PRICE&MYERS

REPORT

# Sarum Hall School, London NW3

## Structural Engineer's Report and Basement Impact Assessment Screening

### Contents



### Appendices




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| Date | Version | Notes / Amendments / Issue Purpose |
|---|---|---|
| January 2016 | 1 | For Information |




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# 1 The Site

The site is at the back of a purpose built detached brick building built in the early 90s. Situated on the South side of Eton Avenue in Camden.

Desk study research (in Appendix A) shows the site location.

# 2 Ground Conditions

Published geological maps indicate that the site will be underlain directly by the London Clay stratum in common with much of North London. This has been corroborated by recent experience in nearby areas.

Price and Myers were the structural engineers when the building was built in the 90s and from the structural drawings at the time we know that the building is founded on

# 3 Proposed Structure

### Substructure
The project involves excavating an existing under croft to the rear of the building by approximately 1.5 metres to create a new classroom space and access stair well. It involves approximately 6 piles to be cut down and reused if the capacity is not exceeded, as well as the removal of some existing ground beams. The new classroom will be constructed using reinforced concrete slab and walls to retain the surrounding ground, with a drained cavity.

### Superstructure
The superstructure consists of removing approximately three quarters of the existing steps down from the terrace above the new classroom and building out at terrace level to the width of the bottom step, see structural plans in Appendix C.

### External Works
The existing masonry at the end of the terrace will be rebuilt in the same location and new fire escape stairs from the classroom out to the playground will be provided.

# 4 Design Criteria

### Codes and Standards
The works will be designed in accordance with the relevant British Standards.

### Loadings
The floor will be designed for 3.0kN/sqm and the terrace for 5.0kN/sqm in accordance with BS6399.

### Design Fire Periods
Fire protection provided

### Design Life
All design will have a design life of 50 years.

# 5 CPG4 Basement Impact Assessment Screening & Scoping

The screening below has been carried out in accordance with the procedure outlined in London Borough of Camden Planning Guidance CPG4 (September 2013), Section 2.12. The responses below relate to the Screening Charts in Figures 1, 2 and 3 of CPG4, which are included in Appendix B for reference.

Figure 1 Groundwater Flow Screening:

Question 1a: NO – the London Clay is the first stratum occurring below the site, refer to geology map in Appendix A.

Question 1b: NO – London Clay is the first stratum occurring below the site, which means there is no water table present.

Question 2: NO – refer to copies of the Lost Rivers map and the geology map in Appendix A.

Question 3: NO – the site is a long way from the Hampstead Ponds – refer to catchment map in Appendix A.

Question 4: NO – the proposed basement is to be under the current a precast concrete plank terrace and steps – refer to structural low level plan in Appendix C.

Question 5: NO – all surface water will be discharged to the existing sewer connection.

Question 6: NO – there is no local pond or spring line nearby – refer to plans in Appendix A.

*Screening Summary* – No positive responses

Figure 2 Land Stability Screening:

Question 1: NO – the site has a gentle slope of approximately 1.5˚ running North to South across the slope (estimated from 1:25000 OS map 173.

Question 2: NO – there is no re-profiling of existing slopes proposed within the works – refer to the Architects submitted plans.

Question 3: NO – there is no significantly sloped land adjoining the site, and the nearest railway cutting is the line into Euston which is located over 150m away and could not conceivably be affected by the minor works proposed in this development.

Question 4: NO – there is no wider hillside setting of significant slope which the site is part of.

Question 5: YES – refer to geological map in Appendix A. This indicates that in common with most of the Borough, the London Clay is the first stratum.

Question 6: NO – the proposed scheme does not required any trees to be felled. There an no nearby trees to the excavation site.

Question 7: NO – the building shows no signs of significant or unusual damage due to shrink/swell activity.

Question 8: NO – refer to Lost Rivers map in Appendix A.

Question 9: NO – refer to geology and historical maps in Appendix A.

Question 10: NO – refer to geology map indicating that London Clay is the first stratum.

Question 11: NO – refer to site location plan in Appendix A.

Question 12: NO – the site is wholly within the school grounds, a minimum of 16m from the nearest pedestrian footpath on Eton Avenue, refer to Architects plans.

Question 13: NO – the proposed development will be founded on piles, either reusing the existing piles if they have the capacity or using new piles. This will have no effect on neighbouring properties as they are over 20m away and it will have no effect on the existing building as it is also founded on piles. See structural scheme drawings in Appendix C.

Question 14: NO – the nearest railway lines are as mentioned in Q.3 above, and the nearest tube tunnels are the Over Ground Line which runs on the line into Euston, in tunnels from Primrose Hill Rd to Finchley Rd more than 150m to the South of the site. Due to the distance of the nearest tunnel being well over 100m there will be no effect on tunnels in the area.

*Screening Summary* – only one positive response in that the London Clay is the shallowest stratum on the site, but this is the case for most of the Borough, and does not pose any issues in relation to the proposed scheme.

Figure 3 Surface Flow and Flooding Screening:

Question 1: NO – refer to location plan and catchment map in Appendix A.

Question 2: NO – the existing sewer connections will be reused and no other surface water measures are proposed.

Question 3: NO – refer to response under Figure 1 above. There is no increase to the total hardstanding area.

Question 4: NO – there are no change in flows due to no changes to the overall hardstanding area.

Question 5: NO – there is no change in the means of collection or discharge of the rainwater and therefore no change in its quality.

Question 6: NO – Eton Avenue did not flood in 1975 or 2002 despite a number of surround streets flooding in one or both floods. It is not identified as having the potential for flooding in Map 2 of Camden Policy DP23, or on the map provided by The Environment Agency see map in Appendix A.

*Screening Summary* – No positive responses

BIA Scoping:

Based on the responses given above, the wording of CPG4 and the wording of the Arup Hyrdo-geological report text, the project should proceed to the BIA Scoping stage on the basis of the one positive response highlighted above.

The positive response relates solely to the fact that the existing building is directly underlain by the London Clay (in common with most of the Borough).

On the basis of the above we would suggest that there is no need to proceed to the formal BIA stage for this project.

Appendix A: Desk Study
Appendix B: London Borough of Camden CPG4 Screening Flow Charts
Appendix C: Structural Design Sketches

