



9 WOODLAND RISE

LONDON N10 3UP

STRUCTURAL METHODOLOGY STATEMENT

**PREPARED FOR
MS HAAGENSEN & MR LACAZE**

Date: OCTOBER 2022

**Ref: 18523 Rev A
Prepared by: DO**

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Contents

1	Brief	3
2	Screening	4
3	Site Investigation	5
4	Basement Information.....	8
5	Construction Sequence.....	9
6	Ground Movement & Predicted Damage Category	10
7	Monitoring.....	12
8	Waterproofing	12
9	Party Walls.....	12
10	Temporary Works.....	13
11	Appendix A - Drawings	14

1 Brief

- 1.1 The Structural Engineering design brief was to produce a structural methodology statement and a feasibility study into the demolition and re-construction of a residential property at 9 Woodland Rise, London, N10 3UP.
- 1.2 The existing site is a broadly rectangular shaped plot of land with an existing three-storey dwelling with a loft space and a garden at the rear of the property. The proposed works will involve the demolition of the existing house, followed by construction of a replacement dwelling to include a basement level below what is currently the ground floor. The basement will extend beyond the current footprint at the rear, and will also include a lightwell to the front of the house. The lightwell will extend up to the rear edge of the public footpath which runs along Woodland Rise.
- 1.3 This report is to be read in conjunction with the following reports and drawings:
- GEA Basement Impact Assessment Ref. J21267, October 2021
 - Halstead Associates Drawing No. 18523/PL01A, Basement Proposed Plan, October 2022
 - Halstead Associates Drawing No. 18523/PL02A, Proposed Ground Floor Plan, October 2022
 - Halstead Associates Drawing No. 18523/PL03A, Proposed Basement Sections, October 2022
 - Halstead Associates Drawing No. 18523/PL04A, Suggested Construction Sequence, October 2022
- 1.4 A small footprint basement exists under the ground floor hallway and extends under the study and WC. The current headroom is approximately 2.1-2.2 metres. The new floor-to-ceiling height is proposed at 2.8 metres. As part of the demolition works the basement will be removed and replaced with a new reinforced concrete slab and wall structure.

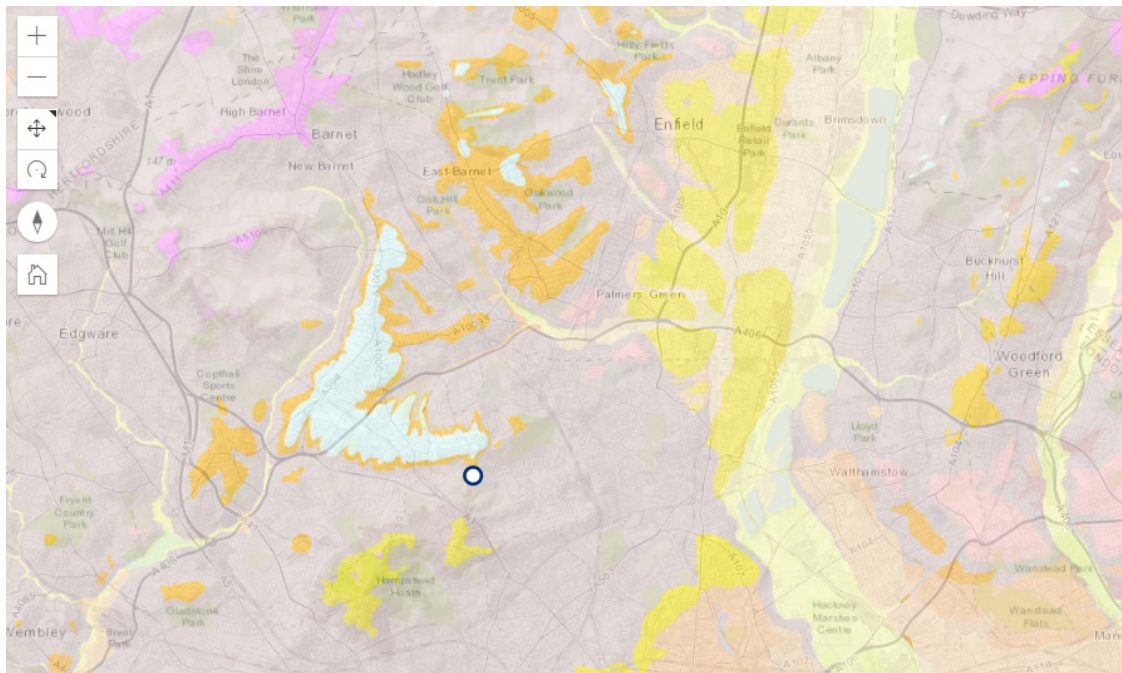
2 Screening

2.1 Structural Stability Screening Assessment

I.	Does the proposed basement involve underpinning of the existing building?	Yes
II.	Does the proposed basement extend lower than the adjacent structure to the right?	Yes
III.	Does the proposed basement extend lower than the Party Wall to the left?	Yes
IV.	Does the proposed basement extend below the Party Wall footing level to the right?	Yes
V.	Does the proposed basement extend lower than the building structure to the left?	Yes
VI.	Does the proposed basement undermine the public highway?	Yes

3 Site Investigation

- 3.1 This assessment has been informed by the results of a Basement Impact Assessment with associated geotechnical testing prepared by GEA dated October 2021.
- 3.2 The British Geological Survey indicates that the site is directly underlain by solid deposits of the London Clay Formation, with potentially sacrificial deposits of made ground (historically shown to be up to 1.8m deep). London Clay is suitable as a load bearing strata.



British Geological Survey extract

- 3.3 London Clay is a generally stable material and not typically prone to collapse in short term excavations. Notwithstanding, in line with good construction practice, temporary shoring will be required in all underpinning excavations below the existing building.
- 3.4 The London Clay will be suitable as a foundation bearing strata for the new basement, as has been proven with numerous similar developments in the North London area with which Halstead Associates have been involved.
- 3.5 Section 3.1.1 of the GEA report identifies the risk of any adverse groundwater conditions as low. Whilst small pockets of groundwater are often present in London Clay, they are not typically associated with extensive groundwater flows. In such instances, the volume of water is usually low and slow moving owing to the cohesive nature of the soil. Excavations for the underpinning would not, therefore, be impacted by groundwater, with any inflows being controlled by localised pumping.
- 3.6 Due to the presence of overconsolidated soil below the site, a suitably designed basement slab will be required to resist heave pressures. In the proposed arrangement, (see the drawings in the Appendix) the basement slab will be designed to span between points of vertical restraint i.e. perimeter walls and internal pad and strip foundations which support steel columns and loadbearing walls above. A mesh of steel reinforcement within the top face of the basement floor structure will assist the concrete in spanning between points of restraint. Under positive (downward) design loads the basement slab will bear directly onto the stiff London Clay.
- 3.7 Given the proximity of the adjoining properties, it will not be possible for excavations to be battered back to a safe angle. A suitable temporary propping scheme and method of working has been considered to account for this. Please refer to the scheme drawings in Appendix A for further details. The specific sequencing of the underpinning will be confirmed by the appointed contractor and agreed with the Structural Engineer prior to works commencing on site.

- 3.8 The basement formation at 9 Woodland Rise will not adversely impact the site, providing adequate measures are taken to protect the surrounding structures during construction. These measures will include temporary shoring to the party walls of both adjoining properties and adopting a sequential construction of the perimeter basement walls as highlighted on the appended drawings. This approach will restrict the extent of excavation at any one time (typically limited to 20-25% of any individual length of wall) and thus minimise the risk structural instability due to wholesale undermining.
- 3.9 The proposed excavation for the front lightwell will be less than 1m from the back edge of the public footway. Notwithstanding, as the lightwell is of small plan area and is to be excavated and constructed in discrete sections, the works are not considered to be a risk to the stability of the footway or the road.
- 3.10 The party wall on the left hand side of the property is shared with No. 7 Woodland Rise and will need to be underpinned. Underpinning will take the form of a reinforced concrete retaining wall with integral base. The design will account for vertical loads from the wall itself, as well as lateral forces applied from soil, water and surcharge loads. On the right hand side, the party wall is shared with No. 11 Woodland Rise and a similar design approach to the left hand party wall will be required.
- 3.11 The retaining walls and the individual wall pins are expected to be designed as cantilever retaining walls to resist overturning and sliding in both temporary and permanent loading condition. An allowance is to be made for the water pressure from the retained ground (reduced in the temporary condition to allow for pumping any water out from the excavations during construction).

4 Basement Formation

- 4.1 Given the proximity to adjacent properties, it is expected that the walls of the new basement extension will be formed in an underpinning type sequence. This will involve carrying out local excavations of around 1.0 -1.2m in width and down to the formation level of the new basement, followed by fixing of reinforcement within the excavations and then casting of concrete to form individual retaining wall sections integral with their bases.
- 4.2 The sequencing of this work would be such that no more than 20-25% of a single wall elevation would be excavated at any given time. At the required excavation depth, suitable shoring would be required to provide a safe working area for site operatives. Typical sequencing for the excavation of a wall section is shown on Drawing No. 18523/PL04.
- 4.3 At the expected depth required for the excavation, it is likely that temporary shoring to the retaining wall sections will be required in the short term in order to prevent overturning and/or sliding, until the basement slab has been installed.
- 4.4 Works to form the basement will be carried out following demolition of the existing building. A level working platform at existing ground level will therefore be available. Whilst it would be possible to work from within the existing lower ground area, a greater level of temporary shoring may be required and as such consideration will be given to an approach which involves filling the lower ground area to create the level working platform referred to above.
- 4.5 At an approximately 3.50m depth down to formation level, heave forces caused by the removal of overburden are not expected to be significant on the basis that there are no undue delays in the construction program. Nevertheless, any theoretical heave pressures are to be accounted for in the detailed design by the inclusion of anti-heave boarding under the slab or alternatively by designing the rebar in the top surface of the slab to resist these forces.
- 4.7 The Contractor will provide a method statement prior to commencement of work on site in which full details of hours, site set up and method for the formation of reinforced underpinning sections will be detailed.

