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Ashton Court
254 – 256 Camden Road
London
NW1 9HE

Geotechnical and Geoenvironmental Desktop

For

Origin Housing

Project Number:

12047

July 2015

Campbell Reith Hill LLP
Friars Bridge Court
41-45 Blackfriars Road
London
SE1 8NZ

T:+44 (0)20 7340 1700
F:+44 (0)20 7340 1777
E:london@campbellreith.com
W:www.campbellreith.com

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1.0 EXECUTIVE SUMMARY

SITE LOCATION	The site location is presented in Figure 1. The site is situated on Camden Road, London, NW1 9HE. This site is approximately 0.45Ha and is centred on an approximate National Grid reference of 529740E, 184830N.
ENVIRONMENTAL SETTING	The site is underlain by London Clay. The site is of **Medium to High** end use sensitivity and the overall environmental sensitivity of the site is considered to be **Low to Medium** due to the following classifications: **Hydrogeology (Low)**: The site is situated on an Unproductive Stratum. **Hydrology (Very Low)**: The nearest significant surface water is Regent's Canal located at >500m from the site. **Radon (Low)**: The site is not situated in an area where radon protective measures are required. **Sensitive Land Uses (Low to Medium)**: The site is located within the Camden Square Conservation Area and a number of trees on site have Tree Protection Orders.
CURRENT USE AND HISTORY	The site currently comprises a four storey building on Camden Road, a two storey building with partial undercroft parking on Camden Mews and a single storey common room on Camden Park Road. Historically, the site use is believed to be mainly residential although a building in the northern area was indicated as a day nursery in 1960. The current buildings were constructed in the early 1980s.
GEOTECHNICAL HAZARDS	Geotechnical hazards on site comprise: • Made Ground and obstructions due to historic development; • high volume change potential soils; • ground conditions aggressive to buried concrete; and • neighbouring buildings and infrastructure which could be affected by basement construction.
CONTAMINATION ISSUES	Contamination issues identified in the desk study are considered to present a **LOW - MODERATE** risk to residential end users. Potential sources of contamination at the site comprise: • areas of Made and Infilled Ground; • an on-site boiler room; • an infilled reservoir to the south east; • a historic warehouse of unknown use situated to the south east and a garage to the south west; • an area of historic heavy industry located to the north, comprising clothing manufacturers, electrical engineers, sheet metal works, printing works and joinery manufacturers; and, • dry cleaners situated to the north.
RECOMMENDATIONS	Further intrusive ground investigation is recommended. This should be designed and implemented in accordance with BS 10175:2011 (+A1:2013) and BS5930 (+A2:2010), consider geotechnical elements in accordance with Eurocode 7 and provide information for desiccation assessment, buried concrete classification and the design of foundations, floor slabs, external areas, excavations and drainage. It should also target the identified potential pollutant linkages and in addition, it could also potentially consider elements such as soils reuse and waste classification.

	Land quality assessment is an iterative process and is likely to be a condition of planning consent for the redevelopment. It is recommended that this report is submitted to the Local Authority as part of the planning application.

2.0 INTRODUCTION

2.1. Appointment and Scope

2.1.1. Campbell Reith Hill LLP (CampbellReith) was requested by the Robert Lombardelli Partnership (RLP) on behalf of Origin Housing (the Client), to provide a report summarising environmental and geotechnical information relating to Ashton Court (hereafter referred to as the site). The references and limitations associated with this report follow the main text. Figures showing the location of the site, existing layout and the development proposals are presented in Appendix A.

2.1.2. The report has been produced in general accordance with the procedures for site investigation, interpretation and reporting set out in DEFRA Contaminated Land Report (CLR) 11, BS 5930 (+A2:2010), BS 10175 (+A1:2013) and BS EN 1997 (Eurocode 7). The objective of the report is to collate and interpret Phase 1 Desk Study information in order to provide:

a) an overview of the site area including a description of the site's environmental setting;

b) a review of the site's historical and industrial development;

c) a preliminary qualitative environmental risk assessment and conceptual site model;

d) a discussion of potential geotechnical constraints and development considerations; and,

e) recommendations for further surveys and reporting.

2.1.3. The Tier 1 contamination appraisal is intended to identify likely presence of source-pathway-target linkages and provide a qualitative analysis of the level of risk posed by potential ground contamination at the site. Further to this assessment recommended actions are provided to permit the demolition of the flats on Camden Mews and the existing common room on Camden Park Road and the construction of a three storey building with a single storey basement for residential use. The common room on Camden Park Road is to be replaced by a two storey building comprising a new common room on the ground floor and flats on the floor above.

2.1.4. This assessment considers the objectives of the National Planning Policy Framework which requires information to demonstrate that a site is suitable for its new use (taking account of ground conditions and land instability) and not capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990 (after remediation). This also requires adequate site investigation information, prepared by a competent person (with the minimum requirement comprising a desk study and site reconnaissance).

2.1.5. The desk study information is presented in Appendix B. Responses to consultations with the regulatory authorities are included in Section 5.2.

2.2. Ground Investigations

2.2.1. A geotechnical ground investigation, procured by RLP and comprising a single exploratory hole, was undertaken in the garden in the southern half of the property in January 2015 by Ground Engineering Limited (GEL). Two foundation inspection pits were undertaken by GEL in April and May 2015 in the southwest area against the wall of the neighbouring property and on the north

western corner of the garage against the boundary wall with 103 Camden Mews & 252 Camden Road. The ground investigation data are presented in Appendix C.

2.2.2. The following site specific information has been reviewed and is referred to:

TABLE 2.1: Existing Site Specific Information

Report Title	Author	Reference
Ashton Court Ground Investigation Report, March 2015, Report Reference: C13840.	Ground Engineering Limited	[1]
Ashton Court trial pit logs, Reference:C13840a	Ground Engineering Limited	[2]

3.0 SITE DESCRIPTION

3.1. Site Location

3.1.1. The site location is presented in Figure 1. The site is located on Camden Road, NW1 9HE, in the London Borough of Camden, at an approximate National Grid reference of 529740E, 184830N.

3.1.2. The site is bound to the northwest by Camden Road and to the northeast and east by Camden Park Road. The southeast of the site is bound by an access road into Camden Mews with a residential property to the west and southwest.

3.2. Site Layout

3.2.1. A site walkover was completed by a representative of CampbellReith on 29th April 2015 and forms the basis of the following description. An annotated site layout plan is presented in Figure 2.

3.2.2. The site is a rectangular plot of approximately 0.45 hectares and currently comprises a 4 storey block of flats on Camden Road and a two storey building also comprising flats (four flats on the first floor and two flats on the ground floor with partial undercroft parking) on Camden Mews. An enclosed garden is located between the main building on Camden Road and the Camden Mews flats with a single storey common room in the eastern area of the garden linking the two structures.

3.2.3. A boiler room is located down a flight of stairs (15 steps) to the east of the front door to the main building on Camden Road. An electricity intake cupboard comprising electricity meters for the Camden Mews flats, is located in the eastern area of the garage on Camden Mews.

