Wates Construction London

ABBEY ROAD ESTATE, CAMDEN

Preliminary Risk Assessment

70071591-PRA
MAY 2020

PUBLIC

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Preliminary Risk Assessment

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WSP

Unit 9, The Chase
John Tate Road, Foxholes Business Park
Hertford
SG13 7NN

Phone: +44 1992 526 000

Fax: +44 1992 526 001

WSP.com

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EXECUTIVE SUMMARY

The Site (Phase 2) currently comprise approximately 1.086 ha of land utilised as residential tower blocks and open green space.

The site redevelopment comprises the construction of a community and healthcare centre in the east of the site, landscaping works including the relocation of a car park and the removal of the footbridge located between Phase 2 and 3 of the development. No changes are proposed to the two residential towers on site.

A Preliminary Risk Assessment (PRA) has been undertaken to develop a preliminary conceptual site model (pCSM) identifying potential ground contamination risks and evaluate the likely significant risks associated with the Proposed Development.

It should be noted that this executive summary does not form a standalone document and should be read in conjunction with the WSP Preliminary Risk Assessment (Ref: 70071591-PRA).

ENVIRONMENTAL SETTING

The ground profile at the Site is likely to comprise Made Ground underlain by the London Clay Formation.

Localised groundwater may be present within granular deposits within the Made Ground.

The Site is underlain by an Unproductive Stratum (the London Clay Formation), therefore, ground water resources are perceived not to be at risk from activities carried out on Site.

No surface water features are present within 500m of the Site.

POTENTIAL FOR GROUND CONTAMINATION

WSP considers that on-site sources of potential contamination are limited including from Made Ground associated with the former and current on-site structures and PCBs to be present in the transformers located in the electricity plant rooms.

Potential off-site sources of contamination include adjacent railway and surrounding current and historical industrial land uses.

Plausible contaminant linkages have been identified with respect to human health including dermal contact with, inhalation of asbestos fibres and inhalation or ingestion of contaminated soils, dust or water.

Plausible contaminant linkages identified to controlled waters include the possibility of leaching of contaminants from the unsaturated zone, lateral migration of contaminated groundwater from up gradient off-site sources on to the Site, and lateral migration of contaminated surface water (surface water run-off).

Plausible contaminant linkages to building structures include direct contact with contaminated soils, groundwater or immiscible contaminants.

Under the Proposed Development potential receptors were identified as:

- Current and future site users;
- Construction and maintenance workers;
- Localised Groundwater (if present) within granular Made Ground;
- Site structures, particularly foundations, of existing buildings; and
- Potable water supply pipes

In conclusion, the Preliminary Risk assessment indicates a **low risk** to human health. The risk to controlled waters (groundwater) and site structures is **low**.

RECOMMENDATIONS

WSP recommends the following actions are undertaken:

- A Phase 2 ground investigation focused on the proposed community and healthcare centre to assess
    - Baseline ground conditions at the Site including contaminant concentrations and groundwater monitoring (if present).

It should be noted that a Phase 2 ground investigation has recently been completed at the Site, however the Ground Investigation Report has not been completed at the time of writing this report. Please see **Appendix A** for the Ground Investigation Plan.

1 INTRODUCTION AND OBJECTIVES

1.1 AUTHORISATION AND PURPOSE OF ASSESSMENT

WSP was instructed by Wates Construction London (the Client) to undertake a Preliminary Risk Assessment (PRA) at the Abbey Road Estate, Camden ('the Site') as shown on **Figure 1** in **Appendix A.**

1.2 PROPOSED DEVELOPMENT

The wider site lies off Belsize Road and comprises approximately 2.4 ha of land utilised as mixed-use development. The wider site comprises three Phases of Development, Phase 1 (residential flats), Phase 3 (health centre, community centre and residential accommodation) and Phase 2 (residential tower blocks and open green space) as shown on **Figure 2** in **Appendix A.**

Phase 2 (the Site) is located towards the north of the wider site and will be the focus of this report. Phase 2 comprises approximately 1.086 ha of land utilised as residential tower blocks, open green space and a pedestrian footbridge.

WSP understand that this report will be used to support a planning application for a community and healthcare centre to be built on the green space. Other works include landscaping works including the relocation of a car park and the removal of the footbridge located between Phase 2 and 3 of the development. No changes are proposed to the two residential towers on site. The proposed layout is shown in **Appendix A.**

WSP previously completed a Phase 1 Geo-Environmental Assessment for the wider site (Ref: 12220476), dated March 2011.

1.3 OBJECTIVES

The key objectives of this assessment are to:

- Develop a preliminary conceptual site model (pCSM) to identify potential ground contamination risks associated with the Site; and
- Evaluate the likely significance of risks associated with potential ground contamination through a contaminant linkage assessment for the Proposed Development.

1.4 SCOPE OF WORKS

The scope of works undertaken in this assessment comprises:

- A review of relevant previous reports pertaining to the Site;
- A review of publicly available historical maps and site plans (where available) to identify former land uses and potential contaminative activities on and surrounding the Site;
- A review of relevant regulatory authorities including the Environment Agency (EA), Local Council planning website and the Contaminated Land Officer (CLO);
- A review of relevant publicly available information relating to hydrological features, hydrogeology, neighbouring land use, ecologically sensitive uses and geology in order to establish the environmental setting of the Site and the sensitivity of the location;
- A Preliminary review of Unexploded Ordnance (UXO) risk at the site;

- Development of a preliminary conceptual site model via the source-pathway-receptor contaminant linkage approach; and
- An outline of environmental risks with respect to ground, groundwater and ground gas conditions, which may potentially arise as liabilities or constraints.

This report has been prepared in general accordance with:

- Part 2A, Environmental Protection Act 1990;
- Environment Agency 'Model Procedures for the Management of Land Contamination', CLR11. 2004; and
- The National Planning Policy Framework.

The report contains British Geological Survey (BGS) and EA information.

1.5 LIMITATIONS

This report is addressed to and may be relied upon by the client (Wates Construction London). It may not be relied upon or transferred to any other parties without the express agreement of WSP in writing. The report should be read and used in full. No responsibility will be accepted where this report is used, ether in its entirety or in part, by any other party. WSP cannot be held liable for third party information.

The limitations of this assessment are attached in **Appendix B**.

2 SITE RECONNAISSANCE

2.1 SITE DESCRIPTION

The Site location is provided as **Figure 1** (**Appendix A**) and a site layout plan as **Figure 2 (Appendix A)**. Due to ongoing to health and safety restrictions (related to Covid-19) a site walkover was not undertaken. The client had stipulated that the site had not materialistically changed since the previous WSP walkover (2011). Information obtained in the previous walkover which comprised an inspection of the interior of the two residential towers (Snowman and Casterbridge) on Site (Phase 2) has been used as a reference. A photographic record of key on-Site observations are provided in **Appendix C**.

