Basement Impact Assessment: 4 Ingham Road, London NW6 4DE

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Prepared for:

Patrick O'Connor
Garden Flat
4 Ingham Road
London
NW6 1DE

Report reference: 64907R1D1, July 2016
Report status: Draft report

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64907R1D1. DRAFT

Surface Water

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Groundwater

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Revision record:

Issue	Report ref	Comment	Author	Checker	Reviewer	Issue date	Issued to
1	64907R1D1	Draft Report	JRJ	TKT	HCV / JWG	30/06/2016	Patrick O'Connor

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REPORT SUMMARY

The assessment findings are summarised as follows:

1. Impacts to surface water flows and related flooding	High	
	Med	
	Low	
2. Impacts to ground water flows and related flooding	High	
	Med	
	Low	
3. Overall risk posed by the site	High	
	Med	
	Low	

Key:

High		*There is a high potential risk*
Med		*There is medium potential risk*
Low		*There is a low potential risk*

RECOMMENDATIONS (FOR NEXT STEPS)

Surface Water : The development described in this report will not cause any issues in respect of surface water.

Groundwater : There is a possibility that the Site lies above a shallow aquifer. There may be a shallow water table associated with the aquifer at a level above the base of the proposed basement. Therefore it is recommended that soils are logged during excavation and if permeable soils are present, groundwater monitoring be continued through the construction phase of the development to ensure that if groundwater is encountered, an appropriate design may be implemented.

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1 INTRODUCTION

1.1 This Document

ESI Ltd. (ESI) was commissioned by Mr O'Connor in April 2016 to undertake a hydrological and hydrogeological Basement Impact Assessment for the proposed development at 4 Ingham Road, London, NW6 1DE (the Site). Grid reference for the Site is TQ 25242 85594 and it falls within the London Borough of Camden (see Figure 1.1).

This document comprises a desk study which considers the potential impact relating to the proposed basement development in terms of surface water and groundwater flow and flooding and complies with the London Borough of Camden planning guidance notes on subterranean development (CPG4, London Borough of Camden, 2015).

1.2 Scope of Works

The following scope of works has been undertaken:

- ground water levels and flow and levels; and,
- an assessment of the impacts of the proposed development on surface water flow.

To satisfy the planning guidance, a screening analysis of key hydrological and hydrogeological issues has been undertaken.

The report has been set out in accordance with this guidance with an initial screening assessment followed by a more detailed scoping assessment of specific items.

1.3 Proposed Basement Works

The proposed development is the extension of the existing cellar both vertically and horizontally to accommodate a study and a store that will be accessed from the existing ground floor flat. The area of the basement will be increased from 13 m^2 to 28.5 m^2 and the depth of the basement floor will be deepened from 1.9mbgl (metres below ground level) to 2.2 mbgl. In addition, two single storey extensions will be constructed to the rear of the property.

