

Proposed Basement Construction Methodology

EX24/079/03

23 Hillside Road

London

N15 6LU

Revision	Date	Changes
-	27.03.2024	Initial Issue

Preamble

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Revisions & additional material

Document History and Status

Revision	Date	Purpose/Status
-	27.03.2024	First Issue

Document Details

Project Director	B Norman
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1.0 Introduction

JMS Engineers have been appointed to prepare a proposed basement and ground water assessment for the works at 23 Hillside Road, London, N15 6LU.

The report is written with a view to addressing comments received from Haringey Council in relation to the proposed basement and the basement impact assessment previously submitted by others. This report has been produced as stand-alone document, with a view to addressing the following comments:

1. **Soil/site investigation from the actual site;**
2. **Full construction details allow with temporary works;**
3. **No indication of proposed/expected movement to adjoining properties and how this will be monitored;**

The comments made request intrusive investigations/trial pits and monitoring where necessary, this report aims to provide the required information and address those comments.

This report is for the exclusive use of the Client and should not be used in whole or in part by any third parties without the express permission of JMS Engineers in writing. This report should not be relied upon exclusively by the Client for decision-making purposes and may require reading with other material or reports.

The scope of the proposal is for the extension/construction of a new basement beneath the ground floor footprint.

The report is based on the information produced by the clients Architects, & borehole data provided by Point Drilling Services and is intended to provide the basis for planning and may be subject to further design discussion and development with the successful contractor.

1.1. Sources of Information

1.1.1. The following baseline data have been referenced:

- Point Drilling Services Site investigation trial pit log 15.03.2024.
- Association of Specialist Underpinning Contractors (ASUC), Guidelines on safe and efficient basement construction directly below or near to existing structures;
- Fiona Cobbs, Structural Engineer's Pocket Book;
- Architect's floor layouts, sections and elevations.
- BS8000-0:2014: Workmanship on construction site.

1.2. Existing and Proposed Development

1.2.1. Existing and Proposed development drawings are provided by the architect. refer to architect's drawings for details.

1.2.2. The proposed development will utilise standard underpinning construction technique which include sequenced stages of works as denoted by the ASUC "Guidelines on safe and efficient basement construction". This is based on the preliminary information provided by the Architect.

1.2.3. The outline construction programme for the proposed development is indicative only and to be confirmed by the contractor.

2.0 Site Geology

2.1 Boreholes

- 2.1.1. A site-specific ground investigation was carried out during March 2024. A single borehole was sunk to a depth of 5m at the rear of the property.
- 2.1.2. See Appendix for borehole details.
- 2.1.3. The borehole log found clay of varying stiffness to termination of borehole. The upper layers showed some silt to a depth of approximately 1m. No water was encountered and borehole end was dry at 5.0m depth.

3.0 Construction Methodology/ Engineering Statements

3.1 Outline Temporary and Permanent Works Proposals

- 3.1.1. This method statement has been prepared to provide information on the likely methods for Basement Construction, subject to confirmation of details and final input from the successful contractor.
- 3.1.2. The final methods will be subject to the limitations and constraints noted in this document. Any revised matters associated with the Method Statement will be issued for review and comment prior to any site construction works.
- 3.1.3. The method of construction is to be agreed by all parties, with specific reference to the potential for vibrations and noise from the basement construction.
- 3.1.4. A detailed method statement for means of access, site logistics and intended vehicle movements, particularly spoil removal, will be agreed with the main contractor prior to commencing any site works and any variations reported accordingly.
- 3.1.5. All services surveys, diversion agreements and temporary supply requirements will be agreed, and approvals will be in place prior to commencement of works.
- 3.1.6. Existing building condition surveys will be carried out prior to commencing any works, of neighbouring property.

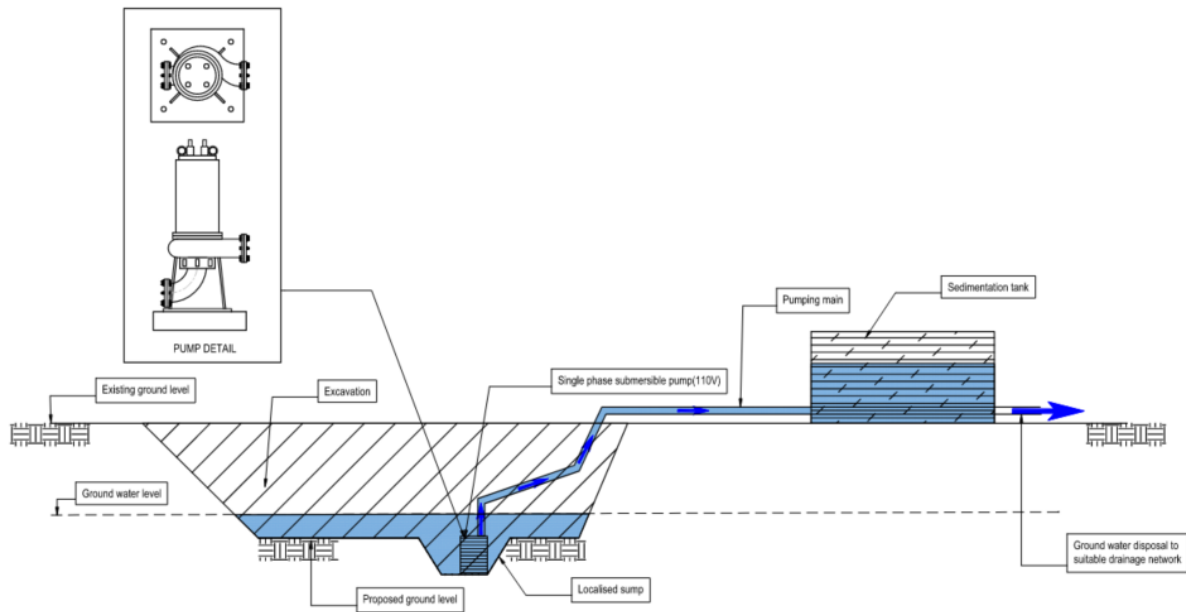
3.2 Sequence of works for underpinning section

- 3.2.1. Establish site access & hoarding.
- 3.2.2. Investigatory works as required for full detailed design.
- 3.2.3. It is presumed that all the temporary works to ensure stability to adjacent properties are provided during demolition as designed and specified by contractor.
- 3.2.4. It is the contractor's responsibility to take all necessary steps to ensure that the structure is adequately propped, shored and braced to ensure that during the progress of the works excessive deflections and deformation of the structure do not occur. Therefore, the contractor shall discuss with the engineer any proposals for temporary works. It is frequently necessary for the contractor to brace or prop existing openings so that isolated load bearing piers may be underpinned. The contractor is to allow in his tender price for all propping, shoring and bracing to ensure that the works may be safely undertaken with no undue disruption to the structure.

