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SEVENOAKS

465-467 Finchley Rd

London NW3 6HS

Planning Application

Basement Impact Assessment &

Construction Method Statement

Project No. AB1115

Report No. R1

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Contents

1. Introduction

ABSTRUCT LLP have been appointed by Mr A. Govani for the preparation of a Basement Impact Assessment (BIA) and Construction Method Statement (CMS) to accompany the planning application for the proposed new basement below the existing end of terrace building at 465-467 Finchley Road, London .

2. Scope

Our appointment is based on our fee proposal letter dated 12th January 2015 to Mr. A Govani which details our Terms & Conditions of Appointment and Limit of Liability.

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The object of this report was to produce an impact assessment for the proposed new basement construction on this site all in accordance with the requirements of the London Borough of Camden. These include LB Camden Development Policy DP27 – "Basements and Lightwells" and the LB Camden guidance document "Camden geological, hydrogeological and hydrological study – Guidance for subterranean development" by Arup November 2010.

This report covers the following steps of

- Screening
- Scoping
- Site investigation and Study
- Basement Retaining Wall Design
- Construction Method Statement
- Impact Assessment

The information in relation to the Geotechnical Desk Study has been incorporated within the body of the appended report by Southern Testing Laboratories Ltd (Report No. STL: J12147 dated March 2015).

3. Site Location

The site comprises an existing end of terraced property 465-467 Finchley Road, London NW3 6HS. The approximate Nation Grid Reference of the site is TQ 256 853.

4. Existing Building General Description

The existing property at 465-467 forms the end of terrace of a four storey block containing ground floor shop units with residential /office accommodation to the upper floors. To the rear there is an existing lower ground semi -basement with an upper ground floor and flat roof over. The building has been left empty for a number of years and parts of the building are in a bad state of disrepair.

The building is of Victorian era. It is constructed principally with solid load bearing external brick walls with a solid brick dividing wall (reduces in thickness up the building) for the full height of the building which was the former party wall between 465 and 467. At ground floor level there are a number of load-bearing steel columns embedded within this dividing wall and also within the shop front and front left corner of the building.

The ground floor steel columns terminate at first floor level where they support load bearing steel beams and load bearing solid brick walls over. There are also load bearing solid brick walls to the rear of the main four storey section of the building from ground to roof level.

At first floor level there is an existing steel and concrete filler joist floor structure with timber joists placed directly on top of the steel filler joists. For the main front part of the four storey building the filler joists span left to right between main steel beams which in turn span to the ground floor columns. To the rear section of the four storey block the first floor filler joists change direction to span between an internal steel beam and the main rear load bearing solid brick wall.

The existing second and third floors comprise traditional timber joists which span from front to back direction. They are supported on the front and rear elevation solid brick walls and internally via load-bearing timber stud walls which bear on to the first floor filler joists (transfer level). At roof level the existing structure comprises a timber joisted flat roof

The existing foundations have been investigated via trial pits and found to comprise traditional corbelled brick footings on relatively thin mass concrete strip footings bearing on to London Clay. The existing floors at ground floor and rear lower ground floor level were found to be un-reinforced mass concrete ground bearing concrete slabs.

There are no trees within close proximity of the existing building. Externally the ground pavement levels fall from north to south on Finchley Road and around the corner in to West End Lane which falls towards the west.

5. Proposed Development

The proposed development comprises the following main areas of construction:

- Construction of a new single level basement below the footprint of the main front part of the building. (Note the rear already has a semi-basement and the level of this will not be altered)
- For the superstructure works it is proposed to carry out a full refurbishment of the main body of the building.
- As part of the refurbishment of the upper levels it is proposed to install new steel beams spanning side-to-side to support the floor joists enabling the existing load-bearing stud walls to be removed and the floor plans to be re-configured.
- Complete new roof structure over the entire building.
- Demolition and re-build of the left hand side with a new superstructure and roof over.
- Re positioned internal stair core for full height of the building.
- Re-modelling and re-building the 2 storey area at the rear. Existing semi basement to receive a new ground bearing slab. A new timber joisted floor will be installed to the rear upper ground floor and new timber joisted flat roof over.