# Appendix A

# Desk Study

## Library Search Results

Map 1: Street Map

Street View of Site

Map 2: Ordinance Survey Map 2001

Map 3: Old Ordinance Survey Map 1894

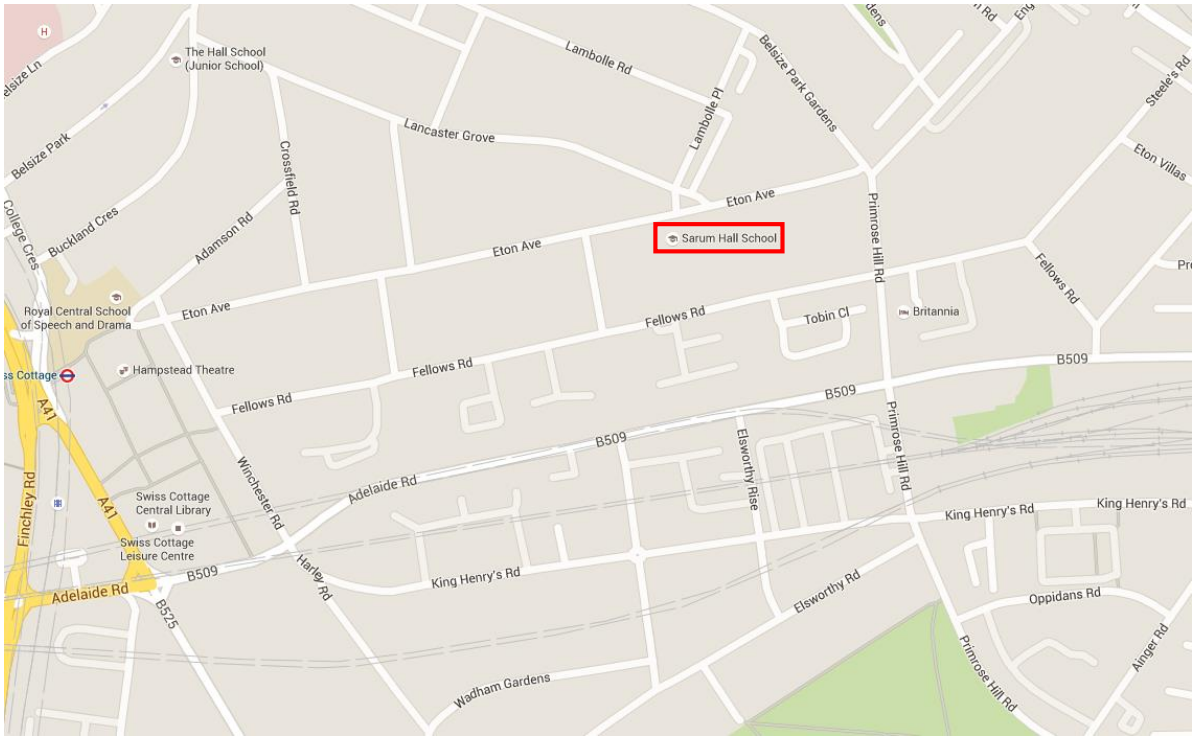
Map 4: Bomb Damage Map

Map 5: Geological Map

Map 6: Lost Rivers of London Map

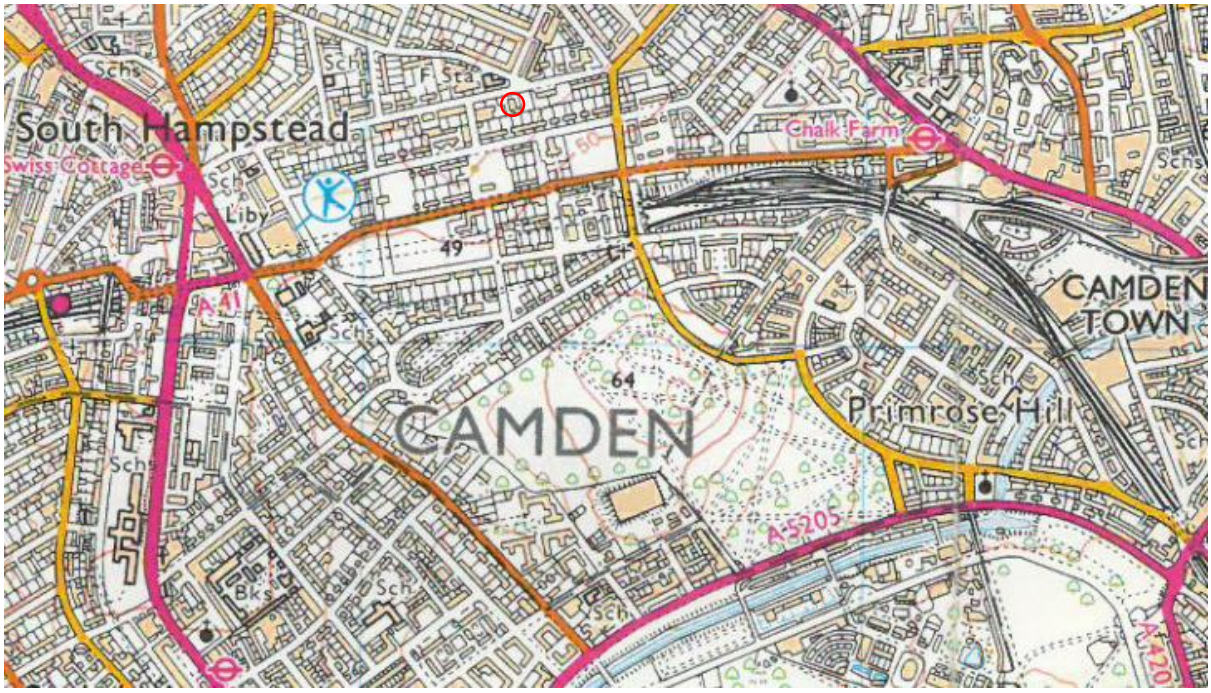
Map 7: Risk of Flooding from Reservoirs

Map 8: Risk of Flooding from Surface Water

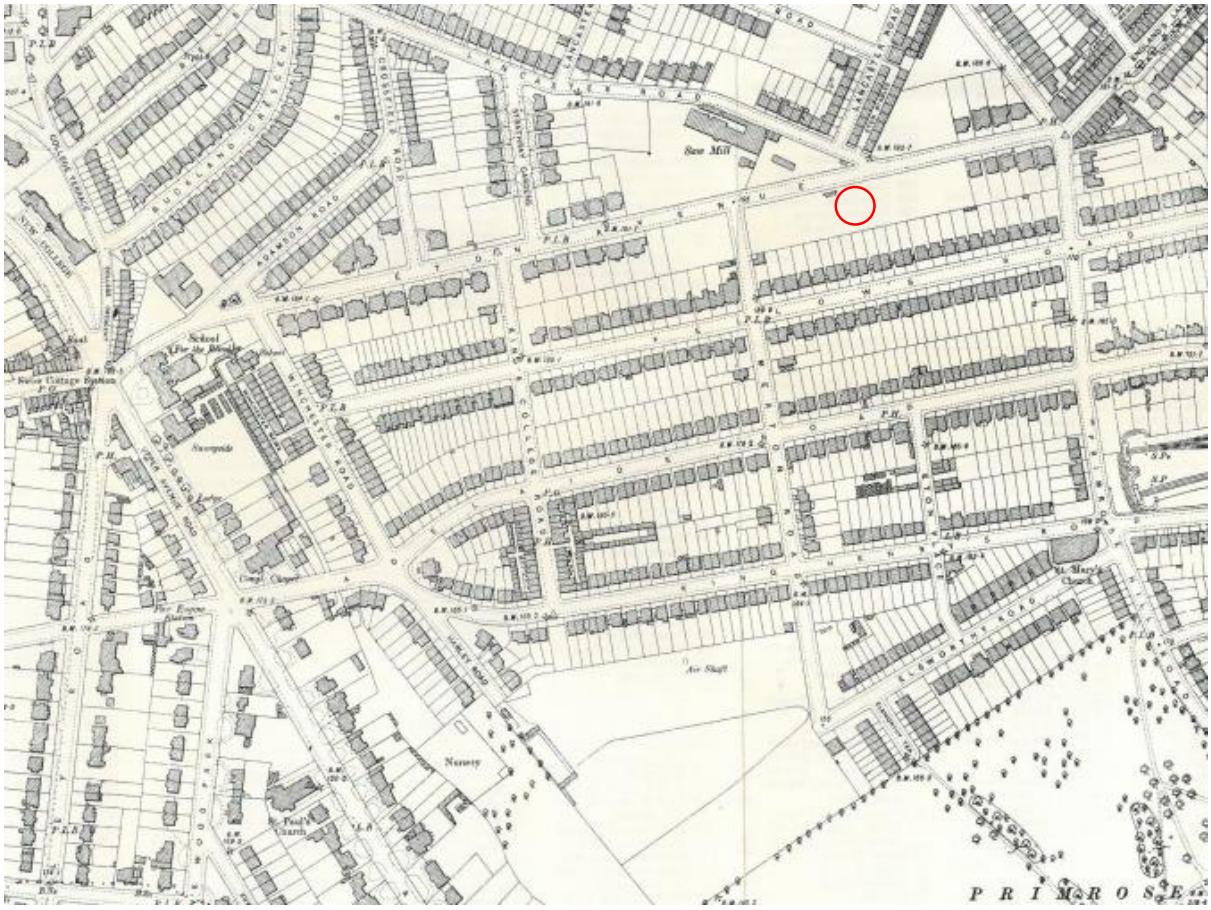



Map 1: Street Map

Street View of Site



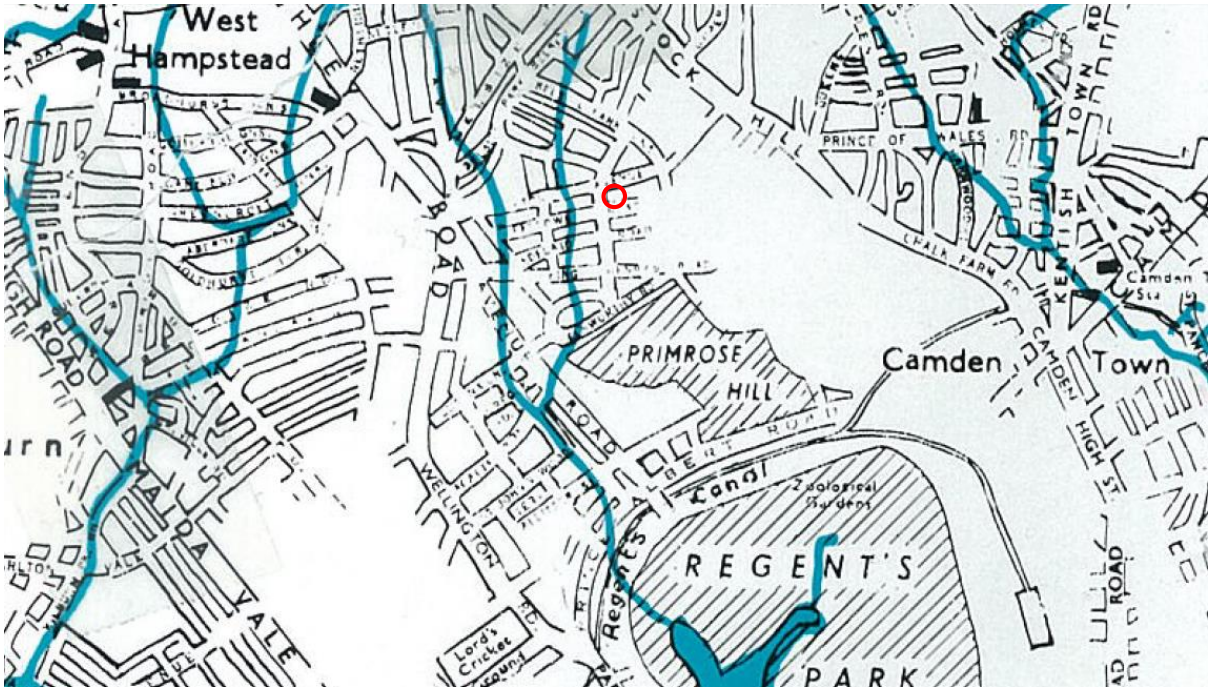

Map 2: Ordinance Survey Map 2001




Map 3: Old Ordinance Survey Map 1894


Map 4: Bomb Damage Map

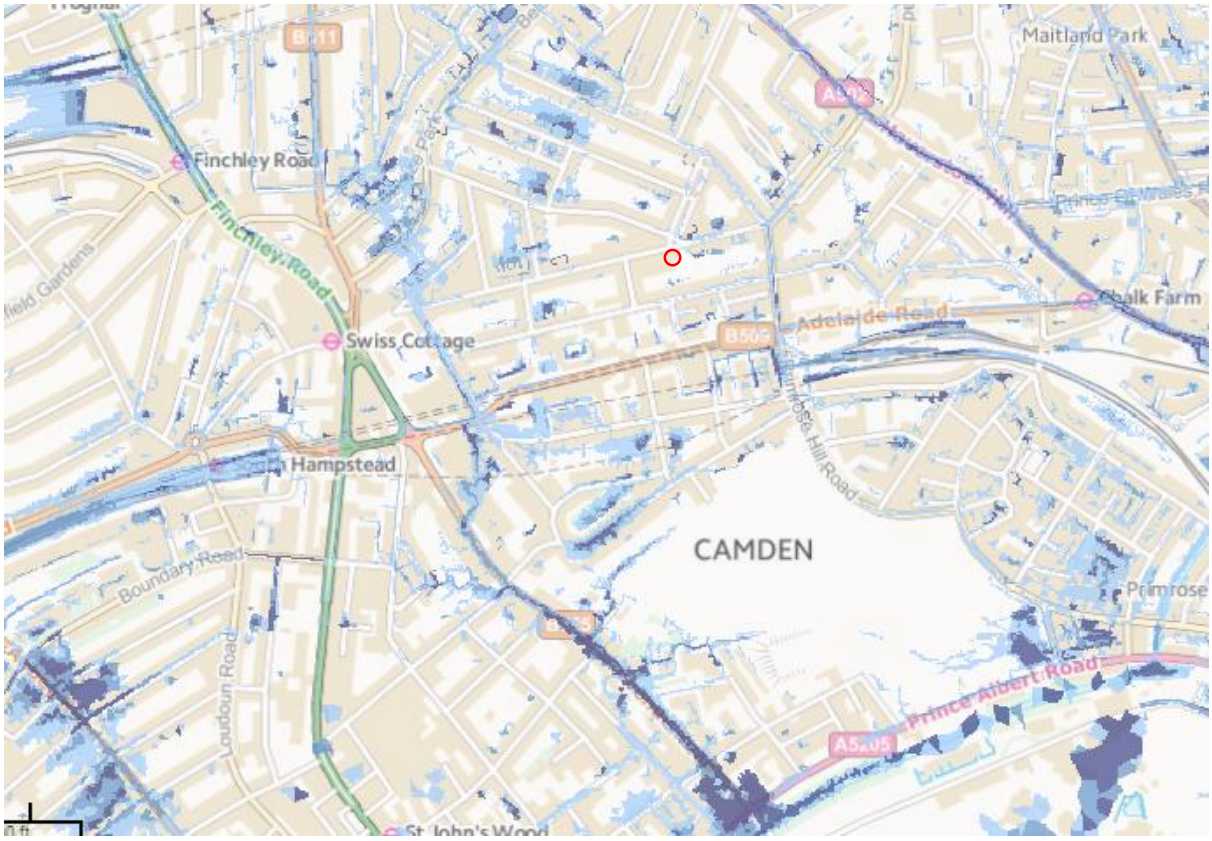

Map 5: Geological Map




Map 6: Lost Rivers of London Map


Map 7: Risk of Flooding from Reservoirs Map

*Taken from the Environment Agency website*




Map 8: Risk of Flooding from Surface Water Flow

*Taken from the Environment Agency website*

# Appendix B

## London Borough of Camden CPG4 Screening Flow Charts

Subterranean (ground water) Flow Screening Flow Chart

Subterranean (ground water) Flow Screening Notes/Sources of Information

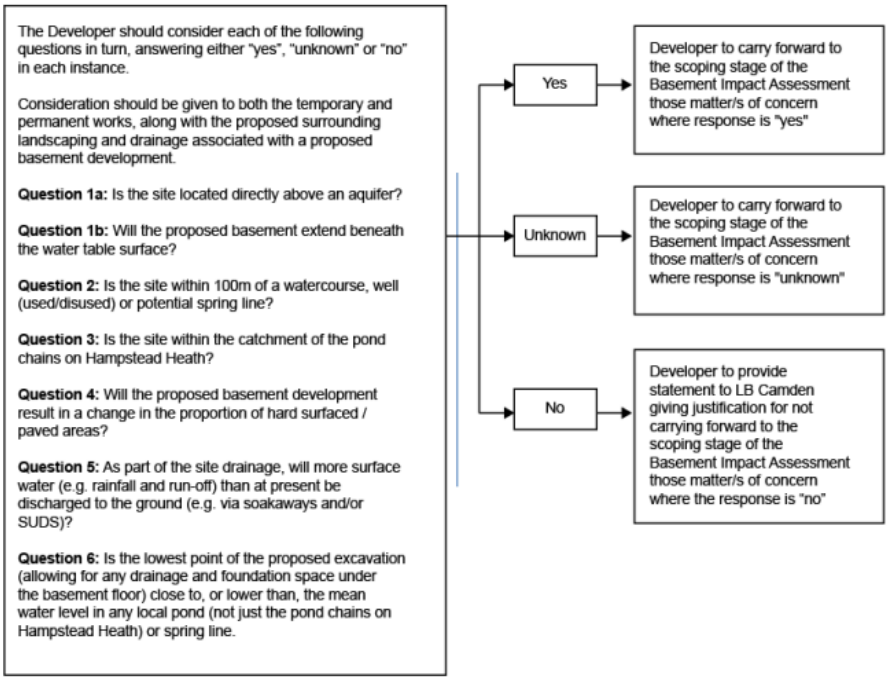
Land Stability Screening Flow Chart

Land Stability Notes/Sources of Information

Surface Flow and Flooding Screening Flow Chart

Surface Flow and Flooding Screening Notes/Sources of Information

## Subterranean (ground water) Flow Screening Flow Chart:




## Subterranean (ground water) Flow Screening Notes/Sources of Information:

**SUBTERRANEAN (GROUND WATER) FLOW SCREENING CHART NOTES AND SOURCES OF INFORMATION**

**Question 1:** In LB Camden, all areas where the London Clay does not outcrop at the surface are considered to be an aquifer. This includes the River