- 3.2.5. In addition, no floors are to be removed to allow the excavation of the basement until adequate propping has been provided to ensure continuity of support of opposing walls. Propping system to remain in-situ until new floor has been fully installed and strapped. Design of propping is a contractor designed item, unless instructed otherwise.
- 3.2.6. The sequence of works shall be based on a maximum leg length of approx. 1.0m. and max. of 1.2m. The agreed sequence of operations shall be strictly adhered to. In case the contractor wishes to alter any sequence, it must be discussed in prior with the engineer and/or local authorities and any amendment must be confirmed in writing.
- 3.2.7. Sequenced underpinning/sequenced construction sections can take place as per indicative sketch. Underpinning to be connected to a central slab with starter bars.
- 3.2.8. During the excavation, the contractor shall take all the necessary steps to prevent softening of the ground. The contractor shall also ensure that the base of the excavation shall not become contaminated by loose material falling into the excavation. The contractor shall take steps to ensure that the size of the excavation loosely matches the required size agreed with the engineer /local authorities. Excessive overbreak will not be permitted and the contractor shall provide all necessary trench sheeting and strutting to prevent overbreak. The contractor might be required to provide sheeting and strutting to prevent any ingress of loose material beneath the existing floor.
- 3.2.9. Prior to concreting, the contractor shall incorporate shear keys to permit shear transfer between adjacent retaining wall legs. Where necessary, projecting dowel bars should be cleaned of all loose dirt prior to concreting.
- 3.2.10. The underside of all existing footings (where exposed by excavation in preparation for underpinning) shall be cleaned of all loose soil and fragments. Any major projections or inclusions such as bricks broken concrete or boulders shall be broken away from the underside of the existing footing. Prior to concreting the underpinning leg, the existing footing should be clean and firm and level, so the dry packing may be accomplished satisfactorily.
- 3.2.11. All concrete shall be grade C35 (unless specified otherwise) and strictly operated according to the concrete specifications contained in BS8110:Part 1:1985. It should be noted that the concrete should be adequately compacted with a vibrator poker to ensure adequate density. The concrete for the retaining wall legs should be brought up to 75mm from the underside of the existing footing.
- 3.2.12. Once the retaining wall legs have set (at least 3 days after concrete placement) the gap between the underside of the existing footing and the top of the new footing is to be packed with dry concrete. Mix proportions for the dry concrete are to be by weight 1:3 (cement: zone 2 sharp sand) with combex non-shrink admixture added in accordance with manufacturers recommendation. The constituents are to be

mixed dry and small volume of water is to be added that such that when compressed, a small bar of the mixture retains its shape. The dry packing concrete is then to be rammed solid into the gap between the underside of the existing footing and the top of the new footing using a steel bar.

- 3.2.13. A sufficient time should elapse between the completion of dry packing and the excavation of any retaining wall legs in the vicinity. The curing time shall be 72h between adjacent bays, unless stated otherwise.
- 3.2.14. Internal waterproofing membranes, screeds and finishes are to be placed at completion of the retaining wall boxes and ground floor slab.
- 3.2.15. The final sequence of working in detail will be agreed with the successful main contractor and any variations reported accordingly. It is worth mentioning that retaining wall legs may be punctured by the services entering the building. The means of “sleeving” these services shall be agreed with the engineer during the progress of the works.
- 3.2.16. Based on the size of the proposed development, it is presumed that it is likely the bays constructions will be undertaken on “top down” construction method, to be confirmed by the successful contractor.
- 3.2.17. Based on the size of the proposed development, and the proposed levels, the underpinning depth is likely to be no more than 3.0m which can be constructed in one pour. This is to be confirmed by the successful contractor and by the finalized architectural layouts.
- 3.2.18. Refer to Appendix for typical details and notes for underpinning construction in one pour. (Note: details are INDICATIVE only, shown only for illustrative purposes.) where necessary, multi-stages pouring must be undertaken, contractor to advise.
- 3.2.19. It is to the successful contractor’s discretion to finalise appropriate methodology based on site accessibility and resources.
- 3.2.20. Based on the borehole log, no ground water is expected to be encountered at basement formation level. Should ground water be encountered during excavation works the contractor should adopt a suitable ground water disposal system. Such a system is likely to incorporate submersible pumps, draining first to a silt tank to remove fines and gravel before discharging to the drainage network. The diagram below shows the proposed arrangement and submersible pump details.



3.3. Establish Access & Hoarding

- 3.3.1. The hoarding will be located around the property to enclose all works.
- 3.3.2. A plywood hoarding will be erected with vertical standards, anchored to the ground. The hoarding will be fully secure with a lockable door for access. Suitable heights and colours will be in accordance with the Local Authority requirements.

3.4. Waterproofing System and Screed

- 3.4.1. For all basement areas, the Architect will prepare design details in conjunction with a specialist contractor. The waterproofing system will be installed in accordance with the Architects details in conjunction with the specialist contractor technical specifications once the basement slab is complete.
- 3.4.2. The floor finishes, which may include insulation and under floor heating, can then be laid in accordance with the Architects details. A cement and sand screed will be applied on the slab surface.
- 3.4.3. The height of the basement and relative level of the water table determines that Types A (barrier), B (structurally integrated) or C(drained) protection against ingress of water will be satisfactory, as defined by BS 8102:2009. The basement will be constructed and detailed to achieve a Grade 3 Level of Performance, as defined by BS 8102:2009.