6. Screening

In preparing the Screening Assessment the procedures set out in the following documents have been used:

- Camden Planning Guidance CPG 4
- Camden Development Policies
- Camden Geological, Hydrogeological and Hydrological Study

The questions and answers for the Screening Assessment are incorporated within the Screening Section 1 of the appended report by Southern Testing Laboratories Ltd (Report No. STL: J12147 dated March 2015).

7. Scoping

On the basis of this screening exercise, it was concluded that there were a number of items that needed to be investigated further and taken into the scoping stage of the process. The Scoping Assessment is incorporated within the Scoping Section 2 of the appended report by Southern Testing Laboratories Ltd (Report No. STL: J12147 dated March 2015).

These are as follows:

- A geotechnical investigation to confirm the ground conditions underlying the site.
- Groundwater monitoring.
- A series of trial pits to establish party wall foundations.
- An assessment of the potential impact of the new basement on groundwater levels and also the potential cumulative effects on the groundwater environment in the area.
- An assessment of potential surface water flooding at the site, from the neighbouring highway.
- An assessment of any ground movements in relation to the nearby Highway and adjacent property.

The reader is referred to the appended Stage 3 Ground Investigation report by Southern Testing Laboratories Ltd (Report No. STL: J12147 dated March 2015) which considers the above issues.

8. Site Investigation and Study

The reader is referred to the appended Stage 3 Ground Investigation report by Southern Testing Laboratories Ltd (Report No. STL: J12147 dated March 2015)

To summarise:

- Geological records indicate the site to be underlain by London Clay with a propensity for being overlain by Head Deposits.
- A single phase of intrusive investigation was carried out.
- The soils encountered comprised Made Ground over London Clay. The London Clay was proved to a depth of 6.0m below the existing ground floor level.
- During the course of the site works groundwater was not in the exploratory trial pits and borehole. In the subsequent groundwater monitoring visits of the standpipe installed in WS1 groundwater levels of between 3.6m and 3.8m from existing ground floor level were measured.
- The soluble sulphate content of the natural clays soils was found to fall within Class DS-4. The ACEC classification for the site is AC-3s.

9. Constructing the New Basement

The proposals are to construct a new single level basement with new footings at approximately 3.7m depth below the existing main front section of the existing building. Trial pits carried out have revealed that the existing footings are traditional corbelled brickwork on to thin mass concrete strip footings at relatively shallow depth below the existing ground floor level.

It is proposed to carry out mass concrete underpinning below the right hand party wall and to the front and rear elevation walls in order to extend the founding level of these existing walls to below the new basement slab level. The underpinning will be carried out in 1.0m wide sections using a two-stage underpinning construction method. Sacrificial mesh reinforcement will be contained with the sections to give temporary vertical bending strength of the underpins during later basement excavation.

To the left hand side the existing south gable end superstructure is to be demolished and re-built. Therefore along this wall line the existing corbelled brick footings and their thin mass concrete footings will be grubbed out a new deep footing will installed in either mass concrete or as a contiguous piled wall. The rear section of the main building will also have the superstructure demolished but the semi-basement and ground floor wall will remain and this wall will also be underpinned.

Internally, new sacrificial temporary footings in the form of concrete pads or piles with steel plunge columns will initially be formed at approximately 3.5m below ground level using localised excavation. Temporary vertical propping is then to be installed on top of these footings to enable the existing loads from the spine wall columns to be temporarily supported. This will then enable the existing internal column footings, 'spine wall' footings and front column footings to be removed and new permanent footings to be formed at the new basement level. New RC walls will then be constructed within the basement to re-support the columns and spine wall over.

To the perimeter of the new basement footprint the inside faces of the underpins will have temporary diagonal strutting installed as required to restrain the tops of the underpins. Excavation will then proceed within the basement down to slab and footing formation level with further levels of temporary strutting installed as required.

New footings will constructed at basement level for the new basement internal walls. The new perimeter retaining wall bases and basement slab will be formed and cast monolithically.

