary of the adjoining building and appropriate precautionary measures taken to protect any existing trees and roots in the adjoining owner's premises. We understand that a tree specialist has been appointed to advise on this.

Following excavation it is anticipated that new internal concrete pad foundations will be cast by the contractor which will allow installation of the steel columns and beams which supports the superstructure. In addition the in-situ concrete walls within the garden area of the basement will also be cast, which allows construction of the rear terrace concrete floor.

The underpinning will be reinforced and designed to withstand groundwater, active soil pressures and surcharge loading.

Similarly the ground slab will be designed to resist uplift from groundwater pressures and soil heave pressures as well as the gravity dead and imposed loading applied.

The contractor must carry out the works in a manner to minimise any immediate settlement to the adjoining property. Similarly the designer must allow sufficient provision within the design and structural concept to safeguard the adjoining property from any potential long-term or differential settlements which may arise as a result of the works.

Other factors which need consideration in the design:

- Rising groundwater i.e. design should allow a margin for groundwater levels higher than that discovered on site.
- Soil Heave: From the Ground Investigation Report the estimated swelling at the centre of the basement is calculated at some 20mm and a void former should be incorporated beneath the basement slab to allow for anticipated swelling. Alternatively the slab could be designed to withstand the anticipated swelling.
- Long term maintenance: pumps, measures to prevent flotation, inspection of drained cavities, monitoring differential settlement,
- Temporary works and propping: Where permanent structure is to be used as temporary works, the permanent works superstructure designer must be informed of the applied temporary loads to these elements.
- The superstructure designer will provide a diagram showing the **unfactored** dead and imposed loadings applied to the basement walls/ slabs and foundations.

7.3 Basement Use

The basement is intended to be used as residential or habitable accommodation.

7.4 Codes of Practice and basement classification

The governing code of practice for basement construction is BS 8102; 1990 (Protection of structures against water from the ground). CIRIA report 139 (Water-resisting basements) has also been referred to in the production of this report.

Figure 1, below has been reproduced from the CIRIA guide. This table explains the classification of basements due to their expected use, and also identifies generic waterproofing systems for each basement type.

Grade of basement	Basement usage	Performance level	Form of protection*	Commentary on Table 1 of BS8102: 1990
Grade 1 (basic utility)	Car parking; plant rooms (excluding electrical equipment); workshops	Some seepage and damp patches tolerable	Type B. Reinforced concrete design in accordance with BS8110	Unless there is good ventilation, or local drainage, visible water may not be acceptable even for the suggested uses. BS8110: Part 1 contains only limited guidance on crack control and lacks consideration of early thermal movement. Using Part 1 may result in the formation of cracks with widths unacceptable in permeable ground. Additional guidance on the importance of cracks is given in Section 3.4.2. Groundwater should be checked for chemicals, which may have a deleterious effect on the structure or internal finishes. The performance level defined in BS8102 for workshops is unlikely to meet the requirements of the Building Regulations, Approved Document C for workshops, which are more likely to require a Grade 3 (habitable) environment.
Grade 2 (better utility)	Workshops and plant rooms requiring drier environment; retail storage areas	No water penetration but moisture vapour tolerable	Type A Type B. Reinforced concrete design in accordance with BS8007	Membranes may be applied in multiple layers with well-lapped joints. The performance level assumes no serious defects in workmanship, although these may be masked in dry conditions or impermeable ground. Groundwater should be checked as for Grade 1. A high level of supervision of all stages of construction is necessary.
Grade 3 (habitable)	Ventilated residential and working areas including offices, restaurants etc., leisure centres	Dry environment	Type A. Type B. With reinforced concrete design to BS8007 Type C. With wall and floor cavity and DPM	As Grade 2 In highly permeable ground multi-element systems (possibly including active precautions) will probably be necessary.
Grade 4 (special)	Archives and stores requiring controlled environment	Totally dry environment	Type A. Type B. With reinforced concrete design to BS8007 plus a vapour-proof membrane Type C. With ventilated wall cavity and vapour barrier to inner skin and floor cavity with DPM	As Grade 3
*	The 'form of protection' suitable for each grade is rigorously examined in this report and detailed guidance for concrete basements is given in Section 3.3.			

Figure 1: Guide to level of protection to suit basement use

The forms of protection identified in Figure 1 are explained below:

Type A	**Tanked protection** Protection is provided by a continuous membrane system, either externally or internally. This method can provide water-proof and vapour-proof construction.
Type B	**Structurally integral protection** Protection is provided by the structure only using reinforced concrete with either design to BS 8110 or BS 8007 (enhanced crack control). This method can provide water-proof but not vapour-proof construction without additional measures.
Type C	**Drained cavity Protection** Protection additional to that from the structural envelope is provided by means of an internal ventilated drained cavity. This method can provide water-proof and vapour-proof construction.

The environment category appropriate for this development is **Grade 3 (Habitable)** and the performance level as defined by BS8102 is a 'Dry Environment'. For this we recommend that a Type C 'Drained Cavity Protection' is provided for both basement walls and slab i.e. provision of appropriate tanking and a cavity drainage system which will pump the limited groundwater permeating through the basement retaining wall to the surface water drainage system.

7.5 Movement Joints

Structural movement joints are likely to be required to the basement structure. The joint details would need to take account of the environment category, waterproofing details i.e. waterstops/waterbars, and the form of concrete construction plus the expected differential movement from different types of construction and phasing.

8. Superstructure Design

8.1 General

Steel beams will be provided to support load-bearing walls and timber floors. These in turn will be supported, depending on the loading, by new steel columns, new masonry piers or by the existing retained masonry walls via padstones.

New construction at the rear of the property will comprise timber roof joists spanning onto load-bearing cavity wall construction/ steel framing.

The suspended ground floor rear terrace over the basement is proposed to be reinforced concrete construction using either precast or in-situ concrete subject to discussions with the contractor.

For the purpose of controlling cracking in old / existing brick buildings, the total dead and live load deflection for beams supporting existing roofs and existing walls over new openings is to be limited to span/360 or 15mm, whichever is the lesser.

8.2 Structural Stability

It is assumed that the existing external walls and some internal walls provide lateral stability to the existing building. Where existing stability/ shear internal walls are removed, new unbraced moment resisting steel frames will be installed to retain overall stability of the building. This will be achieved by providing moment resisting connections at the beam/column head connection. These walls/ frames will in-turn transfer these lateral loads to the basement structure which in turn transfer these to the ground via the substructure.

8.3 Disproportionate Collapse

The development is a Class 1 building as defined in Table 5 of the Building Regulations Part A 2004 and therefore provided the building has been designed in accordance with the requirements of the Approved Document A no additional measures are likely to be necessary.

9. Loadings

All loadings should be derived using:

- BS6399 Parts 1-3 'Design Loadings for Buildings'
- BS648 'Weights of Building Materials'
- BS8004 'Foundations'

See Appendix A for loading assumptions used in scheme designs.

Appendix A:

Loading Assumptions

LOADING ASSUMPTIONS

MAIN ROOF

Tiles	0.75
Battens + Underlay	0.10
Timber Rafters etc	0.33
Glassfibre Quilt	0.05
Counter Battens	0.05
Plasterboard Ceiling	0.22
Gk =	**1.50** kN/m2
Imposed Load Qk =	**0.75** kN/m2

EXTENSION ROOF

Finishes	0.30
Timber Rafters etc	0.20
Insulation (250thk) - Glassfibre Quilt	0.05
Steelwork	0.20
Plasterboard Ceiling	0.25
Gk =	**1.00** kN/m2
Imposed Load Qk =	**0.60** kN/m2

CONCRETE GROUND FLOOR (Span < 4.25m)

65mm Screed	1.50
90mm Insulation	0.07
Beam & Block Floor @ 525ctrs (Hanson)	1.83
Gk =	**3.40** kN/m2
Imposed Load Qk =	**1.50** kN/m2

TYPICAL FLOOR

22mm T & G Boarding	0.15
Noggins	0.05
Floor Joists	0.18
Insulation	0.05
Plasterboard	0.22
Gk =	**0.65** kN/m2
Imposed Load	1.50
Partitions	0.50
Qk =	**2.00** kN/m2

EXTERNAL WALL

100mm Brick	2.15
50mm Insulation	0.15
100mm Block	1.60
Plaster (13mm)	0.20
Gk =	**4.10** kN/m2

EXISTING SOLID BRICK WALL (330mm)

330mm Brick	7.10
Plaster (lath and plaster)	0.25
Gk =	**7.35** kN/m2

EXISTING SOLID BRICK WALL (215mm)

225mm Brick	4.90
Plaster (Lath and plaster)	0.25
Gk =	**5.15** kN/m2

NEW CAVITY WALL

100mm Brick outer (2150kg/m3)	2.15
100mm Block (1200kg/m3)	1.20
50mm Insulation	0.05
Plaster (13mm)	0.20
Gk =	**3.60** kN/m2

