STRUCTURAL REPORT

ON

PROPOSED BASEMENT EXTENSION WORKS

AT

84 SOUTH HILL PARK
LONDON
NW3 2SN

P6138

MAY 2025

ISSUE 1.0 ISSUED FOR PLANNING

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DOCUMENT CONTROL SHEET

	84 South Hill Park, London NW3 3SN	Project No.	P6138
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Issue No.	**Status**	**Date**	
0.1	Preliminary Issue	27/03/2025	
1.0	Issued for Planning	22/05/2025	

CONTENTS

1.00 INTRODUCTION

1.01 Michael Alexander has been appointed by the Building Owner to prepare a Structural Report to support the Planning Application for the proposed refurbishment works to the house at 84 South Hill Park.

1.02 This document has been prepared by Francesco Gelosi MEng CEng MICE who is a chartered structural engineer.

1.03 The existing residential property is a terraced three storey house above ground, with a single storey basement. The property is grade II Listed.

1.04 The property is bound by residential houses to either side, as part of a terrace. The property is bound by Hampstead Heath to the rear and by South Hill Park itself to the front.

1.05 The property is in a residential area and is part of a terrace built in the 1950s. Housing in the area is mainly Victorian or mid-twentieth century. The property is approximately 30m from the Hampstead Heath Ponds.

1.06 The proposed works are to extend the single storey basement underneath the existing driveway.

1.07 There are no additional storeys or other significant increases in loading affecting the original basement and foundations.

2.00 BASEMENT IMPACT STUDIES

2.01 Following an initial screening study a Basement Impact Assessment was carried out in accordance with the flow charts given in the Camden Planning Guidance: Basements (CPGB) of January 2021. Refer Jomas Associates' Ground Investigations and Basement Impact Assessment, issued on 20/05/2025, and Preliminary UXO Risk Assessment, issued on 25/03/2025.

2.02 This document, read in conjunction with Jomas Associates BIA, addresses the specific issues relating to the basement construction, as described in the CPGB. Reference has also been made to the Camden Geological, Hydrogeological and Hydrological Study by Arup, together with other available sources of local information.

2.03 With respect to Flooding, although the site is located within EA Flood Zone 1, it lies within South End Local Flood Risk Zone and the Hampstead Chain Catchment. Therefore, a site-specific FRA and SuDS/drainage strategy report is ongoing, as recommended by Jomas.

2.04 With respect to Surface Water flows, no issues were identified that could impact the wider environment, as the existing front driveway is already on hardstanding. Surface water at the site will be handled in the same was as it is currently, with no increase in load on the existing sewer and drainage systems. There will be no increase in hard landscaping or surface water runoff.

2.05 The proposed development is not expected to cause significant changes to the subterranean groundwater flows, due to the presence of the impermeable London Clay strata.

2.06 With respect to Ground Stability, the screening process identified that: -

a. The site lies within a wider hillside setting.
b. The shallowest soil strata recorded on site has been made ground, underlain by London Clay Formation.
c. The work will be in close proximity to the street trees.
d. The site is within 5m of a pedestrian right of way and neighbouring properties.
e. The proposed basement will not significantly increase the differential depth of foundations, as the existing basement on no. 84 and the neighbouring properties are approximately at the same formation level of the proposed basement extension.

2.07 The findings in respect of Ground Stability will be reflected in the Structural Design of the basement.

Any potential impacts will be mitigated by careful planning, design and execution of both the temporary and permanent works.

2.08 Following the Preliminary UXO Risk Assessment carried out, a UXO Supervision has been recommended due to the current risk level.

2.09 As a result of the screening study, a site investigation has been carried out on 15th April 2025. Due to the existing below ground utilities and the physical obstructions present on site, the final Trial Pit/Borehole Plan is shown below, with a borehole at location A and a trial pit at locations C.

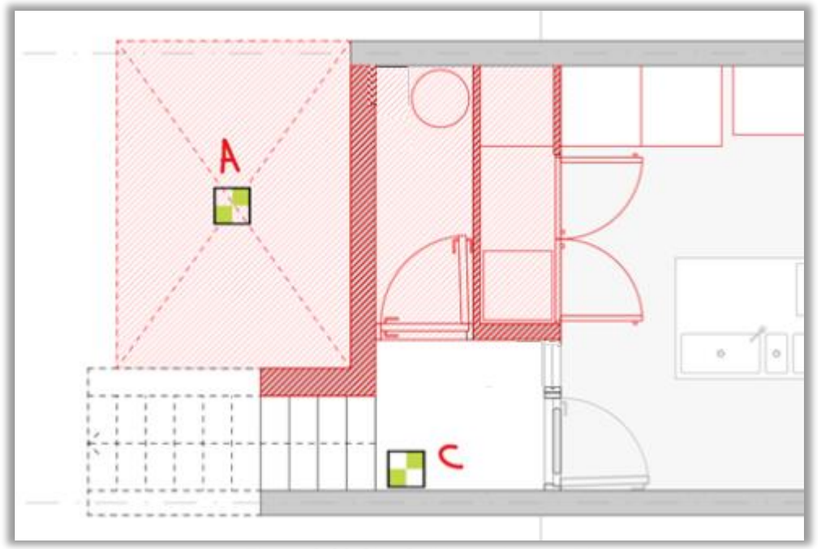


Figure 2.09 Site Soil Investigation Plan

2.10 The results of the ground investigation revealed a ground profile comprising Made Ground to 3m below ground level, overlying the London Clay Formation to a maximum proven depth of 8m below ground level.