The entire perimeter of the basement will have new RC retaining walls cast in front of the underpins/new footings. The perimeter basement RC retaining walls will be designed to span vertically in the permanent condition and will be restrained by the RC ground floor slab and new basement slab. They also carry loads from the new ground floor slab.

For the possible effects of ground water uplift the basement slab itself will be designed to span between the bases and heave protection will be provided below the basement slabs to counteract the effect of heave.

The retaining walls and basement slab will be constructed with water resisting concrete with minimum thickness of 250mm. In addition there will be a drained cavity wall system internally. All construction joints will be treated with hydrophilic strips to prevent water ingress.

Once the new basement slab, internal walls and perimeter RC retaining walls are completed then the new ground floor steel beams and slabs are constructed off the top of these in order to restrain the top of the retaining walls. On completion of the ground floor structure the basement internal diagonal strutting can be removed.

Any perched water encountered during the basement construction will be pumped out and the formation level of the underpins will be scraped immediately prior to concreting to ensure that the new concrete will be in contact with un-softened London Clay. Groundwater is not expected to be an issue in the London Clay.

Refer to the Construction Method Sequence for diagrams of the proposed basement construction.
Refer to Appendix A for structural General Arrangement Drawings of the proposed basement.

10. Basement and Retaining Wall Design

The new basement will be built by creating a new reinforced concrete 'box' which will support the vertical loads of the new ground floor over as well as resisting the perimeter ground surcharge and ground lateral loads. The retaining walls will not need to support vertical loads from the perimeter walls or columns as these loads are carried independently by the new underpins/new mass concrete footings outside of the RC walls. The base of the concrete box will bear on to the existing London Clay stratum at low level.

The perimeter basement RC retaining walls will be designed to span vertically in the permanent condition and will be restrained by the RC ground floor slab and new basement slab. They also carry loads from the new ground floor slab. The walls are designed for a surcharge loading of either 5kPa (for adjacent shop load) or 10kPa for loading on the pavement.

In the design calculations it is proposed to take a worst case scenario for height of ground water as full depth of the basement.

Calculations are presented for the basic design of the RC walls and base and to check the bearing capacity below the bases.

A P-disp analysis has been carried out by Southern Testing and the results are presented in Appendix E of their report. Their analysis indicates that the maximum predicted immediate (un-drained) heave displacement is a maximum 10mm occurring beneath the central point of the basement floor area. The total long term drained heave movement (which includes the initial undrained heave movement) occurs at the same point and is 16mm.

It is proposed to place 50mm of 'Cellcore' heave protection below the inner areas of new basement slab in order to counteract any heave issues.

Long term settlement of the underpins is expected to be negligible due to the fact that they will be placed in more consolidated London Clay at lower depth. The existing building has been in existence for a considerable number of years so the London Clay is consolidated.

Displacement monitors will be attached to the existing building walls and checked regularly during the underpinning and basement construction process to check for any settlements and movements.

BS 8102: 2009 Code of practice for the protection of below ground structures against water from the ground defines 4 Grades of basement:

1 - Basic utility (car parking, plant rooms (excluding electrical equipment), workshops)
2 - Better utility (workshops and plant rooms requiring drier environments than Grade 1)
3 - Habitable (ventilated residential and commercial areas)
4 - Special (archives, requiring controlled environments)

The new basement will fall under Grade 3. As such, the concrete for the new rear basement RC structure will contain a waterproofing additive such as 'Caltite' or similar approved. The basement will also be provided with a secondary system of waterproofing via means of a drained cavity system such as 'Delta Drain' or similar approved.

The structural calculations are presented in appendix B of this report.