INTERNAL BRICK WALL

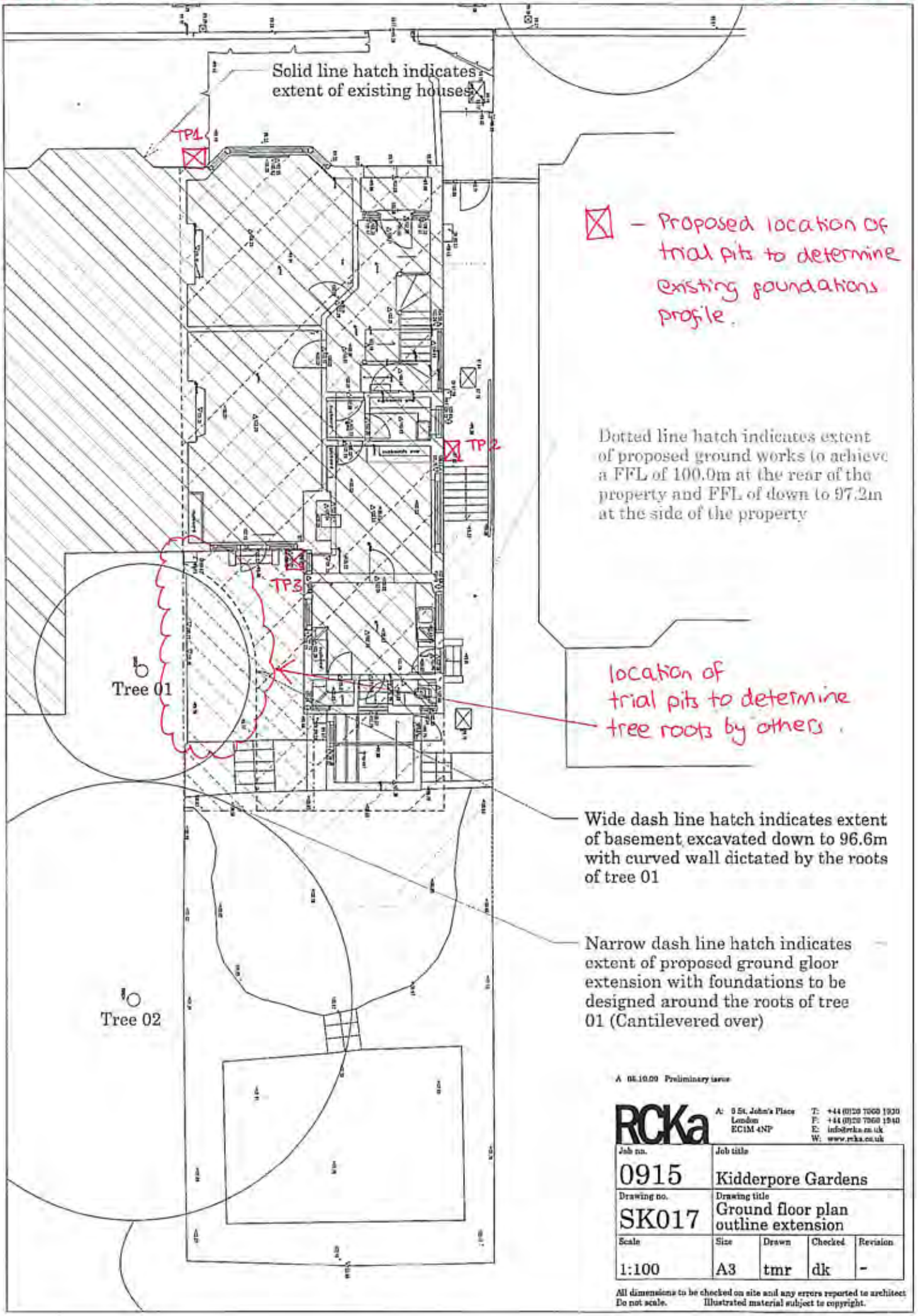
100mm Brick	2.10
Plaster (2 x 12.5mm)	0.40
Gk =	**2.50** kN/m2

Appendix B:

Trial Pit Data

5/10/09.

REACTION

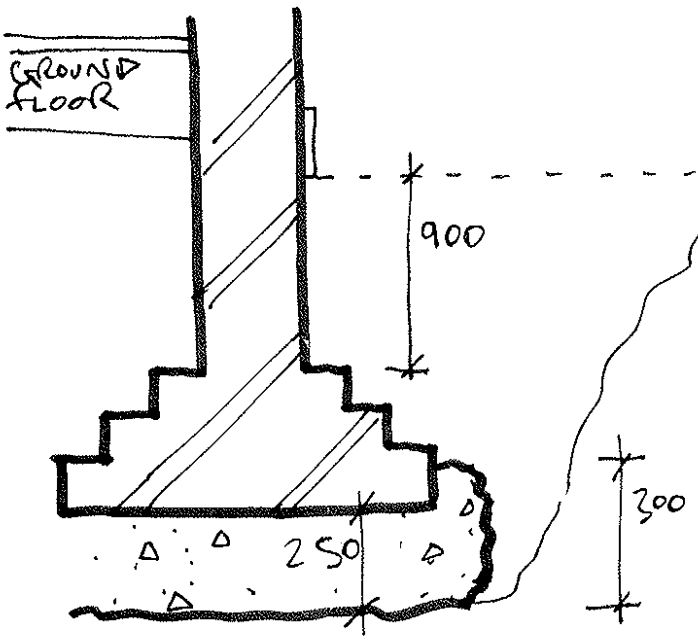


A 05.10.09 Preliminary issue

RCKa
A: 8 St. John's Place, London EC1M 4NP
T: +44 (0)20 7060 1930
F: +44 (0)20 7060 1940
E: info@rcka.co.uk
W: www.rcka.co.uk

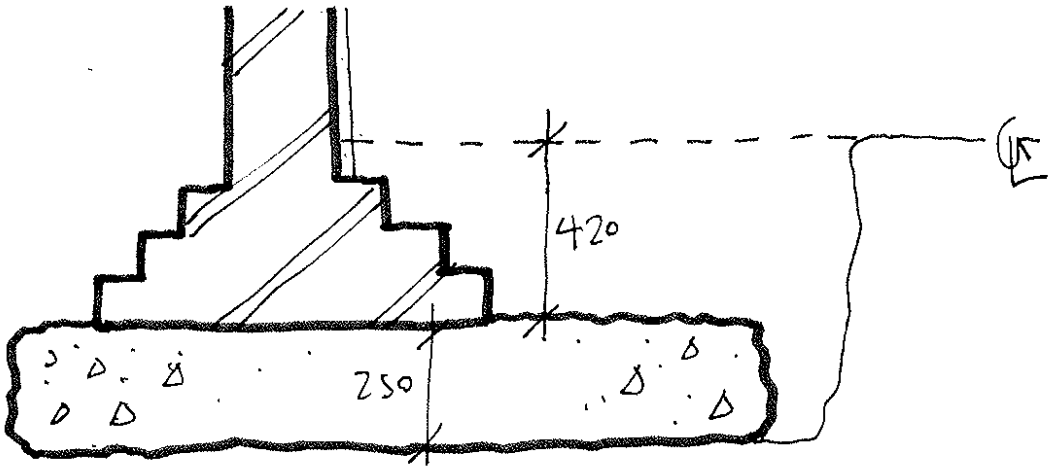
Job no.	Job title			
0915	Kidderpore Gardens			
Drawing no.	Drawing title			
SK017	Ground floor plan outline extension			
Scale	Size	Drawn	Checked	Revision
1:100	A3	tmr	dk	-

TP1

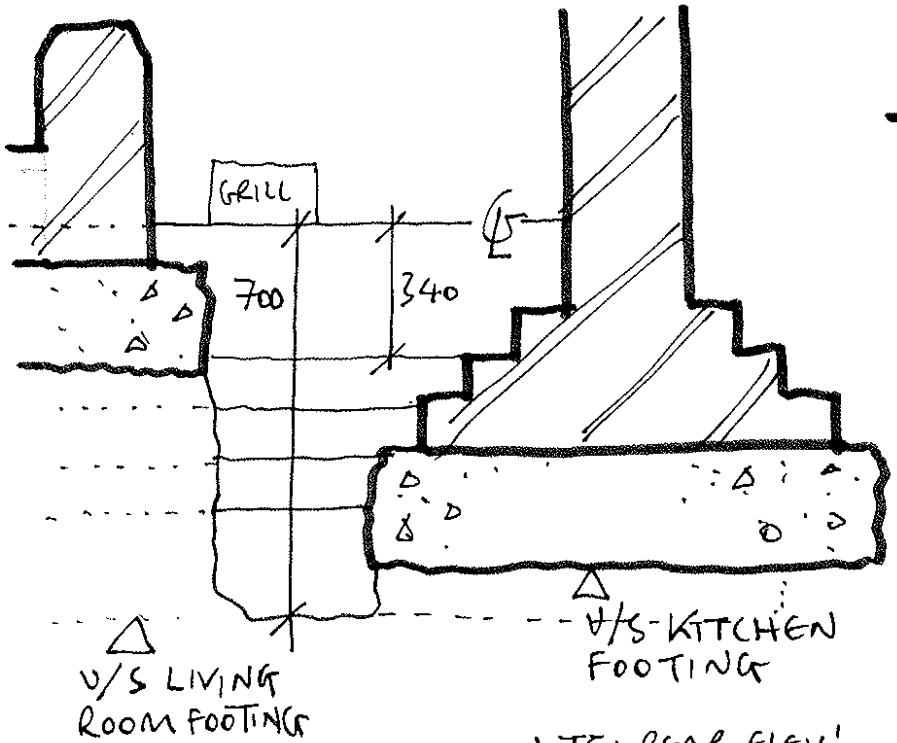


NOTE: 300 EDGE ASSUMED TO BE 250 BENEATH FOOTING.

TP2



TP3



NOTE: REAR ELEV' FOOTING SET 1no. BRICK LOWER THAN SIDE KITCHEN WALL FOOTING

INTERNAL FOOTING PROFILES ASSUMED

0915 KIDDERPORE GARDENS

TRIAL HOLES

05 NOV 2009

REF ATTACHED TRIAL HOLE PICS + LOCATION PLAN

6.8 CONSTRUCTION AND TRAFFIC MANAGEMENT PLAN

The owners of 9 Kidderpore Gardens are keen to minimise any disruption caused by the works to their neighbours.

The London Basement Company were selected from a number of contractors following site visits to various works in progress and interviews with site foremen that assessed their ability to complete the project in a considerate and competent manner.

LBC demonstrated a high-quality of workmanship and excellent site management, clearly taking pride in maintaining a tidy and safe site, and working hard to minimise disruption both in terms of traffic management and noise/dirt disturbance. They have also successfully completed numerous projects both locally and in the wider borough.

To best ensure the works are carried out in a considerate manner the client commissioned LBC to produce a construction management plan that will be put in place to minimise disruption.