5 Construction Sequence

5.1 The following construction sequence is envisaged, which will be agreed with the main contractor prior to any works commencing on site:

- Staged demolition of the existing house. During demolition temporary shoring to be installed to brace the party walls on both sides of the site.
- Fill existing basement area to form level working platform at existing ground floor level.
- Underpin the perimeter walls in reinforced concrete, making allowance for the front elevation pins to be linked to the new lightwell retaining wall along the front property line. Limit the width of the individual pin sections to maximum 1.2m in width. Suggested hit-and-miss sequence is shown on drawing 18486/PL01 in Appendix A. Backfill once each pin is completed.
- Excavate internally to cast strip footings under loadbearing masonry walls. Build up walls to underside of ground floor level.
- Install new beams and floor structure at ground floor level. The completed structure will provide horizontal propping to the perimeter walls, most notably along the party wall lines on the left and right hand side of the plot.
- Carry out bulk excavation for the new basement. In the event that the detailed basement wall design requires temporary lateral propping to resist overturning and/ or sliding, excavate and cast the basement slab in discrete sections in order to retain overall ground stability.
- Reinforced concrete basement slab to provide permanent propping to perimeter retaining walls and to be tied into perimeter walls to form a monolithic concrete box.
- Completion of the structure to ground floor level will provide a platform from which the structure to the floors above can be built.

6 Ground Movement & Predicted Damage Category

- 6.1 Any ground works pose an elevated risk to adjacent properties. The proposed works undermines the adjacent property along the Party Wall line.
- 6.2 It is not expected that any cracking will occur during the works. However, our experience informs us that there is a risk of movement to the neighbours.
- 6.3 Whilst there is a level difference of approximate 3.0m between the foundations, the adjacent houses are in excess of 100 years old and any settlement which may have occurred due to consolidation of the founding strata would have taken place during the early years of the life of the building.
- 6.4 To reduce the risk to the development:
- Employ a reputable firm for extensive knowledge of basement works.
 - Employ suitably qualified Consultants. Halstead Associates have extensive experience with basement constructions.
 - Design the underpins to be suitably propped during construction until permanent props are in place.
 - Provide method statements for the Contractors to follow.
 - Investigate the ground
 - Record and monitor the external properties. This would be done by a condition survey under the Party Wall Act before and after the works are completed.

6.5 The maximum level of cracking anticipated is Fine cracking which can be made good with decorative repairs by the appointed contractor. Under the Party Wall Act damage is allowed (although unwanted) to occur to a neighbouring property as long as repairs are suitably undertaken to rectify this. To mitigate this risk, the Party Wall Act is to be followed and Halstead Associates can be appointed to act in this respect.

6.6 Burland Scale:

Extract from The Institution of Structural Engineers “Subsidence of Low-Rise Buildings”
Classification of visible damage to walls with particular reference to type of repair and rectification consideration.

Category of damage	Approximate crack width	Limiting tensile strain	Definitions of cracks & repair types / considerations
0	Up to 0.1	0.0 – 0.05	HAIRLINE – Internally cracks can be filled or covered by wall covering and redecorated. Externally, cracks rarely visible & remedial works rarely justified
1	0.2 to 2	0.05 – 0.075	FINE – Internally cracks can be filled or covered by wall covering, and redecorated. Externally, cracks may be visible, sometimes repairs required for weather tightness or aesthetics. NOTE: Plaster cracks may, in time, become visible again if not covered by a wall covering.

7 Monitoring

- 7.1 Any visual movement monitoring, level of monitoring and reporting strategy required will be agreed subject to a Party Wall Surveyor's consultation before the works commence on site.

8 Waterproofing

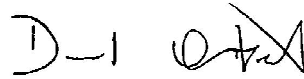
- 8.1 As this form of construction will not allow external damp proofing systems to be employed, it is envisaged that the Architect will opt for a proprietary drained cavity system to line the face of the retaining wall and slab. Any inflow of ground water which may result would then be directed to an internal sump and then pumped as necessary into the surface water system.

9 Party Walls

- 9.1 Given the proximity of adjacent buildings, Party Wall Agreements will be required with neighbouring property owners on both sides of the site. Halstead Associates will work with the appointed Party Wall Surveyors to address queries arising prior to the Agreements being concluded.

10 Temporary Works

- 10.1 A competent Contractor, experienced in this form of residential basement construction must be used, and a Temporary Works Coordinator should be employed to ensure that the stability of the ground and adjoining buildings is maintained throughout the construction process. As highlighted previously, temporary shoring is expected to be required both at demolition stage and during the formation of the basement.
- 10.2 Significant propping of the existing structure will be required and as such will require careful consideration to ensure the safety of site operatives during construction.
- 10.3 Whilst suggestions have been provided with this document for the sequencing of the works, it will be the responsibility of the Contractor and Temporary Works co-ordinator to provide detailed proposals for the methodology for the Structural Engineer and design team to review.

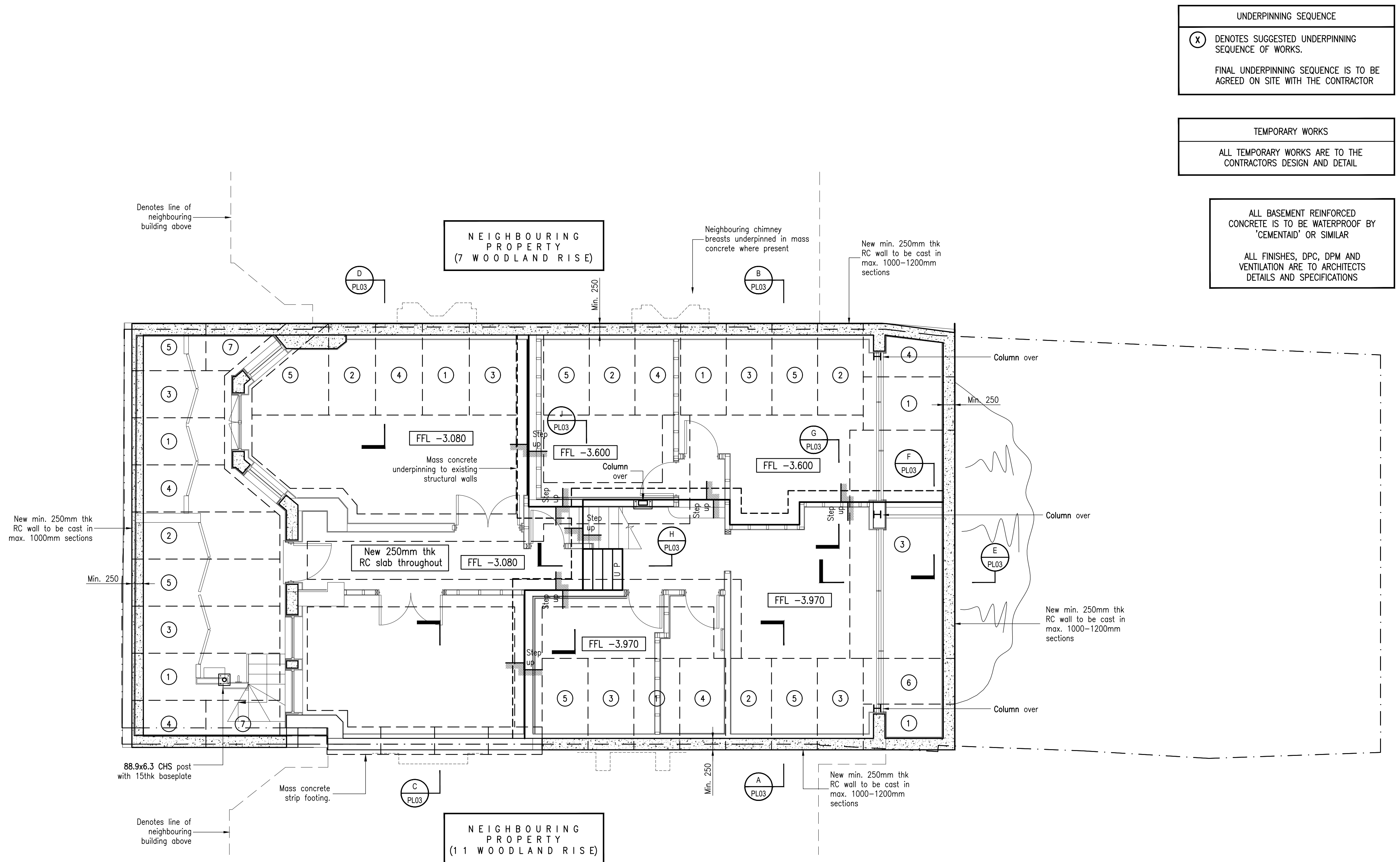


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David Oates CEng BEng (Hons) MStructE

11 Appendix A - Drawings

Halstead Associates Drawing No:

- 18523/PL01A
- 18523/PL02A
- 18523/PL03A
- 18523/PL04A



UNDERPINNING SEQUENCE

(X) DENOTES SUGGESTED UNDERPINNING SEQUENCE OF WORKS.

FINAL UNDERPINNING SEQUENCE IS TO BE AGREED ON SITE WITH THE CONTRACTOR

TEMPORARY WORKS

ALL TEMPORARY WORKS ARE TO THE CONTRACTORS DESIGN AND DETAIL

ALL BASEMENT REINFORCED CONCRETE IS TO BE WATERPROOF BY 'CEMENTAID' OR SIMILAR

ALL FINISHES, DPC, DPM AND VENTILATION ARE TO ARCHITECTS DETAILS AND SPECIFICATIONS

BASEMENT FLOOR PLAN
SCALE 1:50

Rev.	Date	Revisions	By	Engineer
A	27.10.22	Updated to Suit New Build Scheme	KS	DO

Notes:
1. The drawing is to be read in conjunction with all relevant Consultant's drawings and specifications.