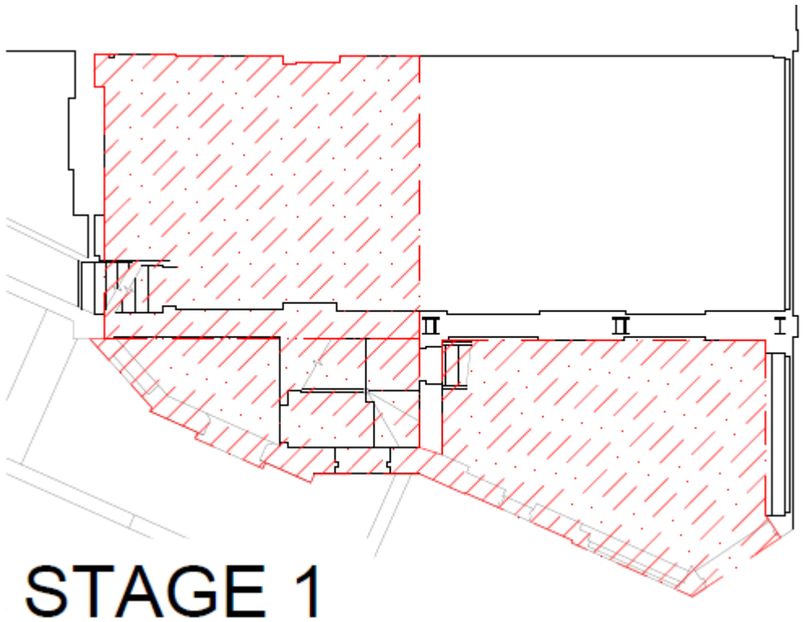
11. Basement - Construction Method Statement

The proposed construction is take place broadly in the sequence as follows:

Stage 1 Demolish existing south gable end of the building and rear superstructure of main block

Soft Strip of existing building including removing all windows and doors

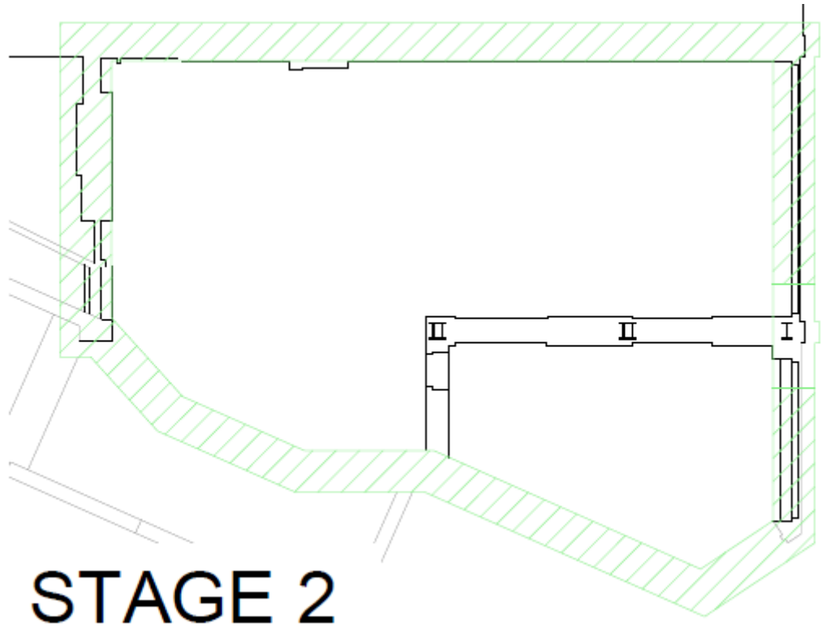
Make alterations to the upper floors and roof



STAGE 1

Stage 2 Carry out mass concrete underpinning below the right hand party wall and to the front and rear elevation walls in order to extend the founding level of these existing walls to below the new basement slab level.

