

# **Basement Impact Assessment**

**Of**

**30A Thurlow Road,  
Camden,  
London,  
NW3 5PH**

**for**

**Mr Mark Davies**

LBH4346bia Ver 1.2

September 2015

**LBH**  
**WEMBLEY**



**Geotechnical &  
Environmental**

Project No: LBH4346bia

Report Ref: LBH4346bia Ver 1.1

Date: 22<sup>nd</sup> September 2015

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## Foreword-Guidance Notes

### GENERAL

This report has been prepared for a specific client and to meet a specific brief. The preparation of this report may have been affected by limitations of scope, resources or time scale required by the client. Should any part of this report be relied on by a third party, that party does so wholly at its own risk and LBH WEMBLEY Geotechnical & Environmental disclaims any liability to such parties.

The observations and conclusions described in this report are based solely upon the agreed scope of work. LBH WEMBLEY Geotechnical & Environmental has not performed any observations, investigations, studies or testing not specifically set out in the agreed scope of work and cannot accept any liability for the existence of any condition, the discovery of which would require performance of services beyond the agreed scope of work.

### VALIDITY

Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances shall be at the client's sole and own risk. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should therefore not be relied upon in the future.

### THIRD PARTY INFORMATION

The report may present an opinion on the disposition, configuration and composition of soils, strata and any contamination within or near the site based upon information received from third parties. However, no liability can be accepted for any inaccuracies or omissions in that information.

### DRAWINGS

Any plans or drawings provided in this report are not meant to be an accurate base plan, but are used to present the general relative locations of features on, and surrounding, the site.

## Introduction

### 1.1 Background

It is proposed to redevelop this site through the demolition of the existing single storey property and the construction of a new two storey house with a single level of basement.

Planning permission had previously been granted for a basement development at this site (Planning Reference 2013/1613/P) however following changes to the development plans (the addition of a second storey and change in basement footprint); a new Basement Impact Assessment (BIA) is required. A comparison of the two schemes is shown in the geotechnical, hydrogeological & ground movement assessment report that accompanies this document.

### 1.2 Brief

LBH WEMBLEY Geotechnical & Environmental have been appointed to carry out a Basement Impact Assessment (BIA) for submission to London Borough of Camden in order to satisfy the specific requirements of Camden Planning Policy DP27 on Basements and Lightwells and Supplementary Planning Guidance CPG4 on Basements and Lightwells.

### 1.3 Planning Policy

The CPG4 Planning Guidance on Basements and Lightwells refers primarily to Planning Policy DP27 on Basements and Lightwells.

The DP27 Policy reads as follows:

*In determining proposals for basement and other underground development, the Council will require an assessment of the scheme's impact on drainage, flooding, groundwater conditions and structural stability, where appropriate. The Council will only permit basement and other underground development that does not cause harm to the built and natural environment and local amenity and does not result in flooding or ground instability. We will require developers to demonstrate by methodologies appropriate to the site that schemes:*

- a) *maintain the structural stability of the building and neighbouring properties;*
- b) *avoid adversely affecting drainage and run-off or causing other damage to the water environment;*
- c) *avoid cumulative impacts upon structural stability or the water environment in the local area;*

*and we will consider whether schemes:*

- d) *harm the amenity of neighbours;*
- e) *lead to the loss of open space or trees of townscape or amenity value;*
- f) *provide satisfactory landscaping, including adequate soil depth;*
- g) *harm the appearance or setting of the property or the established character of the surrounding area; and*
- h) *protect important archaeological remains.*

*The Council will not permit basement schemes which include habitable rooms and other sensitive uses in areas prone to flooding. In determining applications for lightwells, the Council will consider whether:*

- i) *the architectural character of the building is protected;*
- j) *the character and appearance of the surrounding area is harmed; and*

*k) the development results in the loss of more than 50% of the front garden or amenity area.*

In addition to DP27, the CPG4 Guidance on Basements and Lightwells also supports the following Local Development Framework policies:

Core Strategies:

- CS5 Managing the impact of growth and development
- CS14 Promoting high quality places and conserving our heritage
- CS15 Protecting and improving our parks and open spaces & encouraging biodiversity
- CS17 Making Camden a safer place
- CS18 Dealing with our waste and encouraging recycling

Development Policies:

- DP23 Water
- DP24 Securing high quality design
- DP25 Conserving Camden's heritage
- DP26 Managing the impact of development on occupiers and neighbours

#### **1.4 Documents Consulted**

The following documents should be read in conjunction with this report:

- November 2010 - Camden geological, hydrogeological and hydrological study, Guidance for subterranean development (CGHHS), prepared by Arup.
- November 2010 - Camden Development Policy 27 (DP27) Basements and lightwells, Local Development Framework.
- July 2015 - Camden Planning Guidance 4 (CPG4) Basements and lightwells, Supplementary Planning Document (SPD)
- September 2015 - 30A Thurlow Rd, Geotechnical, hydrogeological & ground movement assessment LBH4346gma ver 1.1, prepared by LBH WEMBLEY Geotechnical & Environmental.