Key:
1. Denotes Section
Denotes Drawing Number

PRELIMINARY

Project: 9 WOODLAND RISE, LONDON, N10 3UP	Drawn by: BA
Title: BASEMENT FLOOR PLAN	Checked by: DO
Client: Ms Haagensen & Mr Lacaze Architect: XUL Architecture	Date: October 2021
Scale: 1:50 @ A1	Drawing No: 18523/PL01
halstead ASSOCIATES CONSTRUCTION CONSULTANTS t. 020 8445 7721 1 Athenaeum Road Whetstone London N20 9AA e. office@halsteads.co.uk w. www.halsteads.co.uk	A

TEMPORARY WORKS

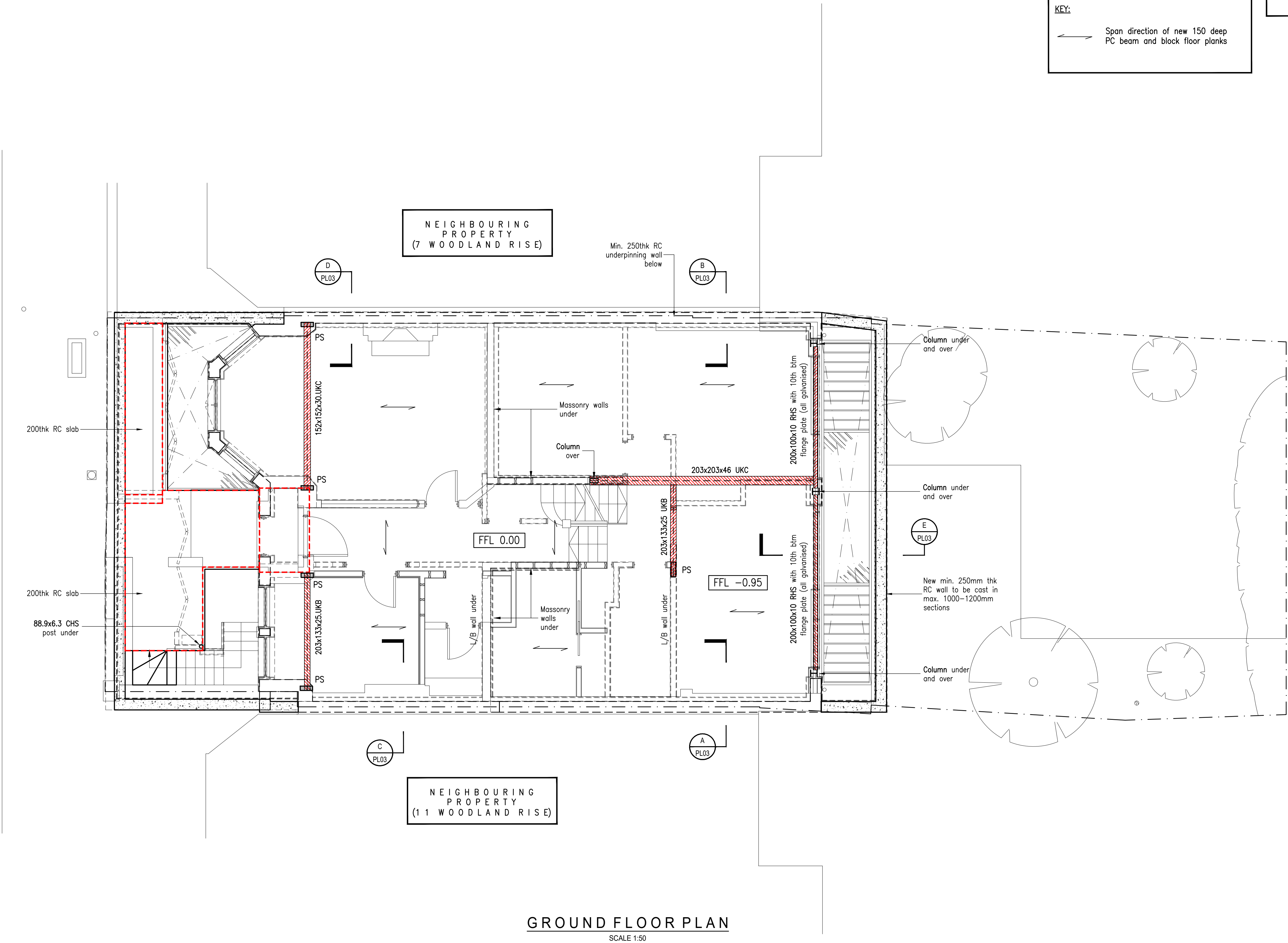
ALL TEMPORARY WORKS ARE TO THE CONTRACTORS DESIGN AND DETAIL

NOTE

CONTRACTOR TO VERIFY ARRANGEMENT/BUILD UP OF EXISTING STRUCTURAL ELEMENTS E.G. SPANS OF FLOOR JOISTS PRIOR TO ORDERING MATERIALS. HALSTEAD ASSOCIATES TO BE NOTIFIED OF ANY DEVIATIONS FROM ASSUMED LAYOUTS TO ALLOW FOR DESIGN AMENDMENTS TO BE MADE

KEY:

Span direction of new 150 deep PC beam and block floor planks



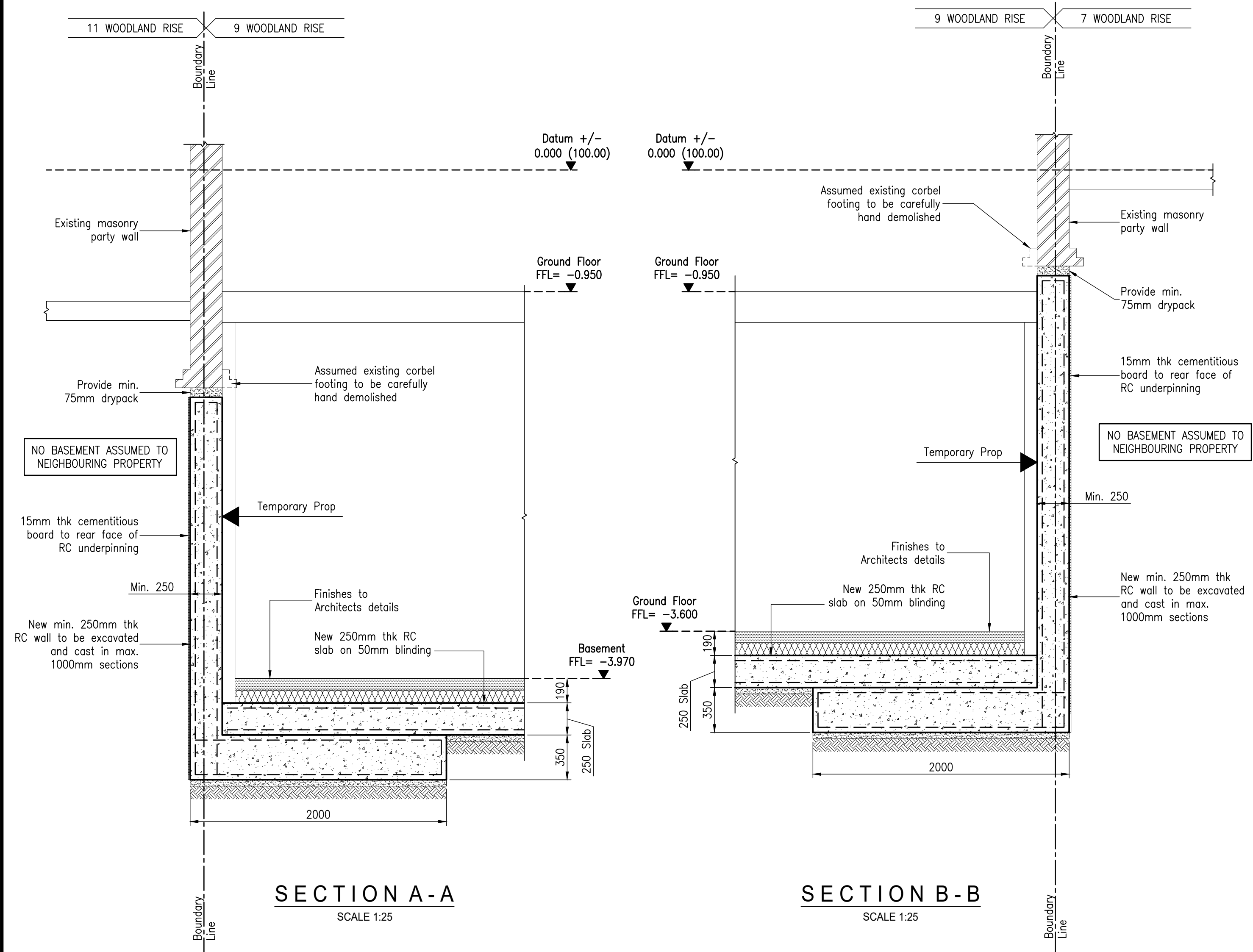
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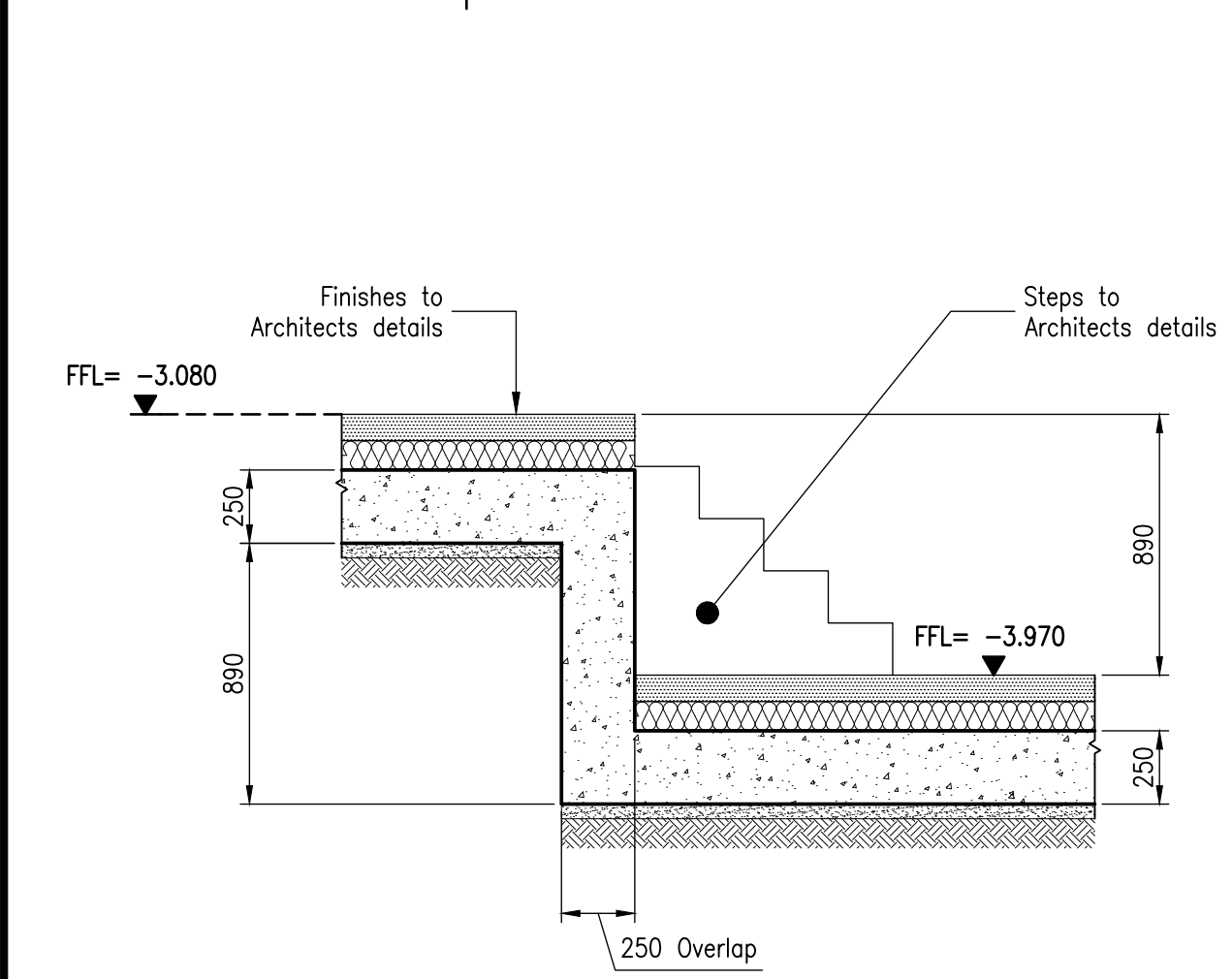
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halsteadASSOCIATES CONSTRUCTION CONSULTANTS 1 Athenaeum Road Whetstone London N20 9AA t. 020 8445 7721 f. 020 8446 2199 e. office@halsteads.co.uk w. www.halsteads.co.uk	A