The following excerpts illustrate LBC's approach, a full copy is included within the appendix.

Care will be taken to minimise disturbance to the neighbours and residents by the appropriate use of dust screens, vibration, noise damped machinery and good site management.

If residents need to access or exit the area and our wagons are in the way, every effort will be made by the banksmen to re-position these in order that vehicles can drive past.

No rubbish or debris will be allowed to be stored in any public areas and will be removed from site as soon as practically possible

All London Basement Site Supervisors are trained to industry recognized standards under a 5 day Site Management Safety Training Scheme

A Health and Safety Officer will carry out weekly site visits and audits to ensure all works are carried out in accordance with the Health & Safety

the london basement company

Construction Management Plan

for

9 Kidderpore Gardens, London NW3 7SS

Generally

Project Commencement date: TBA

The access and egress of the property for the construction of the habitable basement will be through the licensed hoarding.

We proposed to access the basement and excavate from the front bay below the front reception room.

The modus operandi for the removable of excavated soil from the basement will be by hand digging and disposal by wheelbarrow to the mechanical conveyor. The soil is transported to a static skip by conveyor over-sailing the public footpath situated within the hoarding located on the public highway. Standard hoarding details is attached to the traffic management plan.

Routeing of demolition, excavation and construction vehicles

9 Kidderpore Gardens is a two way traffic road.

a) The vehicles visiting site for activities greater than deliveries will be legally parked in either pay and display bays or bays suspended and paid for by this company.

b) The routes to this site are determined by which direction the vehicle is coming from. It is likely that any vehicle being deployed from our head office will take the optimum route to the site.

c) As this is a domestic contract the site traffic will be relatively low. We would assume that the following site visits will be required.

d)

Vehicle type/no of visits per day	Dimensions
1 Concrete lorry/day maximum	9.0m x 2.5m
1 skip lorry/day maximum	8.6m x 2.45m
1 staff van/day maximum	5.6m x 2.1m
1 material delivery/day maximum	7.5m x 2.45m

Access arrangements to the site

We will erect an 1800mm hoarding to the area in front of the property on the line of the back edge of public footpath and returned along the line of the boundary party wall with No 11. The hoarding on the other side will return parallel with the front path. Access to the site will be through a single personal door located in the hoarding.

The area within the hoarding will have a temporary weatherproof roof.

Estimated number of vehicles per day

We assess that four vehicles will visit the site per day comprising one concrete lorry, one skip lorry, one staff van and general materials lorry.

Deliveries/skip lorries will be restricted to after 10am and before 4.00pm to avoid rush hour/school times.

Vehicle holding area

We propose enclosing a static skip within hoarded area and "grabbing" the soil from a mobile skip lorry. Normally this operation takes approximately ten minutes.

Vehicle call up procedure

The procedure for ordering materials, concrete or skip lorries is either arranged by the site foreman or the head office and is normally arranged for the following day. If arranged by the head office the site foreman is advised so that the personnel are on hand to assist in unloading.

Parking suspensions

We propose requesting the suspension of two parking bays outside the property. One bay for the static skip, the other for materials and plant.

Diversion/disruption of the public highway

Except for two parking suspensions stated above we do not anticipate any disruption to the public highway.

Work programme

We anticipate the duration of the works to be approximately between 22 – 24 weeks.

Street cleaning

We will sweep the highway 10metres either side of the property at the end of the working day.

Hoarding lighting

The hoarding for the skip and materials will be lit during the hours of darkness and the conveyor will be enclosed in a plywood hoarding.

General Conditions

Working hours will be weekdays between 08.30 and 17.30.No works will be carried out on weekends or public holidays. (Saturday works to be agreed)

All works will be carried out in a workman like manner, using the best new materials possible

Care will be taken to minimise disturbance to the neighbours and residents by the appropriate use of dust screens, vibration, noise damped machinery and good site management.

No rubbish or debris will be allowed to be stored in any public areas and will be removed from site as soon as practically possible

All London Basement Site Supervisors are trained to industry recognized standards under a 5 day Site Management Safety Training Scheme (SMSTS)

A Health and Safety Officer will carry out weekly site visits and audits to ensure all works are carried out in accordance with the Health & Safety at Work Act, and good codes of Practice are maintained throughout the construction program.

the london basement company

9 Kidderpore Gardens, London NW3 7SS

Traffic Management – Delivery of materials to site and Spoil Removal

Date Issued: 9th April 2010
Issued by: Angela Stevens
Checked by: Robin Knowles
Revision: Rev A

Introduction and Site Description

- This document covers the steps that will be taken to reduce potential traffic congestion outside of the property, when there are deliveries to site of materials and when the spoil is removed by the waste management company.
- The property is in a residential area with two-way traffic on Kidderpore Gardens, on which it is proposed to suspend two bays for a skip and materials compound.
- Please refer to the attached sketch “Typical Hoarding and Conveyor Installation”, which details the setup that we will employ on this project.
- We issue a standard letter to thirty of the closest local residents informing them of our presence, setting out the duration of the works and providing them with contact details should they feel the need to contact us.
- We will provide a minimum width of 1.2m through the hoarding/gantry area to allow wheelchair access.
- The works are planned to continue for a period of approximately 20 weeks. This includes 2 weeks of setting up and soft stripping.
- Welfare facilities will be located within the property.

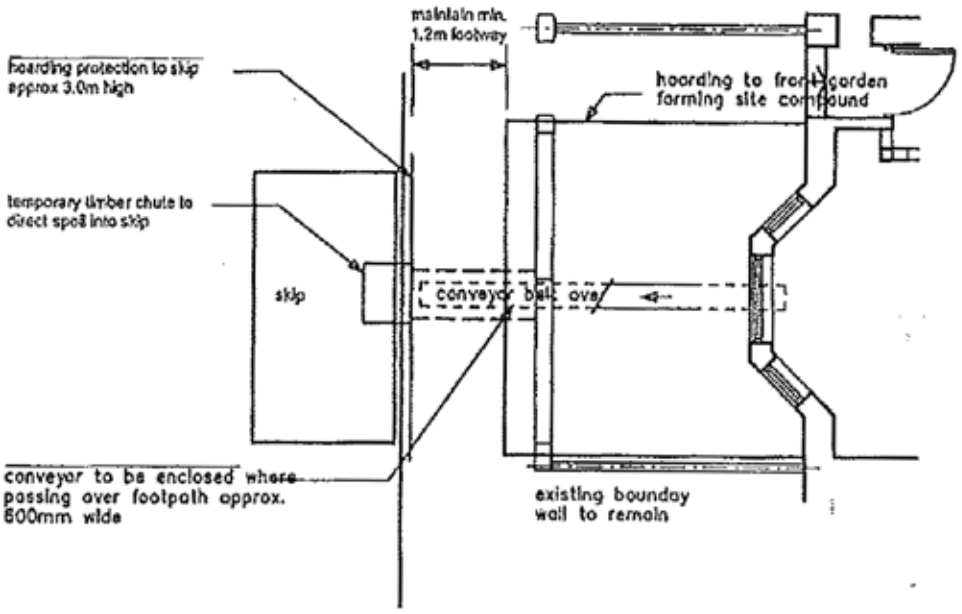
Procedure

Delivery of Materials and Plant and General Access and Egress

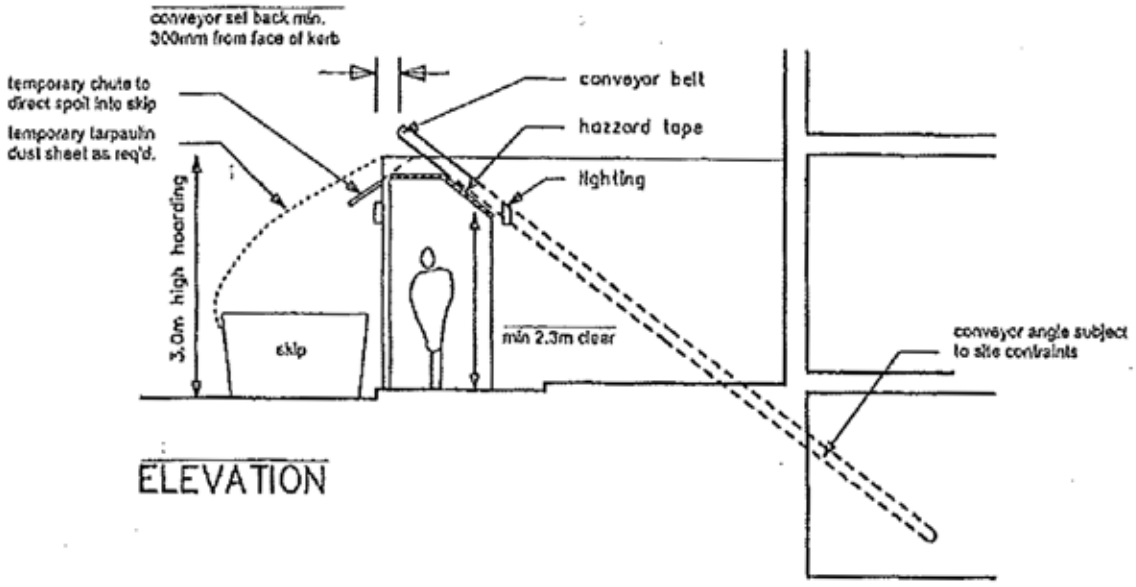
- Materials will be delivered to site by numerous sub contractor suppliers. Delivery drivers will park their vehicles adjacent to the site compound area. This will be located on Kidderpore Gardens in a designated bay, suspended for the duration of the works.
- All large vehicles will be parked temporarily in the highway, alongside the hoarding (Containing skip and materials). We will restrict all large vehicle deliveries/collections/muck away to the hours of 10a.m. to 4p.m.
- Ready mix concrete will be supplied by a combined unit containing an on board pump. The expected duration for delivery will be 15–20 minutes, during this process banksmen will be providing Traffic Management.
- Traffic generally will be managed by banksmen, with priority at all times for emergency vehicles. A dedicated structural site foreman will be present at all times.
- All materials will be contained within our hoarding, and materials will only be ordered when required. These will be moved into the working area as soon as practically possible so that at no time is the allocated hoarding area exceeded.
- Materials will be ordered as and when required. At no stage will the storage area required on Kidderpore Gardens be exceeded by the suspended parking bays.
- Materials and plant will be unloaded by driver and site staff, temporary traffic management will be supplied by suitably qualified site staff.
- We estimate that the maximum number of vehicles coming to site in any one day would be four. This would typically be two grab lorries, one concrete wagon, and periodically a materials delivery. The estimated dwell time for all three would be 15 minutes, during which time banksmen would be provided at all times with Hi-Vis PPE.
- Traffic management will consist temporary signage and cones as required to sufficiently warn all pedestrians and passing traffic of our operations.
- We will provide banksmen as necessary to direct traffic when required.
- The route for traffic will be entering via Ferncroft Avenue.