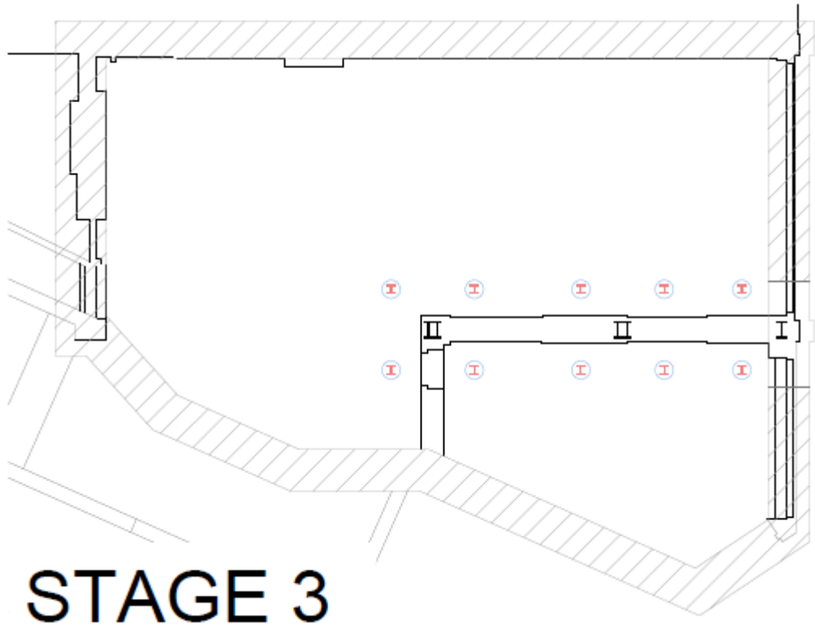
To left side of building install new footing in either mass concrete or as a contiguous piled wall.



STAGE 2

Stage 3 Install new sacrificial temporary footings for temporary vertical propping

Install temporary vertical propping of superstructure over.

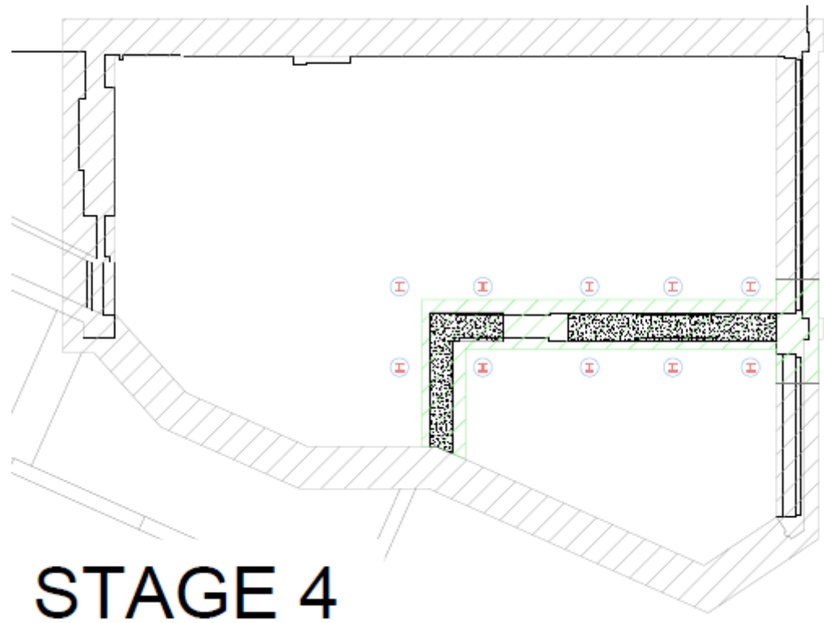


STAGE 3

Stage 4 Remove existing internal column footings, ‘spine wall’ footings and front column footing.

Construct new permanent footings to be formed at the new basement level via underpinning method.

Localised constructed of new RC walls within the basement to re-support the columns and spine wall over.