Table 1 provides information relating to the Site obtained from a review of Ordnance Survey (OS) mapping, online aerial photography, the Site walkover from 2011 and relevant regulatory information contained within the Envirocheck Report **(Appendix D)**.

Table 1 – Site Information

Details	Description
Name and address of site	Abbey Road Estate, Belsize Road, London NW6
Grid reference	525790, 183890
Size	1.086 ha
Site description and current use	The Site comprises two 19no. storey residential tower blocks (Snowman and Casterbridge) with associated car parking areas and open green space located towards the east of the Site. At the time of the walkover specific Site activities included: ▪ A single storey plant room was present adjacent to the western edge of Snowman House (Photo 1). Electricity plant rooms were noted on the ground floors of Snowman and Casterbridge House (Photo 2). ▪ Lift shafts servicing 19no. floors were noted within Snowman House and Casterbridge House. ▪ A tarmac car park, for approximately 30no. vehicles, was present adjacent to the eastern edge of Casterbridge House. ▪ A soft landscaped area containing a children's adventure playground was present in the north of the Site adjacent to the northern edges of Snowman House and Casterbridge House (Photo 3). ▪ Elevated walkways are present linking Snowman House to Casterbridge House and Snowman House to Emminster House (off-site south within Phase 3). (Photo 4).
Ground cover	Ground cover at the Site generally comprised tarmac and concrete, with soft landscaped grassed open space located in the east of the Site.
Trees and invasive species	Mature trees were noted in the north of the Site in the area of open space adjacent to Snowman and Casterbridge Towers.

Details	Description
	No invasive species were identified at the Site during the walkover.
Topography	The Site is generally flat and level.
Bulk material storage	No bulk hazardous materials were noted on Site at the time of the walkover.
Polychlorinated biphenyls (PCBs)	Plant rooms containing electricity sub were noted on the ground floors of Snowman House and Casterbridge House. An internal inspection of the plant rooms was not possible at the time of the walkover, so the condition of the sub stations could not be determined. The presence of PCBs cannot therefore be discounted; however no changes are proposed to the residential towers reducing the potential risk from PCBs.
Waste storage	Aluminium refuse bins containing domestic waste were noted in the courtyard area between Snowman and Casterbridge House (Photo 5). Recycling bins for tins, plastic and paper were noted in the car park adjacent to Casterbridge house. No hazardous waste streams were noted on Site at the time of the walkover.
Asbestos containing materials (ACMs)	No asbestos report or asbestos management plan (AMP) was available to review on-Site at the time of the walkover, however there is potential for ACMs to be present within the buildings on the Site. It should be noted however that no refurbishment or demolition works are scheduled to be undertaken in these buildings. An asbestos survey was undertaken on the link bridge between Phase 2 and 3. ACMs were not detected during this survey.
Nearby features	Phase 3 (south-west of the Site) - A mixed use 7no. storey block (Emminster House) comprising residential dwellings with commercial properties (fireworks shop, a pub and a party shop) and an NHS Health Centre forming the ground floor, a 5no. storey mixed use Block (Hinstock) comprising residential dwellings with commercial properties (news agents, a pharmacy, and an Indian restaurant) forming the ground floor. A gated car park containing approximately 15 spaces was present at ground level beneath residential dwellings and behind commercial properties within Emminster House. Phase 1 (south of the Site) – Redeveloped to residential properties which were built ~2018. Residential properties are located north, east, south and west of the Site, with a railway located towards the south.

3 HISTORICAL POTENTIALLY CONTAMINATIVE LAND USES

3.1 SITE HISTORY

The history of the Site and local environs has been reviewed and determined with reference to Ordnance Survey maps contained within the Envirocheck Report (241962101_1_1). A study has been undertaken to identify potentially contaminative former land uses. The following section provides a summary of this information and the Envirocheck Report is attached as **Appendix D.**

ON-SITE

Table 2 – On-site historical map review

Date of Mapping	Scale	Feature
1871	1:2,500	Residential properties with gardens were present towards the east of the Site, with open land present across the rest of the Site.
1874	1:10,560	No apparent change.
1896	1:2,500 1:10,560	The entire Site comprised terraced residential properties with gardens.
1915	1:2,500	No apparent change.
1920	1:10,560	No apparent change.
1935	1:2,500	No apparent change.
1946	Aerial Photography	No apparent change.
1951	1:10,560	No apparent change.
1954	1:1,250	No apparent change.
1955	1:2,500	No apparent change.
1957	1:10,560	No apparent change.
1968	1:1,250 1:10,560	Snowman and Casterbridge House residential flats connected by a footbridge are present at the Site. Open space is present towards the east of the Site.
1970	1:2,500	No apparent change.
1972	1:1,250	The open land is shown as an open green space. The Site is in its current layout.
1974	1:10,000	No apparent change.
1978	1:1,250	No apparent change.
1991	1:1,250	No apparent change.

Date of Mapping	Scale	Feature
	1:10,000	
1999	Aerial Photography 1:10,000	No apparent change.
2006	1:10,000	No apparent change.
2020	Aerial Photography 1:10,000	No apparent change.

OFF-SITE

Table 3 – Off-site historical features within 500m

Name	Direction	Approx. Distance (m)	Years feature observed
Agricultural fields Residential properties / roads	N	Adjacent to 500	1871 to 1896 1896 to Present
Open space Terrace residential properties with gardens Terrace residential properties with gardens and an area of open space Open space Emminster and Hinstock House and health centre with associated commercial properties	SW	26	1871 to 1896 1896 to 1915 1915 to 1974 1974 to 1978 1978 to Present
Residential properties with gardens Properties demolished Multi-story car park / commercial properties including a garage Redeveloped to residential flats (Phase 1)	S	40	1871 to 1970 1970 to 1972 1972 to 2018 2018 to Present
Railway	S	42	1871 to Present
Residential properties / undeveloped land Building	NW	140	1871 to 1896 1896 to 1954

Name	Direction	Approx. Distance (m)	Years feature observed
Garage Residential properties			1954 to 1970 1970 to Present
Building Ladder Works Wharfedale House	SW	255	1871 to 1935 1935 to 1954 1954 to present
Residential properties Building Motor car showroom Warehouse Commercial Properties	SE	265	1871 to 1935 1935 to 1954 1954 to 1968 1968 to 2013 2013 to Present
Kilburn College Residential properties	S	330	1871 to 1874 1874 to Present
Building Priory Works / warehouse	SW	335	1871 to 1935 1935 to Present
Building Sorting Office	SW	375	1871 to 1896 1896 to Present
Building Engineering works Falcon House	SW	395	1871 to 1955 1955 to 1968 1968 to Present

4 ENVIRONMENTAL SETTING

4.1 GEOLOGY AND HYDROGEOLOGY

The BGS Map Sheet 256 – North London (1:50,000) has been reviewed and the underlying geology is presented in **Table 4** together with EA aquifer designations for the relevant geological units.