Spoil Removal

- The system of loading static containers from a conveyor system will be utilised, to reduce both the daily inconvenience to residents, and the length of time of spoil wagons on site.
- The spoil will be first loaded at basement level into a conveyor located in the existing lightwell, which will be fully protected. The conveyor will load directly into the skip located on Kidderpore Gardens.
- Protection will be provided where any part of the hoarding extends over the footpath. Depending on local council requirements and site conditions, the hoarding will have the relevant night lights and safety notices. The conveyor will be adequately supported and secured to the hoarding using a temporary scaffold structure. We will provide a minimum height of 2.3m for the conveyor belt.
- The London Basement Company uses a specialist sub contractor, Worton Waste, for the removal of spoil from skips and collection with a grab lorry.
- The lorry will pull up beside the static skip, and will have banksmen from site to implement traffic control, and pedestrian movements.
- The lorry will remain in position until it is fully loaded. This operation takes approximately 15-20 minutes to complete.
- Whilst the spoil is being removed members of the site staff are present and will notify other drivers of approximate time the operation will take.
- If residents need to access or exit the area and our wagons are in the way, every effort will be made by the banksmen to re-position these in order that vehicles can drive past.
- Worton Waste is also under strict instruction that if they are grab loading and any emergency vehicles need to get past they are to move immediately.
- Once the spoil wagons have left the site banksmen will ensure that the road is completely clear of debris, immediately following the collection of waste.
- Periodically during the day and at the end of every working day the main road will be thoroughly swept and washed down, so it is kept presentable at all times.



PLAN AT PAVEMENT LEVEL



ELEVATION

TYPICAL HOARDING & OVERHEAD CONVEYOR INSTALLATION

The London Basement Company

Innovation House
292 Worton Road, Isleworth, TW7 6EL
Tel. 020 8847 9449 Fax. 020 8380 4999
www.tlbc.co.uk

Sheet 5

scale 1:100

6.9 DAYLIGHT STUDY

A daylight study was commissioned and carried out by BrooksDevlin associates. The report proves that there will be no discernible loss of light to the adjoining property at No 11 and that any loss of light falls within the guidelines set out in the BRE standards. . .

> With this in mind, it is contended that the BRE requirements are met and that any reduction in internal daylighting conditions within 11 Kidderpore Gardens will be minimal and due to the adaptability of the human eye, is unlikely to be perceptible to occupants.

It should be noted that the daylight study was carried out on a previous proposal that was longer on the boundary than the current scheme and that the loss of light will actually be *less* than measured in the study by BrooksDevlin.

brooksdevlin
environmental design consultants
unit 17 | st. michaels trading estate | bridport | dorset | dt6 3rr
T: 01308 428917/8 | www.brooksdevlin.com

Daylighting Impact Assessment

9 Kidderpore Gardens, London

June 2010

1 Executive Summary

Brooks Devlin Ltd were appointed to complete a daylighting impact assessment of the new build rear extension proposals designed by RCK Architects for 9 Kidderpore Gardens. Specifically, the aim was to determine whether the development proposed results in an adverse reduction in daylighting potential at the rear of 11 Kidderpore Gardens as assessed in accordance with the guidelines defined in BRE Report 209 – Site Layout Planning for Sunlight and Daylight by Paul Littlefair.

BRE Report 209 – Site Layout Planning for Sunlight and Daylight proposes that where post development, the VSC of existing windows remains greater than 0.8 times its original value and above a threshold of 27%, then any loss of light may not be perceptible to the occupants and is within reasonable and acceptable limits.

The analysis contained in this report details that the development proposals will result in a minor reduction in daylighting potential at the rear of 11 Kidderpore Gardens. However, the reduction is calculated to be no greater than 6% relative to the existing Vertical Sky Component values. Furthermore, the resultant average Vertical Sky Component (VSC) for the rear group of windows is calculated to be 28.1% (reduced from 29.8%) and therefore is greater than the BRE 27% threshold.

On this basis it is contended that the development proposals do not result in an unacceptable reduction in daylighting potential at the rear of 11 Kidderpore Gardens as assessed in accordance with BRE Report 209.

2 Introduction

Brooks Devlin were appointed to undertake an assessment of the potential loss of daylighting currently experienced at the rear of 11 Kidderpore Gardens from the proposed new build extension in the neighboring no. 9 Kidderpore Gardens.

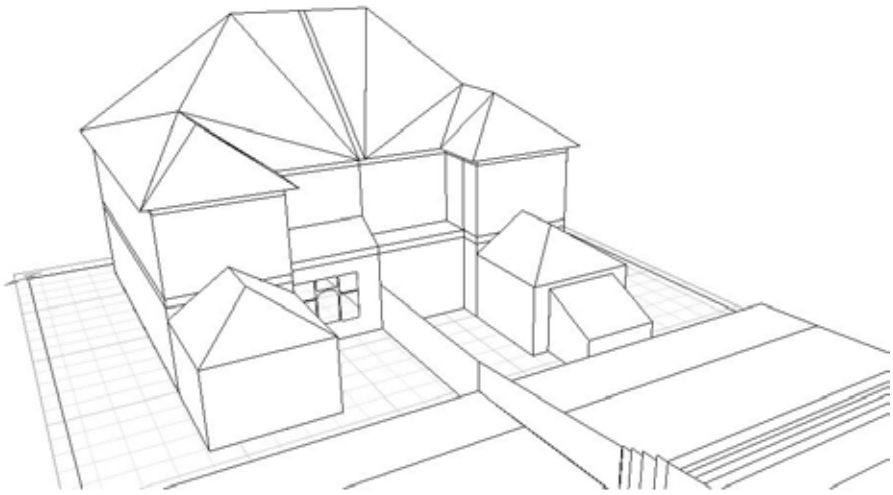
Figure 1: View of the rear elevation of 9 Kidderpore Gardens (11 to the left of the image)

2.1 General Site Description

The site is located at 9 Kidderpore Gardens, in the London Borough of Camden. The dwelling is located on the northwest side of the street and the rear facades face North West. Numbers 9 & 11 form a pair of semi-detached dwellings both with existing single storey rear extensions. The rear gardens experience a significant level change as they rise away from the rear of the dwellings towards tennis courts located beyond Croft Way.

There are a number of trees in the rear garden of the adjacent property, although in keeping with BRE Guidelines on daylighting analysis, these are ignored for the purposes of the assessment. Figure 1 on the following page illustrates an extract from the computer model used in the assessment. Given the situation of the windows to be assessed, it was possible to ignore other potential obstructions caused by other adjacent buildings.

Existing



Proposed

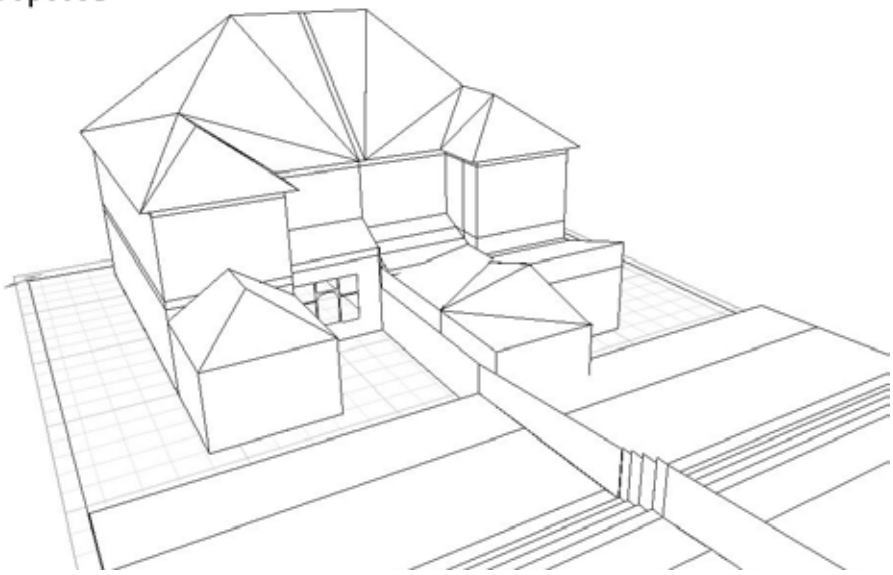


Figure 2: View of Existing and Proposed Conditions in computer 3d model

3 Methodology

The assessment methodology was to evaluate any potential alteration to the sky dome access currently experienced at 11 Kidderpore Gardens through use of Vertical Sky Component (VSC) calculations,

The Vertical Sky Component (VSC) is a numerical value which describes the quantum of the sky dome that is visible from a reference point on a vertical surface. The calculation is used to assess the extent of obstruction to the sky dome to a window or window facade caused by adjacent buildings

The maximum potential value for the VSC is 39.6%, which represents the ratio of direct skylight (non-reflected and with no direct sunlight) incident upon an external vertical surface compared with that falling simultaneously on an unobstructed external horizontal surface. This is measured under a standard CIE (Commission Internationale de l'Eclairage) Overcast Sky where the zenith is three times brighter than the horizon. As the VSC is measured as a ratio, the absolute value or brightness of the sky is not relevant.