Terrace Deposits, the Claygate Member and the Bagshot Formation. The location of the geological strata can be established from British Geological Survey maps (e.g. 1:50,000 and 1:10,000 scale). Note that the boundaries are indicative and should be considered to be accurate to ±50m at best.

Additionally, the Environment Agency (EA) "Aquifer Designation Maps" can be used to identify aquifers. These can be found on the "Groundwater maps" available on the EA website (www.environment-agency.gov.uk) follow "At home & leisure" > "What's in Your Backyard" > "Interactive Maps" > "Groundwater". Knowledge of the thickness of the geological strata present and the level of the groundwater table is required. This may be known from existing information (for example nearby site investigations), however, it may not be known in the early stages of a project. Determination of the water table level may form part of the site investigation phase of a BIA.

**Question 2:** Watercourses, wells or spring lines may be identified from the following sources:

- Local knowledge and/or site walkovers
- Ordnance Survey maps (e.g. 1:25,000 or 1:10,000 scale). If features are marked (they are not always) the following symbols may be present: W; Spr; water is indicated by blue colouration. (check the key on the map being used)
- British Geological Survey maps (e.g. 1:10,000 scale, current and earlier editions). Current maps will show indicative geological strata boundaries which are where springs may form at the ground surface; of relevance are the boundary between the Bagshot Formation with the Claygate Member and the Claygate Member with the London Clay. Note that the boundaries are indicative should be considered to be accurate to ±50m. Earlier geological maps (e.g. the 1920's 1:10560 scale) maps show the location of some wells.