Table 4 – Geological Mapping Summary

Strata	Location	Description	Aquifer Designation
London Clay Formation	Entire site	Bioturbated or poorly laminated blue-grey or grey-brown, slightly calcareous silt, clayey silt and sometimes layers of sandy clay. Commonly contains, carbonate concretions ('cementstone nodules') and disseminated pyrite. Thin beds of shells and fine sand partings or pockets of sand are also present.	Unproductive Stratum

The BGS mapping does not identify any superficial deposits to be present overlying the London Clay Formation.

Four publicly available BGS boreholes were present on the wider site (Phase 1 and Phase 3). The BGS borehole locations are shown on **Figure 2** (**Appendix A**) and a review available in **Table 5**.

Table 5 – BGS Borehole Summaries

Borehole	Location	Strata encountered	From – to depth (m bgl)	Water Strike (m)
TQ28SE378	25m SW Phase 3 (health Centre) (525750,183900)	None Recorded Brown fissured clay with fine roots Brown fissured clay, blue in fissures with selenite crystals Brown fissured clay with selenite crystals Blue fissured clay	Ground level – 1.10 1.10 – 2.6 2.6 – 5.7 5.7 – 8.7 8.7– 12.19	None recorded
TQ28SE380	84m S Phase 1 (525750,183830)	None Recorded Brown fissured clay, blue in fissures with selenite crystals and fine roots	Ground level – 2.92 2.92 – 4.5	None Recorded

Borehole	Location	Strata encountered	From – to depth (m bgl)	Water Strike (m)
		Brown fissured clay, blue in fissures with selenite crystals	4.5 – 7.5	
		Brown fissured clay with selenite crystals	7.5 – 9.4	
		Blue fissured clay	9.4 – 12.19	
TQ28SE377	90m SW Phase 3 (community centre) (525720,183840)	None Recorded Brown fissured clay, blue in fissures with selenite crystals Brown fissured clay with selenite crystals Blue fissured clay	Ground level – 1.10 1.10 – 2.6 2.6 – 7.2 7.2 – 12.19	None Recorded
TQ28SE379	125m S Phase 1 (525710,183800)	None Recorded Brown fissured clay with fine roots Brown fissured clay, blue in fissures with selenite crystals Brown fissured clay with selenite crystals Blue fissured clay	Ground level – 1.40 1.40 – 2.9 2.9 – 5.97 5.97 – 10.5 10.5 – 14.02	None Recorded

No groundwater abstractions are recorded within 500m of the Site.

The Site is underlain by an Unproductive Stratum (the London Clay Formation), therefore, ground water resources are perceived not to be at risk from activities carried out on Site.

The Site is not located within or within the vicinity (<500m) of an EA groundwater Source Protection Zone (SPZ).

4.2 HYDROLOGY

No surface water features are present within 500m of the Site.

The Site is located within Flood Zone 1 (Low Probability: 1 in 1000 or greater chance of occurring each year).

BGS groundwater flooding susceptibility model indicates there is no potential for groundwater flooding to occur.

No surface water abstractions are recorded within 500m of the Site.

No surface or groundwater nitrate vulnerable zones are located on-Site.

4.3 PRELIMINARY HYDROGEOLOGICAL MODEL

The ground profile at the Site is likely to comprise Made Ground underlain by the London Clay Formation.

The London Clay Formation is designated as Unproductive Stratum.

Localised groundwater may be present within granular deposits within the Made Ground.

4.4 RADON

The BGS indicates that the Site is in a lower probability radon area as less than 1% of homes are above the Action Level. No radon protection measures are necessary in the construction of new dwellings or extensions.

4.5 UNEXPLODED ORDNANCE RISK (UXO)

A Detailed Unexploded Ordnance (UXO) Risk Assessment has been completed for the Site by Alpha Associated Limited dated April 2013 (ref:P3263), attached as **Appendix F**, and indicates that the Site (Phase 2) has a low-medium risk of UXO. However, it should be noted that the report indicates that the wider site (Phase 1 and Phase 3) has a high of UXO.

The report highlighted that London experienced high levels of bombing during World War Two with locations such as industry, transport links, communication and residential areas being targeted. The London Borough of Hampstead was no exception; sustaining a bomb density of 139 high explosives (HE) bombs per 1,000 acres. The report concluded that the most probable UXO threat items for the wider site are German HE bombs, Incendiary Bomb and British Anti-Aircraft Artillery projectiles.

The report recommended for Phase 2 (low-medium UXO risk) the following:

- Operational UXO Risk Management Plan – appropriate Site management documentation should be held on Site to plan for and guide upon the actions to be carried out in the event of a suspected or real UXO discovery.
- UXO Safety and Awareness Briefings – all personal on Site should receive a general briefing on the identification of UXB, what actions they should take to keep people and equipment away from the hazard and to alert Site management. Posters and information of the general nature of UXB threat should be held in the Site office.

4.6 MINERAL EXTRACTION

No mineral extraction sites are recorded within 500m of the Site.

4.7 LANDFILLING

No current or historical landfills are recorded within 500m of the Site.

No areas of unknown infilled land (water and non-water) are recorded within 500m of the Site.

No waste management, waste transfer, waste disposal or waste treatment facilities are located within 500m of the Site.

4.8 ECOLOGY

No environmentally sensitive areas are located within 500m of the Site.

5 REGULATORY CONSULTATION

5.1 REGULATORY INFORMATION

Information relating to various regulatory controls has been taken from the Envirocheck Report, which is presented in **Appendix D**. The potential for hazardous materials to impact upon the ground conditions, surface or groundwater on site are summarised below within **Table 6**.