The maximum value for the VSC is lower than 50% to reflect the fact that light falling on a vertical surface from an oblique angle (high in the sky) is less effective at providing illumination than light arriving perpendicular from or nearer to the horizon. Technically, the brightness of the CIE overcast sky is such that in represents the minimum daylight availability for 85% of daylight hours and therefore can be varied for location. However, as previously stated for VSC calculations, the exact sky brightness is not important.

The BRE guidelines suggest that for a room to be able to be adequately daylit, the window should achieve, or be within 4m measured horizontally of a point with a vertical sky component greater than 27%. A VSC of 27% is the equivalent of an infinitely wide obstruction at 25 degrees above the horizon (the current basic standard for adequate internal daylighting potential). Historically, the 27% value and 25 degree obstruction are all based upon the spacing of Victorian terraced dwellings, meaning that in some circumstances, such as densely developed urban sites they are an inappropriate baseline for consideration. Where the existing VSC values are below the 27% threshold, the BRE recommends that any further reduction caused by new development is kept to a minimum, and certainly less than a 20% reduction of the existing value.

The VSC guidelines state that in cases where the VSC of a relevant window is reduced to below 27% and to 0.8 times its' original value, then it is likely that internal daylighting levels would be adversely affected and noticeable to the occupants.

Where post development, the VSC of existing windows remains either above the 27% value or greater than 80% of its original value, then it is contended that whilst there may be some loss of daylight, the reduction is within acceptable levels. Specifically, this means that whilst a loss of light may be measurable, it may not be perceptible due to the adaptability of the human eye.

In instances where the VSC requirements and thresholds are satisfied no further analysis is required.

4 Calculation Results

Figure 3 below details the location of windows of interest in the rear of 11 Kidderpore Gardens. Information supplied by the design team details that these are the only potential affected windows at ground floor. The windows have been numbered 1-6, with no. 4 representing the half glazed rear access door to what is believed to be a principal living room.

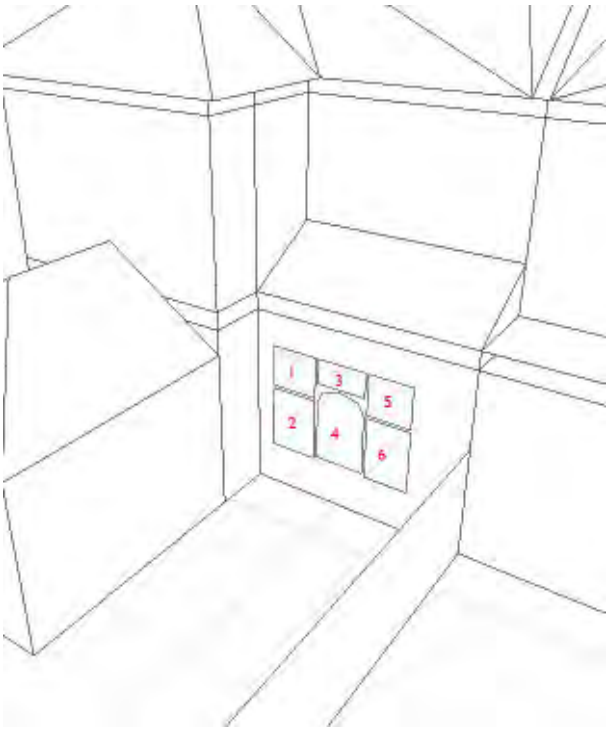


Figure 3: Window ID numbers for 11 Kidderpore Gardens

4.1 Vertical Sky Component

Table 1 below details the results from the VSC analysis completed on the 3d model. It can be seen that the predicted reductions to the VSC is in all cases less than 20% of the existing value.

Ref	Existing VSC %	Resultant VSC %	% Reduction	Is resultant <27%
1	28.1	27.6	2%	No
2	23.7	22.1	7%	Yes
3	33.1	32.6	2%	No
4	30.6	28.4	7%	No
5	34.2	32.5	5%	No
6	28.9	25.4	12%	Yes
Average	29.8	28.1	6%	No

Table 1: VSC Results for 11 Kidderpore Gardens

The results indicate that with the exception of reference point 2, all of the existing values are above the 27% VSC threshold. The resultant values with the exception of reference point 2 and 6 remain higher than the threshold value. However, it should be noted that in all cases, the reduction compared to the existing level is less than 20% the original value

Furthermore, it is unusual to consider a grouping of windows such as these as separate entities given their close proximity to each other. The last line of the table details the average VSC in the before and proposed states, from which it can be seen that the proposed development is predicted to result in a 6% loss of skylight accessibility, but with the resultant average VSC for the window grouping remaining above the BRE 27% threshold.

With this in mind, it is contended that the BRE requirements are met and that any reduction in internal daylighting conditions within 11 Kidderpore Gardens will be minimal and potentially imperceptible to the occupants.

6.10 PLANNING PRECEDENT

A summary of local contemporaneous planning applications of a similar scale to that applied for are included over the following pages. These indicate that there is clear precedent for basement and rear extensions of an appropriate scale within the Conservation Area.

The Location Plan below identifies the proximity of 4 no. buildings for which approved applications have been granted - information regarding these is listed under the respective heading 1 - 5.

The site of 9 Kidderpore gardens is outlined in red.

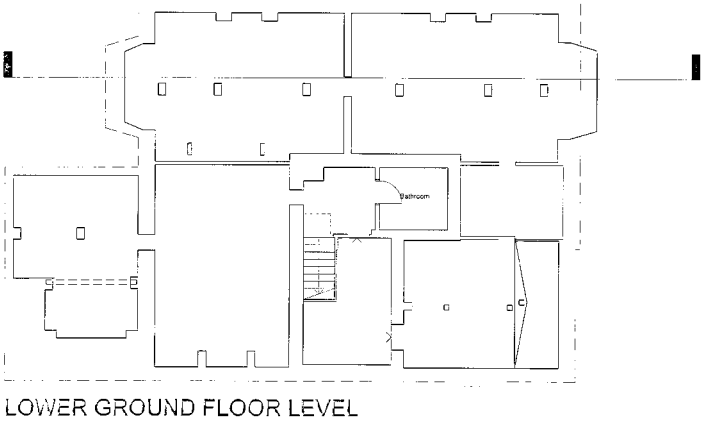
(Right)

Site location plan (Scale 1:1250) identifying properties with recent planning applications. 9 Kidderpore Gardens outlined in red..

(1) GARDEN FLAT, 14 KIDDERPORE GARDENS BASEMENT ENLARGEMENT - REF 2009/0659/P

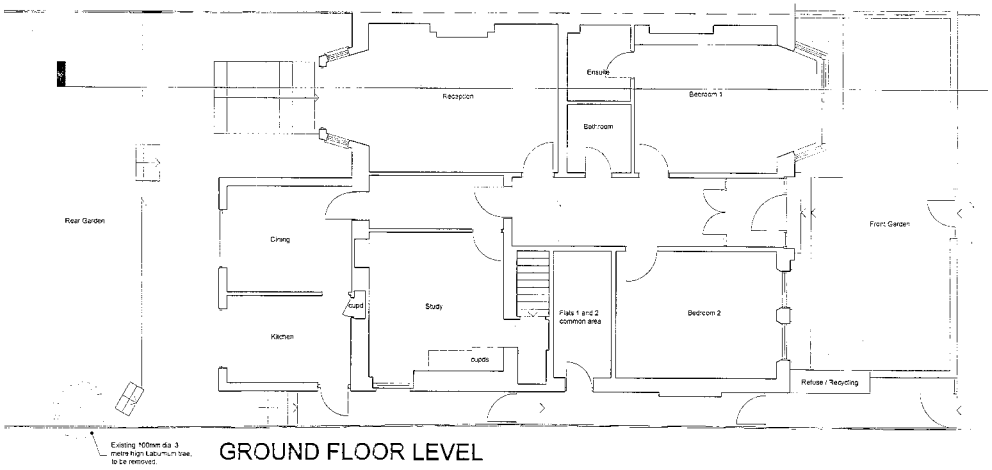
Excavation to create a deeper and enlarged basement area for use as habitable accommodation attached to the ground floor flat including two lightwells to the front and alterations to the rear including creation of a sunken patio and insertion of a window and 2 French doors on the rear elevation at lower ground floor level. Granted 19/02/2009.