3.2.4. The site slopes up gently from c44m AOD on Camden Road to c44.50m at the main entrance. The car park on Camden Mews is c45.50m AOD, level with the access road. The garden area slopes down from west to east (c45.40 to 44.65m AOD on the wooden deck of the common room patio) and from south to north (c45.70m AOD on the paved area between the rear of the flats on Camden Mews and the common room to 44.40m AOD at the back of the main building). The ground level of the common room is approximately 0.95m lower than the ground level of the Camden Mews flats. A few steps (5) lead down from the patio to the back entrance of the main building which is at c43.75m AOD.

3.2.5. A brick wall is present along the site boundary on Camden Road and along the northwest and southwest on the boundary with the neighbouring property. On the northeast corner, the wall is about 1.50m high (0.40m brick with metal railings on top). The remainder of the wall on Camden Road is about 1.50 to 1.70m high and of brick construction. The boundary wall with the neighbouring property to the west is also of brick construction increasing in height from 0.50m in the northwest to about 2.10m on the southwest. The wall along Camden Road and the northwest boundary retains about 0.25m of soil.

3.2.6. A number of trees of varying heights and shrubs are present on site. These are noted on the topographic survey and are shown on the site layout plan in Figure 2. The heights of the trees range from approximately 6 to 12m. Of particular note are a Cherry tree (10m high) and an Ash tree (12m high) in the garden located at approximately 11 and 4.50m to the north of the

proposed building on Camden Mews respectively; and a Plane tree (12m high) in the paved area to the east of the common room.

3.2.7. The site walkover images showing the location of the trial pits referred to in Section 2.2.1 are presented as Figure 3.

3.3. Surrounding Land Use

3.3.1. Surrounding land use generally comprises housing. The site is bound to the west and southwest by a residential property. On Camden Road, the neighbouring property to the west appears to be lower than the site with the part of the ground floor not visible from the road. Camden Road (A503) is present along the northwest boundary with Camden Park Road (A5200) to the northeast and east. A cobblestone road leading to Camden Mews is present on the southeast with housing beyond.

3.4. Proposed Development

3.4.1. The proposed site redevelopment is presented as Figures 4a – 4c. It is proposed to demolish the flats on Camden Mews and construct a three storey block of flats with a single storey basement. The common room on Camden Park Road is also proposed to be demolished with a two storey building comprising a common room on the ground floor and two flats above constructed.

3.4.2. Based on the above, and the anticipated ground conditions discussed in Section 3, the proposed development is considered to fall into Geotechnical Category 2 with respect to BS EN 1997 (Eurocode 7).

3.4.3. The proposed end use is considered to be **Medium – High** sensitivity.

4.0 ENVIRONMENTAL SETTING

4.1. Geology

4.1.1. The site geology and potential geotechnical hazards are summarised in Tables 4.1 and 4.2. The associated references are listed at the rear of the report. The GEL report [1], the geological sheet for the area (Sheet 256, North London 1:50000 Geological Survey of England and Wales) [3], the Envirocheck Report [4] and the BGS website [5] indicate that the site is underlain by London Clay with Superficial Deposits absent. Given that the site has a history of development, a thickness of Made Ground was anticipated.

4.1.2. Reference [1] recorded Made Ground to 1.50m bgl and indicates the Made Ground is heterogeneous. The two foundation inspection pits (TP1 and TP2) [2] recorded fill to the base of the pits at 1.20 and 1.30m bgl respectively. TP1 was probed beyond the base of the pit with the metal bar still in the Made Ground at 1.70m bgl. The probe revealed natural clay at 0.60m bgl beyond the boundary wall on the neighbouring property.

TABLE 4.1: Summary of Geology

Strata	Depth to Base (m bgl)	Depth to base[a] (m AOD)	Thickness (m)	Description
Made Ground[a]	1.50 - >1.70	c43.90 - <43.70	1.50 - >1.70	Man-made cohesive and granular soils associated with the historic development of the site.
London Clay[b]	7.00	38.40	5.50	Firm to stiff closely fissured orange brown and grey mottled clay with partings of sand.
	45 (proven to 10 on site)	0.40	43.50	Stiff closely fissured grey clay.
Undifferentiated and Lambeth Group and Thanet Sand[c]	c70	c-25	c25	Sands and clays
Chalk[c]	>120	<-82.60	>60	White Chalk with flints

[a] Based on a ground level of 45.40m AOD in the southern area of the site
[b] These depths and descriptions for the MG and LC are from WS1, TP1 and TP2 contained in reference 1 and 2
[c] These depths are from a historic borehole record approximately 500m to the NW and may vary on site

4.1.3. The Made Ground was described as yellow brown, dark brown and grey gravelly sand, slightly gravelly to gravelly clay or sandy gravelly clayey silt. The gravel was described as angular to subrounded flint, limestone, wood, brick, concrete, asphalt, chalk, shell fragments and ash. Additionally, metal fragments, plastic, ceramic tile fragments, mortar fragments, nails and metal bolts were encountered in TP1 and TP2.

4.1.4. Live roots were reported to be observed to between 0.65m bgl and 4.00m bgl in WS1, TP1 and TP2. Selenite crystals were encountered from 3.90m bgl to the base of the exploratory hole at 10.00m bgl in WS1.

TABLE 4.2: Summary of Geotechnical Hazards

Hazard	Distance	Description	Reference
Made Ground and obstructions	On site	Up to 1.70m thickness of Made Ground was found to be present in some areas on site. Relic foundations and basements may be present associated with historical development. Possible old foundations were encountered in TP1.	[1&2)
Volume change potential	On site	The London Clay has a high volume change (shrink-swell) potential. There are trees present on site and as such there is the potential for soil desiccation.	-
Ground conditions aggressive to buried concrete	On site	The London Clay and materials derived from it can naturally contain elevated concentrations of minerals that can be aggressive to buried concrete. The results from pH and water soluble sulphate determinations contained in reference [1] indicate a DS-4 classification in the London Clay although no testing was undertaken to allow an assessment to be made in relation to the potential thaumasite form of concrete attack.	[1]

4.1.5. The Envirocheck report indicates a moderate potential for shrinking or swelling clay ground stability hazards on site. This will be associated with the London Clay. The report indicates 'no hazard' for compressible ground stability hazards, ground dissolution stability hazards and running sand ground stability hazards and a 'very low' risk for collapsible ground stability hazards and for landslide ground stability hazards.

4.2. Seismicity

4.2.1. Clause 3.2.1(1),(2),(3) in the National Annex to BS EN 1998-1:2004 Eurocode 8: Design of structures for earthquake resistance states that in the absence of a project-specific assessment, the reference ground acceleration for a return period of 2,500 years given by the seismic contour map in PD 6698 should be adopted. The map shows that the PGA (peak ground acceleration) for the site is in the region of 0.00 – 0.02g, which indicates a very low seismicity.

4.3. Hydrogeology

4.3.1. The site hydrogeology is summarised in Table 4.3 and the associated references are listed at the rear of the report.

