



STRUCTURAL IMPACT ASSESSMENT

59 PETERSHAM ROAD, RICHMOND TW10 6UT

**PROPOSED SINGLE STOREY REAR EXTENSION AT GARDEN LEVEL WITH
UPPER POD TO LOWER GROUND FLOOR, AND PROPOSED FRONT
LIGHTWELL AND STEPS (PLUS ASSOCIATED ALTERATIONS)**



**Job No: G1100
18th September 2024**

IAN RICHARDS BSc CEng MStructE, SIMON RAYNER BSc CEng MStructE, Adrian Long BEng (Hons)

ASSOCIATES: David Davies IEng AMStructE, Graham Spittle, James Folley

CONSULTANT: Michael Lewis

ALAN BAXTER PARTNERSHIP THE CLOCK BUILDING PYMPES COURT BUSBRIDGE ROAD MAIDSTONE KENT ME15 0HZ

TELEPHONE: 01622 744263 FAX: 01622 749270

POOLE OFFICE: WESTONS POINT HOUSE WESTONS POINT BOATYARD TURKS LANE POOLE DORSET BH14 8EW

TELEPHONE: 01202 748712

EMAIL: mail@abpengineers.co.uk Website: www.abpengineers.co.uk

VAT REGISTRATION NO. 373 6951 20 LLP No. OC319497



1.0 INTRODUCTION

- 1.1 This report was commissioned by the building's owner to appraise the structure of the property to inform a proposed refurbishment of the house in association with a proposed rear extension, minor alterations to the floor layouts and alterations to the front lightwell. It is to be read in conjunction with the other information submitted with the Planning and Listed Building Applications.
- 1.2 The information and recommendations given in this report is the result of a desk top study, visual inspections, trial pit soil investigation and limited opening up. It should be noted that there may be special conditions prevailing at the site which are not currently evident and which have not therefore been taken in to consideration. No liability can be accepted for any such conditions.
- 1.3 Site visits were carried out between December 2022 and September 2023 to determine the existing structure, its condition and its relationship with neighbouring properties, site topography and other site constraints.
- 1.4 As Structural Engineers, we are not qualified to comment on damp, timber decay or insect infestation.

2.0 SITE DETAILS & HISTORY

- 2.1 59 Petersham Road, on the west side of this mainly residential street, is located to the south of Richmond centre. The rear garden slopes down to the towpath alongside the River Thames.
- 2.2 It is a mid-terrace Georgian townhouse previously known as 2 The Paragon and built around 1720. It has a party wall with No 57 to the north and No 61 to the south.
- 2.3 The property is Grade II listed and is located within the Richmond Hill Conservation Area.
- 2.4 A heritage statement has been prepared separately to this report and should be referred to for full details. It has undergone minor alterations and additions together with repairs but its overall appearance and layout is understood to be predominantly original.
- 2.5 Recent works have been carried out to provide a new roof structure enclosing the original roof which was severely deteriorated. The original roof timbers are retained and suspended from the new structure.



- 2.6 The property is built in to the natural slope of the land down to the river. There are 5 floors, including within the roof, with garden level and lower ground floor below street level at the front.

3.0 SITE INVESTIGATION DATA

- 3.1 The local geology map (British Geological Survey Sheet 270) indicates the site is underlain by London Clay with a strata of the over lying River Terrace gravels immediately to the north.
- 3.2 A search for nearby publicly available boreholes at BGS found records of the trial shafts carried out in 1891 along the tow path, at the bottom of the garden, in advance of installing the main public sewer. The closest record indicates 4 feet of made ground over 7 feet of ballast over the London Clay. No ground water was recorded.
- 3.3 To further understand the substructure of the building and adjacent walls a series of trial pits were carried out. These are recorded in Appendix A.
- 3.4 They consistently show the walls to be founded in firm dark brown gravelly clay. No ground water was encountered.
- 3.5 The rear wall was founded at a depth of 1.8m below garden level with the adjacent boundary walls founded at a depth of 1m (No 57) and 450mm (No 61). To the front of the building the footings were 250mm below this level. No corbelling of the brickwork at their bases was found.
- 3.6 The results of a CCTV survey of the below ground drainage is summarised in Appendix B. This shows a combined system draining from front to back – presumably to the public sewer running parallel with the river.
- 3.7 Their summary concludes the drainage system is not in a satisfactory structural condition having multiple fracturing on the verge of collapse and heavy root penetration. There are also heavy debris deposits with cement intrusion which is affecting the free flow of waste. It is all confirmed as private and not under the ownership of Thames Water.
- 3.8 A Flood Risk Assessment has been carried out by others and should be referred to for details.
- 3.9 There are party walls with the adjoining terrace properties Nos 57 and 61. No further party walls have been identified.



4.0 EXISTING STRUCTURE

- 4.1 The existing property comprises five storeys including rooms within the roof. The bottom floor is labelled Garden Level (with access from the rear) and the next two floors Lower Ground and Upper Ground respectively – which are access to the upper level via steps up from street level at the front.
- 4.2 The existing structure drawings in Appendix C note the primary structural members where observed. These are limited by only opening up very small sections of the finishes to obtain a general understanding of the form and condition of the structure.
- 4.3 The original front and rear external walls appear to be of solid brick construction, 2 bricks thick at Garden Level reducing in thickness at upper levels. The internal spine wall is of brick construction at the two lower floors becoming timber stud at the upper levels. All other internal partitions are of timber stud or lightweight panelling.
- 4.4 The floor at Garden Level is predominantly ground bearing oversite finishes with steps up between rooms towards the front of the building. The upper floors comprise floor boards on timber joists generally spanning front to back over the central spine wall. The roof comprises new timber rafters to the recently installed steel frame – forming a central flat roof over the original double pitch profiled roof.
- 4.5 The overall stability of this type of structure relies upon the combined cellular nature of the walls and floors transferring lateral loads to the foundations and the ground below.

5.0 OBSERVATIONS

5.1 General

The property is generally in poor decorative order. Until the recent re-construction of the damaged roof the property has had props running though it internally and repairs/re-decoration of the lower levels has been on hold until this aspect has been resolved.

All buildings will show signs of small movements and these are often not of structural concern. Consequently we make reference to BRE Digest 251 – Assessment of damage in low-rise buildings. This classifies widths of cracks in to categories relative to their size. Category 0 (up to 0.1mm), Category 1 (up to 1mm), Category 2 (up to 5mm) etc. It concludes that Category 2 damage can result from a variety of causes which are frequently difficult to identify and may be caused by a combination of factors. This level of damage is rarely of structural significance and consequently damage at or below Category 2 does not normally justify



remedial work other than restoration of the appearance of the building. We therefore do not typically record damage at or below Category 2.

Reference should be made to drawings G1100-001 to 005 (Appendix C) where these observations are recorded. Many of the rooms are clad in panelling – concealing the underlying condition of the structure.

5.2 Foundations & Garden Level Floor

Reference to the trial pits carried out (Appendix B) shows the brick walls to the rear are founded relatively deeply at 1.8m onto the underlying gravelly clay. No corbelling at the base of the wall was found.

To the front the walls were founded at about 250mm below ground level into the underlying clay.

The subsoil was found to be damp possibly due to the local topography – being at the lower section of the natural slope down to the river.

The subsoil comprises a clay with high volume change potential. Consequently, variations in the moisture content will result in cyclical heave/shrinkage occurring which is most likely close to the surface and potentially seasonal.

At foundation level there were no cracks identified which would indicate differential settlement – but refer to section 5.3 regarding the rear wall.

5.3 External Walls

The external walls were partially obscured with scaffolding when inspected.

The front exterior wall was previously rendered – understood to have been cement base. This has been removed and its replacement is part of a previous Planning Application for it to have a more suitable lime based render. The wall has a number of minor defects, repairs and previous alterations but none of structural significance were noted.

The rear wall is in fair condition. It is apparent that the central pier between the two windows has settled relative to the two sides. The heads of the windows also slope down. No significant cracks were identified and the movement appears longstanding.

5.4 Internal Walls

Internally, the primary wall is the spine wall which, though panelled in places, shows no significant structural defects.

The remaining internal partitions are not structural.



5.5 Floors

The floors show signs of longstanding movements being uneven and sloping in places.

Under foot the floors are relatively sound and are not overly springy under foot.

6.0 **DISCUSSION & RECOMMENDATIONS [INC. PROPOSED ALTERATIONS]**

6.1 General

The poor decorative order of the property is of assistance in determining the structural significance of the damage and movement recorded.

In general, the property is in poor condition for its age and type but the overall structure, whilst showing signs of historic movement, is generally sound.

It is understood that the current owners intend to fully refurbish the property – a once in a generation opportunity to properly resolve any structural concerns using current methods appropriate for repairs to properties of historic importance as well as enhance existing floor/wall connections to ensure the long term robustness of the structure.

6.2 Foundations, Ground Floor & Walls

The rear wall is founded at a depth of 1.8m in to clay and has settled differentially along its length. This movement appears longstanding and is likely due to changes in moisture content of the clay (due to ground water runoff down the slope of the hill or damaged below ground drainage) resulting in cycles of swelling and shrinkage. The CCTV survey report of the below ground drainage confirmed it is in very poor condition and should be replaced.

The settlement that has occurred has not compromised the stability of the walls and where damaged localised repairs to the brickwork can be carried out.

The front wall, has minor cracks, spalling and previous repairs – none of which are structurally significant.

The original masonry construction would have used a lime mortar which is able to accommodate the movement that has occurred. It is important that any repairs are carried out using similar lime based mortars such that any future movements do not cause brittle fracturing of the masonry



along with ensuring moisture does not become trapped within the walls which can cause additional damage.

The ground bearing floor to the property appears in generally good condition but the inadequate condition of the below ground drainage in conjunction with incorporating underfloor insulation will result in a new ground bearing slab, independent of the walls and lightly reinforced to resist future differential settlements of the subsoil. An insulated limecrete floor which has the characteristics of 'breathing' but resists moisture rising from the ground is to replace the existing.

The trial pits indicate that no excavations below the foot of the existing wall foundations will be required to replace the ground floor slab. Where re-laid drains (or below ground services) run parallel to a load bearing wall, any associated trenches should be located at least 1m away to ensure they are not undermined – or appropriate temporary support provided.

6.3 Internal Walls

No significant concerns with the structural condition of the internal walls have been found. Where timber panelling conceals their condition it should be carefully removed for reinstatement after a fuller survey and any required repairs are completed as necessary

It is expected that only minor repairs such as limited bed joint reinforcement, elbow ties to tie the external walls to internal walls (where not adequately bonded in), and replacement of decayed lintels will be required.

6.4 Suspended Floors

The timber floor joists are likely to have deflected due to timber creep over the ensuing years. Further movements have occurred with historic settlement of the supporting walls. Where floors are particularly springy it would be appropriate to stiffen them up by bolting alongside additional timbers which can also be used to level the floors where required.

As part of an overall refurbishment of a building of this age we would also recommend the installation of horizontal wall ties to enhance the connection between floor and wall. Whilst this is being done a full assessment of the condition of the timbers at their bearings can be carried out and any necessary repairs spliced in.

This intervention will make the property more robust to resist future movements and prolong the useful life of the building structure.

6.5 Roof

The roof has recently been fully repaired and re-supported and is not considered within this report.



6.6 Proposed Alterations

The full proposals for the refurbishment of the property are shown on drawings G1100-SC1-111 to 116 [Appendix D]

To the rear it is proposed to construct a two storey (Garden Level and Lower Ground Floor) extension.

The proposed structure for this is predominantly independent of the existing house. The Garden Level floor will be lowered slightly but will not undermine the existing rear wall of the house. Low key mass concrete underpinning to one party boundary wall (No 61) [refer to drg G1100-SC1-116 for proposed sequence of construction] is envisaged with a low level retaining structure protecting the stability of the boundaries incorporated in the new slab.

Our drawings illustrate a steel frame structure to support a concrete and glass roof over the new kitchen space. This also supports a lightweight steel frame to the glass pod extension at Lower Ground Floor level.

The new steel frame structure is independent of the existing property and provides additional stability to the two existing slender party boundary walls.

Internally, no structural alterations are proposed. Door openings in non-load bearing timber stud walls can be accommodated with timber lintels.

It is proposed to replace the existing steps in the front lightwell. They currently provide access from the drive area to the Garden level with solid steps running parallel to the front elevation within a masonry retaining wall.