- Aerial photographs
- "Lost Rivers of London" by Nicolas Barton, 1962. Shows the alignment of rivers in London and their tributaries.
- The British Geological Survey (BGS) GeoIndex includes "Water Well" records. See www.bgs.ac.uk and follow "Online data" > "GeoIndex" > "Onshore GeoIndex".
- The location of older wells can be found in well inventory/catalogue publications such as "Records of London Wells" by G. Barrow and L. J. Wills (1913) and "The Water Supply of the County of London from Underground Sources" by S Buchan (1938).
- The Environment Agency (EA) "Source Protection Zone Maps" can be used to identify aquifers. These can be found on the "Groundwater maps" available on the EA website (www.environment-agency.gov.uk) follow "At home & leisure" > "What's in Your Backyard" > "Interactive Maps" > "Groundwater".
- The EA hold records of licensed groundwater abstraction boreholes. LB Camden is within the North East Area of the
- Thames Region. Details can be found on the EA website.
- LB Camden Environmental Health department may hold records of groundwater wells in the Borough.

Where a groundwater well or borehole is identified, it will be necessary to determine if it is extending into the Lower Aquifer (Chalk) or the Upper Aquifer (River Terrace Deposits, Bagshot Formation, Claygate Member etc). It is water wells extending into the Upper Aquifer which are of concern with regard to basement development.

**Question 3:** Figure 14 in the attached study, (prepared using data supplied by the City of London Corporation's hydrology consultant, Haycocks Associates) shows the catchment areas of the pond chains on Hampstead Heath.