TABLE 4.3: Summary of Hydrogeology

Type	Distance	Description	Reference
Bedrock Aquifer	On site	London Clay – Unproductive Stratum	[4] & [6]
Source Protection Zone	>1km	None within 1km of the site	[4]
Soil Leaching Potential	On site	Negligibly permeable – Non aquifer	[4]
Groundwater Abstractions	770m S and 900m W	There are a number of groundwater abstractions for commercial, industrial and potable use. The nearest is a borehole 770m to the south at a concrete plant.	[4]
Rising Groundwater	N/A	With respect to foundations and basements, the site is remote from any 'critical areas' associated with the potential for rising groundwater.	[7]

4.3.2. Groundwater was recorded at 5.23m bgl in WS1 [1] during a monitoring visit undertaken by GEL.

4.3.3. The site is considered to have a **Low** Sensitivity with respect to hydrogeology. The sensitivities have been based upon the definitions provided in NHBC R&D661, as amended to include the requirements of the Water Framework Directive and the EA's River Basin Catchment Plans.

4.4. Hydrology

4.4.1. The site hydrology is summarised in Table 4.4 and the associated references are listed at the rear of the report.

TABLE 4.4: Summary of Hydrology

Type	Distance	Description	Reference
Surface Waters	615m NW & 800m SW	The Envirocheck report indicates a possible well approximately 615m to the northwest, however, the nearest significant surface water feature is Regent's Canal located at about 800m to the southwest.	[4]
Surface Water Abstractions	>1000m	None within 1000m of the site	[4]
Flooding	None identified	The site has not been identified as lying within a designated flood risk zone.	[4] & [6]

4.4.2. The site is considered to have a **Very Low** Sensitivity with respect to hydrology. The sensitivities have been based upon the guidance detailed for the hydrogeological assessment above.

4.5. Radon

4.5.1. Reference [4], BRE 211 [8] and the National Radiological Protection Board (NRPB) Atlas [9] show the site does not fall within an area where basic or full radon protection measures are

[1] Guidance for the Safe Development of Housing on Land Affected by Contamination R&D66: 2008 Volume 1 (Environment Agency, NHBC and CIEH)

considered necessary for domestic dwellings, nor is it in an area requiring a geological assessment for such measures. As such, a **Low** risk is adjudged.

4.6. Sensitive Land-Uses

4.6.1. A review has been made of Designated Ecological and Heritage sites and these are not found to be present within 1km of the site [4]. The Local Authority may also consider non designated heritage and archaeological sites as significant, and these are not appraised except where noted.

4.6.2. Consultation with the Planning Department of the London Borough of Camden revealed that the site is within the Camden Square Conservation Area therefore permission is required before any works involving the trees on site are undertaken. Also five of the trees (a Plane tree, three Ash trees and a Lime tree) have Tree Preservations Orders.

4.7. Miscellaneous

4.7.1. The topographic survey identifies an area of possible Japanese Knotweed along the western boundary. This report does not contain an assessment of the presence of invasive species such as Japanese Knotweed.

5.0 SITE HISTORY AND INDUSTRIAL SETTING

5.1. Site History

5.1.1. Information relating to the site history has been obtained by reference to the historic maps contained within the Envirocheck Report [4] and is summarised for the site and its surroundings (relevant features within 250m) in Tables 5.1 and 5.2.

TABLE 5.1: Site History

Date	Development
1851	The site is shown as an undeveloped open land with Camden Road indicated to the northwest, Camden Park Road to the northeast and Camden Mews to the southeast.
1873	The site is now developed as No. 254 and 256 Camden Road with a building in each of the northern halves and possible gardens in the rear.
1875 -1882	Site remains unchanged.
1895	The buildings in the northern area still indicated, however, the southern area is shown as open land.
1896	Site remains unchanged.
1920	Three buildings are indicated in the rear of No. 254 Camden Road on Camden Mews.
1938 & 1946	The buildings on site are still present.
1951	Site remains unchanged.
1954	The boundary between Nos 254 and 256 extends southwards only as far the building lines. The layout of the buildings on Camden Mews in the rear of No. 254 appears to have changed with two buildings shown; a larger building with a smaller one to the west of it.
1957	Site remains unchanged.
1960	No. 254 Camden Road is now indicated as 'Camden Road Day Nursery'.
1968 - 1970	Site remains unchanged.
1973	The buildings in the northern area of the site are no longer present.
1974 - 1975	Site remains unchanged
1982	Three buildings of a similar layout to the current buildings are now indicated with partial undercroft parking in the western area of the building on Camden Mews.
1986*	A planning application was submitted to Camden Council for the demolition and rebuilding of the common room in the east due to unsound foundations as a result of subsidence/heave.
1991 - 2015	Site remains unchanged.

* Obtained from a historic planning application on the London Borough of Camden Planning website.

TABLE 5.2: Adjacent Land History

Date	Development
1851	The surrounding land is mainly undeveloped with only roads indicated.
1873	The area is developed and appears to be residential. Three buildings are shown on No. 252 Camden Road to the west. A reservoir marked 'New River Company's Water Works' is indicated approximately 80m to the southeast. Camden Road Station is indicated approximately 220m to the northwest with a tunnel running from the south into the station.
1875 -1882	No changes indicated.
1895	No significant changes indicated, although the building in the centre of No. 252 is no longer shown and a fountain is indicated in the open area where the building was located. Another fountain is indicated 10m to the northwest. A building 80m to the southeast is marked 'organ works'.
1896 - 1916	A cattle market and a slaughterhouse are indicated at approximately 300m and 500m to the southeast respectively. No significant changes indicated in the remainder of the surrounding area.
1938	The reservoir to the southeast is no longer indicated with buildings shown instead at its former location.
1946 & 1951	No significant changes.
1954	The fountain in the centre of No. 252 Camden Road is no longer shown. A warehouse is indicated at approximately 20m to the southeast. The building at the location of the former reservoir to the southeast is marked Camelot House with an electricity substation indicated 10m to the south of the building. An electricity substation is indicated at about 45m to the north. Two buildings are marked 'printing works' within 60m to the north. Three buildings to the north are marked 'ruin', with the closest approximately 150m away and the remaining two about 220m away. A depository is indicated at about 60m to the east of the site with a warehouse beyond it. Two buildings marked 'Builders Yard' are present within 90m to the northwest. A building marked 'printing works' is located approximately 100m to the north of the site.
1957	No significant changes.
1960	The buildings immediately across Camden Road to the northwest are demolished with a secondary school now shown within 25m to the northwest.
1968	No significant changes.
1969	The school building across Camden Road has been extended eastwards with tennis courts now indicated to the southwest of the building. The cattle market and slaughterhouse to the southeast are no longer shown.
1970 & 1973	No significant changes.
1974 - 1975	No significant changes.
1982 - 2015	No significant changes, although the 1992 plan shows modest alterations to the layout of No. 252 Camden Road.

5.2. Liaison With Regulatory Authorities

5.2.1. The Environmental Health, Building Control and Planning Departments of the London Borough of Camden Council were consulted on 7th May 2015. The responses are given below.