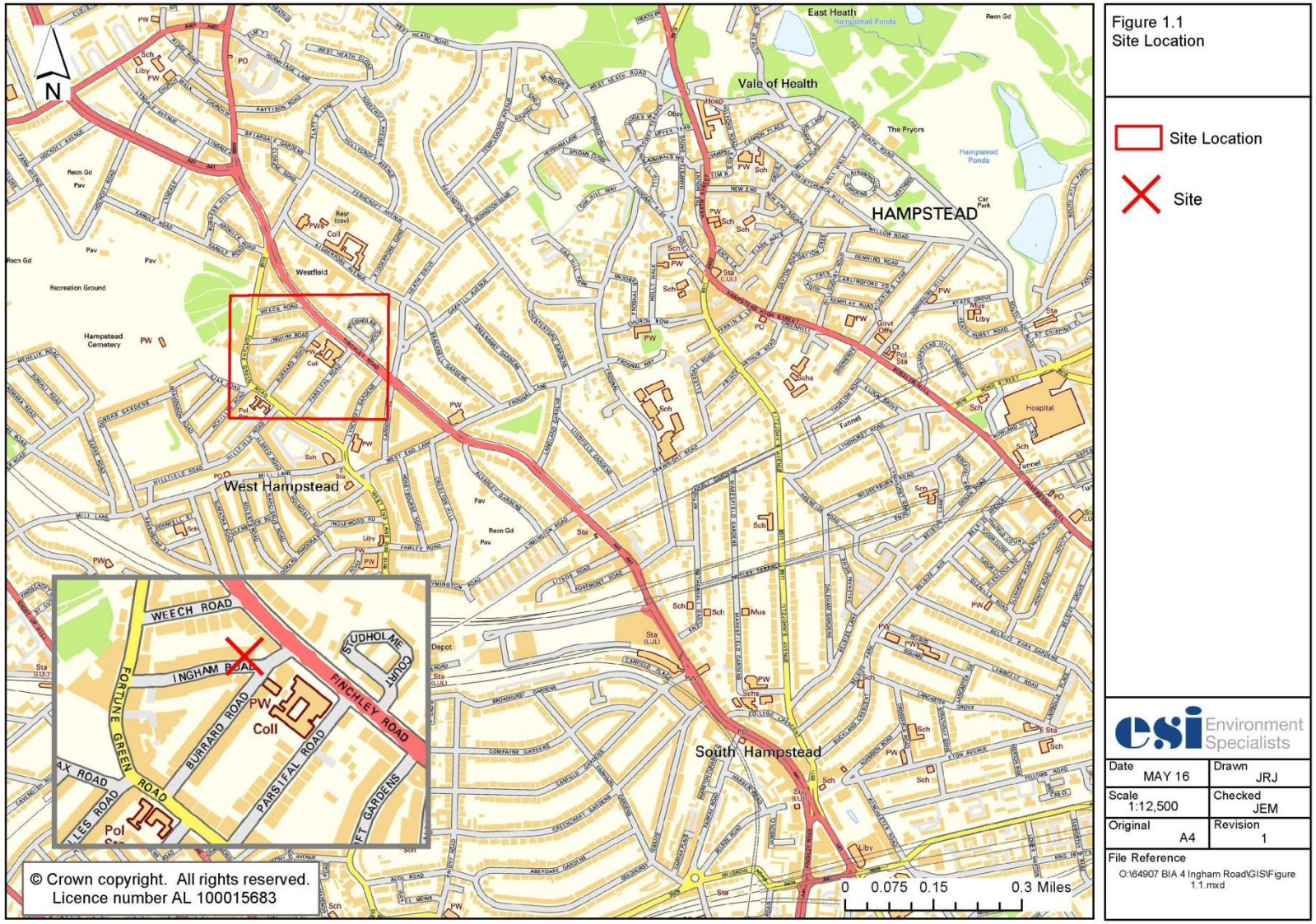

Figure 1.1 Site Location Plan

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2 SCREENING

The screening stage for Impact Assessment has been considered as set out in CPG4 (Camden Council, 2011) and the results have been tabulated below.

2.1 SURFACE WATER (Surface flow and flooding screening flowchart (Figure 3, CPG4 (Camden Council, 2011))

Impact question	Answer	Justification	Reference
1) Is the site within the catchment of the pond chains on Hampstead Heath?	**No**	The Site falls outside all the Hampstead Heath Chain Catchments	ARUP, 2010
2) 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**	Based on the plans received (Appendix A) and pending confirmation from a detailed drainage assessment, the proposed scheme will not alter the Site drainage therefore there will be no change in the surface water flows.	Site Plans (Appendix A).
3) Will the proposed basement development result in a change in the proportion of hard surfaced/ paved external areas?	**No**	The proposed development will include the addition of two single storey extensions as a replacement of sections of the external space. However these areas have existing hard surfaces, therefore the proportion of hard surfaced/ paved external areas will not be changed.	Site plans (Appendix A).
4) 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**	A tributary to the "lost" River Westbourne runs north east to south west, passing approximately 250m south-east of the Site. It may be possible that the Site falls within the catchment of this underground river. However, it is highly likely that the river is culverted and it is highly unlikely that there is any direct hydraulic continuity between the historical river course and the Site.	Barton, 1992. Ordnance Survey Mapping.
5) Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	**No**	It is possible that the Site falls within the catchment of the underground river mentioned above. However, run-off from the Site would be unlikely to affect the quality of the river.	Barton, 1992. Ordnance Survey Mapping.
6) Is the site in an area known to be at risk from surface water flooding, or is it at risk from flooding, for example because the proposed basement is below the static water level of a nearby surface water feature?	**No**	The Site is not within a designated flood plain, nor is it a street which is at risk of significant localised tidal flooding or reservoir failure. Fortune Green Road, at the western end of Ingham Road is identified in ARUP (2010) as having flooded in 1975. At its closest point, Fortune Green Road is 60 m to the west of the proposed development. According to the Camden SFRA (URS, 2014) the Site is within an area where one property has suffered internal sewer flooding within the 10 years preceding the report being produced. The Environment Agency does not identify any potential sources of flooding for the proposed development.	Environment Agency, 2015. Camden Council 2015 URS, 2014