It is proposed to form a helical stair in concrete (with York stone treads) within a new masonry retaining structure (circular in plan) [refer to drg G1100-SC1-116 for construction details].

This locally widens the retained section of lightwell adjacent the existing boundary wall with No 61 and removes sections of retained material immediately against the lower sections of the front wall to improve resistance to damp penetrating the internal fabric of the property in this area.



7.0 CONCLUSIONS

The property is in fair to poor condition for its age and type. Only recently has the severely damaged roof construction been repaired and consequently the fabric of the building below has not had much attention. The normal periodic maintenance required for any property had not been carried out in recent years.

The overall structural fabric of the building, whilst having some minor issues in its construction – commonly encountered in buildings of this age – has no significant structural concerns.

It is not uncommon for buildings to undergo a complete refurbishment such as this every 70 – 80 years and is a valuable opportunity to identify and address defects in the building structure in order to prolong the long term future of the property. Recommended tying in of the floors to the walls will enhance the long term robustness of the building's structure.

Buildings of this age and type were built using lime products rather than cement based. This allows the building to have a degree of flex unlike a modern building which is built to be rigid. The use of lime based products should be used in any repairs to maintain this characteristic of the building's structure.

As the refurbishment progresses it is likely that minor localised issues will be encountered but it is not envisaged that any major defects affecting the overall structure of the building will be found.

The proposed rear extension is predominantly independent of the house imparting minor additional loads to the existing rear wall of the building. This wall, whilst undergoing historic movement in the past, is well founded and able to support the proposed load increase. Besides some low key underpinning to a section of boundary wall no further strengthening or alterations will be required to existing structure.

The proposed alterations to the front lightwell can be completed with minor impact on the adjacent structures and reduces the risk of damp penetration to the lower parts of the front wall.

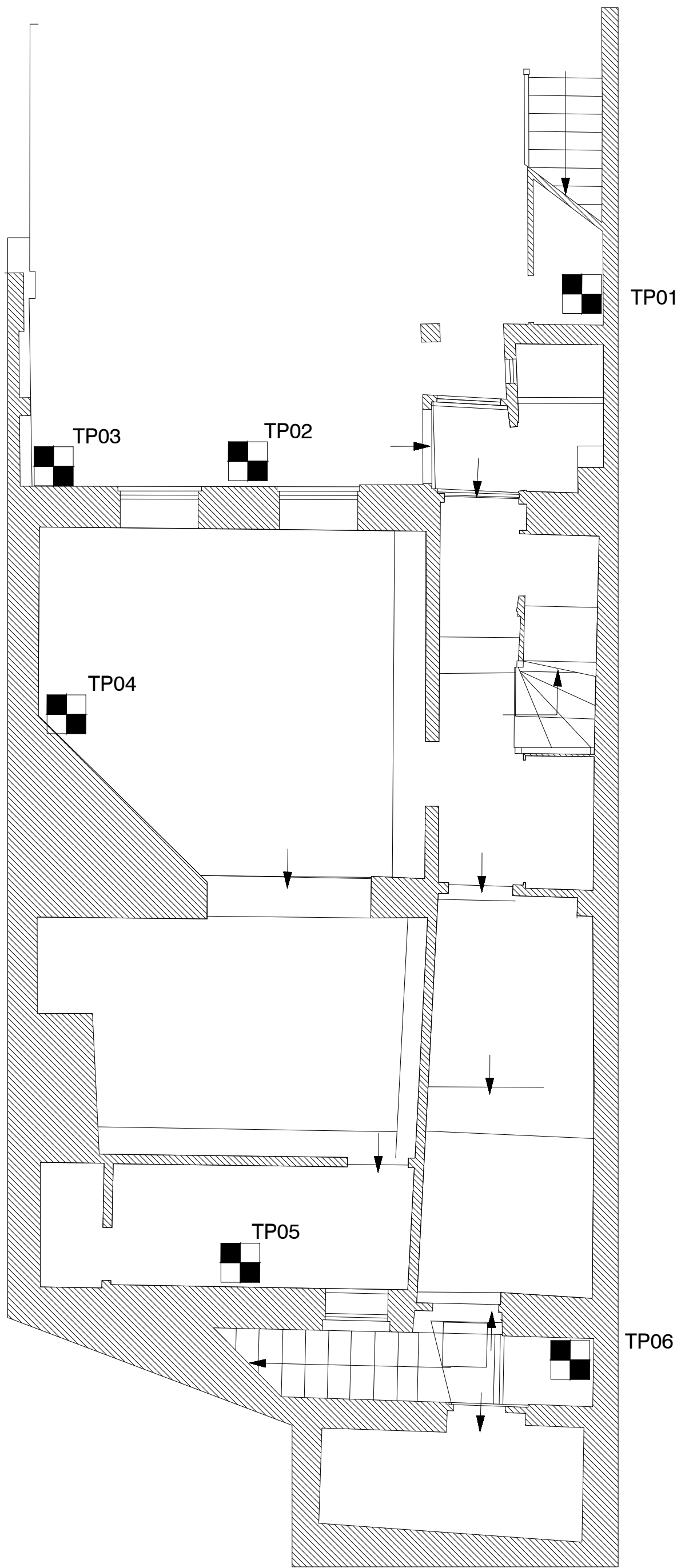
The proposed works will not have a detrimental impact upon the structure of the building. The associated refurbishment of the property will contribute to the long term robustness of the structure and ensure its continued use as a family home.

SIMON RAYNER BSc CEng MStructE
ALAN BAXTER PARTNERSHIP LLP

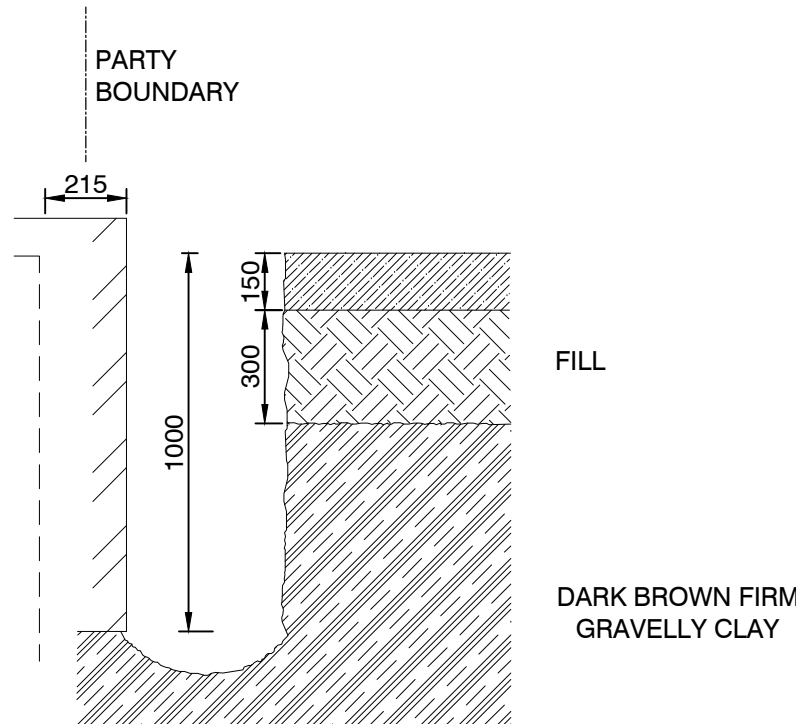
APPENDIX A

TRIAL PIT SITE INVESTIGATION

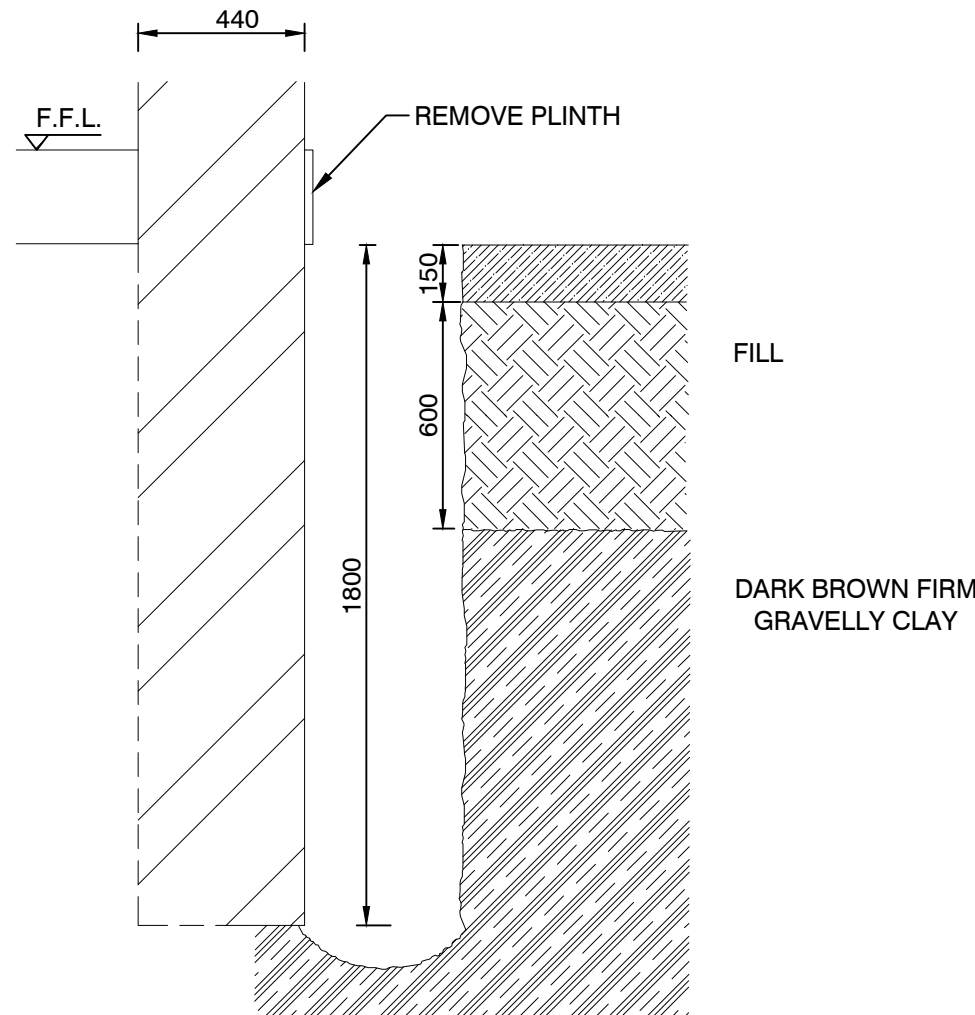
ABP/ G1100 – TP01 Trial Pit Locations & Sections



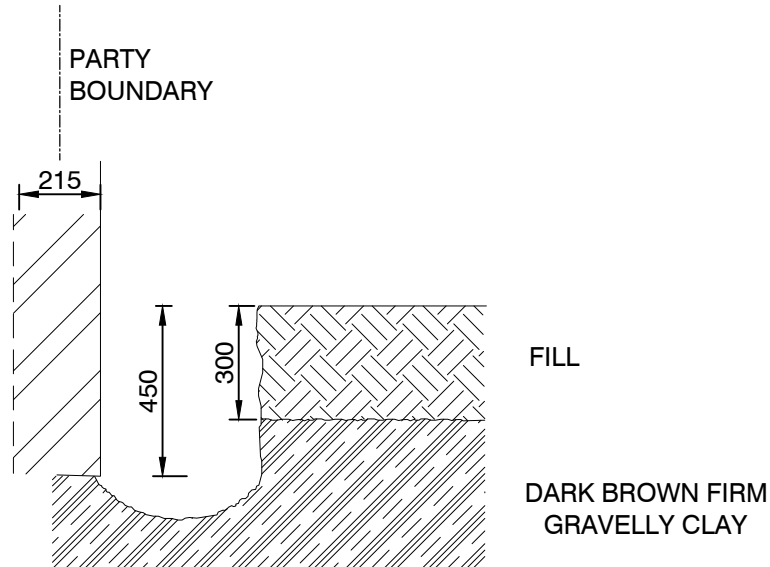
Trial Pit Locations
(Scale 1:50 @ A1)