Building Control

5.2.2. The following responses were provided by the Building Control Officer:

- The site and the adjacent land have been residential for possibly the last 40 years;
- The area is underlain by the London Clay although gravels and sands are locally encountered above the London Clay;
- Fill is encountered on a number of sites in the area, however, the top of the London Clay is typically at c0.50m bgl;
- Rafts and piled foundations are typically used in the area;
- The water table level in the area is unknown, however, it is likely to vary;
- There is no knowledge of methane problems in the area; and
- Piped networks are used for drainage.

Environmental Health

5.2.3. The response from the Environmental Health Officer is as follows:

- The site has not been determined as Contaminated Land under Part IIA of the Environmental Protection Act 1990 as the Council considers it to be suitable for its current use;
- Under the Council's Part IIA Strategy, Camden has created a Contaminated Land Database to identify and prioritise sites within the Borough with a former potentially contaminative land use. Sites recorded on the database are not contaminated land (as defined by Part IIA of the Environmental Protection Act 1990); rather they are considered as having the potential to be contaminated land through their previous use. The site has no former industrial land uses and therefore will not been identified as a priority for inspection;
- The site is not on the Council's contaminated land register and there is no evidence of contamination issues affecting the site, other than the soil profile in Camden tends to exhibit high levels of Lead. A planning condition may be imposed with a requirement to carry out site investigation and if necessary remediation works, if the site was to be redeveloped in the future;
- The Council has no information about the extent of Made Ground on the subject site, however the Camden soil profile tends to exhibit high levels of Lead as described above;
- The Council holds no information on pollution incidents in the area;
- There are no historical landfills identified within 250 metres of the site;
- Currently, the Council holds no information about water abstraction points or private water supplies (see Section 4.3 and 4.4);
- The Council holds no information relating to materials extraction, mine gasses, or animal burial grounds;
- There are no IPPC (Environment Agency) or LAPPC (Local Authority) industrial process within 50 metres of the site;

- The Council holds no records relating to flooding, however our desk study research shows the site has not been identified as lying within a designated flood risk zone (see Section 4.4); and
- The Council holds no information relating to radon levels, however, our desk study research indicates the site does not fall within an area where basic or full radon protection measures are considered necessary for domestic dwellings, nor is it in an area requiring a geological assessment for such measures (see Section 4.5).

Planning

5.2.4. The following responses were provided by the Planning Officer:

- There are no listed buildings on site;
- The site is in the Camden Square Conservation Area therefore permission is required from the council before any work is undertaken on the trees; and
- There is a Tree Preservation Order on five trees on site (a Plane tree, a Lime tree and three Ash trees).

5.3. Unexploded Ordnance (UXO)

5.3.1. A preliminary review has been made of the UXO risk presented by the site based upon CIRIA C681 ('Unexploded Ordnance (UXO) – A guide for the construction industry') [10] and the assessment matrices presented in Tables 5.1-5.3 therein.

5.3.2. During World War II, the site was located in an urban area of London and the railway line running within 250m of the site from the south west to the northwest would have been a potential bombing target. Pre and post war plans and aerial photographs do not indicate obvious signs of bomb damage (e.g. ruins), nor do they indicate any change to the layout of the buildings on site.

5.3.3. The London County Council bomb damage maps 1939 – 1945 [11] indicate that both Nos 254 and 256 Camden Road suffered minor blast damage. The Zetica Unexploded Bomb Risk Map for West Central London [12] indicates a medium to high risk of encountering UXOs in the general Camden area.

5.3.4. With respect to the surrounding area, several buildings along Camden Road are indicated on reference [11] to have suffered minor blast damage. A number of buildings in the wider area suffered general blast damage with a handful of these indicated to be seriously damaged or damaged beyond repair. The closest of these are three buildings approximately 30m to the southeast and 50m to the northwest which were indicated to have suffered general blast damage which was not structural. Mapping of the World War II Blitz [13] shows that high explosive bombs did fall at or close to these locations.

5.3.5. By reference to the CIRIA report Table 5.1, there is a medium to high potential for ordnance to have been delivered to the site. Although significant post war development is indicated and it is possible that any UXOs could have been encountered at the time, there is a potential for such features to remain.

5.3.6. Given the above and the contents of Table 5.3, the risk of encountering UXOs is considered to be **Low - Medium** in relation to borehole drilling (for ground investigations) and excavation for

facilities and services. However, a **Medium – High** potential is suggested for the basement excavation.

5.4. Tunnels and Infrastructure

5.4.1. Information from the CampbellReith database indicates a National Grid tunnel runs very close to the site boundary and possibly encroaches the site along Camden Mews, however, National Grid was contacted and the plans obtained did not indicate the presence of a tunnel although low to medium pressure gas pipes are shown running along Camden Mews and Camden Park Road. The database suggests that the site is not located within 100m of London Underground, Network Rail assets, the Crossrail Safeguarding Zones, Royal Mail tunnels or government communication tunnels.

5.4.2. An asset location search was undertaken prior to the site investigation and maps provided by the client indicate various Thames Water assets running close to the site boundary along Camden Mews and Camden Park Road. These include two combined sewers running along Camden Mews and Camden Park Road. A storm relief sewer tunnel is indicated running along Camden Road.

5.5. Current Industrial Setting

5.5.1. Table 5.3 summarises identified industrial features within 250m which may present a potential source of contamination to the site based on the Envirocheck Report [4].

TABLE 5.3: Industrial Setting

Type	Distance	Description
Local Authority Pollution Prevention and Controls	120m NE	Name: Empire Professional Dry Cleaners. Permit reference: PPC/DC43. Location: 173 York Way, N7 9LN.Date: 26/01/07. Status: Permitted.
	145m N	Name: University Dry Cleaners. Permit reference: PPC/DC30. Location: 9 – 11 Brecknock Road, N7 0BL. Date: 29/01/07. Status: Permitted.
	230m SE	Name: Totalfinaelf. Permit reference: PPC20. Location: 109 – 113 York Way, N7 9QE. Date: 04/01/99. Status: Permitted.
Active Contemporary Trade Directory Entries	30 – 240m	Ten entries including: garage services, dry cleaners, domestic cleaning services, foam products (rubber and plastics), office furniture and equipment and garage services.
Inactive Contemporary Trade Directory Entries	60 – 220m	Eighteen entries including: Leather products manufacturers and suppliers, antiques repairing and restoring, dry cleaners, clothing and fabrics manufacturers, electrical engineers, sheet metal work, joinery manufacturers, domestic cleaning services, picture and picture frame renovating and restoring, bags belts and accessories manufacturers and suppliers, tyre dealers, record tape and CD manufacturers and car dealers.
Fuel Station Entries	230m SE	Name: Shell Camden Town. Premises type: Petrol Station. Location: 109 – 113 York Way, N7 9QE. Status: Open.
	240m SW	Name: Fairways Garage. Premises type: N/A. Location: 139 – 143 Camden Road, NW1 9HA. Status: Obsolete

5.5.2. Research did not establish the presence of any of the following at or within 250m of the site:

- BGS recorded landfill sites;
- Historical landfill sites;
- Integrated pollution control registered waste sites;
- Registered landfill sites;
- Registered waste transfer sites;
- Registered waste treatment and disposal sites;
- Local Authority recorded landfill sites;
- Licensed waste management facilities (landfill boundaries);
- Licensed waste management facilities (locations);
- Contaminated land register entries and notices;
- Control of Major Accident Hazards Sites (COMAH);
- Notification of Installations Handling Hazardous Substances (NHHS);
- Discharge consents;
- Enforcement and prohibition notices;
- Explosive sites;
- Integrated pollution controls;
- Integrated pollution prevention and control;
- Local Authority pollution prevention and control enforcements;
- Local Authority integrated pollution prevention and control;
- Planning hazardous substance consents;
- Planning hazardous substances enforcements;
- Prosecutions relating to authorised processes;
- Prosecutions relating to controlled waters;
- Registered radioactive substances;
- Pollution incidents to control waters;
- Substantiated pollution incident register;
- Water abstractions; and,
- Water industry act referrals.

