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154 Royal College Street: Subsurface Flow Basement Impact Assessment: screening and scoping document

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1. Introduction

1.1 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 154 Royal College Street, London NW1 0TA (Figure 1.1). The local planning authority is Camden Borough Council.

1.2 Basement Works

The site comprises 154 Royal College Street which is currently a four-storey building, including a basement, on the north-west side of the street. It is currently occupied by two flats.

To the north of the site is an adjoined commercial/residential property, number 156. To the south the plot of number 152 is currently vacant but has received planning permission (the most recent reference is 2023/1033/P) for erection of a 5-storey building including a lower ground floor. To the rear (east) of number 154 is Bruges Place, a complex of flats, and to the west, across Royal College Street, are mixed commercial/residential properties.

Plans for the new development at number 154 involves extending the basement down and to the rear. Figure 1.2 compares the existing and proposed basement extent, with the proposed basement outline drawn on. Floor level in the basement is currently c. 2.3 m below ground floor level (measured from AJS Planning drawing RCS.154.EX.102) while finished floor level of the new basement is to be 2.85 m below ground floor (measured from AJS Planning drawing RCS.154.PR.102). The basement to be extended 3.0 m to the rear.

1.3 Scope of Report

This report presents the sub-surface water (hydrogeology) screening and scoping report for a basement development, that complies with CPG4 screening and scoping stages, and makes reference to the basement impact assessment guidance of ARUP (2010)[1].

1.4 Authorship of Report

Stephen Buss Environmental Consulting Ltd was instructed in July 2025 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 25 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.** Dr Buss's CV and publications list is available at www.hydro-geology.co.uk.

[1] ARUP, 2010. Camden geological, hydrogeological and hydrological study. Guidance for subterranean development.