2.11 During the intrusive investigation, groundwater was not reported within the exploratory holes. During return monitoring, groundwater was not present within the well on the first occasion and at a depth of 4.65m below ground level on the other (deeper than the proposed basement formation level, which is approximately 3.5m below ground level).

2.12 Based on the results of chemical testing included in the Jomas's report, the recommended concrete class for the site is DS-2 AC-1s on both the Made Ground strata and the London Clay Formation, in accordance with the procedures outlined in BRE Special Digest 1.

2.13 The soil general parameters included in the Jomas's report are shown in the table below.

Table 5.3: Derived General Parameters

Property	Made Ground	London Clay Formation
Unit Weight[1]	17	18.5
Drained Friction, ϕ′ (°)[2]	22.0	22.4 – 23.4
Drained Cohesion, c′ (kPa)	-	0
SPT N-value	1 – 4	5 – 16
Undrained Young's Modulus, E_u (MPa)[3]	-	9 – 28.8
Drained Young's Modulus E′ (MPa)[4]	-	5.4 – 17.3
Undrained Shear Strength, c_u (kPa)[5]	-	22.5 – 72
Plasticity Index (%)	40	31 – 37
Modified Plasticity Index (%)	32	31 – 35.9
Volume Change Potential [NHBC]	Medium	Medium
Modulus of Volume Compressibility, m_v (m^2/MN)[6]	-	0.139 – 0.444

Figure 2.13 Soil General Parameters

3.00 BASEMENT PROPOSALS

3.01 The architectural proposal for the basement is shown on the following Well St Studio drawings.
24SHP_D_P_Demolition Plans
24SHP_A_P_As Proposed Plans

3.02 The structural proposals for the proposed basement extension have been developed by Michael Alexander Engineers and shown in the attached Outline Structural Drawings (Appendix A).

3.03 The proposed works include: -

- A bored pile wall between the proposed basement extension and the public pavement. Driven piles or driven sheet piles will not be used due to the potential impacts from the vibration.
- A reinforced concrete retaining wall, to be cast in sequence, to support the existing neighbouring driveway (house no. 82 side).
- Underpinning is likely to be required under the existing retaining structure for the external staircase, as this is assumed to have stepped foundations.
- A new basement reinforced concrete slab, with a formation level approximately 3.0m below existing ground level.
- A ground level reinforced concrete slab will act as permanent prop to the excavation and to support the reconstructed driveway.

3.04 The details of the existing structure and site boundaries will be subject to detailed exploratory work prior to and during the works on site. Monitoring of adjoining structures will be carried out throughout the works.

3.05 The design and construction of the building structure shall be in accordance with current Building Regulations, British Standards, Codes of Practice, Health and Safety requirements and good building practice.

3.06 Ground Movement Assessment.
To estimate ground movements associated with the excavation works, reference has been made to Table 6.3 of CIRIA C780. This empirical method is normally used for basements formed using piled walls on all sides but can be a useful estimate for other forms of basement construction, provided the construction methods maintain horizontal propping at all times and that retaining structures are 'stiff'. The estimates have been based on the maximum depth of basement, which is approximately 3m below the front pavement level.

The ground movement estimates immediately adjacent to the proposed basement are therefore as follows: -

Location	Excavation depth (m)	Predicted movements Horiz (mm)	Vert (mm)
Basement to rear garden (typical)	4.5	5	3

Table 3.06 - Initial predictions of ground movement calculated using procedure in CIRIA C780

The predicted ground movements are small, and since the adjoining properties have the same original basement as house no. 84 founded at approximately the same depth of the proposed basement extension (see also point 2.06.e above), the foundation level movements will be significantly less than those predicted using the CIRIA C780 method. It is therefore expected that any damage to the adjacent buildings as a result of the basement extension works, as classified by Burland, will generally be category 0 'Negligible' for adjoining properties and at worst category 1, 'Very Slight'.