6.0 CONCEPTUAL MODEL

6.1. Introduction

6.1.1. Current practice for land contamination evaluation involves classification of risk for each of the identified contaminant source-pathway-receptor pollutant linkages. These are summarised below, considering the desk study information obtained. This information has been utilised to design the site investigation considering the proposed end use.

6.2. Classification of Risk

6.2.1. Risk is defined by the combination of two factors: i) the probability of an occurrence (expressed as a likelihood); and ii) the consequence of it happening (expressed as a severity). The procedure for classifying risk is summarised in Table 6.1. The categories of risk have been based upon those defined in the Guidance for the Safe Development of Housing on Land Affected by Contamination, R&D66: 2008 Volume 1 (Environment Agency, NHBC and CIEH). The categories are defined in the Environmental Risk Assessment Supporting Information section to the rear of this report, together with definitions of the classifications of probability and consequence.

TABLE 6.1: Classification of Risk

Probability (Likelihood)		Consequence			
		Severe	Medium	Mild	Minor
	High likelihood	Very high risk	High risk	Moderate risk	Low risk
	Likely	High risk	Moderate risk	Moderate/low risk	Low risk
	Low likelihood	Moderate risk	Moderate/low risk	Low risk	Very low risk
	Unlikely	Moderate/low risk	Low risk	Very low risk	Very low risk

6.3. Potential Sources of Contamination

6.3.1. Table 6.2 summarises the potential contamination sources that have been identified on or near the site. The potential contaminant types associated with these is then given based upon a review of CLR 11, industry profiles and anecdotal information.

TABLE 6.2: Potential Sources of Contamination

Feature on or near site	Potential Contaminant
Areas of infilling and Made Ground resulting from historical demolition of the site and the surrounding area.	Metals and hydrocarbons. In addition, Asbestos Containing Materials (ACM) may be present associated with backfilled demolition arisings from historical development. Furthermore, deleterious constituents of the Made Ground may give rise to elevated levels of ground gases (CO_2 and CH_4).
Boiler room on site	Localised hydrocarbon contamination

Feature on or near site	Potential Contaminant
Historic warehouse of unknown use located 20m to south east.	Localised hydrocarbon, metals, VOC and SVOC contamination. In addition, ACM may be present.
A garage located approximately 30m to the south west.	Localised hydrocarbon contamination.
Area of historic heavy industry approximately 90m and 100m to the north, comprising: clothing manufacturers; electrical engineers, sheet metal works, printing works and joinery manufacturers.	Localised hydrocarbon, metals, VOC and SVOC contamination.
Dry cleaners located approximately 130m and 150m to the north of the site.	Localised VOC and SVOC contamination.
Former reservoir approximately 80m to the south east that appears to have been infilled circa 1938.	Elevated levels of ground gases (CO_2 and CH_4), ACM, metals and hydrocarbons associated with the infilling of the reservoir.
Notes: VOC – Volatile Organic Compounds. SVOC – Semi Volatile Organic Compounds.	

6.4. Receptors and Exposure Pathways

6.4.1. Potential risks have been identified based on the proposed site use, the receptors and potential pathways by which the receptor/s may be exposed to the contaminant source/s. These are presented in Table 6.3.

TABLE 6.3: Receptors and Exposure Pathways

Receptor	Pathway	Risk
End Users	Ingestion of soil / dust	Low – Moderate
Neighbours		Low
Construction Workers		Low – Moderate
End Users	Inhalation of soil / dust	Low – Moderate
Neighbours		Low
Construction Workers		Low – Moderate
End Users	Inhalation of vapour from soil / dust / water	Low – Moderate
Neighbours		Low
Construction Workers		Low – Moderate
End Users	Dermal contact with soil / dust / water	Low – Moderate
Neighbours		Low
Construction Workers		Low – Moderate
End Users	Consumption of vegetables / plants	Low – Moderate
End Users	Migration of soil gases/vapours to confined spaces / structures	Low*
Construction Workers		
Building		
Surface Waters	Migration of water borne contaminants	Very Low – Low
Neighbours		
Groundwater Aquifer	Leaching of contamination from Made Ground	Very Low

Receptor	Pathway	Risk
End Users	Movement of contaminants to engineered structures (water pipes)	Low – Moderate
Sensitive Land Use (SSSI etc.)	Uptake by flora / fauna associated with sensitive land use	Very Low

*It is noted that the as part of the ground investigation, the GEL report [1] indicates that a single ground gas monitoring visit was carried out on 3rd February 2015. Elevated hazardous ground gas concentrations were not recorded and as such, the risk to human health and the building is considered to be low.

6.4.2. A ground investigation is required in order to appraise the potential issues of land contamination and geotechnical matters. This should target the identified pollutant linkages as detailed in Table 6.4.

TABLE 6.4: Targeted Pollutant Linkages

Issue	Exploration
Human exposure to shallow Made Ground soils.	General site coverage. Shallow soil samples in all holes within the top 1.0m and within the soft landscaping area.
Boiler room on site.	Targeted sampling
Ground gas generation from the underlying Made Ground.	Ground gas installations within the proposed building footprint.

6.4.3. Considering the past uses of the site, a contamination analysis suite should be applied that considers metals, semi-metals, inorganic chemicals and speciated hydrocarbon contaminants (including mono aromatic in order to provide data for human health risk assessment). In addition, the presence of asbestos in soils should be appraised by testing. Such testing should be completed in accordance with UKAS and MCERTs standards. Subject to the determination of the final objectives of the ground investigation, the test suite may also be modified to facilitate the classification of waste soil arisings and also to consider the suitability of soils on site for reuse as a growing medium (BS 3882).

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1. Environmental Setting and Sensitivity

7.1.1. The site has a **Low** hydrogeological and **Very Low** hydrological sensitivity associated with the presence of an Unproductive Stratum beneath the site and the absence of a significant surface water body within 500m of the site boundary. The proposed site end use is of residential in nature with communal gardens and therefore its sensitivity in relation to human health is considered to be **Medium – High**.

7.2. Site History and Development Proposals

7.2.1. The site currently comprises a four storey building comprising flats on Camden Road and two storey flats with partial undercroft parking on Camden Mews. A single storey common room on Camden Park Road to the east links the main building to the flats on Camden Mews.

