UNDA

Flood Risk Assessment

Basement Impact Assessment (Subsurface Flow)

Prepared for: MRE Building Contractors Ltd

Location: 26 Dartmouth Park Avenue, Camden, NW5 1JN

Our reference: 86122-HartleyProjects-DartmouthPkAv

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Client:	MRE Building Contractors Ltd
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Introduction

Background:

This report presents the subsurface flow (groundwater) component of a basement impact assessment, to be submitted in support of a planning application for the basement development at 26 Dartmouth Park Avenue, Dartmouth Park, London NW5 1JN (Figure 1.1, national grid reference TQ 2888 8633). The local planning authority is Camden Borough Council.

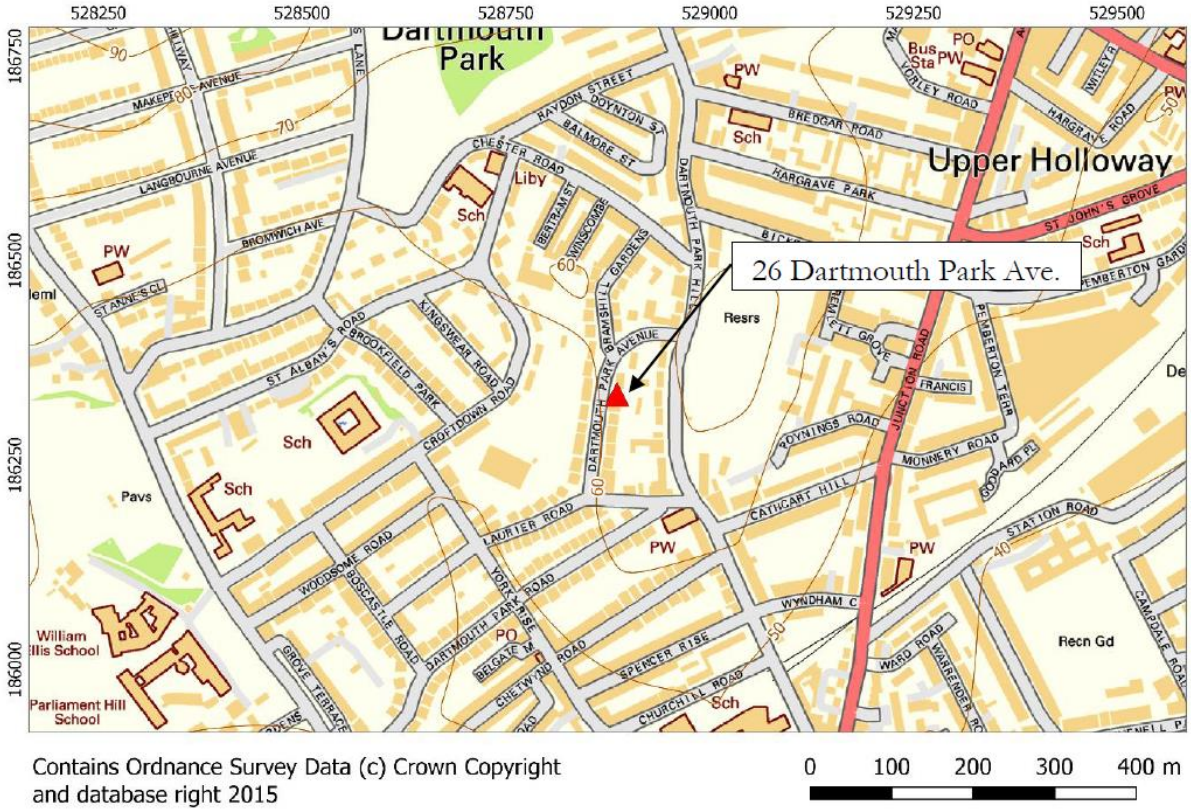

Figure 1.1 Location of 26 Dartmouth Park Avenue

Basement Works:

The site comprises 26 Dartmouth Park Avenue which is a three-storey semi-detached building on the east side of the avenue. To the east, south, west and north of the site are neighbouring residential properties. Number 24 adjoins the property, to the south.