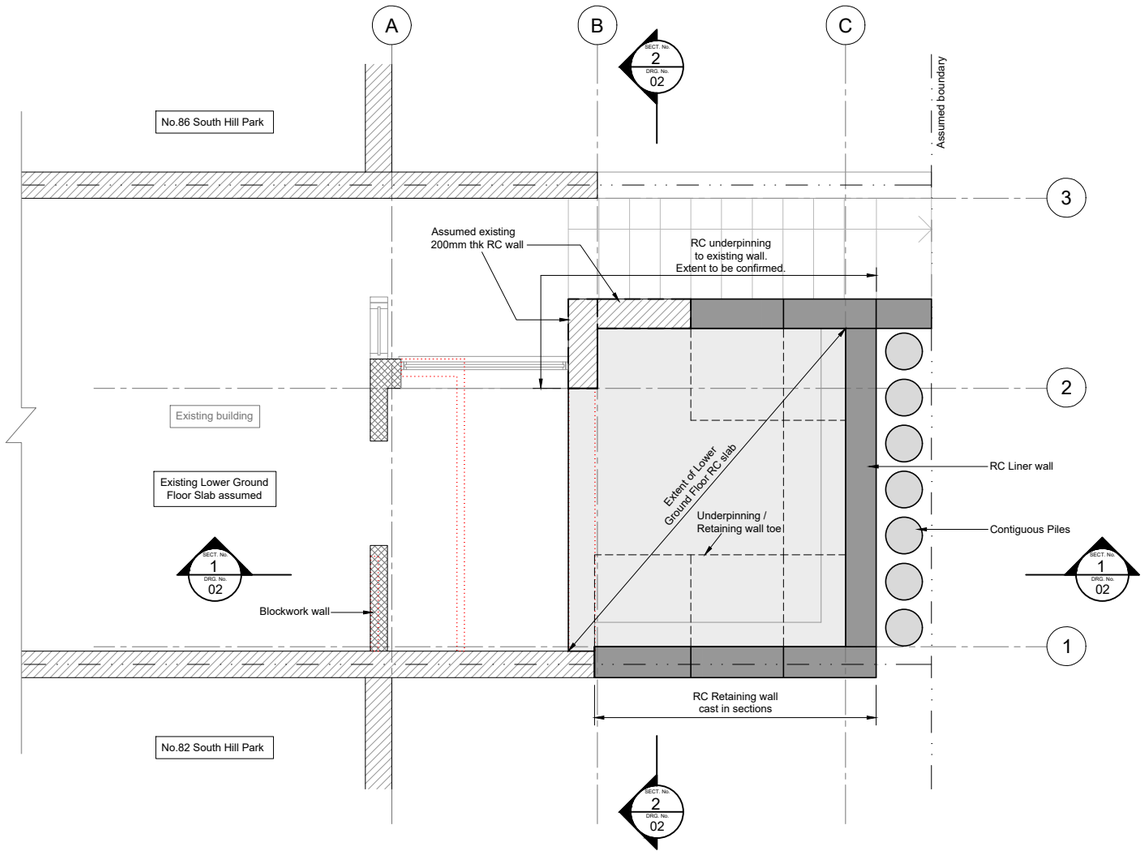
As part of the process of obtaining party wall awards, a schedule of condition will be carried out to the adjoining properties. If there is any 'damage' as a result of the works it will then be recorded and rectified under the provisions of the Party Wall Act.

3.07 Following the site investigations carried out as per the point 2.09 above, we have reviewed our preliminary assessment and drawings to reflect the findings.

In addition, the following documents are attached below: -
- Outline construction sequence for the Works (Appendix B).
- Preliminary structural calculations (Appendix C).
- Outline programme for the basement works (Appendix D).