Table 2 Grades of waterproofing protection

Grade	Example of use of structure ^{A)}	Performance level
1	Car parking; plant rooms (excluding electrical equipment); workshops	Some seepage and damp areas tolerable, dependent on the intended use ^{B)} Local drainage might be necessary to deal with seepage
2	Plant rooms and workshops requiring a drier environment (than Grade 1); storage areas	No water penetration acceptable Damp areas tolerable; ventilation might be required
3	Ventilated residential and commercial areas, including offices, restaurants etc.; leisure centres	No water penetration acceptable Ventilation, dehumidification or air conditioning necessary, appropriate to the intended use

^{A)} The previous edition of this standard referred to Grade 4 environments. However, this grade has not been retained as its only difference from Grade 3 is the performance level related to ventilation, dehumidification or air conditioning (see BS 5454 for recommendations for the storage and exhibition of archival documents). The structural form for Grade 4 could be the same or similar to Grade 3.

^{B)} Seepage and damp areas for some forms of construction can be quantified by reference to industry standards, such as the ICE's *Specification for piling and embedded retaining walls* [1].

3.4.4.

Figure 1: Grades of waterproofing protection

3.4.5. To achieve Grade 3 Performance, we propose either a drained cavity installed in front of the concrete wall; or an applied waterproofing membrane applied and bonded to the internal faces of the pins. Waterproof concrete will also be employed.

3.5. Ground Movement and Damage Impact Assessment

3.5.1. At this site unloading of the London Clay as a result of the basement excavation, the reduction in vertical stress will cause heave to take place. Values of stiffness for the soils at this site are readily available from published data and the creation of the basement will result in a net unloading of about approximately 50 kN/m².

3.5.2. Such a reduction would mean that by the time the basement construction is complete, approximately <10 mm of heave is likely to have taken place at the centre of the proposed excavations, reducing to less than 5 mm at the edges. In the long term, following completion of the basement construction, a further 8 mm of heave (at the centre) is estimated as a result of long term swelling of the underlying London Clay.

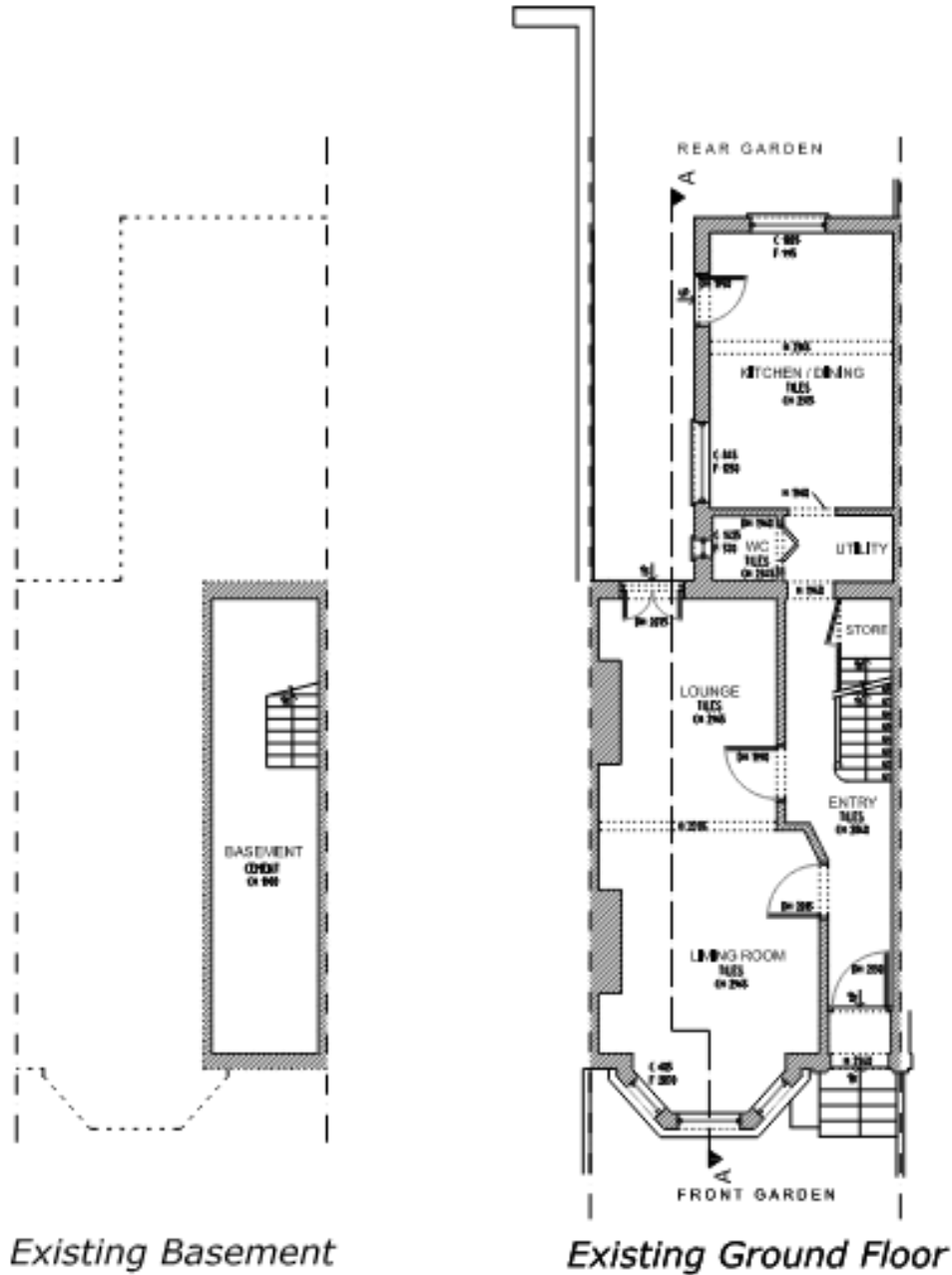
3.5.3. It is, however, important to bear in mind that such figures are based on an unrestrained excavation as computer models are unable to take account of the mitigating effect of existing structures, the stiffness of the proposed floor slab and proposed underpins which in reality will combine to restrict these movements within the basement excavation.

3.5.4. The movements predicted at or just beyond the site boundaries are unlikely to be fully realised and should not therefore have a detrimental impact upon any nearby structures.

3.5.5. In order to mitigate the effects of heave on the new building, the basement should be designed to transmit heave forces into the walls.