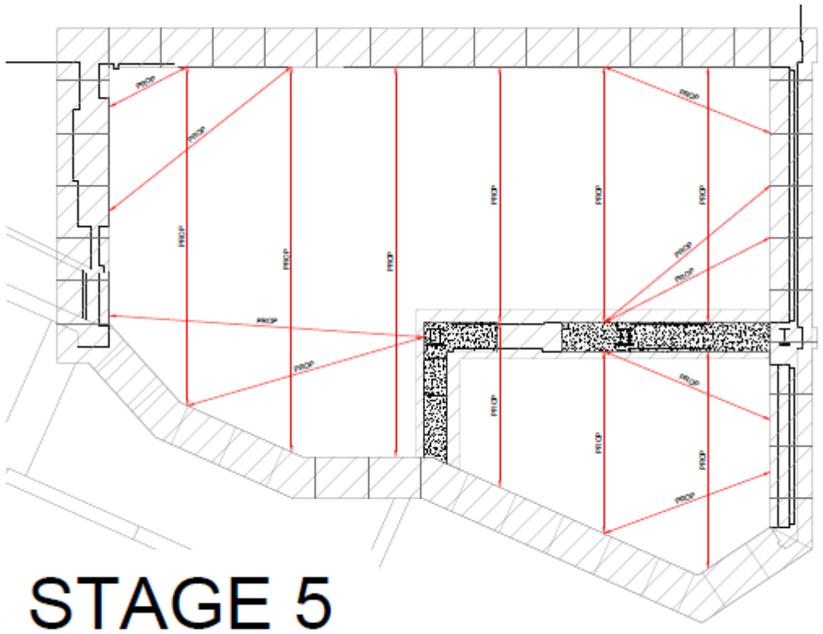


STAGE 4

Stage 5

To the perimeter of the new basement footprint the inside faces of the underpins will have temporary diagonal strutting installed as required to restrain the tops of the underpins.

Excavation will then proceed within the basement down to slab and footing formation level with further levels of temporary strutting installed as required.

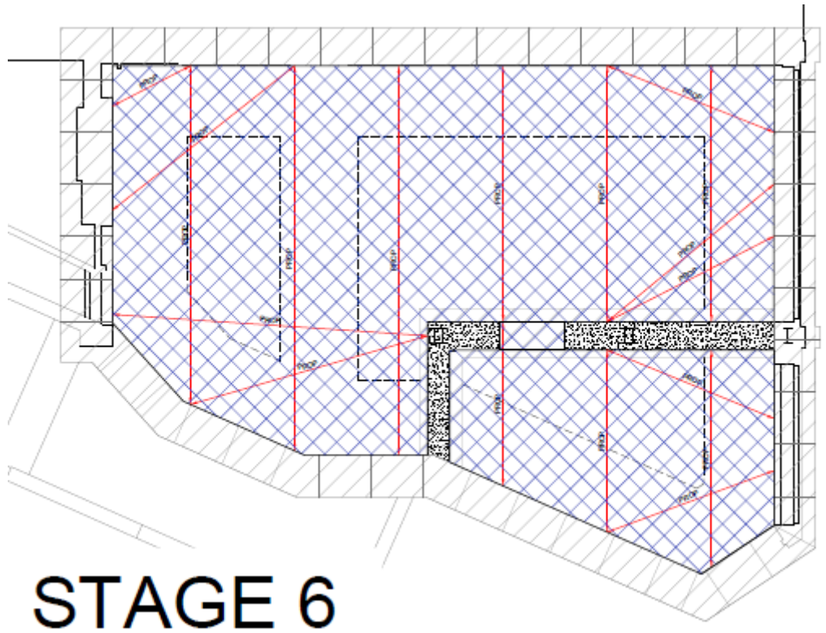


STAGE 5

Stage 6

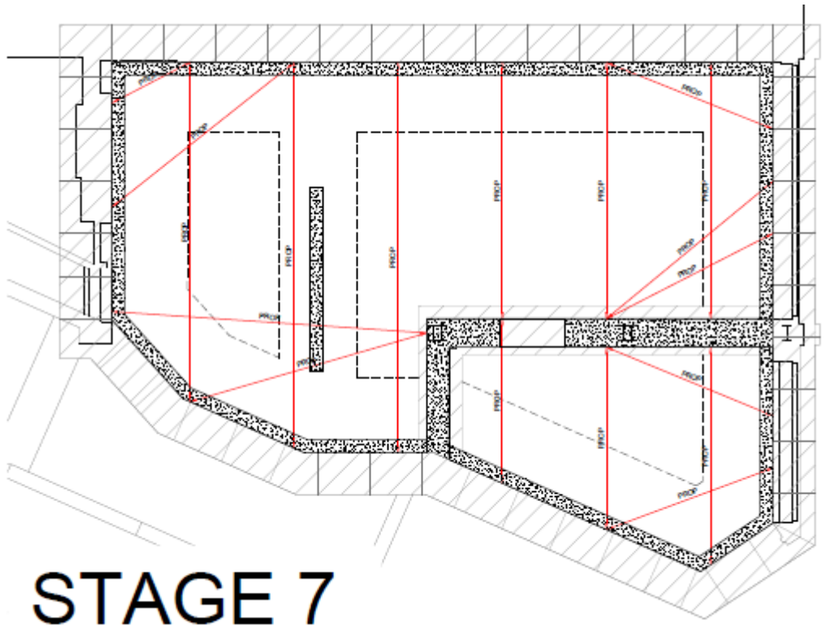
Construct new footings at basement level for the new basement internal walls.