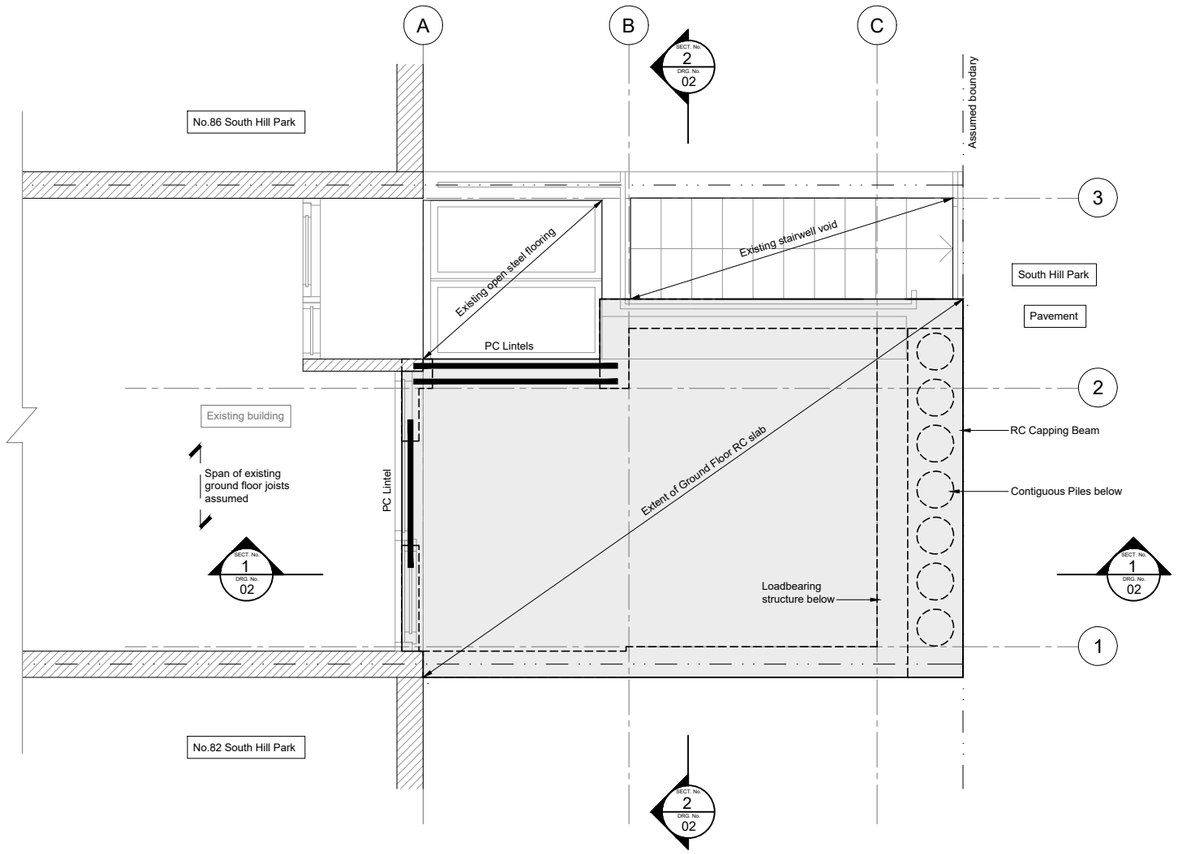
APPENDIX A

OUTLINE STRUCTURAL DRAWINGS



PART LOWER GROUND FLOOR GENERAL ARRANGEMENT

Scale 1:25



PART GROUND FLOOR GENERAL ARRANGEMENT

Scale 1:25

0 100mm WHEN PLOTTED @ 1:1 FOR A1 100 50mm WHEN PLOTTED @ 1:2 FOR A3 200

LEGEND

- Existing walls retained
- Existing structure demolished
- Contiguous Piles
- RC structure
- Structure below
- Blockwork wall
- PC lintel

NOTES

1. This drawing shall be read in conjunction with all relevant Architects & Engineers drawings and specifications.
2. Do not scale any dimensions. All dimensions are in millimetres and to be checked on site.

