

Basement Impact Assessment

EX22/070/08

20 Nicholls Avenue

Uxbridge

UB8 3JL

Revision	Date	Changes
-	30.08.22	Initial Issue

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Revisions & additional material

Document History and Status

Revision	Date	Purpose/Status
-	30.08.2022	First Issue

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1.0 Executive Summary

- 1.1.1. The site location is 20 Nicholls Avenue, Uxbridge, UB8 3JL. The site falls within the London Borough of Hillingdon. Grid Reference: TQ 07522 824031 (Easting: 507522; Northing: 182403)
- 1.1.2. The current site arrangement includes one residential properties, composed of ground floor and first floor.
- 1.1.3. The proposed development comprises the creation of a new basement underneath the existing main building and new lightwells at the 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.

The authors of the assessments are:

- M Weston CEng MStructE (Structural Engineer): Structural stability analysis has been provided by JMS Engineers (Chelmsford)
- B Norman (Civil Engineer): Surface flow & flooding analysis has been provided by JMS Engineers (Midlands) Ltd.
- D Staines CEng MStructE (Structural Engineer): Damage Assessment provided by JMS Engineers Ltd.

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

- 1.1.8. 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.
- 1.1.9. 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.
- 1.1.10. 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 20 Nicholls Avenue, Uxbridge, UB8 3JL. 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 proposed basement unit below the ground floor of the new – redevelopment at 20 Nicholls Avenue, Uxbridge, UB8 3JL. The proposed basement does not exceed the extent of the proposed ground floor plan.

The report is based on the information produced by the clients Architects, & borehole data provided by British Geological Survey 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 Hillingdon. 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 property is currently being occupied and compromise of ground floor plan and first floor plan. Refer to Architect's drawings in Appendix for existing and proposed plans and sections.

2.2.2. The adjacent properties present similar features.

2.2.3. The development property, 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". This is based on the preliminary information provided by the Architect.

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

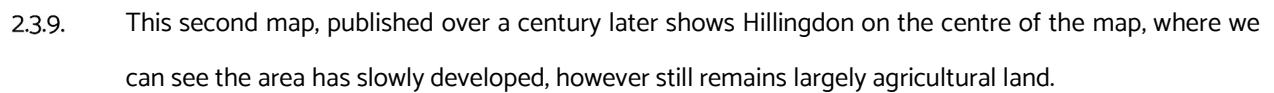
2.2.8. The full extent of the proposed basement will be within the boundary of the property so there will be no increase in impermeable surface area.

2.3. London Borough of Hillingdon

- 2.3.1. This section contains materials from The London Borough of Hillingdon Website, Facts and statistics about the borough.
- 2.3.2. The London borough of Hillingdon sits on the outskirts of Greater London and is made up of 3 localities and 22 wards. It was created in 1965 with the amalgamation of the former borough of Uxbridge with the urban districts of Hayes and Harlington, Ruislip-Northwood, and Yiewsley and West Drayton and has an area of slightly over 42 square miles. The borough comprises 17 main districts.
- 2.3.3. The Hillingdon 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 with just a few farmhouses, however, in the mid-18th century due to industrialisation this led to rapid urbanisation and developments, at present around 730 hectares of borough remains as green spaces.
- 2.3.5. The following historical maps indicate the development of this area over the period.
- 2.3.6. Published 1754 – Surveyed 1807



- 2.3.7. Our earliest map dating to the mid Georgian era, shows the entirety of the region later known Hillingdon near the centre of the map. It is clear on the map the area is not very developed and is mostly agricultural land.

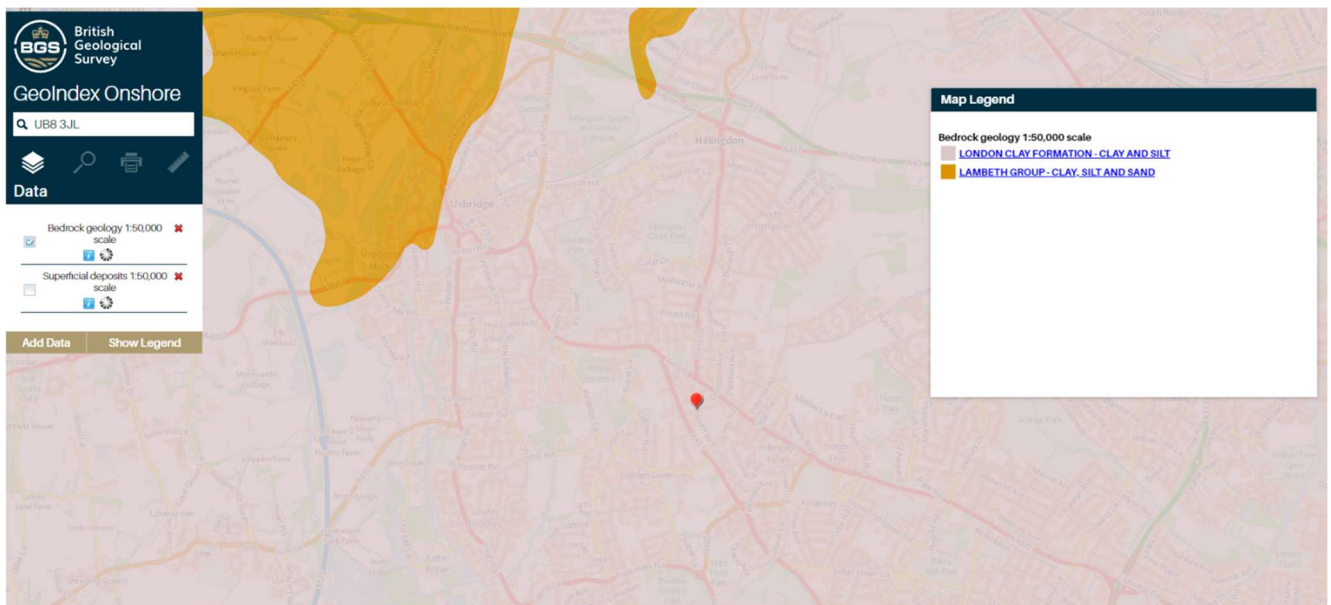


- 2.3.11. The final map is from the same period, where we can see more of the surrounding area has transformed to very urban and densely populated area with lots of terraced housing in typical Victorian arrangement. When compared to a current day map, the streets on plan remain relatively unchanged.
- 2.3.12. *Contains Ordnance Survey data © Crown Copyright and database right 2013.*

3.0 Site Geology

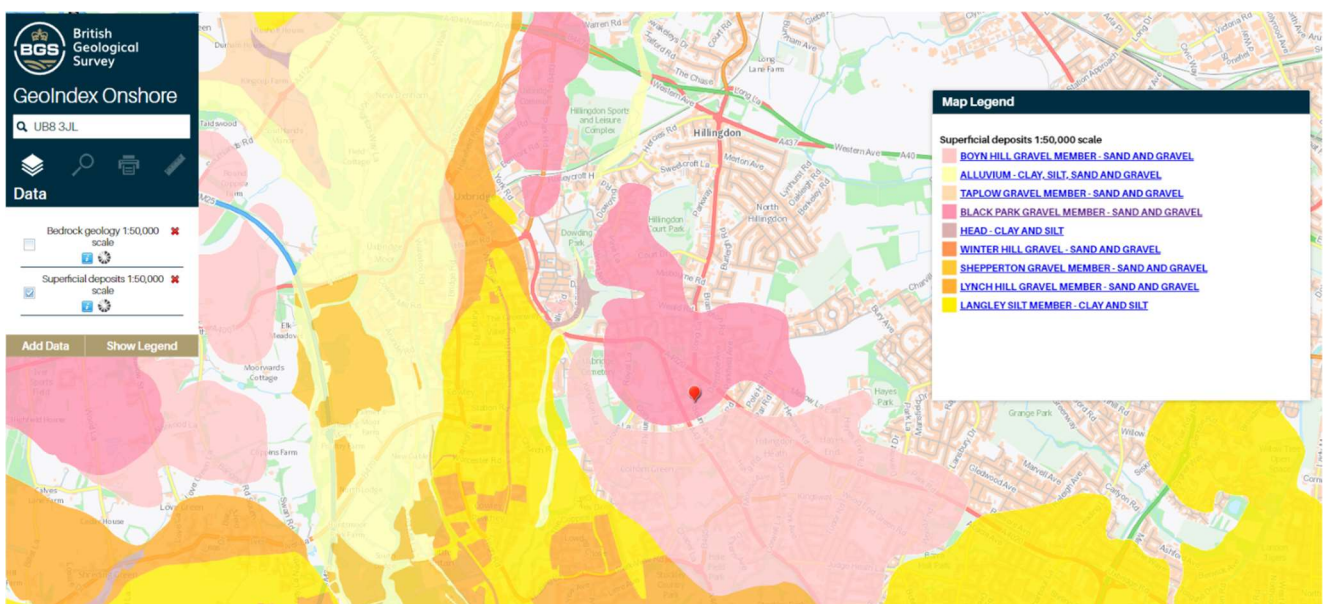
The 1:50 000 scale geological map for this area, made available by the BGS, shows the sites bedrock geology to be London Clay Formation comprising of Clay & Silt.

3.1. Bedrock Geology



3.1.1. The British Geological Survey (BGS) information shows the superficial drift at this location to be Black Park Gravel member comprising of sand & gravel from river deposits.

3.2. Superficial Geology

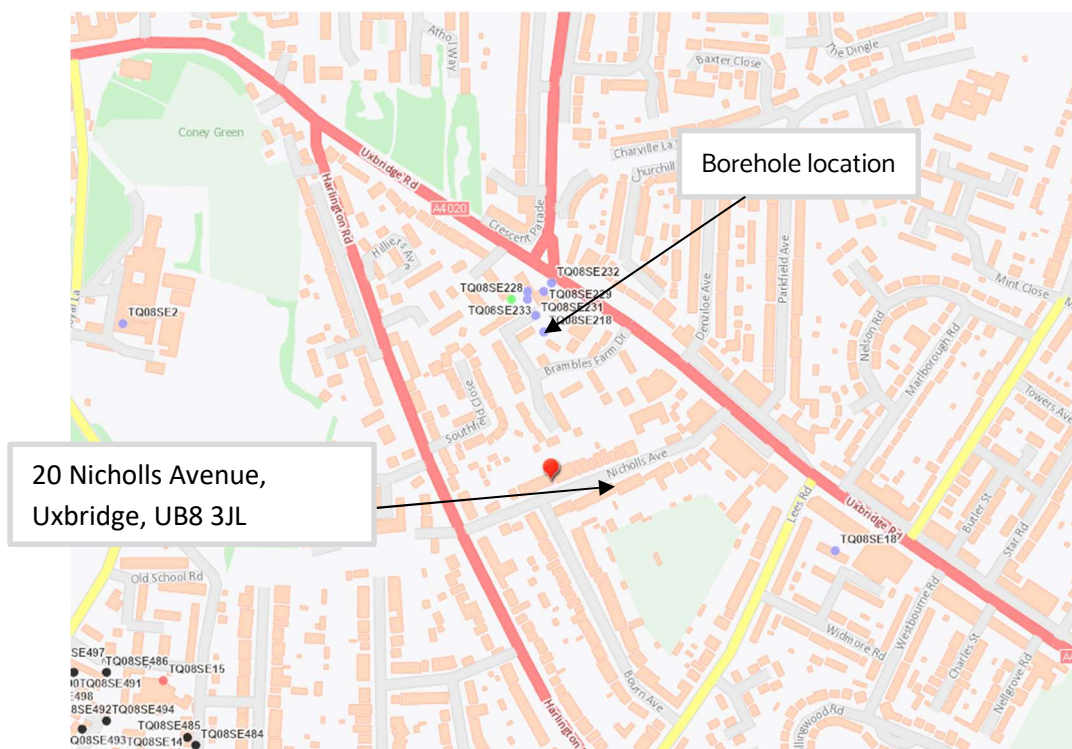


- 3.2.1. Most of Hillingdon is underlain by London clay formation comprising of clay silt and sand and significantly below this, a layer of chalk, which acts as the major aquifer of the London basin drained by the river Thames.

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.

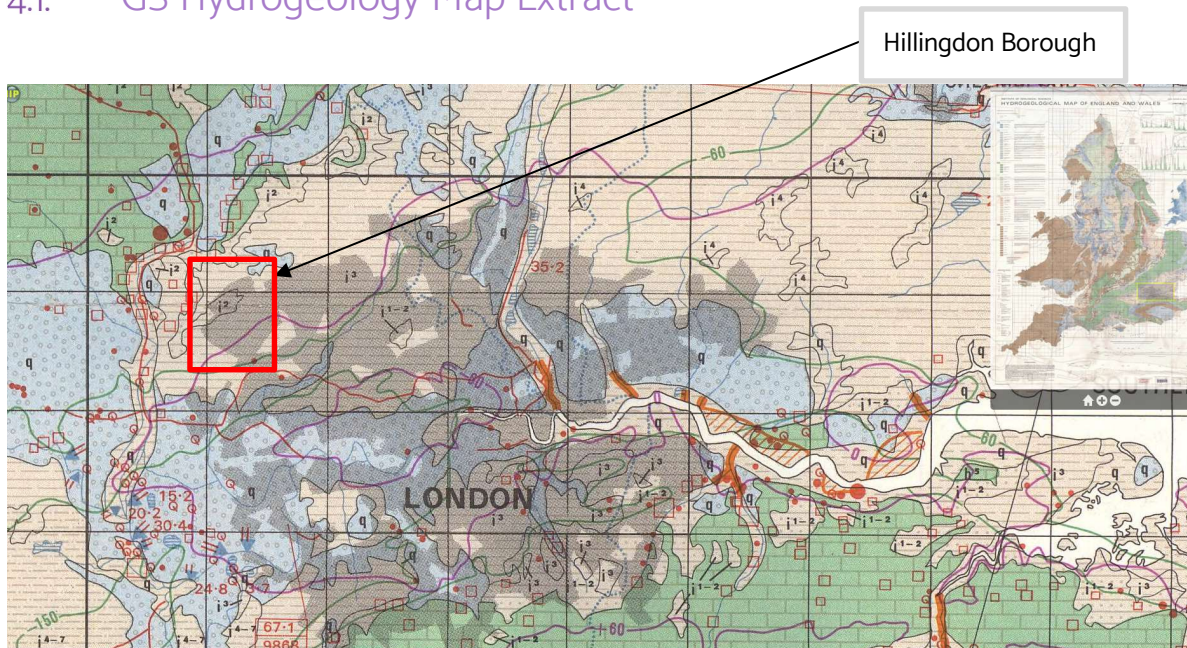
- 3.3.2. See Appendix for Borehole details.



- 3.3.3. The borehole log indicates made ground up to 0.6 inches, soft to firm mottled brown and grey sandy clay with gravel to a depth of 4.6 inches followed by stiff mottled brown and grey clay to a depth of 11.6 inches. Stiff fissured dark grey clay is then recorded until depth of 30 inches where the borehole ends. No groundwater is observed during the survey, however, as the clay is not particularly permeable, changes in groundwater level should be minimal. Typical safe bearing capacity for stiff clays range between 150 – 300 kN/m (Cobb, 2015).
- 3.3.4. No site investigations have been carried out at the time of writing this report to confirm the soil results.

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 health 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.

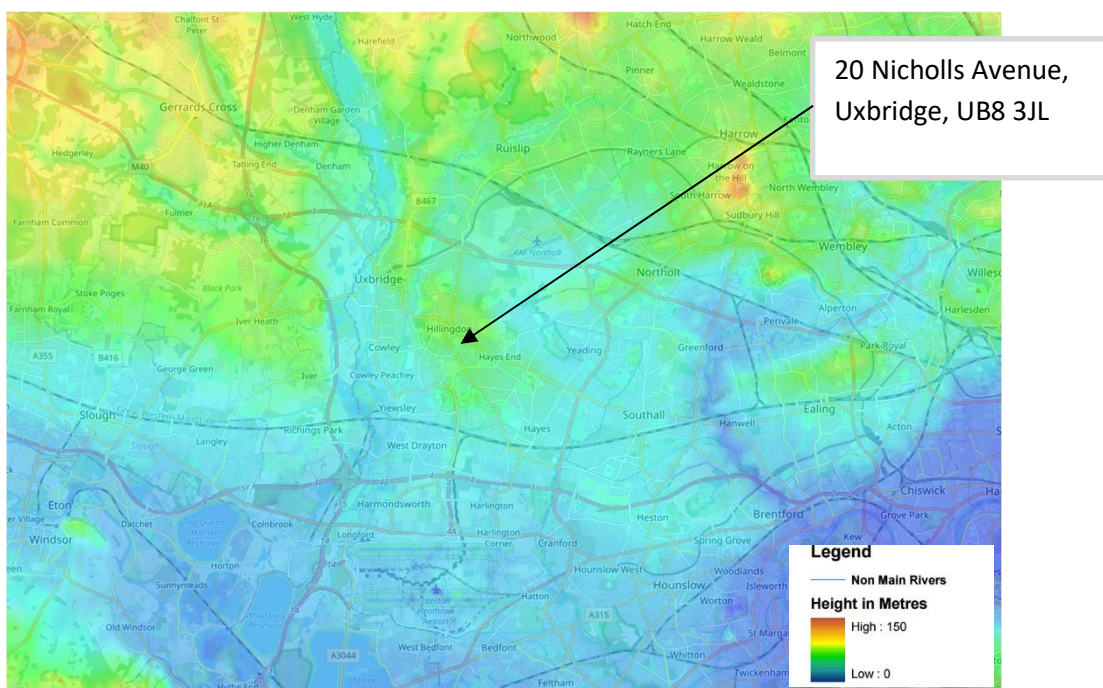
5.0 CPG4 Screening Flowcharts

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.



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)?

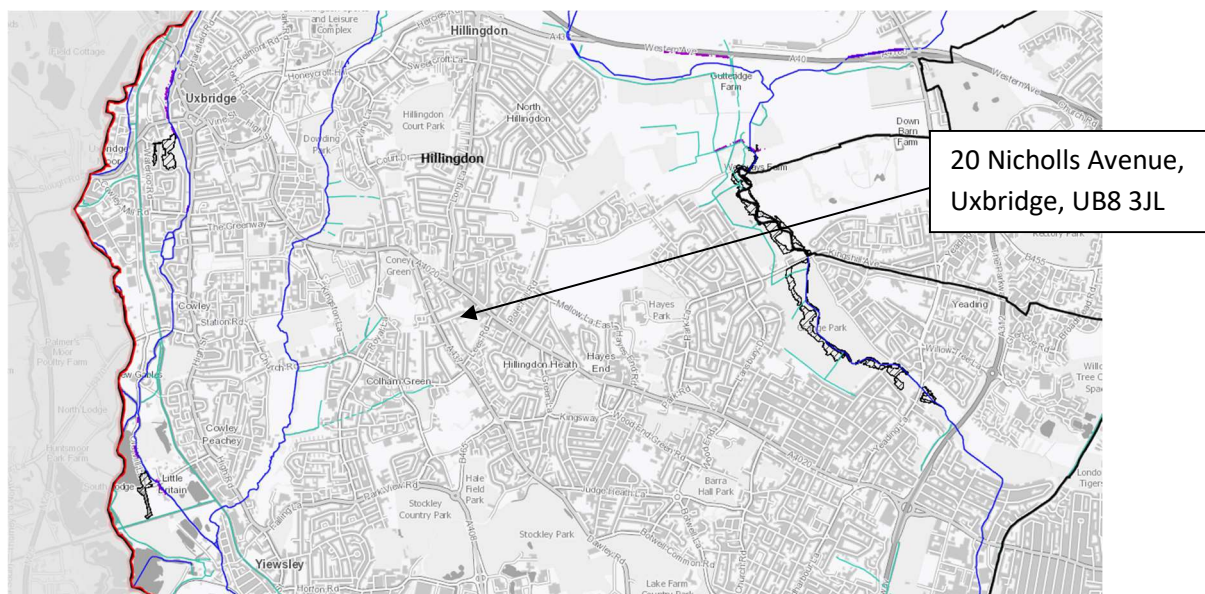
5.1.8. No. The wider gradient is less than 1:8.

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. River Pinn, approx. 1.30km 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. 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 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



- 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 Rivers and Watercourses map from the Hillingdon council shows the site to fall outside of potential flood zones. EA Flood mapping does not suggest there to be a risk from surface water flooding (see Appendix).

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.

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. Consideration of SuDS is a planning requirement for new developments. 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.
- 5.4.3. 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.
- 5.4.4. For this development the London Borough of Hillingdon are the Local Planning Authority who sets out the requirements in relation to the drainage strategy and SuDS. The Hillingdon Local Plan Part 2 2020, Policy 9 and 10 sets out these requirements”.

5.5. SUDs Incorporation and Maintenance

- 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 - Rainwater storage (Water-butts) to be utilised where possible. The site layout offers an opportunity to utilise rainwater harvesting for landscape irrigation with an added benefit of reducing the volume of runoff entering the drainage system.
- Use infiltration techniques, such as porous surfaces in non-clay areas - Infiltration of surface water has been proposed using permeable paving within the driveway.
- Attenuate rainwater in ponds or open water features for gradual release - The site layout does not offer the opportunity 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 – Surface water runoff is restricted for the entire development before discharging to the public surface water sewer at a reduced rate of 1.5 l/s.

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. Local Borehole information showed no record of groundwater being encountered.

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. It is assumed 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 contiguous piled wall 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 assume within the designs: Using k_0 , the earth pressures are considered 'at rest'. Active pressure (k_a) will be mobilised if the wall moves 0.25-1% of the wall height, while passive pressures (k_p) will require movements of 2-4% in dense sand or 10-15% in loose sand/fill.

k_0 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

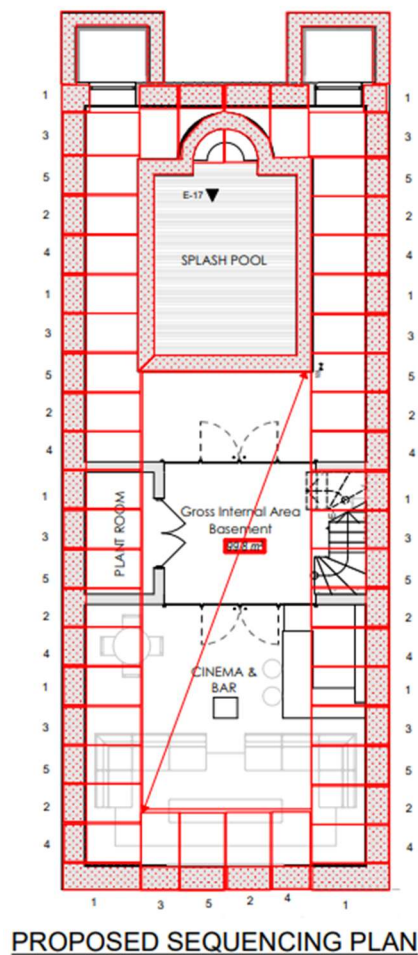
7.1 Outline Temporary and Permanent Works Proposals

- 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 prior to commencing any works, of neighbouring property.

7.2 Sequence of works for underpinning section

- 7.2.1. Establish site access & hoarding.
- 7.2.2. 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 in-situ 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 sections can take place as per indicative sketch below. Underpinning to be connected to a central slab with starter bars.



- 7.2.8. During the excavation, the contractor shall take all the necessary steps to prevent softening of the ground. The contractor shall also ensure that the base of the excavation shall not become contaminated by loose material falling into the excavation. The contractor shall take steps to ensure that the size of the excavation loosely matches the required size agreed with the engineer /local authorities. Excessive overbreak will not be permitted and the contractor shall provide all necessary trench sheeting and

strutting to prevent overbreak. The contractor might be required to provide sheeting and strutting to prevent any ingress of loose material beneath the existing floor.

- 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 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 C35 (unless specified otherwise) and strictly operated according to the concrete specifications contained in BS8110:Part 1:1985. It should be noted that the concrete should be adequately compacted with a vibrator poker to ensure adequate density. The concrete for the retaining wall legs should be brought up to 75mm from the underside of the existing footing.
- 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 it is likely the bays constructions 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 2.8m-8m which can 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 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 <i>Specification for piling and embedded retaining walls</i> [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/m².

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.

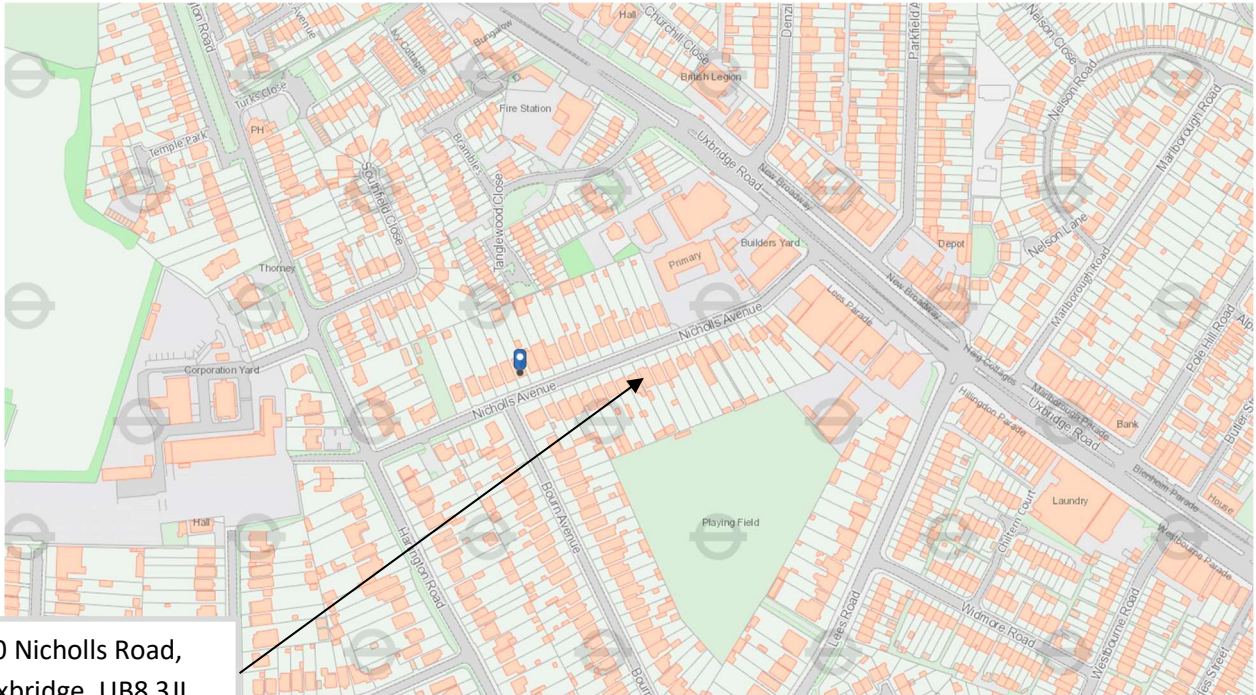
7.6. Existing Drainage

- 7.6.1. Appendix 14 shows the Asset Location Search Sewer Map show a Ø225mm foul sewer in Nicholls Avenue which is approximately 1.5m deep. Asset plans also show a Ø225mm surface water sewer in Nicholls Avenue.

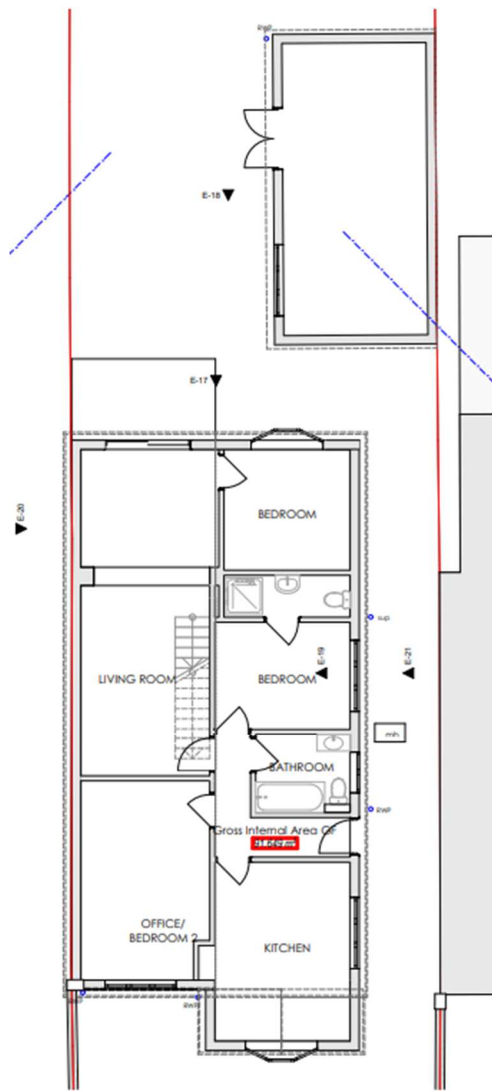
8.0 Conclusion

- 8.1.1. The proposed re-development of 20 Nicholls Road, Uxbridge, UB8 3JL can be achieved using standard construction techniques and materials and using mixed methodology where appropriate or practical.
- 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 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 surface water 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.

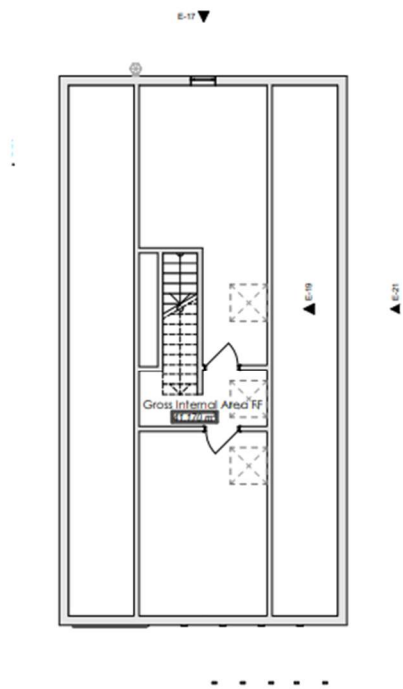
Appendix 1: Transport for London Property Asset Register



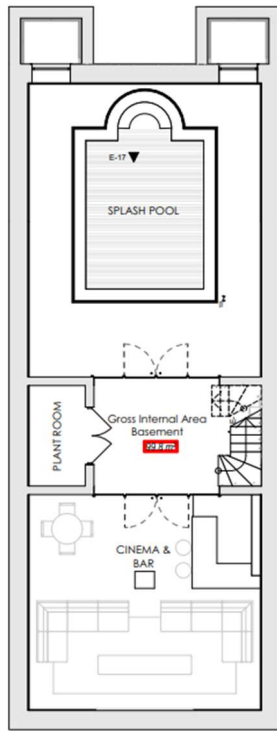
Appendix 2: Existing/Proposed Plans



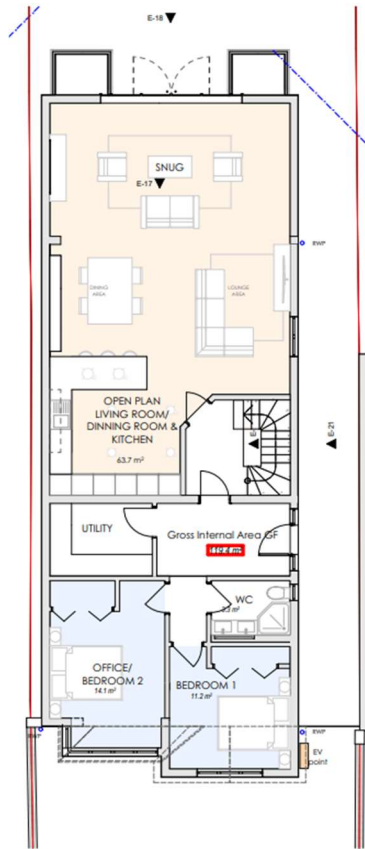
Existing Ground Floor Plan



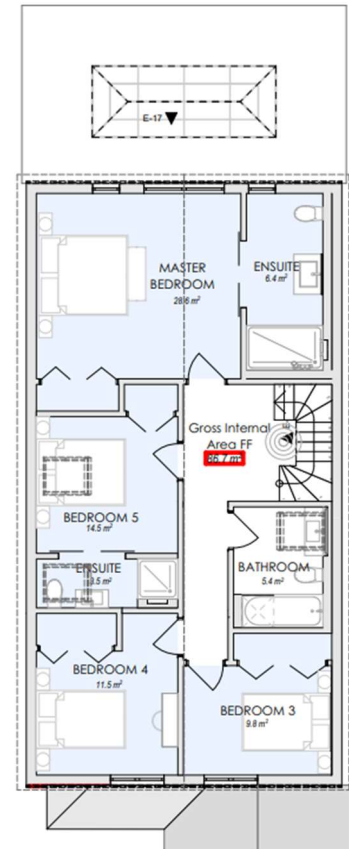
Existing First Floor Plan



Proposed Basement Floor



Proposed Ground Floor

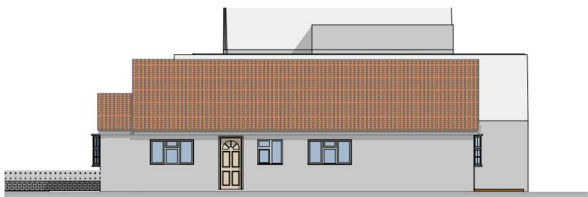


Proposed First Floor

Appendix 3: Existing/Proposed Sections



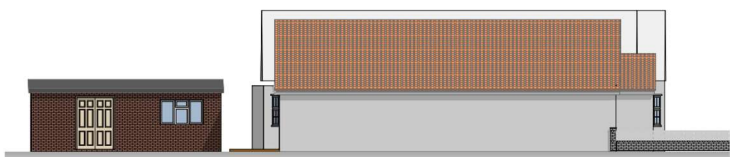
E-16 Existing Front Elevation 1:100



E-19 Existing Right Side Elevation 1:100



E-17 Existing Rear Elevation 1:100



E-20 Existing Left Side Elevation 1:100

Existing Section & Elevations



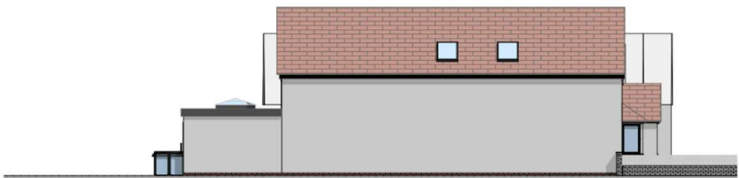
E-16 Proposed Front Elevation 1:100



E-21 Proposed Right Side Elevation 1:100



E-18 Proposed Rear Elevation 01 1:100

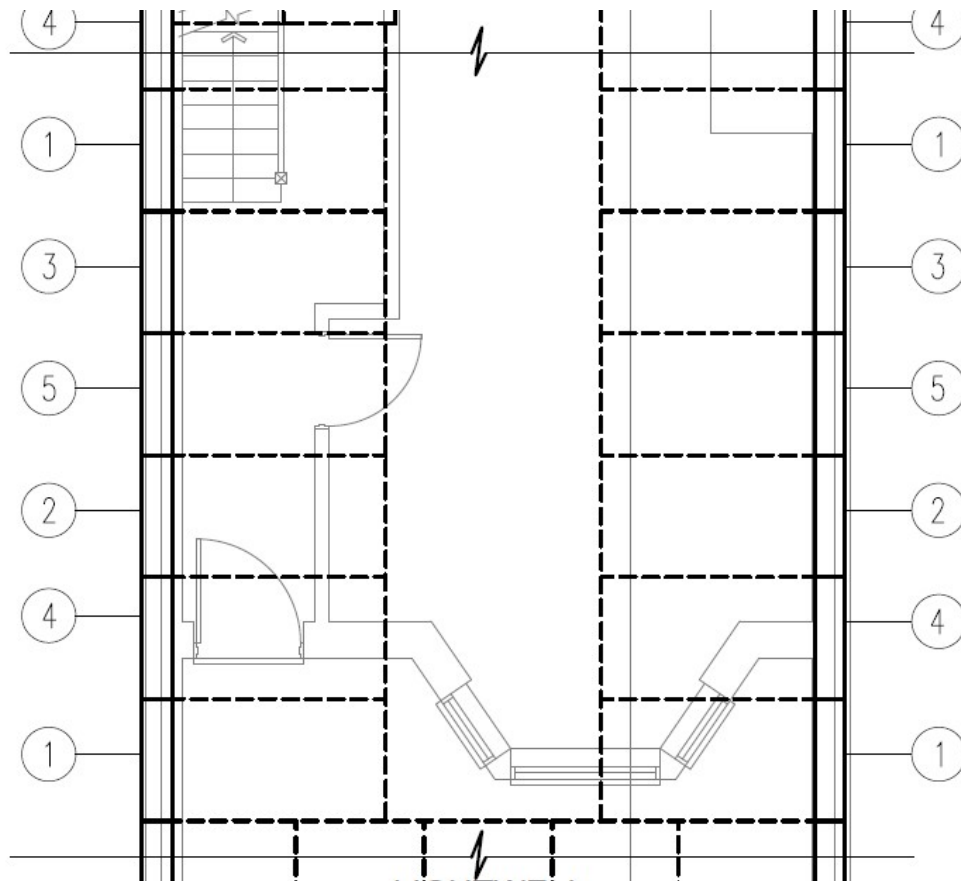


E-20 Proposed Left Side Elevation 1:100

Proposed Section & Elevations

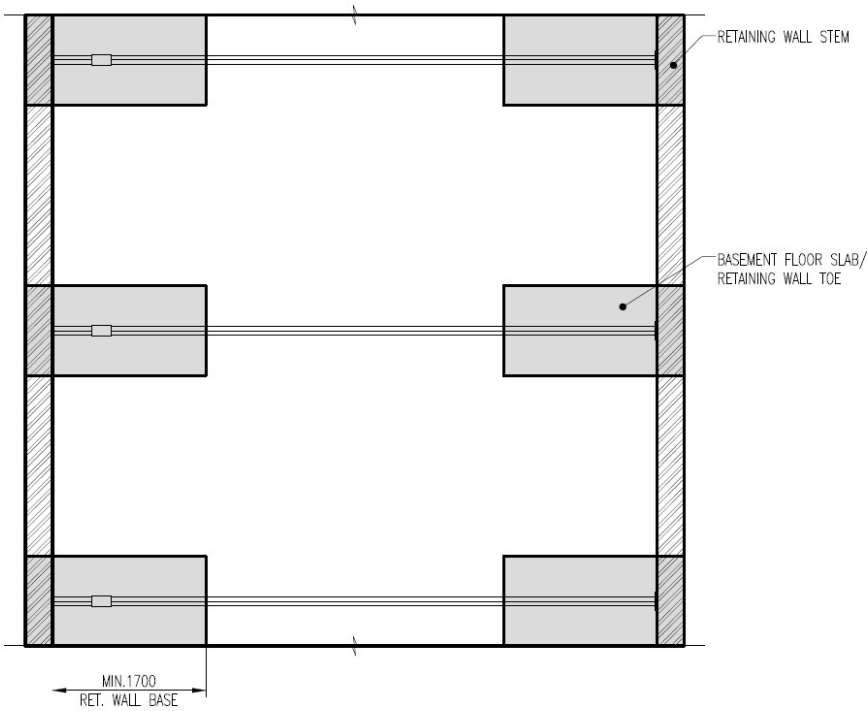
Appendix 4: Section on envisaged basement works

INDICATIVE ONLY

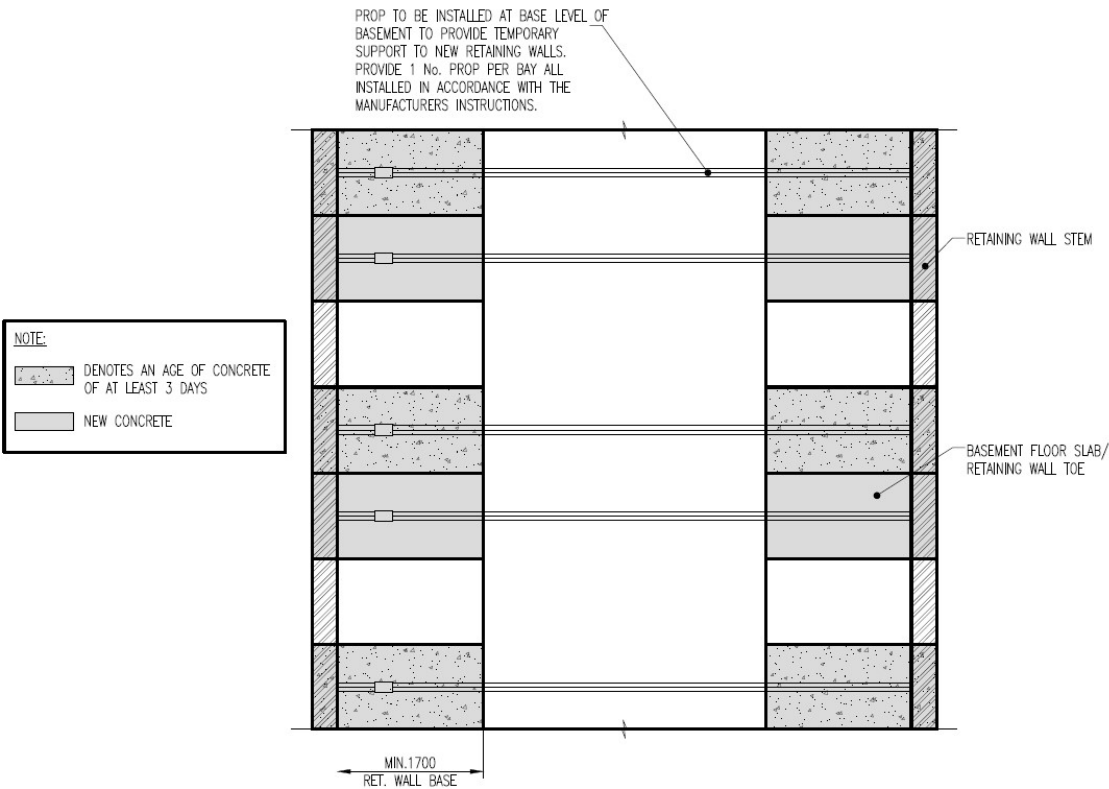


TYPICAL SEQUENCE OF UNDERPINNING

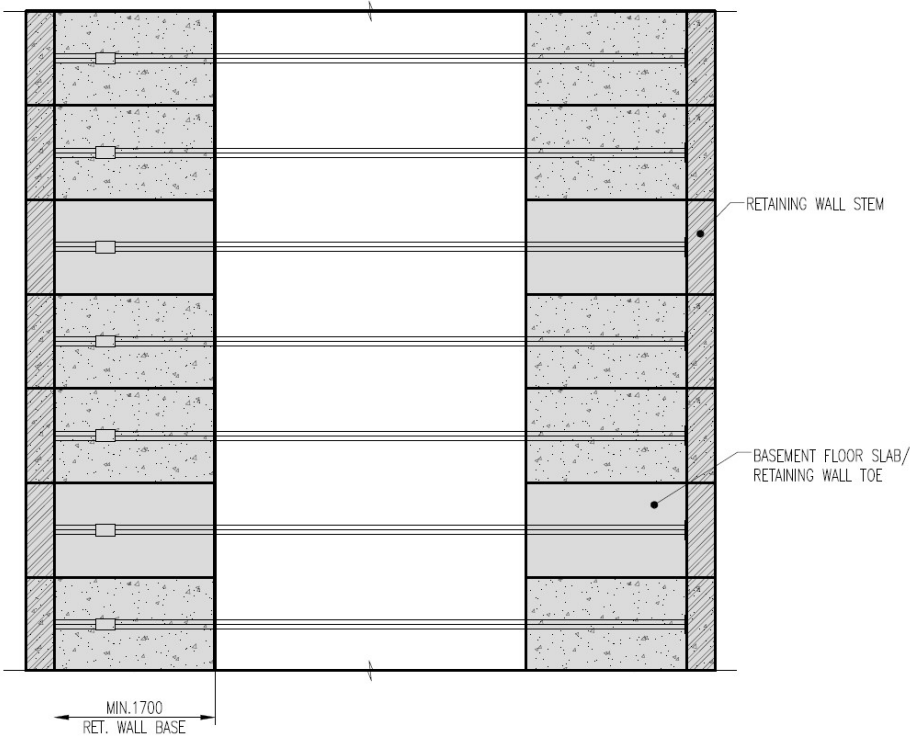
- A. EXCAVATE BAYS MARKED (1)
- B. CONCRETE BAYS MARKED (1)
- C. 3 DAY'S TO ALLOW CONCRETE UNDERPINNING TO SET & SHRINK
- D. DRY PACK BETWEEN UNDERPINNING & ORIGINAL FOUNDATION
- E. 24Hrs. TO ALLOW DRY PACK MORTAR TO GAIN STRENGTH
- F. EXCAVATE BAYS MARKED (2)
- G. PROCEED AS FOR B. – E. ABOVE FOR BAYS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



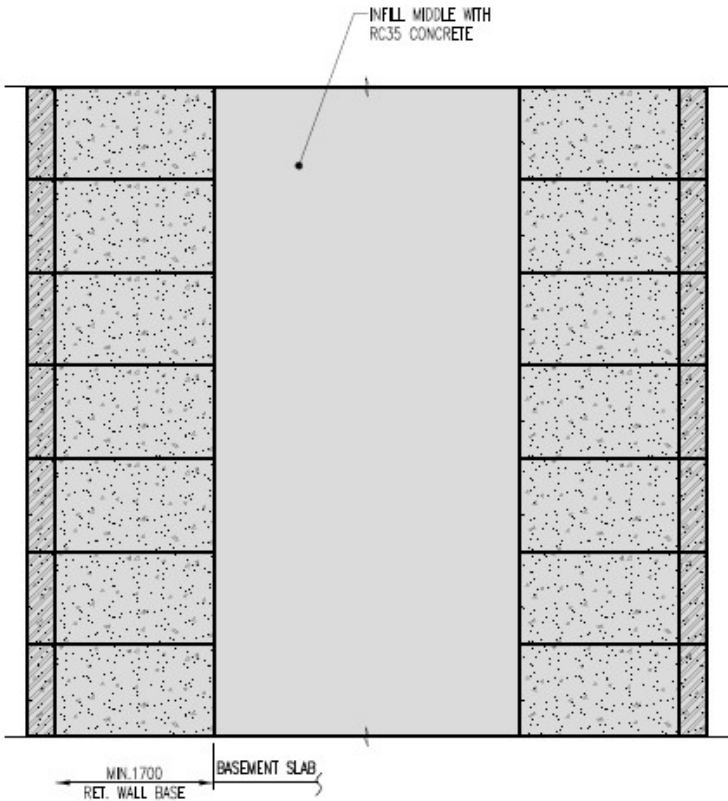
PLAN ON BASEMENT WORKS



PLAN ON BASEMENT WORKS



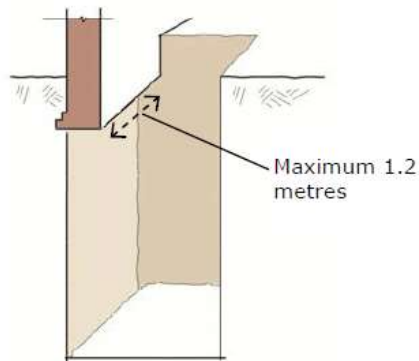
PLAN ON BASEMENT WORKS



PLAN ON BASEMENT WORKS

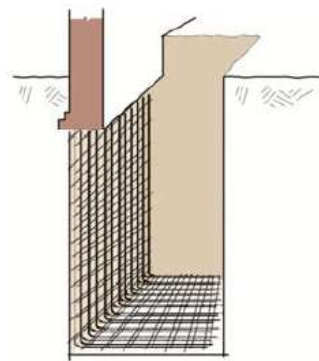
SCALE 1:50

Appendix 5: Typical Underpinning sequence (ASUC Guideline)



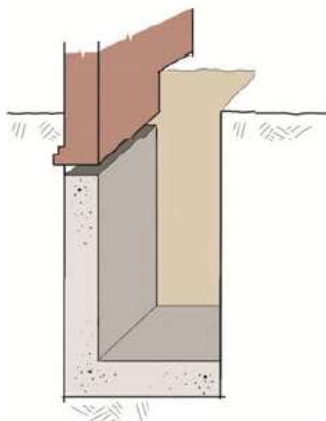
1. Excavation must be fully supported by props and shoring.
2. Edge protection to prevent falls into the excavation must be installed.
3. A temporary vertical prop or support may be placed under the wall to keep any loose bricks or masonry in place.
4. The main load from the existing wall will span onto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

Stage 1. Excavation



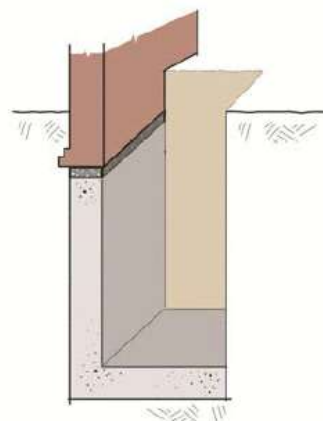
1. Reinforcement is fixed into position.
2. Reinforcement details are given in the engineering design. It is critical that the reinforcement is installed as detailed in the design.
3. The design will usually require a shear connection between adjacent underpins. This is generally achieved using dowel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

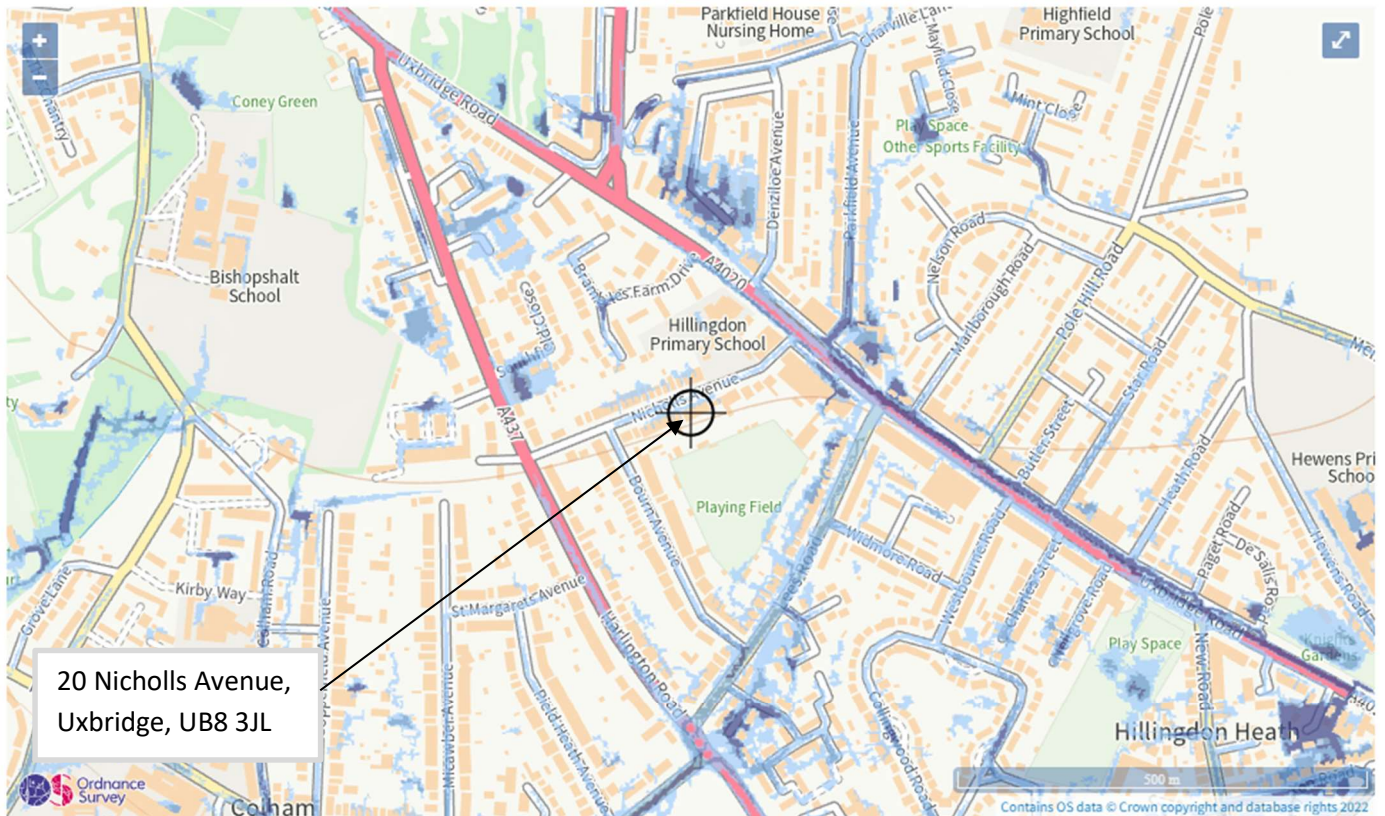
Stage 3. Concrete placement



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

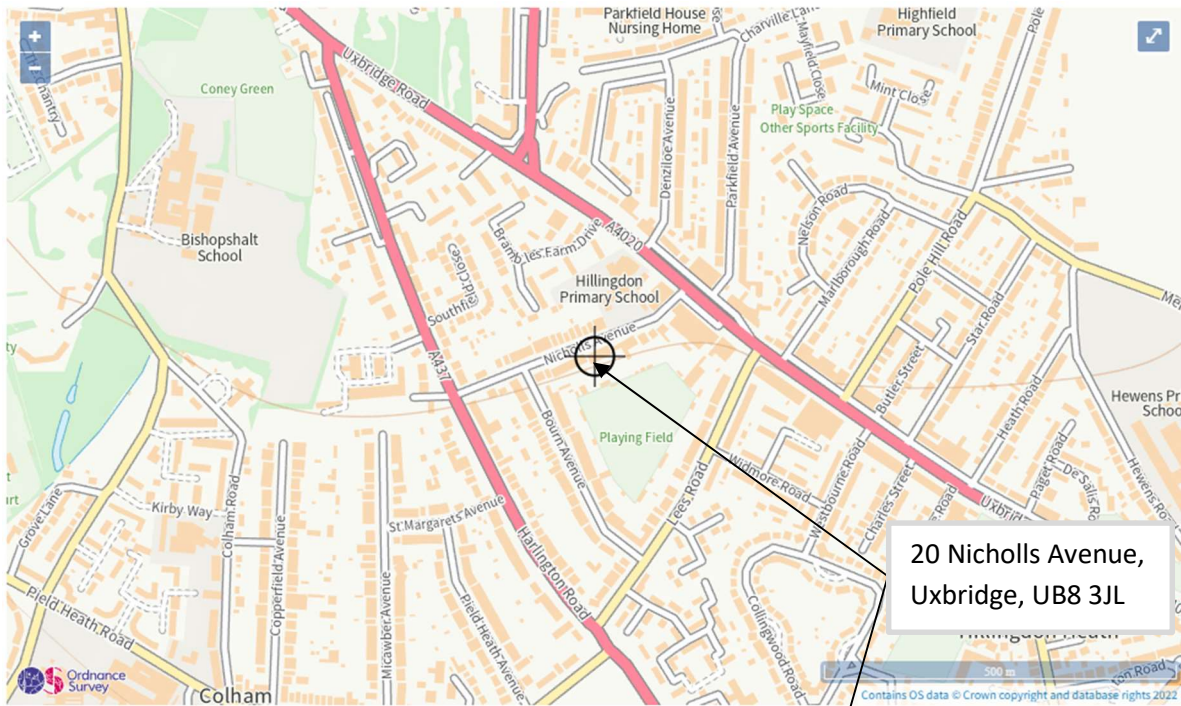
Appendix 6: Flood Risk Maps



Extent of flooding from surface water

● High ● Medium ● Low ○ Very low ⊕ Location you selected

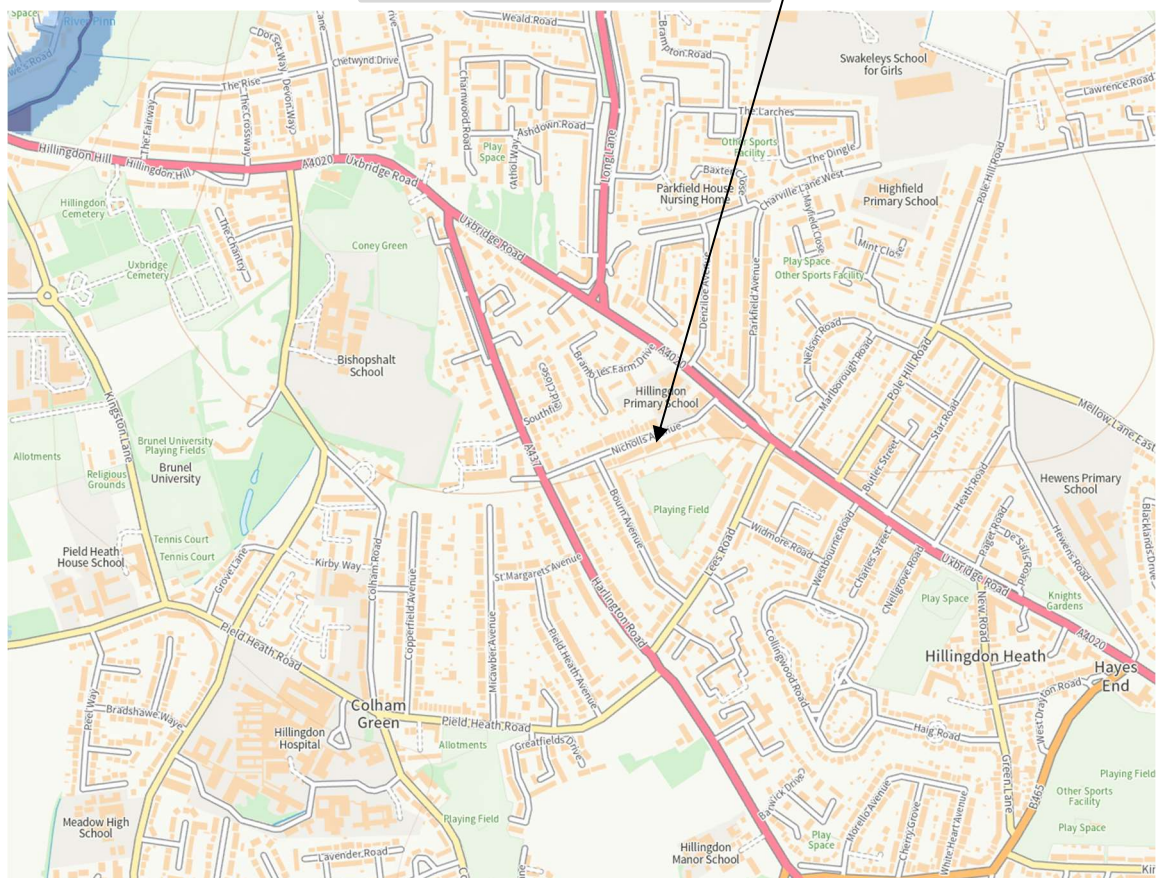
Flood risk from surface water



Maximum extent of flooding from reservoirs:

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

Flood risk from reservoirs



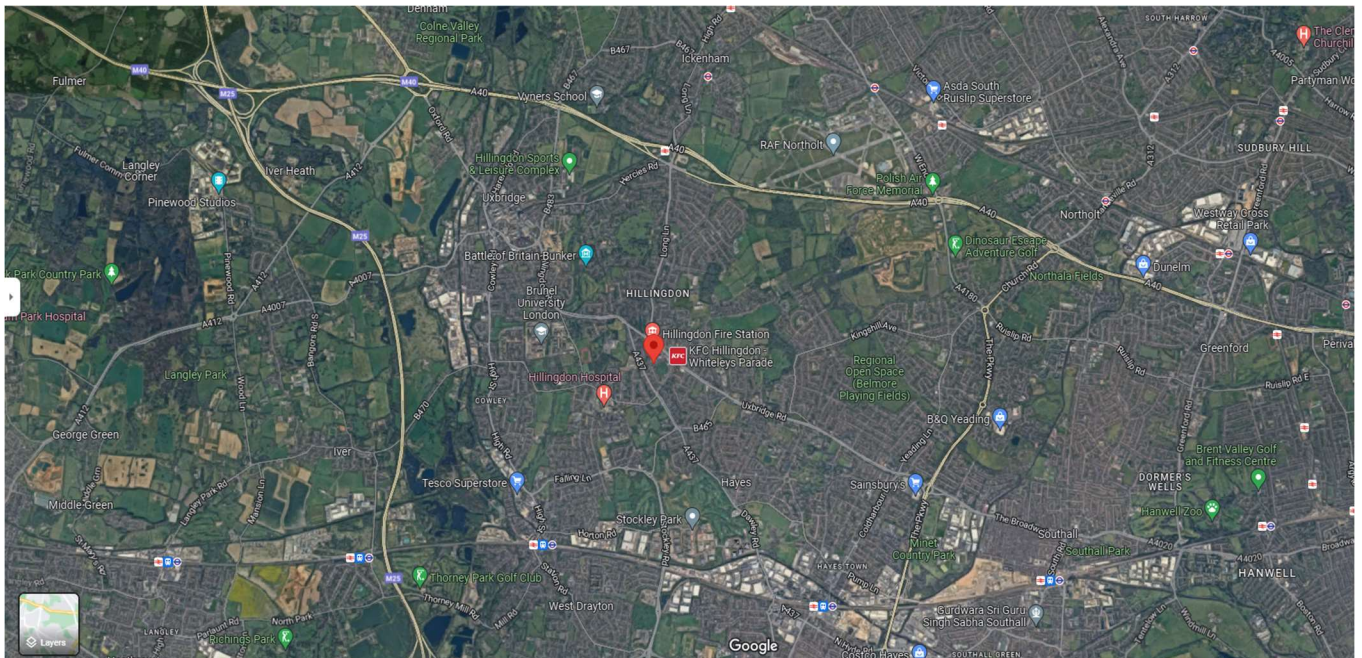
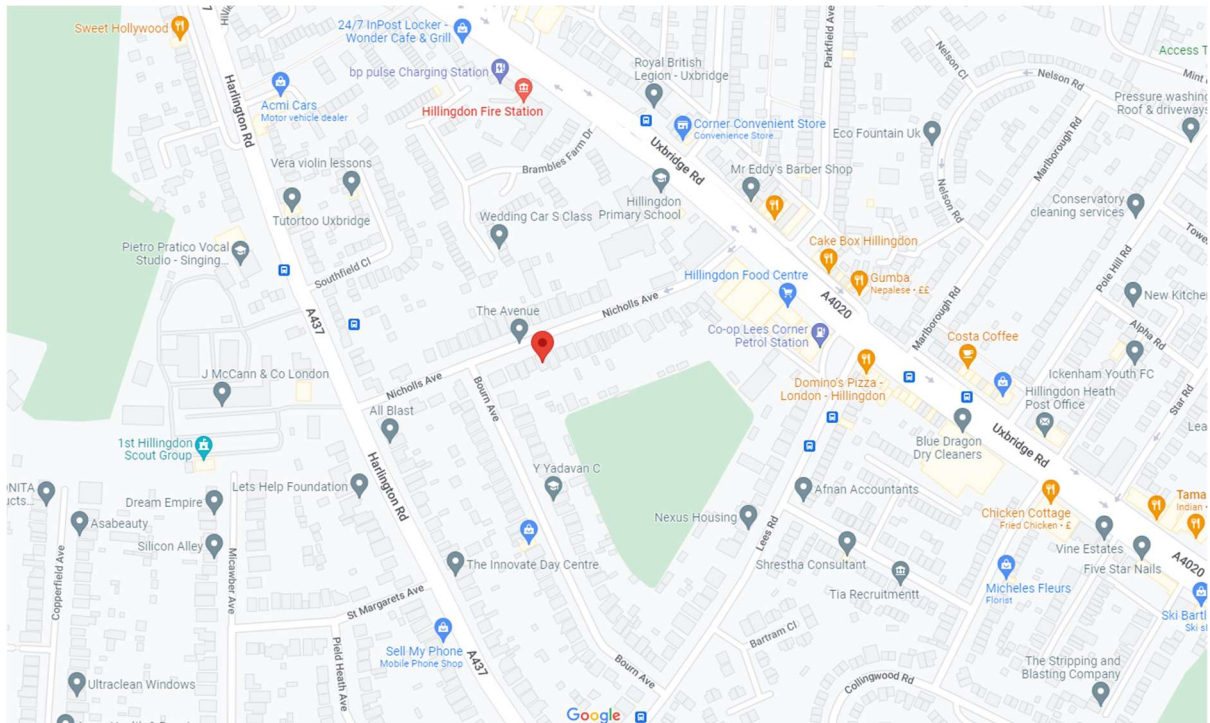
Flood risk from river or the sea

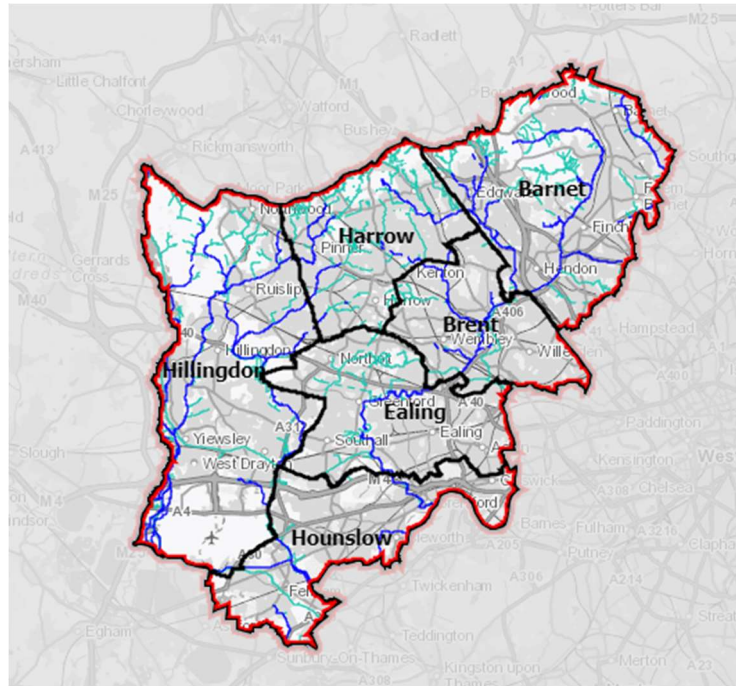
Appendix 7: Borehole details¹BOREHOLE

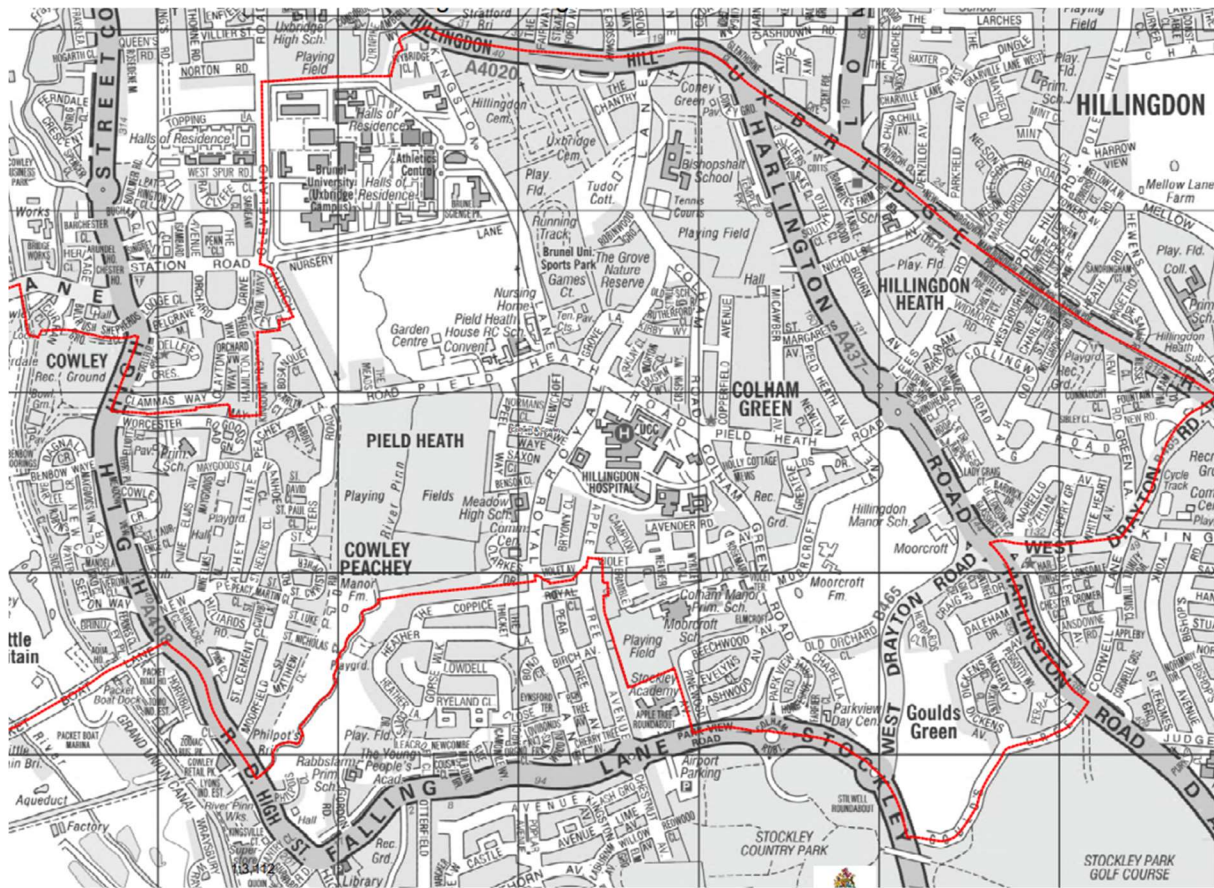
Description of Strata	Thickness	Depth	Reduced Level	Disturbed Samples	Undisturbed Samples and Insitu Tests
Made ground (concrete)	0'6"	0'6"	176.0		
Soft to firm mottled brown and grey sandy clay with gravel	4'0"	4'6"	172.0 + 52.4	1'6" J5645 3'0" B5646	3'0" N = 29
Stiff mottled brown and grey clay	7'0"	11'6"	165.0	7'6" J5648	5'0" U5647 10'0" U5649
Stiff fissured dark grey clay	18'6"	30'0"	146.5	12'6" J5650 17'6" J5652 22'6" J5654 27'6" J5656	14'0" U5651 20'0" U5653 24'0" U5655 28'6" U5657
Bottom of borehole					
TOTALS	30'0"	30'0"			

¹ http://scans.bgs.ac.uk/sobi_scans/boreholes/576551/images/12193826.html [Accessed: 24.08.2019]

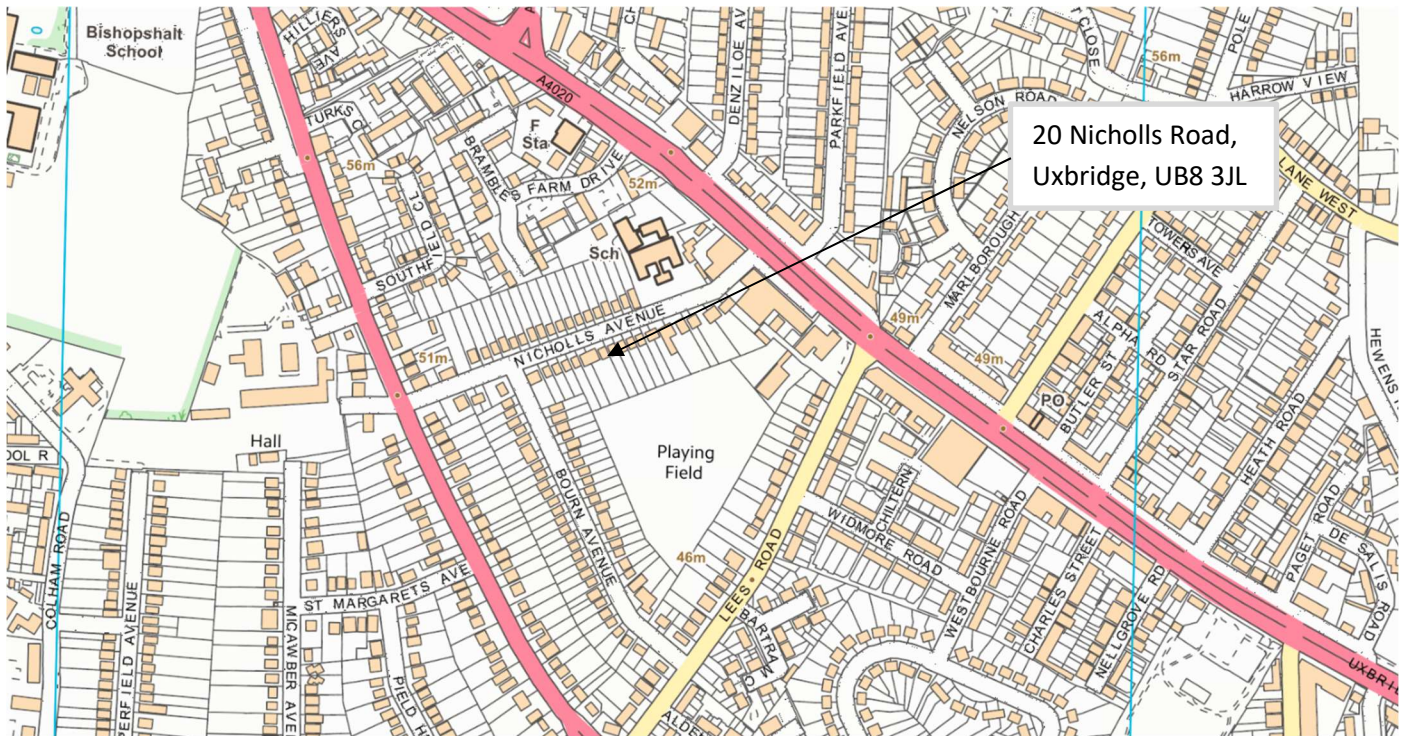
Appendix 8: Google Maps/Hillingdon Maps



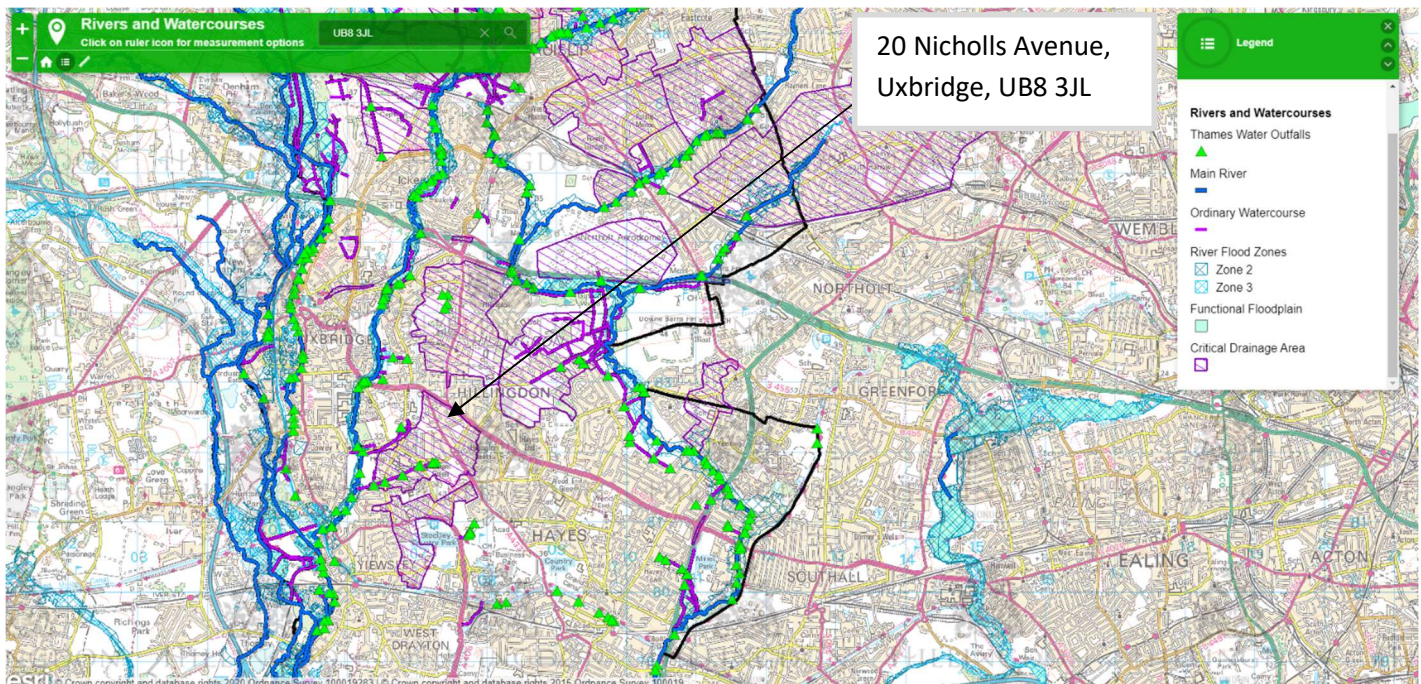




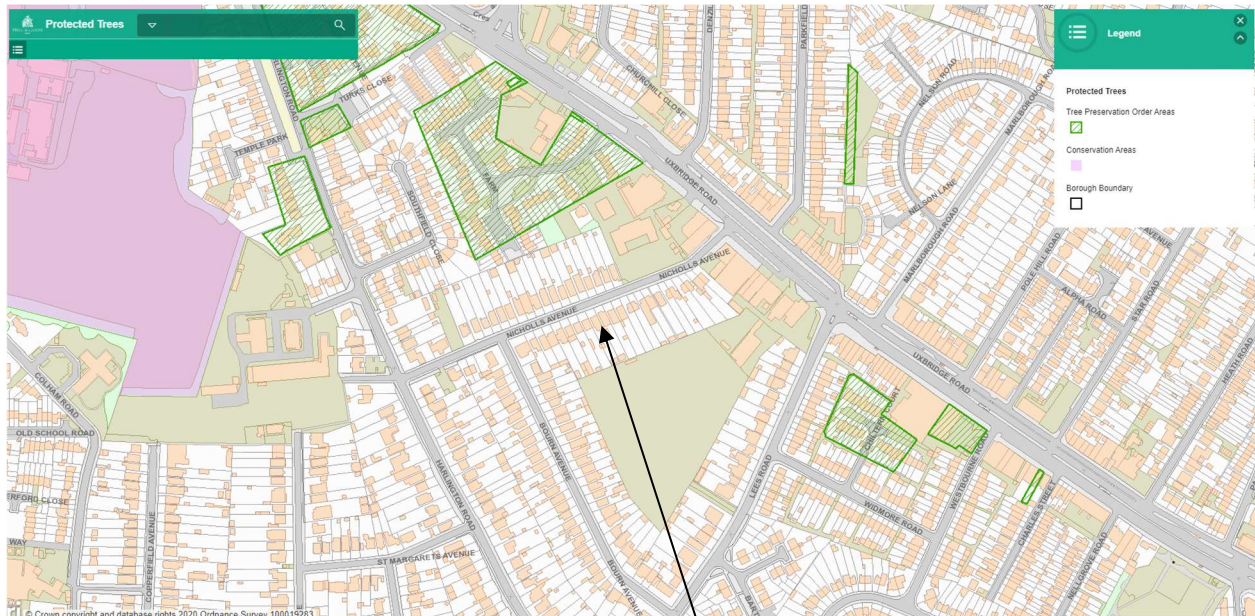
Appendix 9: Map of Listed Buildings (Source: HistoricEngland website)



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

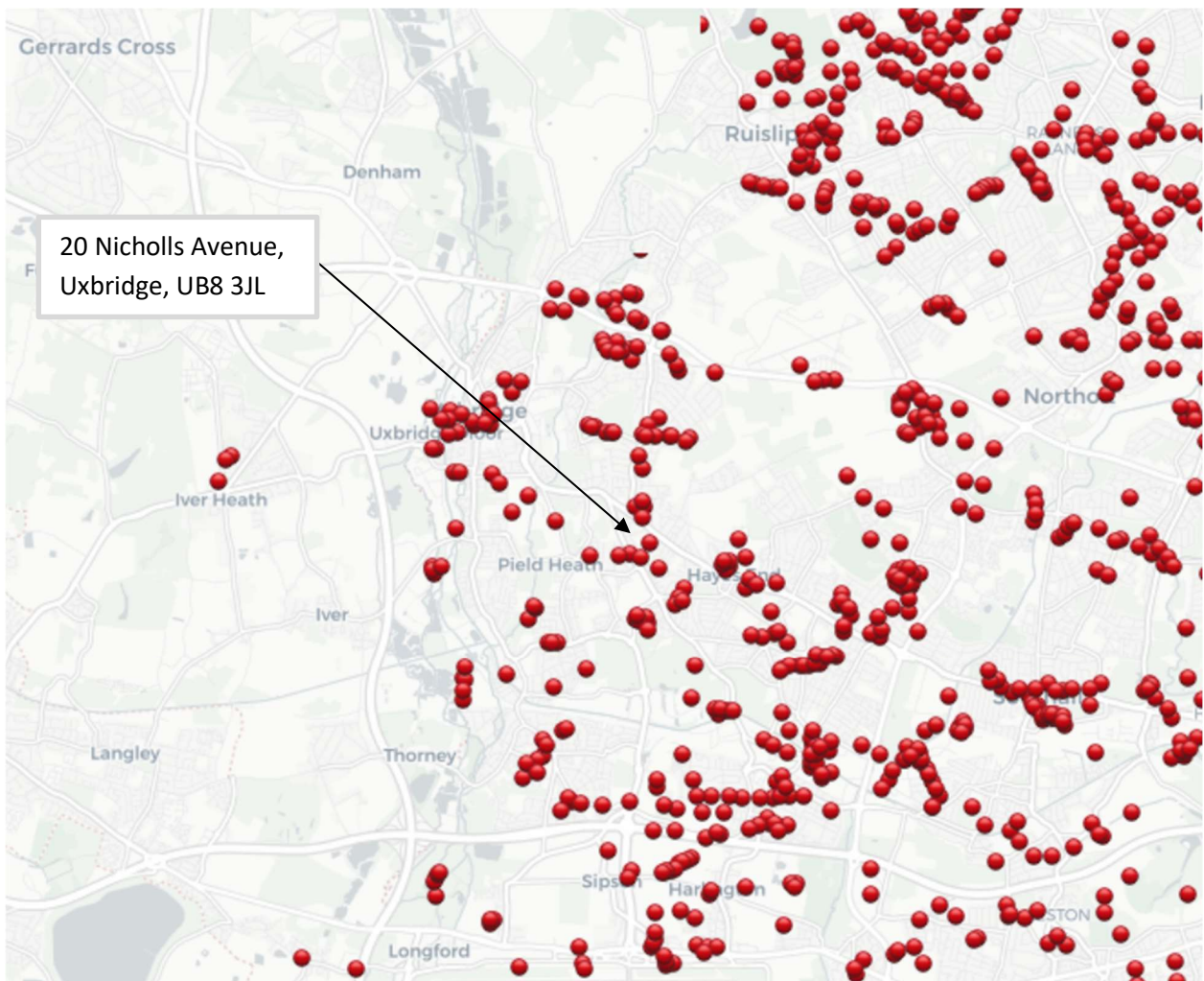


Appendix 11: Map showing Trees Preservation Order (TPO)



20 Nicholls Avenue,
Uxbridge, UB8 3JL

Appendix 12: Map showing the recorded bomb location of WW2



Appendix 13: Asset Location Search Sewer Map by Thames Water



6205	46.28	44.95
721F	n/a	n/a
721G	n/a	n/a
7202	46	44.25
621H	n/a	n/a
4302	51.02	49.23
431B	n/a	n/a
4301	50.92	48.17
4303	49.51	47.89
421B	n/a	n/a
431A	n/a	n/a
421A	n/a	n/a
4201	n/a	n/a
4402	51.07	49.38
4202	48.08	46.54
5105	46.61	45.14
5401	50.99	48.95
5402	50.99	49.5
541A	n/a	n/a
541B	n/a	n/a
6403	50.69	49.65
6401	50.64	49.73
6111	45.7	44.64
621A	n/a	n/a
6119	46.1	44.42