Plans for the new basement extension involve extending the existing basement floor towards the rear of the building. The basement extension is to be approximately 'L' shaped: the excavation will be full width about 3 m past the limit of the current ground floor, and a half-width extension a further c. 4.3 m into the garden (Figure 1.2).

The finished floor level (FFL) of the basement will be the same as present, which is about 2.9 m below the level of the garden, but approximately level with the pavement on Dartmouth Avenue.

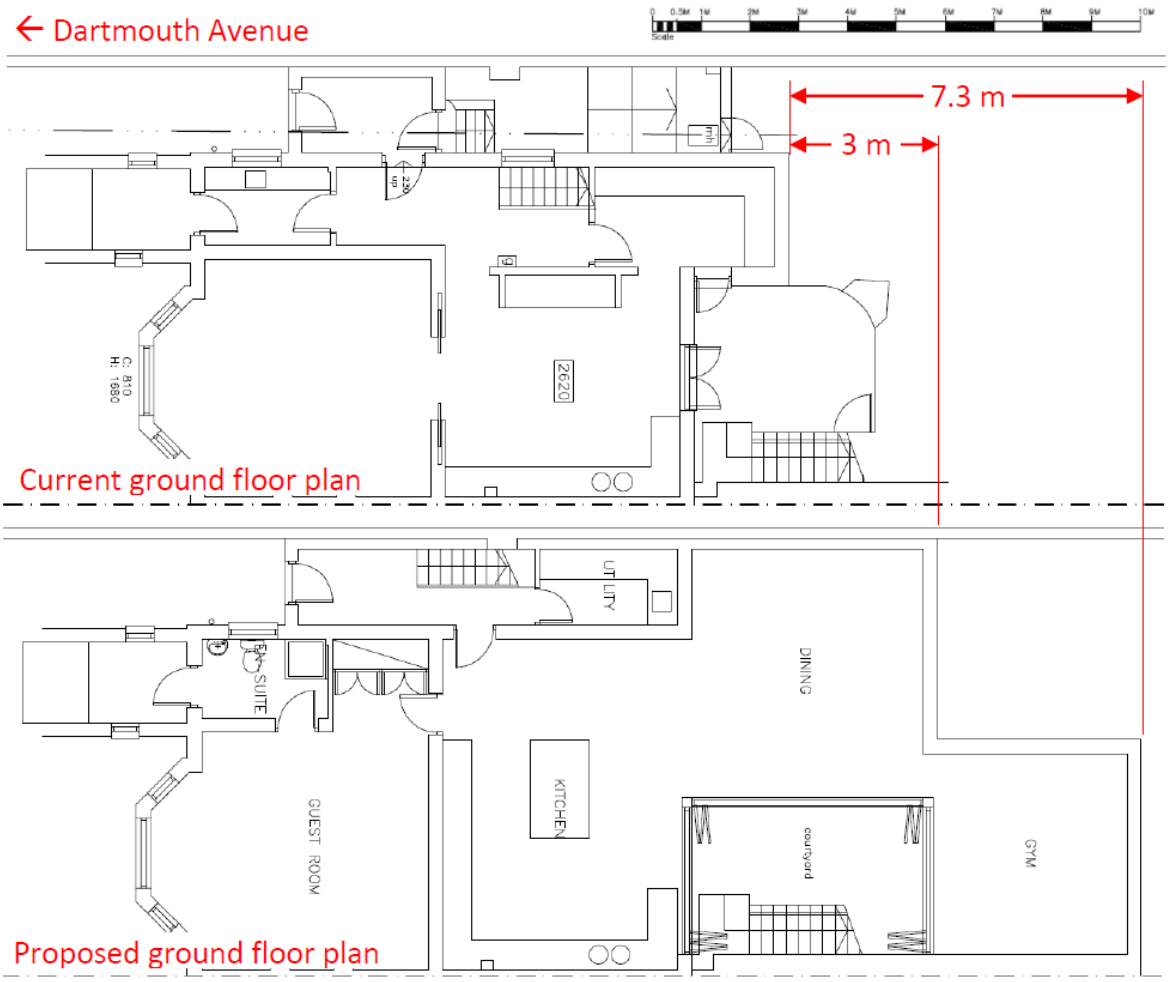

Figure 1.2 Existing (top) and proposed (bottom) basement plans of the proposed development.