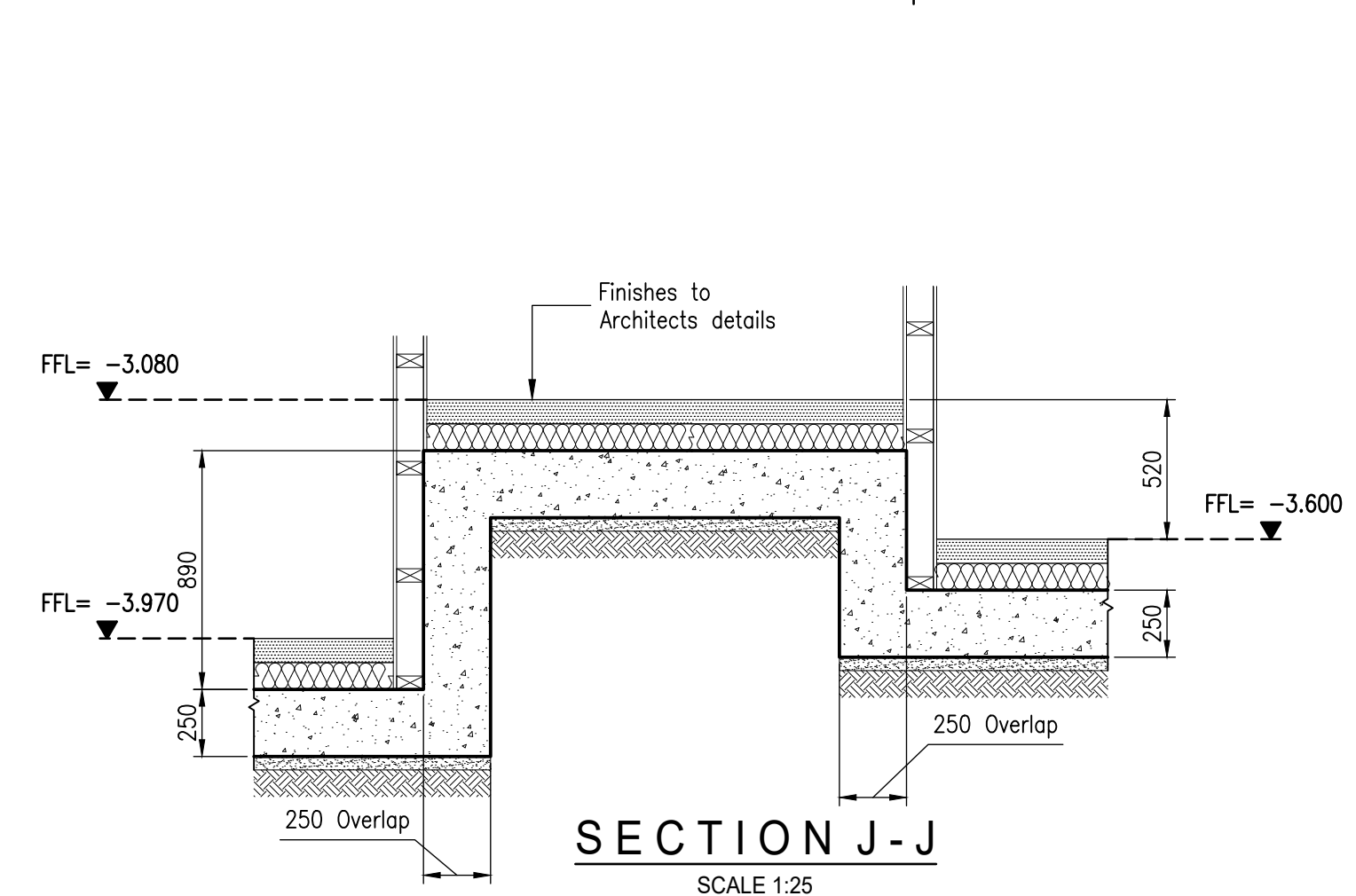


SECTION A-A
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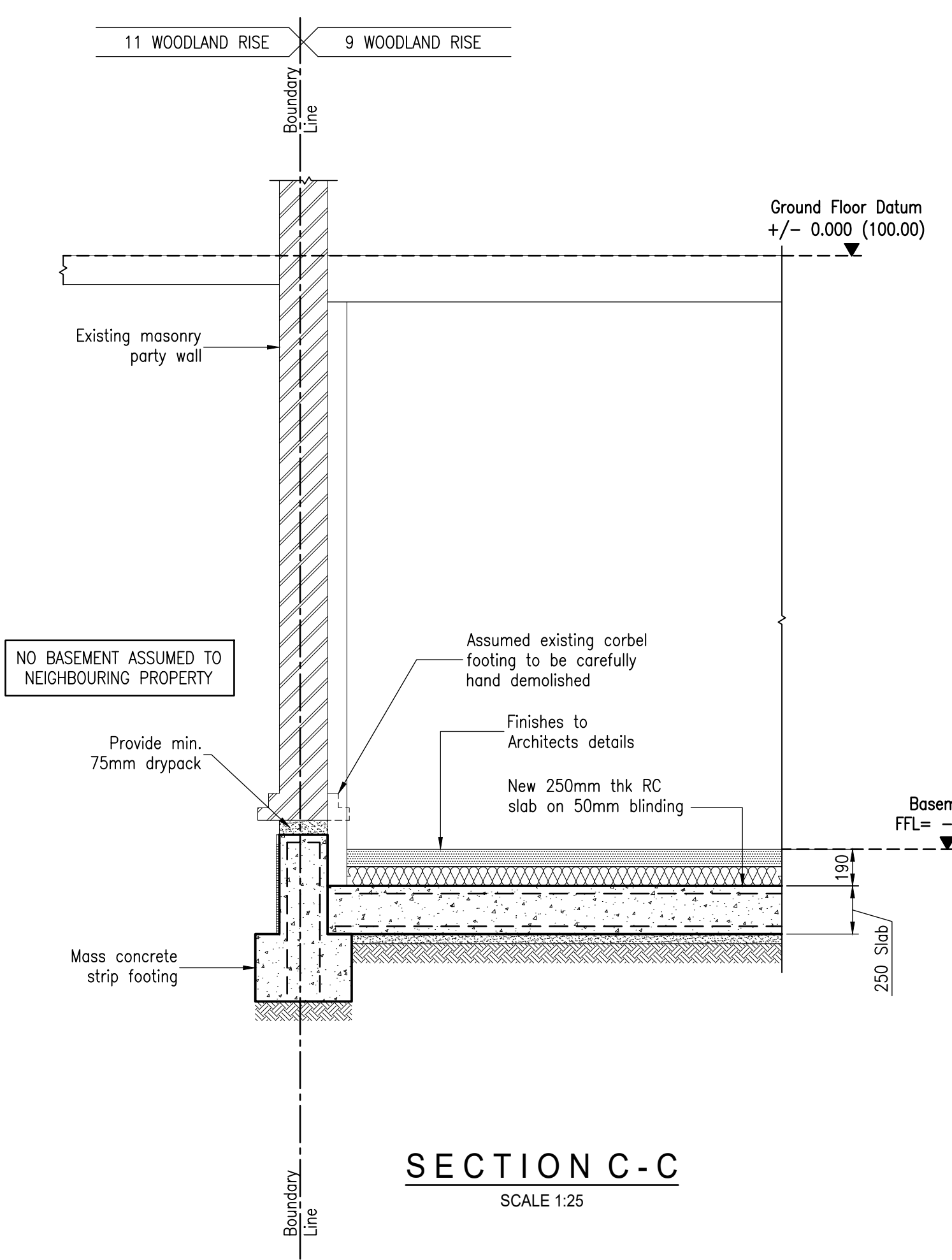
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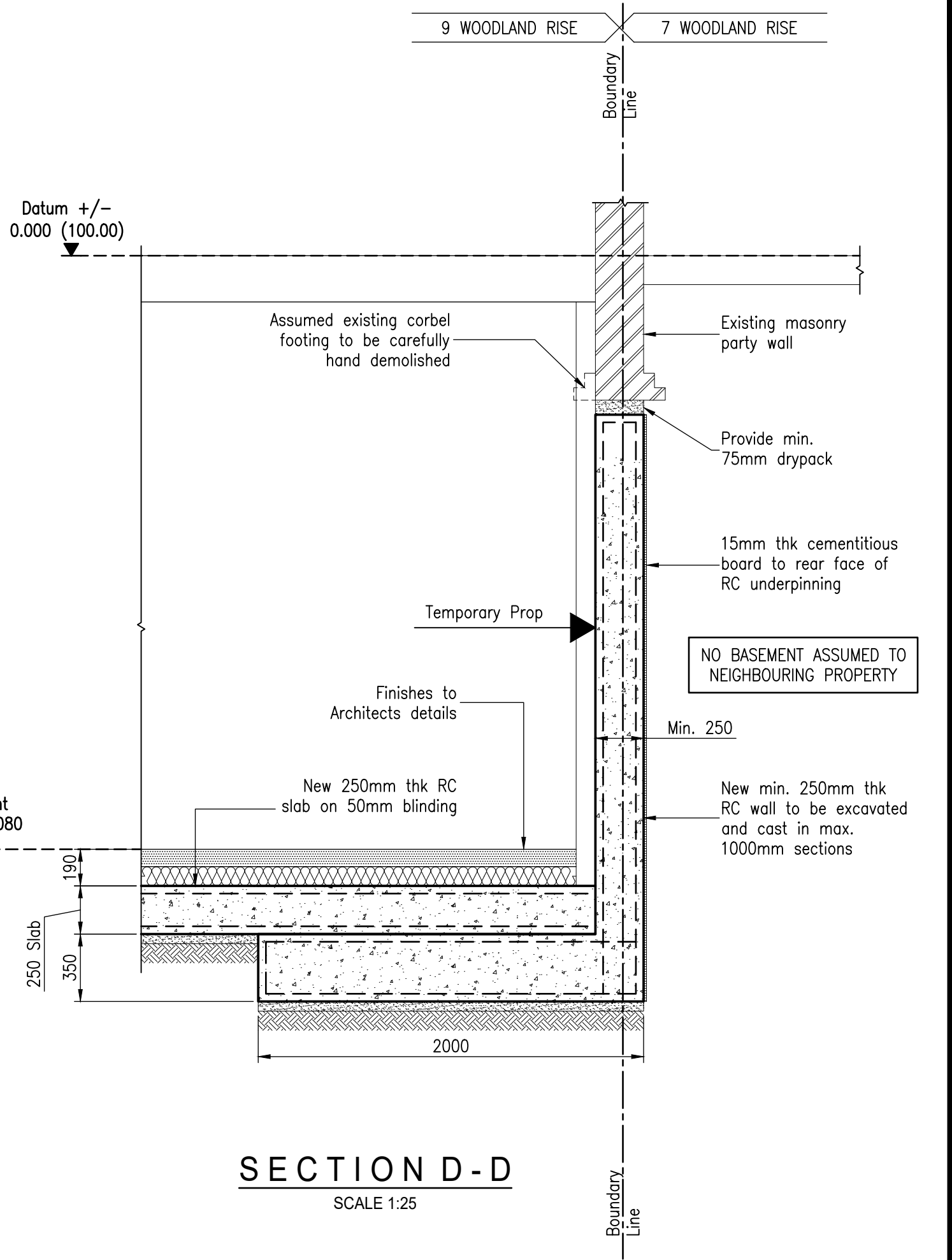
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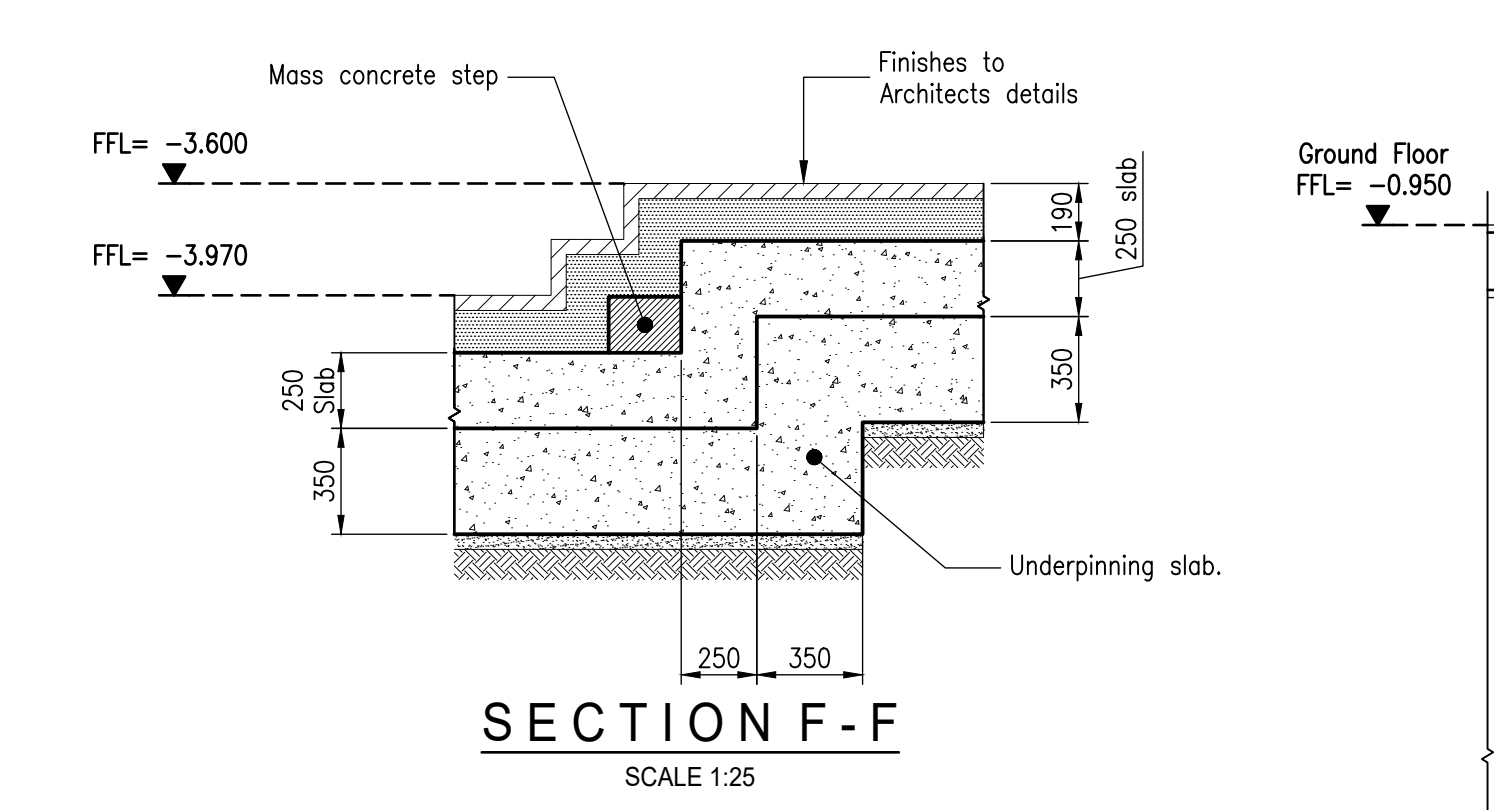