2.2 GROUND WATER (Subterranean (ground water) flow screening chart (Figure 1, CPG4 (Camden Council, 2011))			
Impact question	**Answer**	**Justification**	**Reference**
1a) Is the site located directly above an aquifer?	**Unlikely**	The geology beneath the Site is the London Clay Formation (Figure 2.1). There is potential for an unknown depth of Made Ground to be present overlying the London Clay Formation and the possibility that the Claygate Member may also be encoutered. Neither Made Ground nor the London Clay Formation is classified as an aquifer. Approximately 150 m to the north of the Site is the geological boundary with the Claygate Member (Figure 3 in ARUP, 2010 (included below in this report as Figure 2.1) and BGS, 2016), which overlies the London Clay Formation and is classified as a secondary aquifer. Claygate Member	British Geological Survey, 2016. Environment Agency, 2016. ARUP, 2010
1b) Will the proposed basement extend beneath the water table surface?	**Unlikely**	BGS boreholes TQ28NE119 are the nearest available logs to the Site, at a distance of 160 m to the north-east; drilled within the Claygate Member over the London Clay Formation they indicate a water level at approximately 2 mbgl. A deeper water level at that location was also recorded between 6.25 and 7.45 mbgl.	British Geological Survey, 2016. (borehole logs included in Appendix B)
2) Is the site within 100m of a watercourse, well (used/disused) or potential spring line?	**No**	There are no wells, watercourses or spring lines known to exist within 100 m of the Site.	Barton, 1992 British Geological Survey, 2016 Ordnance Survey mapping 2016 1:25,000
3) Is the site within the catchment of the pond chains on Hampstead Heath?	**No**	The Site is not within the catchment of the ponds on Hampstead Heath	Environment Agency, 2016
4) Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?	**No**	The proposed development will include the addition of two single storey extensions to the rear of the property. However these areas have existing hard surfaces, therefore the proportion of hard surfaced/ paved external areas will not be changed.	Site Plans (Appendix A)
5) As part of the 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 proposed extension to the rear of the property will not extend beyond the existing area of hard standing and, according to the Site Plans will continue to use the existing drainage system pending confirmation from a detailed drainage assessment	Site Plans
6) 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**	There are no known ponds or spring lines within 1 km of The Site.	Ordnance Survey mapping 2016 1:25,000