Scope of Report:

This report presents the sub-surface assessment for a basement development that complies with CPG4 screening and scoping stages, and makes reference to the basement impact assessment guidance of ARUP (2010) (Camden geological, hydrogeological and hydrological study. Guidance for subterranean development).

Authorship of Report:

Unda Consulting Limited was instructed in June 2015 to complete this report. This report has been prepared by Dr Stephen Buss MA MSc CGeol. Dr Buss is a UK-based independent hydrogeologist with more than 15 years' consulting experience in solving groundwater issues for regulators, water companies and other private sector organisations. Dr Buss is a Chartered Geologist with the Geological Society of London.

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Conceptual Site Model

Drainage and Topography:

Elevation of 26 Dartmouth Park Avenue is about 60 to 62 m above Ordnance Datum (m AOD) according to Ordnance Survey Terrain 5 data. Ground surface around the site slopes westwards (gradient from Ordnance Survey 10 m contours is about 0.010).

The property lies relatively close to the former course of a tributary of the River Fleet (Barton, N.J., 1993. The Lost Rivers of London 3rd edition), which has been culverted beneath the city (Figure 2.1). Contours of the stream's valley (Figure 1.1) indicate that the river probably flowed along what is now York Rise, about 250 m to the west of Dartmouth Park Avenue.

The nearest current surface water feature is the Highgate Ponds chain, the nearest of which is Highgate No. 1 Pond about 840 m to the west of the site. Whilst the elevation of the pond is about the same as that of 26 Dartmouth Park Avenue there is a valley feature between them that drops down to about 50 m AOD.

Two covered reservoirs are present 90 m to the east (uphill) from the property. These are probably lined with concrete and, as such, will not contribute to the local hydrology.