Table 6 – Regulatory Information

Environmental Data	Distance from site (within 500m)	Details	Potential risk
Contaminated land register entries and notices	N/A	No entries on the contaminated land register were recorded within 500m of the Site.	No
Discharge Consents	N/A	No entries on discharge consents were recorded within 500m of the Site.	No
Local Authority Pollution Prevention and Controls	321m south	September 2007 – Bromptoms of Windsor, PG6/46 dry cleaning, permitted.	No
	370m east	January 2007 – Squeaky Clean professional Dry Cleaners, PG6/46 dry cleaning, permitted.	No
	387m east	January 2007 – Connoisseur Dry Cleaners, PG6/46 dry cleaning, permitted.	No
	390m south east	January 2007 – Perfect Dry Cleaners, PG6/46 dry cleaning, permitted.	No
	441m east	January 2007 – Masterclean Dry Cleaners, PG6/46 dry cleaning, permitted.	No
Pollution Incidents to Controlled Waters	N/A	No entries on pollution incidents to controlled waters recorded within 500m of the Site.	No
Substantiated Pollution Incident Register	N/A	No entries on sustained pollution incidents recorded within 500m of the Site.	No
Trade Directory Entries	0 Inactive	Blinds awnings and canopies, fireworks stockists, photo and digital imaging services, breakdown and recovery services, car engine tuning and diagnostic services, pest and vermin control, garage services, air conditioning equipment and car body repairs.	Yes
	0 Active	No entries	No

Environmental Data	Distance from site (within 500m)	Details	Potential risk
	1-100 Inactive	Asphalt and macadam suppliers, car dealers, commercial cleaning services, domestic cleaning services, and engineers.	Yes
	1-100 Active	Food products manufactures	Yes
	100-300 Inactive	Heating equipment sales and service, dry cleaners, garage services, carpet / curtain/ upholstery cleaners, toiletries, commercial and domestic cleaning services, road haulage services, fireplace and mantlepieces, boilers servicing and repairs, windows, printers, and electronic component, manufactures, and distributors.	Yes
	100-300 Active	Commercial and domestic cleaning services.	Yes
	300- 500 Inactive	Perfume supplies, builders merchants, printers, food products manufacturers, digital printers, domestic cleaning services, dry cleaners, textile printers, distribution services, hospitals, dyers, digital printing, telecommunications equipment and systems, leather merchants and wholesalers, photographic processors, garage services, wallpaper and wall coverings, chemists and pharmacists suppliers and wholesalers, Asphalt & Coated Macadam Laying Contractors, commercial cleaning services, oven cleaning, Testing, Inspection & Calibration Equipment Manufacturers, manufactures, laundries and laundrettes, Art Restoration & Picture Cleaning, Chemicals - Distributors & Wholesalers, PVC-U Products - Manufacturers & Suppliers, Laboratories, Clothing & Fabrics – Manufacturers, Packaging & Wrapping Equipment & Supplies and meat wholesalers.	Yes
	300 -500 Active	Domestic cleaning services, printers, Carpet, Curtain & Upholstery Cleaners, dry cleaners, Lighting Manufacturers, pest and vermin control, Carpet, Curtain & Upholstery Cleaners, Swimming Pool Contractors, Repairers & Service, optical good manufactures,	
Control of major accident hazards sites (COMAH)	N/A	No entries of control of major accident hazards sites were recorded within 500m of the Site.	No

Environmental Data	Distance from site (within 500m)	Details	Potential risk
Registered radioactive substances	N/A	No entries of radioactive substances were recorded within 500m of the Site.	No
Notification of installations handling hazardous substances	N/A	No entries of notification of installations handling hazardous substances were recorded within 500m of the Site.	No
Planning Hazardous Substance Consents	N/A	No entries of planning hazardous substance consents were recorded within 500m of the Site.	No
Fuel station entries	N/A	No entries of fuel stations were recorded within 500m of the Site.	No

5.2 CORRESPONDENCE 2020

CONTAMINATED LAND OFFICER (CLO)

The Contaminated Land Officer for Camden Council was contacted in March 2020. The following response was received (the response relates to the Site):

- The results from the Council GIS contaminated land software that predicates the risk potential of land contamination based on historical land se activities within 100m of the Site identified that the Site has potentially been impacted by historical land-use activities associated with railway land (off-Site). According to the councils contaminated land risk characterisation, land on which these processes/activities were carried out is considered to represent **a plausible risk (score of 9)**, although the Council has no present evidence that confirms these activities have affected the Site. Further information is Provided in **Appendix G.1**
- The Council software includes the results of background contamination surveys undertaken by LBC between 1998 and 2006 and reported in 2007. This relates to a borough specific surveying of Open Spaces, Allotments, Nursery's and the rear gardens of dwellings from the Victorian era. Earlier surveys established gardens adjacent to a former electroplating works in Kentish Town were contaminated (by definition under Part 2A of EPA 1990) with heavy metals (Cadmium, Chromium, Nickel, Mercury, Lead and Arsenic). Elevated concentrations of lead and arsenic were found in the majority of the gardens. This prompted further surveys i.e. reported in 2007 to investigate whether the rear gardens of Victorian dwellings throughout the borough contained elevated levels of lead, arsenic and Benzo(a)pyrene. Basis the spreading of domestic ash in gardens from the Victorian period onwards was typically practiced.

Results

- Soil samples were laboratory analysed and the results compared to the UK Soil Guideline Values (SGV) for "Residential Use." 84% of all samples analysed exceeded the lead SGV (450mg/kg) for residential use. Further statistical analyses confirmed the sample mean (1280 mg/kg)

exceeded the SGV at the 95th percentile level. In terms of arsenic 79% of the samples analysed exceed the SGV i.e. (20mg/kg) for residential use. Statistical analyses confirmed the sample mean (30mg/kg) from 29 of the 31 properties exceeded the SGV at the 95th percentile level. With No SGV for PAH, the results were compared to screening value of 1mg/kg for BaP. 32% of samples analysed exceeded the BaP screening value (1mg/kg). Statistical analysis confirmed the sample mean (1.42mg/kg) marginally exceeded the screening level @ the 95th % tile level. The report recommended further work to establish if intervention was required. It was difficult for the author to be more informative at that point in time due to the lack of guidance from the Government. It wasn't until 2012 when the Secretary of State for DEFRA explained the legal definition of significant harm and significant possibility of significant harm in the Contaminated Land Statutory Guidance.

- Sample 38 was taken at Casterbridge (on-Site) (see **Appendix G.1** for further details).
- Since the 2007 survey report SGVs have been replaced. To assess risks from the heavy metals recorded in Sample 38, the results were compared to Assessment Criteria for Public Open Space (Parks) using the Category 4 Screening Levels (C4SL) published by DEFRA in 2014. In the absence of C4SL's, Suitable 4 Use Levels (S4UL) for Parks published by Land Quality Management: Chartered Institute of Environmental Health (LQM:CIEH in 2015) were selected. It is noted that the C4SL are based on the acceptance of a low level of toxicological concern, rather than the more conservative standard adopted in the derivation of S4ULs, which are based on a tolerable or minimal level of risk.
- The contaminants of concern (i.e. heavy metals from Sample 38) were all below their assessment criterion for Public Open Space (Parks). This indicates the site is suitable for its current use and not contaminated land as defined by Part 2A of the Environmental Protection Act 1990. Therefore, the subject site is not being investigated further under the Part IIA of the Contaminated Land Regime.
- If however, the subject Site was to be redeveloped in the future, involving ground disturbance, excavation works or soft landscaping then a planning condition would be recommended to the Planning Dept for a detailed site investigation (desk top study, walkover survey and intrusive investigation) and assessments, and if necessary remediation works. The investigation process follows a risk-based approach under Part 2A of EPA 1990, objectively to ensure that potentially contaminated land is suitable for its proposed use. Consequently, the planning process is the main way in which contaminated land and potentially contaminated land is investigated and remediated in Camden.

