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Basement Impact Assessment

15 Clifton Gardens, London, N15 6AP

Project Ref: EX23/204/07

Preamble

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Revisions & additional material

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APPENDIX

1.0 Executive Summary

1.1.1. The site location is 15 Clifton gardens, London, N15 6AP. The site falls within the London Borough of Haringey. Grid Reference: TQ339882 (Easting: 533990; Northing: 188234)

1.1.2. The current site arrangement includes one residential property, composed of a ground floor, first floor and Second Floor.

1.1.3. The proposed development compromises the creation of a new basement underneath the existing main building and a new lightwells at the front and rear of the property.

1.1.4. The report is based on the information produced by the clients Architects, & borehole data provided by British Geological Survey (BGS), and is intended to provide the basis for planning and may be subject to further design discussion and development with the successful Contractor.

1.1.5. The following assessments are presented:

- Site Geology
- Site Hydrology
- CPG4 Screening Flowcharts
- Construction Methodology
- Outline Temporary and Permanent Works Proposal
- Ground Movement and Damage Assessment

1.1.6. Refer to Architect drawings for:

- Existing floor plans and elevations;
- Proposed floor plans and elevations.

1.1.7. The authors of the assessments are:

- James A Cove BEng

- Antony Ronaldson – Reviewing/Checking Engineer

1.1.8. The ground and groundwater conditions beneath the site are as stated in Hydrological/Site report by others.

1.1.9. The construction methods proposed for basement construction are standard underpinning construction technique. This is shown in the Appendix as indicative only. Please note that the drawings may be subject to confirmation of details and final input from the successful contractor.

1.1.10. A structural monitoring strategy to control the works and impacts to neighbouring structures will comprise, if required, of monitoring tools and scheduled movement registration. Slope monitoring is at the present not required, based on the information provided by the BGS. The engineer must be notified immediately if any slope stability issues are encountered.

1.1.11. The strategic drainage system is as designed by others.

1.1.12. This is a live document and that further detailed assessments will be ongoing as the design and construction progresses.

2.0 Introduction

This report has been prepared to set out the proposed design philosophy and construction method statement for the proposed basement construction at 15 Clifton Gardens, London, N15 6AP. It will summarise the basis of the structural and civil engineering design and will be issued to all relevant parties including the Client, Local Planning Authority and Design team members.

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 creation of the proposed basement.

The report is based on the information produced by the clients Architects, & borehole data provided by trial holes examination on site and is intended to provide the basis for planning and may be subject to further design discussion and development with the successful Contractor.

The work carried out comprises a Basement Impact Assessment, which is in accordance with the procedures specified in the planning guidelines for the London Borough of Haringey. The aim of the work is to assess if the proposed basement will have a detrimental impact on the surroundings with respect to groundwater and land stability and in particular to assess whether the development will affect the stability of neighbouring properties, local and regional hydrogeology and whether any identified impacts can be appropriately mitigated by the design of the development.

2.1. Sources of Information

2.1.1. The following baseline data have been referenced to complete the BIA in relation to the proposed development:

- Current/historical mapping provided by Google Maps and Online Historic Maps resources;
- 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.

2.2. Existing and Proposed Development

2.2.1. The existing properties are currently occupied and compromise of ground floor plan, first and second floor and roof. Refer to drawings in the Appendix.

2.2.2. The adjacent properties present similar features.

2.2.3. The development properties, and adjacent properties are not in the Listed Building.

2.2.4. Underground infrastructures are not present beneath/close to the site. Refer to Transport for London Property Asset Register in Appendix

2.2.5. Existing and Proposed development drawings are provided by Architect. Refer to Architect's drawings for details.

2.2.6. 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"

2.2.7. The outline construction programme for the proposed development, shown as indicative only in appendix, is to be agreed with successful contractor.

2.2.8. The full extent of the proposed basement will be within the boundary of the property so there will be no increase in impermeable surface area.

2.3. London Borough of Haringey

2.3.1. This section contains materials from The London Borough of Haringey Website, The Natural History of Haringey: David Bevan, Haringey ward profiles and Haringey's Economic profile, Tottenham: Growth before 1850 and the Seven Sisters, London.

2.3.2. The London borough of Haringey was created in 1965 with the amalgamation of three former municipal boroughs (Hornsey, Wood Green and Tottenham) and has an area of slightly over 11 square miles.

2.3.3. The Haringey borough was at the edge of a huge glacial mass last ice age, and there is evidence from both the stone age and the bronze age as well as discoveries suggesting Roman settlement and a Saxon invasion.

2.3.4. The borough was very rural up until the 18th century just with a few large country houses, however, when railways arrived in the 19th century this led to rapid urbanisation and developments, at present around 25% of borough remains as green space.

2.3.5. There is a varied geography and topography of Haringey with very high ground around Highgate and Muswell Hill, up to 130m above sea level. The land then falls sharply away to the flat low lying land beside the River Lea in the East. The Borough is also home to 5 distinct ancient woods and 3 notable above ground rivers. Haringey has achieved Green Flag status for eight of its parks, the highest number awarded to any London Borough.

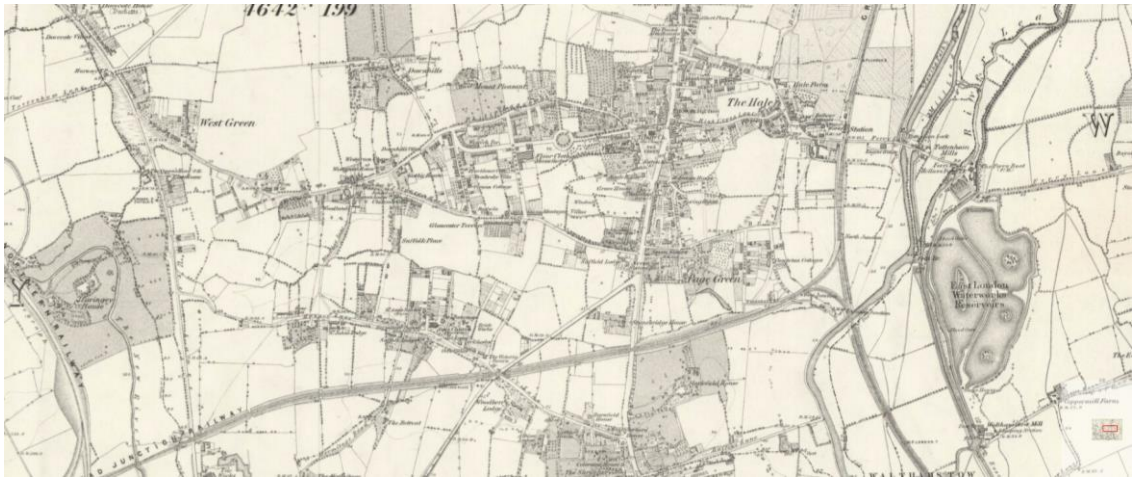
2.3.6. The Seven Sisters ward is at the very south of Haringey and close to the boundary of the Hackney borough. It is on the route of Ermie Street, a Roman road connecting London to York and an area once held by Waltheof II, Earl of Northumbria who held all land within the Tottenham Manor.

2.3.7. There is some speculation and mystery to the origin of the name 'The Seven Sisters'. It is believed the name is a reference to 7 elm trees, planted in a circle, around an oak tree in Page Green. The area was officially known as The Seven Sisters by 1732, although there is evidence from the early 1600s with references to 'an ancient walnut tree surrounded by a tuft of elms' this is also visible on a map from 1619. The name stuck with it as in 1840 the passing road connecting Tottenham and Camden town was named Seven sisters road, and in 1872 the Seven Sisters train station opened nearby.

2.3.8. It is documented that in 1852, the trees were in a sorry state so seven new trees were planted by the seven daughters of Mr J McRae. The tradition of planting the trees in a circle, by seven sisters, has continued to this day, with the trees being replanted a few times since.

2.3.9. The following historical maps indicate the development of this area over the period.

2.3.10. Published 1873 – Surveyed 1863-69



2.3.11. Our earliest map dating to the mid Victorian era, shows the entity of the region later known as The Seven Sisters, with Page Green near the centre of the map. It is clear on the map the area is not very developed and is mostly agricultural land.

2.3.12. Published 1895 – Surveyed 1893-96

2.3.13. This second map, published only 22 years later shows a shot of page green, where we can see the area has transformed to very urban and densely populated area with lots of terraced housing in typical Victorian arrangement.

2.3.14. Published 1895 – Surveyed 1893-96

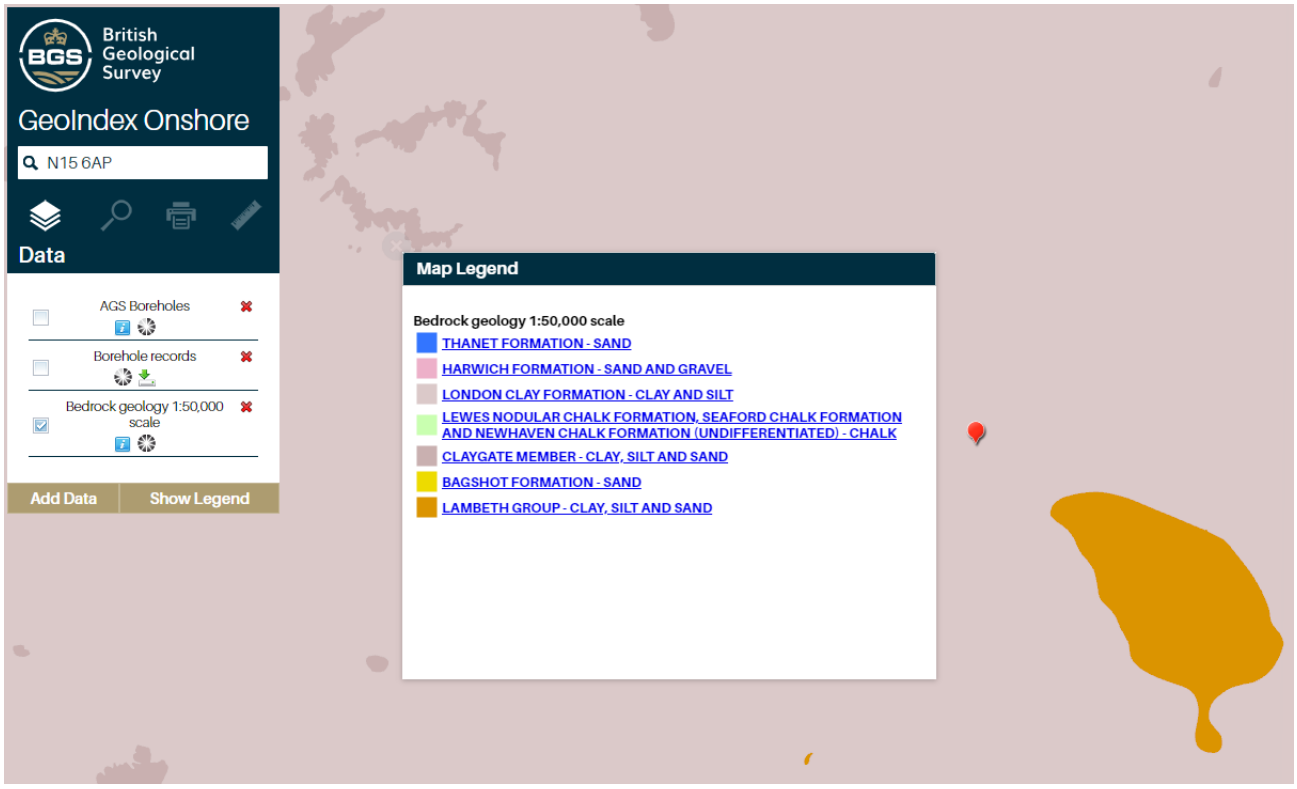
2.3.15. The final map is from the same period, but to a different scale, where we can see more of the surrounding area. When compared to a current day map, the streets and houses on plan remain relatively unchanged, confirming that all properties are, more or less, from the same period.

2.3.16. *Contains Ordnance Survey data © Crown Copyright and database right 2013.*

3.0 Site Geology

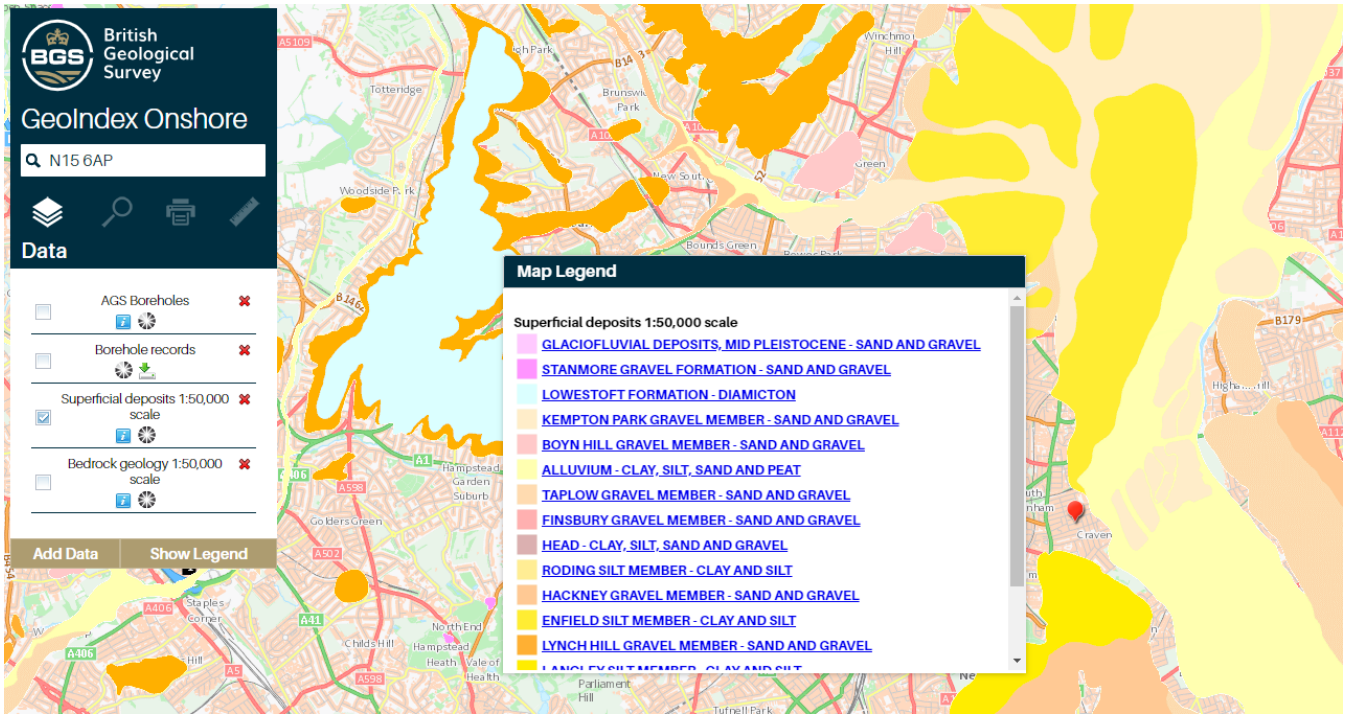
The 1:50 000 scale geological map for this area, made available by the BGS, shows the sites bedrock geology to be London Clay Formation comprising of Clay, Silt, Sand & Gravel.

3.1. Bedrock Geology



3.1.1. The superficial drift deposits are not recorded at this location, but based on the surrounding area we could expect this to be a mixture of silty clay, sand & gravel from river deposits, or an alluvium comprising of clay, silt and sand.

3.2. Superficial Geology

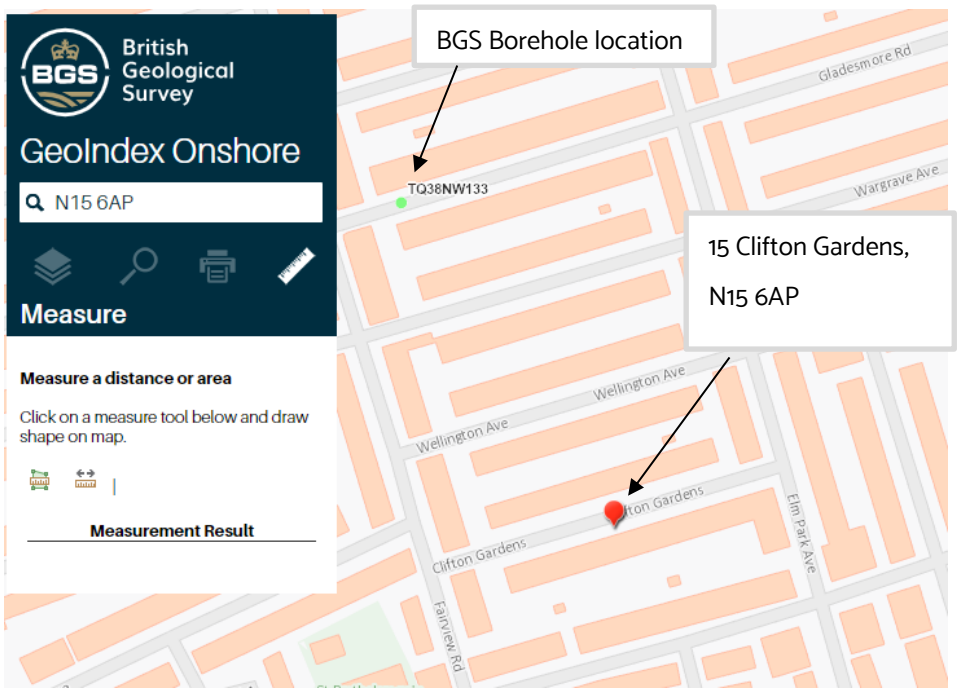


3.2.1. Most of Haringey is underlain with london clay and significatly below this, a layer of chalk, which acts as the major aquifer of the london basin drained by the river Thames.

3.3. Boreholes

3.3.1. This borehole log was provided by the BGS . The sample was taken from approx. 200m from site, as can be seen on the map, and is a fair representation of the expected soil and ground conditions on site as proved by lower depth excavations supervised by this Company in and around the area.

3.3.2. See Appendix 7 for Borehole details.

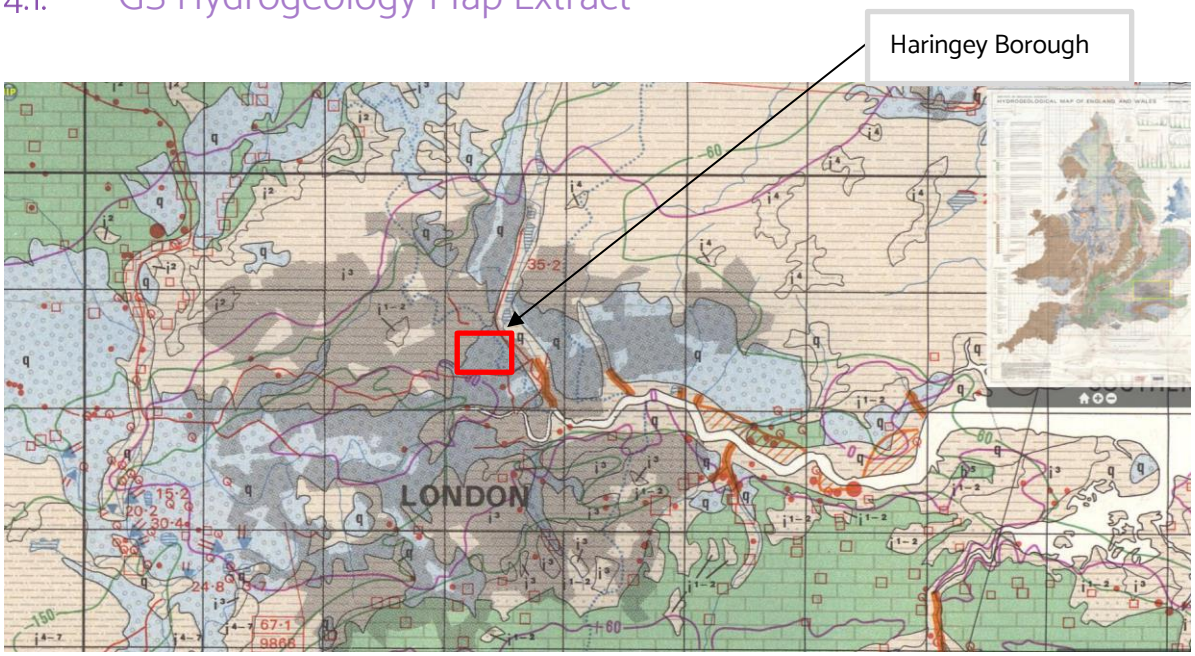


3.3.3. The borehole log indicates made ground up to 2 ft, Stiff brown/grey-blue Fissured clay to a depth of 35 ft , followed by a thin 2" strata of Mudstone. Stiff Grey-Blue clay is then recorded until the depth of nearly 90 ft. No water is observed in the borehole during survey however, until 42", with probable seepage from a pocket between 35 and 45ft. Typical safe bearing capacity for stiff clays ranges between 150 – 300 kN/m (Cobb, 2015).

3.3.4. A borehole carried out on 18.02.2011 near the site of reference and the soil results as shown on APPENDIX 7 are not much different than close by boreholes from BGS. The strata predominantly remains Stiff clay, varying betwwen brown, grey and green, on a base of chalk.

4.0 Hydrology

4.1. GS Hydrogeology Map Extract



4.1.1. Key: Relates to areas in the box of interest:

4.1.2. Blue: Quaternary Sands and Gravels – Include glacial, fluvioglacial and plateau gravels, river terrace deposits, raised beaches and marine sands and gravels of differing origin, but all of limited importance as aquifers.

4.1.3. Yellow: All yellow areas defined as 'Concealed aquifers; aquifers with limited or local potential.

4.1.4. The Hydrogeology study will enable:

- Identification of maximum probable flood at any location
- The variation in water production from catchments
- The relationship between a catchments surface water and groundwater resources
- Expected flood flows over a spillway, at a culvert, or in an urban storm drainage system
- Required reservoir capacity to allow adequate water for irrigation or municipal water supply in drought conditions

4.1.5. Every building must be designed and constructed in such a way that there will not be a threat to the building or the heath of the occupants as a result of flooding and the accumulation of groundwater.

4.1.6. Basements affect groundwater flows as the displaced water has to find a new course around the area of obstruction, the newly diverted flow may have the potential to cause problems for nearby buildings.

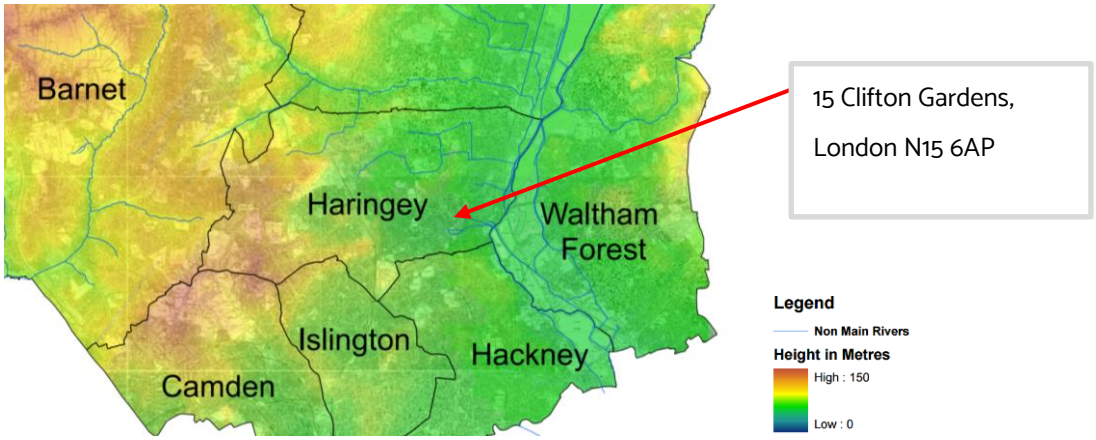
5.0 CPG4 Screening Flowcharts

For the purposes of this report reference has been made to Appendix E of the Arup document screening tools, which includes a series of questions within a screening flowchart for three categories; groundwater flow; land stability; and surface water flow.

5.1. Slope Stability

5.1.1. Does the existing site include slope, natural or man-made, greater than 7° (approximately 1 in 8)?

5.1.2. No. The following topography map shows flat ground around our area of interest in Haringey - all the sloping ground is all to the west of Haringey.



5.1.3. Will the proposed re-profiling of landscaping at site change slopes at the property boundary to greater than 7 ° (approximately 1 in 8)?

5.1.4. No. The proposal does not include landscaping that affects the boundaries.

5.1.5. Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7°?

5.1.6. No. The neighbouring sites are at a similar gradient.

5.1.7. Is the site within a wider hillside setting in which the general slope is greater than 7° (Approximately 1 in 8)?

5.1.8. No. The wider gradient is less than 1:8.

5.1.9. Is London Clay the shallowest stratum on the site?

5.1.10. Yes. London Clay is the shallowest stratum – carry forward to scoping stage.

5.1.11. Will any trees be felled as part of the proposed development and/or are there any proposed works within any tree protection zones where trees are to be retained?

5.1.12. No. No trees are to be felled.

5.1.13. **Is there a history of shrink swell subsidence in the local area and/or evidence of such effects at the site?**

5.1.14. No. There is no such evidence to the existing building or neighbouring properties.

5.1.15. **Is the site within 100m of a watercourse, or spring line?**

5.1.16. No. The East Reservoir, approx. 1.25km from the site, the only other near watercourse is Warwick Reservoir West, approx. 520m from the site.

5.1.17. **Is the site within an area of previously worked ground?**

5.1.18. No. Historic records indicate that the site has only been built on in the late 18th Century & was built on land with agricultural or horticultural use prior to that.

5.1.19. **Is the site within an aquifer? If so, will the proposed basement extend beneath the water table such that dewatering will be required during construction?**

5.1.20. No– the site lays within an area that water level is not recorded. Presumed to be below basement formation level. Notify the engineer if otherwise.

5.1.21. **Is the site within 50m of any ponds?**

5.1.22. No. The site is outside a 50m zone of any ponds.

5.1.23. **Is the site within 5m of a public highway or pedestrian right of way?**

5.1.24. No, as shown by Google maps attached in the Appendix.

5.1.25. **Will the proposed basement significantly extend the differential depth of basements relative to neighbouring properties?**

5.1.26. Yes. The proposed basement does not abut existing cellars. – carry forward to scoping stage.

5.1.27. **Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines?**

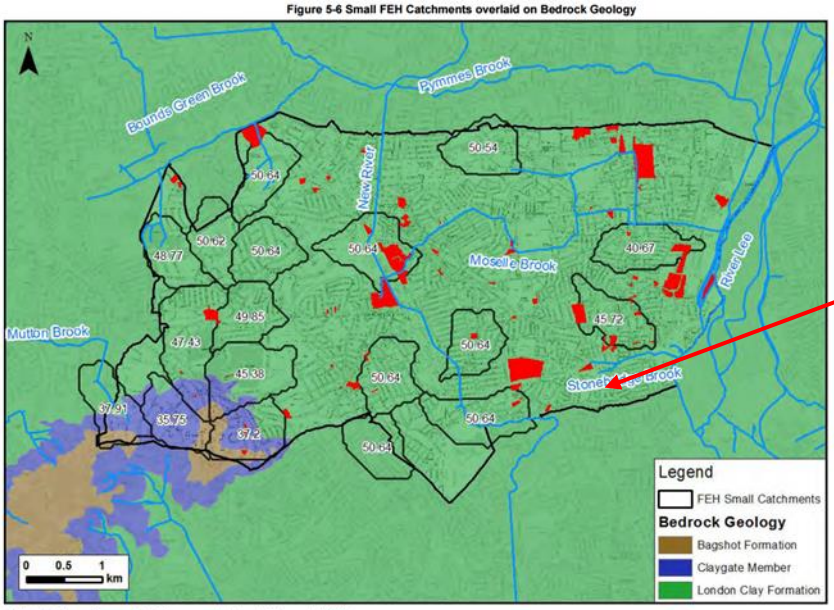
5.1.28. No – see Haringey Critical Infrastructure Map and Transport Asset In Appendix.

5.2. Surface Flow and Flooding

5.2.1. **Is the site within a catchment area?**

5.2.2. No. The site is outside the catchment area. As shown on the map below

Figure 5-6 Small FEH Catchments overlaid on Bedrock Geology



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15 Clifton Gardens, London N15 6AP

5.2.3. As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak run off) be materially changed from the existing route?

5.2.4. No. It will be largely unaffected.

5.2.5. Will the proposed basement development result in a change in the proportion of hard surfaces/paved external areas?

5.2.6. No. The amount and proportion of hard standing areas will remain unchanged as the existing paved area is replaced by basement.

5.2.7. 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?

5.2.8. No. There will be no change in the surface water flow off-site as a result of this proposal. Surface water will be discharged via existing connection

5.2.9. Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?

5.2.10. No. There will be no change in the surface water flow off-site as a result of this proposal.

5.2.11. Is the site in an area known to be at risk from surface water flooding? Or is the proposed basement below the static water level of a nearby surface water feature?

5.2.12. No. The map from the Haringey council shows areas of potential flood zones which the site falls outside (see Appendix). Yes the river, however this is still approx. 200m away from site but is not prone to flooding. The maps shows potential flood risk due to surface water. See next paragraph.

5.3. Surface Water (Flood Risk)

5.3.1. Given the development lies within flood zone 1 and is not subject to overland flooding, no special construction features are required to mitigate fluvial flooding. The Local Planning Authority, however, consider this site to have a 'medium-high' risk of surface water flooding and as a result require flood mitigation measures to be provided.

5.3.2. The internal layout of the property considers such measures by ensuring bedrooms are not located in the basement area and provision is made for an unrestricted internal access to higher levels. Surface water could be attenuated using SUDS permeable paving and drained into the existing public sewer system at a reduced runoff rate.

5.4. SUDs Considerations

5.4.1. Consideration of SuDS is a planning requirement for major developments in order to provide betterment to the runoff regime post-development. SuDS are designed to replicate the natural course of drainage as closely as possible with a view to reducing the impact of flooding, removing pollutants at source and combining water management with green space. Any solution needs to be agreed with appointed Civil/Drainage Engineer.

5.4.2. The following hierarchy for surface water disposal is considered where reasonably practicable:

- Into ground (infiltration);
- To a surface water body;
- To a surface water sewer;
- To a combined sewer.

5.4.3. For this development the London Borough of Haringey Council has been identified as the Lead Local Flood Authority (LLFA) and as such are responsible for the approval of SuDS proposals. The requirements are set out in the London Borough of Haringey guidance document. In accordance with the guidance, the surface water design follows the criteria and incorporates SuDS wherever practicable.

5.5. SUDs Incorporation and Maintanance

5.5.1. The site geology is generally clay, therefore it is unlikely that surface water can be disposed of via infiltration. A flow control and attenuation system is proposed in order to restrict the rate of run-off to the equivalent greenfield runoff rate. The final system will be agreed once the planning layout will be

approved, in order to evaluate the opportunity for SUDs features that maximise amenity and biodiversity benefits.

5.5.2. Maintenance of the system shall include for regular inspections at varying intervals depending on the system requirements. In this case, the responsibility for maintaining system will be with the property owner.

5.6. Surface Water Strategy

5.6.1. The surface water strategy is based upon the SuDS implementation as outlined above and the hierarchy for surface water disposal as follows:

- Store rainwater for later use - rain water storage to be utilised where possible.
- Use infiltration techniques, such as porous surfaces in non-clay areas - infiltration is unlikely owing to the general geology in the area which is predominantly clay.
- Attenuate rain water in ponds or open water features for gradual release - although attenuation is proposed for this scheme the approved planning layout does not provide sufficient area for open water features.
- Surface water runoff is restricted before discharging to the public sewer at a reduced rate. The equivalent greenfield runoff rate found is minimal and therefore impractical to restrict to such a rate, mainly due to blockage potential. Therefore, proposals are to reduce flows to a rate which is considered reasonably practical which can be determined by using a typical SUDs Evaluation Sheet. Flow rate will be controlled by the rump rate with chamber sized to attenuate flows for the worst case duration of the 1:100 year storm event, inclusive of climate change.
- Direct rainwater direct to the watercourse – N/A
- Discharge rainwater to a surface water sewer/drain – N/A

6.0 Scoping Stage

The purpose of scoping is to assess in more detail the factors to be investigated in the impact assessment. Potential consequences are assessed for each of the identified potential impact factors.

It is considered that the scope of the investigation complies with the guidance issued by the Council and is therefore a suitable basis on which to assess the potential impacts.

6.1. Groundwater Flow

6.1.1. From previous excavations carried out in this area supervised by this Company, it has been established that ground water levels are below that of the proposed excavation depth and is reinforced by the findings of historic boreholes.

6.2. Slope Stability

6.2.1. London Clay is the shallowest stratum on this site and the structural design of the retaining walls and slabs will take this into account accordingly.

6.2.2. The site lies within an area identified as a secondary aquifer. The nearby bore-hole records suggest that the water table is lower than the basement and associated works.

6.2.3. The existence of basements in adjoining buildings is presumed to be absent. However, the structural engineering proposal for this scheme involves the use of underpinning to form the structural box below ground which should have no negative effect on neighbouring properties.

6.2.4. Due to the limited soils information available the following parameters are to assumed within the designs: Using ko, the earth pressures are considered 'at rest'. Active pressure (ka) will be mobilised if the wall moves 0.25-1% of the wall height, while passive pressures (kp) will require movements of 2-4% in dense sand or 10-15% in loose sand/fill.

ko values adopted:

- 0.50-0.60 for normally consolidated clay,
- 0.35 for dense sand,
- 0.6 for loose sand/fill
- 1.0-2.8 for over-consolidated clays such as London clay.

(source: Structural Engineer's Pocket Book, Eurocodes by Fiona Cobb)

7.0 Construction Methodology/ Engineering Statements

7.1. Outline Temporary and Permanent Works Proposals

7.1.1. 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.

7.1.2. 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.

7.1.3. 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.

7.1.4. 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.

7.1.5. All services surveys, diversion agreements and temporary supply requirements will be agreed, and approvals will be in place prior to commencement of works.

7.1.6. Existing building condition surveys will be carried out by others prior to commencing any works, of neighbouring property.

7.2. Sequence of works

7.2.1. Establish site access & hoarding.

7.2.2. Further investigatory works as required for full detailed design.

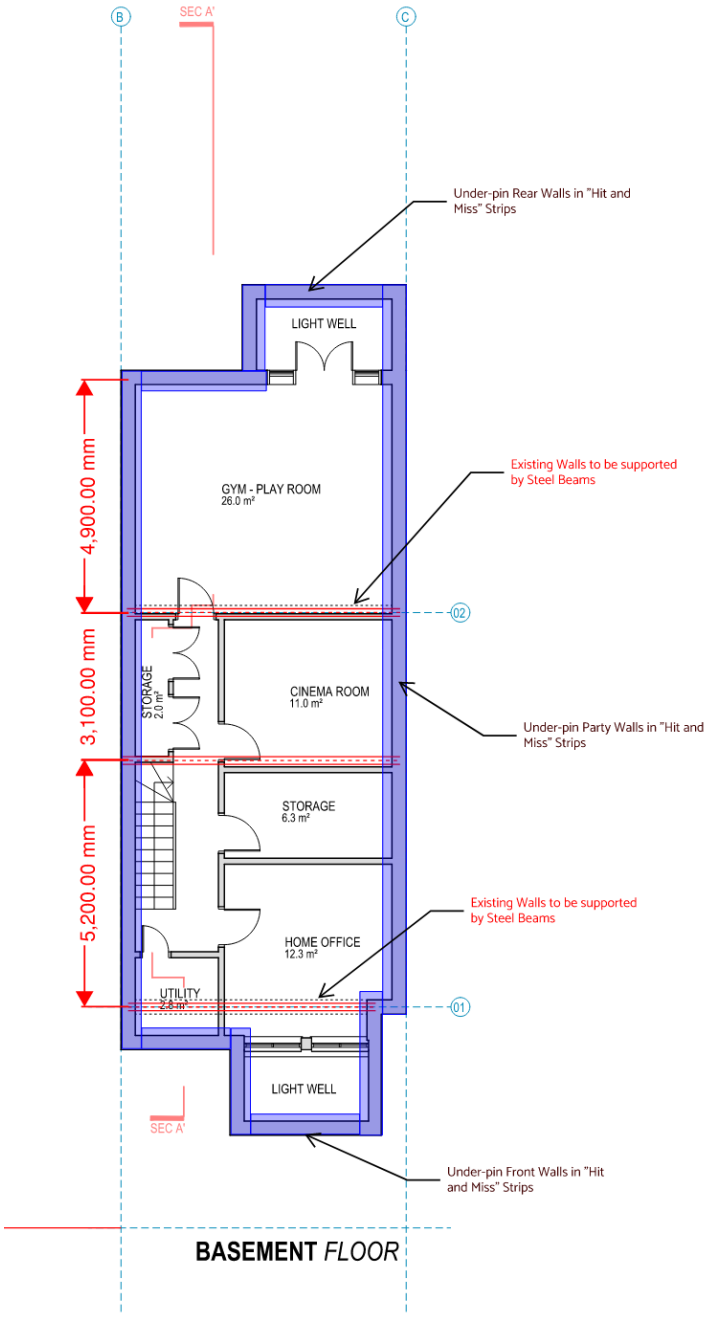
7.2.3. It is presumed that all the temporary works to ensure stability to adjacent properties are provided during demolition as designed and specified by contractor.

7.2.4. 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.

7.2.5. 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 insitu until new floor has been fully installed and strapped. Design of propping is a contractor designed item, unless instructed otherwise.

7.2.6. 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.

7.2.7. Sequenced underpinning/sequenced construction methods can take place as per indicative sketch below.



7.2.8. During the excavation, the contractor shall take all the necessary steps to prevent softening of the ground. The contractor shall also endure 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.

7.2.9. 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.

7.2.10. The underside of all existing footings (where exposed by excavation on the northern and southern walls 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.

7.2.11. All concrete shall be grade C20 (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.

7.2.12. 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.

7.2.13. 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.

7.2.14. Internal waterproofing membranes, screeds and finishes are to be placed at completion of the retaining wall boxes and ground floor slab.

7.2.15. 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.

7.2.16. Based on the size of the proposed development, it is presumed that is it likely that the bays construction will be undertaken on "top down" construction method, to be confirmed by the successful contractor.

7.2.17. Based on the size of the proposed development, and the proposed levels, the underpinning depth is between 2.4m-3.0m which is likely to be constructed in one pour. This is to be confirmed by the successful contractor and by the finalized architectural layouts.

7.2.18. Refer to Appendix for typical details and notes for underpinning construction 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.

7.2.19. It is to the successful contractor's discretion to finalise appropriate methodology based on site accessibility and resources.

7.3. Establish Access & Hoarding

7.3.1. The hoarding will be located around the property to enclose all works.

7.3.2. 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.

7.4. Waterproofing System and Screed

7.4.1. 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.

7.4.2. 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.

7.4.3. 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].

7.4.4.

Figure 1: Grades of waterproofing protection

7.4.5. 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.

7.5. Ground Movement and Damage Impact Assessment

7.5.1. 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/m^2.

7.5.2. 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.

7.5.3. 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.

7.5.4. 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.

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

7.5.6. 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.

7.5.7. 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.

7.5.8. 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.

7.5.9. 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.

7.5.10. 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.

7.5.11. 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

7.6. Existing Drainage

7.6.1. Due to the nature of the works proposed, there is a significant chance that utility assets in the area may be impacted. As such, it is up to the Client/Contractor to conduct a full asset search before beginning any works, and to apply for and diversionary works with the affected asset owner. C3 and C4 information will be implemented into the design phase of the basement.

7.6.2. Thames Water have been identified as a Key asset owner in the area. Sewers identified as surface water and combined run near the development but are not affected by the proposals. (See Appendix 14).

8.0 Conclusion

8.1.1. The proposed re-development of 15 Clifton Gardens, London N15 6AP can be achieved using standard construction techniques and materials.

8.1.2. Where mechanical means are necessary to construct permanent works, these can be of a type that generates low vibrations to which the surrounding buildings have a form and construction that is robust and resistant to.

8.1.3. We can therefore conclude with confidence that the construction of the proposed development generally, and the subterranean basement in particular, will not affect the integrity of the surrounding building stock or overload the near-surface geology.

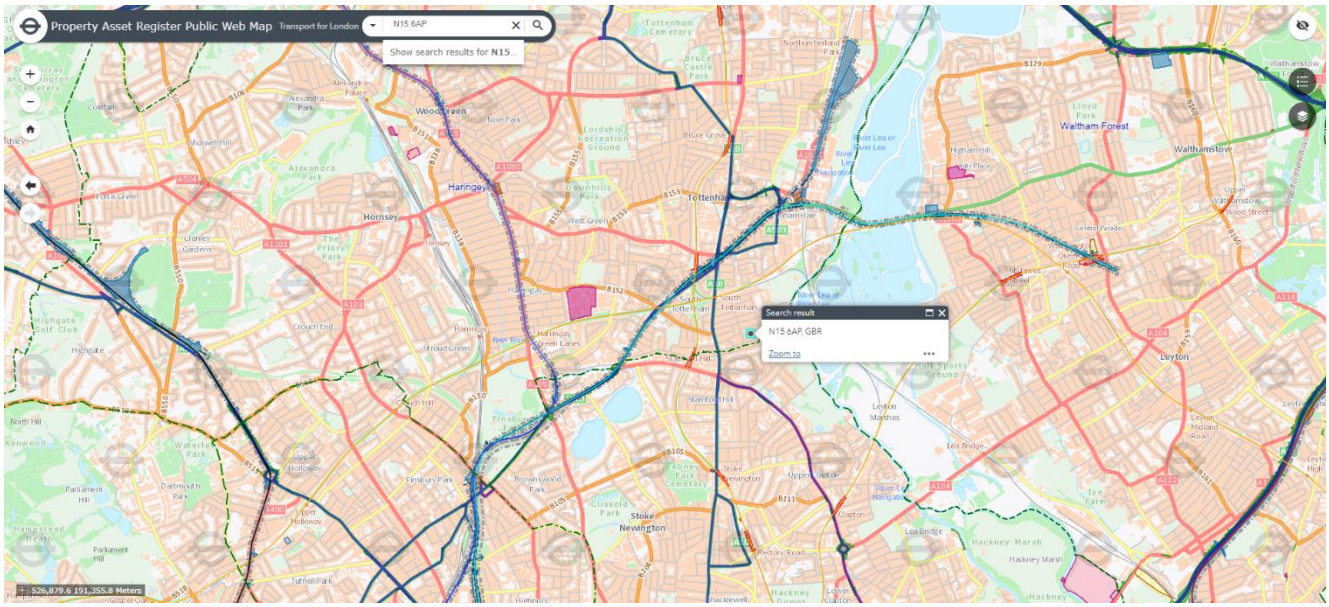
8.1.4. There are likely no critical utilities beneath the site that cannot be relocated easily to accommodate the construction and, as there is no change in use proposed there will be no significant increase in foul discharge to the sewer despite the increase in level of accommodation.

8.1.5. The techniques proposed for the subterranean element of the building and the nature of the underlying geology minimises the risk of instability, ground slip and movement.

8.1.6. The review of the proposals has concluded that the predicted damage to the neighbouring properties would generally be 'Negligible', with some limited areas of 'Very Slight'.

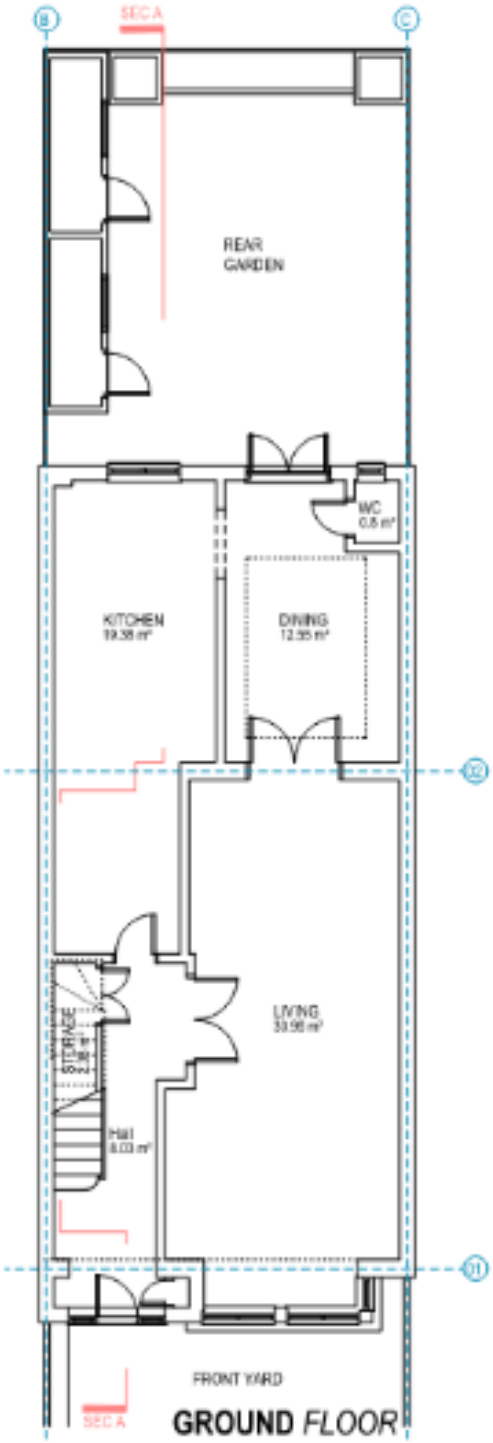
8.1.7. On this basis, the damage that would inevitably occur as a result of such an excavation of the proposed basement, will in practice be separated by a number of weeks during which time construction will take place. This will provide an opportunity for the ground movements during and immediately after excavation to be measured and reviewed so that propping arrangements can be adjusted if required.

Appendix 1: Transport for London Property Asset Register

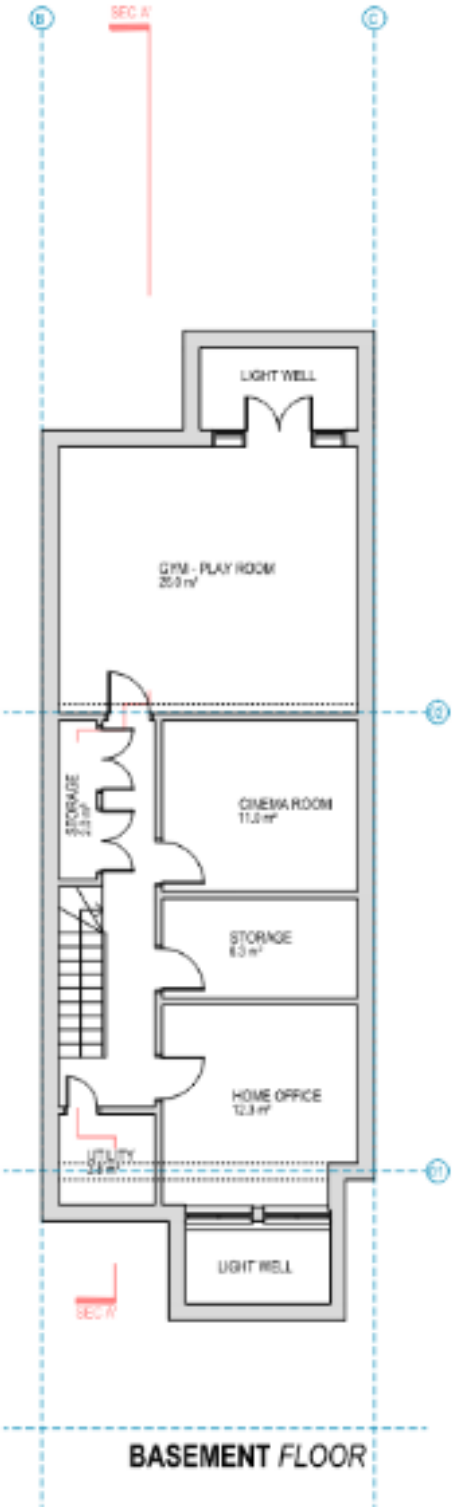


Appendix 2: Existing/Proposed Plans

Existing Ground Floor Plan

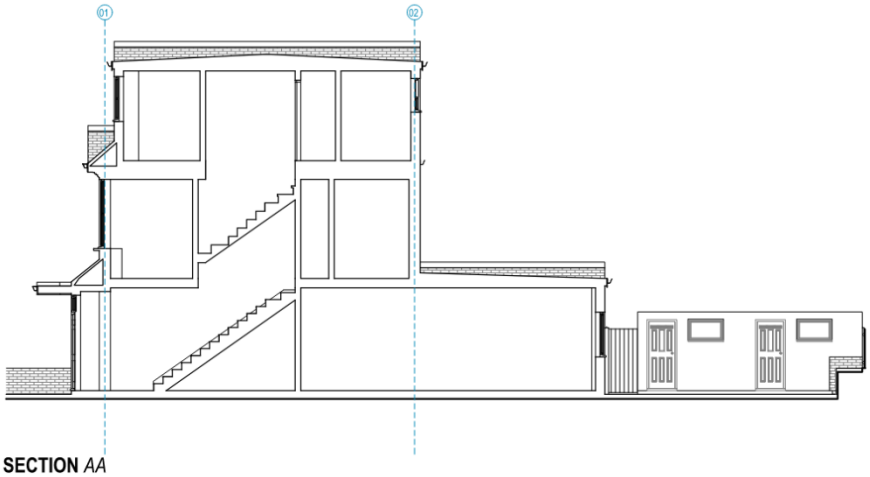


Proposed Basement Floor Plan



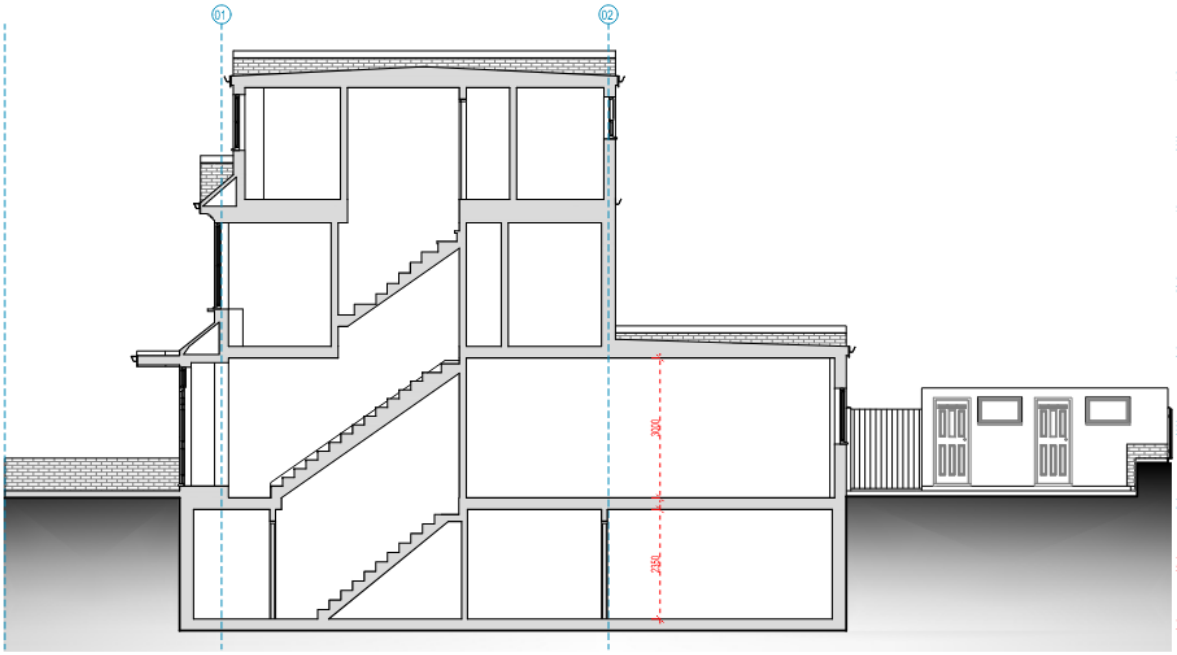
Appendix 3: Existing/Proposed Sections

Existing Section A-A



SECTION *AA*

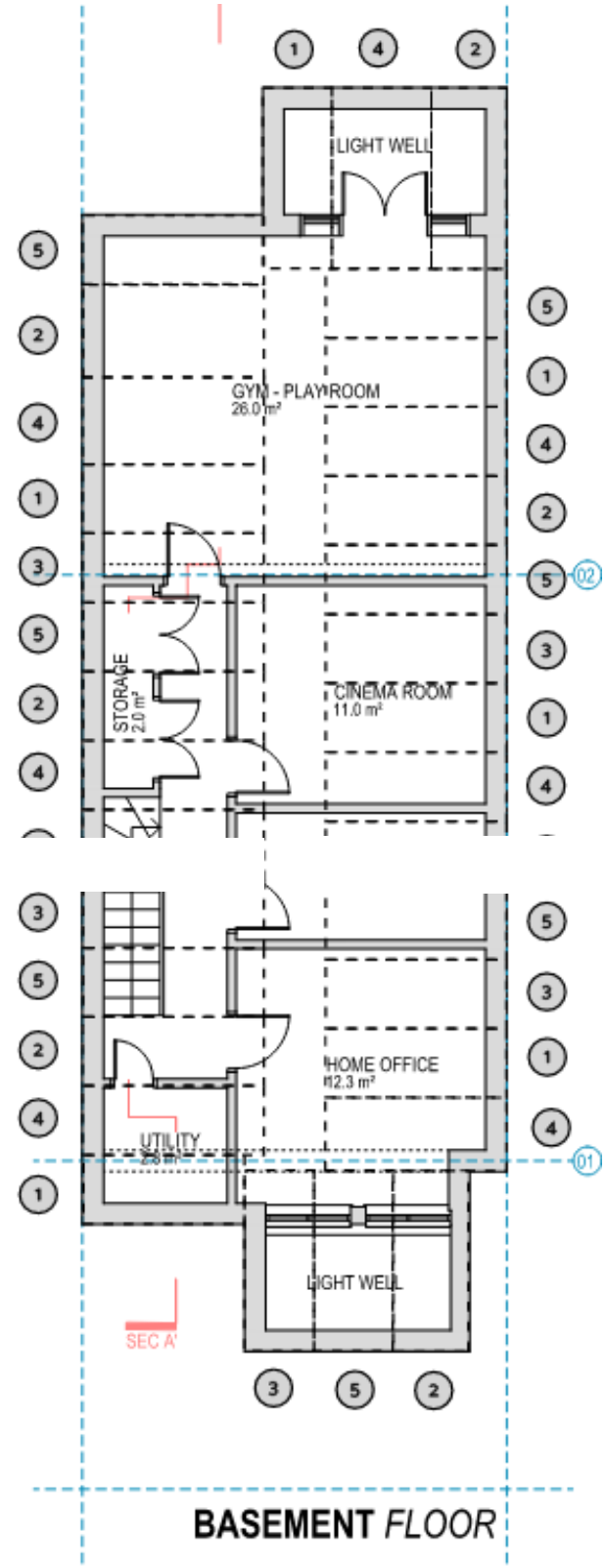
Proposed Section A-A



SECTION *A'A*

Appendix 4: Plan 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

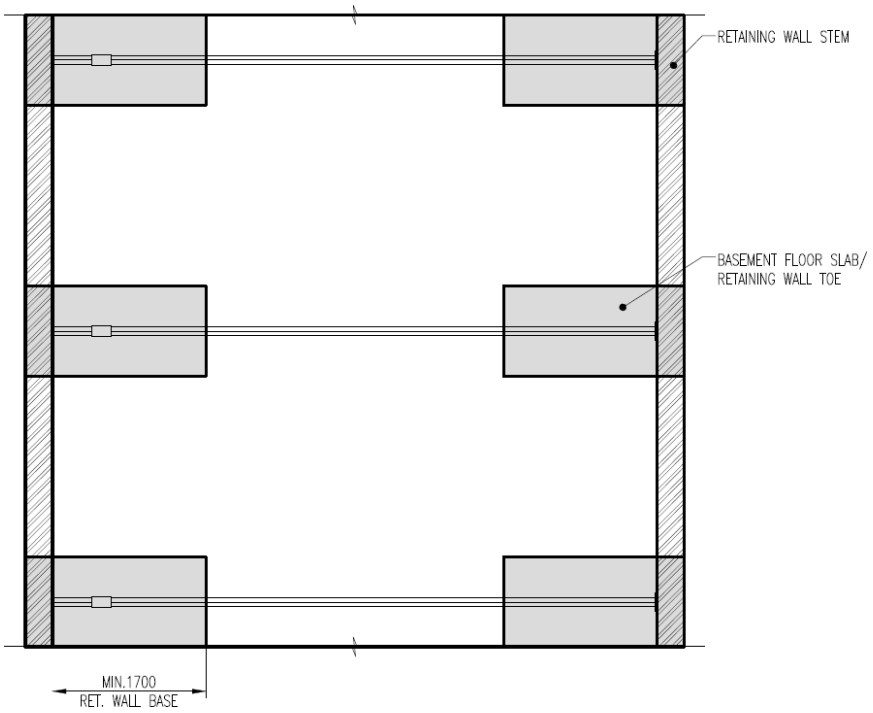
D. DRY PACK BETWEEN UNDERPINNING & ORIGINAL FOUNDATION

E. 24Hrs. TO ALLOW DRY PACK MORTAR TO GAIN STRENGTH

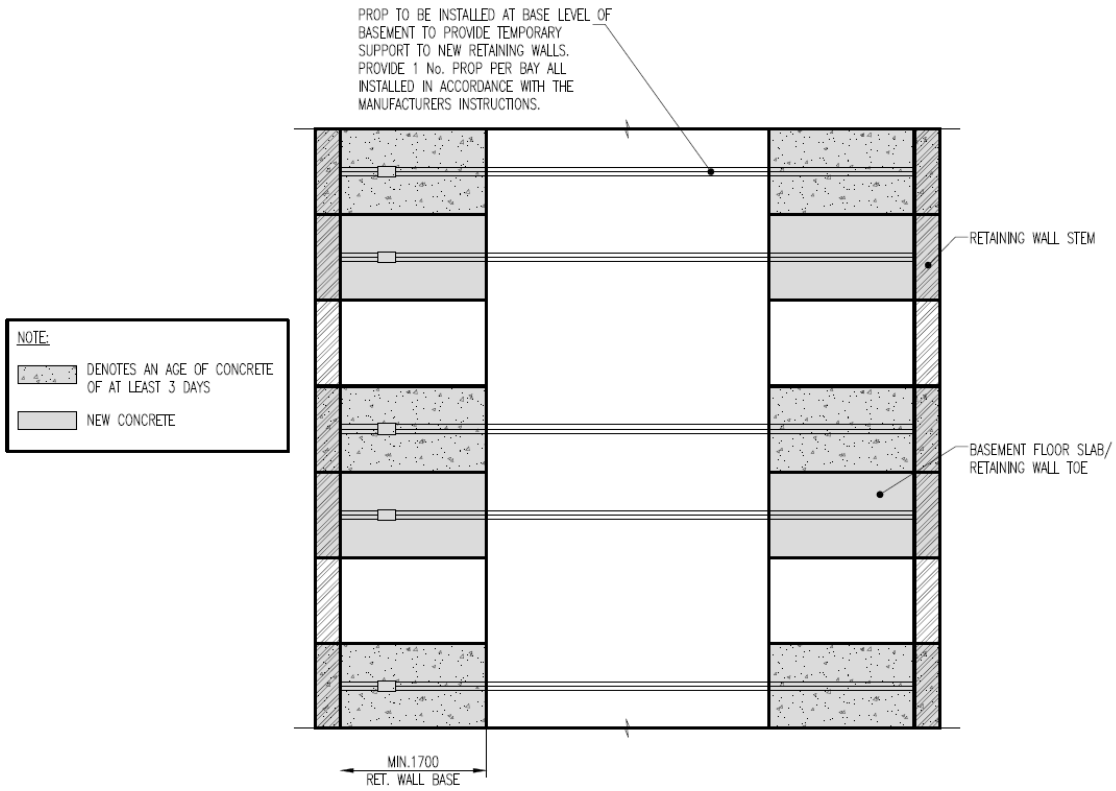
F. EXCAVATE BAYS MARKED (2)

G. PROCEED AS FOR B. – E. ABOVE FOR BAYS MARKED (2)

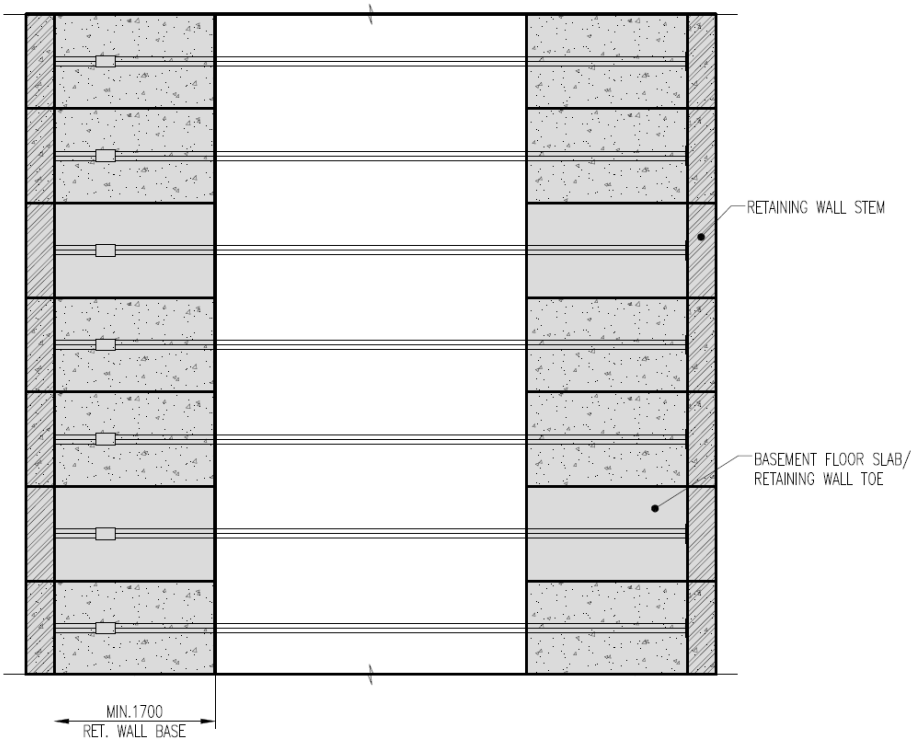
H. REPEAT PROCESS F. – G. FOR REMAINING BAYS IN SEQUENCE MARKED ON PLAN



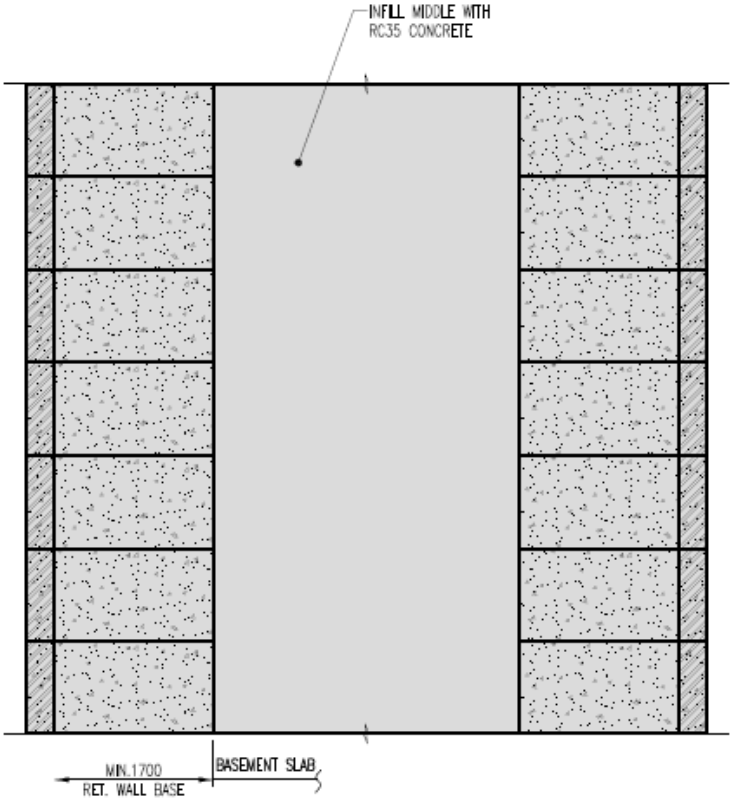
PLAN ON BASEMENT WORKS



PLAN ON BASEMENT WORKS



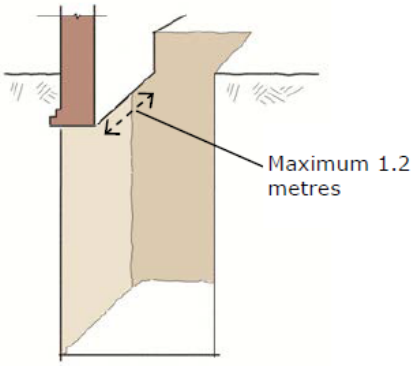
PLAN ON BASEMENT WORKS



PLAN ON BASEMENT WORKS

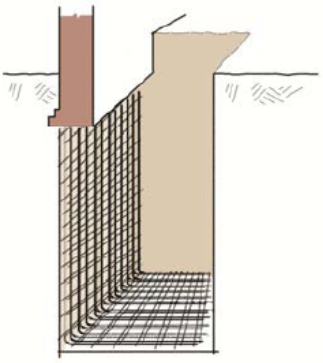
SCALE 1:50

Appendix 5: Typical Underpinning sequence (ASUC Guideline)



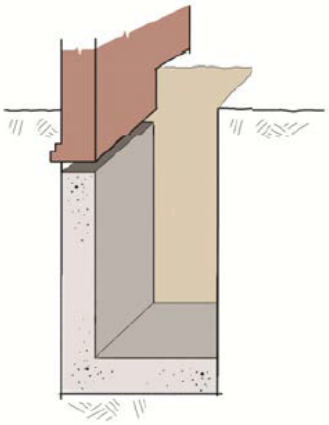
1. Excavation must be fully supported by props and shoring.
2. Edge protection to prevent falls into the excavation must be installed.
3. A temporary vertical prop or support may be placed under the wall to keep any loose bricks or masonry in place.
4. The main load from the existing wall will span onto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

Stage 1. Excavation



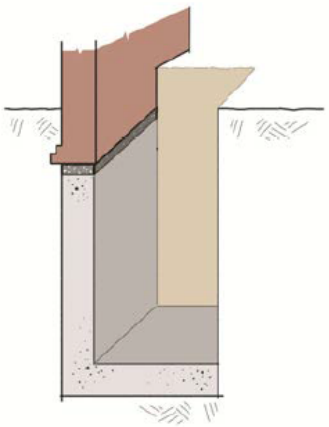
1. Reinforcement is fixed into position.
2. Reinforcement details are given in the engineering design. It is critical that the reinforcement is installed as detailed in the design
3. The design will usually require a shear connection between adjacent underpins. This is generally achieved using dowel 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

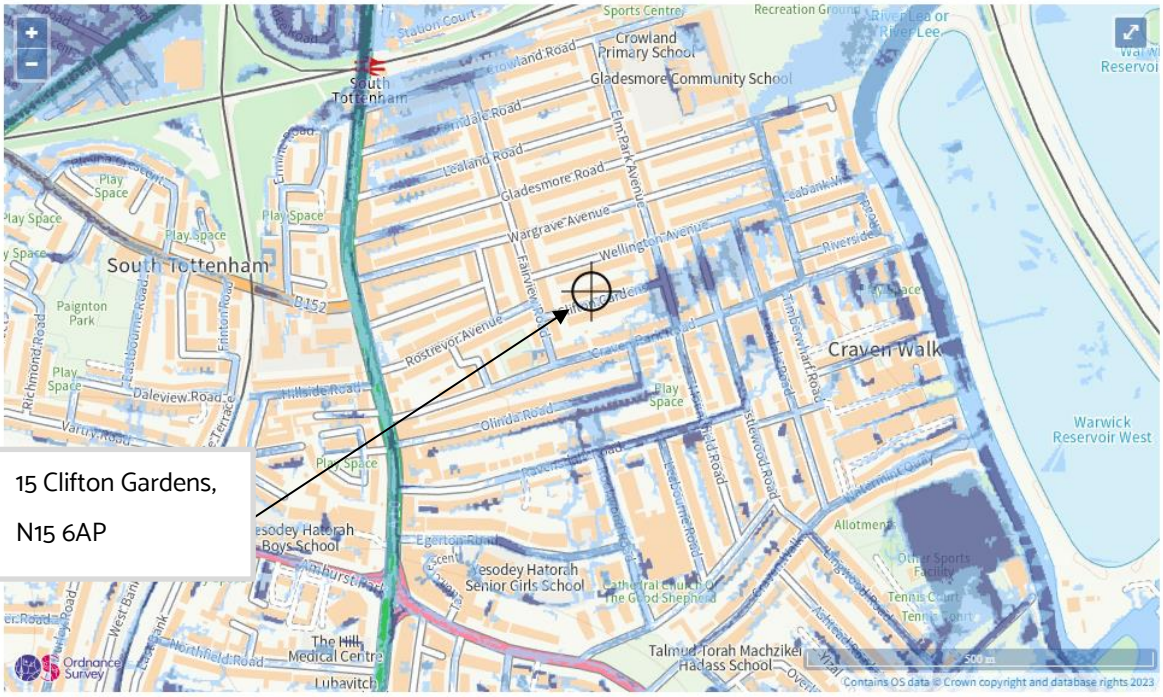
Appendix 6: Flood Risk Maps

Flood risk

Extent of flooding

Location

N15 6AP



Extent of flooding from surface water

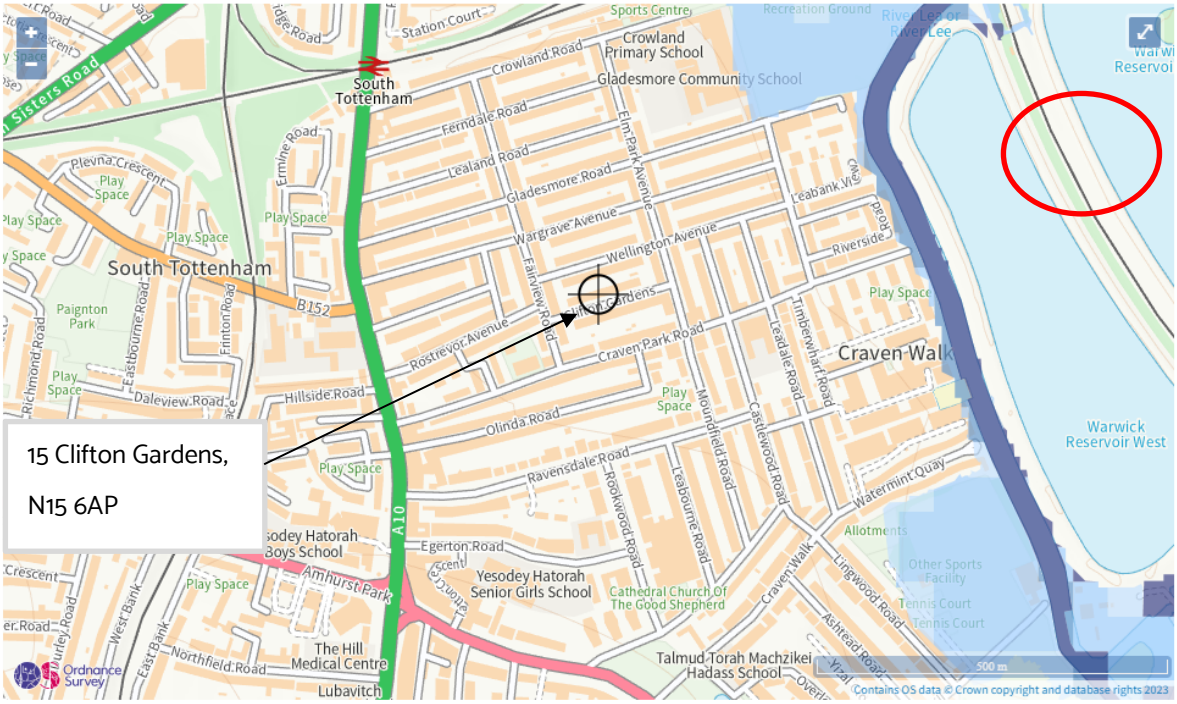
High Medium Low Very low Location you selected

Flood risk

Extent of flooding

Location

N15 6AP



Extent of flooding from rivers or the sea

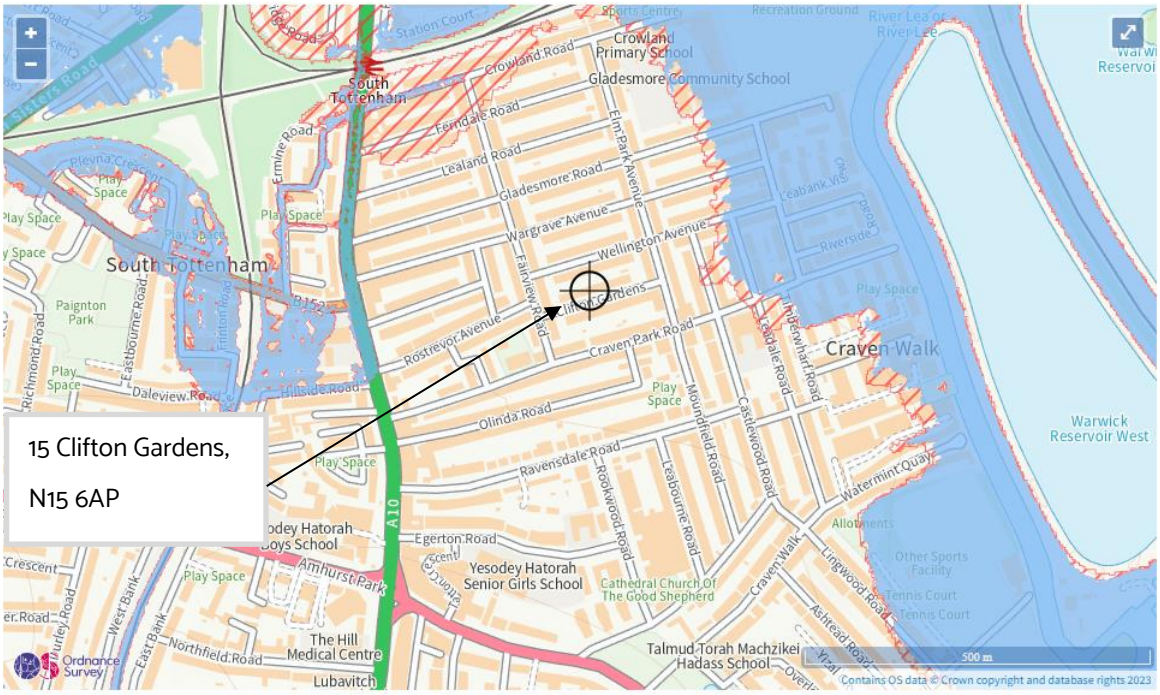
High Medium Low Very low Location you selected

Flood risk

Extent of flooding

Location

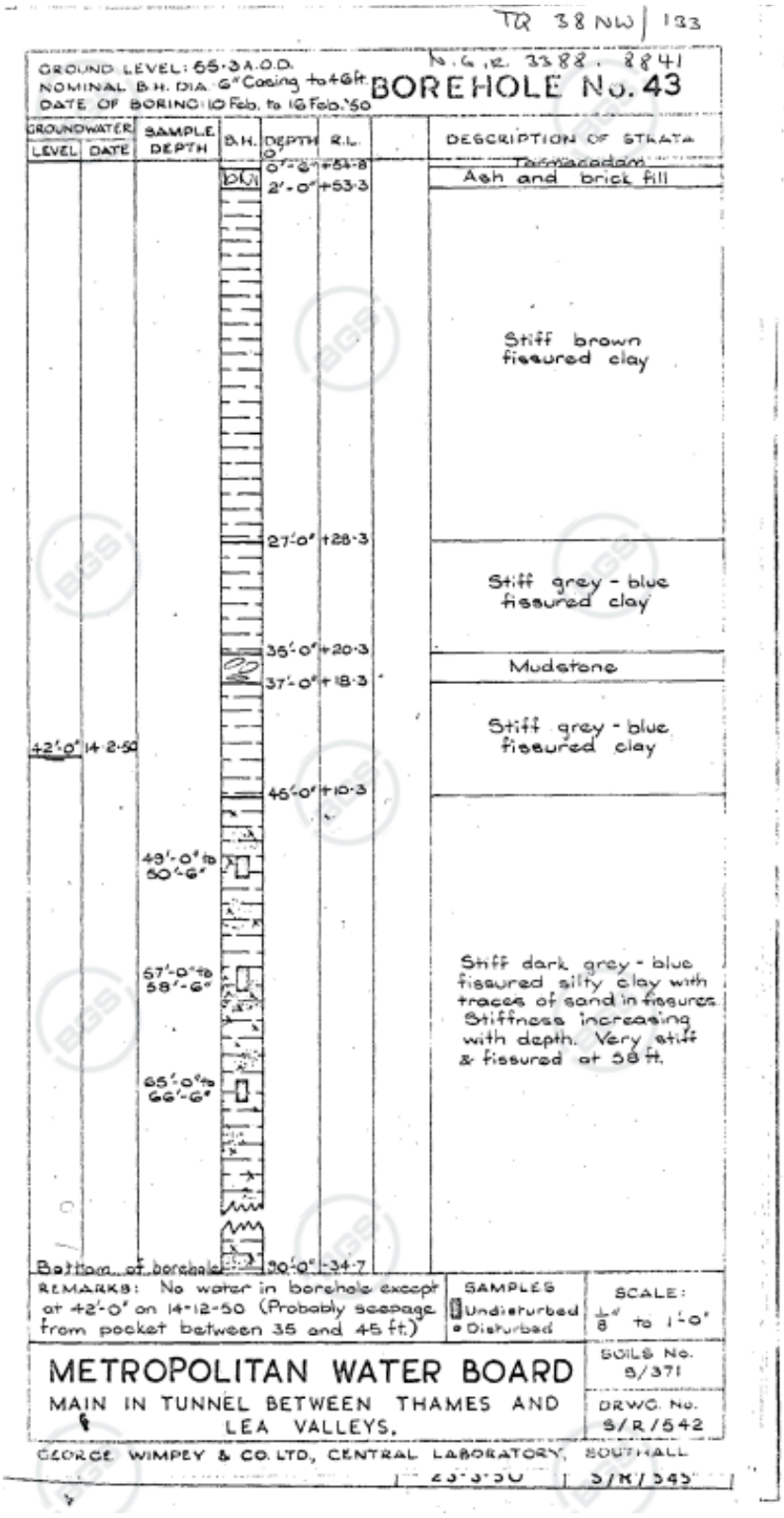
N15 6AP



Maximum extent of flooding from reservoirs:

when river levels are normal | when there is also flooding from rivers | Location you selected

Appendix 7: Borehole details[1]



TQ 38 NW | 133

N.G.R. 3388 . 8841

GROUND LEVEL: 55·3 A.O.D.
NOMINAL B.H. DIA. 6" Casing to 46ft.
DATE OF BORING: 10 Feb. to 16 Feb. '50

BOREHOLE No. 43

GROUNDWATER LEVEL	GROUNDWATER DATE	SAMPLE DEPTH	B.H.	DEPTH	R.L.	DESCRIPTION OF STRATA
				0'-2"	+54·8	Tarmacadam
				2'-0"	+53·3	Ash and brick fill
				27'-0"	+28·3	Stiff brown fissured clay
				35'-0"	+20·3	Stiff grey-blue fissured clay
				37'-0"	+18·3	Mudstone
42'-0"	14-2-50					Stiff grey-blue fissured clay
				46'-0"	+10·3	
		49'-0" to 50'-6"				Stiff dark grey-blue fissured silty clay with traces of sand in fissures. Stiffness increasing with depth. Very stiff & fissured at 58 ft.
		57'-0" to 58'-6"				
		65'-0" to 66'-6"				
Bottom of borehole				90'-0"	-34·7	

REMARKS: No water in borehole except at 42'-0" on 14-12-50 (Probably seepage from pocket between 35 and 45 ft.)

SAMPLES: ▮ Undisturbed ● Disturbed

SCALE: 1/8" to 1'-0"

METROPOLITAN WATER BOARD

MAIN IN TUNNEL BETWEEN THAMES AND LEA VALLEYS.

SOILS No. S/371

DRWG. No. S/R/542

GEORGE WIMPEY & CO. LTD., CENTRAL LABORATORY, SOUTHALL

23·3·50 | S/R/545

[1]

TQ38/655

Daily Borehole Log

Site	47 Moundfield Road	Drill Method	S/A	Rig No.		Crew Names	S.Bellamy
Client		Hole Dia.	200mm	Log No.	1 Of 1		D.Hufton

Day		Date	18/02/12	Start	08:00 AM	Stop	06:00 PM	Borehole	tq34188♦

Strata Description	Metres From	Metres To	Metres Thickness	Samples Type	Samples Depth	Samples no
Reinforced concrete	4.6	5.1	0.50			
Stiff brown clay	5.1	6.5	1.40			
Stiff grey clay	6.5	21	14.50			
Hard grey mudstone	21	21.3	0.30			
Stiff grey clay	21.3	37	15.70			
Grey green sandy clay	37	42	5.00			
Grey green / red brown stiff clay with sandy bands	42	51	9.00			
Grey silty sandy clay with black fragments	51	64.5	13.50			
Firm flinty chalk Losing circulation below 110m	64.5	130	65.50			
Installation 200mm steel casing installed to 69m bgl. casing cemented into						
Place using bottom end tremmie method.						
Pump installed to 59m below casing top and pumped @2m3/hr With no drawdown.						
Drilled this shift			125.40			

	08:00 AM	06:00 PM
Depth of Water	28	
Depth Cased	69	
Depth of Hole	130	

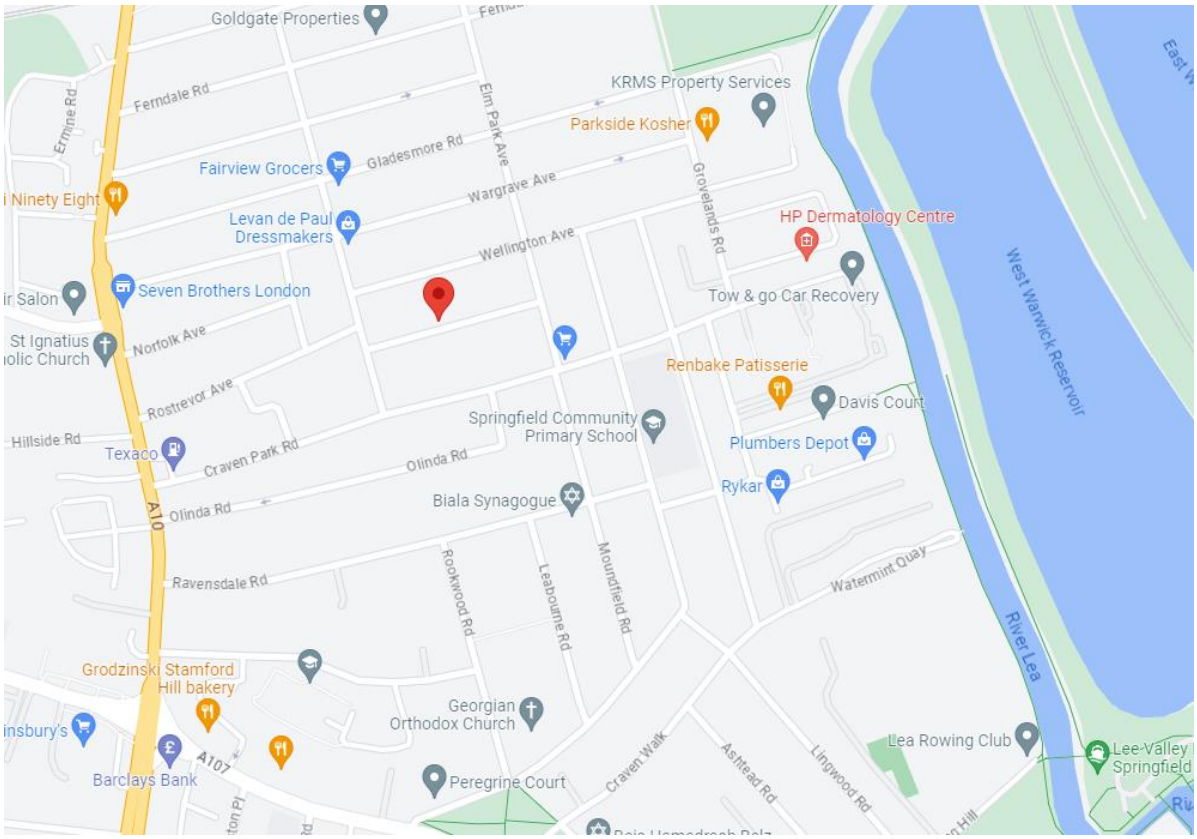
Remarks:

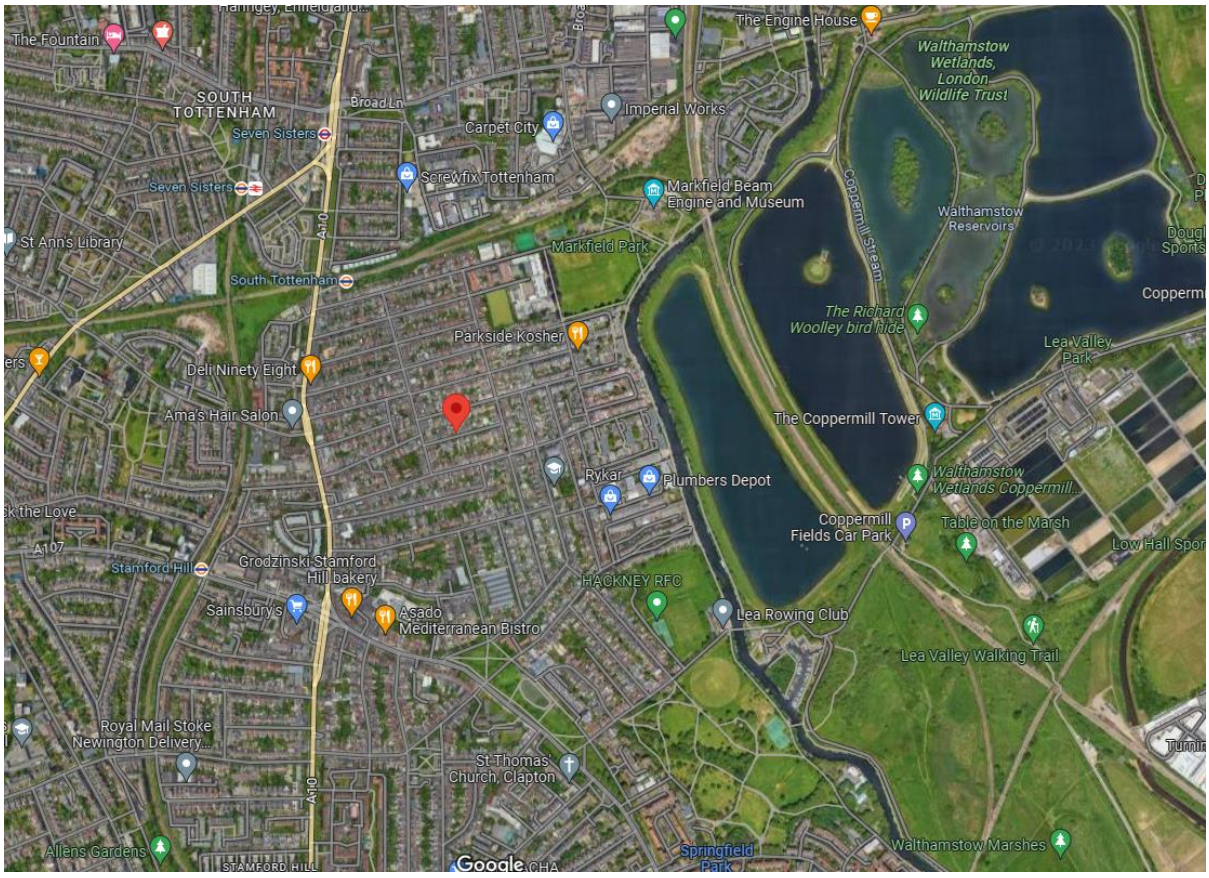
Signature on behalf of client: _____

Drilling & Servicing Contractors Ltd http://www.dsc-online.co.uk

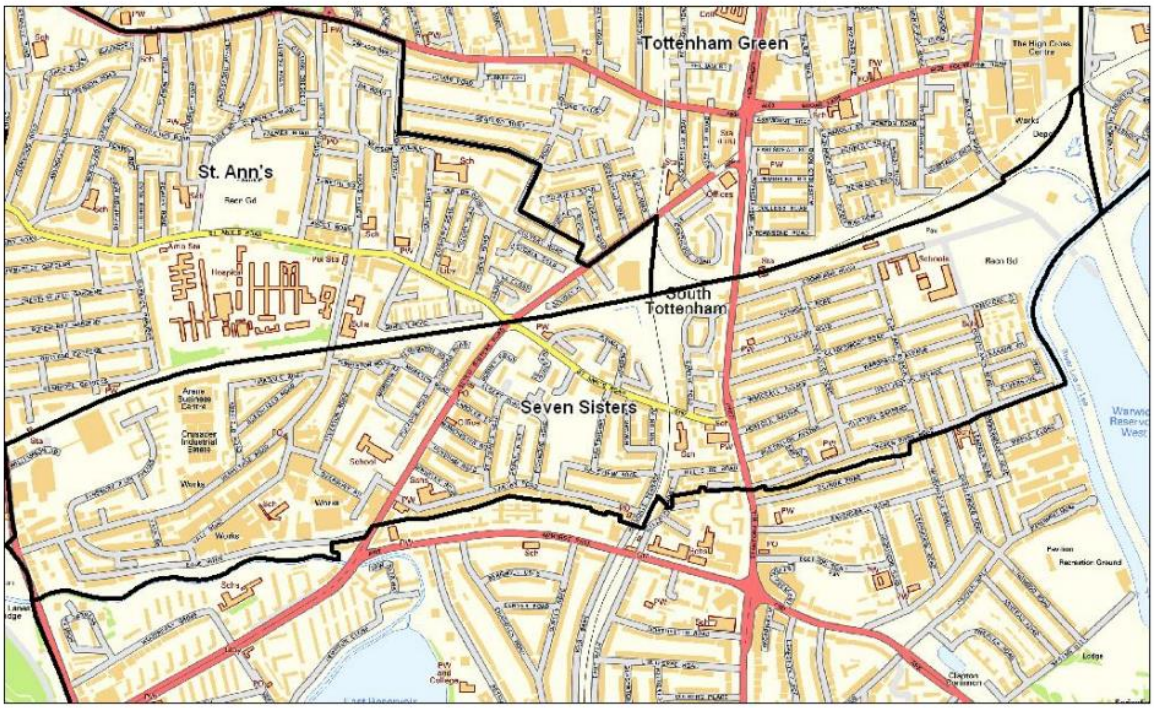
11 Bennetts Hill, Dunton Bassett, Lutterworth, LE17 5JJ.
Tel: 01455 209314 Fax: 01455 510011 Mobile: 07836 665418/7

Appendix 8: Google Maps/Haringey Maps

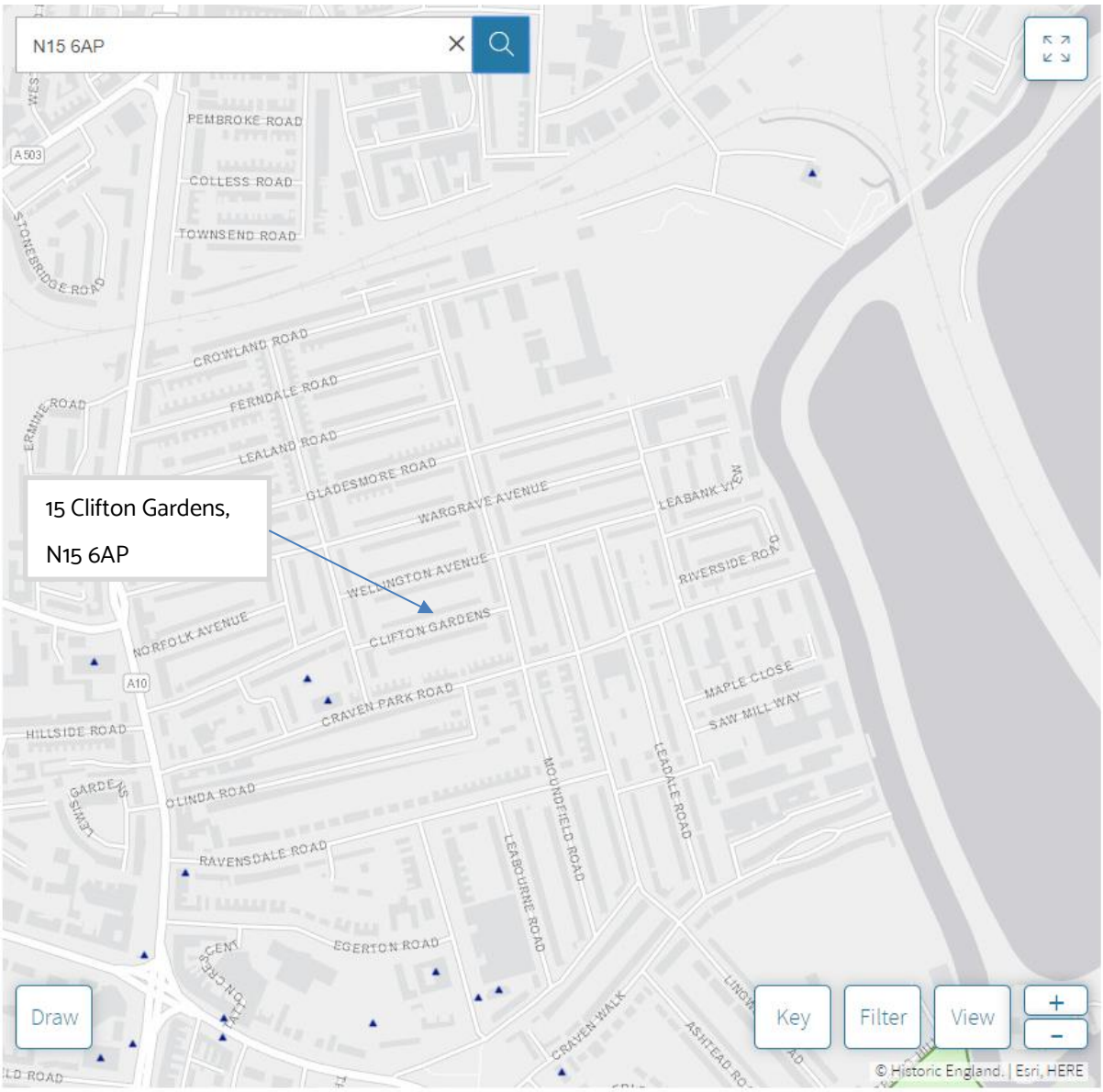




Bounds Green
White Hart Lane
Northumberland Park
Woodside
Alexandra
Fortis Green
Noel Park
Bruce Grove
Tottenham Hale
West Green
Hornsey
Harringay
Muswell Hill
Tottenham Green
St Ann's
Seven Sisters
Crouch End
Highgate
Stroud Green


Tottenham Green
St. Ann's
South Tottenham
Seven Sisters

Appendix 9: Map of Listed Buildings (Source: HistoricEngland website)



Appendix 10: Map of Local Flood Risk Zones and Critical Drainage Areas

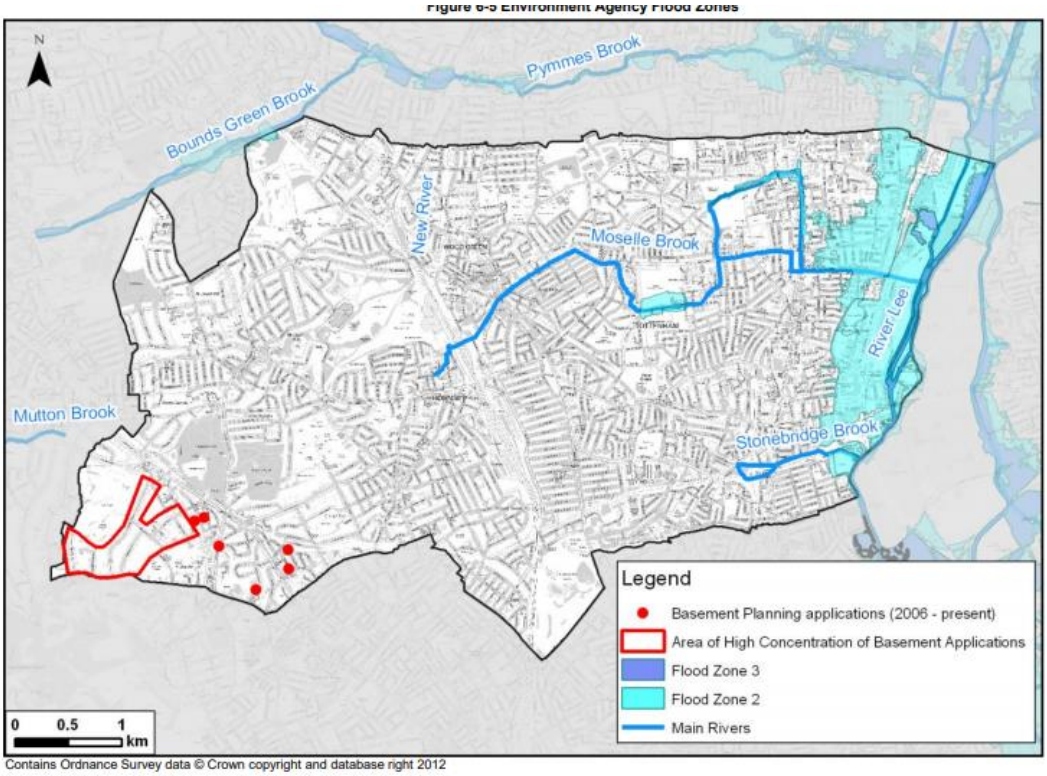


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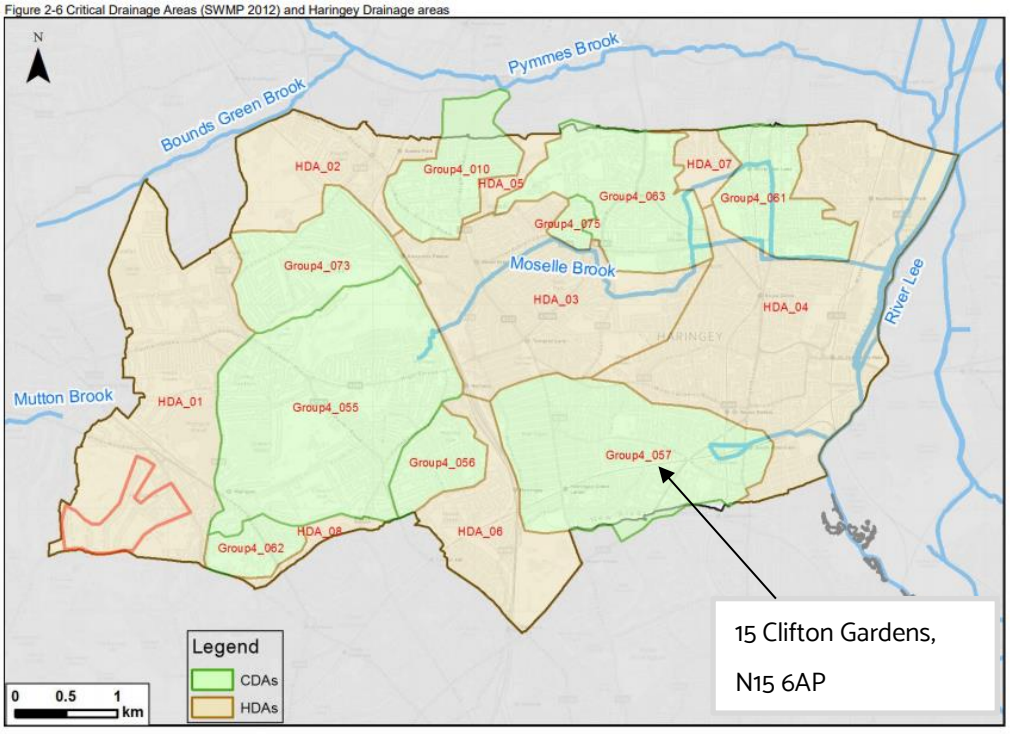
Figure 2-6 Critical Drainage Areas (SWMP 2012) and Haringey Drainage areas



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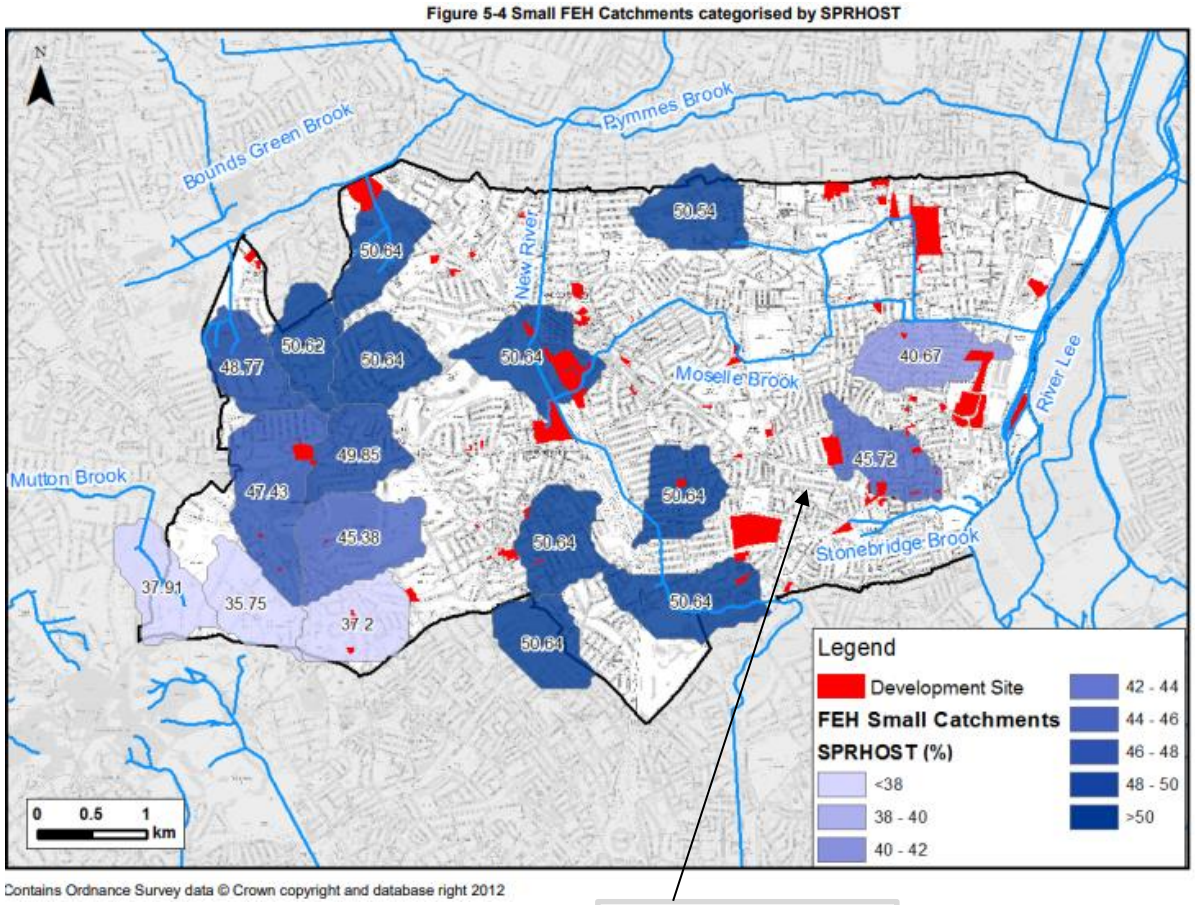
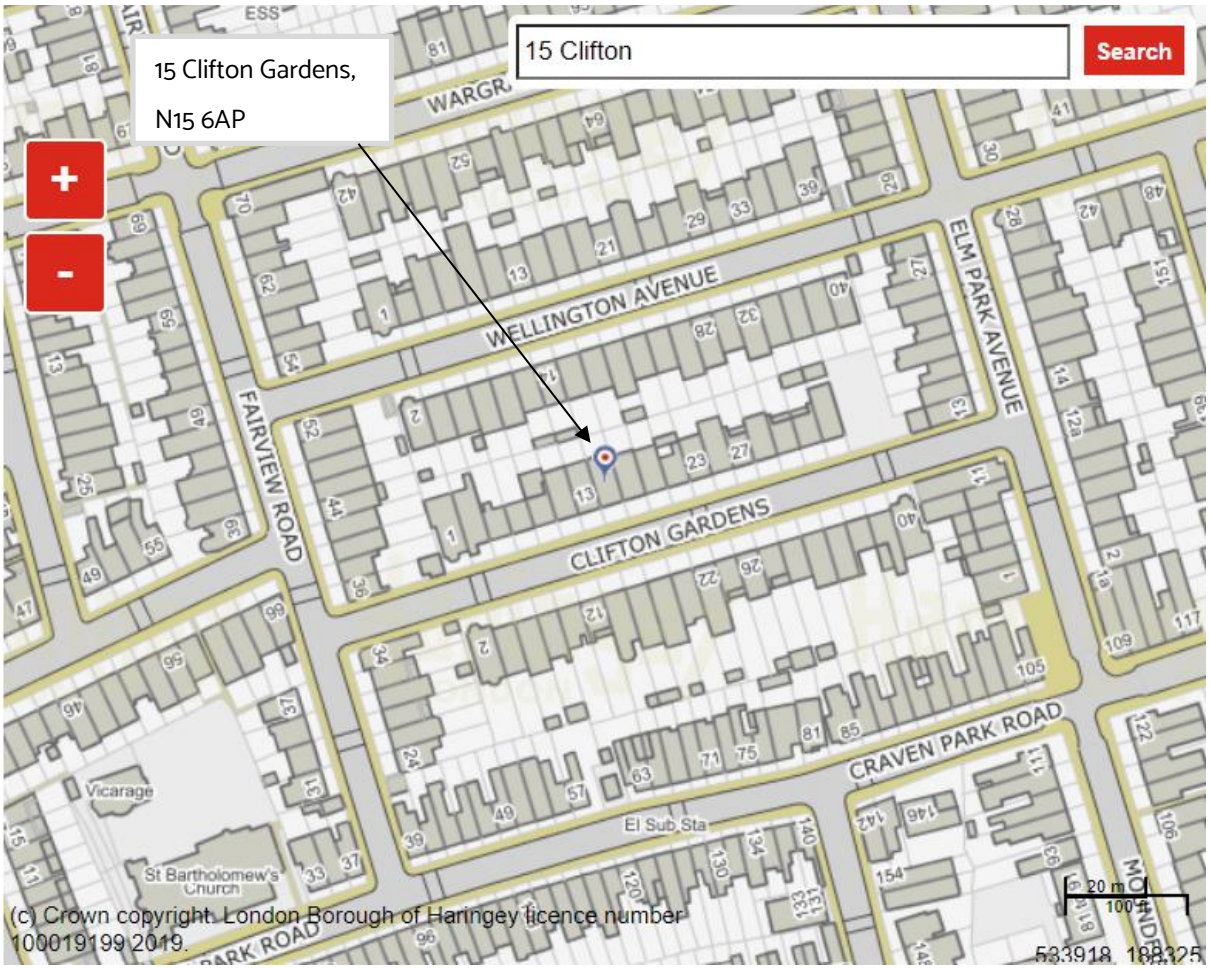
Appendix 11: Map of Areas with small catchments in Haringey

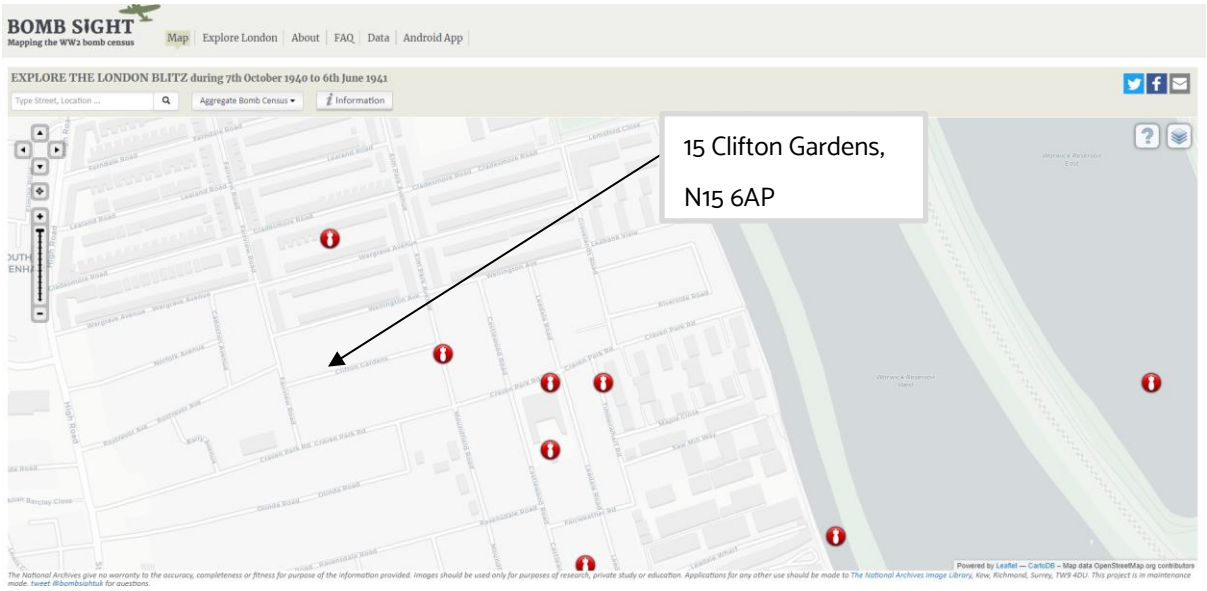


15 Clifton Gardens, N15 6AP

Appendix 12: Map showing Trees Preservation Order (TPO)



Appendix 13: Map showing the recorded bomb location of WW2



Appendix 14: Thames Water Asset Location search