New perimeter retaining wall bases and basement slab will be formed and cast monolithically.

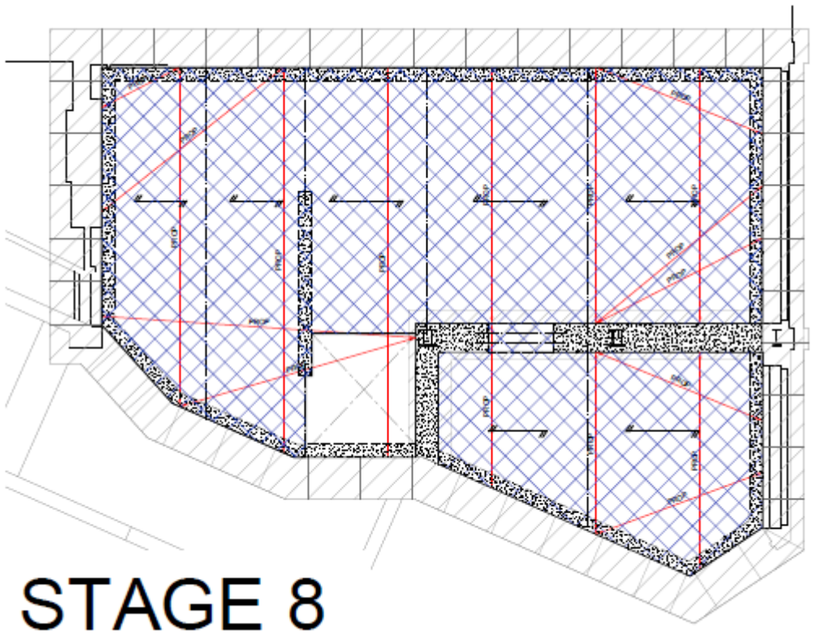


STAGE 6

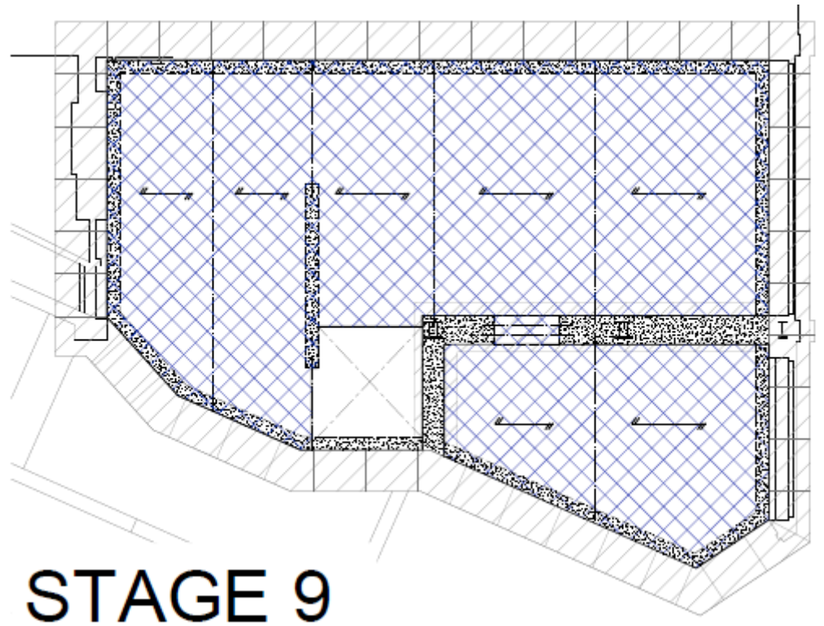
Stage 7 New perimeter RC retaining walls and internal RC wall to be constructed.