The geotechnical, hydrogeological & ground movement assessment includes a description of the site and the proposed development along with relevant desk study and site investigation information,

## 2. Stage 1 - Screening Assessment

### 2.1 Purpose and Methodology

Screening uses checklists to identify whether there are matters of concern (with regard to hydrogeology, hydrology or ground stability) which should be investigated using a BIA (Section 6.2 and Appendix E of the CGHSS) and is the process for determining whether or not a BIA is required. There are three checklists as follows:

- subterranean (groundwater) flow
- slope stability
- surface flow and flooding

### 2.2 Screening Checklist for Subterranean (Groundwater) Flow

Question	Response	Justification
Is the site is located directly above an aquifer?	<b>NO</b>	Although the Claygate Member is classed by the EA as a Secondary A Aquifer, unproductive clay strata without any sand seams have been found beneath the site and repeated monitoring for has not detected any groundwater presence.
Will the proposed basement extend beneath the water table surface?	<b>NO</b>	
Is the site within 100m of a watercourse, well (used/disused) or potential spring line?	<b>NO</b>	The nearest surface water feature is the River Fleet, now culverted, that is believed to flow some 350m to the north of the site.
Will the proposed development result in a change in the area of hard-surfaced/paved areas?	<b>NO</b>	See accompanying report. The proposals will not result in any significant change to the surfacing.
Will more surface water (e.g. rainfall and run-off) than at present will be discharged to the ground (e.g. via soakaways and/or SUDS)?	<b>NO</b>	Drainage will continue to be to the sewer in Thurlow Road.
Is the lowest point of the proposed excavation (allowing for any drainage and foundation space under the basement floor) close to or lower than the mean water level in any local pond?	<b>NO</b>	There are no nearby surface water features.

### 2.3 Screening Checklist for Stability

Question	Response	Justification
Does the existing site include slopes, natural or manmade, greater than 7 degrees?	<b>NO</b>	The slope along Thurlow Road itself has been calculated to be at an angle of less than 3 degrees.
Does the proposed re-profiling of landscaping at the site change slopes at the property boundary to more than 7 degrees?	<b>NO</b>	No changes to the slopes at the property boundaries are planned.
Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7 degrees?	<b>NO</b>	The slope along Thurlow Road itself has been calculated to be at an angle of less than 3 degrees.
Is the site within a wider hillside setting in which the general slope is greater than 7 degrees?	<b>NO</b>	No. Figure 16 of the CGHHS shows the site to be in an area of zero to seven degrees slope.
Is London Clay the shallowest strata at the site?	<b>NO</b>	The Claygate Member is the highest natural strata.
Will trees be felled as part of the proposed development and/or are works proposed within tree protection zones where trees are to be retained?	<b>YES</b>	Carried forward to scoping.
Is there a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site?	<b>NO</b>	Some small scale evidence of cracks was evident upon visiting the site, within the existing shared garden wall with No.30 Thurlow Road. However this has been attributed to poor foundation design, rather than shrink-swell subsidence.
Is the site within 100m of a watercourse of a potential spring line?	<b>NO</b>	The nearest surface water feature is a tributary of the River Fleet, now culverted, that is believed to flow some 360m to the north of the site.
Is the site within an area of previously worked ground?	<b>NO</b>	No. Figure 2 of the CGHHS shows the site not to be in an area of worked ground.
Is the site within an aquifer?	<b>NO</b>	Although the Claygate Member is classed by the EA as a Secondary A Aquifer, unproductive clay strata without any sand seams have been found beneath the site and repeated monitoring for has not detected any groundwater presence.
Will the proposed basement extend beneath the water table such that dewatering may be required during construction?	<b>NO</b>	
Is the site within 50m of the Hampstead Heath ponds?	<b>NO</b>	The Hampstead Heath ponds are approximately 500m to the northeast of the site.
Is the site within 5m of a highway or pedestrian right of way?	<b>YES</b>	Carried forward to scoping.
Will the proposed basement significantly increase the differential depth of foundations relative to the neighbouring properties?	<b>YES</b>	Carried forward to scoping.
Is the site over (or within the exclusion zone of) tunnels, e.g. railway lines?	<b>NO</b>	The nearest tunnels are approximately 80m to the southeast.