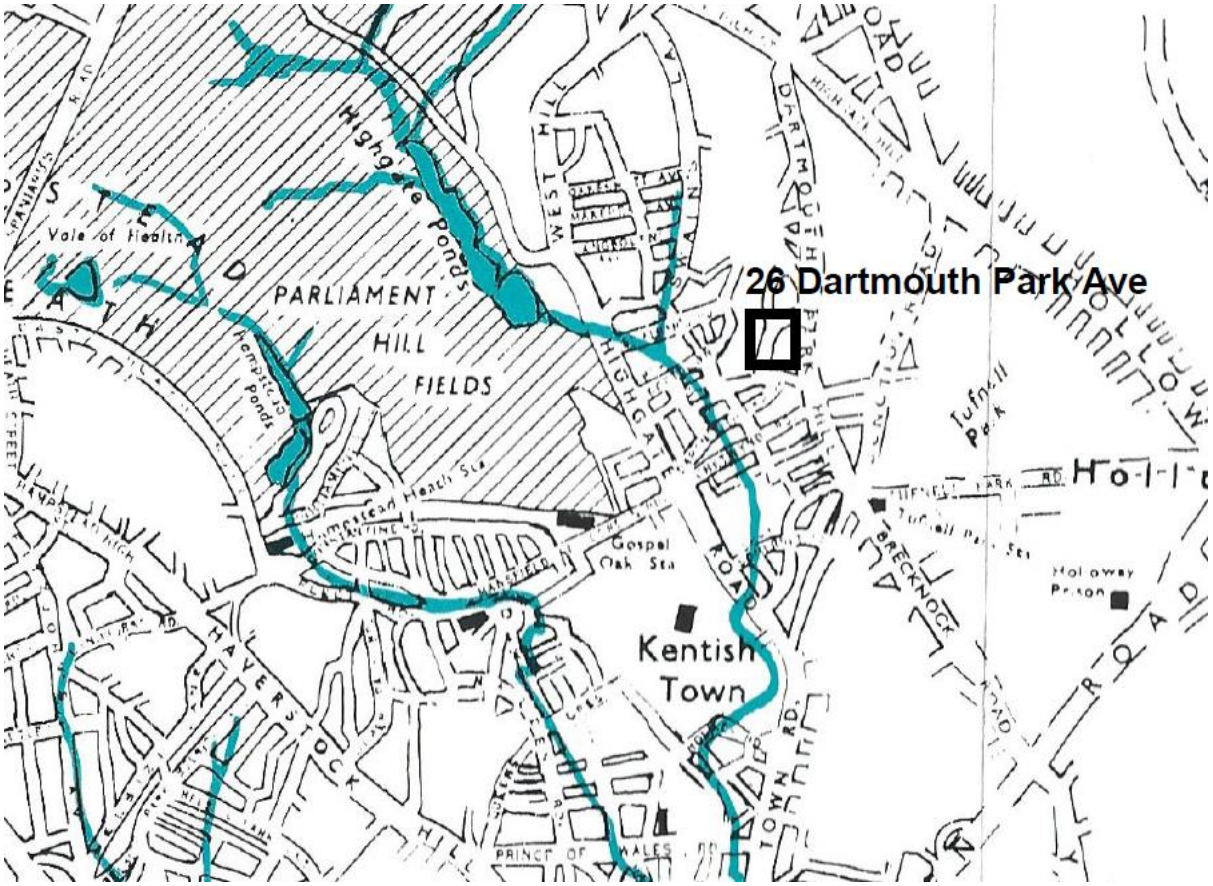

Figure 2.1 Location of tributaries of the River Fleet

Geology and Hydrogeology:

Bedrock at the site comprises London Clay (http://mapapps.bgs.ac.uk/geologyofbritain/home.html). The base of the London Clay is at about 70 m below ground level at the Kentish Town Waterworks (http://scans.bgs.ac.uk/sobi_scans/boreholes/590594) (about 620 m to the west of the site) and isolates the

main aquifer of the London Basin from the near-surface hydrogeology. No superficial deposits are mapped at the surface.

Outcrop of the Claygate Beds (which are highlighted in the ARUP 2010 report as prone to groundwater issues) is about 700 m to the north west of the property and at an elevation of about 90 m AOD.

Nearby shallow borehole records available from the British Geological Survey show the absence of any thickness of permeable superficial deposits in the area:

- There are three borehole records (http://scans.bgs.ac.uk/sobi_scans/boreholes/590635) under TQ28NE47, which were drilled in August 1964, about 200 m east of 26 Dartmouth Park Avenue. These show clayey fill and topsoil lying directly upon weathered, then firm, London Clay. No groundwater was encountered during drilling.
- Fourteen borehole records (http://scans.bgs.ac.uk/sobi_scans/boreholes/590633) are listed under TQ28SE1024 were drilled in April 1964 along with five others, about 230 m east of the property. None of the boreholes show any superficial deposits. As with the boreholes above, these show clayey fill and topsoil lying directly upon weathered, then firm, London Clay.
- One borehole (http://scans.bgs.ac.uk/sobi_scans/boreholes/590740) was drilled, in February 1968, about 200 m north of the property (designated TQ28NE152). Again this shows just a little clayey fill and then London Clay. No groundwater was encountered during drilling.

Local Groundwater:

Ten of the local boreholes encountered groundwater at varying depths. These are listed in Table 2.1 and approximate locations are shown on Figure 2.2 but the original scans are not clear enough to be able to map all the borehole IDs to their points. Most water strikes were considerably deeper than 3 m depth (i.e. below excavation level of the proposed basement), or the boreholes were dry.

In all but one of the boreholes where water was encountered the standing water level remained at the level of the water strike. In the confined conditions of a clay aquitard, this suggests that the amount of flow in the sub-surface is very small.

It is typical of some boreholes in the London Clay to exhibit seepages of water from horizons above low permeability bands; whilst others remain dry to depth. These are not instances of intercepting water tables, just pockets of water moving through slightly more permeable layers, and perhaps fractures, within the upper clay strata.