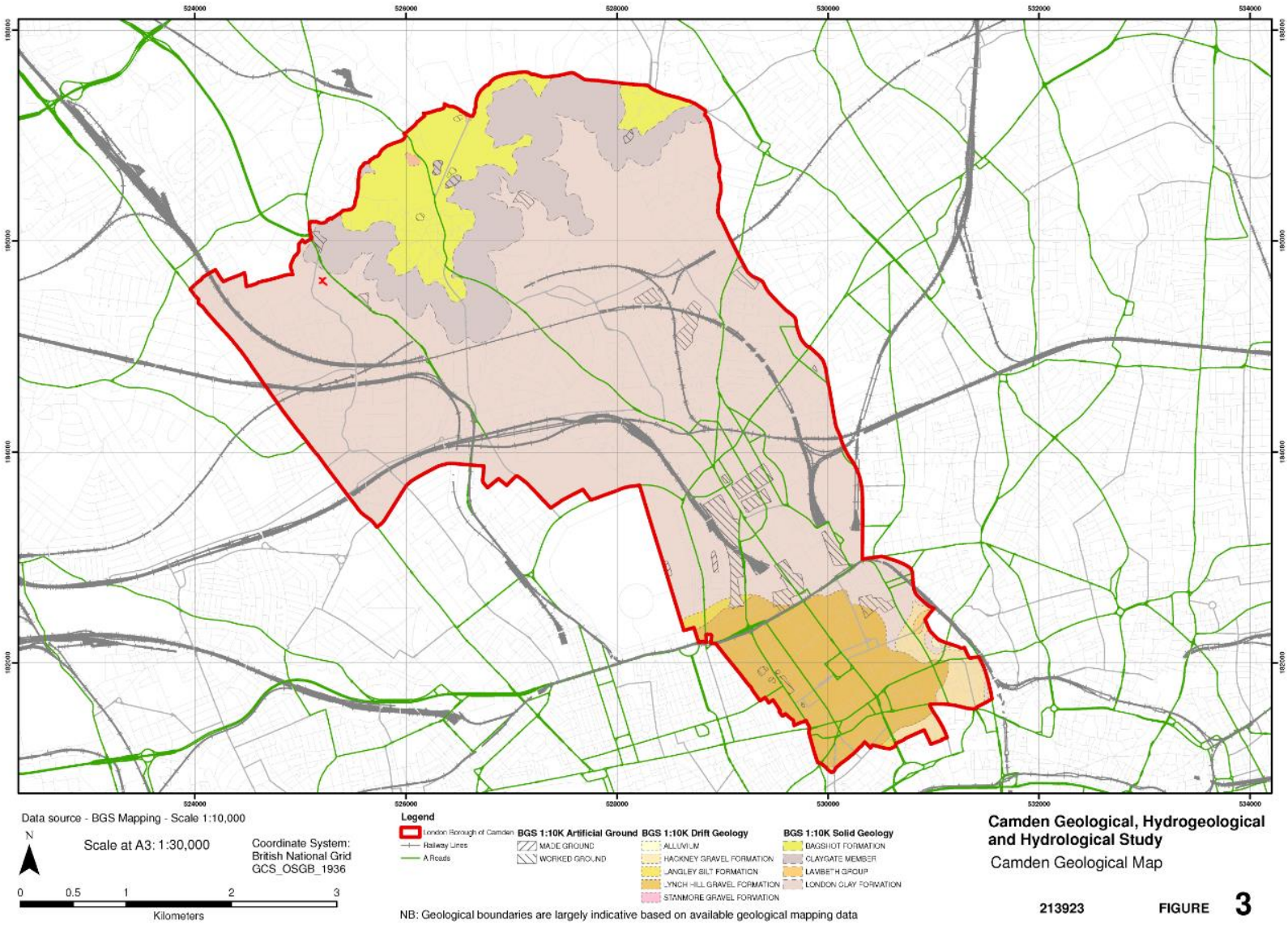

Figure 2.1 Site Geology (ARUP, 2010).

3 SCOPING

The Scoping stage identifies the potential impacts of the proposed development where responses were 'Yes' to the questions raised in the Screening stage, as defined in Section 2.16 of CPG4 (Camden Council, 2011). It is noted that in some cases the answer 'Yes' relates to a positive outcome (e.g. a reduction in run-off) and this is stated under the section on potential impacts.