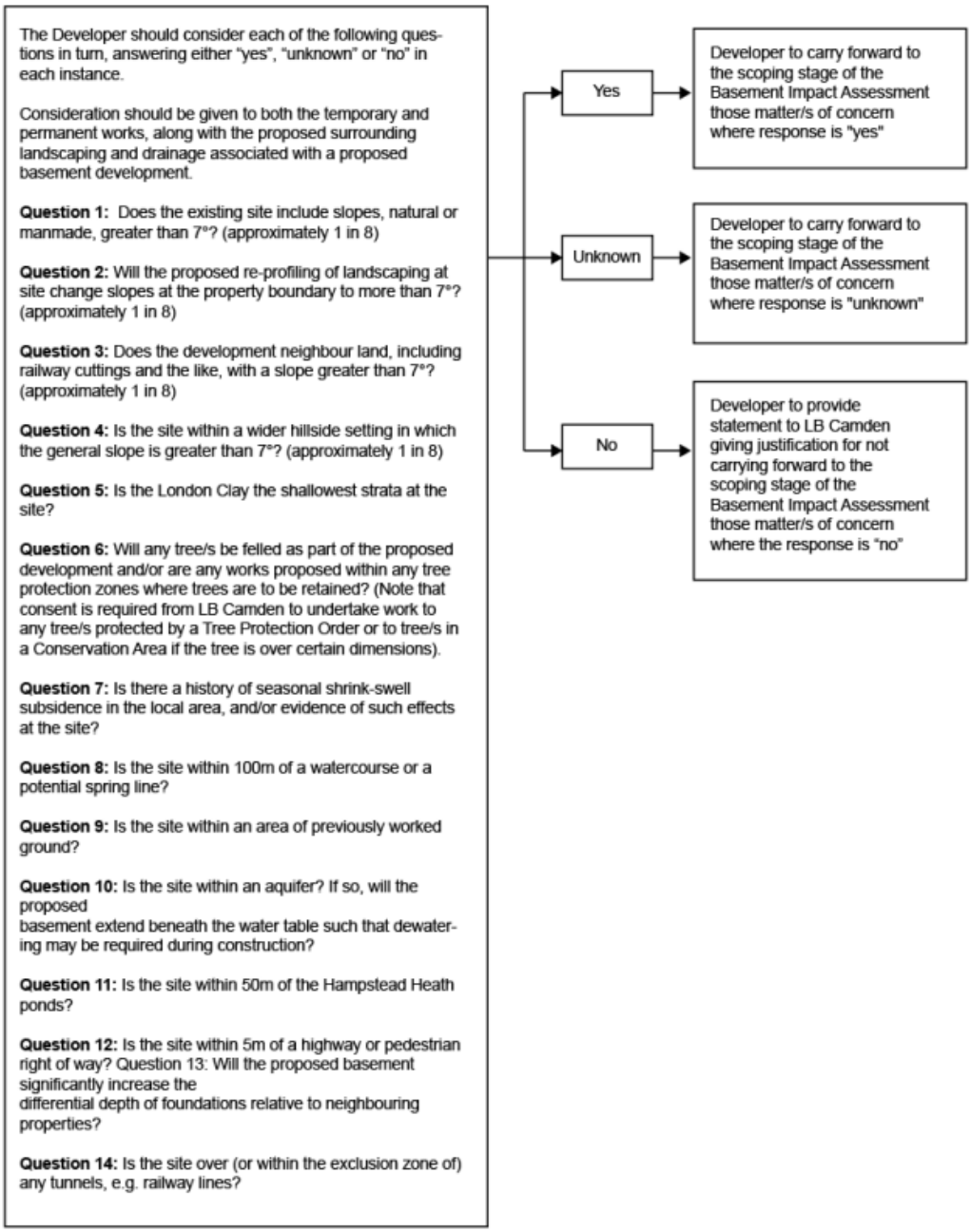
**Question 4:** This will be specific to the proposed development and will be a result of the proposed landscaping of areas above and surrounding a proposed basement.

**Question 5:** This will be specific to the proposed development and will be a result of the chosen drainage scheme adopted for the property.

**Question 6:** The lowest point will be specific to the proposed development. Knowledge of local ponds may be taken from

- Local knowledge and/or site walkovers
- Ordnance Survey maps (e.g. 1:25,000 or 1:10,000 scale). If features are marked (they are not always) the following symbols may be present: W; Spr; water is indicated by blue colouration. (check the key on the map being used)
- Aerial photographs

## Land Stability Screening Flow Chart:



## Land Stability Notes/Sources of Information:

**SLOPE STABILITY SCREENING FLOWCHART**
**NOTES AND SOURCES OF INFORMATION**

**Question 1, 3 & 4:** The current surface slope can be determined by a site topographical survey. Slopes may be estimated from

1:25,000 OS maps, however in many urban areas such maps will not show sufficient detail to determine surface slopes on a property-by-property scale, just overall trends. With regard to slopes associated with infrastructure, e.g. cuttings, it should be ensured that any works do not impact on critical infrastructure.

**Question 2:** This will be specific to the proposed development and will be a result of the proposed landscaping of areas above and surrounding a proposed basement.

**Question 5:** The plan footprint of the outcropping geological strata can be established from British Geological Survey maps (e.g. 1:50,000 and 1:10,000 scale). Note that the boundaries are indicative and should be considered to be accurate to ±50m at best.

**Question 6:** this is a project specific determination, subject to relevant Tree Preservation Orders etc.

**Question 7:** this can be assessed from local knowledge and on-site observations of indicative features, such as cracking, Insurance firms may also give guidance, based on post code. Soil maps can be used to identify high-risk soil types. Relevant guidance is presented in BRE Digest 298 "Low-rise building foundations: the influence of trees in clay soils" (1999); BRE Digest 240 "Low-rise buildings on shrinkable clay soils: part 1" (1993); and BRE Digest 251 "Assessment of damage in low- rise buildings" (1995).

**Question 8:** Watercourses or spring lines may be identified from the following sources:

- Local knowledge and/or site walkovers
- Ordnance Survey maps (e.g. 1:25,000 or 1:10,000 scale). If features are marked (they are not always) the following symbol may be present "Spr"; water is indicated by blue colouration. (check the key on the map being used)
- Geological maps will show indicative geological strata boundaries which are where springs may form at the ground surface; of relevance are the boundary between the Bagshot Formation with the Claygate Member and the Claygate Member with the London Clay. Note that the boundaries are indicative should be considered to be accurate to ±50m at best. British Geological Survey maps (e.g. 1:10,000 scale, current and earlier editions).
- Aerial photographs
- "Lost Rivers of London" by Nicolas Barton, 1962. Shows the alignment of rivers in London and their tributaries.

**Question 9:** Worked ground includes, for example, old pits, brickyards, cuttings etc. Information can be gained from local knowledge and/or site walkovers, and from historical Ordnance Survey maps (at 1:25,000 or 1:10,000 scale, or better) and British Geological Survey maps (at 1:10,000 scale, current and earlier editions). Earlier geological maps (e.g. the 1:10560 scale series from the 1920s) include annotated descriptions such as "old pits", "formerly dug", "brickyard" etc.

**Question 10:** In LB Camden, all areas where the London Clay does not outcrop at the surface are considered to be an aquifer.

This includes the River Terrace Deposits, the Claygate Member and the Bagshot Formation. The general footprint of the geological strata can be assessed from British Geological Survey maps (e.g. 1:50,000 and 1:10,000 scale). Note that the boundaries are indicative and should be considered to be accurate to ±50m at best.

The Environment Agency (EA) Aquifer Designation Maps can be used to identify aquifers. These are available from the EA website (www.environment-agency.gov.uk), by clicking on 'At home & leisure' > 'What's in Your Backyard' > 'Interactive Maps' > 'Groundwater'.