## 2.4 Screening Checklist for Surface Flow and Flooding

Question	Response	Justification
Is the site within the catchment area of the pond chains on Hampstead Heath?	<b>NO</b>	The site is outside of the catchment areas of the Hampstead Heath ponds as shown in Figure 14 of the CGHHS
As part of the site drainage, will surface water flows (e.g. rainfall and run-off) be materially changed from the existing route?	<b>NO</b>	Surface water flows will be disposed of by the existing means.
Will the proposed basement development result in a change in the proportion of hard-surfaced/paved areas?	<b>NO</b>	See accompanying report. The proposals will not result in any significant change to the surfacing.
Will the proposed basement result in changes to the profile of the inflows (instantaneous and long-term) of surface-water being received by adjacent properties or downstream watercourses?	<b>NO</b>	All drainage is to the sewer as per existing.
Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	<b>NO</b>	All drainage is to the sewer as per existing.
Is the site in an area known to be at risk from surface water flooding, or is it at risk from flooding, for example because the proposed basement is below the static water level of a nearby surface water feature?	<b>NO</b>	Thurlow Road is not listed within CPG4 as being at risk of surface water flooding.

### 3. Stage 2 - Scoping Assessment

Where the checklist is answered with a “yes” or “unknown” to any of the questions posed in the flowcharts, these matters are carried forward to the scoping stage of the BIA process.

The scoping produces a statement which defines further the matters of concern identified in the screening stage. This defining should be in terms of ground processes, in order that a site specific BIA can be designed and executed (Section 6.3 of the CGHSS).

The issues identified from the checklists as being of concern in the previous sections are as follows:

- **Trees will be felled as part of the proposed development and/or works are proposed within tree protection zones where trees are to be retained**  
*The guidance advises that the soil moisture deficit associated with felled tree will gradually recover. In high plasticity clay soils (such as London Clay) this will lead to gradual swelling of the ground until it reaches a new value. This may reduce the soil strength which could affect the slope stability. Additionally the binding effect of tree roots can have a beneficial effect on stability and the loss of a tree may cause loss of stability.*
- **The site is within 5m of a highway or pedestrian right of way.**  
*The guidance advises that excavation for a basement may result in damage to the road, pathway or any underground services buried in trenches beneath the road or pathway.*
- **The proposed basement will significantly increase the differential depth of foundations relative to the neighbouring properties.**  
*The guidance advises that excavation for a basement may result in structural damage to neighbouring properties if there is a significant differential depth between adjacent foundations.*

The assessment of potential impacts is informed by an intrusive ground investigation and the above issues are to be carried forward for impact assessment.

## **4. Stage 3 – Site Investigation**

In June 2015 an intrusive site investigation was undertaken comprising a cable percussion borehole constructed to a depth of 20m alongside six window sample boreholes to a maximum depth of 5m and two dynamic probes to 10m.

Four trial pits were also hand excavated along the boundary walls of the site to reveal the configuration of existing foundations.

Three standpipes were installed to allow for subsequent groundwater monitoring.

The investigation findings are presented and discussed within the accompanying geotechnical, hydrogeological & ground movement assessment report (LBH4346gma).

## Stage 4 – Impact Assessment

The screening assessment has identified that the principal potential issues with the proposed development are associated with land stability.

### 4.1 Potential impact resulting from works close to existing trees

The results of plasticity index testing have confirmed the Claygate Member beneath the site to be of medium to high volume change potential. An 11m tall cherry tree is to be removed as part of the proposals and it is understood that this is to be replaced by a similar tree outside the new basement. The felling of the cherry tree has been granted planning permission. No threat to slope stability is perceived as a result of the removal of this tree.

### 4.2 Construction methodology

In order to construct the proposed development with the minimal possible impact upon the neighbouring environment the new basement is to be formed through an excavation supported laterally by a contiguous bored pile retaining wall installed using Continuous Flight Auger (CFA) techniques.

The engineer's current proposed construction methodology is envisaged to be as follows.