7.2.2. The site was first developed in the early 1870s with two buildings believed to be of residential use in the northern half. The site remained the same with minor landscape alterations to the rear of the properties indicated until 1920 when three small structures were indicated in the southernmost area on Camden Mews. An alteration to the layout of the buildings along Camden Mews was undertaken in the early 1950s. One of the buildings in the northern half, No. 254 Camden Road, is marked as a day nursery in 1960. The site remained unchanged until the early 1970s when the buildings in the northern area were demolished. The current buildings are indicated to have been constructed in the early 1980s and have remained unaltered, although a previous planning application indicates the common room was demolished and rebuilt in the mid-1980s due to damage to the foundations as a result of heave/subsidence.

7.2.3. It is proposed to demolish the flats on Camden Mews and the common room and build a three storey building for residential use on Camden Mews with a one storey basement. A new common room will be constructed along Camden Park Road with flats above.

7.3. Geotechnical Conclusions and Recommendations

7.3.1. A review of the ground investigation data [1&2], the Envirocheck report [4] and other available data identifies the following potential geotechnical hazards at the site:

- Obstructions and pockets of deep Made Ground;
- high volume change potential soils and the presence of trees within the zone of influence of the new buildings;
- ground conditions aggressive to buried concrete; and
- neighbouring buildings and infrastructure which could be affected by basement construction.

7.3.2. The ground investigation data indicates the presence of deep Made Ground in some areas and potentially old foundations. It is probable that underground obstructions will be encountered, which will require removal within the proposed building footprints so as not to hinder foundation and basement construction. The two foundation inspection pits undertaken by GEL indicate the presence of these in the southernmost area. It is recommended that further trial pitting is undertaken to establish the presence of relic foundations and basements.

7.3.3. Four samples from the London Clay were subject to pH and water soluble sulphates determinations in the GEL investigation [1] and with reference to BRE Digest SD1 (2005 Ed) [14], the results indicate an AC-4 classification in the London Clay for buried concrete. None of the samples were subjected to total sulphur and acid soluble sulphate content testing to allow an assessment to be made in relation to the potential thaumasite form of concrete attack and this should be undertaken in the recommended additional investigation together with pH and sulphate determinations on the groundwater.

7.3.4. Chapter 4.2 of the NHBC Standard [15] 'Building near trees' was consulted with regard to recommended foundation depths in the vicinity of the trees. The new foundations along the northern area of the proposed Camden Mews flats and eastern area of the new common room are within the zone of influence of three trees (a Cherry and a Plane tree in the garden and an Ash tree in the paved area to the east of the existing common room). The trees are all of moderate water demand. Taking into consideration their distance away from the new buildings, the NHBC Standards require foundation depths to at least 2.10m.

7.3.5. The excavation for the basement is likely to be at least 3m deep which will remove any desiccated soils, however, the new common room requires a minimum founding depth of at least 2.10m. In addition it is recommended that the foundations are taken to 300mm below any live roots.

7.3.6. Further intrusive ground investigation, undertaken in accordance with BS5930+A2 and BS EN 1997, to provide information for desiccation assessment, buried concrete classification and the design of foundations, floor slabs, external areas, excavations and drainage is recommended.

7.3.7. The proposals involve the excavation and construction of a basement. Where surrounding existing buildings or infrastructure are within 4xd of a basement excavation (where d is the depth of excavation), consideration should be given to the impact of ground movements as a result of such excavation. This will in turn have implications for the design, installation and support (both temporary and permanent) for the proposed basement walls. A basement impact assessment and ground movement assessment are reported under a separate cover.

7.3.8. In any proposed excavations, the stability of the Made Ground cannot be relied upon, even in the short term. It should be assumed that excavations into a significant depth of such strata materials will require support. Basement excavation support is discussed in the construction sequence report.

7.3.9. The potential for UXOs to be encountered during the development is considered to be **MEDIUM – HIGH**, and as such a specialist should be consulted to undertake a detailed UXO risk assessment to determine the need for any mitigation measures at the site.

7.4. Environmental Conclusions and Recommendations

7.4.1. The potential sources of contamination identified at the site and within the site's vicinity include:

- areas of Made and Infilled Ground, including the infilled reservoir, located approximately 80m to the southeast;
- an on-site boiler room;

- an historic warehouse of unknown use situated to the south east and a garage to the south west;
- an area of historic heavy industry located approximately 90m and 100m to the north, comprising clothing manufacturers, electrical engineers, sheet metal works, printing works and joinery manufacturers; and,
- dry cleaners situated approximately 130m and 150m to the north.

7.4.2. Given the development history and proposed end use the site is considered to present a **LOW – MODERATE** risk to residential end users, predominantly due to the uncertainty relating to the Made Ground beneath the site and area of soft landscaping that is to remain as part of the redevelopment.

7.4.3. The previous site investigation indicated a thickness of Made Ground was present at the site. In addition, Japanese Knotweed is indicated on the topographical survey and a survey for this and other invasive species is recommended.

7.4.4. With respect to any future development on site, a ground investigation will be required in order to appraise the potential land contamination identified. This should be designed by a 'competent person' in accordance with BS10175:2011+A1:2013. The investigation should provide general site coverage, target the potential sources of identified contamination and assess the underlying soil quality, groundwater quality and ground gas conditions. Ground gas monitoring should be undertaken in accordance with CIRIA publication C665 with the provision for 4 to 6 monitoring visits. The investigation should also consider waste issues, as these can affect the development costs, and options for soil recycling at the site.

7.4.5. We would strongly recommend that a full service tracing and mapping exercise is completed prior to the commencement of site investigation. In addition, an asbestos survey and register should be completed of all structures on the site as this could present a risk during site works which requires advance evaluation.

7.4.6. The Desk Study is considered sufficient to satisfy planning conditions relating to former site uses and provision of a preliminary risk assessment. It is likely that site investigation as described above and reporting will be required in order to satisfy further planning condition(s) relating to land contamination.

7.4.7. The results of any intrusive investigation should be reported within a Land Quality Statement (LQS) for the site considering the requirements of current technical guidance (publications by the Environment Agency, NHBC and Eurocode 7) and the requirements of the NPPF or associated planning conditions. This report should include: a Generic Quantitative (Tier 2) Environmental Risk Assessment; revised Conceptual Site Model; recommendations for further assessments (if required); and , outline remedial and geotechnical recommendations. Land quality assessments is a phased process and it should be noted that further investigation, assessment and reporting may be required, dependent upon the findings of the Land Quality Statement.