Stage 8 Install the new ground floor steel beams and slabs.



Stage 9 On completion of the ground floor structure the basement internal diagonal strutting can be removed.



On completion of stage 9 the new superstructure to the remainder of the building can be constructed.

12. Drainage

We understand that the existing drainage from the building is via gravity connection towards the rear existing semi-basement where there is an existing manhole with outfall to a main sewer in West End Lane.

There is no change in surface area of hard standings or roofs and the surface water will be collected via same means.

The additional foul water from the basement area (i.e. WC's and any future kitchens etc.) will be via pumped drainage up to the rear existing semi-basement level where it will connect to the main building gravity drainage system. The 'delta' drain system will be connected to a local sump within the basement with pumped connection to the main drainage system.

13. Surface Water Flooding

According to the Surface Water Flooding map, Figure 5 from Core Strategy, London Borough of Camden, the site is not in a location which is prone to surface water flooding.

However, the map does show that Finchley Road and West End Lane roads were both flooded in 2002 during a storm event.

In terms of the basement and in consideration of the topography of the roads, any surface water flooding on Finchley road will move away from the site down the Finchley road in a south-east direction. Similarly, any surface flooding on West End land will fall away from the site down West End Land towards the west.

It is highly unlikely if there is an unusual event of surface water flooding for surface water to enter the basement.

14. Monitoring and Contingency Plan

It is proposed to carry out traditional mass concrete underpinning below the side party walls, below the front and rear elevation walls and the internal load-bearing 'spine wall' to extend the founding level of these existing walls to below the new basement slab level.

Long term settlement of the underpins is expected to be negligible due to the fact that they will be placed in more consolidated London Clay at lower depth.

The following monitoring and contingency plan is proposed:

- Monitoring survey points will be installed on the existing building walls at ground floor level in defined locations for measuring horizontal and vertical displacements.
- Readings will be taken <u>every day</u> during the underpinning & process to check for movements.
- The limits for vertical & horizontal movements in the short term during construction stage in these areas are to be kept within the following:
  a. For the existing party walls: Movements of existing walls <1.0mm (Burland Category 1)
  b. For the rear, front and new side walls <5.0mm (Burland Category 2). Note that any movements to these walls can be repaired easily during construction as they are within the building.
- If vertical and/or horizontal displacements greater are recorded then ABSTRUCT are to be informed immediately to review and advise on course of action.
- Contingency measures may include combinations of any of the following.
  1) Site visit by ABSTRUCT to inspect the construction at that stage
  2) Reducing the widths of the underpins
  3) The depth of the 'scrape' or underpin is to be increased until virgin clay is encountered
  4) The sequencing of the underpins to be altered
  5) The timing between underpins/ wall constructions is to be increased
  6) Additional temporary horizontal strutting and/or walings are to be provided (for the rear basement construction)
- These contingencies are to be discussed and agreed between ABSTRUCT and the contractor.

Category of damage	Description of typical damage	Approximate crack width (mm)	Limiting tensile strain εlim (per cent)
0 Negligible	Hairline cracks of less than about 0.1 mm are classed as negligible	<0.1	0.0-0.05
1 Very slight	Fine cracks that can easily be treated during normal decoration. Perhaps isolated slight fracture in building. Cracks in external brickwork visible on inspection	<1	0.05-0.075
2 Slight	Cracks easily filled. Redecoration probably required. Several slight fractures showing inside of building. Cracks are visible externally and some repointing may be required externally to ensure weathertightness. Doors and windows may stick slightly.	<5	0.075-0.15

Extract from Burland Damage Category Chart (CIRIA C580)