Details are required of the thickness of the geological strata present and the level or depth of the groundwater table. This may be known from existing information (for example nearby site investigations); however, it may not be known in the early stages of a project. Determination of the water table level may form part of the site investigation phase of a BIA and may require specialist advice to answer. Depth of proposed development is project specific.

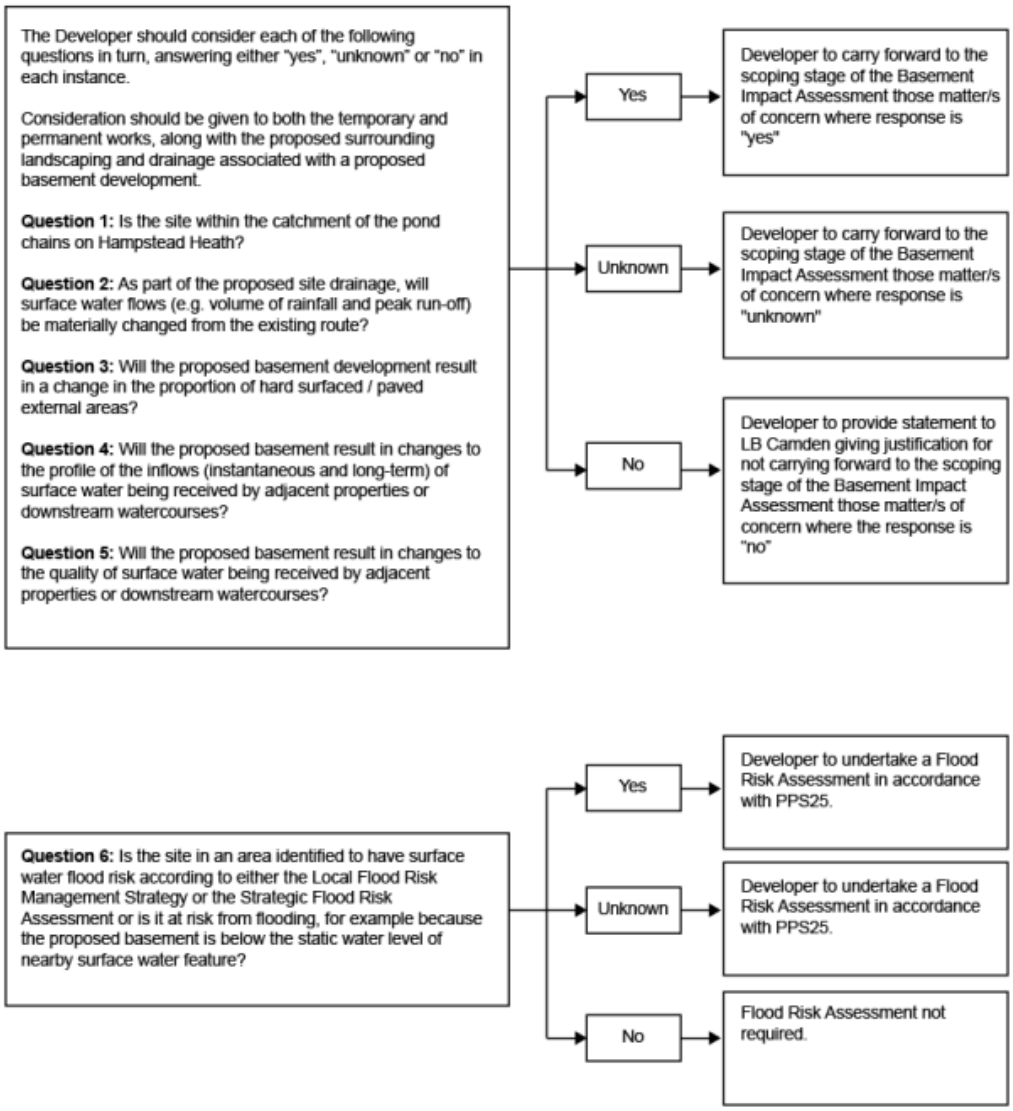
**Question 11:** From local knowledge and/or site walkovers, and from Ordnance Survey maps (e.g. 1:25,000 or 1:10,000 scale). In relation to the stability and integrity of the pond structures and dams, the guidance of a Panel Engineer should be sought. (Details of Panel Engineers can be found on the Environment Agency website: http://www.environment-agency.gov.uk/ business/sectors/64253.aspx). Duty of care needs to be undertaken during any site works in the vicinity of the ponds.

**Question 12:** From local knowledge and/or site walkovers, and from Ordnance Survey maps (e.g. 1:25,000 or 1:10,000 scale). Any works should not impact on critical infrastructure.

**Question 13:** From local knowledge and/or site walkovers. May find some details on neighbouring properties from searches of LB Council databases, e.g. planning applications and/or building control records.

**Question 14:** From local knowledge and/or site walkovers, from Ordnance Survey maps (e.g. 1:25,000 or 1:10,000 scale) and directly from those responsible for tunnels (e.g. TfL or Network Rail). Any works should not impact on critical infrastructure.

## Surface Flow and Flooding Screening Chart:




## Surface Flow and Flooding Notes/Sources of Information:

**SURFACE FLOW AND FLOODING SCREENING FLOWCHART NOTES AND SOURCES OF INFORMATION**

**Question 1:** Figure 14 in the Camden geological, hydrogeological and hydrological study (prepared using data supplied by the City of London Corporation's hydrology consultant, Haycocks Associates) shows the catchment areas of the pond chains on Hampstead Heath

**Question 2:** This will be specific to the proposed development and will be a result of the proposed landscaping of areas above and surrounding a proposed basement. The developer should provide documentation of discussion with Thames Water to confirm that the sewers have capacity to receive any increased wastewater flows.

**Question 3:** This will be specific to the proposed development and will be a result of the chosen drainage scheme adopted for the property

**Question 4:** This will be specific to the proposed development and will be a result of the proposed landscaping and chosen drainage scheme adopted for the property. SUDS will be required to compensate any increases in peak flow.

**Question 5:** This will be specific to the proposed development and will be a result of the proposed landscaping and chosen drainage scheme adopted for the property. SUDS will be required to compensate any increases in peak flow.