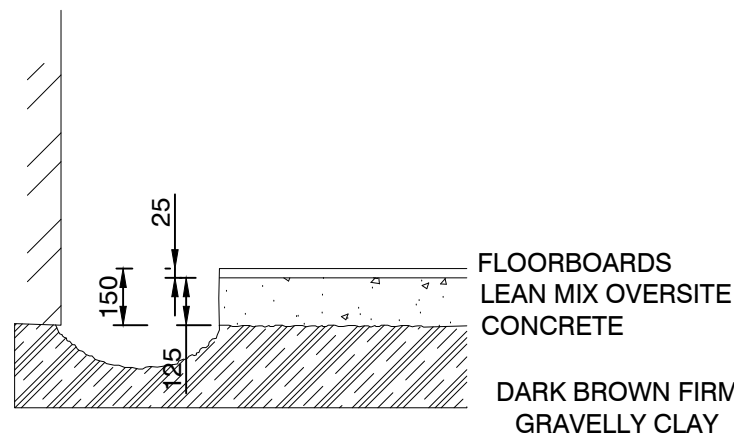
TP01
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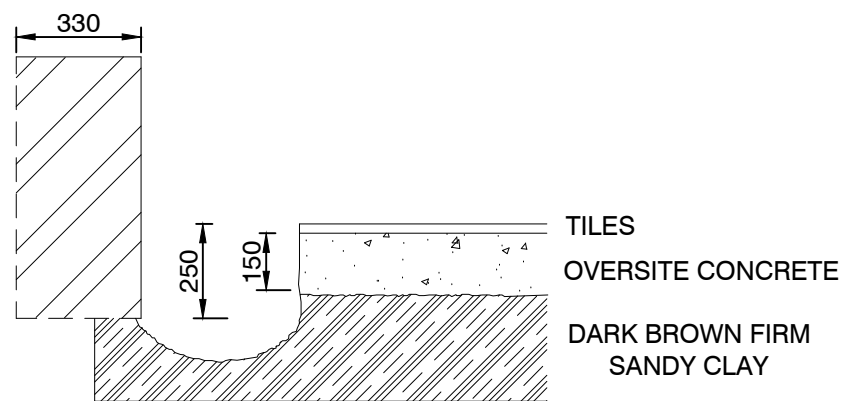
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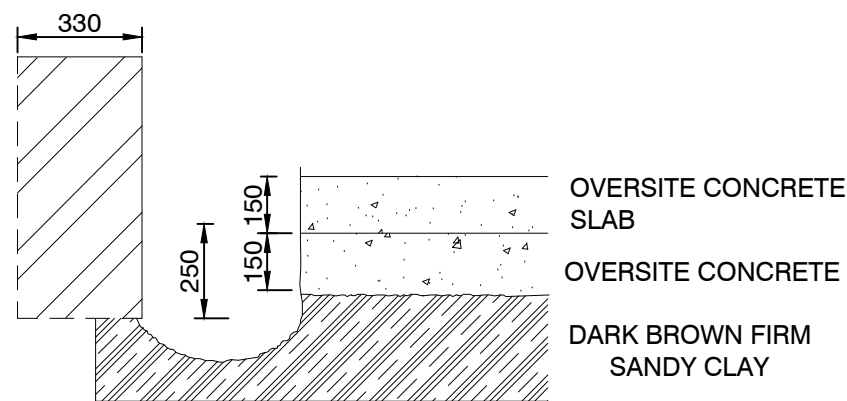
TP03
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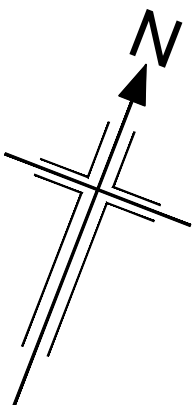
TP04
(SCALE 1:20 @ A1)



TP05
(SCALE 1:20 @ A1)



TP06
(SCALE 1:20 @ A1)



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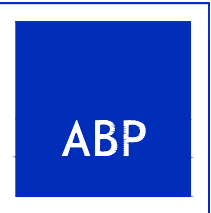
FOR PLANNING

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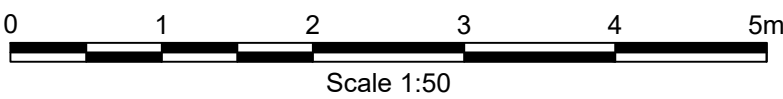
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FAX: 01622 749270
EMAIL: mail@abpengineers.co.uk



Project Title:
59 Petersham Road
Richmond
TW10 6UT

Drawing Title:
Trial Pit Locations & Sections

Scale:	As Shown @A1	Do not scale from drawing
Drawing Number:	G1100-1600-TP01	
Rev:		



APPENDIX B

BELOW GROUND DRAINAGE REPORT

Drain Smart Report Ref: 33822 [6 October 2020]

THE COMPLETE DRAINAGE SERVICE • CCTV CAMERA SURVEYS • STRUCTURAL SOFT FELT LINING
REPAIRS WITHOUT EXCAVATIONS • REFORMING OF PITCH FIBRE PIPES

0800 7 40 80 40

WWW.DRAINSMART.ORG EMAIL: info@drainsmart.org

For the attention of Jon and Angela Earle

59 Petersham Road
Richmond
TW10 6UT

06 October 2020

Our reference: 33822



CCTV CAMERA INSPECTION REPORT

Site Location – 59 Petersham Road, Richmond, TW10 6UT

Further to recent instruction, our engineers attended the above site location to carry out a CCTV camera inspection of the drainage and our findings are as follows:

Commence survey from Manhole 3 up branch connection 1. 100mm earthenware pipework. Duty foul water system.

<u>Distance (m)</u>	<u>Observations & Remarks</u>
0.0	Joint
0.4	Offset joint
0.6	Offset joint
1.3	Offset joint and heavy root penetration
1.6	Circumferential fracture
1.7	Branch connection at 3 o'clock (origin unknown) and circumferential fracture
1.9	Offset joint and bend upwards
2.4	Outlet of ground floor WC

Continue survey from Manhole 3 up branch connection 2 (high level). 100mm earthenware pipework. Duty foul water system.

0.0	Joint
0.1	Circumferential fracture
0.9	Offset joint and heavy debris deposits
1.4	Outlet of Rainwater Gully 1

Continue survey from Manhole 3 downstream. 100mm earthenware pipework. Duty foul water system.

0.0	Joint
0.3	Offset joint
0.6	Circumferential fracture

0.9	Joint
1.6	Offset joint
2.0	Heavy debris deposits
2.1	Offset joint and heavy debris deposits
2.7	Offset joint
3.3	Joint
3.8	Joint
4.5	Joint
5.1	Joint
5.7	Offset joint
6.5	Offset joint
6.8	Offset joint
7.5	Offset joint
8.2	Joint
8.8	Joint
9.4	Offset joint
10.0	Joint and debris deposits
10.6	Joint
11.2	Joint
11.8	Offset joint
12.4	Offset joint
13.0	Joint
13.6	Offset joint
14.1	Offset joint
14.9	Offset joint
15.4	Offset joint and heavy cement intrusion
15.9	Offset joint
16.5	Offset joint
17.1	Offset joint
17.6	Offset joint
18.3	Offset joint
18.8	Offset joint
19.4	Offset joint and water holding in pipework which prevented a full view
19.9	Manhole 4

Continue survey from Manhole 2 upstream. 100mm earthenware pipework. Duty foul water system.

0.0	Joint and bend upwards
0.3	Outlet of soil and vent pipe

Continue survey from Manhole 2 up branch connection. 100mm earthenware pipework. Duty foul water system.

0.0	Joint
0.2	Outlet of yard gully

Continue survey from Manhole 2 downstream. 100mm earthenware pipework. Duty foul water system.

0.0	Joint
0.2	Circumferential fracture

0.9	Offset joint
1.6	Offset joint
2.2	Offset joint
2.8	Offset joint
3.6	Offset joint
4.1	Offset joint
4.7	Offset joint
5.4	Offset joint
6.0	Offset joint
6.6	Offset joint
7.3	Offset joint
7.8	Offset joint and circumferential fracture
8.4	Offset joint
9.0	Joint, slight bend to left and multiple fracturing with pipework on the verge of collapse
9.5	Severe offset joint
10.1	Offset joint
10.7	Offset joint and multiple fracturing
10.8	Branch connection at 9 o'clock to Rainwater Gully 2
11.2	Offset joint and multiple fracturing
11.4	Offset joint and slight bend to right
11.8	Manhole 3

END OF SURVEY

Conclusions and Recommendations

It was apparent from the CCTV camera inspection that the accessible private drainage system is not in a satisfactory structural condition having multiple fracturing on the verge of collapse and heavy root penetration which will be allowing the loss of water into the surrounding ground area. Please note that the root mass in Manhole 4 prevented a survey downstream of this chamber.

The system is also suffering from heavy debris deposits together with cement intrusion which is affecting the free flow of waste through the pipework and prevented a clear view of some sections.

Please note that all of the pipework inspected on the property is private and therefore the responsibility of the homeowner until it passes the boundary line, after which it becomes the ownership of Thames Water and should blockages occur in this section they will attend to clear free of charge.

Our engineers also reviewed the supplied drawing which shows a chamber (Manhole 1) located in the front garden however upon investigation we could not find it and therefore we assume that this was an error.

Whilst the damage discovered in the private system should be repaired, it may be that some of the affected drainage will be replaced as part of the proposed building works or made redundant. Should you require an estimate for any of the necessary repair or cleaning works in the pipework to be retained we will be pleased to provide this upon request.

We do hope that the above meets with your approval but should you have any queries please do not hesitate to contact us.

PLEASE NOTE 1: ALL REPAIR WORKS CARRIED OUT ARE COVERED BY CERTIFIED ENGINEERS AS PART OF THE NATIONAL ASSOCIATION OF DRAINAGE CONTRACTORS (NADC) SCHEME. THIS ENSURES THAT ANY REMEDIAL WORKS MEET THE HIGHEST INDUSTRY STANDARDS AND CARRY OUR 15-YEAR GUARANTEE AGAINST FAULTY WORKMANSHIP AND MATERIALS. PLEASE BEWARE CONTRACTORS WHO ARE NOT NADC CERTIFIED.

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SITE LOCATION
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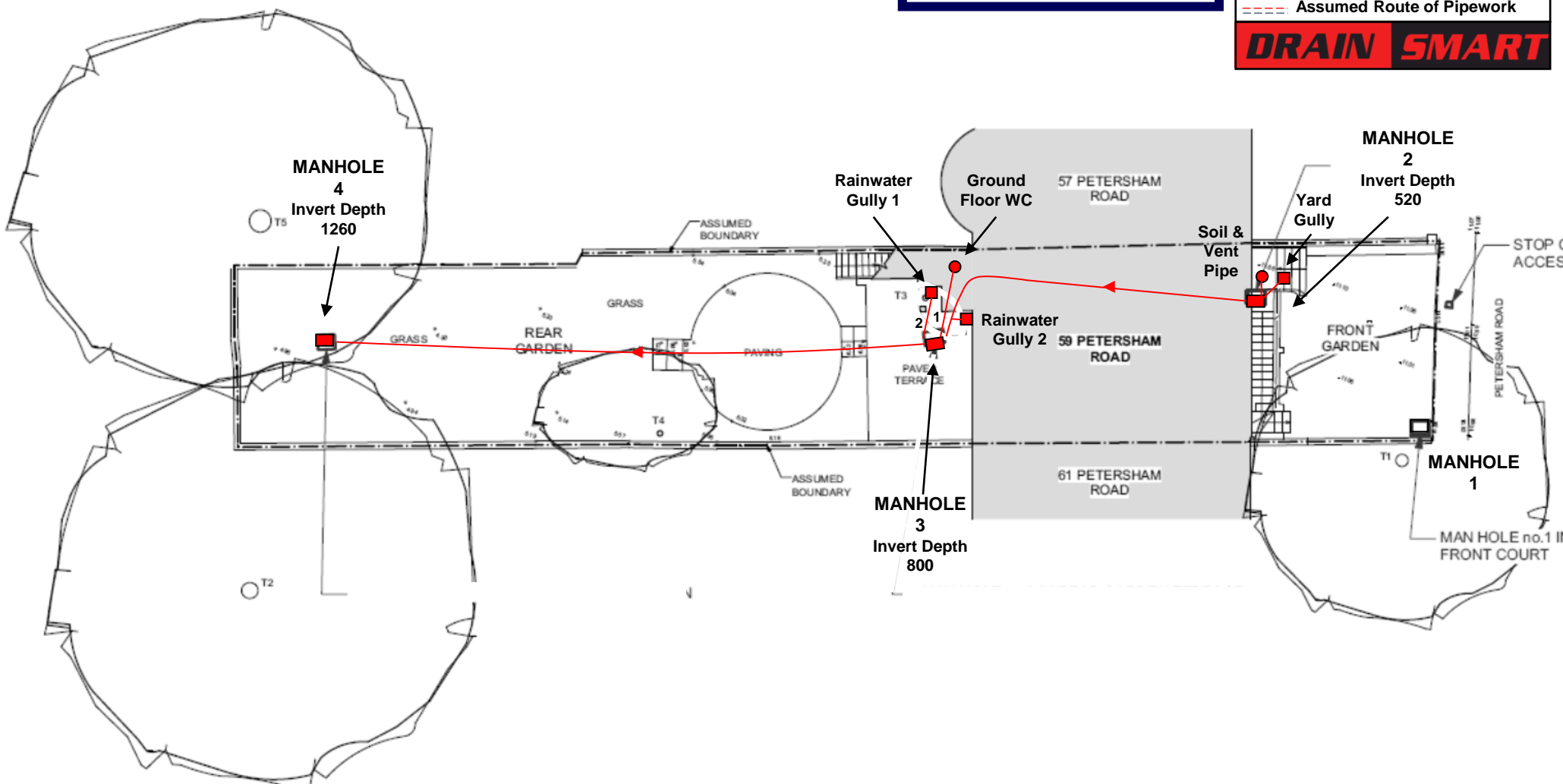