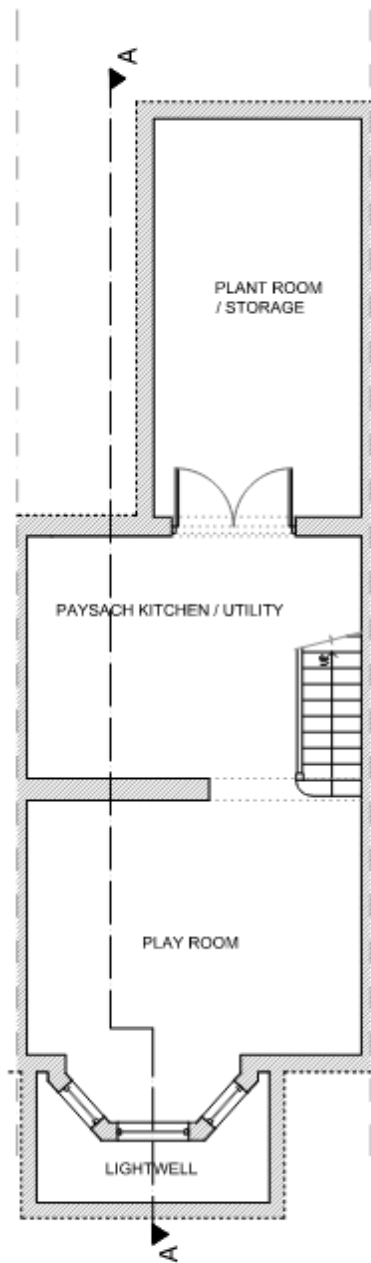
- 3.5.6. Alternatively, a void or layer of compressible material could be introduced beneath the slab designed to be able to resist the potential uplift forces generated by the ground movements. In this respect potential heave pressures to be accommodated are typically taken to equate to around 30% to 40% of the total unloading pressure.
- 3.5.7. In addition to the above assessment of the likely movements that will result from the proposed development, some of the neighbouring structures have been considered as sensitive structures, requiring Building Damage Assessments, on the basis of the classification given in Table 2.5 of C580.
- 3.5.8. The potential heave movements predicted have been included in the assessment section, which can therefore be considered as conservative, as these movements are likely to have a mitigating effect on the downward settlement due to the increase in load.
- 3.5.9. It is noted that the proposed development will not include the felling of trees, therefore negligible to minimal changes should be expected to soil moisture conditions.
- 3.5.10. Subsequently, it is predicted that the damage to the adjoining and nearby structures would generally be Category 0 (negligible), with limited areas of Category 1 (Very Slight) damage due to differential movement from inconsistent loadings. On this basis, the damage that would inevitably occur as a result of such an excavation would fall well within the acceptable limits.
- 3.5.11. Note that these predictions are based on the presumption of the quality of the work and the construction tolerances adopted on site will comply with BS8000: Workmanship on construction site.