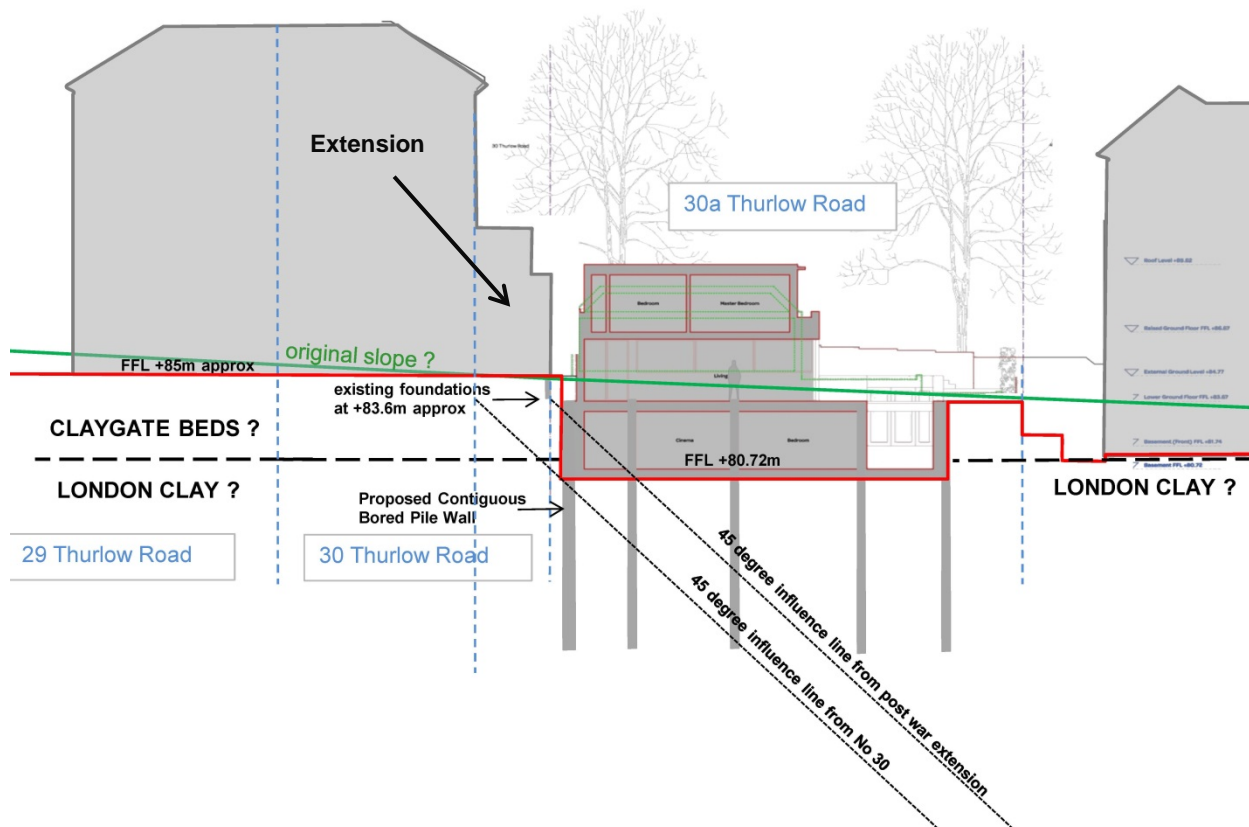
- Phase 1
  - Take down existing building
  - Remove ground slab and footings
  - Clear site and prepare for placing perimeter piling, including protection of trees
  - Place first stage monitoring system
- Phase 2
  - Place perimeter piling
  - Form capping beam
  - Reduce dig – to minimum depth required (700mm approx.) to allow placing of bracing system (incorporating cross and corner bracing)
  - Place second stage monitoring system
  - Place temporary pile propping system
- Phase 3
  - Carry out reduced level dig
  - Place tension piles
  - Complete excavation
  - Form raft slab
- Phase 4
  - Cast lower ground floor slab
  - Remove pile support temporary works
- Phase 5
  - Form R.C structure above ground floor slab
  - Basement and building completed
  - Continue non-structural works to completion

### 4.3 Ground movement

In line with policy DP27 Camden Council seek to ensure that harm will not be caused to neighbouring properties by basement development.

A key factor in the design of the new basement construction will be the need to preserve the stability of the adjacent buildings and highway at all times, both during excavation and construction and in the permanent situation.

It is readily concluded that there will be no significant risk to the integrity of the adjacent highway or to the services that have been identified as lying beneath Thurlow Road, but there is some risk to the



neighbouring building. While the adjacent structure at 30 Thurlow Road appears to be founded at a relatively high level, no underpinning is anticipated and the stability of these adjacent foundations will be maintained through preserving lateral earth support.

While the main building to 29/30 Thurlow Road is situated over 3m back from the proposed excavation and its foundations will arguably be outside the zone of possible influence from the excavation, the foundations to the post-War extension will be at some risk of movement due to the excavation.

A ground movement and damage category assessment has been undertaken based on a soil model devised from the results of the ground investigation and the construction proposals outlined in the previous section.

The results of the ground movement assessment indicate a predicted damage Category 1 (very slight) for No. 30 Thurlow Road, provided that inward yielding of the retaining wall is limited to a maximum horizontal strain of 0.015 %. This level of damage is associated only with aesthetic damage to buildings (see

Burland, J “The assessment of the risk of damage to buildings due to tunnelling and excavations”, Imperial College London, 1995)

CPG4 guidance recognises that residential properties are particularly sensitive to damage, as relatively minor internal damage to a person’s home can incur cost and considerable inconvenience to repair and redecorate and the Council expect mitigation measures to be employed where a risk of damage to residential buildings is identified of Burland Category 1 ‘very slight’ or higher.

In this case the assessment of Category 1 damage appears to be reasonable and the mitigation that has been planned is considered to be in accordance with accepted best practice.