REF: 33822

DRAWING NOT TO SCALE
PLEASE NOTE THAT THE DRAINAGE
ROUTES SHOWN ARE FOR INDICATIVE PURPOSES
ONLY AND ARE NOT TO BE RELIED UPON

Key-
— Foul Water System
— Surface Water System
--- Assumed Route of Pipework

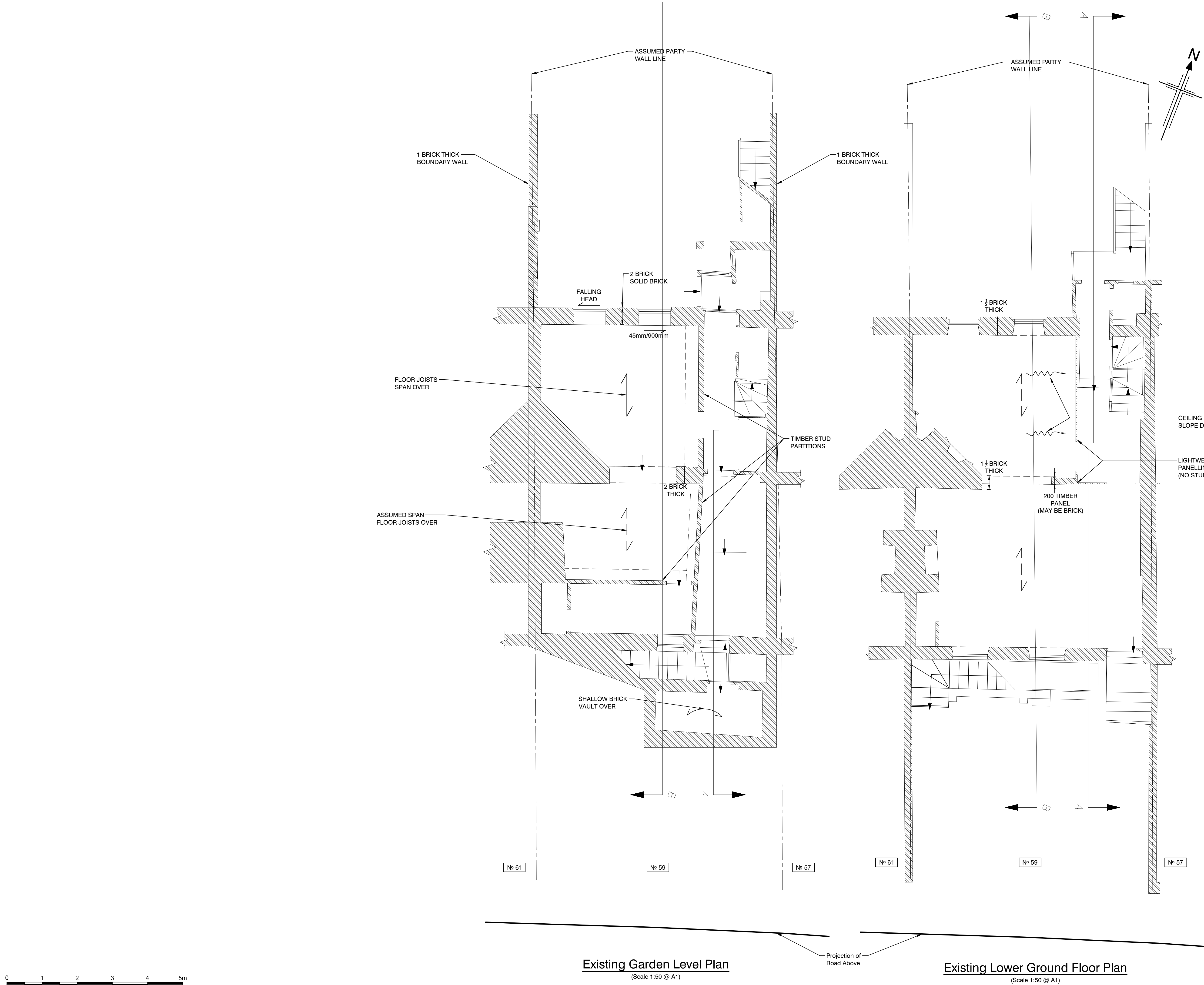
DRAIN SMART



APPENDIX C

EXISTING STRUCTURE PLANS & OBSERVATIONS

ABP/	G1100-1600-001	Existing Garden & L Ground Flr Level Plan
	G1100-1600-002	Existing U Ground, 1 st & 2 nd Floor Plan
	G1100-1600-003	Existing Roof Plan
	G1100-1600-004	Existing Section A-A
	G1100-1600-005	Existing Section B-B



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WESTONS POINT BOATYARD
TURKS LANE
POOLE
DORSET BH14 8EW

TELEPHONE: 01202 748712
FAX: 01622 749270
EMAIL: mail@abpengineers.co.uk

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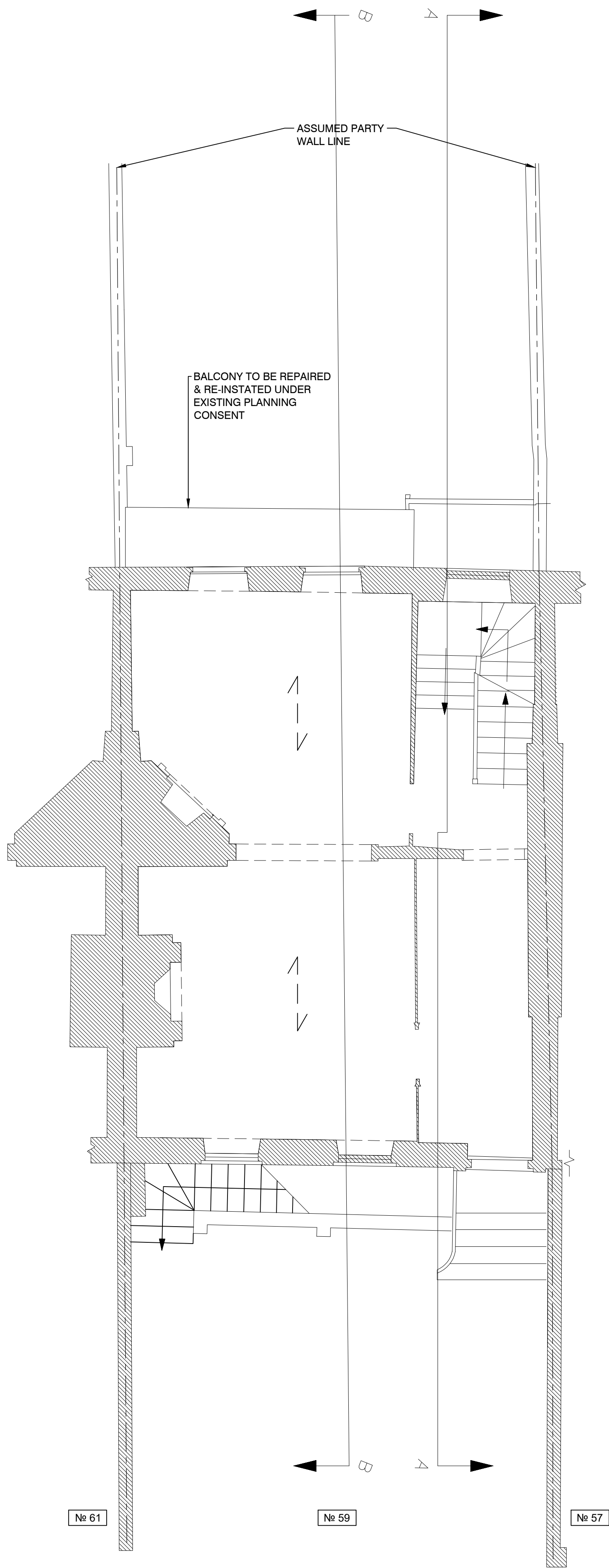
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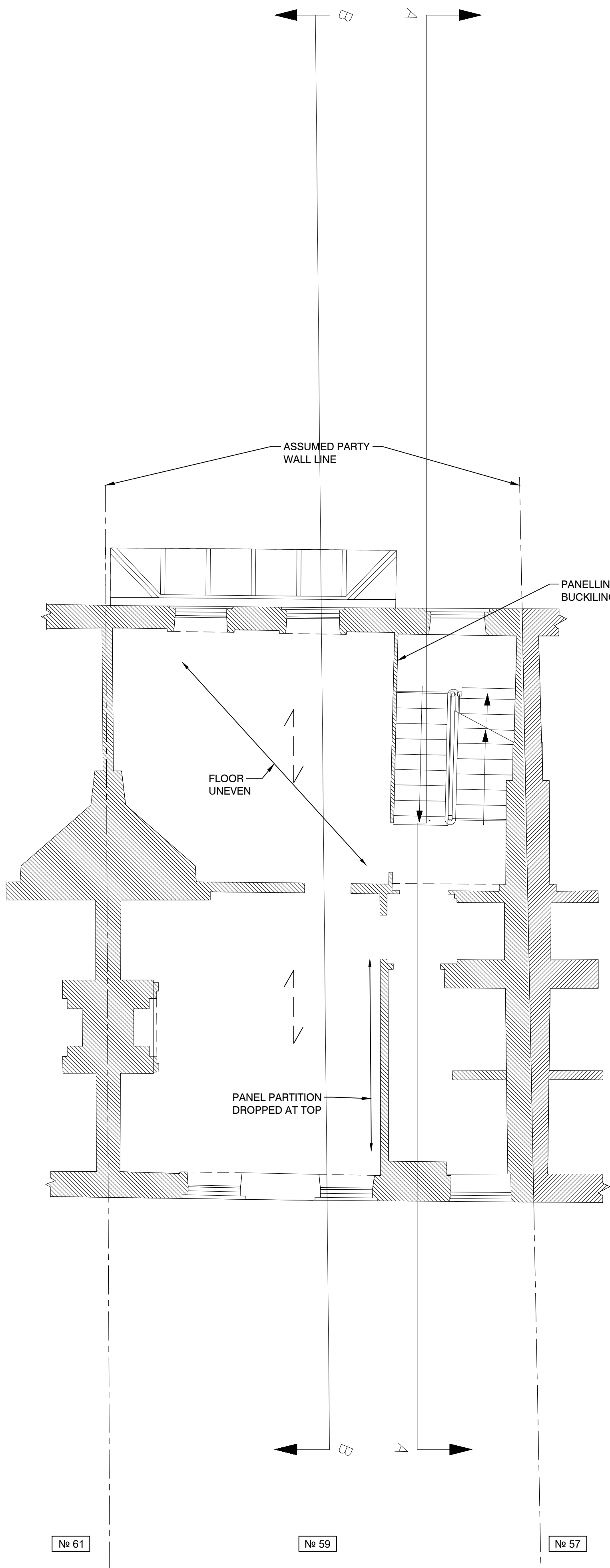
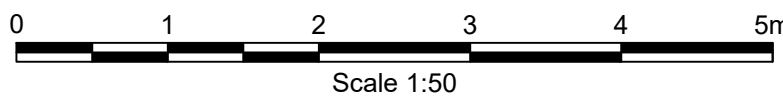
Existing Garden and
Lower Ground Floor Level Plan