Appendix 1: Existing/Proposed Plans



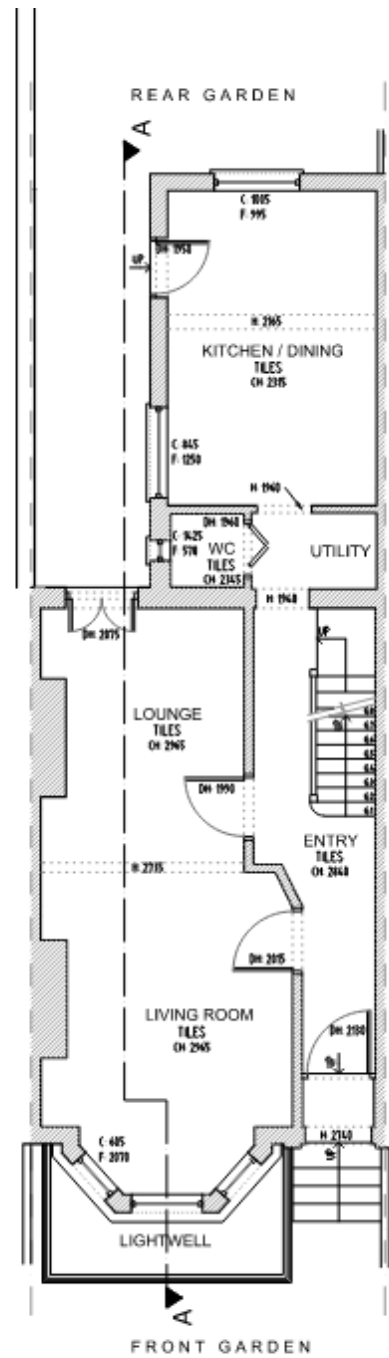
Existing Basement Plan

Existing Ground Floor Plan



Proposed Basement

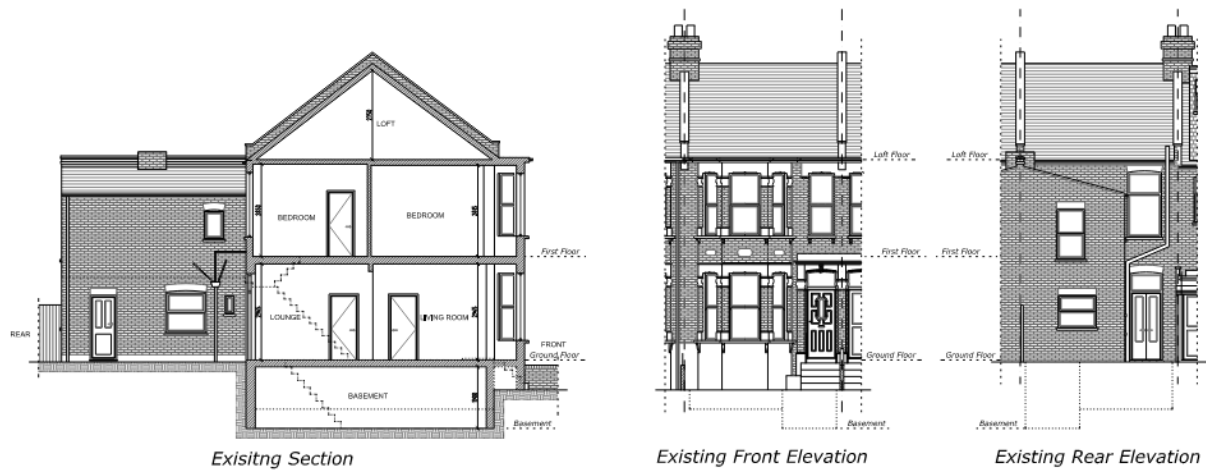
Proposed Basement Plan



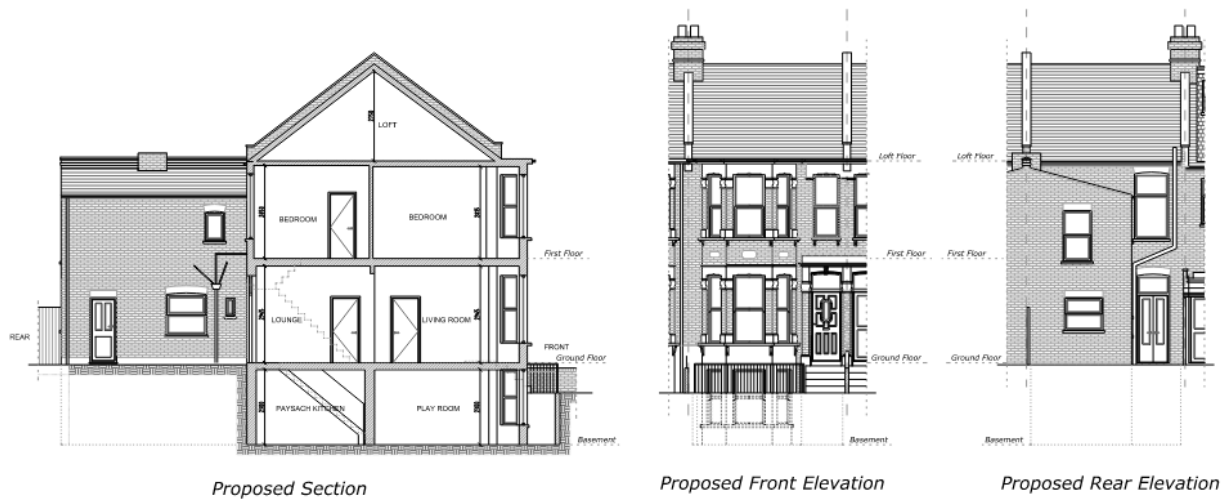
*Proposed Ground Floor
(No Changes)*

Proposed Ground Floor

Appendix 2: Existing/Proposed Sections



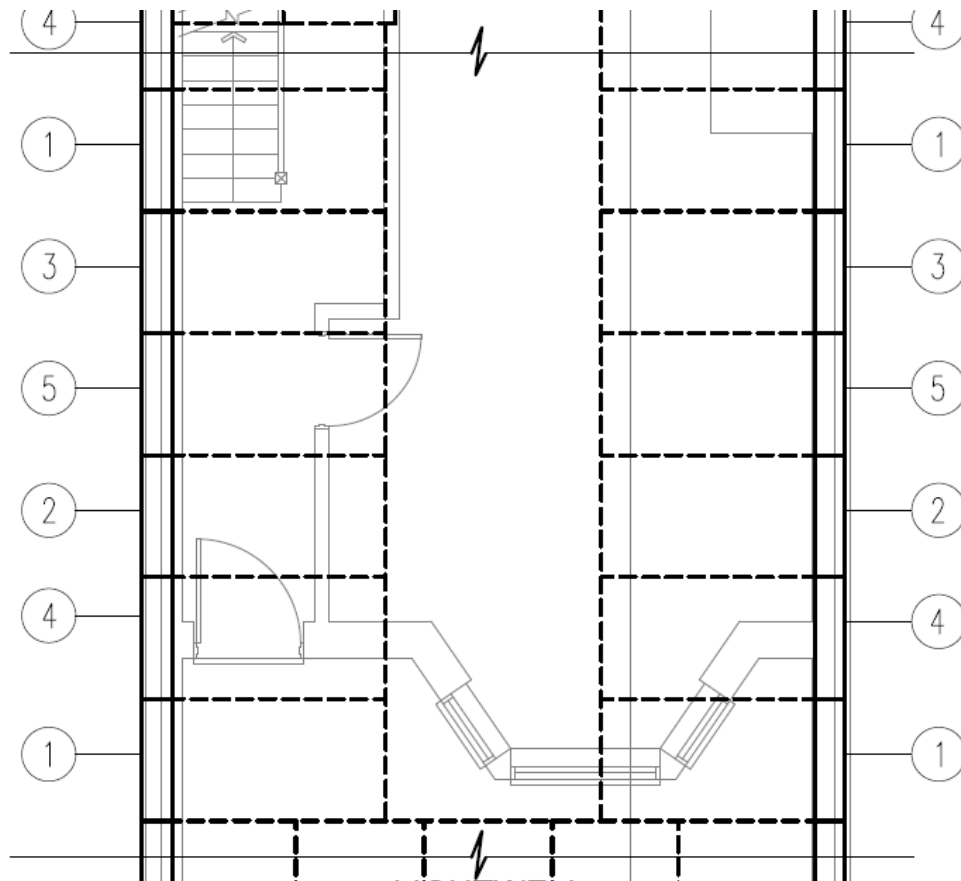
Existing Section & Elevations



Proposed Section & Elevations

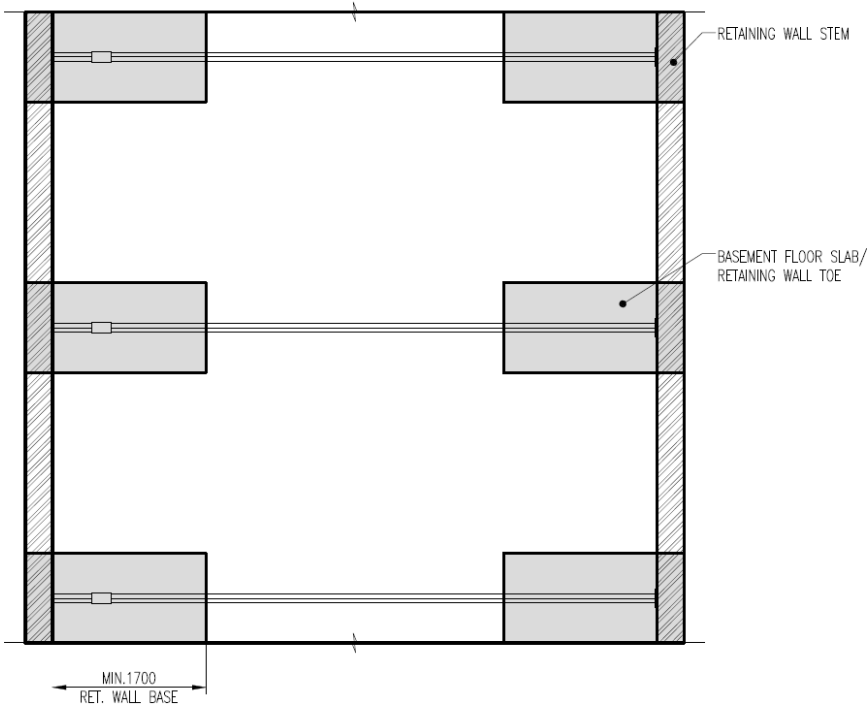
Appendix 3: Section on envisaged basement works