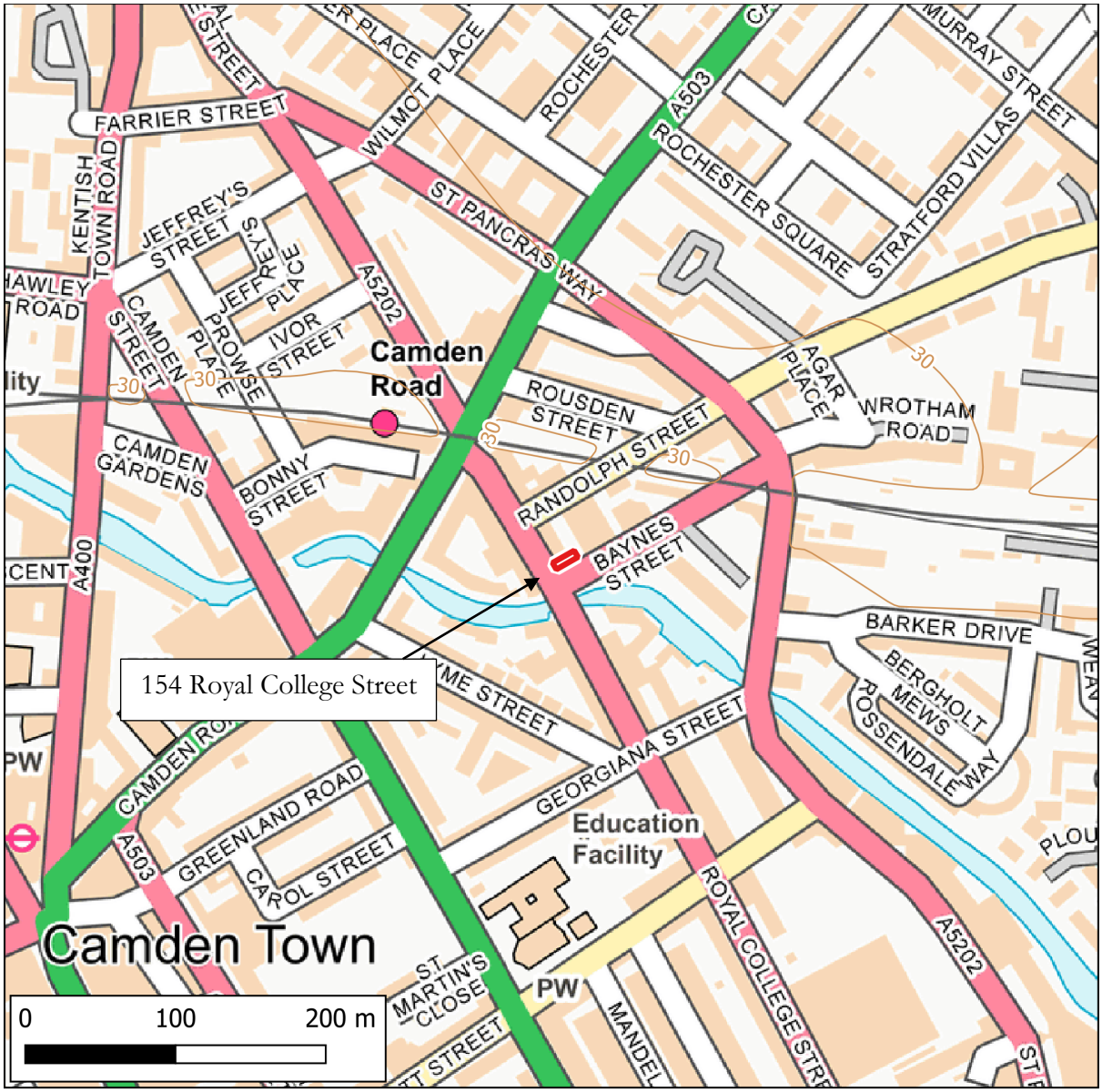

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Figure 1.1 Location

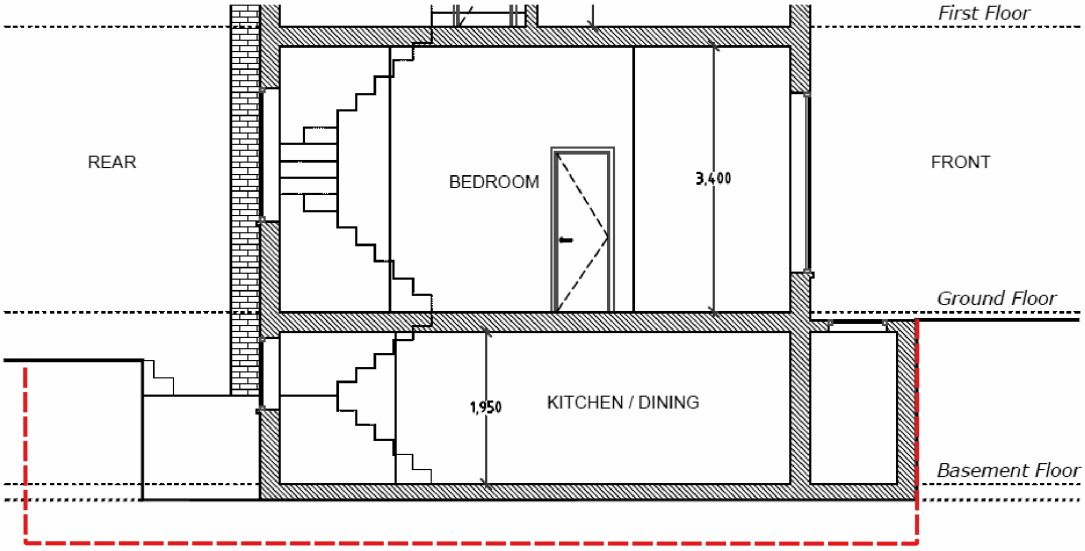

Figure 1.2 Section of the existing property, with the proposed basement in red

(After AJS Planning drawings RCS.154.EX.102 and RCS.154.PR.102)

2. Factual Assessment

2.1 Drainage and Topography

Elevation of the pavement outside 154 Royal College Street is about 27.25 m above Ordnance Datum (m AOD), according to Environment Agency 1 m resolution LIDAR data. Ground surface around the site slopes gently southwards.