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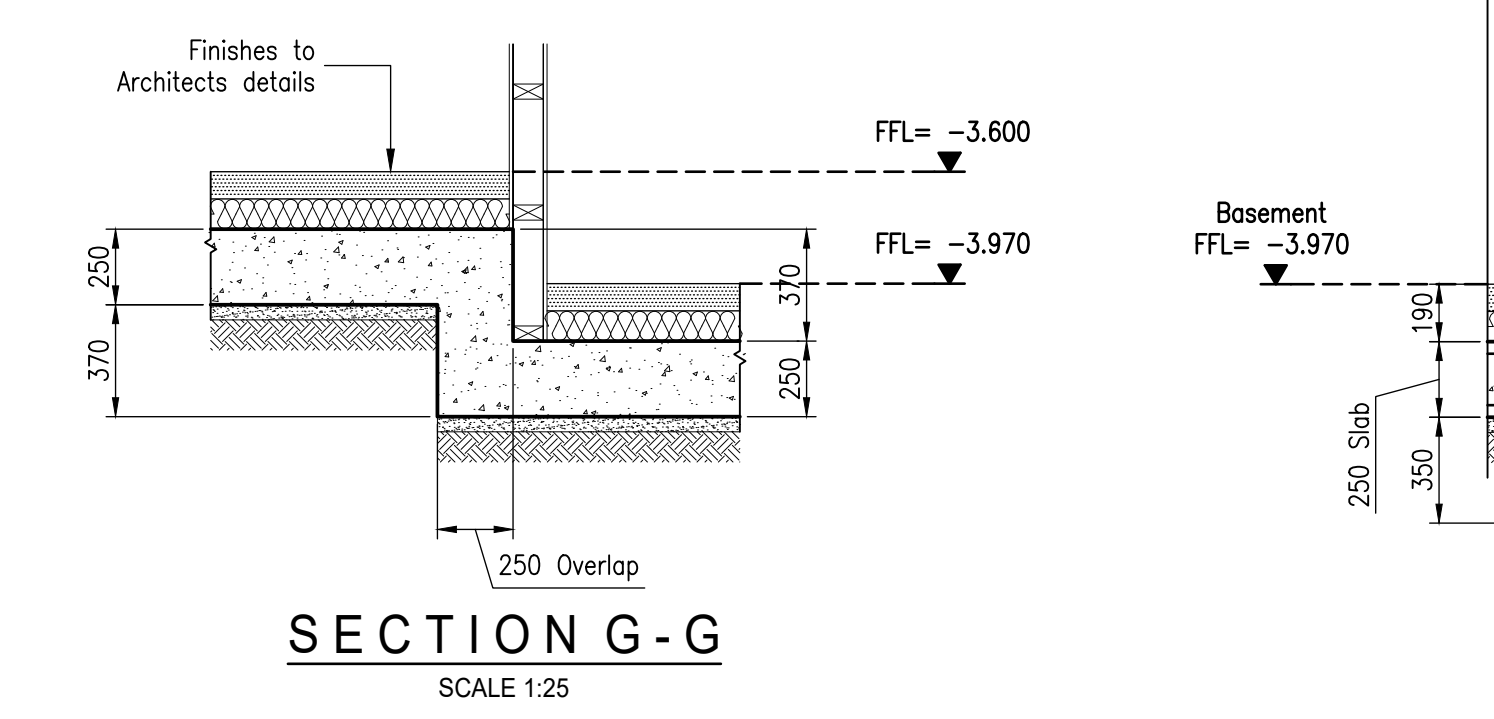
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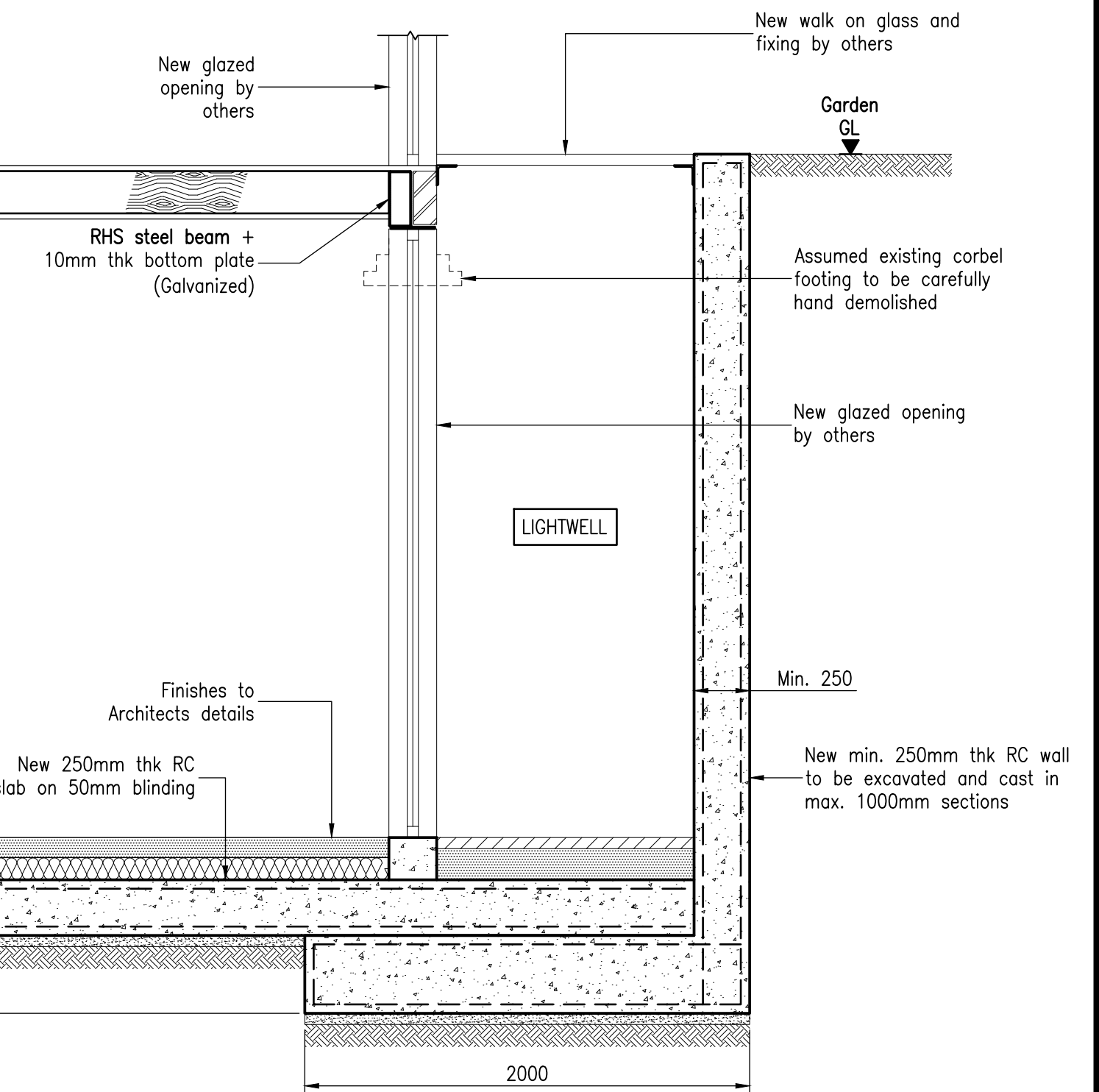
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SECTION F-F
SCALE 1:25