**Question 6:** The principles outlined in PPS25 should be followed to ensure that flood risk is not increased.

# Appendix C

## Structural Design Sketches

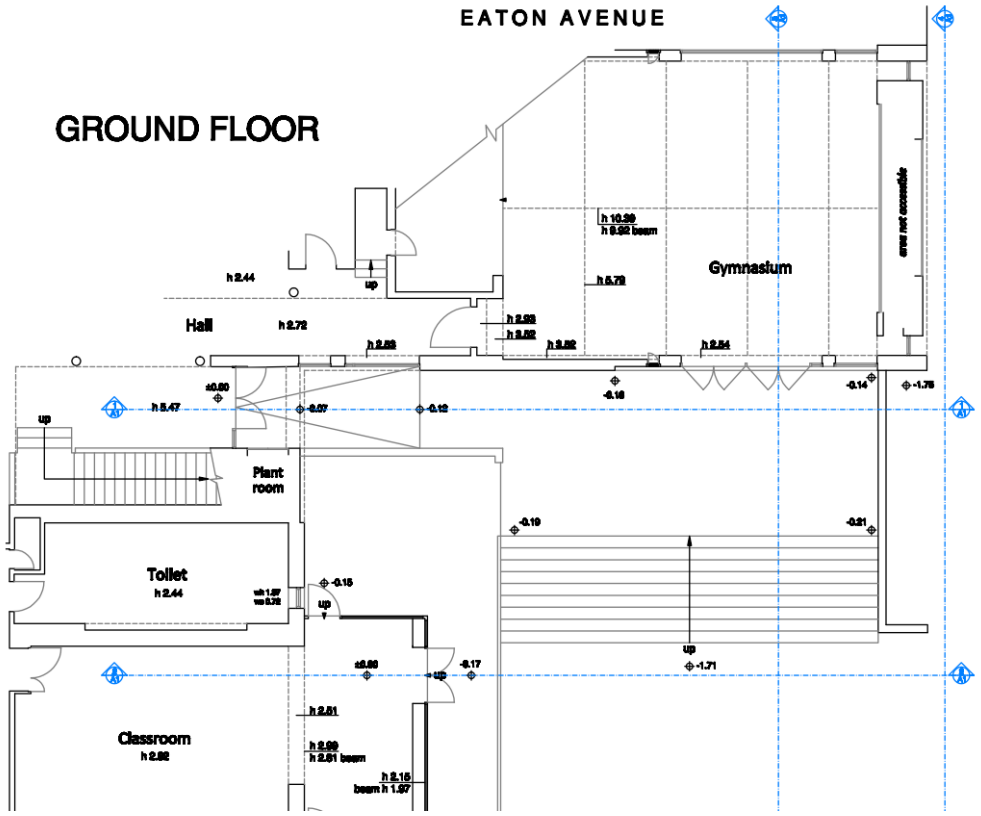
Ground Floor Plan as Existing

Ground Floor Plan as Proposed

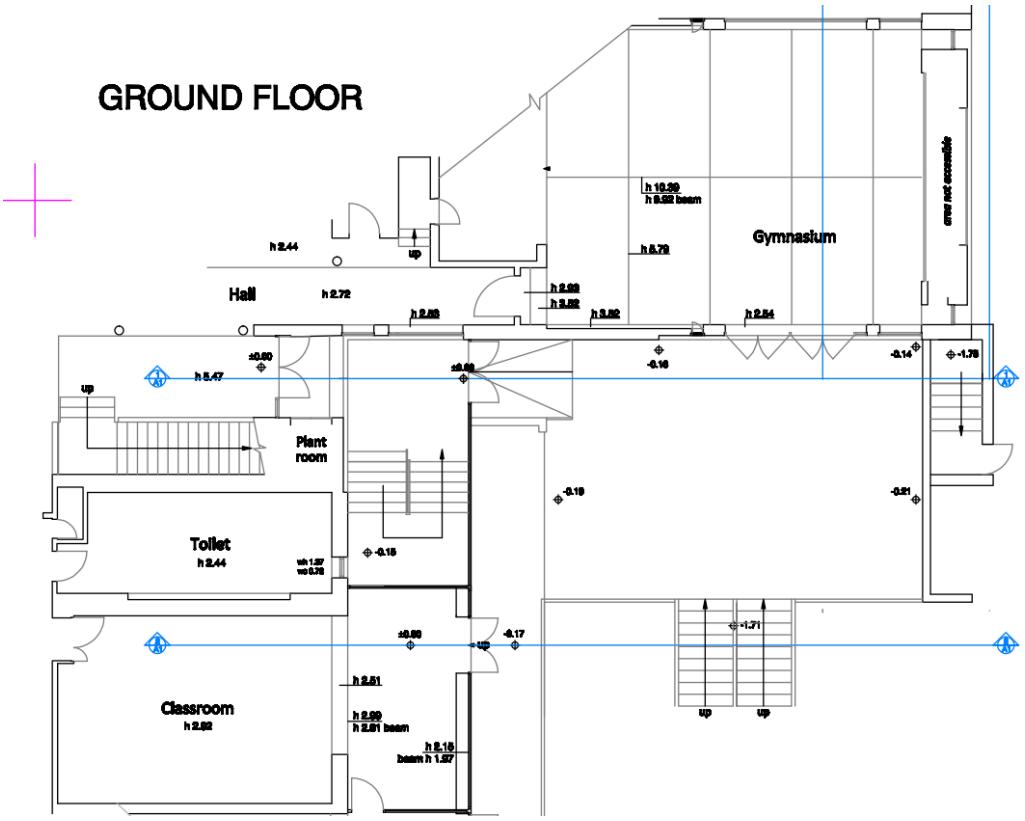
Proposed Half Basement Low Level Structural Plan