The Grand Union Canal is about 23 m to the south of the site where it passes under Royal College Street. Ground adjacent to the canal is at an elevation of about 23.5 m AOD according to Environment Agency LIDAR data.

The property is also close to the former course of the 'lost' River Fleet[2]. Judging from the mapping in Barton and Myers (2016) (Figure 2.1) the former course passes south of the Grand Union Canal hereabouts, and about 100 m south of the property. With reference to Figure 1.1 the former course is where Lyme Street is now, and there is a drain in Lyme Street (outside the Prince Albert pub) where the current River Fleet can be seen and heard[3].

2.2 Geology and Hydrogeology

Bedrock at the site comprises London Clay. The base of the London Clay is at about 33 m below ground level at a former borehole[4] off Camden Street (about 240 m to the west) and isolates the main aquifer of the London Basin from the surface.

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

- Several shallow boreholes[5] were constructed in June 1965 at the junction of Camden Street and Camden Road, about 160 m west of Royal College Street, and just to the south of the Grand Union Canal. These all show about 1 m of made ground lying directly on weathered London Clay.

  Groundwater was not struck in three of the four nearest boreholes. In one borehole (ID TQ28/SE1206) water was struck at 1.1 m depth. Subsequently groundwater monitoring was installed and the rest water levels were measured at 7.6 to 7.8 m depth.

2.3 Near-Site Geology and Groundwater

No ground investigation has been undertaken at 154 Royal College Street, but boreholes have been constructed on the site of 152 and 156 Royal College Street.

2.3.1 At 152 Royal College Street

One borehole and one trial pit were constructed at number 152 in June 2015, and a standpipe was installed in the borehole. Information was submitted to the council as part of planning application 2017/6978/P.

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[2] Barton, N.J. and Myers, S., 2016. The Lost Rivers of London 3rd edition.
[3] https://londonist.com/2016/09/where-to-see-and-hear-the-hidden-river-fleet
[4] http://scans.bgs.ac.uk/sobi_scans/boreholes/593072
[5] http://scans.bgs.ac.uk/sobi_scans/boreholes/592789, http://scans.bgs.ac.uk/sobi_scans/boreholes/592787, http://scans.bgs.ac.uk/sobi_scans/boreholes/592786, http://scans.bgs.ac.uk/sobi_scans/boreholes/592785

Made ground comprising demolition rubble was encountered to 1.9 m and 2.3 m depth (this rubble filled the former basement of the demolished building). Below this was weathered London Clay, to 16 m depth.

During construction of the borehole, no significant groundwater seepages were observed (there was a little water trapped on a claystone nodule at 4.45 m depth). The standpipe in the borehole was dry at 6.0 m depth when inspected immediately after construction, but a rest water level was measured at 2.86 m depth two weeks later.

Both the borehole and the trial pit intercepted the old basement structure at number 152, so it is not clear if the near-surface outside the building (i.e. the garden) has a substantial thickness of made ground, or superficial deposits (probably not given the geological conditions), or there is London Clay near the surface.

2.3.2 At 156 Royal College Street

One borehole and three trial pits were constructed on the site of 156 Royal College Street in September 2020 and submitted to the council as part of planning application 2022/2112/P.

The borehole was constructed from ground level, in the garden. Made ground beneath the garden comprises mostly sandy gravelly clay to 1.5 m depth, then 0.5 m of gravelly weathered London Clay and then to 9.45 m, intact London Clay was encountered.

Water was not encountered during drilling of the borehole. A standpipe was installed to 5.0 m depth. Groundwater level was subsequently measured only in March 2022, and was present at 1.7 m depth.

2.4 Local Basements

Details of any basement developments in nearby buildings have been searched for via the Camden Planning Portal.