SECTION G-G
SCALE 1:25



SECTION E-E
SCALE 1:25

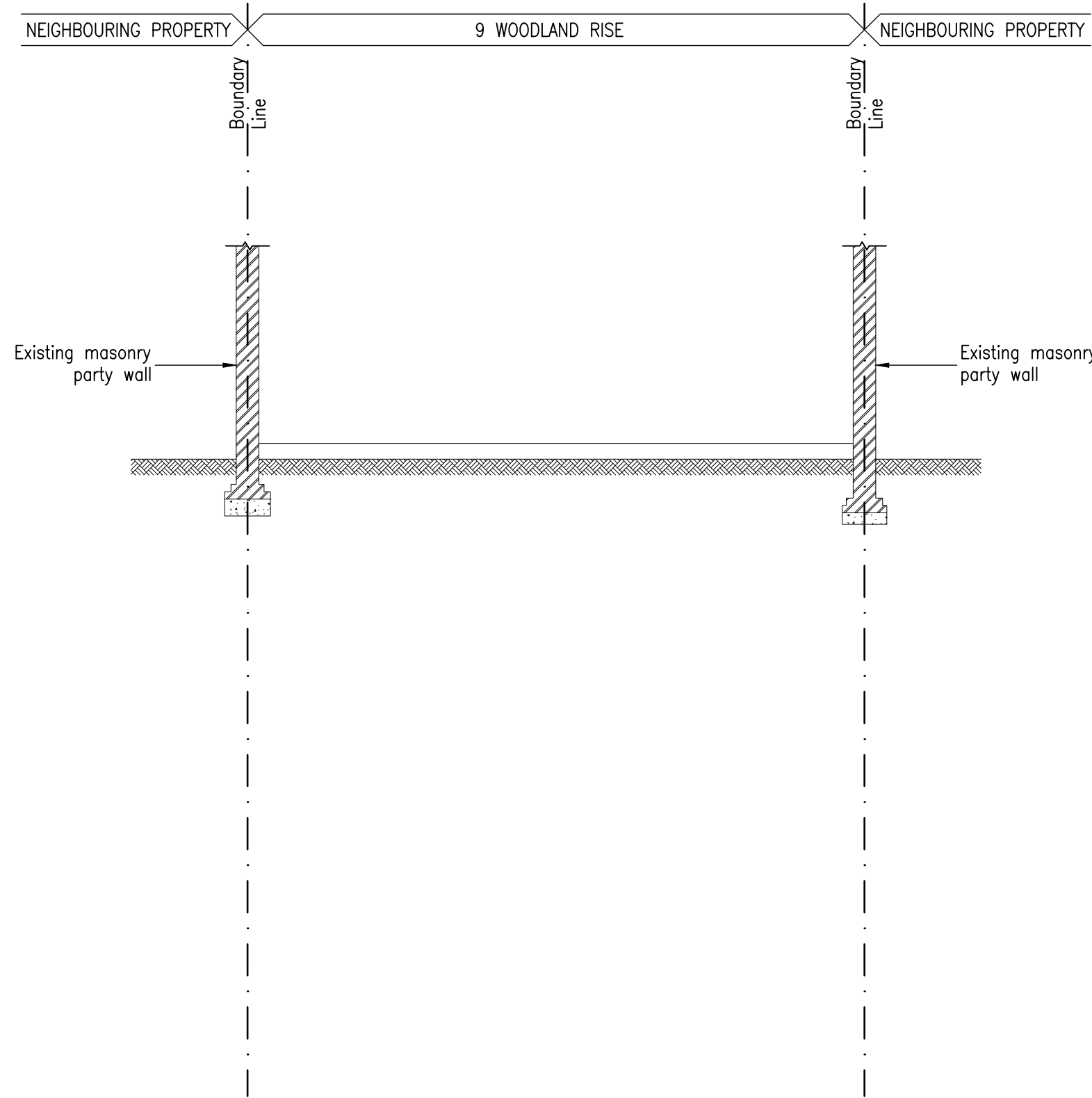
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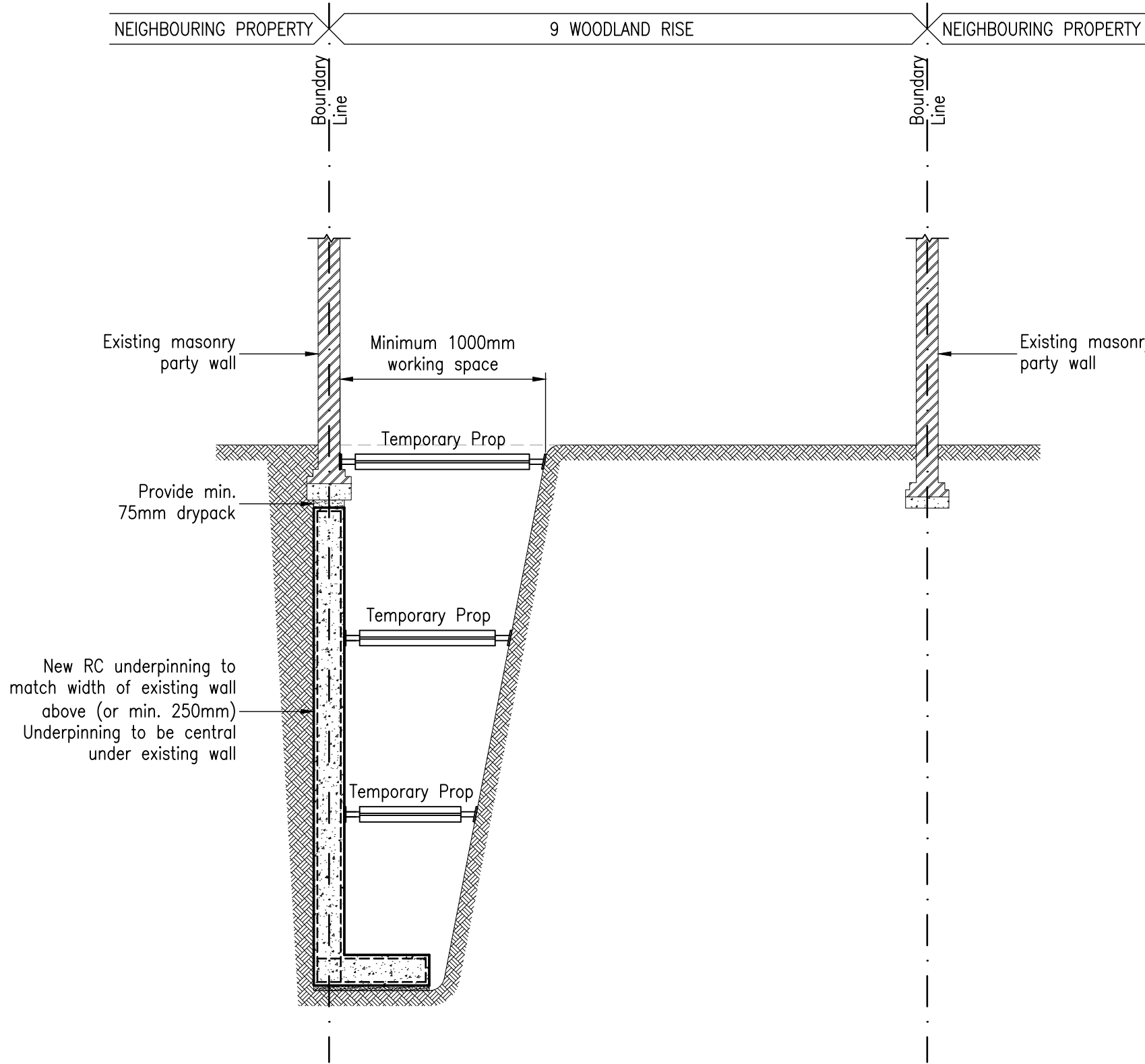
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PRELIMINARY