(Right)
Lower ground floor plan existing

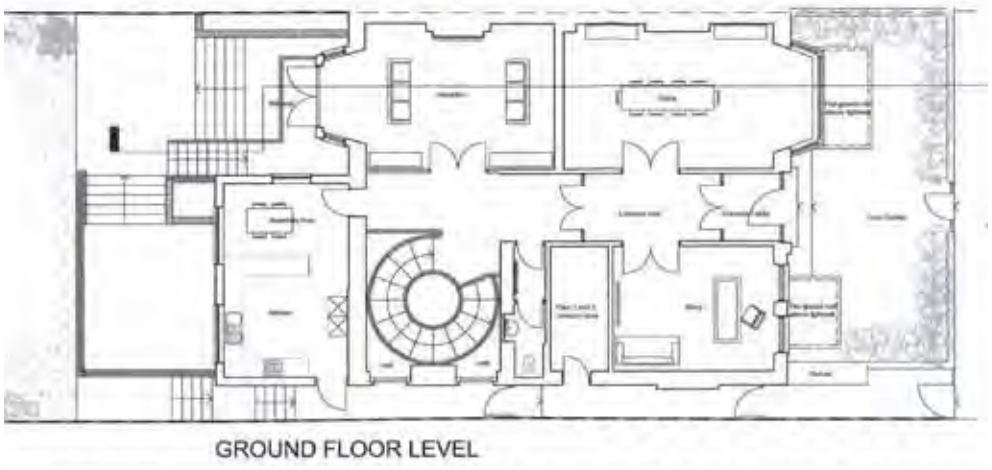


(Right)
Lower ground floor plan proposed

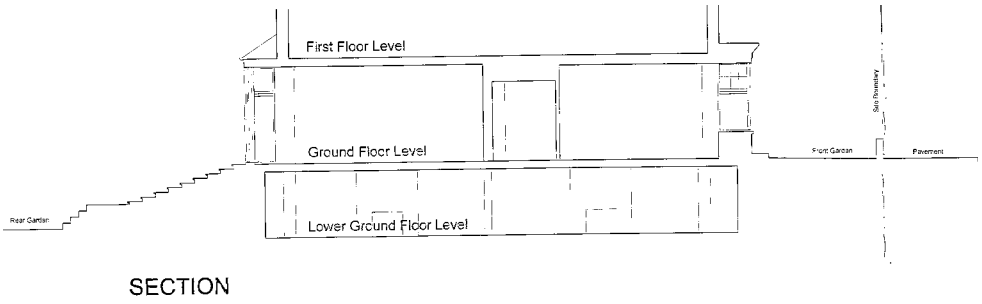
(Right)
Ground floor plan existing



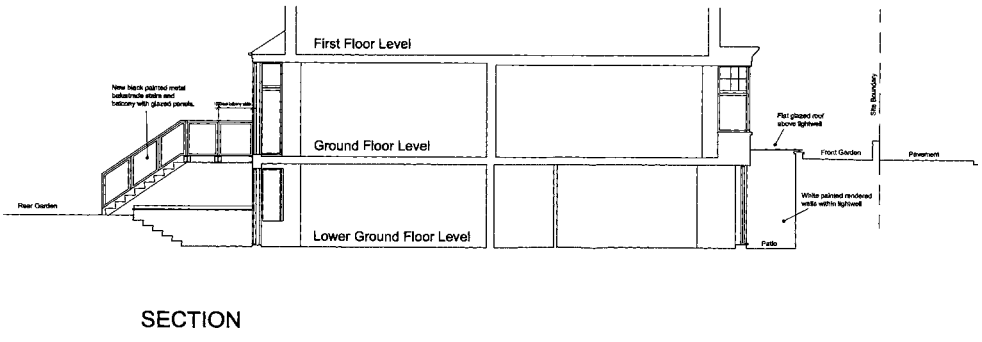
(Right)
Ground floor plan proposed



(Right)
Section existing

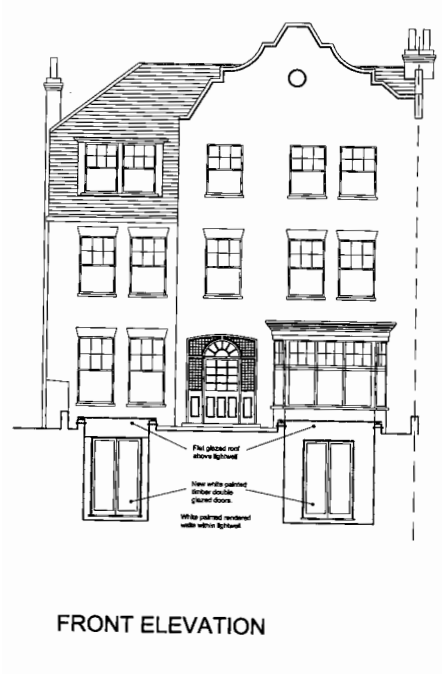


(Right)
Section proposed

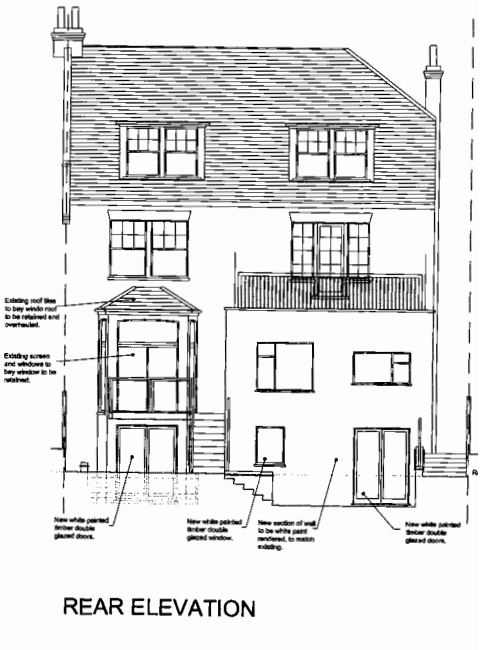


(Above) Front elevation as existing

(Above) Rear elevation as existing



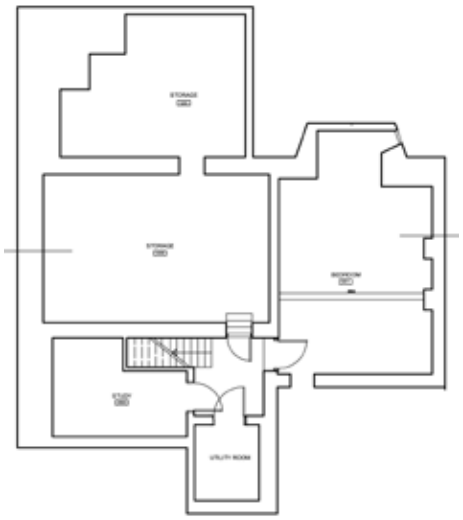
(Above) Front elevation as proposed



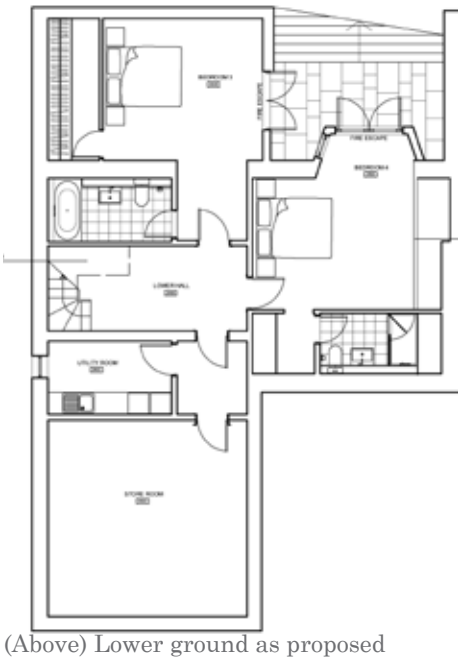
(Above) Rear elevation as proposed

(2) 6 KIDDERPORE GARDENS
BASEMENT ENLARGEMENT - REF:2006/0179/P

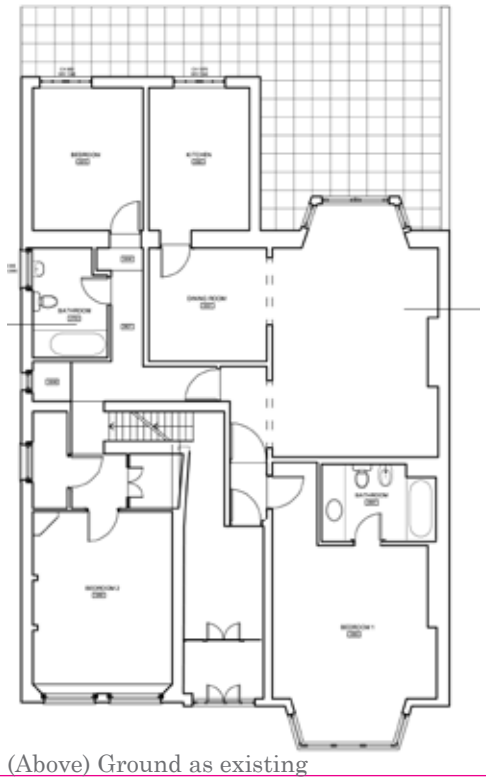
Extension of the existing basement to front and rear including the provision of a lightwell to facilitate access to the rear garden, plus alterations to the side and rear elevations of the ground floor flat. Granted 25/06/2006.