- Immediately to the north of number 154, 156 Royal College Road has a basement beneath the building footprint, which was constructed after gaining planning permission reference 2022/2112/P.
- To the north of number 156, 158-164 Royal College Road has a basement / lower ground floor that comprises a number of flats (as part of planning permission 2009/5128/P).
- As mentioned in Section 1.2, the plot of number 152 is currently vacant but is in planning (application reference 2023/1033/P) for erection of a 5-storey building including a lower ground floor.
- Across Royal College Street, opposite number 154, 197-199 Royal College Street has a lower ground floor. This was subject to extension in 2012 via planning permission 2012/1647/P.
- The absence of basements on any of the drawings for Bruges Place planning applications suggests that that building (east of 154 Royal College Street) does not have a basement.

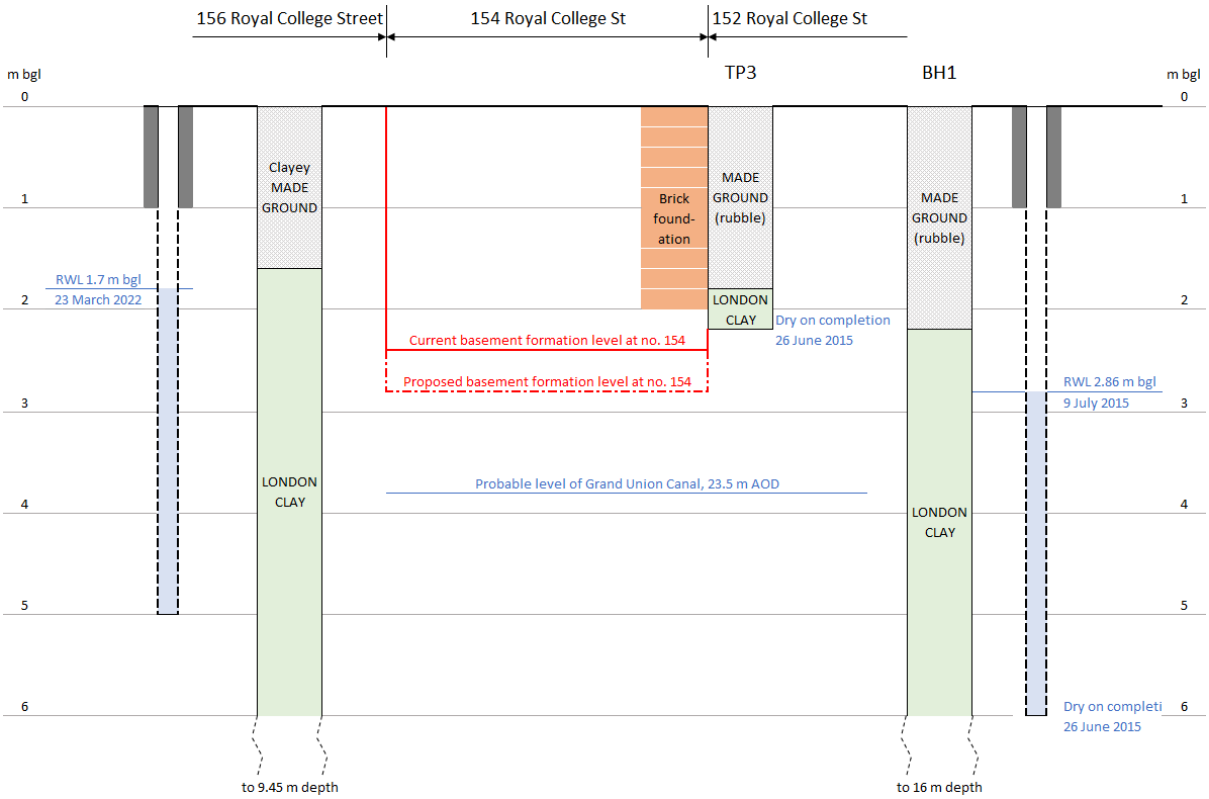

Figure 2.1 Borehole logs from 152 and 156 Royal College Street (looking north-eastwards)

3. Basement Impact Assessment Screening: Groundwater

Subterranean (groundwater) screening follows the procedure outlined in Figure 3: Subterranean (ground water) flow screening chart of the Camden Planning Guidance 4 (CPG4) entitled Basements and Lightwells dated July 2015.