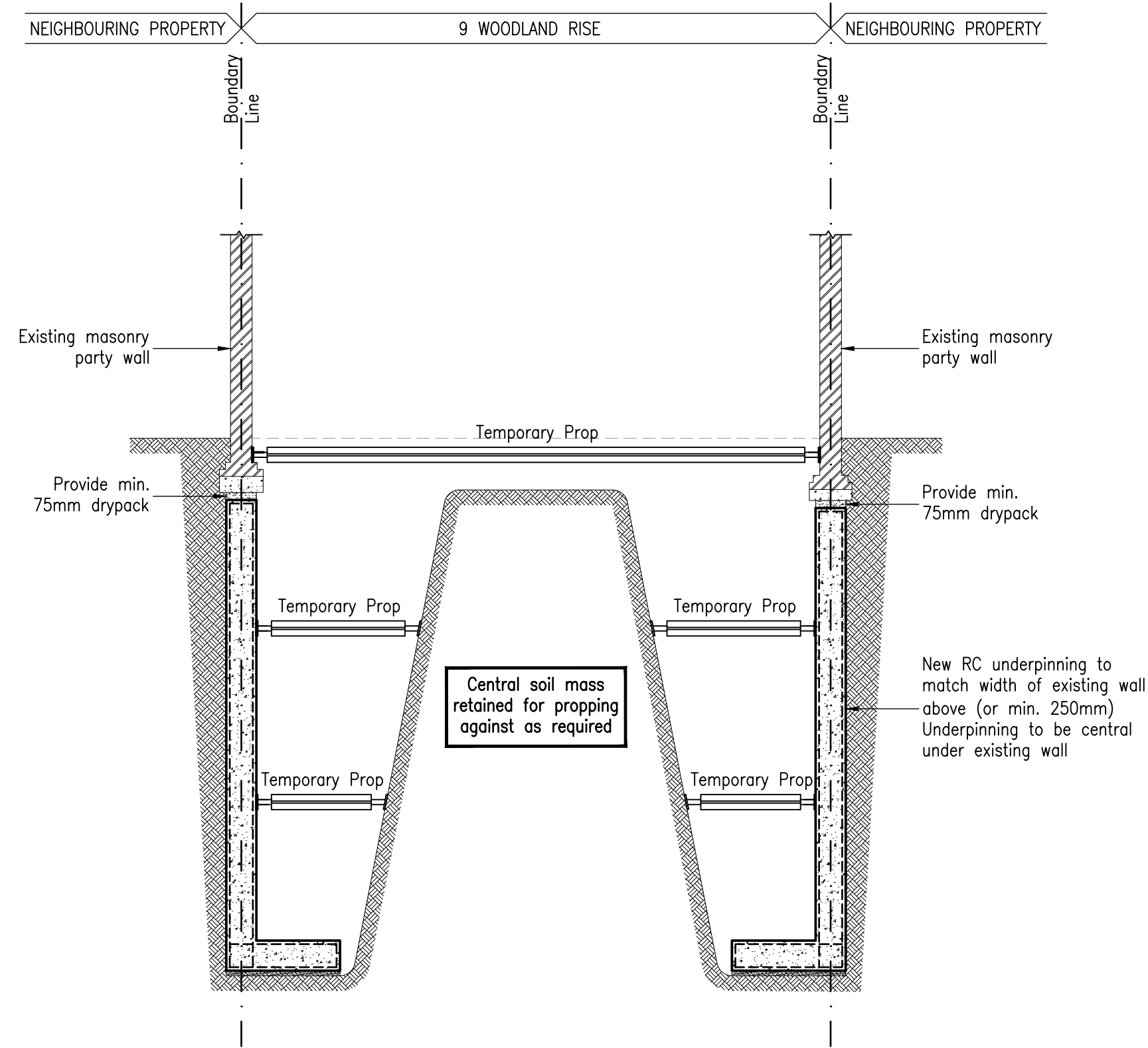
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Architect: XUL Architecture	Scale: AS NOTED @ A1
halstead ASSOCIATES CONSTRUCTION CONSULTANTS	Drawing No: 18523/PL03
t. 020 8445 7721 f. 020 8446 2199 e. office@halsteads.co.uk w. www.halsteads.co.uk	A



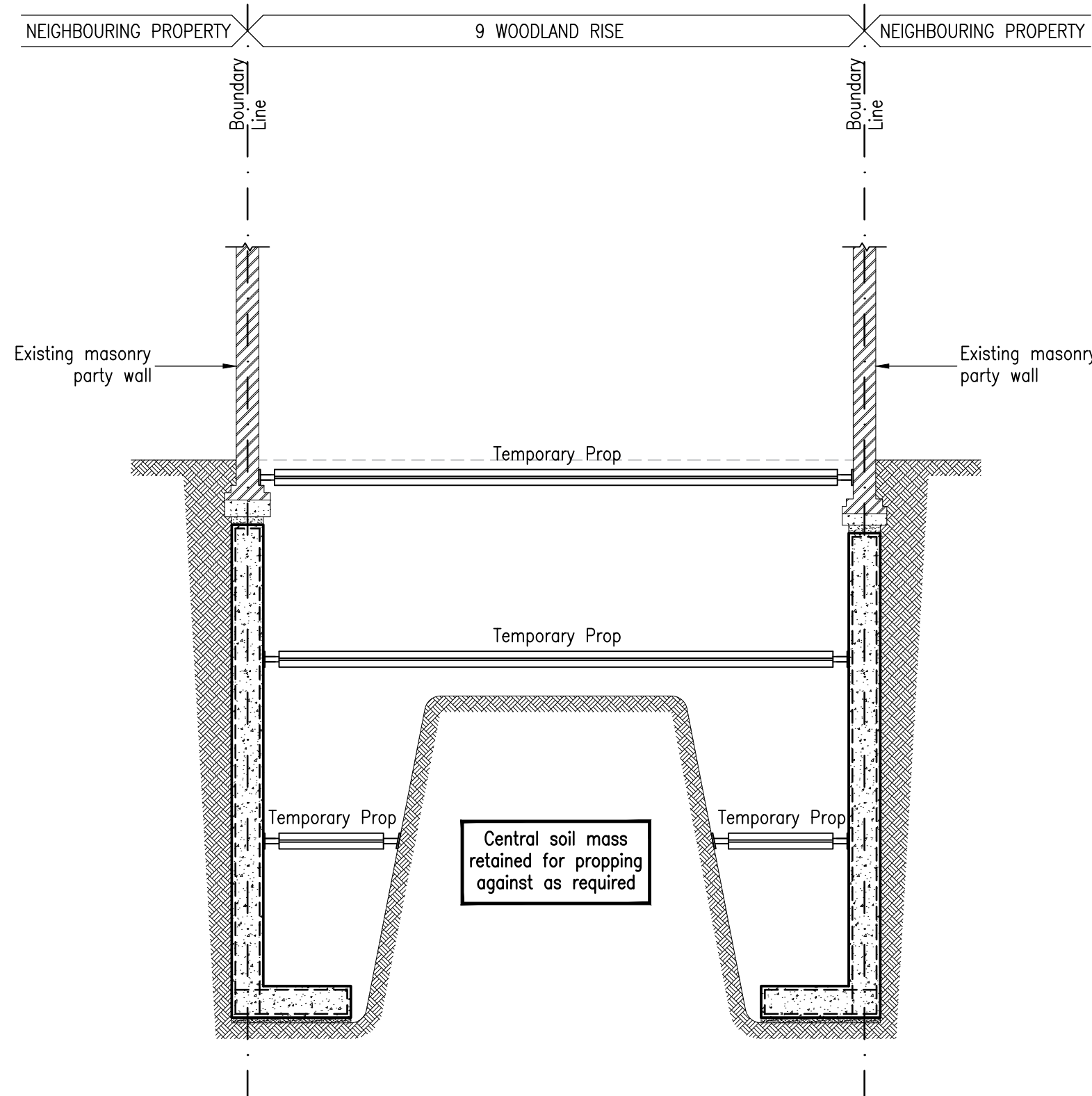
UNDERPINNING SECTION - AS EXISTING
SCALE 1:50