ENVIRONMENT AGENCY

The Environment Agency was contacted on 28 April 2020. No pertinent information has been provided to date, however if provided this report will be updated or the information will be sent as an addendum to this report.

5.3 CORRESPONDENCE 2011

CONTAMINATED LAND OFFICER (CLO)

The Environmental Health Officer at Camden Council was contacted in 2011. The following response was received (the response relates to the wider site all Phases):

- There are no current landfills located in the London Borough of Camden.
- There are no private water supplies located in the London Borough of Camden.

- There are 10no. Part B Processes (or equivalent) present within 1km of the Site. 9 of which are for Dry Cleaning. The remaining process is the unloading of petrol into storage at BP Harmony petrol station, 104a Finchley Road. A summary of this information is presented in the **Table 7**.

Table 7 - Part B Processes (or equivalent) within 1km of the Site

Name	Address 1	Address 2	Post Code	Installation Type
Hampstead Express Dry Cleaning	279a	Finchley Road	NW3 6LT	Dry Cleaner
Janet's Hand Laundry Ltd	281a	Finchley Road	NW3 6ND	Dry Cleaner
Swiss Cottage Dry Cleaners	121	Finchley Road	NW3 6HY	Dry Cleaner
Connoisseur Dry Cleaners	03-May	Fairhazel Gardens	NW6 3QE	Dry Cleaner
Crest Dry Cleaners	220	Kilburn High Road	NW6 4JL	Dry Cleaner
I.S.Dry Cleaners	6	Canfield Gardens	NW6 3BS	Dry Cleaner
Madame George Dry Cleaners	227	West End Lane	NW6 1XJ	Dry Cleaner
Sqweaky Clean Professional Dry Cleaners	13	Fairhazel Gardens	NW6 3QE	Dry Cleaner
Masterclean Dry Cleaners	6	Langtry Walk	NW8 0DU	Dry Cleaner
BP Harmony	104a	Finchley Road	NW3 5EY	Unloading of petrol into storage at petrol stations

- Records show that there has been railway land use within 100m of the Site since 1871. 2no. Motor Garage Repairers were present at 197 and 131-177 Belsize Road, dated 1951 and 1989 respectively. There is no indication of the length of time that the garages were operational.
- The Contaminated Land Officer does not hold information on whether or not the Site has been the source of public complaint.
- The London Borough of Camden has not yet produced a list of sites to investigate under Part 2A of the Environmental Protection Act 1990. This list will only consist of sites deemed high risk.

- Records do not indicate that there have been any pollution or contamination issues surrounding this property. A motor garage is located on the site which has the potential to cause contamination of the ground.

Further information is provided in **Appendix G.2**.

ENVIRONMENT AGENCY

The Environment Agency (EA) was contacted in 2011 with regard to contamination beneath the Site. The following is a summary of their response (the response relates to the wider site all Phases):

- The EA based their search on a radius of 500m from the centre of the site with NGR: TQ 25766 83906 at the centre
- Within this radius there are three pollution incidents. Information on these are provided in **Table 8.**

Table 8 - Pollution Incidents

Date	Contaminant	Distance and Direction	Severity
28 August 2003	Inert materials and waste	161m SE	Category 4 (No Impact)
13 September 2007	Oils and fuel	34m SE	Category 3 (Minor)
10 January 2010	Contaminated water	165m E	Category 4 (No Impact)

These incidents were not recorded within the Envirocheck Report, but are considered to be of minor significance.

- The EA have no records of site investigations or remediation. This is likely to be because the geology is low permeability London Clay to depth with no potentially water bearing drift deposits and therefore potential risk to groundwater is low.
- The EA only consider issues relating to controlled waters and the relevance of regulatory regimes where they are the enforcing authority, such as environmental permitting. The Local Authority should advise on risk to other receptors, such as human health.
- The EA consider that the controlled waters at this Site are of low environmental sensitivity. Therefore they have not provided detailed site-specific advice or comments with regard to land contamination issues for this Site.
- The EA recommend that the requirements of PPS23 and the Environment Agency guidance 'Guiding Principles for Land Contamination' are followed. It is recommended that developers should:
    - Follow the risk management framework provided in CLR11, Model Procedures for the Management of Land Contamination, when dealing with land affected by contamination.
    - Refer to their Guiding Principles for Land Contamination Reports for the type of information that they require in order to assess risks to controlled waters from the site.

Further information is provided in **Appendix G.2**.

6 CONCEPTUAL SITE MODEL (CSM)

6.1 INTRODUCTION

The preliminary CSM is based upon the environmental conditions of the Site as described in the previous sections.

The methods used within this assessment follow a risk-based approach; with the potential environmental risk assessed qualitatively using the 'source-pathway-receptor' contaminant linkage concept introduced in the guidance documents (principally the EA's CLR11) on the practical implementation of the Environmental Protection Act 1990.

Environmental risk can be defined as the combination of the consequence of a harmful effect and the probability of its occurrence. The existence of a contaminant linkage is primarily dependant on site usage and environmental conditions.

The environmental risk assessment has been carried out by identifying and evaluating the significance of the following:

- Potential Sources of Contamination: these include any actual or potentially contaminating materials and activities, located either on or in the vicinity of the Site;
- Potential Pathways for Contamination Migration: these are the routes or mechanisms by which contaminants may migrate from the source to the receptor; and
- Potential Receptors of Contamination: these include present or future land users, activities or persons at the Site.

The preliminary CSM was developed based on the proposed industrial/commercial end use at the Site. A summary of the applicable legislative and planning framework for the assessment is presented in **Appendix H.**

Table 9. provides a key to the potential pathways and receptors identified at the Site. The on-site preliminary CSM is presented in **Table 10**, and the off-site CSM in **Table 11**.