Rev.	Date	Description	By
P1	07.05.2025	PRELIMINARY ISSUE	SP

PRELIMINARY

Architect
WELL ST STUDIO

Project Title
84 SOUTH HILL PARK
LONDON NW3 2SN

Drawing Title
PROPOSED
GENERAL ARRANGEMENTS

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Drawn SP MAY 2025
Checked IH MAY 2025
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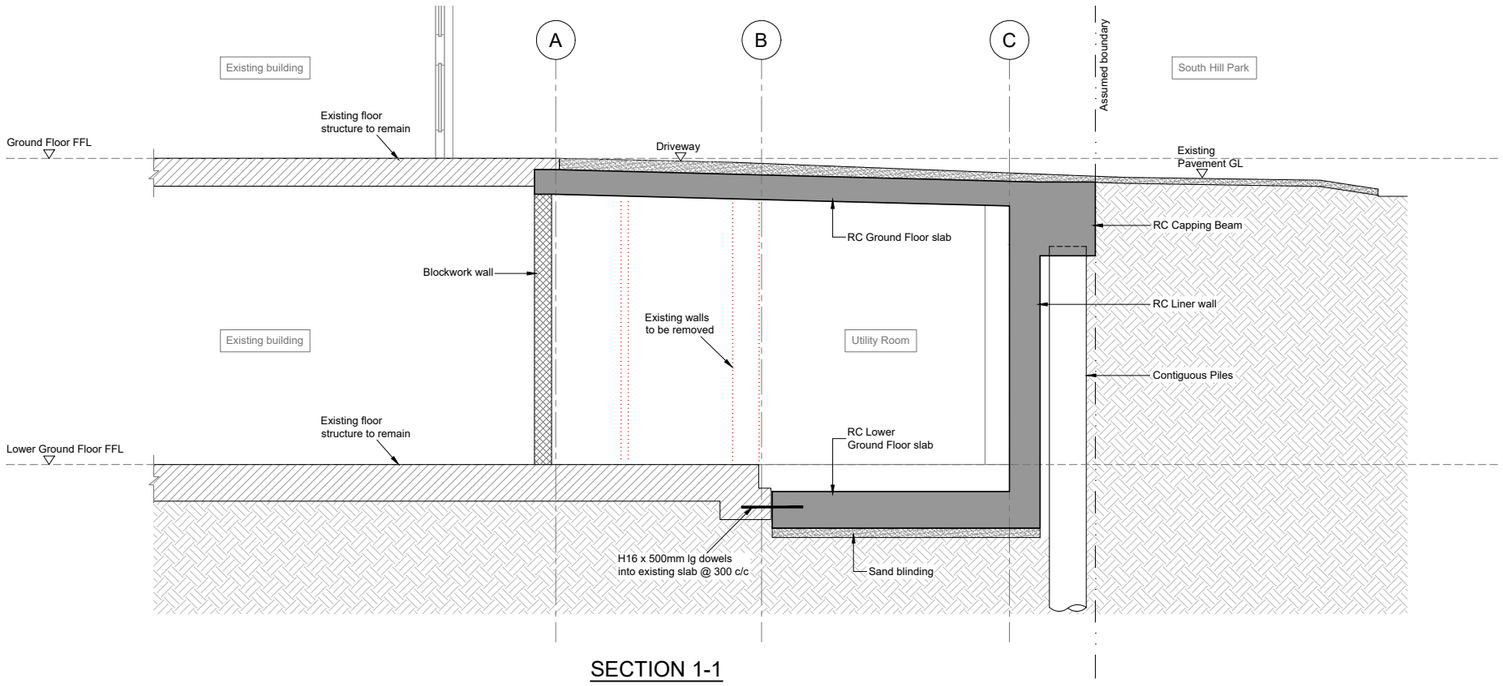
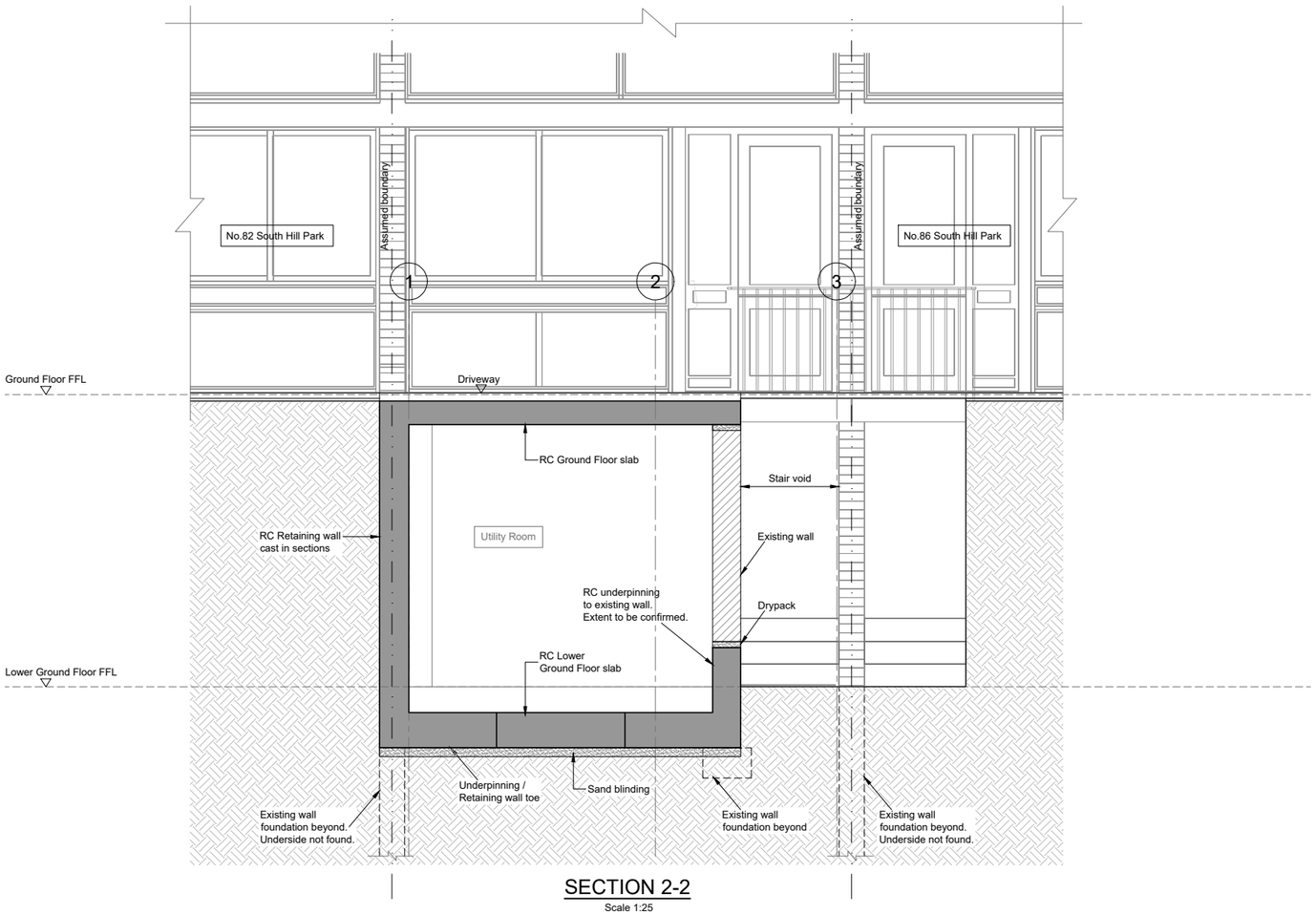
Size A1 A3
Project No. P6138
Drawing No. BIA-01
Rev. P1



SECTION 1-1

Scale 1:25



SECTION 2-2

Scale 1:25

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NOTES

1. This drawing shall be read in conjunction with all relevant Architects & Engineers drawings and specifications.
2. Do not scale any dimensions. All dimensions are in millimetres and to be checked on site.

Rev.	Date	Description	By
P1	07.05.2025	PRELIMINARY ISSUE	SP

PRELIMINARY

Architect
WELL ST STUDIO

Project Title
84 SOUTH HILL PARK
LONDON NW3 2SN

Drawing Title
PROPOSED
SECTIONS & DETAILS

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Drawn		Checked	
SP	MAY 2025	IH	MAY 2025

Scale	Size
1:25	A1
1:50	A3

Project No.	Drawing No.	Rev.
P6138	BIA-02	P1

APPENDIX B

OUTLINE CONSTRUCTION METHOD STATEMENT

B1.00 OUTLINE CONSTRUCTION METHOD STATEMENT

B1.01 The following provides an outline method statement for the construction of the basement extension. This will be developed and finalised by the appointed contractor, once the detailed design is complete. An outline construction programme will be prepared by the Main Contractor and included in the Construction Method Plan.