INDICATIVE ONLY

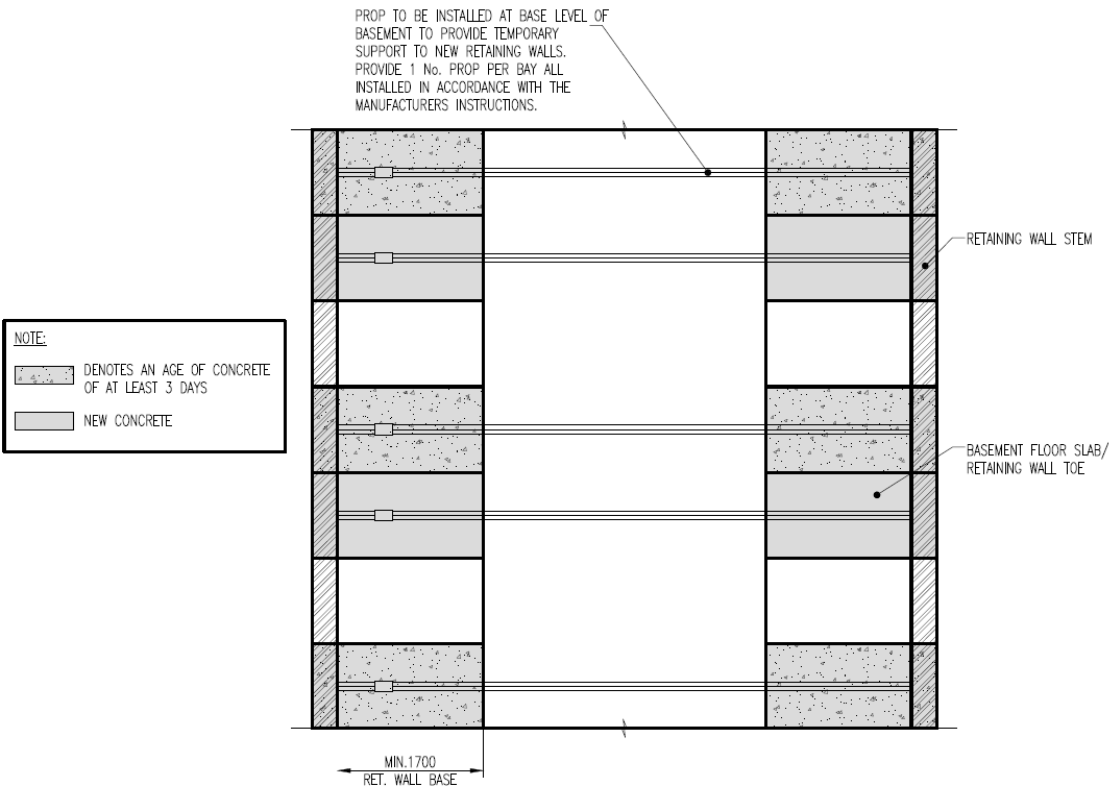


TYPICAL SEQUENCE OF UNDERPINNING

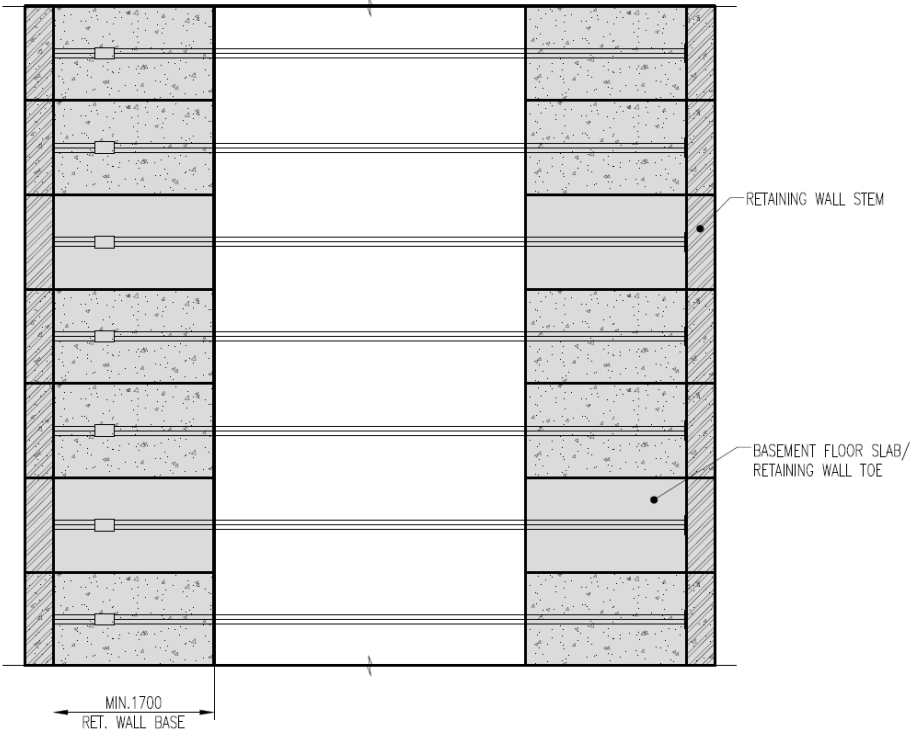
- A. EXCAVATE BAYS MARKED (1)
- B. CONCRETE BAYS MARKED (1)
- C. 3 DAY'S TO ALLOW CONCRETE UNDERPINNING TO SET & SHRINK
- D. DRY PACK BETWEEN UNDERPINNING & ORIGINAL FOUNDATION
- E. 24Hrs. TO ALLOW DRY PACK MORTAR TO GAIN STRENGTH
- F. EXCAVATE BAYS MARKED (2)
- G. PROCEED AS FOR B. – E. ABOVE FOR BAYS MARKED (2)
- H. REPEAT PROCESS F. – G. FOR REMAINING BAYS IN SEQUENCE MARKED ON PLAN