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Drawing Number:	G1100-1600-001	Rev:



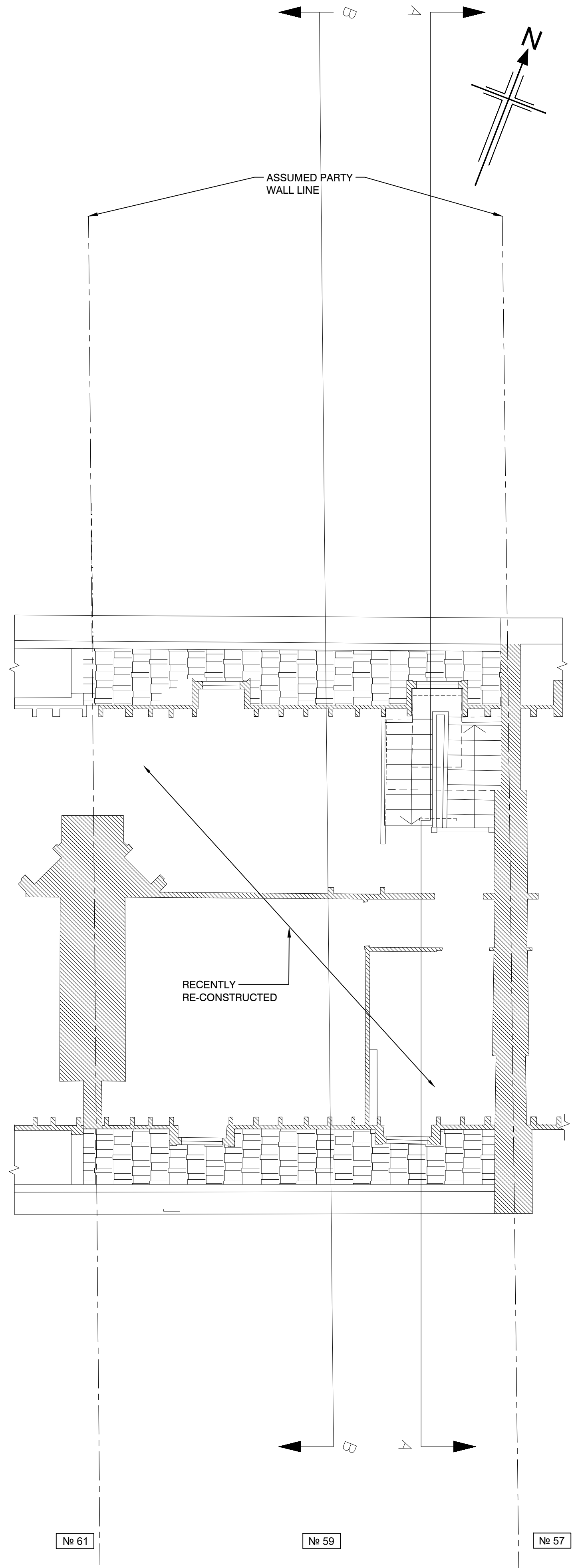
Existing Upper Ground Floor Plan

(Scale 1:50 @ A1)



Existing First Floor Plan

(Scale 1:50 @ A1)



Existing Second Floor Plan

(Scale 1:50 @ A1)

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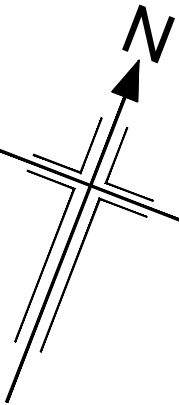
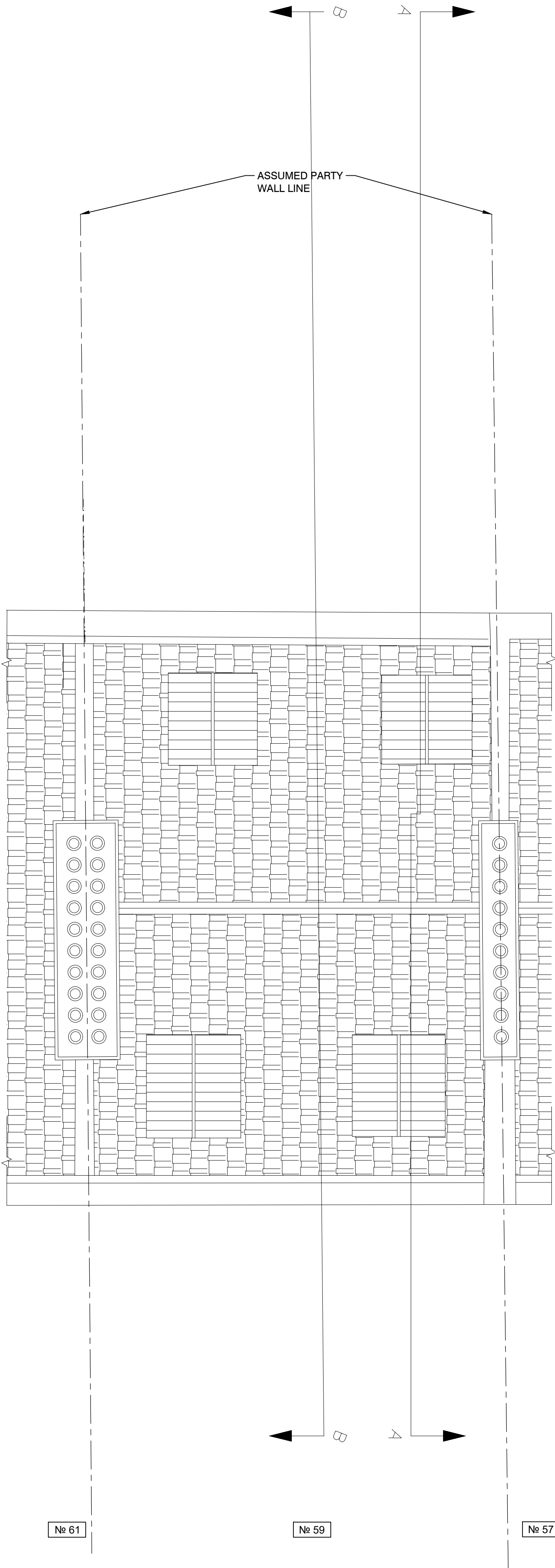
TELEPHONE: 01202 748712
FAX: 01622 749270
EMAIL: mail@abpengineers.co.uk

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Project Title:
**59 Petersham Road
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TW10 6UT**

Drawing Title:
**Existing Upper Ground, First and
Second Floor Plan**

Scale: As Shown @A1	Do not scale from drawing
Drawing Number: G1100-1600-002	Rev:



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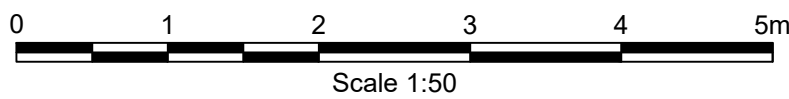
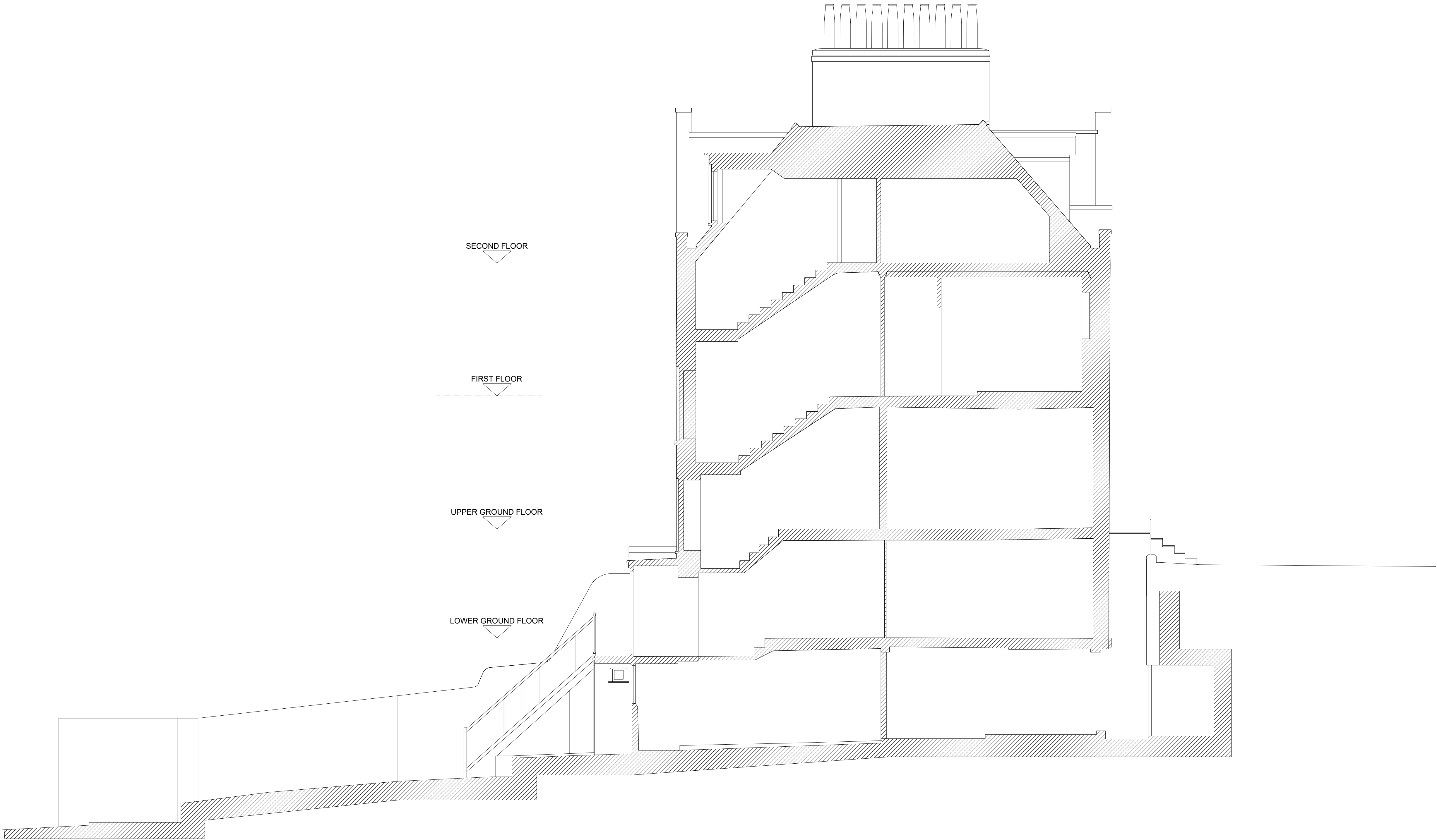
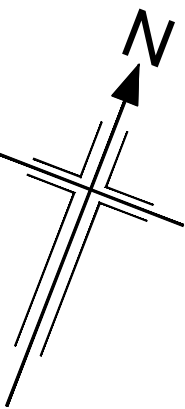
Project Title:

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Richmond
TW10 6UT

Drawing Title:

Existing Roof Plan

Scale:	As Shown @A1	Do not scale from drawing
Drawing Number:	G1100-1600-003	Rev:



Existing Section A-A
(Scale 1:50 @ A1)

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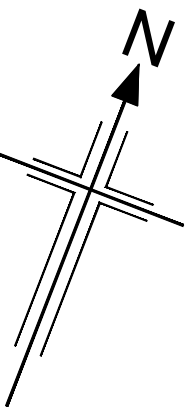
Project Title:

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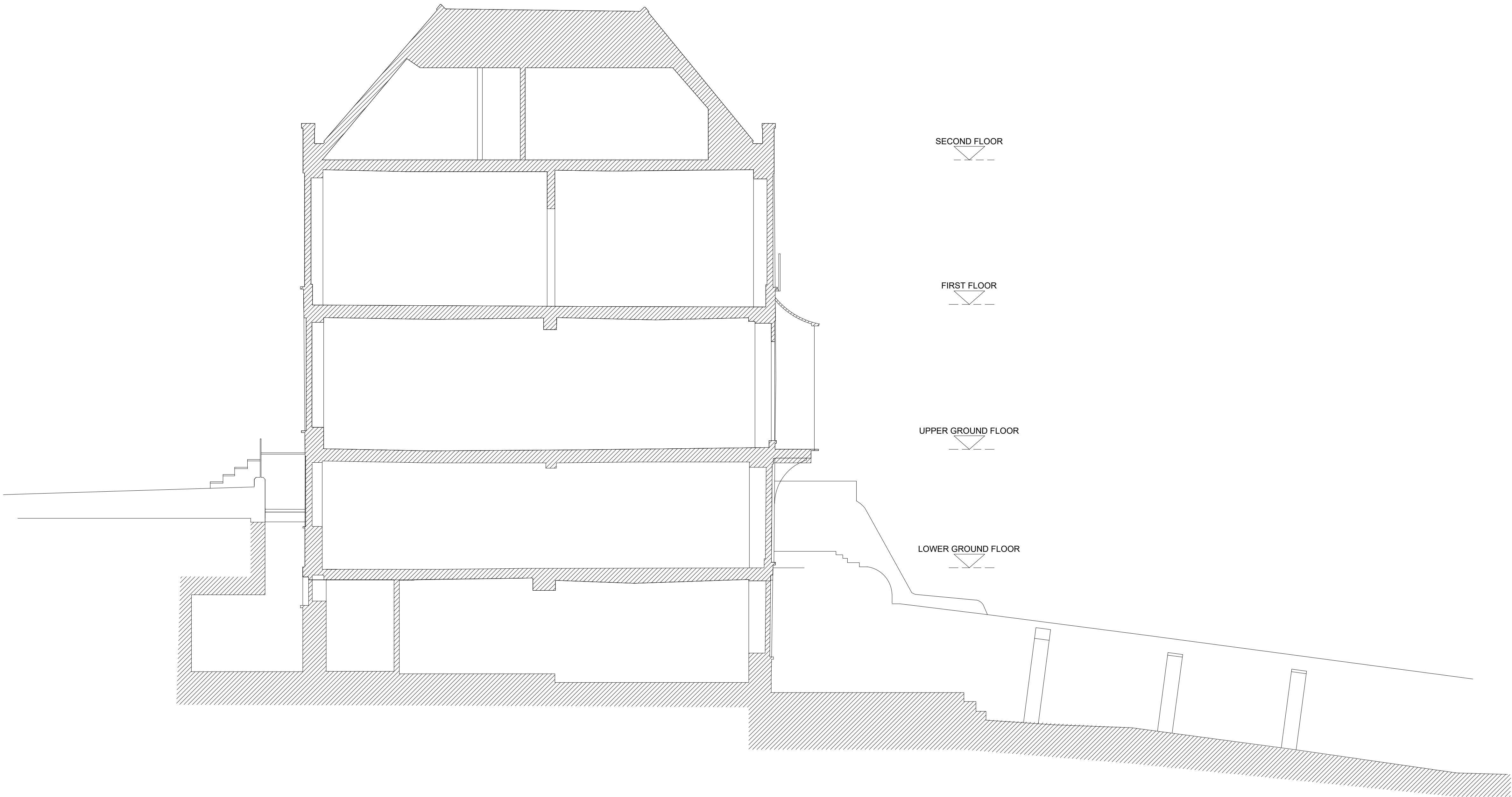
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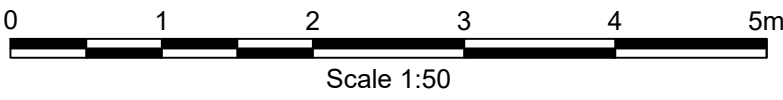
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Existing Section B-B
(Scale 1:50 @ A1)



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Drawing Title:

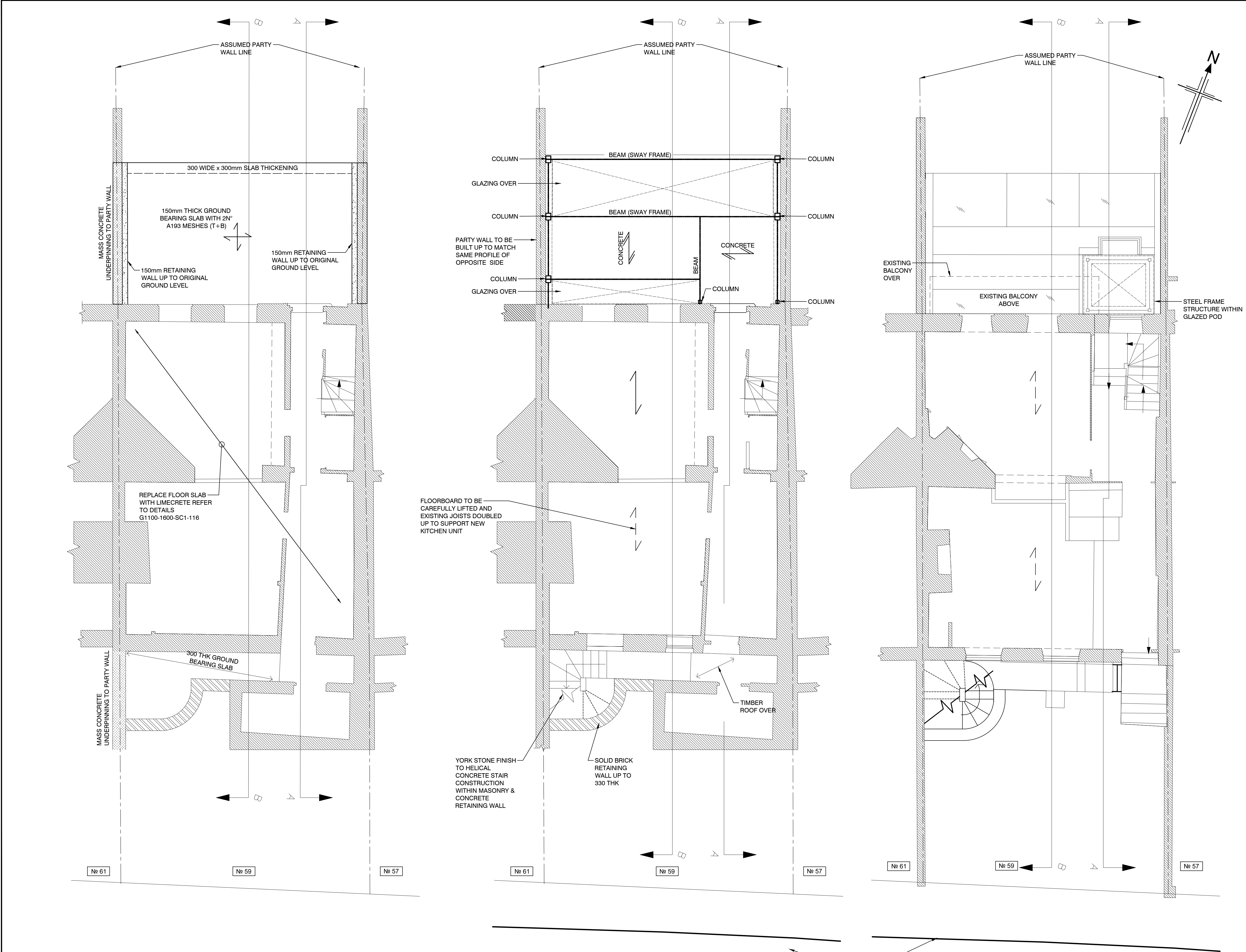
Existing Section B-B

Scale:	As Shown @A1	Do not scale from drawing
Drawing Number:	G1100-1600-005	Rev:

APPENDIX D

PROPOSED PLANS

G1100-1600-SC1-111	Proposed Rear Garden & L Ground Flr Level Plan
G1100-1600-SC1-112	Proposed U Ground, 1 st & 2 nd Floor Plan
G1100-1600-SC1-113	Proposed Roof Plan
G1100-1600-SC1-114	Proposed Section A-A
G1100-1600-SC1-115	Proposed Section B-B
G1100-1600-SC1-116	Suggested Underpinning Sequence & Sections



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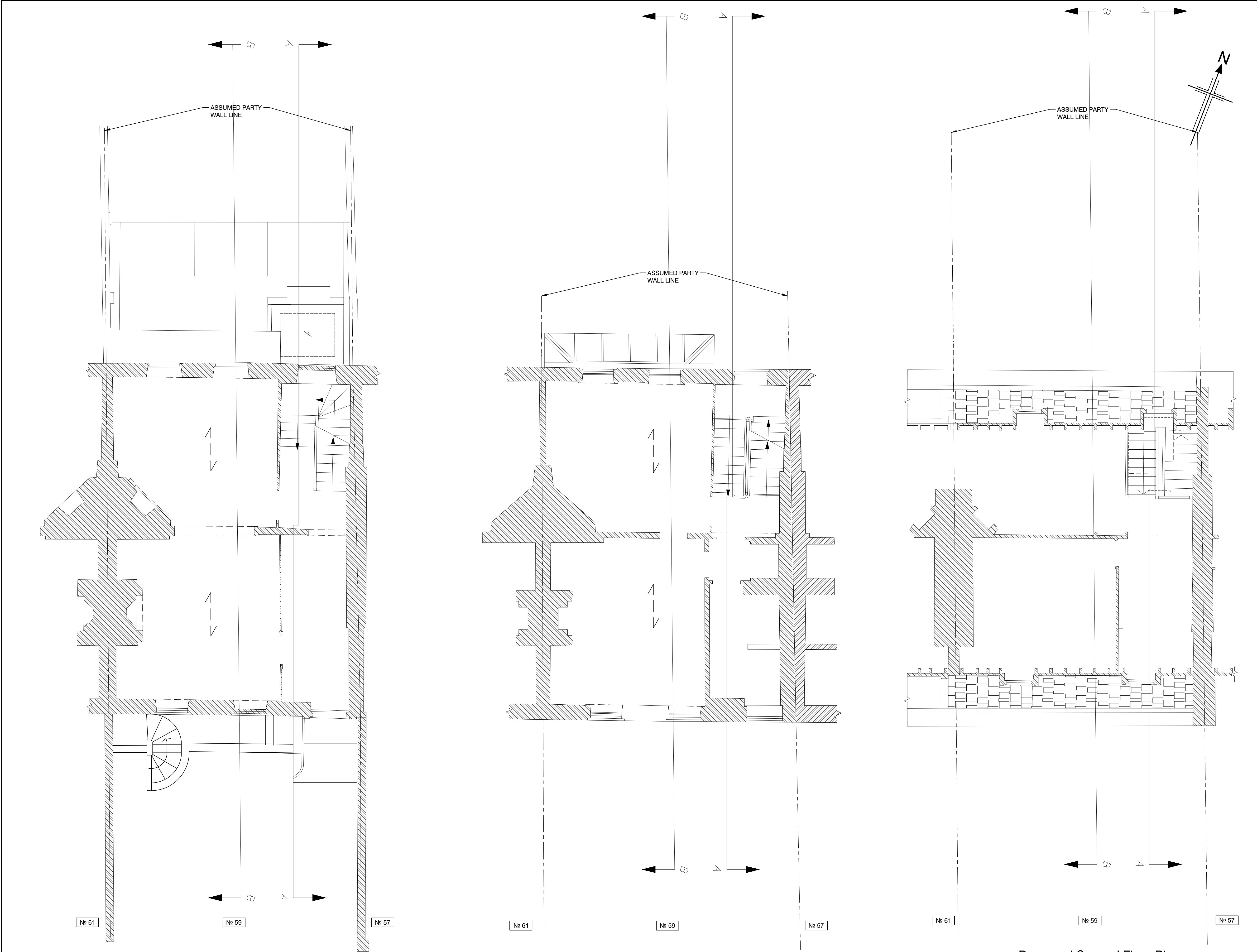
Project Title:

59 Petersham Road
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Drawing Title:

Proposed Rear Garden and
Lower Ground Floor Level Plan

Scale:	As Shown @A1	Do not scale from drawing
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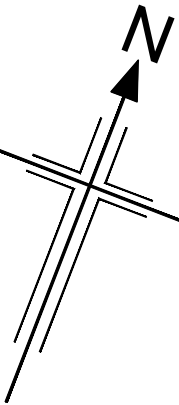
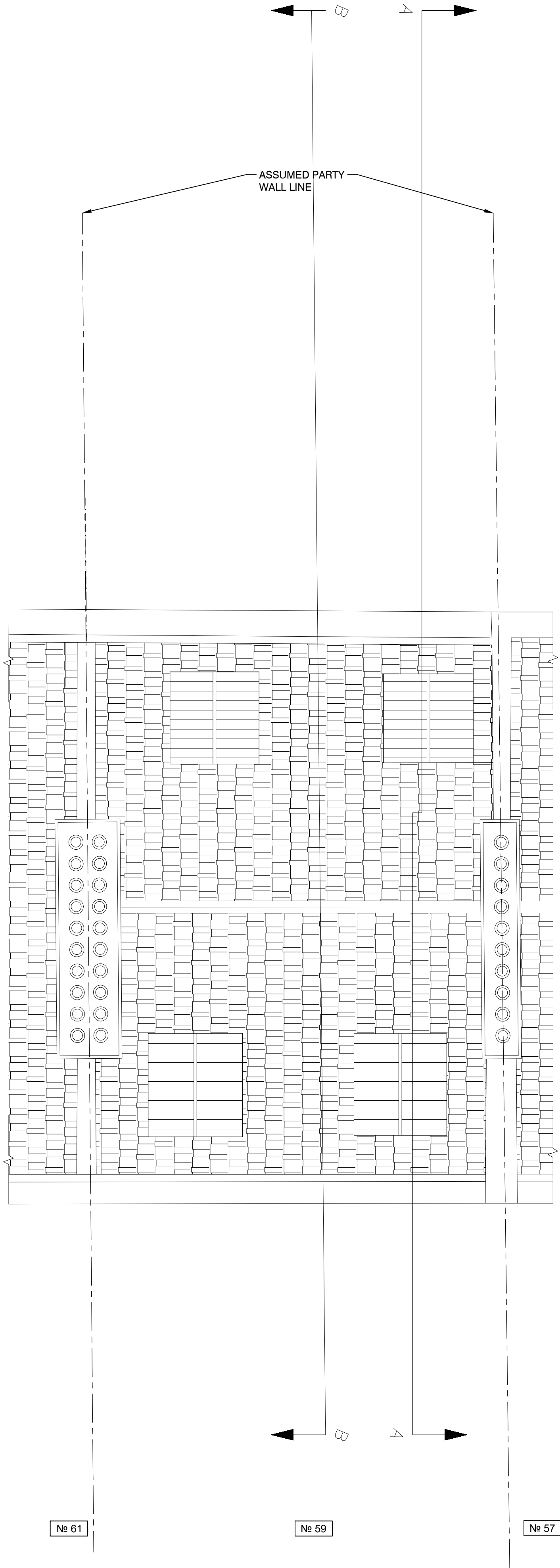
Project Title:

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Drawing Title:

Proposed Upper Ground, First and Second Floor Plan

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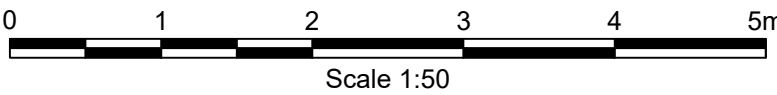
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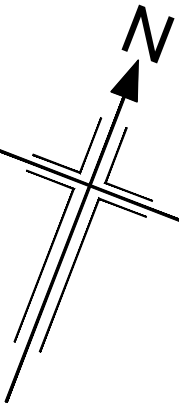
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Proposed Roof Plan

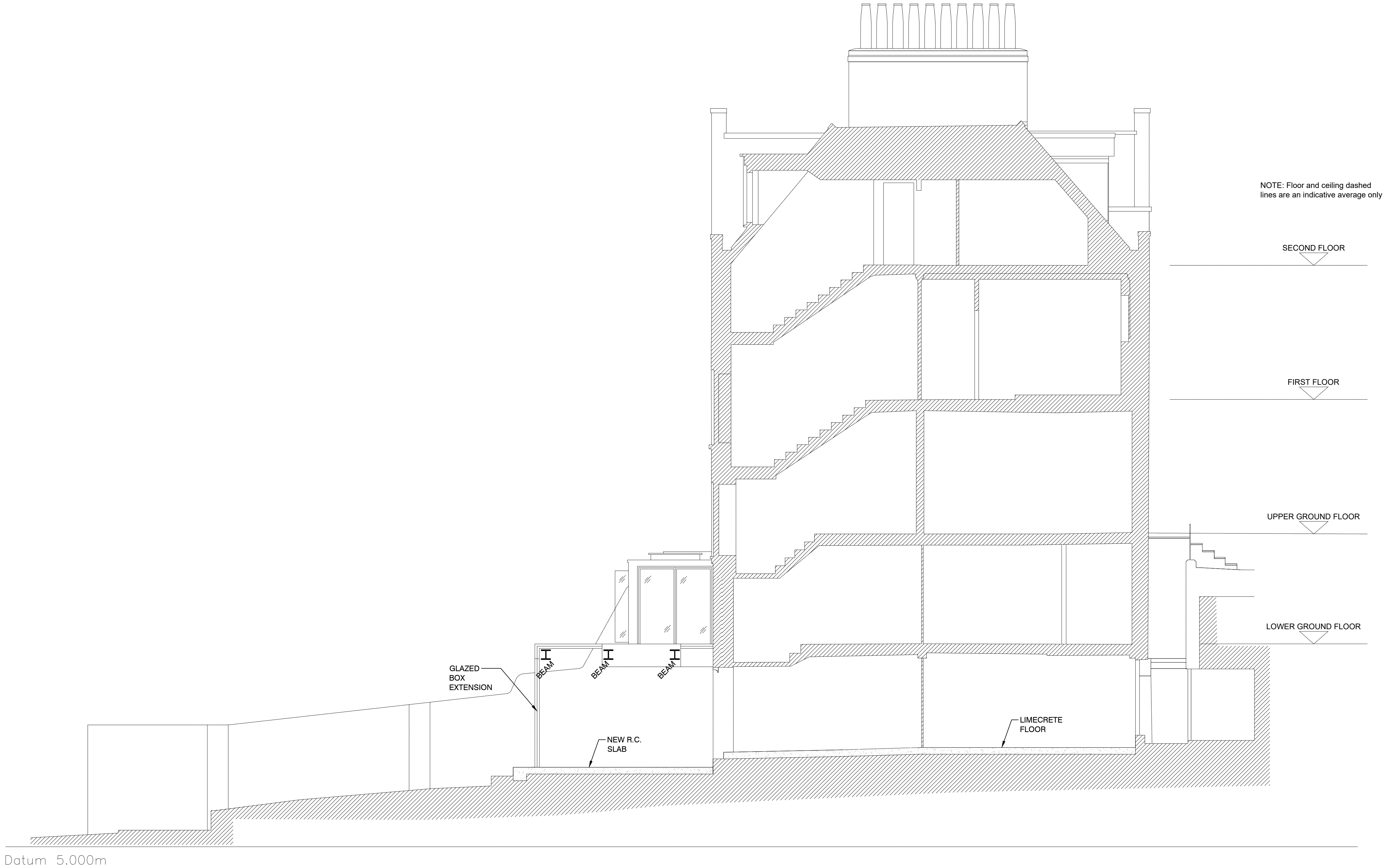
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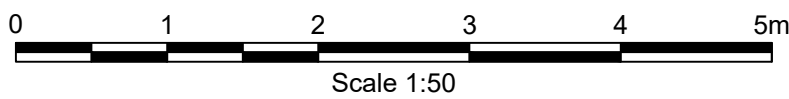
Existing Roof Plan
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Proposed Rear Section A-A
(Scale 1:50 @ A1)



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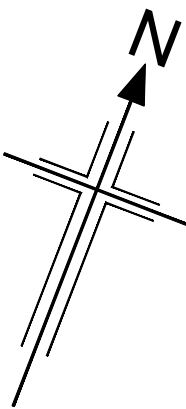
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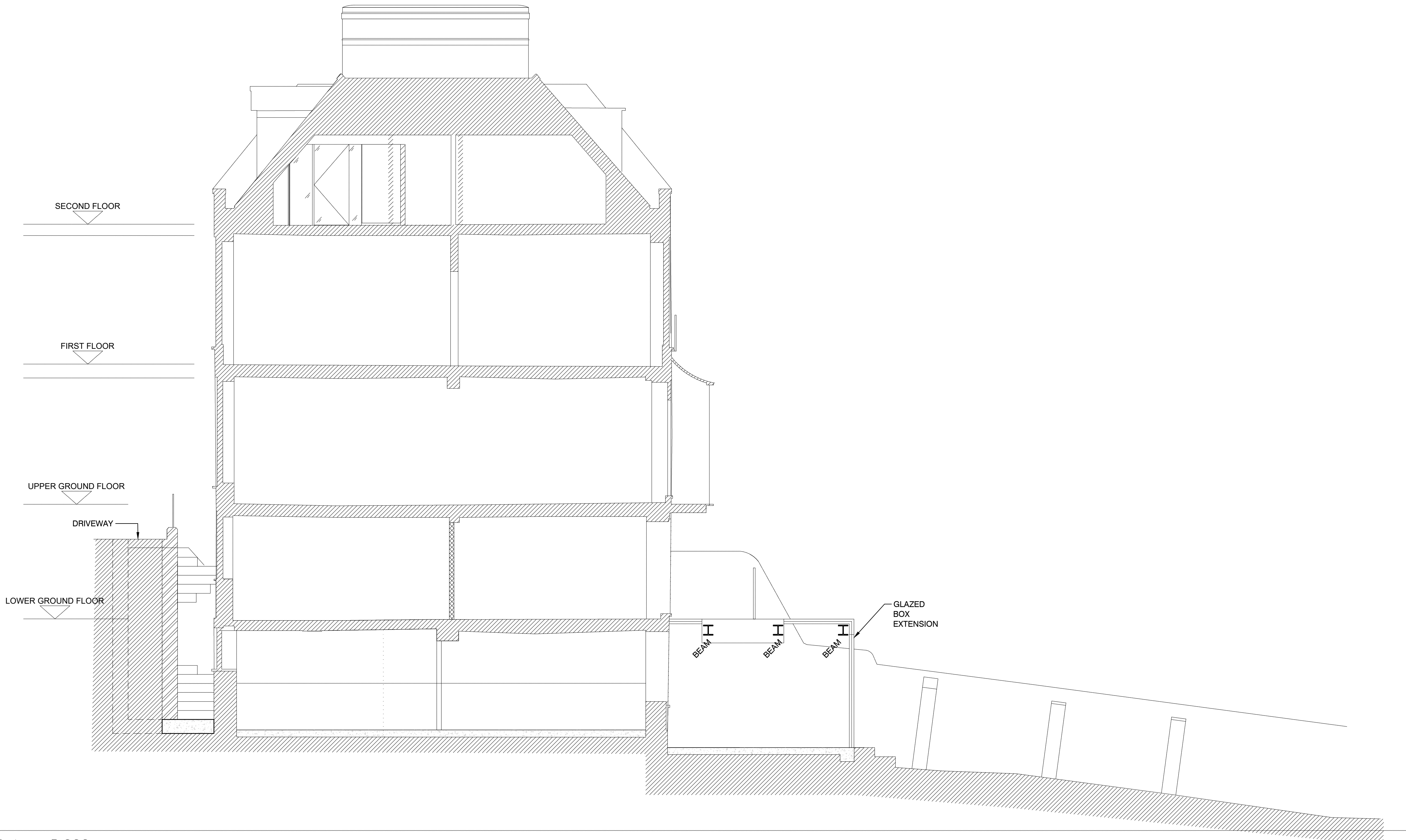
Drawing Title:

Proposed Section A-A

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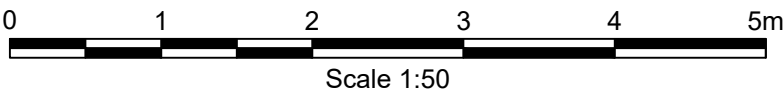
Project Title:

59 Petersham Road
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Drawing Title:

Proposed Section B-B

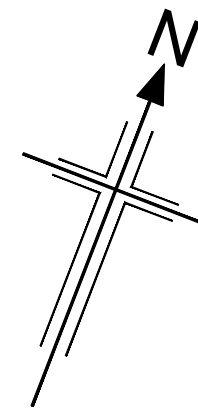
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Drawing Number:	G1100-1600-SC1-115	Rev: -



Proposed Rear Section B-B
(Scale 1:50 @ A1)

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MAXIMUM OF 2 N° DRILLING SITES AT ANY TIME WHEN INSTALLING THE DOWELS INTO THE EXISTING PARTYWALL

CONTRACTOR TO CONFIRM THE LOCATION OF ALL BELOW GROUND SERVICES AND CAP / RE-ROUTE / RE-LAY AS REQUIRED

BACK FACE OF UNDERPINNING WALLS TO HAVE CEMENTBOARD FACING NEIGHBORING PROPERTIES.