B1.02 This sequence is concerned with the basement work only.

1. Prior to works commencing, schedules of condition will be carried out to adjoining properties as part of the party wall process.
2. Precise monitoring points will be fixed to the adjoining building in accordance with the agreed monitoring regime. Initial 'base' readings will be taken.
3. The site and adjoining pavement will be scanned and marked for below ground services prior to the commencement of the main excavation works.
4. Bore and cast contiguous cantilever pile wall on the pavement side.
5. Form RC capping beam.
6. Excavate pin 1 on corner between pile wall and staircase to confirm existing RC wall is full height.
7. Underpin the existing RC wall on pin 1, in case it is found to be not deep enough.
8. Excavate pin 2 on corner between pile wall and next door property.
9. Cast retaining wall section and toe (pin 2), against piles, propped to reduced central earth mass and head of staircase wall. Allow 48hrs min. to cure (typical).
10. Excavate pin 3 on corner between next door property and house.
11. Cast retaining wall section and toe (pin 3), propped to central earth mass only.
12. Excavate and cast pin 4 on central section of staircase if required to underpin the existing wall, depending on pin 1 findings.
13. Excavate pin 5 on central section on next door boundary.
14. Cast retaining wall section and toe, propped to reduced central earth mass and head of staircase wall.
15. Excavate pin 6 on central section on pile wall.
16. Infill toe and cast liner wall full length, unpropped.
17. Once toes and walls are all connected together (and cured 48hrs min.), the earth mass can be removed and high level props retained only.
18. Cast RC slab at basement level.
19. Cast RC slab at ground level (on formwork).
20. Remove props.

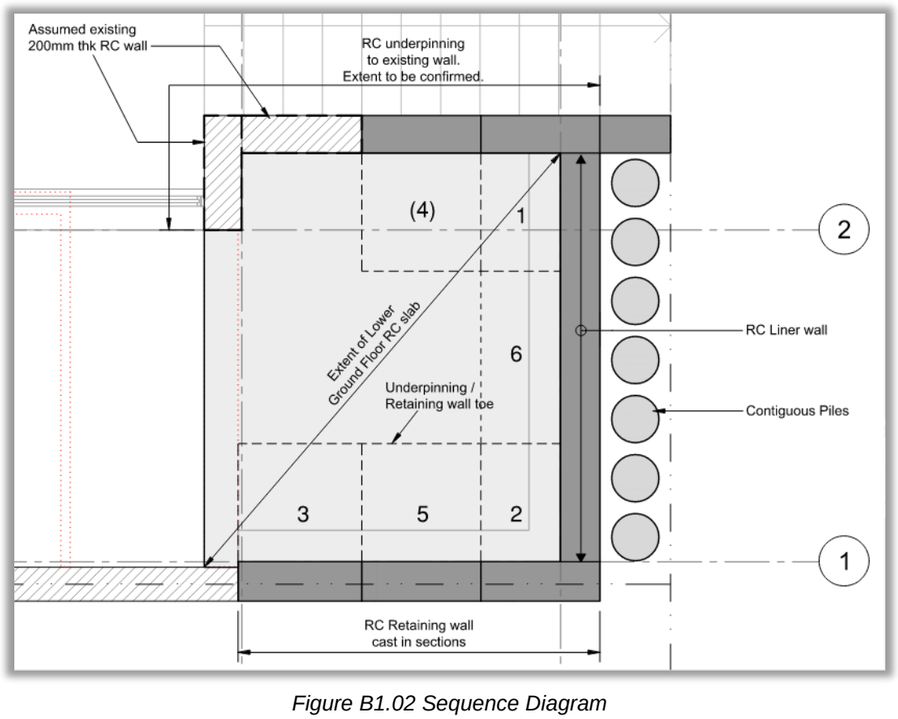


Figure B1.02 Sequence Diagram

APPENDIX C

PRELIMINARY STRUCTURAL CALCULATIONS

C1.00 INTRODUCTION

C1.01 These preliminary calculations are for planning purposes only. Detailed calculations will be developed in due course.

C2.00 DESIGN BASIS

C2.01 CODES

The following Eurocodes will be used in design.

BS EN 1990:2002	Eurocode: Basis of Structural Design
BS EN 1991	Eurocode 1: Actions on Structures
BS EN 1992	Eurocode 2: Design of Concrete Structures
BS EN 1993	Eurocode 3: Design of Steel Structures
BS EN 1996	Eurocode 6: Design of Masonry Structures
BS EN 1997	Eurocode 7: Geotechnical Design

C2.02 MATERIALS

The following materials will be used in design.