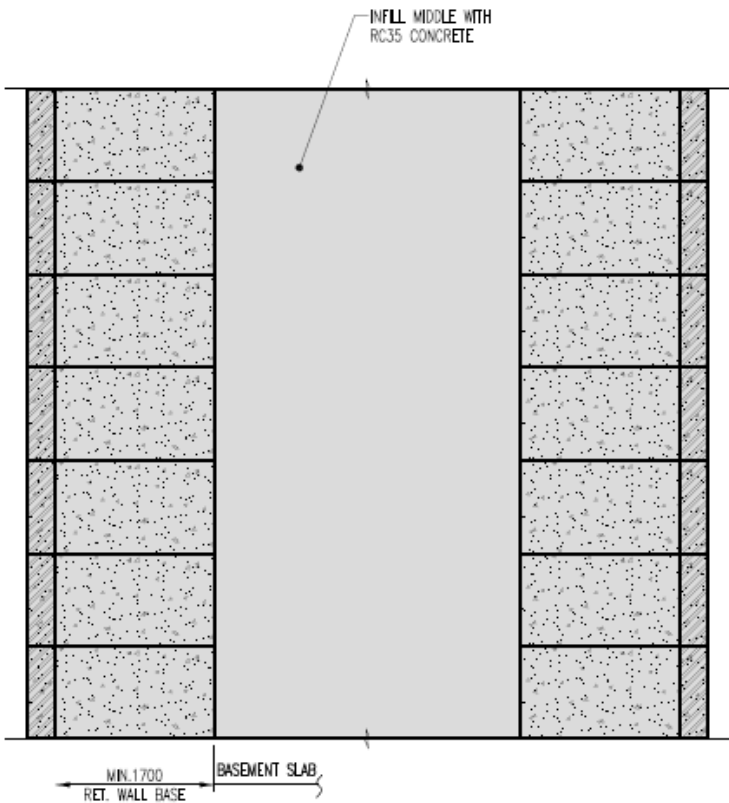
PLAN ON BASEMENT WORKS



PLAN ON BASEMENT WORKS

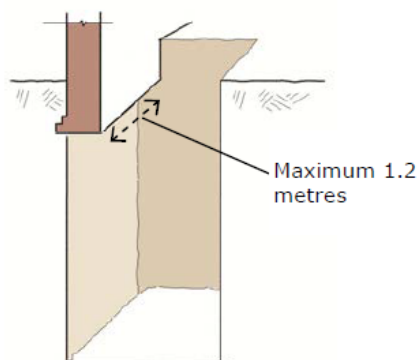


PLAN ON BASEMENT WORKS



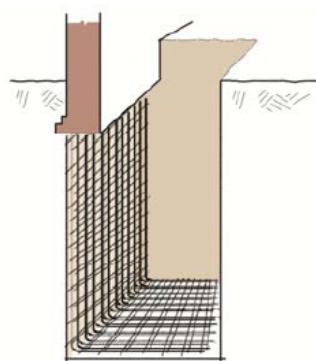
PLAN ON BASEMENT WORKS
SCALE 1:50

Appendix 4: Typical Underpinning sequence (ASUC Guideline)



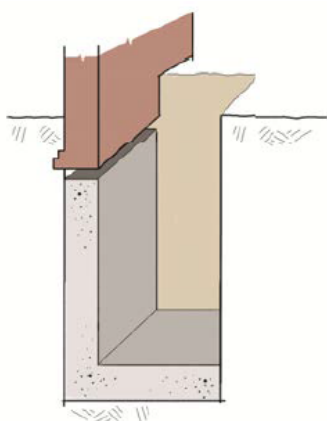
1. Excavation must be fully supported by props and shoring.
2. Edge protection to prevent falls into the excavation must be installed.
3. A temporary vertical prop or support may be placed under the wall to keep any loose bricks or masonry in place.
4. The main load from the existing wall will span onto the wall and foundations on either side of the excavation.

Stage 1. Excavation



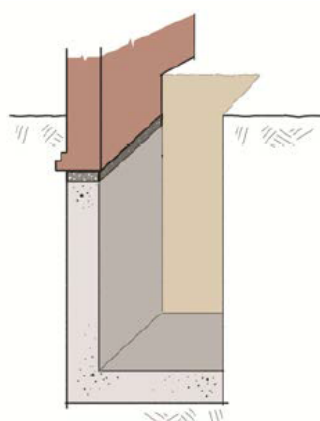
1. Reinforcement is fixed into position.
2. Reinforcement details are given in the engineering design. It is critical that the reinforcement is installed as detailed in the design.
3. The design will usually require a shear connection between adjacent underpins. This is generally achieved using dowel bars between adjacent pins or by building sheer keys in the concrete underpin walls.

Stage 2. Reinforcement



1. Concrete is placed in the toe first.
2. Once the toe is sufficiently cured the concrete wall is poured.
3. Shuttering, usually timber, is used to hold the concrete for the wall in place while it is placed.
4. Gap of approximately 75mm left between the top of the concrete and the underside of the existing foundation.