#### **4.4 Monitoring and Contingency Plan**

The monitoring plan is to be sufficiently robust to enable mitigation to be effectively implemented in the event of agreed trigger values for vertical and horizontal movement being exceeded at agreed monitoring positions. During the actual basement excavation stage both start of shift and end of shift measurements will be implemented in order for movements to be checked and, in the event of any adverse movement, for the contingency plan to be effected sufficiently quickly to prevent the excessive movement to either the neighbouring property.

The plan will make it clear what emergency measures or mitigation may be required to be implemented in the event of an exceedance and will demonstrate the availability of the required resources. The plan will also identify exactly who will have the responsibility for implementing the plan.

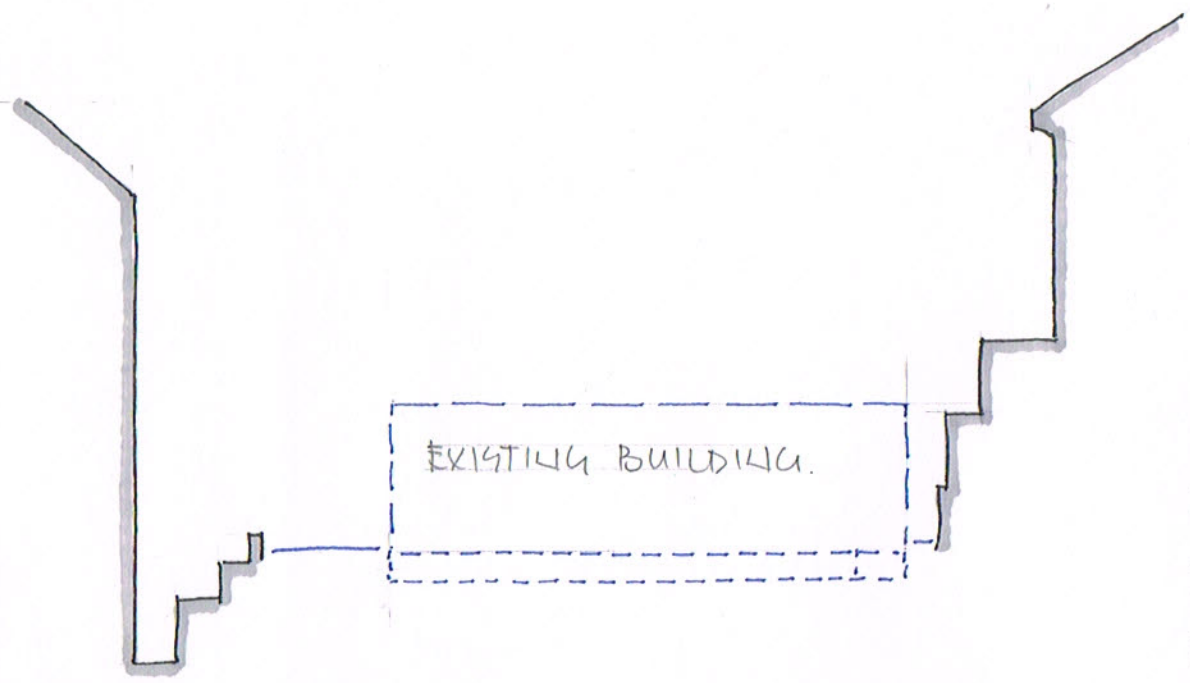
It is anticipated that the piling and subsequent excavation will in practice be separated by a number of weeks. This period will provide an opportunity for the ground movements due to piling to be assessed and for the ground movement analysis to be reviewed prior to the main excavation taking place so that propping proposals can be adjusted if required.

#### **4.5 Residual Impacts**

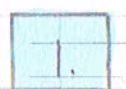
Given the mitigation measures afforded by the construction methodology that has been described, it is concluded that the proposed basement development will have no unacceptable residual impacts upon the surrounding structures, infrastructure and environment. Given the essentially impermeable nature of the soils that the new basement will be replacing, no cumulative impacts are envisaged.