Section A-A

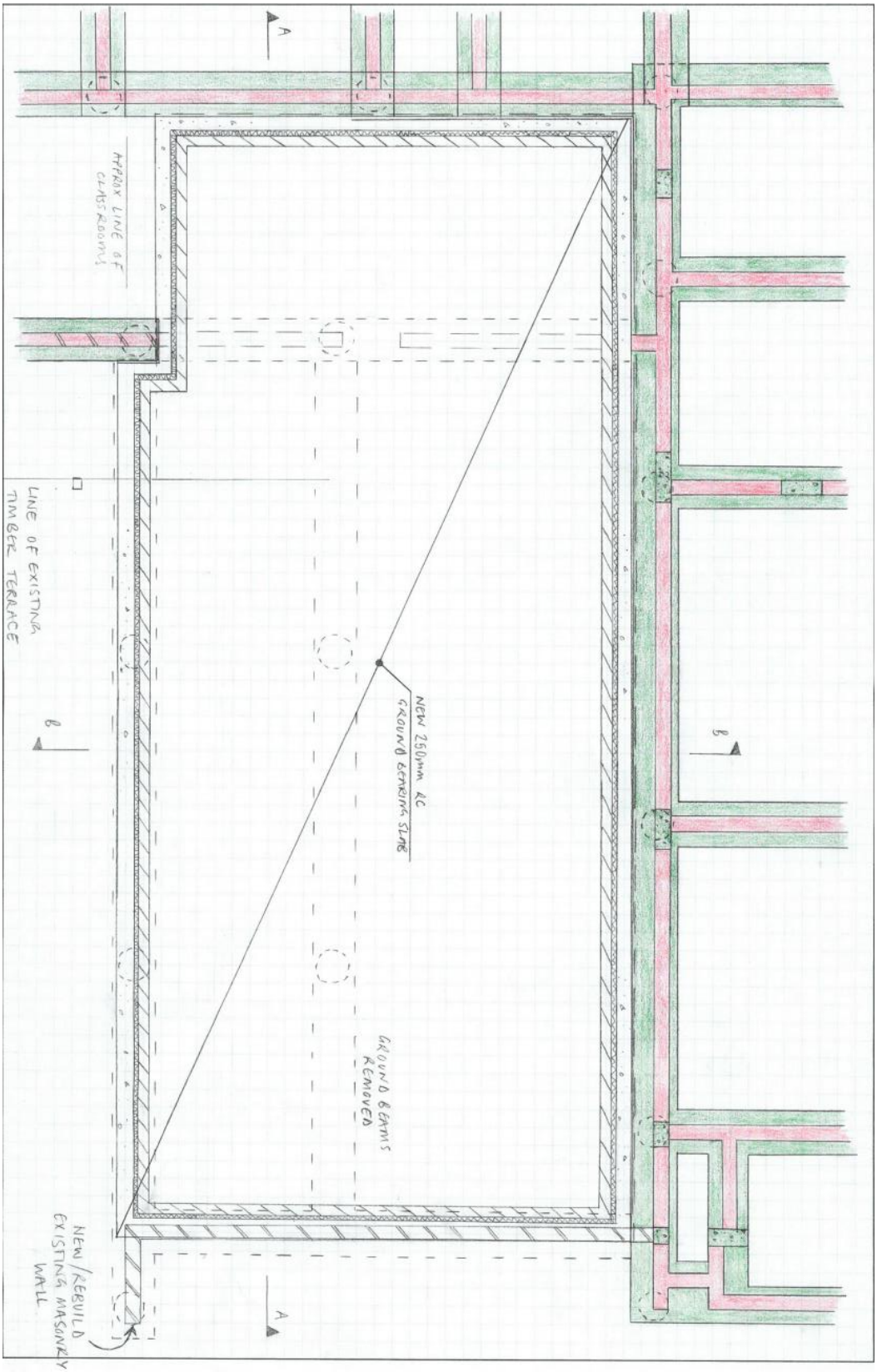
Section B-B



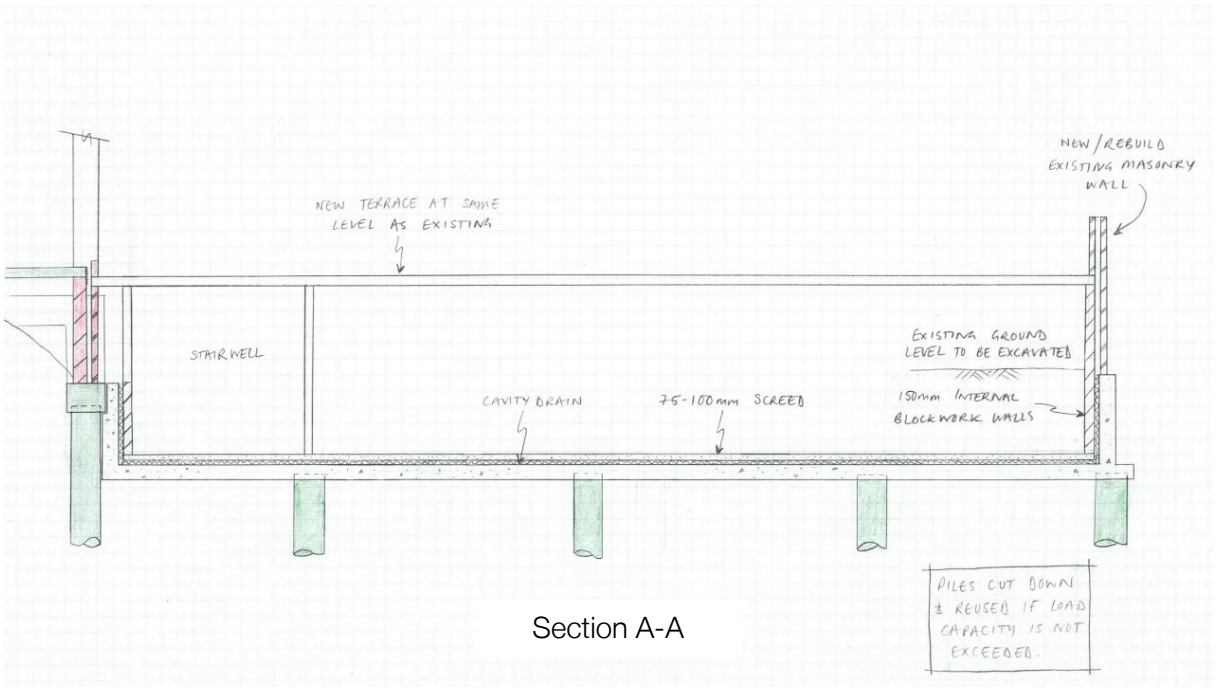

Ground Floor Plan as Existing



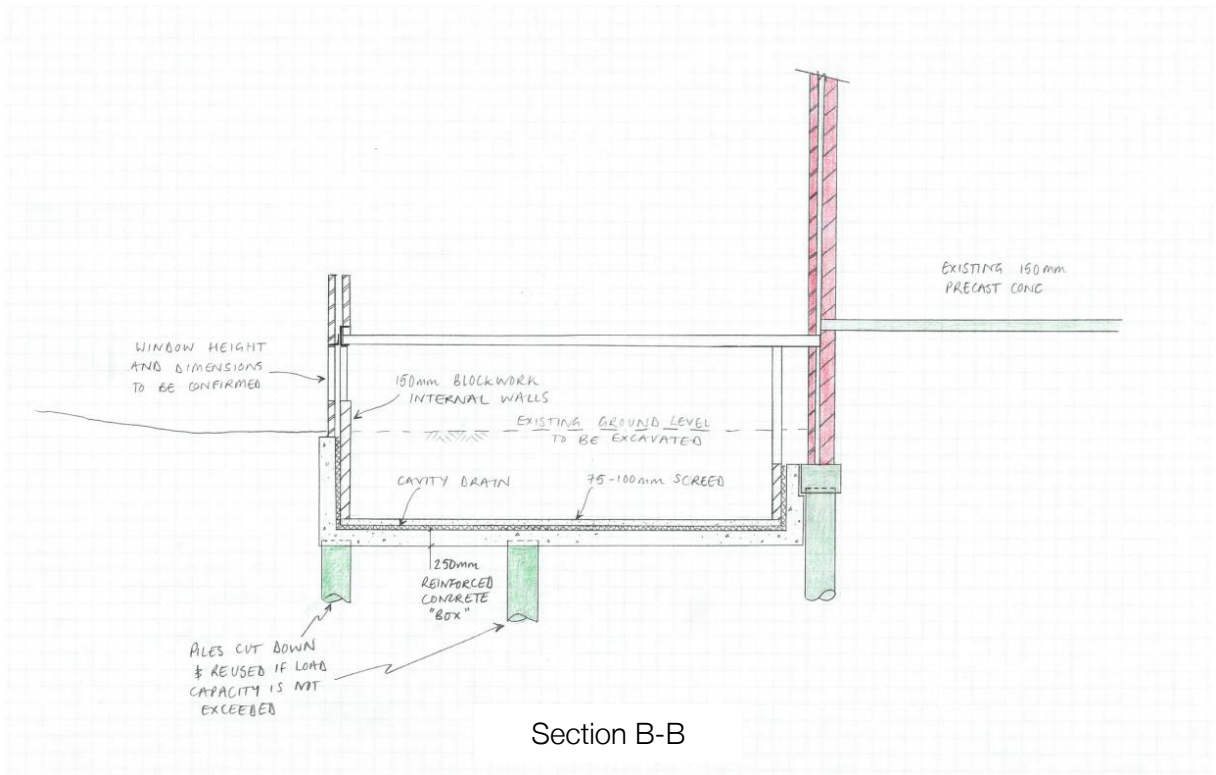

Ground Floor Plan as Proposed




Proposed Half Basement Low Level Structural Plan




Section A-A




Section B-B