TRIM CORNERS OF GULLEYS/ MANHOLES WITH H 10 BARS

NOTE: RC MANHOLES TO BE CAST WITH SLAB

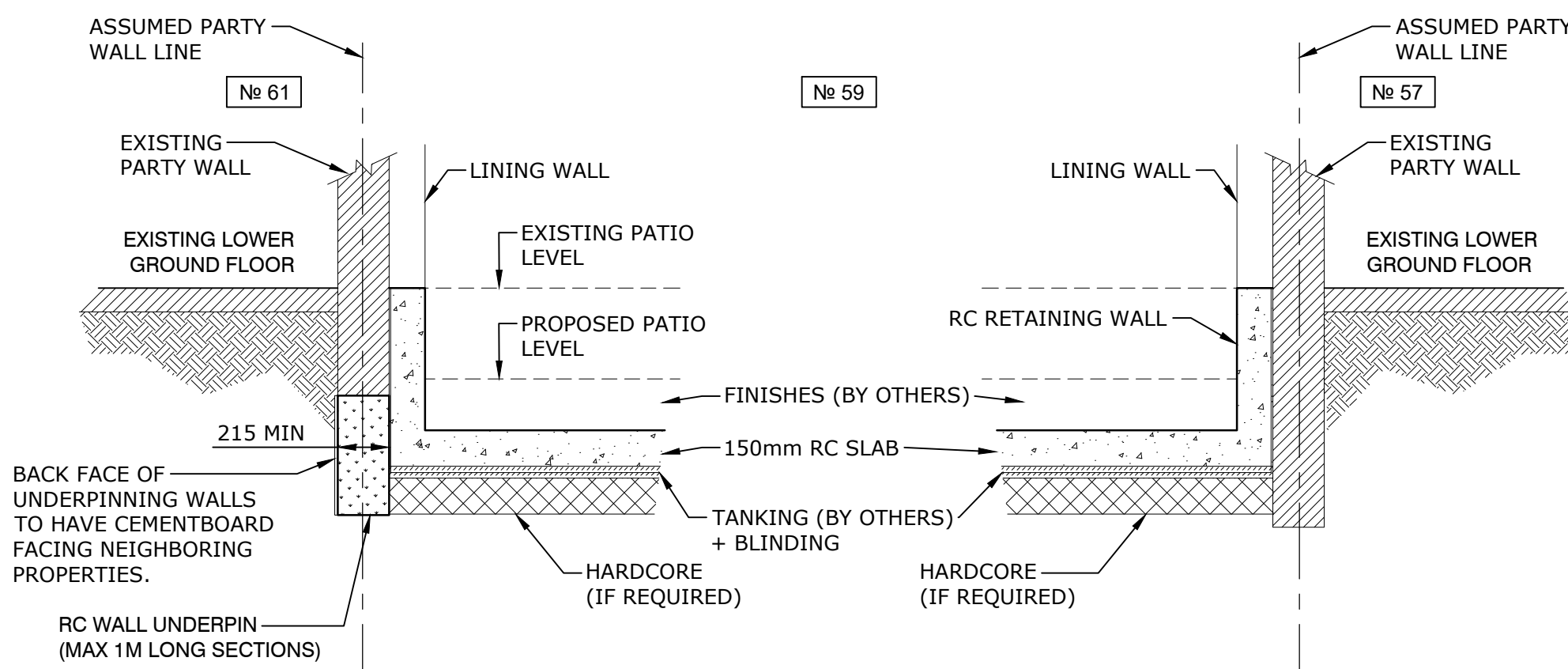
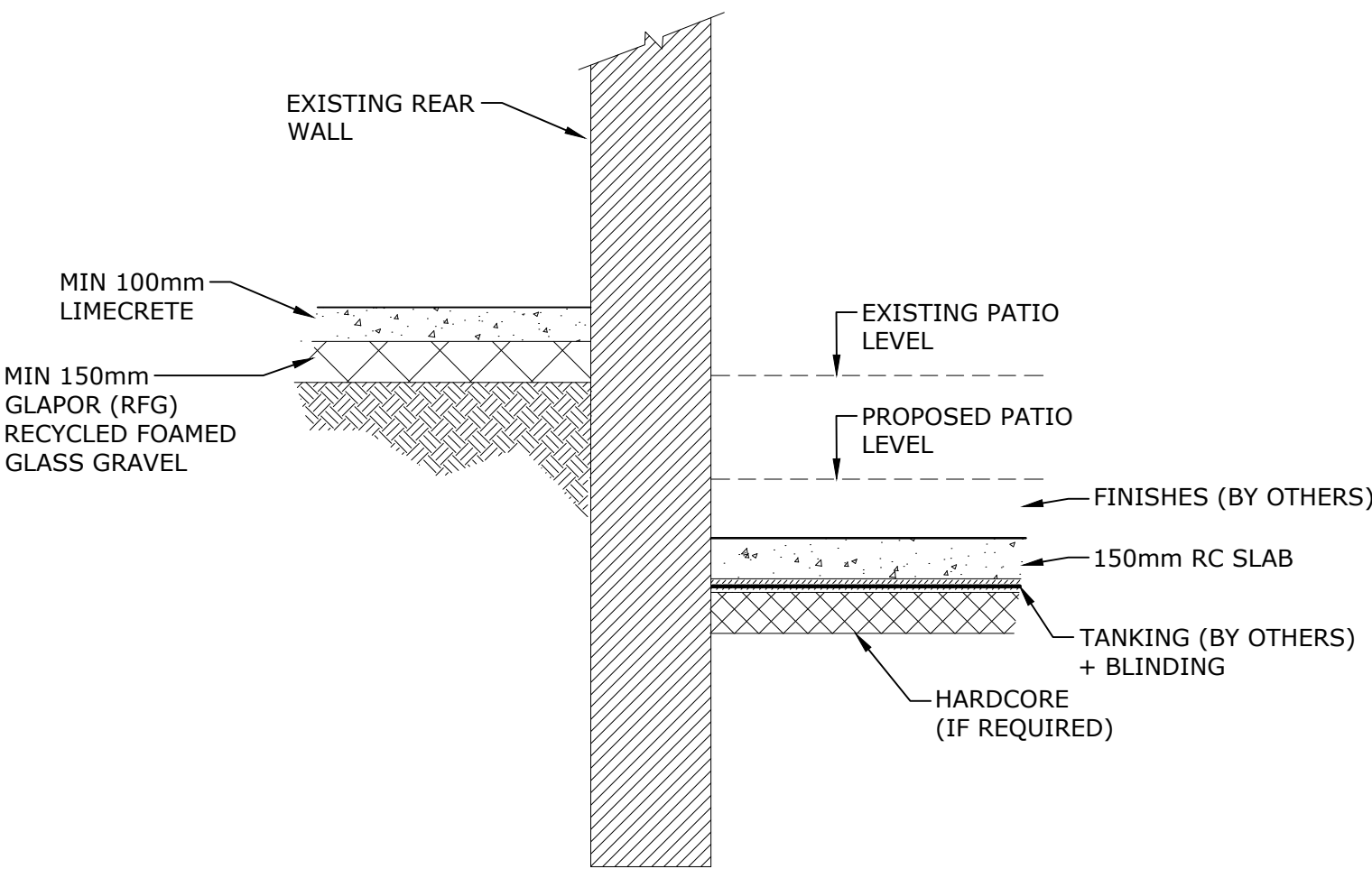
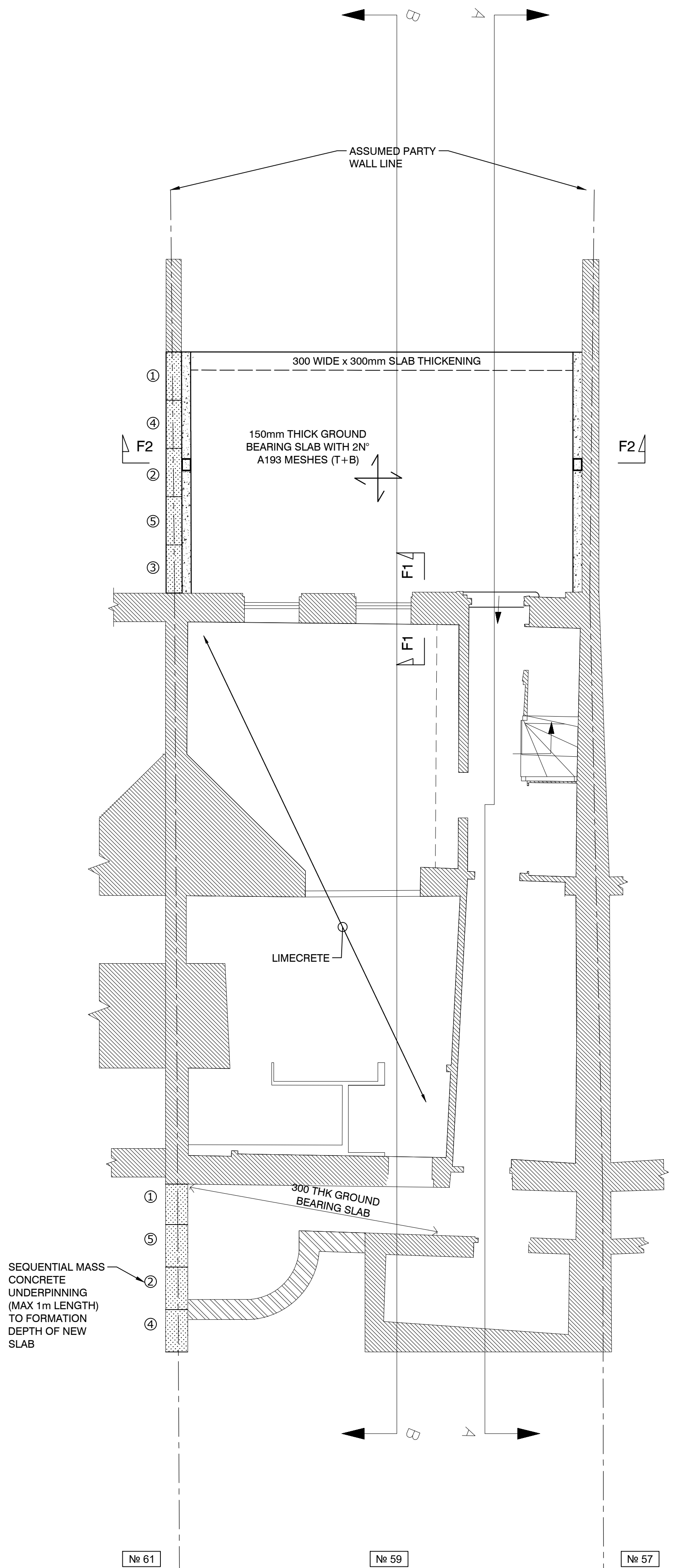
NOTE: ALL DRAINAGE BELOW SLAB TO BE SUSPENDED FROM SOFFIT OF SLAB AND CAST IN SITU. ROCKER PIPES TO BE PROVIDED AT EDGE OF SLAB TO DETAILS BY ARCHITECT.

ASSUMED SEQUENCE OF UNDERPINNING CONSTRUCTED IN 1.0m WIDE SECTIONS

① DENOTES SEQUENCE OF UNDERPINNING

— DENOTES R.C. WALLS

▨ DENOTES MASS CONCRETE UNDERPIN



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Drawing Title:
**Suggested Underpinning
Sequence and Sections**

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Drawing Number: G1100-1600-SC1-116	Rev: -