# APPENDIX

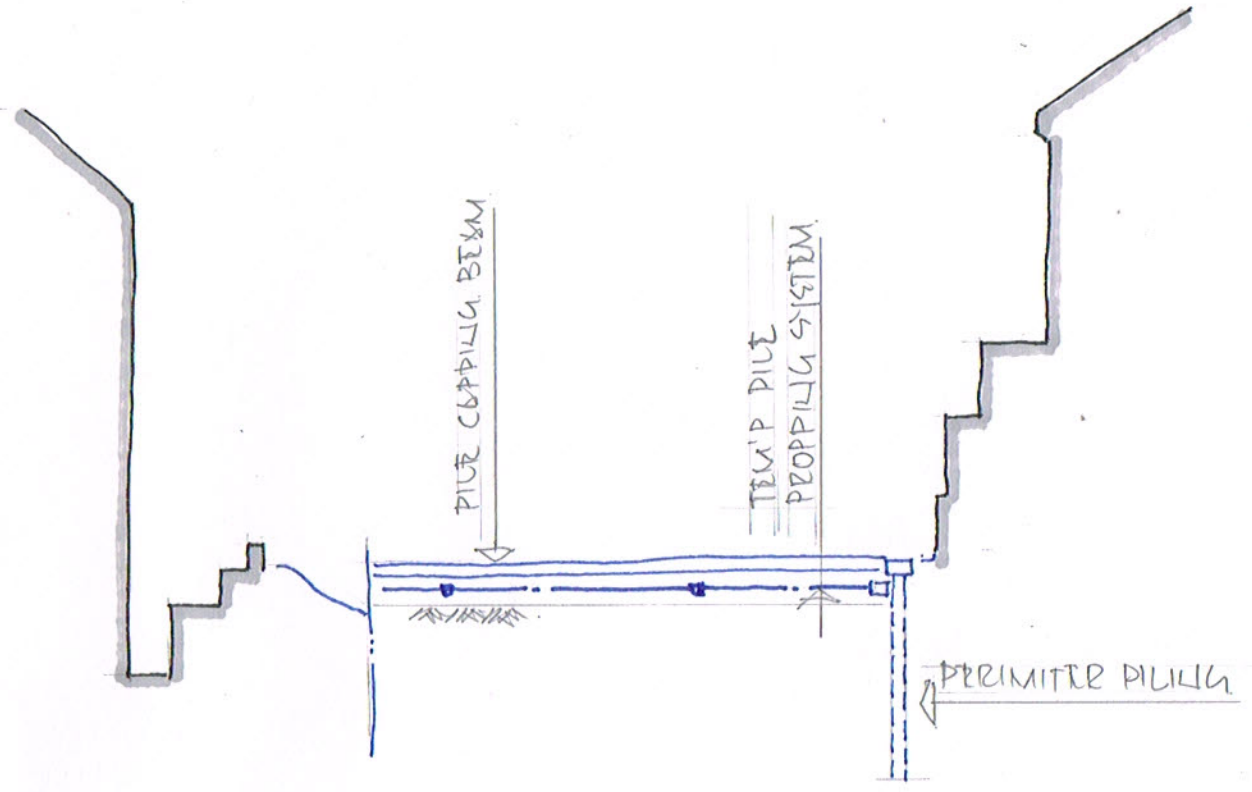
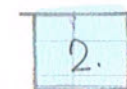
## CONSTRUCTION METHODOLOGY DRAWINGS



EXISTING BUILDING.



- 1. TAKE DOWN EXISTING BUILDING.
- 2. REMOVE GROUND SLAB AND FOOTINGS.
- 3. CLEAR SITE AND PREPARE FOR PLACING PERIMETER PILING INCLUDING PROTECTION TO TREES.
- 4. PLACE FIRST STAGE MONITORING SYSTEM.



PILE CAPPING BEAM

TEMP PILE PROPPING SYSTEM

PERIMETER PILING

- 5. PLACE PERIMETER PILING.
- 6. FORM CAPPING BEAM.
- 7. REDUCE DIG. - TO MINIMUM DEPTH REQUIRED (700mm APPROX) TO ALLOW PLACING OF PILE BRACING SYSTEM (INCORPORATING CROSS AND CORNER BRACING).
- 8. PLACE SECOND STAGE MONITORING SYSTEM.
- 9. PLACE TEMPORARY PILE PROPPING SYSTEM.