TECHNICAL REFERENCES

Reference*	Reference Title	Type
3	Geological Sheet 256 South London, Geological Survey of England and Wales (1:50,000)	Geological Map
4	Report Reference: 67216162_1_1	Envirocheck Report
5	BGS Geology of Britain viewer [http://mapapps.bgs.ac.uk/geologyofbritain/home.html]	BGS Website
6	Environment Agency Website [www.environment-agency.gov.uk]	EA Website
7	CIRIA SP69 'The Engineering Implications of Rising Groundwater Levels in the Deep Aquifer beneath London'	CIRIA Publication
8	BRE 211 'Guidance on Protective Measures for New Buildings'	BRE Publication
9	HPA NRPB R920. Radon Atlas of England, 1996.	NRPB Radon Atlas
10	CIRIA C681: UXO. A Guide for the Construction Industry. 2009.	CIRIA Publication
11	London City Council Bomb Damage Maps 1939 - 1945	Maps
12	Zetica UXB Map for West London	Zetica map
13	Bombsight Website [www.bombsight.org]	Bombsight Website
14	BRE Special Digest 1:Concrete in Aggressive Ground	BRE Publication
15	NHBC Standards Part 4:Chapter 4.2, Building near trees	NHBC Standard

*Numbering continues from Table 2.1

ENVIRONMENTAL RISK ASSESSMENT SUPPORTING INFORMATION

Definitions of Consequence, Probability and Risk

The following classification has been taken from Guidance for the Safe Development of Housing on Land Affected by Contamination R&D66: 2008 Volume 1 (Environment Agency, NHBC and CIEH.

The key to the classification is that the designation of risk is based upon the consideration of both:

a) **the magnitude of the potential consequence (i.e. severity).**

[takes into account both the potential severity of the hazard and the sensitivity of the receptor]

b) **the magnitude of probability (i.e. likelihood).**
[takes into account both the presence of the hazard and receptor and the integrity of the pathway]

Classification of Consequence

Classification	Definition	Examples
Severe	Highly elevated concentrations **likely** to result in "significant harm" to human health as defined by the EPA 1990, Part 2A, if exposure occurs. Equivalent to EA **Category 1** pollution incident including persistent and/or extensive effects on water quality; leading to closure of a potable abstraction point; major impact on amenity value or major damage to agriculture or commerce. Major damage to aquatic or other ecosystems, which is likely to result in a substantial adverse change in its functioning or harm to a species of special interest that endangers the long-term maintenance of the population. Catastrophic damage to crops, buildings or property.	Significant harm to humans is defined in circular 01.2006 as death, disease*, serious injury, genetic mutation, birth defects or the impairment of reproductive functions. Major fish kill in surface water from large spillage of contaminants from site. Highly elevated concentrations of List I and II substances present in groundwater close to small potable abstraction (high sensitivity). Explosion, causing building collapse (can also equate to immediate human health risk if buildings are occupied).
Medium	Elevated concentrations which could result in "significant harm" to human health as defined by the EPA 1990, Part 2A if exposure occurs. Equivalent to **EA Category 2** pollution incident including significant effect on water quality; notification required to abstractors; reduction in amenity value or significant damage to agriculture or commerce. Significant damage to aquatic or other ecosystems, which may result in a substantial adverse change in its functioning or harm to a species of special interest that may endanger the long-term maintenance of the population. Significant damage to crops, buildings or property.	Significant harm to humans is defined in circular 01/2006 as death, disease*, serious injury, genetic mutation, birth defects or the impairment of reproductive functions. Damage to building rendering it unsafe to occupy e.g. foundation damage resulting in instability. Ingress of contaminants through plastic potable water pipes.
Mild	Exposure to human health **unlikely** to lead to "significant harm". Equivalent to **EA Category 3** pollution incident including minimal or short lived effect on water quality; marginal effect on amenity value, agriculture or commerce. Minor or short lived damage to aquatic or other ecosystems, which is unlikely to result in a substantial adverse change in its functioning or harm to a species of special interest that would endanger the long-term maintenance of the population.	Exposure could lead to slight short-term effects (e.g. mild skin rash). Surface spalling of concrete.

Classification	Definition	Examples
	Minor damage to crops, buildings or property.	
Minor	No measurable effect on humans. Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems. Repairable effects of damage to buildings, structures and services.	The loss of plants in a landscaping scheme. Discoloration of concrete.

Classification of Probability

Classification	Definition	Examples
High likelihood	There is pollutant linkage and an event would appear very likely in the short-term and almost inevitable over the long-term, or there is evidence at the receptor of harm or pollution.	*a) Elevated concentrations of toxic contaminants are present in soils in the top 0.5m in a residential garden.* *b) Ground/groundwater contamination could be present from chemical works, containing a number of USTs, having been in operation on the same site for over 50 years.*
Likely	There is pollutant linkage and all the elements are present and in the right place which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short-term and likely over the long-term.	*a) Elevated concentrations of toxic contaminants are present in soils at depths of 0.5-1.0m in a residential garden, or the top 0.5m in public open space.* *b) Ground/groundwater contamination could be present from an industrial site containing a UST present between 1970 and 1990. The tank is known to be single skin. There is no evidence of leakage although there are no records of integrity tests.*
Low likelihood	There is pollutant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a long period such an event would take place, and is less likely in the shorter term.	*a) Elevated concentrations of toxic contaminants are present in soils at depths >1m in a residential garden, or 0.5-1.0m in public open space.* *b) Ground/groundwater contamination could be present on a light industrial unit constructed in the 1990s containing a UST in operation over the last 10 years – the tank is double skinned but there is no integrity testing or evidence of leakage.*
Unlikely	There is pollutant linkage but circumstances are such that it is improbable that an event would occur even in the very long-term.	*a) Elevated concentrations of toxic contaminants are present below hardstanding.* *b) Light industrial units <10 yrs old containing a double-skinned UST with*

Classification	Definition	Examples
		annual integrity testing results available.

Note: A pollution linkage must first be established before probability is classified. If there is no pollution linkage then there is no potential risk. If there is no pollution linkage then there is no need to apply tests for probability and consequence.

For example if there is surface contamination and a principal aquifer is present at depth, but this principal aquifer is overlain by an aquiclude of significant thickness then there is no pollution linkage and the risks to the principal aquifer are not assessed. The report should identify both the source and the receptor but state that because there is no linkage there are no potential risks.

Description of the classified risks

Very high risk
There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without remediation action OR there is evidence that severe harm to a designated receptor is already occurring. Realisation of that risk is likely to present a substantial liability to be site owner/or occupier. Investigation is required as a matter of urgency and remediation works likely to follow in the short-term.

High risk
Harm is likely to arise to a designated receptor from an identified hazard at the site without remediation action. Realisation of the risk is likely to present a substantial liability to the site owner/or occupier. Investigation is required as a matter of urgency to clarify the risk. Remediation works may be necessary in the short-term and are likely over the longer term.

Moderate risk
It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely, that the harm would be relatively mild. Further investigative work is normally required to clarify the risk and to determine the potential liability to site owner/occupier. Some remediation works may be required in the longer term.

Low risk
It is possible that harm could arise to a designated receptor from identified hazard, but it is likely at worst, that this harm if realised would normally be mild. It is unlikely that the site owner/or occupier would face substantial liabilities from such a risk. Further investigative work (which is likely to be limited) to clarify the risk may be required. Any subsequent remediation works are likely to be relatively limited.

Very low risk
It is a low possibility that harm could arise to a designated receptor, but it is likely at worst, that the harm if realised would normally be mild or minor.