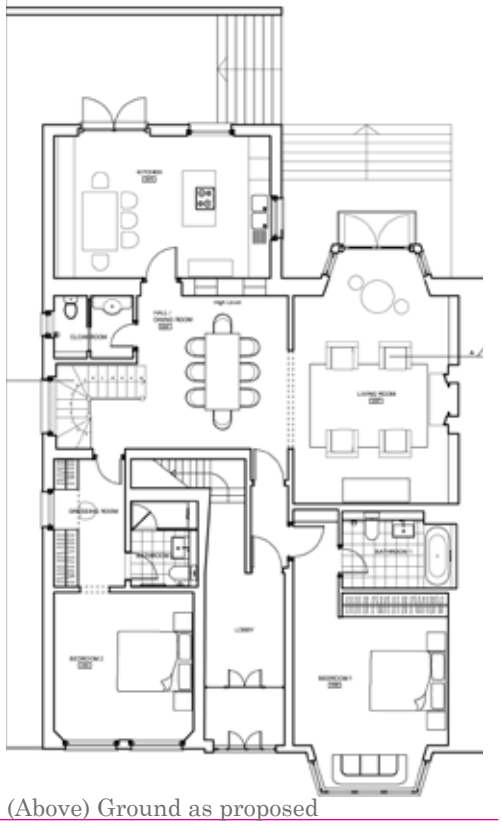
(Above) Lower ground as existing



(Above) Lower ground as proposed



(Above) Ground as existing



(Above) Ground as proposed

(Above) Rear elevation as existing

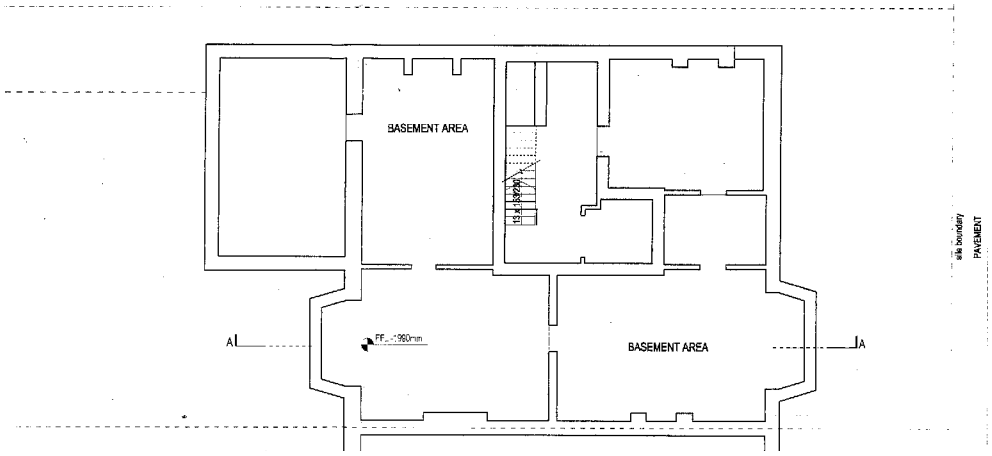
(Above) Rear elevation as proposed

(Above) Section as existing

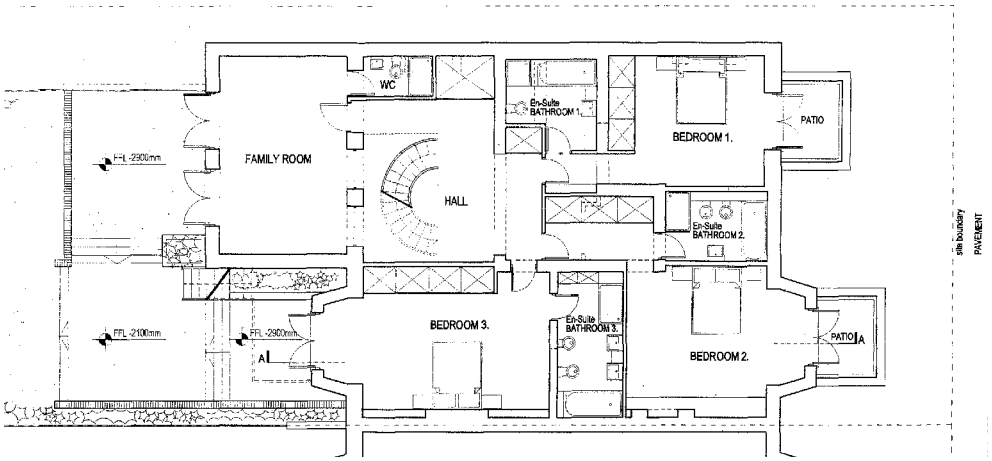
(Above) Section as proposed

(3) FLAT A, 8 KIDDERPORE GARDENS BASEMENT ENLARGEMENT - REF:2004/5207/P

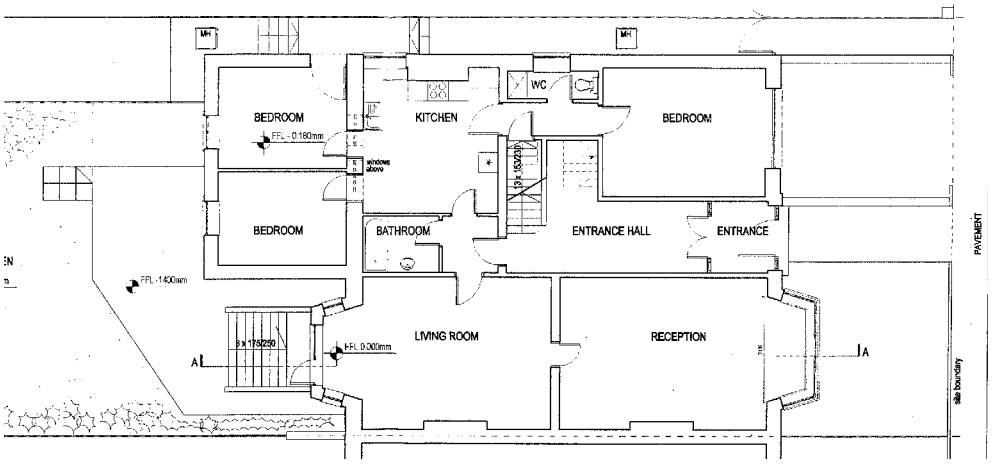
Enlargement of basement to provide new lower ground floor habitable space to the ground floor flat, with associated excavation of two lightwells at front and 2 patios at rear, and installation of new french doors and raised ground floor balcony and staircase at rear, and installation of 2 replacement windows at front. Granted 14/12/2004.



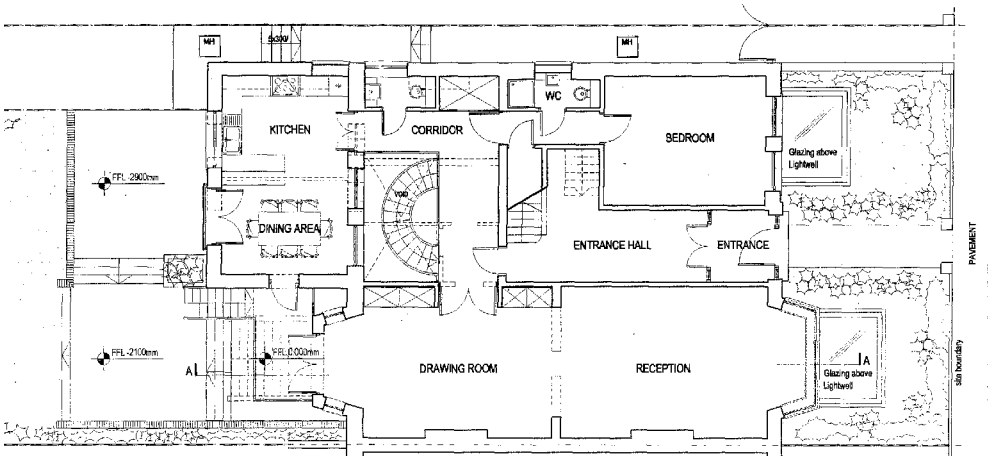
(Right)
Lower ground plan existing



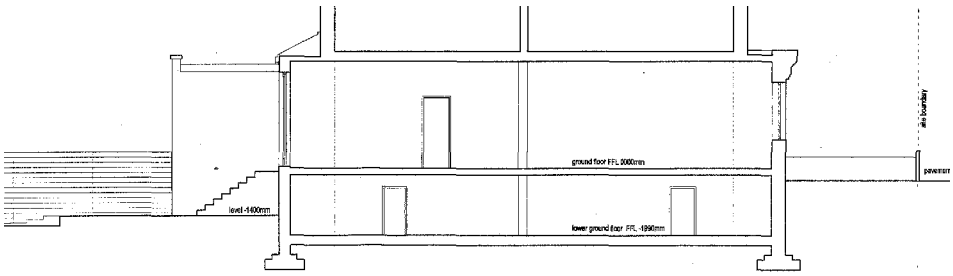
(Right)
Lower ground plan proposed



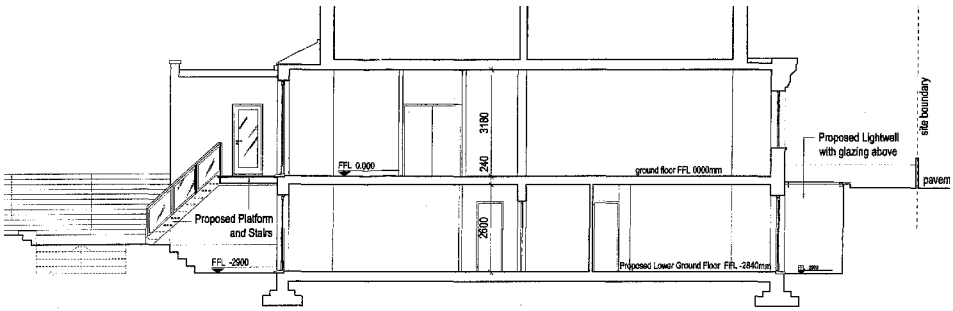
(Right)
Ground plan existing



(Right)
Ground plan proposed



(Right)
Section existing



(Right)
Section proposed

(Above) Front elevation as existing

(Above) Rear elevation as existing

(Above) Front elevation as proposed

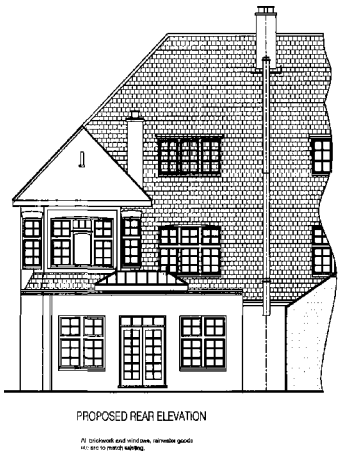
(Above) Rear elevation as proposed

(4) 7 KIDDERPORE GARDENS
REAR EXTENSION - REF:2004/5388/P

Erection of a single storey rear extension to the single family dwellinghouse. Granted 04-03-2005.