Stage 3. Concrete placement



1. After a minimum of 24 hours dry-pack is rammed into the 75mm void that has been left above the new underpin.
2. Dry-pack is a mix of sharp sand and cement. It is easy to handle and has a low shrink volume, minimising settlement of the wall onto the new underpin foundation.
3. The completed underpin must be supported horizontally either by horizontal propping or by backfilling the excavation until the ground slab and possibly other permanent works are constructed.

Stage 4. Dry packing

POINT DRILLING SERVICES

ADDRESS: BIRDSNEST, OAKMEAD ROAD, ST OBYTH ESSEX. CO16 8NL EMAIL: YLOWTHER@AOL.COM

TELEPHONE: 01255 821004. MOBILE: 07771 533 402

SITE INVESTIGATION BORE HOLE LOG

DATE: 15.3.24

SITE ADDRESS:

23 HILLSIDE RD. STAMFORD HILL N15

BOREHOLE LOG REF: 1

DEPTH	DESCRIPTION	SOIL/ROOT SAMPLE	TEST RESULT	DEPTH OF TEST
0	SLAB OVER SHARP SAND.			
1.50	LEAN MIX			
2.00	SOFT, ORANGE/BROWN SILTY CLAY			
4.00	SOFT, ORANGE/BROWN, SLIGHTLY SILTY CLAY			
7.00	SOFT, TO FIRM, MID BROWN, GREY VEIN, SLIGHTLY SILTY CLAY WITH OCC ORANGE SILT PARTINGS		V 60, 60 66	1.0
1.3	AS ABOVE (FIRM) (NO ROOTS SEEN)		V 80, 86 90	1.5
1.6	AS ABOVE (FIRM TO STIFF) (NO WATER)		V 94, 96 96	2.0
2.3	AS ABOVE (STIFF)		V 114, 116 124	2.5
			V 130, 132 130	3.0
			V 120, 126 130	3.5
3.8	VERY STIFF, DARK BROWN, SLIGHTLY SILTY CLAY WITH OCC ORANGE SILT PARTINGS		V 140+	4.0
5.0	BH END DRY & OPEN		V 140+	5.0

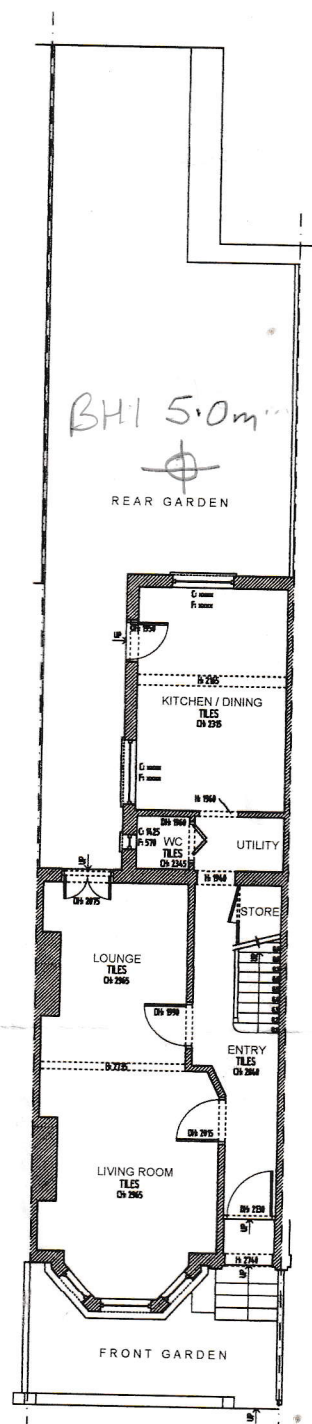
KEY: ● DISTURBED SAMPLE.

V: VANE TEST.

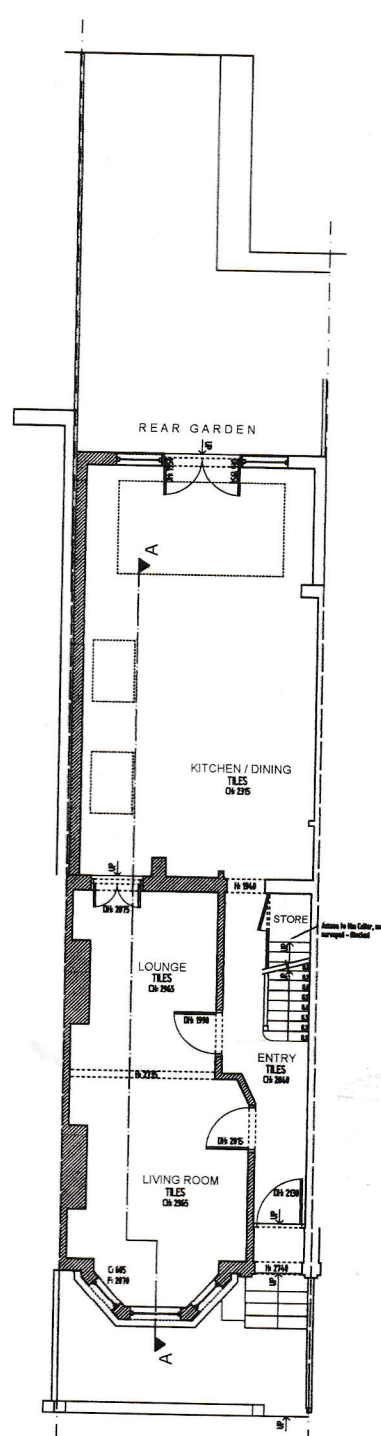
MP: MACINTOSH PROBE TEST.

R: ROOT SAMPLE

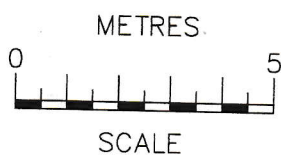
15.3.24



Existing Ground Floor



Proposed Ground Floor



AJ PLANS
info@ajplans.co

NOTES
The contractors are to check all the dimensions, levels, drain runs and general condition of the site before works commence.

All works are to be carried out in accordance with current Building Regulations, British Standards, Code of Practice and Local Authority Requirements.

Project:

23 Hillside Road,
London N15 6LU

Title: **EXISTING & PROPOSED
Site Plan**

Date: 19.06.20

Scale: 1:100 @ A3

Dwg. No. HR.23.EX&PR.SP

Rev: