Basement Impact Assessment

For

10 Abbot's Place, North Maida Vale, London NW6 4NP

Ref. 0675.01

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Appendices

Appendix-A	Scheme Drawings
Appendix-B	Desk Study & Phase I Risk Assessment
Appendix-C	Phase 2 Ground Investigation Report
Appendix-D	Flood Risk Maps
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1. Introduction

This report addresses the design and construction of the new single-storey basement proposal for 10 Abbot's Place, North Maida Vale, London NW6 4NP, with references to the Supplementary Planning Document (Camden Planning Guidance CPG 2021).

The level of assessment undertaken is considered to be appropriate for the size of this project. It is proposed that a single-storey basement under the full print footprint of the main building be constructed at the ground floor level. With respect to site-specific information, reference has been made to the following desktop study documents:

- Desk Study & Phase I Risk Assessment
- Detailed Ground Investigation Report
- Flood Risk Maps
- CCTV Drainage Survey
- Thames Water Maps
- Monitoring Drawings
- Topographical Map
- Tree Survey
- Building Damage Assessment Report
- Flood Risk Assessment and Drainage Strategy Report
- Geotechnical Properties Summary Report
- Groundwater Report

This report describes the key structural considerations and proposed construction methodology associated with the demolition of the existing ground floor slab and installation of the proposed basement level. It considers the underlying ground conditions, the proposed foundations and retaining structures required to construct the subterranean elements of the basement level, and the safeguarding of the surrounding buildings and infrastructure.

It should be noted that the content of this report and all descriptions of the work are indicative and based on our interpretation of the outline planning drawings and experience of similar basement developments. The final structural arrangement, materials, construction methodology, and associated details will be finalised during the detailed design stage, taking due account of site-specific surveys and investigations. The brief report is for the sole use of the Client and is limited to those areas outlined in the paragraph above. No responsibility is accepted or implied by any third party.

1.1 Existing Site

The existing site is currently covered with single storey bungalow type building. Currently there is no soft landscaping on the site, most of the site is covered with hardstanding areas (including main residential building and external paved patio areas).

The later surveys do not reveal significant changes within the site confines. The site appears to have remained in this configuration until the present day.

The existing building is of traditional construction with masonry perimeter walls, solid concrete slab and timber roof construction.

The existing building is approximately 5.0m and 7.60m away from Nos. 11 and 41 (the neighbouring properties), respectively. The neighbouring properties Nos. 11 and 41 have semi-basements, and No. 41 has a full-height basement that extends below the existing ground level. There is a garden along the Northeast elevation and a Public highway along the southwest elevation.

There is no sign of cracking in property No. 10 Abbot's Place, and no cracking was observed outside the adjacent properties No. 41 and No. 11.

There is no sign of subsidence at the existing property, and we are not aware of any history of seasonal shrink-swell subsidence in the local area. The site is not over or within the exclusion zone of any tunnels or railway lines.

Figure 1 Existing site historic plan

1.2 Proposed Structure

The proposed development will comprise and require the following:

- Internal Structural Alterations
- Construction of a new single-storey basement under full print of the building.

2.1 Desktop Study:

2.2 Historical Maps

A review of earliest available and the Historical Map evidence appears to show that the client site was first developed as part of the gardens of 41 Priory Road between the surveys of 1856 and 1861.

A building was first shown within the study site in 1894 and this appears to have been linked to 41 Priory Road by a covered passageway with glazed roof.

The building was first extended to the north by 1915, with a further glazed roof extension along the northern flank shown by 1935.

By 1953 the building was no longer linked to 41 Priory Road by the glazed passageway and a small extension had been added to the southern flank.

The southern extension had been removed by 1965 and the property was identified as 41a Priory Road for the first time on the surveys.

No significant changes within the site confines are evident on the later surveys.

An Electricity Sub-Station was established adjacent to the western boundary between 1955 and 1965 which is not active anymore and dead site. There is no evidence of any watercourses or ponds close to the site.

2.3 Geology and Contamination Assessment

A comprehensive ground site investigation has been carried out by MRH Geotechnical - Refer to Appendix – B, C, L& M.

The results of the ground investigation revealed a ground profile comprising a variable thickness of Made Ground (up to 0.7m bgl depth), overlying soft to firm becoming stiff consistency dark brown silty CLAY with traces of Selenite noted from 6.0m depth (considered to represent the London Clay Formation), encountered to the base of the boreholes (up to 8.0m bgl).

Groundwater was not observed during the investigation, please refer to Appendix-M Groundwater Report. Concentrations of all contaminants within the suite were found to be below the relevant Guideline Limits. No Remediation of the site will be necessary as part of the proposed development.

2.4 Tunnels and other Below Surface Infrastructure

There are no known tunnels in the area, and the basement will not affect any known below-surface infrastructure other than on-site drainage, which will be a new system to accommodate the proposals.

2.5 Trees

A tree survey has been carried out. There are no major trees next to the basement in the rear garden. Existing boundary walls to the back and sides of the structure are likely to be partial or complete root barriers. The basement footprint is out of the tree influence zone. Refer to Appendix - I

2.6 Hydrogeology

The Alluvium superficial deposits are classified by the Environment Agency as a Secondary Undifferentiated Aquifer. This status is assigned where it has not been possible to attribute either Secondary A or Secondary B Aquifer status. In most cases, this means that the layer in question has previously been designated as both a minor and a non-aquifer due to variable characteristics of the rock type.

The London Clay Formation bedrock is classified as Unproductive Strata by the Environment Agency, described as largely unable to provide usable water supplies and are unlikely to have surface water and wetland ecosystems dependent on them.

2.7 Hydrology and Flood-Risk

Based on the FRA & Suds report (*flood risk assessment and sustainable urban drainage strategy report prepared by Cube Consulting, please refer to Appendix-K Flood Risk Assessment and Drainage Strategy, reference 1197-C-RP-0001, Dated 25.07.2024*) , the risk of flooding from all sources was found to be low. However, due to the presence of flooding nearby and the location within a Critical Drainage Area, it is recommended that flood-resilient design be incorporated into the design and construction of the project.

The NPPF requires that an FRA assess the sources of flooding to the development and consider the potential for the development to increase flood risk to the surrounding area.

As detailed above, the site of the proposed development is located within Flood Zone 1 and, therefore, is outside of the designated flood plain. Therefore, the development will not impact the surrounding areas, so there is no requirement to provide floodplain compensation storage.

There are no Water Network references detailed in the Ordnance Survey MasterMap Water Network within 250m of the site, and no surface water features have been identified within 250m of the site.

The potential sources of flooding that could pose a risk to a site are presented in Table 2.1 below.

FLOOD SOURCE	MECHANISM	SITE IMPACT
Tidal/fluvial	Extreme flood water levels from the nearby watercourses.	Floodwaters entering buildings via thresholds or other openings. Flooding of external areas etc.
Land and Surface water Flooding	Surcharging/inundating of existing drainage networks with overland flows to the site.	Flood water entering the site from adjacent highways/properties. Affecting external areas and proposed buildings.
Groundwater	Rising groundwater within underlying aquifers.	Rising groundwater levels could affect the site if the pathway is available.
Drainage/infrastructure systems	Blockages/failure of drainage or water distribution systems on or adjacent to the site.	Backing up into the site of surface/foul water flows. The risk is to property and low-lying areas.

Table 2.2 below shows a flood risk summary prepared and will be adopted in the detailed design stage:

Flood Risk Summary

FLOOD SOURCE	RISK CATEGORY			COMMENTS
	HIGH	MEDIUM	LOW	
Tidal/fluvial			X	Site Located wholly in Flood Zone 1
Surface Water Run-off from Heavy Storm Events			X	The site is classified as being at low risk of flooding from surface water from all available data. Due to the presence of flooding nearby the risk of surface water flooding should be considered in the design.
Groundwater			X	The site was found to be at low risk of ground water flooding.
Reservoirs			X	The proposed site does not lie within an area affected by reservoir flooding.
Sewers			X	Records do not show any localised flood incidents on the site, the risk of flooding from sewers is considered to be low. Due to the presence of large offsite combined public sewerage, the potential risk of sewer surcharge should be considered in the design, particularly to basement areas.

For a detailed hydrology, flood risk assessment and sustainable urban drainage strategy report prepared by Cube Consulting, please refer to Appendix-K Flood Risk Assessment and Drainage Strategy, reference 1197-C-RP-0001, Dated 25.07.2024.

2.8 Suds and Surface Water Drainage Strategy:

Investigations conducted on the site show that a drainage network is currently present. The below-ground drainage design has been developed further. It is expected that the proposed surface water and foul will be drained by utilising a typical gravity-fed system where possible, and the minor amount of water entering the new basement level via the cavity drain system, new light wells, and bathroom areas will fall to a sump/pump.

For a detailed sustainable urban drainage strategy report prepared by Cube Consulting, please refer to Appendix-K Flood Risk Assessment and Drainage Strategy, reference 1197-C-RP-0001, Dated 25.07.2024.

Local planning policy SPD

All developments should avoid or minimise contributing to all sources of flooding, including fluvial, tidal, surface water, groundwater, and flooding from sewers, taking into account climate change and without increasing flood risk elsewhere.

London Plan March 2021 (Draft) - Policy SI 13 - Sustainable drainage

This policy states 'development should utilise sustainable urban drainage systems (SUDS) unless there are practical reasons for not doing so, and should aim to achieve Greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible in line with the following drainage hierarchy:

- store rainwater for later use;
- use infiltration techniques, such as porous surfaces in non-clay areas;
- attenuate rainwater in ponds or open water features for gradual release;
- attenuate rainwater by storing in tanks or sealed water features for gradual release;
- discharge rainwater direct to a watercourse;
- discharge rainwater to a surface water sewer/drain; and
- discharge rainwater to the combined sewer.

Drainage should be designed and implemented in ways that deliver other policy objectives of the Plan, including water use efficiency and quality, biodiversity, amenity and recreation.'

Building Regulations 2015

Part H of the Building Regulations 2015 states that rainfall from a system shall discharge to one of the following listed in order of priority:

- An adequate soakaway or some other adequate infiltration system
- A watercourse
- A sewer

It is proposed to reduce the surface water peak discharge rate from the site by approximately 90% for the 1 in 100 year storm, while also making an allowance of 40% for climate change. The development will therefore result in decreased loading on the offsite combined sewers and therefore decrease flood risk to downstream properties.

From the sump, the water will then be positively pumped to the outfall. A non-return valve will be installed at the main outfall to ensure the basement areas are not flooded by the combined sewer system in times of sustained heavy rainfall in accordance with Supplementary Planning Document SPD by Camden Planning Council.

Record drawings from Thames Water have been obtained. The drawings indicate that the area is served by a combined water system on Abbot's Road. The proposed scheme will result will reduce surface water runoff rates and volumes from the site.

The lowest discharge rate that it is recommended to restrict down to is 1 l/s. Otherwise, an unacceptable risk of blockage is created by using the small opening required in the flow control device. As such it is therefore proposed to restrict the discharge rate from the site to 1 l/s using a hydrobrake flow control device with a small underground storage tank for all storms up to and including the 1 in 100 year storm with a 40% allowance for climate change. Additionally, a rainwater harvesting tank is proposed to collect water from the building roof and store it for later use. For more details, please refer to Appendix-K Flood Risk Assessment and Drainage Strategy, reference 1197-C-RP-0001, Dated 25.07.2024.

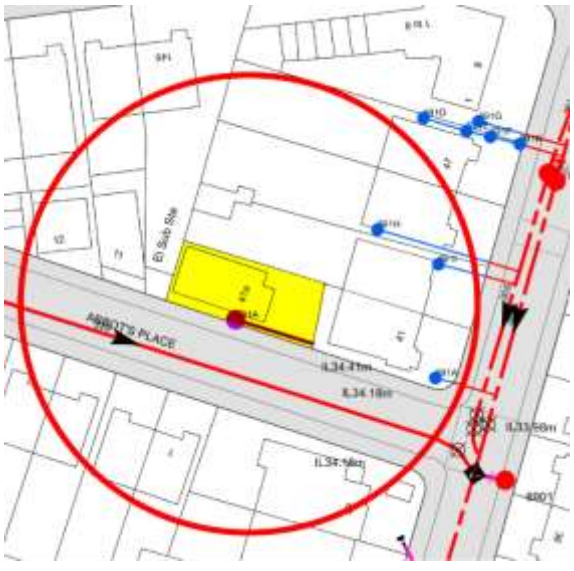

Figure 2 Existing Drainage Network in the Abbot's Road

3. Screening

A screening process has been undertaken, and the findings are described below.

3.1 Groundwater Flow

Table 3.1 Subterranean (Ground Water) Flow Screening

Question	Response	Details
1a. Is the site located directly above an aquifer?	No	London Clay Formation is an unproductive stratum.
1b. Will the proposed basement extend beneath the water table surface?	No	Based on the ground investigation report, no water table was found. No – The basement is to be constructed in unproductive strata. No Groundwater seepages were encountered during the sinking of the Borehole 1 and the Monitoring Standpipe was dry on completion of the installation. Meanwhile, in Borehole 2, a slight seepage was observed when encountering a thin claystone bed between 3.2m and 3.4m. The Borehole was again found to be dry on completion at 8m depth. There is no evidence of any significant flow of Groundwater through the London Clay strata present beneath the site.
2. Is the site within 100m of a watercourse, well (used / disused) or potential spring line?	No	No surface water features have been identified within 250m of the site.
3. Will the proposed basement development result in a change in the proportion of hard-surfaced / paved areas?	Yes	The proposed hardstanding areas will be slightly reduced compared to the existing ones.
4. As part of site drainage, will more surface water (e.g. rainfall and run-off) than at present be discharged to the ground (e.g. via soakaways and/or SUDS)?	No	The surface run-off will be reduced due to the attenuation and flow control device limiting the surface water discharge rate to 1 l/s. Outfall is connected to the existing sewer serving the existing site. Please refer to Flood Risk Assessment & Drainage Strategy, 1197-C-RP-0001. Dated 25/07/2024.
5. Is the lowest point of the proposed excavation (allowing for any drainage and foundation space under the basement floor) close to, or lower than, the mean water level in any local pond or spring line?	No	No. The nearest surface water feature is located 2000m south of the site (Grand Union Canal).

3.2 Stability Screening Assessment

The response to the Stability Screening Assessment is given in Table 3.2.

Table 3.2 Land Stability Screening

Question	Response	Details
1. Does the existing site include slopes, natural or man-made greater than 7 degrees (approximately 1 in 8)?	No	The site is fairly level across. Based on the provided topographic plan (Appendix E) the site was sloping less than1° from west to east.
2. Will the proposed re-profiling of landscaping at the site change slopes at the property boundary to more than 7 degrees (approximately 1 in 8)?	No	The proposed development would not alter the existing site levels and slopes.
3. Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7 degrees (approximately 1 in 8)?	No	
4. Is the site within a wider hillside setting in which the general slope is greater than 7°?	No	No – The wider area was noted to be generally flat and level with a gentle slope down west easterly direction of <2°.
5. Is the London Clay the shallowest strata at the site?	Yes	Based on detailed ground investigation report, London clay is overlying majority of the Site.
6. Will any trees be felled as part of the development and/or are any works proposed within any tree protection zones where trees are to be retained?	No	An Arboricultural survey has been carried out on the 19th of December 2023 by Merewood. Please refer to Appendix I_Arboricultural Report.
7. Is there a history of seasonal shrink-swell subsidence in the local area and/or evidence of such effects at the site?	No	Site walkover has been carried out, no defects were noted. Ground investigation into the London Clay Formation indicated that the London Clay Formation at this location has a high plasticity Index and therefore it is expected that the soil beneath the proposed basement will have high potential for volume change.
8. Is the site within 100m of a watercourse or a potential spring line?	No	The site is not within 250m of a known watercourse or spring line.

9. Is the site within an area of previously worked ground?	No	The results of the ground investigation revealed a ground profile comprising a variable thickness of Made Ground (up to 0.7m bgl depth), overlying soft to firm becoming stiff consistency dark brown silty CLAY with traces of Selenite noted from 6.0m depth (considered to represent the London Clay Formation), encountered to the base of the boreholes (up to 8.0m bgl).
10. Is the site within an aquifer. If so, will the proposed basement extend beneath the water table such that dewatering may be required during construction?	No	London Clay Formation is an unproductive stratum. No ground water level was observed therefore, no dewatering will be needed.
11. Is the site within 5m of a highway or pedestrian right of way?	Yes	The proposed basement is adjacent to the pavement and 2.23m from the edge of the main road (Abbot's Place).
12. Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	No	The proposed basement is at a good distance (5.15m and 7.66m respectively) from the neighbouring properties. Ground movement assessment has been carried out to check the effect on the neighbouring properties. The neighbouring property No. 41 had a basement that extended below the existing ground level, and excavation of a basement will act to reduce the differential depth of foundations.
13. Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines?	No	There is a no railway tunnel within 200mm of the site.

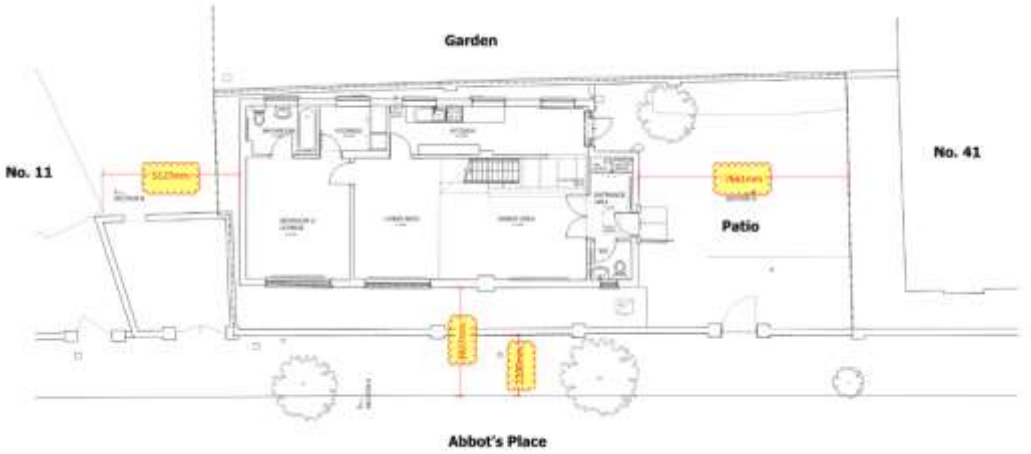

Figure 3 Existing Ground Floor Plan Showing Distance from the Neighbouring Properties

3.3 Surface Water and Flooding

The response to the Surface Flow and Flood Screening Assessment is given in Table 3.1.

Table 3.1 Surface Flow and Flooding Screening

Question	Response	Details
1. 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?	No	Most of the site drainage will be remain taken to same route and combined sewers in public highways via the shared drain in No. 41. And surface water runoff will be reduced using control flow and attenuation on site. Please refer to Flood Risk Assessment & Drainage Strategy, 1197-C-RP-0001. Dated 25/07/2024.
2. Will the proposed basement development result in a change in the proportion of hard-surfaced / paved external areas?	Yes	The proposed hardstanding area will be partially reduced compared to the existing area as part of a new scheme, which will have no significant effect on the scheme overall.
3. 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?	No	No groundwater was observed on site, so the proposed basement development will not affect the groundwater level, and the site is not located above any aquifer.
4. Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	No	The quality of surface water would not be affected.
5. Is the site in an area known to be at risk from surface water flooding?	Yes	Whilst the risk of flooding from all sources was found to be low due to the presence of flooding nearby as the site location within a Critical Drainage Area, it is recommended that flood-resilient design is incorporated into the design and construction of the project. A detailed suds design will be incorporated, for more details, please refer to Flood Risk Assessment & Drainage Strategy, 1197-C-RP-0001 prepared by cube consulting. Dated 25/07/2024.

3.4 Summary of the screening process:

Based on the screening exercise, further stages of the basement impact assessment are required. A summary of the basement impact assessment requirements is provided in Tables 3.1, 3.2, and 3.3. The screening process identifies the following issues where answers are yes or unknown to be carried forward to scoping for further assessment:

3.4.1 Groundwater Flow

Item	Details
Q3	Will the proposed basement development result in a change in the proportion of hard-surfaced / paved areas? The proposed hardstanding area will be partially reduced compared to the existing area as part of a new scheme. The anticipated geology was the London Clay Formation, which has very low permeability and groundwater flow that is effectively negligible. Based on the anticipated geology, the small increase in soft landscaping in surfaced areas would not have an impact on groundwater levels. A detailed flood risk assessment and suds report prepared with detailed strategy and mitigation measures proposed.

3.4.2 Slope Stability

Item	Details
Q5	Is the London Clay the shallowest strata at the site? The results of the ground investigation revealed a ground profile comprising a variable thickness of Made Ground (up to 0.7m bgl depth), overlying soft to firm becoming stiff consistency dark brown silty CLAY with traces of Selenite noted from 6.0m depth (considered to represent the London Clay Formation), encountered to the base of the boreholes (up to 8.0m bgl).
Q11	Is the site within 5m of a highway or pedestrian right of way? The proposed basement is adjacent to the pavement and 2.2m from the edge of the main road (Abbot's Place).

3.4.3 Surface Water and Flooding

Item	Details
Q2	Will the proposed basement development result in a change in the proportion of hard-surfaced / paved external areas? The proposed hardstanding area will be partially reduced compared to the existing area as part of a new scheme. The anticipated geology was the London Clay Formation, which has very low permeability and groundwater flow effectively negligible. Based on the anticipated geology, the small increase in soft landscaping in surfaced areas would not have an impact on groundwater levels.
Q5	Is the site in an area known to be at risk from surface water flooding? Checking that the proposed construction method will not create a flow pathway into the excavation so the excavation doesn't flood and ensure the final design is adequately drained. The proposed development would act to reduce the amount of surface runoff due to an attenuation tank and improved drainage. Whilst the risk of flooding from all sources was found to be low due to the presence of flooding nearby and as the site location is within a Critical Drainage Area, it is recommended that flood resilient design is incorporated into the design and construction of the project. Detailed mitigation measures and suds design will be incorporated; for more details, please refer to Flood Risk Assessment & Drainage Strategy, 1197-C-RP-0001, prepared by Cube Consulting. Dated 25/07/2024.

4. Scoping

The purpose of scoping is to assess in more detail the issues of concern identified in the screening process (i.e. where the answer is "yes" or "unknown" to any of the questions posed) to be investigated in the impact assessment. Potential hazards are assessed for each of the identified potential impact factors.

The scoping stage further assists in defining the nature of the investigation required to assess the impact of the issues of concern identified in the screening process.

Potential Impacts

The following potential impacts were identified in Table 4.1

Screening Flowchart Question	Potential Impacts	Discussion
Is the site within 100 m of a watercourse, well (used/ disused) or potential spring line?	Removal of water bearing soils could cause an increase of groundwater flow.	The anticipated geology was the London Clay Formation, which has a very low permeability and groundwater flow effectively negligible. No further action is required.
2. Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?	Alterations of an existing groundwater flow regime could cause local increase or decrease of groundwater levels. Removal of pathway for rainfall to permeate into underlying ground. Change in groundwater levels.	The proposed hardstanding area will be partially reduced compared to the existing area as part of a new scheme. The anticipated geology was the London Clay Formation, which have very low permeability and groundwater flow effectively negligible. Based on the anticipated geology the small increase in soft landscaping surfaced areas would not have an impact on groundwater levels.
3. 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? Is the site in an area identified to have surface water flood risk?	An increase in hard surfaces will affect the way rainfall and surface water are transmitted away from the property and could adversely impact the local risk of flooding.	No groundwater was observed on site, so the proposed basement development will not affect the groundwater level, and the site is not located above any aquifer. A detailed FRA & Suds has been prepared. FRA concludes that the only residual risk of flooding is from surface water from overland flood, hence the mitigation measures proposed.
Is there a history of seasonal shrink-swell subsidence in the local area and / or evidence of such effects at the site? Received by adjacent properties?	Heave maybe experience.	The results of the site investigation has been used to develop an appropriate structural solution for the proposed works. building damage assessment has been carried out, and uplift forces due to heave have been considered in the basement slab design.
Is the London Clay the shallowest strata at the site?	Damage to the foundation due to volume change potential.	A ground investigation and geotechnical testing has been done. Effects have been mitigated in the basement structural design.
Is the site within 5 m of a highway or pedestrian right of way?	Potential displacement of highways and services.	The proposed basement will be located less than 2.2m from Abbot's place, and particular care must be taken to avoid damages and/or settlements along the paved surface. Construction sequencing will mitigate the risk and Monitoring of the existing building and boundary wall will be implemented.
Is the site in an area known to be at risk from surface water flooding?	Flooding of the Basement during construction or property following Construction.	Check that the proposed construction method will not create a flow pathway into the excavation so the excavation doesn't flood and ensure the final design is adequately drained. The proposed development will act to reduce the amount of surface runoff due to an attenuation tank and improved drainage as per the FRA & Suds strategy report.

5. Site investigation

The results of the ground investigation revealed a ground profile comprising a variable thickness of Made Ground (up to 0.7m bgl depth), overlying soft to firm becoming stiff consistency dark brown silty CLAY with traces of Selenite noted from 6.0m depth (considered to represent the London Clay Formation), encountered to the base of the boreholes (up to 8.0m bgl).

Groundwater was not observed during the investigation. The soil samples has been tested for basic contamination for the safe disposal of spoil removal .Concentrations of all contaminants within the suite were found to be below the relevant Guideline Limits. No Remediation of the site will be necessary as part of the proposed development.

The site proposal indicates that the majority of the site will remain covered by a combination of the proposed building footprint and hard surfacing. Where this is the case, no formal remedial measures are considered necessary in terms of human health, as the building and hard surfacing are expected to provide a barrier to potential receptors.

No groundwater seepages were encountered during the sinking of Borehole 1, and the monitoring standpipe was dry upon completion of the installation. Meanwhile, in Borehole 2, a slight seepage was observed when encountering a thin claystone bed between 3.2m and 3.4m. The Borehole was again found to be dry on completion at 8m depth. There is no evidence of any significant flow of Groundwater through the London Clay strata present beneath the site.

The soil samples recovered were all subjected to a Natural Moisture Content determination, with six samples representing the London Clay material also subjected to Atterberg Limit assessments which categorise the clay strata of the London Clay to be of Very High Plasticity.

Soluble Sulphate Concentrations were measured in the three samples subjected to the Wide-Range Contamination Suite with a further sample taken at depth. While concentrations in the samples of the near-surface materials fall within BRE Class DS-1, the sample from 3m depth reaches into BRE Class DS-4. The presence of Selenite crystals in the clay is also indicative of high sulphate levels. Concrete will be specified accordingly.

From the results of the shear vane tests the clay immediately below the existing footings has an allowable bearing capacity of between 140 to 200 kN/m2 according to test results from the investigation.

The liquid limit test results find that the soils are classified as "very high" on the plasticity chart. This is not unusual for London Clays.

With regard to proposed foundation designs, the in-situ testing indicates the following Allowable Bearing Capacities (based on a Factor of Safety = 3) within the Natural Strata at depths below current ground/floor level at each location:

Borehole No.	Depth (m)	Allowable Bearing Capacity (kN/m^2)	Strata
1	1.0m	140 (Clay)	London Clay
	2.0m	200 (Clay)	London Clay
	3.0m	240 (Clay)	London Clay
2	1.0m	140 (Clay)	London Clay
	2.5m	220 (Clay)	London Clay
	3.0m	260 (Clay)	London Clay

6. Basement Design & Construction Methodology:

It is proposed that the basement wall be formed in an underpin sequence and reinforced without being subject to "special foundations" negotiations with the party wall surveyors. The sequence will be constructed in hit-and-miss underpins to ensure that the existing masonry wall's foundation is not undermined during construction.

In doing so, the new wall (with temporary propping during the construction of the basement) will support active soil pressures, hydrostatic pressure, and surcharge loadings.

The basement slab will be designed to provide internal points of support for the proposed RC walls and superstructure loadings. The slab will be rigid enough to counteract heave and hydrostatic uplift effects as discussed in the previous section.

Maximum basement depth be not more than 3.6m below exiting ground level.

Where the basement extends beyond the proposed south-east elevation of the building, RC liner walls will again be used to form the proposed light well. RC walls directly under the proposed south-east elevation will provide support to the ground-floor slab.

The underpinning will be formed using reinforced concrete and as a retaining wall.

Two 300mm deep void formers will be included below the basement slab to protect against heave pressures. The dead weight of the concrete will also help to act against heave pressures from the excavations.

Wall loading has been applied along this line and onto the underlying soil for around a hundred years. The clay soils beneath the footing will, therefore, be well consolidated now. The underpinned wall will be founded on stiffer clay at greater depth with a relatively low bearing pressure. Therefore, the scope for differential settlement of the adjacent footings at differing depths is very limited.

With respect to the potential for heave, construction of the basement will be phased to allow some relaxation of the ground (heave) to take place as the excavation proceeds. Further measures should be taken against heave by initially reducing site levels in the area of the proposed basement extension to a safe level to avoid undermining existing perimeter wall footings.

The data from the site investigation has established soil and groundwater conditions.

The ground floor slab will be RC and provides lateral restraint to the top of the RC liner walls creating an inherently stiff 'box'. See Appendix A Structural Scheme drawing for details. The superstructure will comprise load-bearing walls and traditional walls to provide support to the duo-pitched roof.

An internal tanking system will be employed to waterproof the basement.

Appropriate waterproofing techniques will be developed with the Architect to ensure protection against water ingress into the basement areas. As is normal practice retaining walls should also be designed to resist a surcharge from water 2/3 of total height below ground level in accordance with BS 8102:2009. In this case the retaining wall will be designed to resist hydrostatic loading. It is recommended two forms of waterproofing protection are used, one comprising of either waterproof concrete or tanking, the other being an internal cavity wall drained system.

6.1 Sequence of Works

The construction sequence must be intended to preserve the retained soils' deformation. Therefore, to minimise horizontal deflection and prevent the rotation of the retaining structures, it is recommended to apply good-quality temporary propping at regular intervals to allow for the construction of the basement walls and the quick construction of the ground floor slab, acting as permanent propping. Below is a sequence of works to mitigate the movement of the property or nearby properties. Sketches are also attached to illustrate this in Appendix A.

The construction sequence will be as follows:

Stage 0

- Carefully demolish the existing internal walls and remove the existing ground floor slab. The excavation work will be carried out in stages.

Stage 1

- Drop the ground floor level without undermining the existing footing.

Stage 2-5

- Excavate locally and Underpin the main external perimeter walls to No. 10 Abbot's Roadside by casting reinforced concrete retaining wall in sections.

- Create two sections of reinforced concrete retaining wall between the ground and basement floor to form a base for basement slab.

- Strike shutter when concrete has gained sufficient strength, drypack, trim - off projecting footing, and re-prop until basement slab is cast.

Stage 6

- Commence excavation of central berm. Once the excavation is 500mm above the formation level, install super slim soldiers across the site at a low level.

Following the construction of basement walls and slab, install shuttering and construct the ground floor slab, which will act as permanent propping. Similar to above stages, carry on the underpinning process to the rest of the Boundary wall to No. 10 Abbot's Roadsides by casting reinforced concrete retaining wall in sections.

6.1.1 Temporary Works

The proposed underpinning wall will require propping in the temporary condition to avoid any lateral movement or risk of settlement of the ground behind until the RC walls, basement slab, and ground floor slab have been cast and allowed to reach full design strength. Temporary propping is likely to take the form of horizontal flying shores across the full length of the basement; these are to be installed at the top of the retaining wall. Temporary props are to remain in place until excavation works are complete and the new RC slabs have been cast and have reached their 28-day design strength. See Appendix A drawing for details.

The method for developing all temporary and permanent works, including design and erection, depends on the particular technology and procedure adopted by the contractor, who will be fully responsible for them and for respecting the information reported in the BIA. The designers and the contractor must apply all care and professionalism to ensure respect for the deflections and damage categories estimated within the report.

7. Impact Assessment

7.1 Overall Proposal

The main risk with these kinds of works are usually associated with ground stability but in our case, there will be a minimal risk of instability. These issues will be dealt with using good workmanship and method of construction, including quality control procedures to form the proposed basement construction.

Monitoring works will be undertaken on the main property and adjacent buildings to check compliance with the overall strategy of the work.

7.2 Outline of Temporary and Permanent Works Proposals

The new basement will be formed using Hit and Miss Underpinning techniques. Then, a concrete slab will be constructed inside to permanently prop the wall at both the basement level and the ground floor level. Refer to Appendix A for suggested sequencing and scheme drawings.

7.3 Ground Movement and Damage Impact Assessment

A detailed Building Damage Assessment has been carried out by Earth Water Geotechnical Engineering based on the applied loading and excavation of soil. The results from the GMA analyses confirmed that the adjacent (nearest) building at 11 Abbot's Place. The predicted potential damage to the adjacent building has been to be Category 0 Negligible.

The ground movements reported in GMA report (please refer to Appendix J) were considered for assessing the expected potential damage category that the construction of a new basement was supposed to induce onto the adjoining properties. The assessment was carried out considering the method described in CIRIA Special Publication 200 (Burland et al., 2001) and CIRIA C580 (Gaba et al., 2003), based upon the method proposed by Burland et al. (2001) and taking into account the works by Burland and Wroth (1974) and Boscardin and Cording (1989)

Raft slabs with Reinforced Concrete Underpinning will be adopted to retain the lateral load acting from the public road and side garden to the neighbouring properties in the temporary and permanent stages. Temporary propping will also be provided towards the head of the wall to provide lateral restraint to control deflection. This will be limited to less than 5mm.

Potential heave effects will be considered and resisted by providing compressible filler under the basement slab and its rigidity. Based on our experience, if the work has been carried out carefully with sequencing, there will be minimum movement. Detailed structural calculations has bee provided, considering all geotechnical parameters.

Table Classification of Visible Damage To Walls

Category	Description
0 (Negligible)	Negligible – hairline cracks
1 (Very slight)	Fine cracks that can easily be treated during normal decoration (crack width <1mm)
2 (Slight)	Cracks easily filled, redecoration probably required. Some repointing may be required externally (crack width <5mm)
3 (Moderate)	The cracks require some opening up and can be patched by a mason. Recurrent cracks can be masked by suitable linings. Repointing of external brickwork and possibly a small amount of brickwork to be replaced (crack width 5 to 15mm or a number of cracks > 3mm).
4 (Severe)	Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows (crack width 15mm to 25mm but also depends on number of cracks).
5 (Very severe)	This requires a major repair involving partial or complete re-building (crack width usually >25mm but depends on number of cracks).

7.4 Mitigation of Adverse Effects

This section of the report addresses the potential impacts identified by the scoping study and the relevant findings of the ground investigation and mitigation measures, where required.

7.4.1 Groundwater Flow

The proposed basement had a depth between 3.00m and 3.50m bgl, and foundations were expected to be taken into the suitable bearing soils of the London Clay Formation. The Made Ground/ Topsoil, Head, and London Clay Formation have low to very low permeabilities. From a hydrological and hydrogeological perspective, the basement would have limited to no impact on the groundwater regime.

Mitigation: Local dewatering may be required during construction, either by exclusion, extraction, or a combination. If extraction methods are used, best practices must be adopted to prevent the loss of material from the surrounding ground, which could cause instability.

7.4.2 Land Stability

The following potential impacts were identified during the screening and scoping study.

- Changes to moisture content in soils with a shrink-swell potential can cause damage to structures.

The ground conditions were confirmed to be cohesive and would have shrinkage and swelling potential. Changes in moisture content from seasonal changes will cause volume changes within the strata encountered.

Mitigation: Due to the potential variability of Head deposits, a high volume change potential is recommended for all strata for design purposes.

Local dewatering may be required during construction, either by exclusion, extraction, or a combination. If extraction methods are to be used, best practices must be adopted to prevent the loss of material from the surrounding ground, which could cause instability.

An adequate retaining structure has been designed to support the slope. It will need to be designed and installed prior to excavation works. It is recommended that the basement be constructed using traditional hit-and-miss techniques around the periphery of the structure.

Structural design and method statements have been established as successful practices, with the use of suitable temporary and permanent support to prevent damage to neighbouring properties or causing

instability. Pre-start and completion surveys made of the adjoining properties. Monitoring of ground and structures to be undertaken before, during and for a sufficiently long period after the completion of the basement for the properties falling within the area of influence of the proposed development.

Earth-Water has undertaken a ground movement assessment to evaluate the construction sequence and a damage category. The predicted potential damage to the adjacent building has been determined to be Category 0 Negligible in accordance with the Burland Scale as detailed in section 6.3 above.

7.4.3 Surface Flow and Flooding

The following potential impacts were identified during the screening and scoping study.

- An affect the way rainfall and surface water are transmitted away from the property and could adversely impact the local risk of flooding.

The ground conditions were found to be cohesive, and permeability was anticipated to be very low. The Made Ground/ Topsoil, Head and London Clay Formation would have limited potential for rainfall storage. Surface water that infiltrates the Made Ground/ Topsoil would flow along the surface of the Head in alignment with the topography. Any water vertically infiltrating the Head will flow at a very slow rate. The proposed development will partially increase the proportion of soft landscaping areas. The effect on surface water infiltration would be limited due to the natural ground conditions being cohesive and allowing limited infiltration.

Mitigation: A detailed flood risk assessment and sustainable urban drainage strategy report prepared by Cube Consulting; please refer to Appendix-K Flood Risk Assessment and Drainage Strategy, reference 1197-C-RP-0001, Dated 25.07.2024. Surface water will be managed, using SUDS techniques or into the sewer and drainage system. Given the cohesive nature of soils encountered, infiltration SUDS are unlikely to be suitable, and attenuation SUDS in combination with drainage to the sewer system have been adopted.

7.5 Control of construction works and Monitoring of Surrounding Buildings:

This section considers the potential effects of basement construction on nearby properties and adjacent roads. Detrimental effects would manifest as cracking and more serious structural damage. Many old buildings exhibit signs of historic movement and repair. In practice, it is often difficult to attribute cracks visible in a structure to specific site construction activities unless a detailed survey of the affected structure and its founding strata had been undertaken before the construction works.

Any observed changes in the state of the building can then be causally linked to the works with more confidence and less debate than if no pre-works condition survey had been undertaken. Surveys require the cooperation of the property owners, as entry by surveyors into the property will be necessary. This would normally be undertaken in collaboration with the neighbour's party wall surveyors.

Close supervision will be made during the construction phase. Movement monitoring of neighbouring and nearby structures will be undertaken before construction starts and continued through the construction phase and for an appropriate period thereafter.

During the formation of the new construction works next to the existing property, monitoring of the existing properties No.10, No.41, and No. 11 will be carried out. This is intended to monitor the impact of the works on land adjacent to 10 Abbot's Place to ensure they are not adversely affected by the works. Similarly, there will be negligible effect on public highways, which are at a reasonable distance from the proposed light well wall and the depth of the light well is well above the influence line as per Appendix-A scheme drawings.

Monitoring will be carried out by forming fixed points as references on the front and side of the property. In total, independent reference points will be established so that the displacements measured at the fixed points and displacements measured at the other points can then be compared.

The points may be summarised as follows:

Initially, at the start of the basement works, readings will be taken on a weekly basis. Assuming no significant movement is identified, the intervening period will be increased after approximately three months. As the basement works progress further the frequency of the readings will be reviewed.

After each round of readings, a review will compare the results and determine whether any significant movement has occurred. A summary report will be prepared each month for issue to the Party Wall Surveyor.

For the purposes of this exercise, any movement recorded between 3-5mm would be immediately declared to the Party Wall Surveyor and Design team. Any movement recorded of greater than 5mm would lead to works ceasing immediately while an assessment of the cause of any such movement was made. Please refer to Appendix G for more details.

7.6 Cumulative Effects

Abbot's Place and the immediate surrounding area generally comprised semi-detached properties. The ground conditions surrounding the site are also anticipated to be cohesive.

Eventual basements like the proposed basement will/are likely to be constructed in cohesive soil with low to very low permeability. The cumulative effect of multiple basements was, therefore, not likely to significantly affect the groundwater regime. As with the proposed development, surface water management plan would be required for any excess surface water.

8. Noise and Vibration

Noise and vibration from demolition works will be minimised by using best practice techniques, in accordance with BS 5228: 1994 Noise Control on Construction and Open Sites.

Work will be programmed to minimise noise & vibration at unreasonable hours, and quiet types of plant, vehicles and equipment shall be used where practicable. Plant, vehicles and equipment shall, where possible, be filled with silencers, acoustic hoods or covers which should be kept in good order and used at all times. Any pneumatically operated percussive tools shall be fitted with approved mufflers or silencers, which shall be kept in good repair.

Care should be taken when loading or unloading vehicles, dismantling scaffolding etc. to minimise impact noise & vibration, and disturbance from persons or vehicles entering or leaving the site should also be kept to a minimum.

Emissions of dust will be minimised with the use of water spraying and other dust suppression techniques. Vehicles removing dusty materials from site should be adequately sheeted and all spoil removed from site will exit via an enclosed conveyor belt into a sheeted skip located at the front of the property. No washing of plants or wheel vehicle will be permitted on the public highway.

Working Hours

Permitted working hours will be:

08:00 to 18:00 (Mondays to Fridays)

From 8:00 to 13:00 (Mondays to Saturdays)

No time during Sundays and Bank/Public Holidays

Neighbouring Liaison

Before the start of any work, occupiers of adjacent properties likely to be affected by the work will be notified with a letter stating the nature and the duration of the works. The letter will provide an outline of the works, methodology and programme, as well as contact details for bringing to attention any

concerns about the traffic management/ the works. Contact details of the site manager or other responsible person will be provided so that any concerns or complaints can be addressed.

9. Conclusion and Recommendations

The proposed works, in accordance with the appointed Engineer's assessment, will not impact substantially on either the local subterranean environment or the built-up surrounding areas.

The new basement will be constructed using traditional techniques in a controlled and predetermined sequence to mitigate the risk of damage or disturbance to neighbouring buildings and highway services and pavement structure. There will be minimal effect on public highways and pavement structure as the depth of the new light well is well above the influence line from the abbot's place as per Appendix-A scheme drawings. Where mechanical means are necessary to construct the permanent works, these can be of a type that generates low noise and vibration and will not unduly affect the surrounding buildings or their occupants. A top-down underpinning' form of construction could potentially be used to further mitigate dust and noise.

Due to the very low permeability of the soils of the London Clay Formation, it should not pose an issue at the time of excavation. The Head and London Clay Formation were unproductive strata and have limited potential for water storage. The proposed basement would not cause any adverse impact on groundwater flows, as groundwater flow would be very low to negligible. In the case local isolated perched water will be encountered, then local water control measures may be required to keep isolated underpin excavations dry prior to concrete placement.

The site did not fall into an area at risk from river and sea, groundwater, or reservoir flooding. Along the southern side, there is a low risk of surface water flooding. Therefore, the requirement for mitigation measures and suds design has to be implemented as per Appendix-K Flood Risk Assessment and Drainage Strategy, reference 1197-C-RP-0001, Dated 25.07.2024.

Given the cohesive nature of the soil encountered attenuation SUDS in combination with drainage to the sewer system will be adopted.

We consider the overall risks associated with the proposed development can be mitigated by appropriate detailed design, and ensuring that the works are carried out in a safe and careful manner by a competent contractor. In doing so, construction of the basement will not affect the integrity of the surrounding buildings, will not unduly impact any underlying hydrology or overload the near-surface geology. The techniques proposed for the construction of the subterranean element will minimise the risk of instability, ground slip and movement, and therefore we consider that the application should be supported by the Local Planning Authority.

Building Regulations Applications will be made with full design information (detailed structural calculations and construction details) provided prior to the commencement of the basement excavations to ensure design compliance.

The basement's construction may generate minimal ground movements due to various causes, including heave, workmanship, and retaining structure construction during and after excavation.

The monitoring of the construction, boundary wall and adjacent buildings No.11 & No. 41 will ensure that what was defined at the design stage is confirmed during construction. In the case of doubts, additional verifications must be done.

It is recommended that an appropriate monitoring regime be adopted to manage risk and potential damage to the neighbouring structures with a further minimisation of the construction effects as construction progresses onsite (Ball et al., 2014).

The above also assumes a good standard of work, construction to be carried out in dry periods, and the limitation of horizontal deflection of the walls during construction.

The construction sequence must be intended to preserve the retained soils' deformation. Therefore, to minimise horizontal deflection and prevent the rotation of the retaining structures, it is recommended to apply good-quality temporary propping at regular intervals to allow for the construction of the basement walls and the quick construction of the ground floor slab, acting as permanent propping.

The method for developing all temporary and permanent works, including design and erection, depends on the particular technology and procedure adopted by the contractor, who will be fully responsible for them and for respecting the information reported in the BIA. The designers and the contractor must apply all care and professionalism to ensure respect for the deflections and damage categories estimated within the report.

Future Recommendation Information required following planning approval and prior to final design:

- Party Wall Agreements should be prepared and submitted to Party Wall Surveyors for all neighbouring properties (No.11 & No. 41), allowing adequate time for agreement before any excavation commences. Ground Movement monitoring regime Trigger limits must be agreed as part of the party wall negotiations with neighbours.
- Pre-commencement surveys of adjacent structures and the monitoring regime should be agreed upon before any excavation commences.

- The commencement of Party Wall negotiations should be used to reinforce the knowledge of the proposed development among the neighbouring properties at 10 Abbot's Place. The construction programmes need to be known across both developments.

Appendices:

Appendix-A	Scheme Drawings
Appendix-B	Desk Study & Phase I Risk Assessment
Appendix-C	Phase 2 Ground Investigation Report
Appendix-D	Flood Risk Maps
Appendix-E	CCTV Drainage Survey
Appendix-F	Thames Water Maps
Appendix-G	Monitoring Drawings
Appendix-H	Topographical Drawings
Appendix-I	Arboriculture Report
Appendix-J	Building Damage Assessment Report
Appendix-K	Flood Risk Assessment and Drainage Strategy Report
Appendix-L	Geotechnical Properties Summary Report
Appendix-M	Groundwater Report
Appendix-N	Structural Calculations