3.1 GROUND WATER			
Impact question	**Answer**	**Potential Impacts**	**Reference**
1a) Is the site located directly above an aquifer?	**Unlikely**	The nearest borehole logs are 160 m to the north-east of the Site (TQ28NE119) and indicate the presence of the Claygate Member to a depth of 4-5 mbgl lying above the London Clay Formation. The Claygate Member areclassified as a Secondary Aquifer consisting of "permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers". The BGS borehole logs TQ28NE21 and TQ28NE32 (approximately 400 m south of the Site) indicate the presence of the London Clay Formation directly beneath a thin layer of topsoil with no record of the Claygate Member. The London Clay Formation is classified as unproductive strata with low permeability that have negligible significance for water supply or river base flow. Figure 3 in the Camden Geological, Hydrogeological and Hydrological Study (ARUP, 2010, see Figure 2.1 above) indicates the boundary of the Claygate Member is approximately 150 m to the north of the Site, close to the location of the TQ28NE21 boreholes. This figure clearly adopts the geology from the British Geological Survey's 1:50,000 scale map, which was last published in 2006. The mapping was revised in part in the 1980s and 1990s. Figure 2 in the ARUP Study (see Appendix C) places the Claygate boundary along Ingham Road itself immediately to the south of the Site. This figure uses the geology from the British Geological Survey's 1:10,600 scale maps, which were produced in 1920. Boreholes TQ28NE119 record between 13 and 17 feet (4 to 5 m) of Claygate Member; the location of these boreholes is 6 to 7 m higher than the Site, as the ground rises towards Hampstead Heath. Given that the British Geological Survey maps the boundary of the Claygate either at Ingham Road or some distance to the north and north west, and the land surface drops towards Ingham Road by several metres, we consider it unlikely that the Claygate Member would be found at the proposed development with any significant thickness. It is nevertheless possible that the Claygate Member are present at the Site (overlying the London Clay Formation and beneath any Made Ground) and, therefore, a potential shallow aquifer may be present at the Site. If the Claygate Member are present it is likely that they would contain groundwater.	British Geological Survey, 2016. Environment Agency, 2016. ARUP, 2010

3.1 GROUND WATER			
Impact question	**Answer**	**Potential Impacts**	**Reference**
1b) Will the proposed basement extend beneath the water table surface?	**Unlikely**	BGS borehole logs TQ28NE119 drilled within the Claygate Member over the London Clay Formation indicate water strikes between 1.9 and 2.3 mbgl in 3 of the 4 boreholes, and a second water level in 2 of the 4 boreholes at between 6.25 and 7.45 mbgl. All 4 boreholes are approximately 160 m to the north east of the site. TQ28NE129 (800 m to the south of the Site) drilled within London Clay recorded water at 11.1 mbgl. Should the Claygate Member extend to be present at the Site then there is a potential for the presence of a shallow water table perched above the London Clay. It is possible that such a water table would be above the level of the base of the proposed development. However, we consider it unlikely that any significant thickness of Claygate Member is present at the Site and therefore the quantity of groundwater, if any, is likely to be negligible.	British Geological Survey, 2016.

4 CONCLUSIONS

Potential impacts of the proposed basement development at 4 Ingham Road NW6 4DE in London have been considered as set out in the scope of works. The following summary conclusions are made.

4.1 Screening Stage

- Surface water

According to the Camden SFRA (URS, 2014) the Site is within an area where one property has suffered internal sewer flooding within the 10 years preceding the report. The available evidence indicates no other potential sources of flood risk. There is also no change to the quality of surface waters. The proposed development will not change the proportion of impermeable surfaces. There are no issues to take forward to the Scoping assessment.

- Ground water

The Site is potentially located above an aquifer which, if present, may have a shallow water table above the level of the base of the proposed development. There are no other groundwater issues identified at the Screening stage, however the assessment should proceed to a Scoping assessment.

4.2 Scoping Stage

- Ground water

It is unlikely that groundwater is present at the Site, or that the proposed excavation will extend below any water table. Should there be a water table it is probable that the aquifer would be shallow with limited depth so that any impacts to groundwater flows and or levels would be minimal.

4.3 Recommendations

It is recommended that soils are carefully logged during excavation to identify any permeable (silty or sandy) layers close to the ground surface and to identify clearly the top surface of the London Clay Formation. If any permeable soils are identified, groundwater level monitoring at the Site should be continued to 1 m below the base of the excavation during construction in order to confirm whether groundwater is present at the Site so that, if necessary, an appropriate design for the development foundations may be implemented

REFERENCES

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URS, 2014. London Borough of Camden Strategic Flood Risk Assessment

APPENDICES

APPENDIX A

Site plans

APPENDIX B

BGS borehole logs

APPENDIX C

Figure 2 Geological Map, ARUP 2010