Concrete	C28/35
Reinforcement	500H
Steel	S275 / S355 where necessary
Timber	C24
Blockwork	7.3 N/mm^2 compressive strength

C3.00 LOADING

C3.01 FLOOR LOADING

Reference	Description	Dead load (kN/m^2)	Live load (kN/m^2)
Existing flat roof	Asphalt membrane	0.50	
	Ply and joists	1.00	
	Ceiling	0.20	
	Access for maintenance		0.60
	TOTAL (CHARACTERISTIC)	1.70	0.60
Existing third, second, first floor	Finishes	0.20	
	Ply and joists	1.00	
	Ceiling	0.20	
	Imposed residential		1.50
	Partitions		1.00
	TOTAL (CHARACTERISTIC)	1.40	2.50
Existing ground floor	Finishes	0.20	
	Screed 50mm	1.25	
	Slab 150mm	3.75	
	Imposed residential		1.50
	Partitions		1.00
	TOTAL (CHARACTERISTIC)	5.20	2.50
Proposed ground floor	Finishes	0.20	
	Screed 75mm	1.90	
	Beam and block floor 155thk	2.00	
	Ceiling	0.30	
	Imposed residential		1.50
	Partitions		1.00
(internal)	TOTAL (CHARACTERISTIC)	4.40	2.50
Proposed ground floor	Finishes	0.20	
	Screed 75mm	1.90	
	Slab 250thk	6.30	
	Ceiling	0.30	
	Imposed residential		1.50
	Partitions		1.00
(external)	TOTAL (CHARACTERISTIC)	8.70	2.50
Proposed basement floor	Finishes	0.20	
	Screed 75mm	1.90	
	Slab 400thk	10.00	
	Imposed residential		1.50
	Partitions		1.00
	TOTAL (CHARACTERISTIC)	12.10	2.50

C3.02 WALL LOADING

Reference	Description	Dead load (kN/m^2)	
Party walls	Block 100mm	2.10	-
	Block 100mm	2.10	-
	Plaster both sides	0.60	-
	TOTAL (CHARACTERISTIC)	4.80	-
External walls	Block 100mm	2.10	-
	Block 100mm	2.10	-
	Plaster one side	0.30	-
	TOTAL (CHARACTERISTIC)	4.50	-
RC liner walls	Concrete 250thk	6.25	-
	Plaster one side	0.30	-
	TOTAL (CHARACTERISTIC)	6.60	-
Underpins	Concrete 250thk (assumed)	6.25	-
	TOTAL (CHARACTERISTIC)	6.30	-

C3.03 EARTH LOADS

The following parameters are adopted for the design of the basement retaining walls.

Soil type	Made Ground	London Clay
Depth of strata	0.0m – 1.8m	1.8m – to depth
Saturated density	16 kN/m^3	19 kN/m^3
Effective cohesion	c' = 0	c' = 0
Effective angle of friction	Φ = 18°	Φ = 21°

Ground water is assumed to be at external ground surface level.

A minimum surcharge of 10 kN/m^2 is applied.

C3.04 ADJOINING BUILDINGS LOADINGS

The neighbouring buildings, nos. 82 and 86 South Hill Park, are a similar height and are assumed to be of similar construction to no. 84.

A load take down has been carried out to understand loads on the party walls.

C3.05 OVERALL LOADS

A summary of the existing and proposed loads, for no. 84 and for the adjoining building, has been prepared.

Jomas have adopted these loads in preparing the ground movement assessment. The loads have also been applied to the underpinning calculations in C4.00

Existing

Front and rear walls		*Dead*	*Live*
Roof		1.70 kN/m^2	0.60 kN/m^2
Third to first floor	3no x	1.40 kN/m^2	2.50 kN/m^2
Total		5.90 kN/m^2	8.10 kN/m^2
Loaded width = 3.6m / 2 = 1.8m		**10.60 kN/m**	**14.60 kN/m**
Wall load		4.50 kN/m^2	-
Height = 8.1m		**36.50 kN/m**	-
Total		**47 kN/m**	**15 kN/m**

Internal walls		*Dead*	*Live*
Roof		1.70 kN/m^2	0.60 kN/m^2
Third to first floor	3no x	1.40 kN/m^2	2.50 kN/m^2
Total		5.90 kN/m^2	8.10 kN/m^2
Loaded width = (3.6m + 2.8m) / 2 = 3.2m		**18.90 kN/m**	**25.90 kN/m**
Total		**19 kN/m**	**26 kN/m**

Party walls	*Dead*	*Live*
Wall load	4.80 kN/m^2	-
Height = 8.6m incl footing	**41.30 kN/m**	-
Total	**42 kN/m**	-

Ground floor	**5.2 kN/m^2**	**2.5 kN/m^2**

Proposed

Front and rear walls	*Dead*	*Live*
Ground floor slab	8.70 kN/m^2	2.50 kN/m^2
Loaded width = 1.6m / 2 = 0.8m	**7.00 kN/m**	**2.00 kN/m**
RC liner wall	6.60 kN/m^2	-
Underpins	6.30 kN/m^2	
Total	12.90 kN/m^2	
Height = 3.3m	**42.60 kN/m**	-
Total	**50 kN/m**	**2 kN/m**