Table 9 – Potential Pathways

Receptor Type	Receptors	Potential Pathways			
		On-site contaminant source	On-site ID	Off-site contaminant source	Off-site ID
Human Health	Site users (current and future maintenance workers)	Dermal contact with contaminated soils and waters Inhalation of contaminated soils, waters and vapours/gas Ingestion of contaminated soils and waters	1	Inhalation/ingestion of contaminated soils in airborne dust	6
	Neighbouring site users	Inhalation/ingestion of contaminated soils in airborne dust	2	- Inhalation/ingestion of contaminated soils in airborne dust	7
Groundwater	Any groundwater within granular Made Ground	Leaching of contaminants from soils Migration of contamination in groundwater Migration of immiscible contaminants Infiltration of contaminated surface water	3	Migration of contaminated groundwater, surface water or immiscible contaminants	8
Surface Water	None identified	Runoff of contaminated surface water (surface water run-off)	4	Runoff of contaminated surface water (surface water run-off)	9
Building Structures	Buried concrete and potable water supply pipes Current buildings	Direct contact with contaminated soils, groundwater or immiscible contaminants	5	n/a	

Table 10 – On-site conceptual site model

Source	Potential Contaminants	Pathway ID (Table 9)	Comment on Hazard Realisation	Risk Rating
Current and historical uses residential properties	Range of contaminants, depending on the source of material, but may include asbestos, and polychlorinated biphenyls (PCBs).	1-5	▪ PCBs may be present within transformers located in the electricity plant rooms.	LOW
Made Ground associated with current and previous residential and commercial properties	A wide range of potential contaminants, depending on the source of material, but may include asbestos, metals, cyanide, total petroleum hydrocarbons (TPH) and polycyclic aromatic hydrocarbons (PAH). There is the potential for ground gas generation from the Made Ground.	1-5	▪ There have been previous phases of demolition and construction at the Site. ▪ Made Ground is known to be present on the Site associated with the former and current development.	LOW

Table 11 – Off-site conceptual site model

Location	Source	Potential Contaminants	Pathway ID (Table 11)	Comment on Hazard Realisation	Risk Rating
0-500m surrounding the site	Surrounding current and historical industrial land uses including: Warehouses, garages, works, motor car show room, printers, builders' merchants, dry cleaners, commercial and domestic cleaners, dyers, and manufactures.	A wide range of potential contaminants, depending on the source of material, but may include metals, cyanide, TPH, PAH, VOCs, SVOCs, PCBs and pathogens.	6-9	▪ It is unknown if good environmental management practices have been undertaken. ▪ It is unknown whether any remediation has been undertaken on surrounding sites. ▪ Potential contamination is likely to be localised, as the underlying impermeable geology will restrict movement onto site.	LOW
Phase 1 and Phase 3	Current and historical land uses as commercial buildings, garages, car parks, residential properties and health centre.	A wide range of potential contaminants, depending on the source of material, but may include metals, cyanide, TPH, PAH, VOCs, SVOCs, PCBs and pathogens.	6-9	▪ Former Hire car companies, a car wash and a garage were present in the Phase 1 area, there was the potential for storage and spillage of fuel oil from above or below ground tanks as well as greases and oil used as lubricants, and surfactants which are used in vehicle cleaning products. However potential contamination, if present is likely to be localised to these areas, as the underlying impermeable geology will restrict movement off site. It should be noted however that this area has recently been redeveloped into residential properties (flats) as part of the Phase 1 Development. WSP assume that any required remediation works were undertaken as part of the planning process.	LOW
Adjacent	Railway	A wide range of potential contaminants, depending on the source of material, but may include, metals, asbestos, TPH, PAH, VOCs and SVOCs.	6-9	▪ Potential contamination associated with the railway is likely to be restricted to the site boundary, as the underlying impermeable geology will restrict movement onto site.	LOW

7 CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of this preliminary assessment, WSP makes the following conclusions in the context of the Proposed Development of the Site to commercial end use.

7.1 ENVIRONMENTAL SETTING

The ground profile at the Site is likely to comprise Made Ground underlain by the London Clay Formation.

Localised groundwater may be present within granular deposits within the Made Ground.

The Site is underlain by an Unproductive Stratum (the London Clay Formation), therefore, ground water resources are perceived no to be a risk from activities carried out on Site.

No surface water features are present within 500m of the Site.

7.2 POTENTIAL FOR GROUND CONTAMINATION

WSP considers that on-site sources of potential contamination are limited from Made Ground associated with the former and current on-site structures and PCBs to be present in the transformers located in the electricity plant rooms.

Potential off-site sources of contamination include adjacent railway and surrounding current and historical industrial land uses.

Plausible contaminant linkages have been identified with respect to human health including dermal contact with, inhalation of asbestos fibres and inhalation or ingestion of contaminated soils, dust or water.

Plausible contaminant linkages identified to controlled waters include the possibility of leaching of contaminants from the unsaturated zone, lateral migration of contaminated groundwater from up gradient off-site sources on to the Site, and lateral migration of contaminated surface water (surface water run-off).

Plausible contaminant linkages to building structures include direct contact with contaminated soils, groundwater or immiscible contaminants.

Under the Proposed Development potential receptors were identified as:

- Current and future site users;
- Construction and maintenance workers;
- Localised Groundwater (if present) within granular Made Ground;
- Site structures, particularly foundations, of existing buildings; and
- Potable water supply pipes

In conclusion, the Preliminary Risk assessment indicates generally a **low risk** to human health. The risk to controlled waters (groundwater) and site structures is **low**.

7.3 RECOMMENDATIONS

WSP recommends the following actions are undertaken:

- A Phase 2 ground investigation focused on the proposed community and healthcare centre to assess
    - Baseline ground conditions at the Site including contaminant concentrations and groundwater monitoring (if present).

It should be noted that a Phase 2 ground investigation has recently been completed at the Site, however the Ground Investigation Report has not been completed at the time of writing this report. Please see **Appendix A** for the Ground Investigation Plan.

Appendix A

FIGURES

TITLE:

Abbey Road Estate
Camden
Site Location Plan

FIGURE No:

70071591- Figure 1

Drawn By:UKZGN001

Date Modified:05/05/2020

File: \\uk.wspgroup.com\Central Data\Projects\700715xx\70071591 - Abbey Road, Camden 2020\02 WIP\GRR\03 Document\(9) Drawings

'Snowman House' - 19 Storey Residential Block

Plant Room Managed by 0²

Refuse & Recycling Bins

Walkway Between Snowman House & Casterbridge House

Electricity Plant Room Accessible From Exterior Western Side of Snowman

'Emminster' 7 Storey Residential Block With Commercial Properties on Ground Floor Including Health Centre