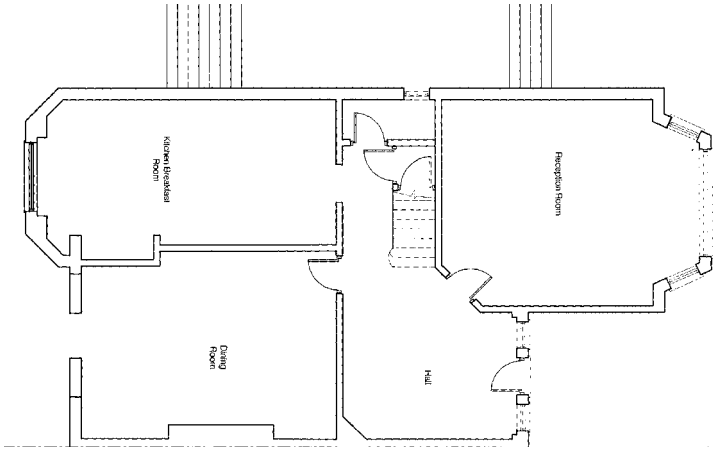
(Above) Rear elevation as existing

(Above) Side elevation as existing

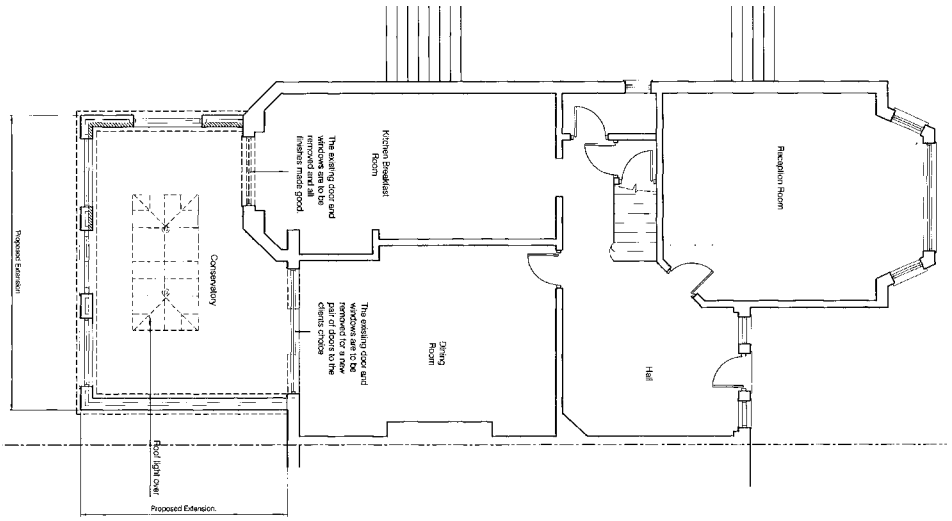


(Above) Rear elevation as proposed

(Above) Side elevation as proposed



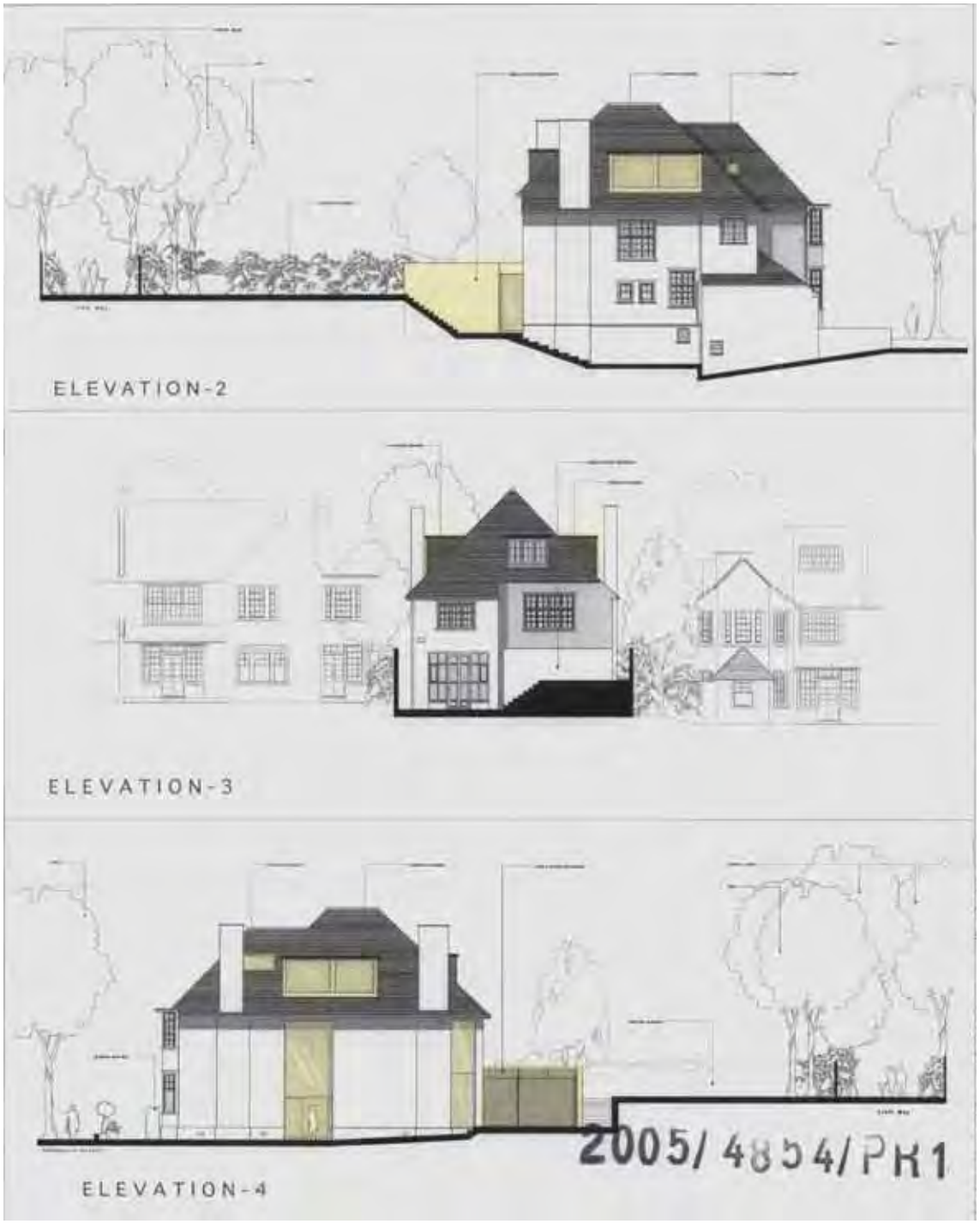
(Above) Ground floor plan as existing



(Above) Ground floor plan as proposed

(4) 7 KIDDERPORE GARDENS
REAR EXTENSION - REF:2004/5388/P

Demolition of the existing single storey lean-to rear extension, two small side dormer windows on the east roof slope, and two side dormer windows on the west roof slope; and the erection of a single storey rear extension, two dormer windows to each side roof slope, two new roof light and alterations to the side elevation of the existing dwelling house. Granted 11-01-2006




ROOF PLAN
SECOND
FIRST
GROUND
BASEMENT
2005/4854/PR1

6.11 LETTER OF SUPPORT

Letter of support for the proposals from Peter Clapp RIBA; an experienced and independent local architect brought in to review the proposals and suggest any alterations to the design.

Peter Clapp RIBA FCSD
12 Jeffrey's Place
London NW1 9PP
telephone 020 7267 2445
mobile 07984 677344
peterclapp@ukonline.co.uk

30th June 2010

John Sheehy
Development Control Planning Services
London Borough of Camden
Town Hall extension
Argyle Street
London WC1H 8ND

Dear John Sheehy

Re 9 Kidderpore Gardens NW3 7SS

I was invited by the client's professional team to undertake an independent peer review exercise of this project in May 2010. I have had no previous knowledge or involvement with either the architects, their client, or this site, but extensive experience of conservation work and sustainable buildings throughout the country, but much of it in Camden. Furthermore I visited the site and read the brief before agreeing to undertake the review.

I found that the background research and analysis had been carried out extremely thoroughly, and that generally the client's wish to modernise a family house had been well interpreted.

The existing house, has a monolithic and unattractive tiled roof, single storey, rear extension, housing scullery and stores, which prevents the main, quite dark, living spaces gaining access to the garden. The architects had rightly proposed the removal of this rear extension, but in trying to satisfy a variety of differing aesthetic opinions over a long period of time, had ended with a number of solutions with a "designed by committee" feel.

Having re-visited the Conservation Area, and reviewed all the technical reports available, I have worked with them to return to their originally stated objective, to add a modern extension for the 21st century, contrasting with the existing body of the house, that both preserves and enhances this unique Conservation Area. The rear elevations of the buildings surrounding the application site have been treated very differently over the years, with some extensions more successful than others. There is no particular theme or style to these elevations, that would indicate to me that this design should follow a particular language or vernacular. I personally find the pastiche treatments the least successful.

It is obviously desirable that this house remains in single family occupation, rather than sub-division into flats, which immediately imposes an additional parking burden on the street. It is also desirable that a property, untouched since first constructed, is brought in line with current standards in terms of thermal insulation and energy provision, so that it can provide quiet and energy conscious enjoyment for the next generation.

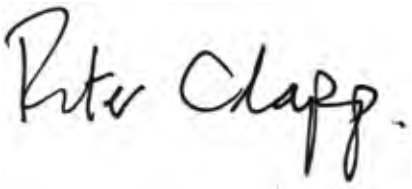
I am both familiar with, and fully supportive of, the principles of Camden's policy on basements. I consider that this basement, generally within the footprint of the existing building, contravenes nothing that this policy is designed to protect. With the normal design and supervision of a structural engineer, combined with an experienced contractor, and the protection of a Party Wall Award, there is no reason why the adjoining owner at No 11 will be in any way affected by these works.

The extension as now proposed provides a clean visual break with the existing property. The use of quality materials, well detailed, including white self-coloured render, glass and a dark grey roof edge trim, will ensure that the extension will remain largely maintenance free for its life. The use of a sedum roof will ensure that the neighbours will see an attractive visual extension to the garden when viewed from their upper windows. The reduction in water run off is simply an added bonus.

The retention of the higher soil level in the vicinity of the birch tree will guarantee that any tree roots remain undisturbed. By changing the elevational treatment at the change of garden level, both reflects the different uses behind the façade, and breaks down the façade to maintain a domestic scale.

In conclusion, I believe that the proposals as now presented, remove a rather unsightly rear extension, designed for an age of servants, and introduces a well mannered and elegant substitute in its place that allows the house to fulfil today's family needs. In doing so it properly conserves and enhances the character of this Conservation Area, and I would expect that a Planning Approval would be granted in due course.

Yours sincerely



Peter Clapp