Party walls	*Dead*	*Live*
Wall load	4.80 kN/m^2	-
Height = 11.2m incl footing	**53.8 kN/m**	-
RC liner wall	6.60 kN/m^2	-
Height = 3.1m	**20.45 kN/m**	
Underpins	6.30 kN/m^2	
Height = 2.9m (average)	**18.25 kN/mz**	
Typical beam reaction spread over 6m	**5 kN/m**	**3 kN/m**
Total	**98 kN/m**	**3 kN/m**
Basement slab	**12.1 kN/m^2**	**2.5 kN/m^2**

C4.00 DESIGN OF STRUCTURAL ELEMENTS

C4.01 BASEMENT SLAB UNDER UPLIFT LOADING

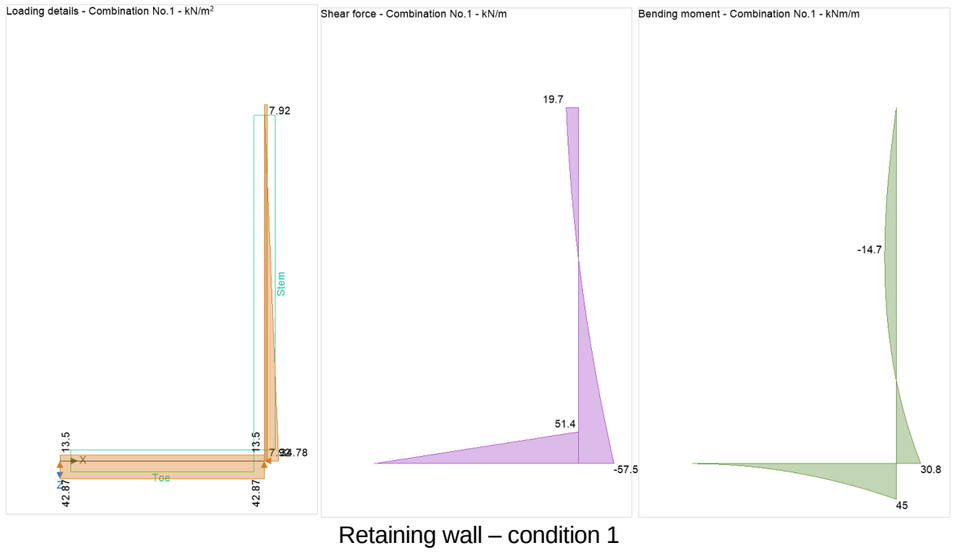
Depth to top of basement slab	d = 3.05m
Slab thickness	t = 400 mm thk
Depth to underside of slab	d = 3.05 + 0.4 = 3.45m
Depth of water	d = 3.45m – 1m = 2.45m
Hydrostatic pressure due to head of water	2.45m x 10 kN/m^3 = 24.5 kN/m^2
Load from self weight of slab	0.4m x 25 kN/m^3 = 10.0 kN/m^2
Load per m strip	w_{ULS} = 24.5 kN/m^2 x 1.5 = 36.8 kN/m
Net uplift force	w_{ULS} = 36.8 – 10.0 = 26.8 kN/m^2
Length	L = 5.35m
Moment	M = w L^2 / 8 = 132 kNm
Shear	V = w L / 2 = 72 kN
	k = M / b d^2 f_{ck} = 0.037
Lever arm	z = 0.95d = 336mm
Reinforcement required	$A_{s,req}$ = M / 0.87 f_y z = 899 mm^2/m
Reinforcement provided	H16 at 200mm c/c: $A_{s,prov}$ = 1005 mm^2/m

C4.02 RETAINING WALLS

4.02.1 Condition 1: Adjacent to no. 82

No. 82 is of similar size and construction to no. 84.

A surcharge of 10 kN/m^2 is applied.
A point load of 30 kN dead load and 17 kN live load acts at the top of the wall (typical beam reactions), applied as line loads of 15 kN/m and 8.5kN/m to allow for load spread.



Retaining wall – condition 1

Bearing pressure – critical case is Combination 2

Applied bearing pressure	P = 32.6 kN/m^2
Allowable bearing pressure	q = 80.9 kN/m^2
Factor of safety	FoS = 2.486

Design forces in wall – critical case is Combination 1

Moment in wall	M_{stem} = 14.7 kNm
Moment at base	M_{base} = 30.8 kNm
Shear at base	V = 57.5 kN

APPENDIX D

OUTLINE CONSTRUCTION PROGRAMME

P6138 84 South Hill Park, London NW3 2SN Rev 1.0 Issued for Planning May 2025

OUTLINE CONSTRUCTION PROGRAMME

TASK	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Month 13	Month 14
Planning														
Planning Approval	◆													
Design														
Architectural design	■	■	■											
Structural design	■	■	■											
Contractor appointment			◆											
Agreement of detailed construction method			■											
Party Wall														
Party Wall Awards agreed			◆											
Structural Works														
Start on site			◆											
Enabling works			■											
Piling				■	■									
Underpinning and installation of temporary propping						■	■	■						
RC liner wall									■					
Basement slab										■				
Ground floor slab											■			
Completion														
Finishes, M&E intallation, etc.											■	■	■	

This programme is for information only and subject to detailed consideration by the appointed contractor