Refuse Bins

Ground Floor Car Park and Electricity Plant Room

'Hinstock' 5 Storey Mixed Commercial and Residential Block

Community Centre

Phase 2

Phase 3

Phase 1

Grassed Area & Children's Playground

Car Park

Electricity Plant Room Accessible From Exterior Eastern Side of Casterbridge

'Casterbridge' House - 19 Storey Residential Block

Recycling Bins on Corner of B507 & Belsize Road

Footbridge Connecting Commercial/Residential Block & Car Park

6 Storey Mixed Use Car Park & Commercial Properties

Now residential flats

TQ28SE378

TQ28SE377

TQ28SE380

TQ28SE379

Key

- Site Boundary
- Wider Site Boundary
- BGS Boreholes

Priory Court

Snowman House

Casterbridge

Emminster

Health Centre

PH

Hinstock

Abbey Road Motorist Centre

Multistorey Car Park

Newton House

Wingreen

Rowley Way

Langley Walk

ABBEY ROAD

BELSIZE ROAD

PRIORY TERR

0 125 metres

1 to 102

\\uk.wspgroup.com\Central Data\Projects\700715xx\70071591 - Abbey Road, Camden 2020\02 WIP\GRR\03 Document\(9) Drawings

wsp

TITLE:

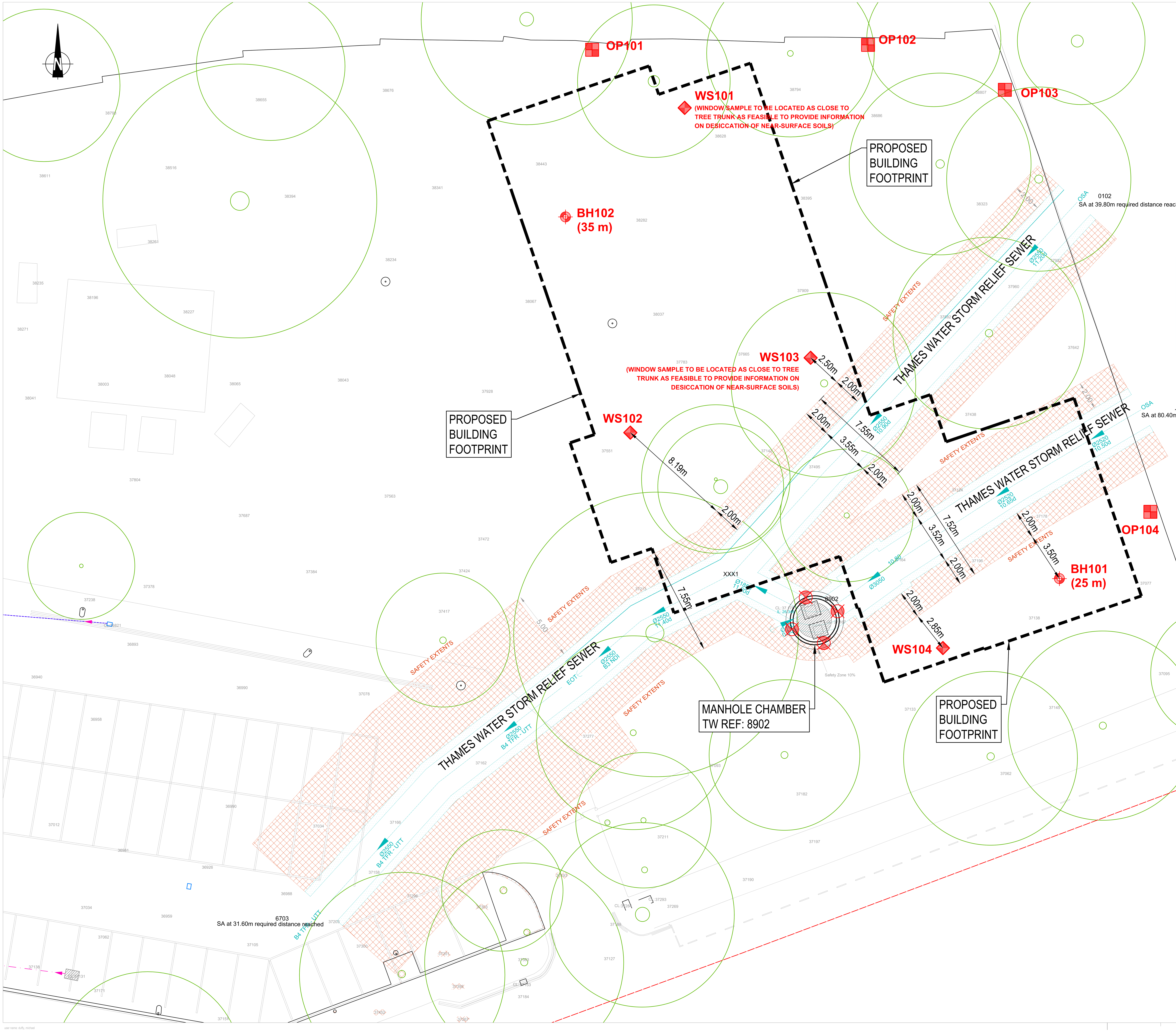
Abbey Road Estate

London NW6

Site Layout Plan

FIGURE No:

70071591 - Figure 2



Schedule 2: Proposed Exploratory Holes

Hole	Exploratory Hole Type	Scheduled Depth, m	Well Depth(1), m	Comments
BH101 to 102	Borehole	25.0	4.0	
WS101 to 104	Window Sample	6.0	4.0	
OP101 to 104	Observation Pit	1.5	-	To investigate foundations to boundary wall

Note 1) Actual details of the installations shall be issued to the Contractor once details of the strata encountered and groundwater conditions have been made available to the Engineer.

LEGEND:

- BOREHOLE LOCATIONS
- WINDOW SAMPLE LOCATIONS
- OBSERVATION PIT LOCATIONS*
- HAND DUG TRIAL HOLES (0.5m-1m DEEP) TO ALLOW SURVEY OF THE OUTSIDE FACE OF THE EXISTING MANHOLE CHAMBER

* EXCAVATIONS SHALL NOT BE EXTENDED BELOW OR UNDER THE EXISTING FOUNDATIONS IF IT IS CONSIDERED THAT THESE ARE TRADITIONAL SPREAD FOUNDATIONS

Mark	Revision	Date	Drawn	Chkd	Appd
3	HAND DUG TRIAL HOLES ADDED	02/04/20	MD	MD	MD
2	FOR THAMES WATER COMMENT	24/03/20	MD	MH	MD
1	FOR COMMENT	23.03.20	MD	HM	MD

SCALING NOTE: Do not scale from this drawing. If in doubt, ask.

UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake their own investigation where the presence of any existing sewers, services, plant or apparatus may affect their operations.