NOTE.  
GROUND WATER IDENTIFIED TO BE BELOW THE LEVEL OF BASEMENT DEPT SLAB

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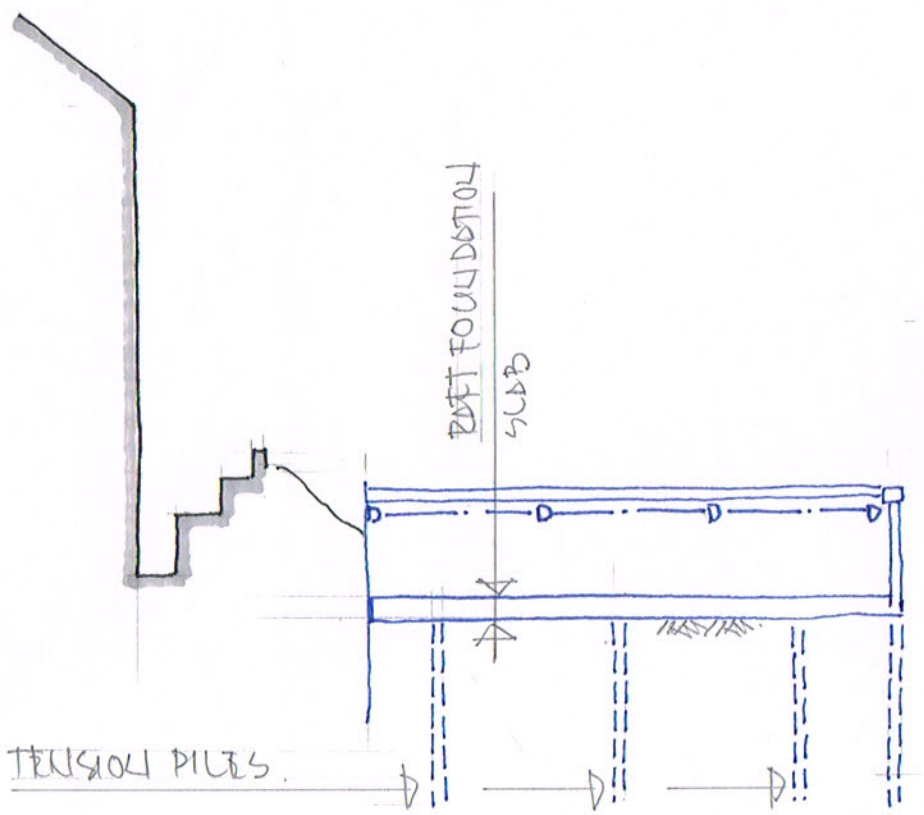
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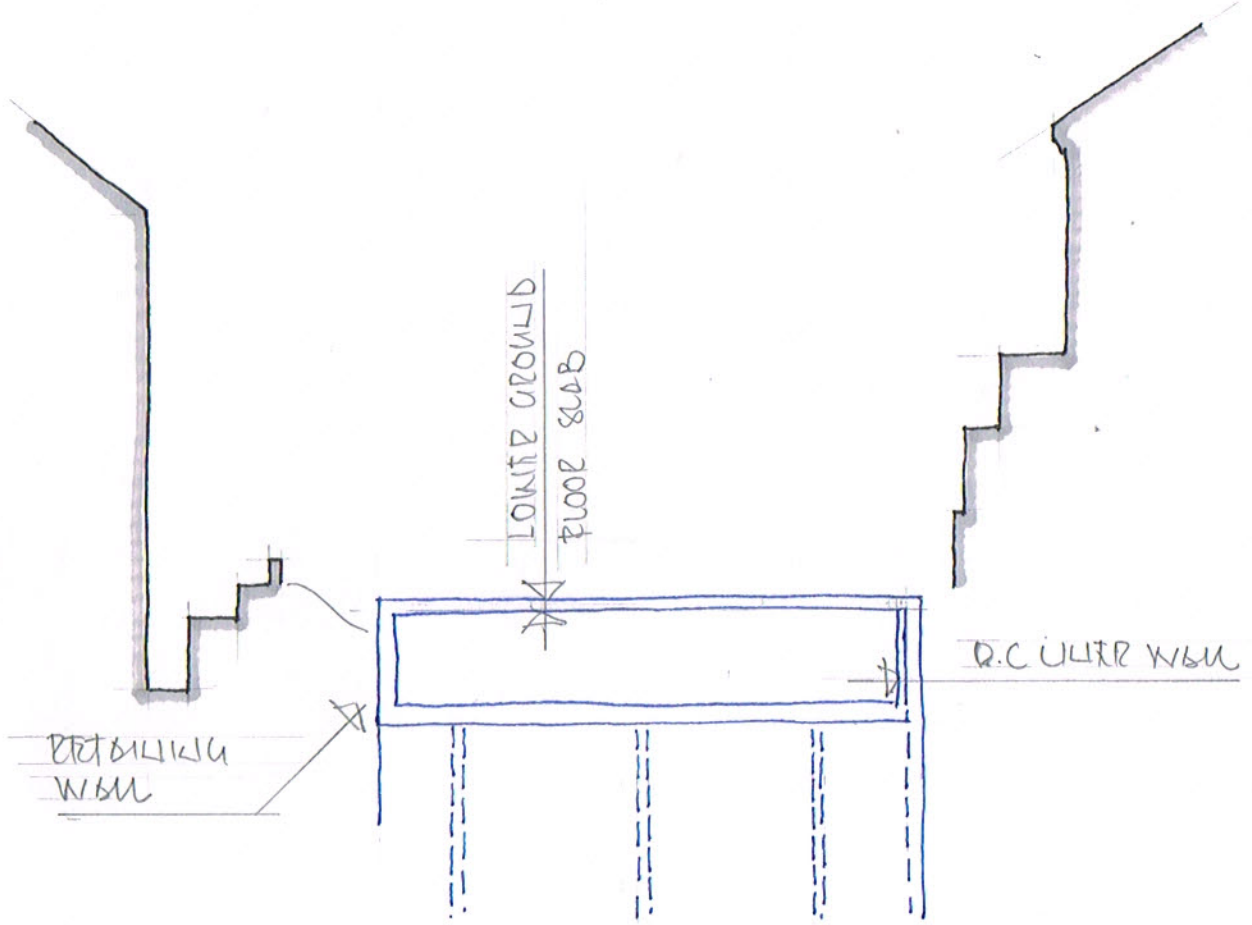




TENSION PILES

3

- COPY OUT REDUCED LEVEL DTM.
- PLACE TENSION PILES
- COMPLETE EXCAVATION
- FORM RBF SLAB.