Borehole ID	Depth to water strike (m)	Elevation of water strike (m AOD)	Standing water level (m AOD)
TQ28NE47 A	-	-	-
TQ28NE47 B	-	-	-
TQ28NE47 C	-	-	-
TQ28SE1024 A	-	-	-
TQ28SE1024 B	8.5	48.8	48.8
TQ28SE1024 C	-	-	-
TQ28SE1024 D	8.3	48.5	48.5
TQ28SE1024 E	-	-	-
TQ28SE1024 F	14.2	40.6	40.6
TQ28SE1024 G	9.4	44.9	44.9
TQ28SE1024 H	3.7	50.8	50.8
TQ28SE1024 I	-	-	-
TQ28SE1024 J	1.5	49.4	49.4
TQ28SE1024 K	3.8	54.4	54.4
TQ28SE1024 L	6.1	43.6	47.8
TQ28SE1024 M	2.6	55.6	55.6
TQ28SE1024 N	3.6	53.9	56.0
TQ28NE152	-	-	-

Table 2.1 Groundwater strikes in local boreholes (Depths in Table 2.1 and borehole IDs in Figure 2.2 may not be completely accurate: original scans are very poor)

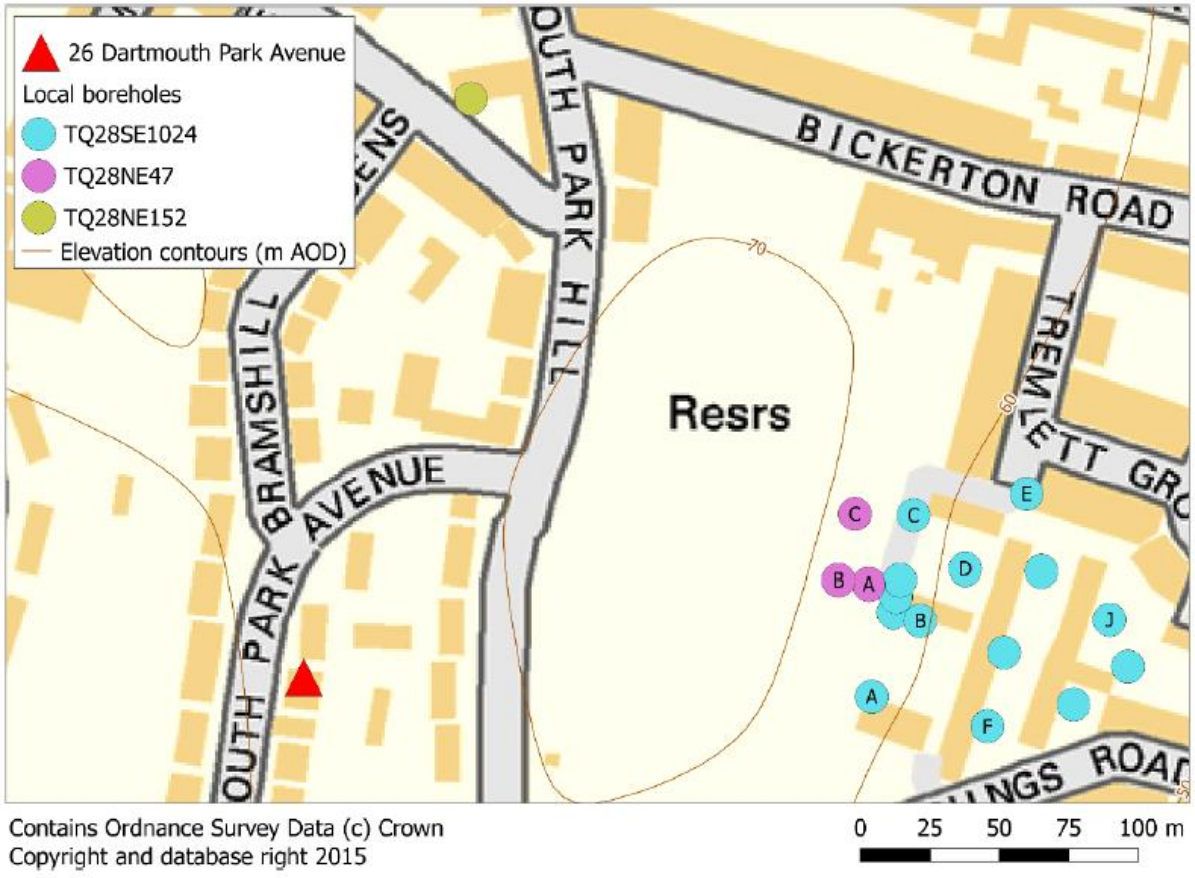

Figure 2.2 Locations of local boreholes (Depths in Table 2.1 and borehole IDs in Figure 2.2 may not be completely accurate: original scans are very poor)