Drawing Issue Status
INFORMATION

ABBEY ROAD LONDON, PHASE 2
GROUND INVESTIGATION PLAN

Client: Wates

Date of 1st Issue	Designed	Drawn
23.03.2020	-	MD
A1 Scale	**Checked**	**Approved**
1:125 @ A1	HM	MD

Drawing Number: 440300-STN-ZZ-00-DR-C-SK10
Revision: 3

pba peterbrett now part of Stantec
peterbrett.com

LONDON
Tel: 020 3824 6600

File Location: c:\users\miduffy\documents\projects\abbey road\cad\440300-stn-zz-00-dr-c-sk10 ground investigation plan.dwg

LEGEND

HARD LANDSCAPE

SURFACE TREATMENT

Proposed Tree Planting
Size/Spec: Refer to plant schedule for details
Note: Final location of trees to be determined with services alignment. All trees are to be tagged by landscape architect prior to delivery

Existing Trees to be Retained
To be protected in accordance with BS 5837:2012 *'Trees in relation to Design, Demolition and Construction'*
Note: Refer to arboricultural survey & report for details

Existing Trees to be Removed
Trees/vegetation in conflict with proposed development, based on current site layout. Note: Refer to arboricultural survey & reports for details

PT01 **Paving Type 01: Asphalt**
To Engineer's Specification

PT02 **Paving Type 02 - Clay paver**
Product: Wienerberger Dutch Clay Paver 'Lotis UWF' or similar
Material: Clay
Dimensions: 200(w) x 50(w) x 70(thickness) mm
Bond: 90° Herringbone
Colour: Grey 'Lotis UWF'

PT03 **Paving Type 03 - Self Binding Gravel**
Product: CED Stone Group 'CEDEC Footpath Gravel' or similar
Material: Comprised of compacted Granite and Quartzite
Depth: Compacted to 50mm
Colour: Gold/Buff

PT04/a **Paving Type 04/a - Concrete Block Paving**
PT4 - Existing block paving to retained and replaced where damaged with the same material
PT4a - Proposed slab paving to match existing

PT05 **Paving Type 05 - Conservation Setts**
Product: Granite Aggregate Setts
Size/Colour/Bond: 100 x 100mm/ Silver Grey / Stacked
Note: All natural stone setts to meet BS EN 1342:2012 requirements

PT06 **Paving Type 06 - Proposed Tactile Paving**
Tactile paving to part M compliant to match adjacent

PT07 **Paving Type 07 - Concrete Sleepers**
Product: Marshall's Concrete 'Conservation Paving' or similar
Material: Pre-cast Concrete blended with Granite aggregates
Dimensions: 300(w) x 900(l) x 50(thickness) mm
Finish: Skimmed
Colour: Heather Grey

PT08 **Paving Type 08 - Proposed Concrete Pavers**
Product: Kellen Breccia
Size/Colour/Bond: 100 x Various/ Silver Grey / Transverse broken bond

PT09 **Paving Type 09 - Proposed Ramp**
Concrete paving type 4 to surface finish with part M compliant handrails

ET01 **Edge Type 01:** Standard Concrete Road Kerb
Product: Concrete Kerb or similar
Size/Colour: 125(w) x 255(h) x 915(l)mm / French Grey
Note: All edging to meet BS EN 1340:2003 requirements

WT01 **Wall Type 01 - Proposed Brick wall**
Proposed double skinned brick wall with brick on edge coping
Product: To match architectural detail
Structure and foundations to engineers detail

WT02 **Wall Type 02 - Existing Brick wall retained**
Existing brick wall retained and made good where necessary, metal railing removed and made good

WT03 **Wall Type 03 - Proposed Signage Wall**
Proposed double skinned brick wall with brick on edge coping With a pannel of precast engraved signage
Structure and foundations to engineers detail

WT04 **Wall Type 04 - Proposed Sheet Pile Cladding**
Proposed sheet piled wall, clad facade to be confirmed

BT01 **Boundary Type 01 - Proposed Metal Railing**
Proposed black painted metall base
plated beneath coping to wall railing to park K standards
Height: 600mm + 500mm wall upstand (1100mm total)

BT02 **Boundary Type 02 - Existing Metal Railing Retained**
Existing metal railing retained and made good where necessary

BT03 **Boundary Type 03:** Timber Fencing
Product: Close Board Timber Fence
Supplier: Jacksons or similar approved
Size/Colour: 1800mm (h) / Natural

ST01 **Step Type 01 - Proposed Brick Steps**
Proposed steps with brick riser and tread

FT01 **Furniture Type 01 - Proposed play apperatus**
Timber play pieces detailt to be confirmed

FT02 **Furniture Type 02 - Proposed Bin**
Lockable top
Product to be confirmed
Note separate dog waste bin attached

FT03 **Furniture Type 03 - Proposed Lighting column**
Lighting columns to provide light levels to meet Secure by design standards to be detailed and design by a lighting specialist

FT04 **Furniture Type 04 - Proposed Feasting Table**
Large timber feasting table with timber benches and access for disabled

GT01 **Grass Type 01: Amenity Grass**
Product - A4 amenity grass mix
Supplier: Rolawn or Germinal/similar approved
Size/Spec: Refer to plant schedule for details

GT02 **Grass Type 02: Flowering Grassland**
GT2 - Mowed on a Grassland regime
Product: WFG2 'Flowering Grassland'
Supplier: Germinal or similar approved
Size/Spec: Refer to plant schedule for details

Proposed Hedge Planting
Product: Field grown plant stock
Size/Spec: Refer to plant schedule for details
Note: All batches of species are to be labelled prior to delivery

SB01 **Proposed Shrub Planting Type 01**
Shrub and herbaceous species chosen to provide a green backdrop to the feature areas of planting (Type 02).
Product: Container grown plant stock
Size/Spec: Refer to plant schedule for details
Note: All batches of species are to be labelled prior to delivery

SB02 **Proposed Shrub Planting Type 02**
Shrub and herbaceous species chosen to have a more ornamental appeal providing feature areas of planting.
Product: Container grown plant stock
Size/Spec: Refer to plant schedule for details
Note: All batches of species are to be labelled prior to delivery

Notes
1.
2.

No.	Date	Reason	Name

Revisions

fabrik
First Floor
4-8 Emerson Street
London
SE1 9DU
T : 0207 620 1453
F : 0207 261 9126
E : london@fabrikuk.com
W : www.fabrikuk.com

DRAFT

Project
Abbey Area Phase 02 for WATES

Drawing
Combined Hard and Soft General Arrangement Plan

Scale	Date	Approved	Checked	Drawn
As indicated@A0	02/28/20	MB	MB	JC

Project No.	Drawing No.	Revision
D2819	FAB-S1-XX-DP-L-9100-PR06	

- [■] Preliminary
- [ ] Issued for Planning Approval
- [ ] Issued for Construction
- [■] Issued for Design/Information
- [ ] Issued for Tender
- [ ] As Built

Drawing sheet size - A0