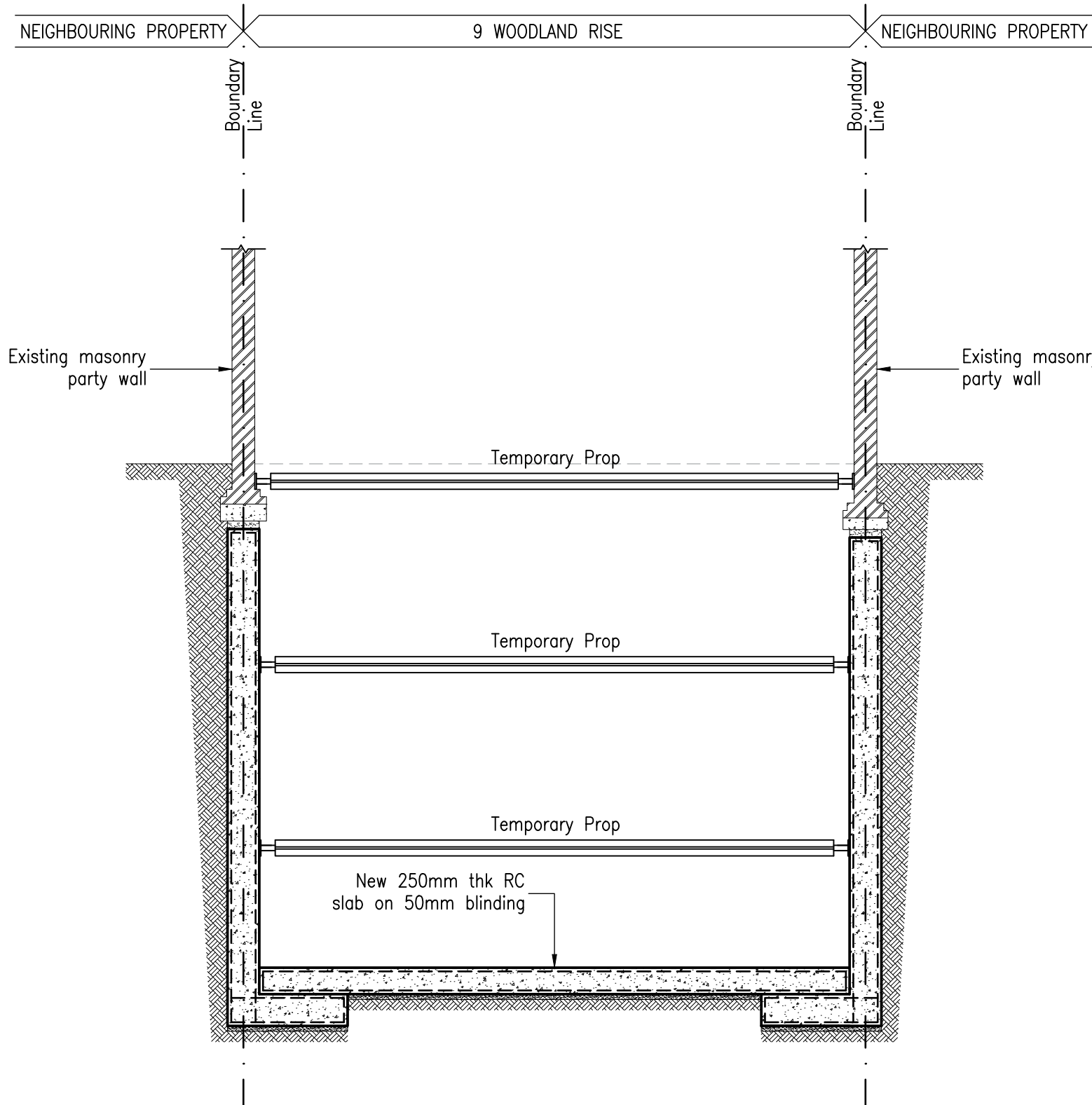
UNDERPINNING SECTION - STAGE 1
SCALE 1:50



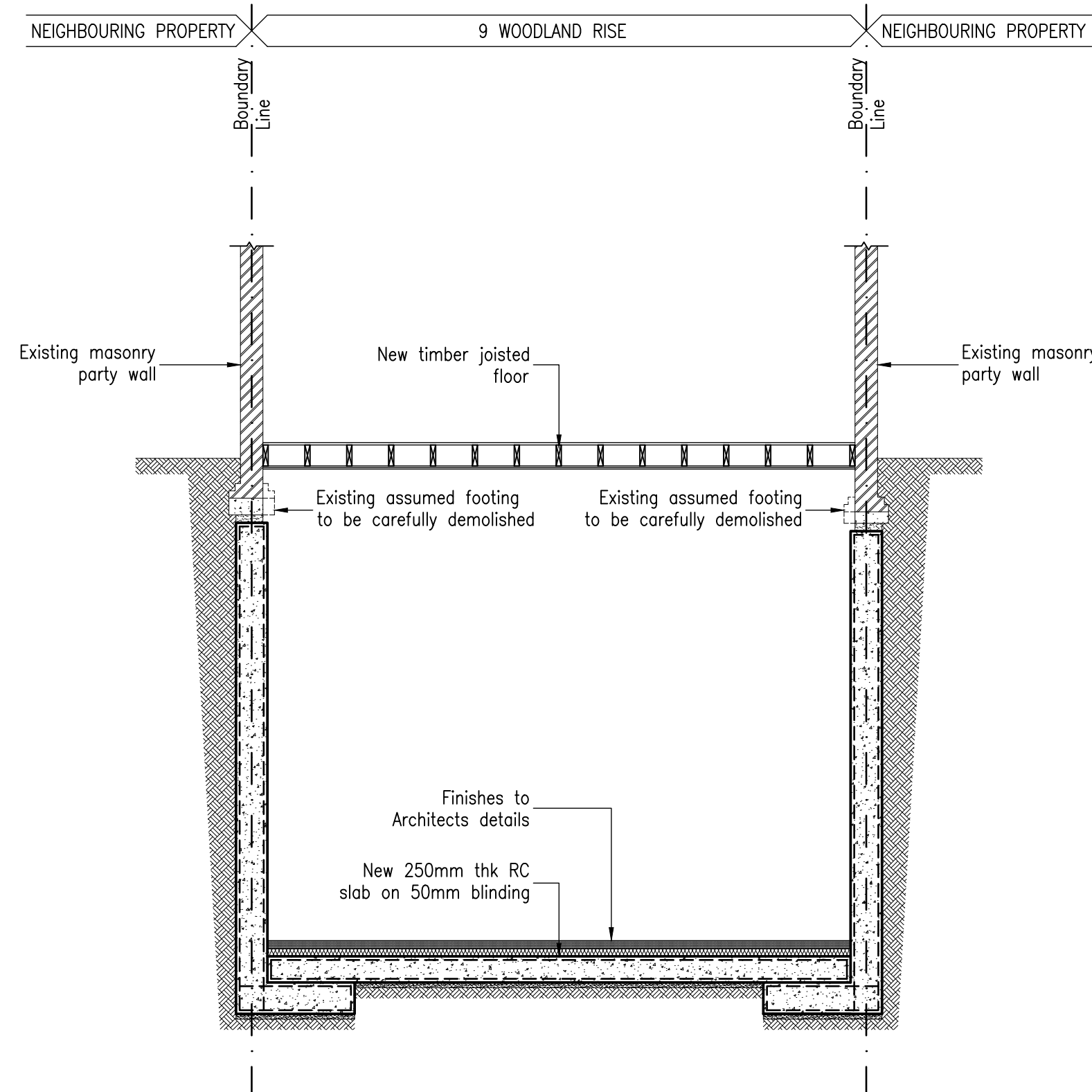
UNDERPINNING SECTION - STAGE 2
SCALE 1:50



UNDERPINNING SECTION - STAGE 3
SCALE 1:50



UNDERPINNING SECTION - STAGE 4
SCALE 1:50

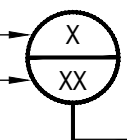


UNDERPINNING SECTION - AS PROPOSED
SCALE 1:50

Rev.	Date	Revisions	By	Engineer
A	27.10.22	Updated to Suit New Build Scheme	KS	DO

Notes:
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Key:
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Denotes Drawing Number



PRELIMINARY

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Scale: 1:50 @ A1	Drawing No: 18523/PL04
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