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

NO. The geological map and the nearest off-site boreholes and trial pits indicate that a continuous layer of permeable superficial deposits is not present beneath the site. Boreholes and trial pits from adjacent sites show c. 2 m of made ground over London Clay (Section 2.3). None of these can be considered an aquifer. Beneath these a significant 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?

YES. Groundwater was observed in one of the adjacent site boreholes at a depth comparable above foundation level of the proposed basement (and above the current foundation level).

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

YES. The Grand Union Canal is about 23 m to the south of the property. The level of the canal (which is carefully controlled) is about 3.8 m below site ground level. This is below the formation level of the basement.

The 'lost' River Fleet runs about 100 m to the south of the property, on the other side of the Grand Union Canal.

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 upon the 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?

YES. The building will cover a larger proportion of the site, part of which is currently permeable. SUDS attenuation prior to discharge into the sewers will reduce the impact to acceptable levels. Infiltration SUDS systems will not work due to low permeability soils.

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. Infiltration SUDS systems will not work due to low permeability soils.

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 water body is the Grand Union Canal, about 23 m to the south. The level of the canal is about 1.0 m below foundation level of the proposed basement. The level in the canal does not significantly fluctuate.

4. Site Conceptual Model and Scoping Impact Assessment

4.1 Baseline Conditions

In a ground investigation for neighbouring buildings (152 and 156 Royal College Street), ground conditions comprised up to 2.3 m of made ground over weathered London Clay.

Groundwater was encountered at between 1.7 m and 2.9 m depth. This, in each borehole, is close to the base of the made ground, and is considered likely to be near-surface drainage that flows along the top of the London Clay. i.e. the groundwater is not considered to be part of a widespread groundwater body in the London Clay. The top of the London Clay is above the formation level of the proposed basement.

The Grand Union Canal is about 23 m to the south of the property. The level of the canal (which is carefully controlled) is about 3.8 m below site ground level and so is below the formation level of the basement. This is therefore considered to have no impact on the hydrogeology here.

4.2 Impact Assessment

The proposed basement is to be excavated downwards into London Clay and rearwards through Made Ground and London Clay. Groundwater flow comprises shallow drainage along the top of the London Clay, and so construction of the rearward extension might increase the length of flow path a little. Extension of the basement downwards will not impede this shallow groundwater flow as the current basement penetrates the top of the London Clay.

Drainage of groundwater is probably southwards towards the Grand Union Canal, i.e. roughly parallel to Royal College Street. Therefore the construction of the rear extension may move the groundwater flow slightly eastwards. Directly east of the property is an access road for Bruges Place, and then the flats of Bruges Place have no basement, so this is not a significant change in groundwater flow in terms of risk to a receptor.

ARUP (2010) mentions the cumulative impacts of basement development in a block. Properties to the north of 154 Royal College Street have basements (i.e. no.s 156 and 158-164) and so the basement extension at number 154 will tend to increase the extent of this a little due to the rearwards extension but not the extension downwards. As the sub-surface drainage flow is probably roughly southwards, this is parallel to the block of basements and should have no significant cumulative impact.

Given that shallow groundwater has been observed at a depth above formation level waterproofing of the basement will be required.

5. Conclusions

Potential environmental impacts of the basement extension at 154 Royal College Street have been considered. The following summary conclusions are made:

- There will be an increase in man-made impermeable area, which will have to be attenuated before discharge to sewers. Ground conditions are not suitable for infiltration. Neighbouring off-site receptors for amount, timing and quality of surface water runoff will not be affected by the development.
- Available geological and hydrogeological information indicates that there is no permeable aquifer beneath the site that is capable of maintaining a significant water table.
- Groundwater has been detected in site boreholes at depths above the floor level of the proposed basement. Dewatering may be required during basement construction, and the basement will need to be waterproofed.
- Construction of the rear basement extension may lead to a slight deviation in the drainage route of groundwater through made ground, above the London Clay. This is beneath the access road to Bruges Place, which is a development without a basement. Therefore 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 or scoping criteria for sub-surface risk.