RETAINING WALL

R.C ULTR W/M

LOWER GROUND FLOOR SLAB

4.

- CAST R.C ULTR W/M TO FACE OF CONTIGUOUS PILE WALLS AND RETAINING WALLS.
- CAST LOWER GROUND FLOOR SLAB
- REMOVE PILE SUPPORT TEMPORARY WORKS.

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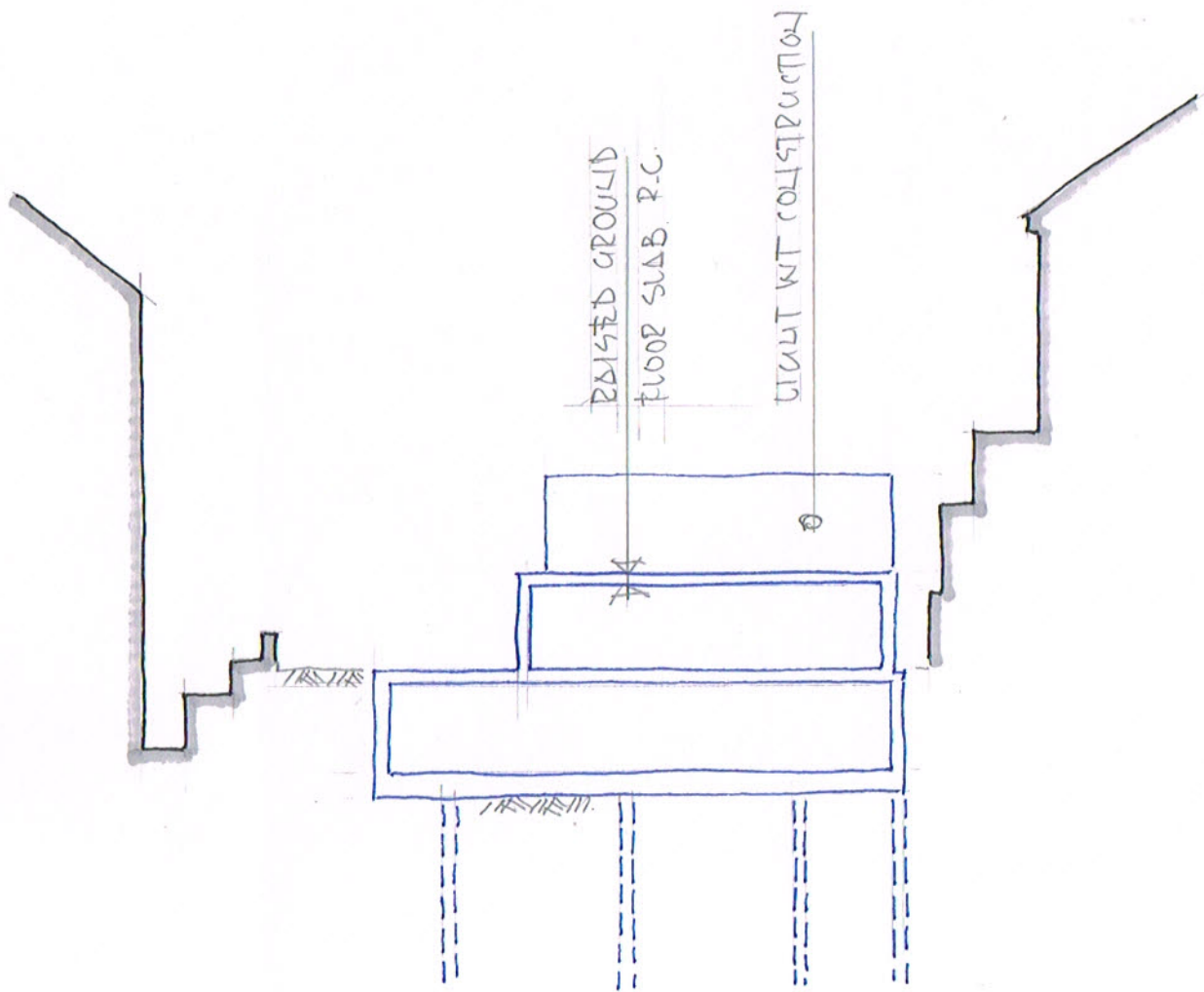
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2/6551	SCS-02.	P1.

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5

- ⓐ FORM R.C. STRUCTURE ABOVE LOWER GROUND FLOOR SLAB
- ⓑ FORM LIGHT WEIGHT STRUCTURE TO UPPER GROUND FLOOR.

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