No potential risk
There is no potential risk if no pollution linkage has been established.

LIMITATIONS

Environmental & Geotechnical Interpretative Reports

1. This report provides available factual data for the site obtained only from the sources described in the text and related to the site on the basis of the location information provided by the client.
2. Where any data or information supplied by the client or other external source, including that from previous studies, has been used, it has been assumed that the information is correct. No responsibility can be accepted by CampbellReith for inaccuracies within this data or information. In relation to historic maps the accuracy of maps cannot be guaranteed and it should be recognized that different conditions on site may have existed between and subsequent to the various map surveys.
3. This report is limited to those aspects of historical land use and enquiries related to environmental matters reported on and no liability is accepted for any other aspects. The opinions expressed cannot be absolute due to the limit of time and resources implicit within the agreed brief and the possibility of unrecorded previous uses of the site and adjacent land.
4. The material encountered and samples obtained during on-site investigations represent only a small proportion of the materials present on the site. There may be other conditions prevailing at the site which have not been revealed and which have therefore not been taken into account in this report. These risks can be minimised and reduced by additional investigations. If significant variations become evident, additional specialist advice should be sought to assess the implications of these few findings.
5. The generalised soil conditions described in the text are intended to convey trends in subsurface conditions. The boundaries between strata are approximate and have been developed on interpretations of the exploration locations and samples collected.
6. Water level and gas readings have been taken at times and under conditions stated on the exploration logs. It must be noted that fluctuations in the level of groundwater or gas may occur due to a variety of factors which may differ from those prevailing at the time the measurements were taken.
7. Please note that CampbellReith cannot accept any liability for observations or opinions expressed regarding the absence or presence of asbestos or on any product or waste that may contain asbestos. We recommend that an asbestos specialist, with appropriate professional indemnity insurance, is employed directly by the client in every case where asbestos may be present on the site or within the buildings or installations. Any comments made in this report with respect to asbestos, or asbestos containing materials, are only included to assist the client with the initial appraisal of the project and should not be relied upon in any way.
8. The findings and opinions expressed are relevant to those dates of the reported site work and should not be relied upon to represent conditions at substantially later dates.
9. This report is produced solely for the benefit of the client, and no liability is accepted for any reliance placed upon it by any other party unless specifically agreed in writing.

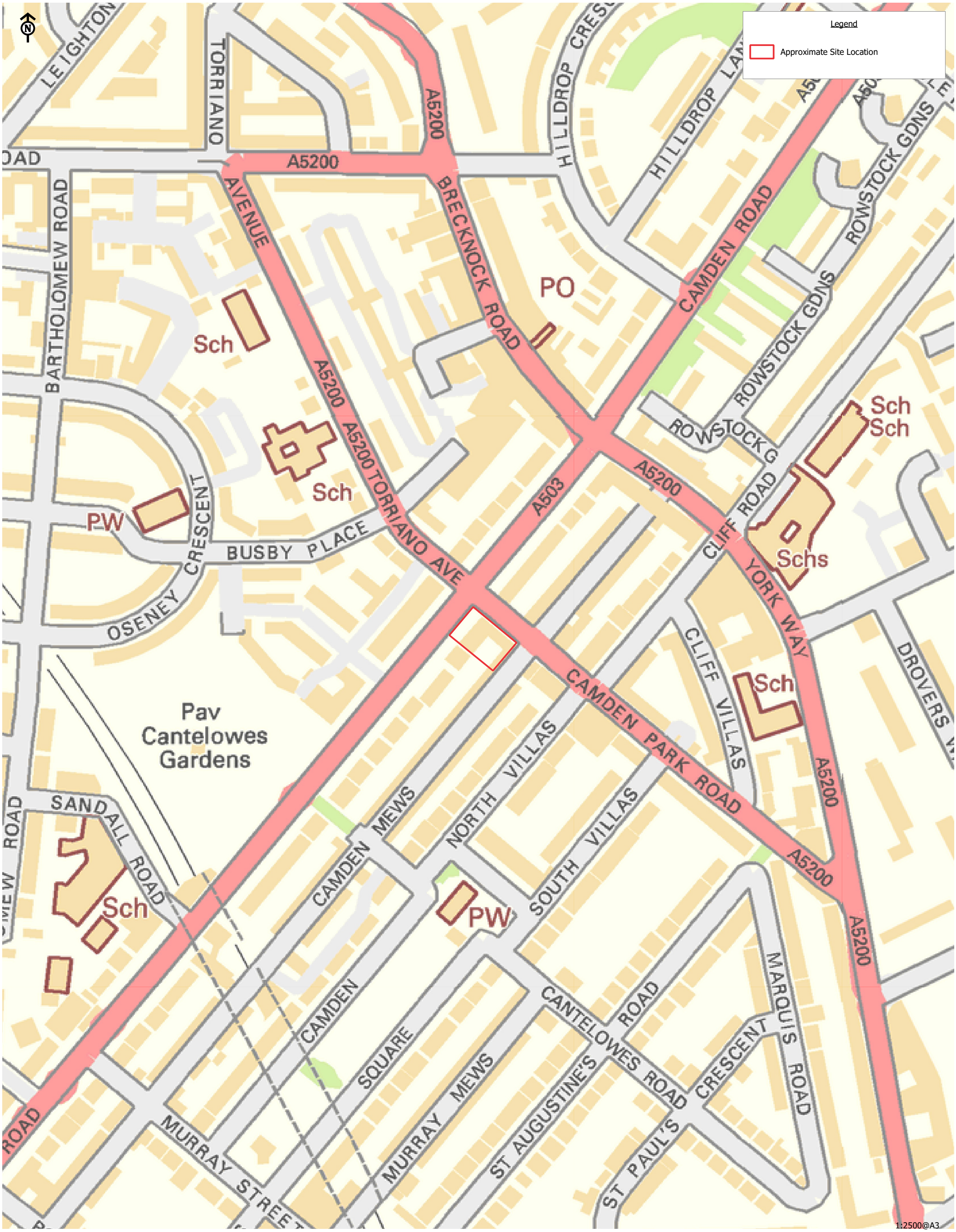
Appendix A: Figures

Figure 1: Site Location

Figure 2: Annotated Site Layout

Figure 3: Site Photographs

Figures 4a – 4c: Proposed Development



Ashton Court

Client: Origin Housing

Figure 1:
Site Location

Scale: 1:5000@A4

Job Number: 12047
Drawn by - Checked by: LB - FD
Drg No - Status/Revision: GIS001 - A
File location: N:\12000 - 12249\12047 L - Ashton Court\Project_Workspaces (pdf in Outputs)
Date (Revision History): 26/05/2015 (A, First Issue,26/05/15, LB)

CampbellReith
consulting engineers
LONDON 020 7340 1700 ☒ ☐ MANCHESTER 0161 819 3060
REDHILL 01737 784 500 ☐ ☐ BIRMINGHAM 01675 467 484
BRISTOL 0117 916 1066 ☐ ☐ DUBAI 00 971 4453 4735
www.campbellreith.com