Local Basements:

Other nearby properties on Dartmouth Park Avenue have lower ground / basement floors. The basement of number 24 has, for instance, a basement at the same level. It is noted that the basement of number 24 is slightly downhill of the proposed basement extension. If there are any groundwater impacts as a result of the development, it will be that groundwater levels are lowered at number 24.

Details of any other recent basement developments have searched for via the Camden Planning Portal but none have been identified.

Basement Impact Assessment Screening: Groundwater

Subterranean (groundwater) screening follows the procedure outlined in Figure 1: Subterranean (ground water) flow screening chart of the Camden Planning Guidance 4 (CPG4) entitled Basements and Lightwells dated 2013.

1a) Is the site located directly above an aquifer?

NO. The geological map and the nearest off-site boreholes indicate that a layer of permeable superficial deposits is not present beneath the site. Local boreholes show clayey fill and topsoil, over London Clay (Section 0). None of these can be considered an aquifer. Beneath made ground a considerable thickness of London Clay isolates the deeper aquifer units of the London Basin aquifer from the surface.

1b) Will the proposed basement extend beneath the water table surface?

NO. Local boreholes did find groundwater, mostly below 3m depth. It is typical of some boreholes in the London Clay to exhibit seepages of water from horizons above low permeability bands; others remain dry to depth. These are not instances of intercepting water tables, just pockets of water moving through the upper horizons.

Hence it is considered that, in the unlikely event of groundwater being encountered by the excavation, inflows will be negligible. When the basement is constructed these flows are not expected to be sufficient to lead to any change in the groundwater flow patterns beneath the site.

2) Is the site within 100m of a watercourse, well (used/disused) or potential spring line?

NO. There are no surface water bodies within 100 m of the site. The site lies 250 m east of the former River Fleet, and about 10 m elevation above its bed level. There are no known water wells within 100 m of the site.

Geological conditions indicate that there is no potential for development of a spring line in the vicinity of the property, as the 1:50 000 geology map indicates that it is located in the centre of an outcrop the London Clay, and there are no superficial deposits nearby.

3) Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?

NO. The development will be beneath the current footprint of the property, and the garden will be reinstated after the works, so surface water flows will be unchanged.

4) As part of the site drainage, will more surface water (e.g. rainfall and runoff) than at present be discharged to the ground (e.g. via soakaways and/or SUDS)?

NO. Discharge to the ground is not proposed.

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. The nearest surface water body is the Highgate No. 1 Pond, about 840 m to the west of the site. Whilst the elevation of the pond is about the same as that of 26 Dartmouth Park Avenue there is a valley feature between them that drops down to about 50 m AOD.

Conclusions

Potential environmental impacts of the basement extension at 26 Dartmouth Park Avenue have been considered. The following summary conclusions are made:

- There will be no increase in man-made impermeable area so the amount, timing and quality of surface water runoff will not be affected by the development. No water will go to ground as a result of the basement development.
- There are no local surface water bodies.
- Available geological and hydrogeological information indicates that there is no permeable aquifer beneath the site that is capable of maintaining a significant water table.
- Water strikes were identified in some local boreholes, but flowing groundwater is not anticipated in the subsurface here. In addition most water strikes were below excavation level of the proposed basement at 26 Dartmouth Park Avenue.
- Given that there is not likely to be any groundwater at a depth to be intercepted by the proposed basement, and the London Clay is not an aquifer, it is considered that there is no risk of hydrogeological issues arising from the proposed development.

These conclusions are considered to be robust and no further investigations are needed to satisfy the screening criteria for sub-surface risk. In particular, it is considered that there will be no benefit to undertaking a site investigation for the purposes of this risk assessment; and the basement impact assessment does not need to go to scoping or impact assessment stages.