Former Holloway Prison

Contamination - Generic Quantitative Environmental Risk Assessment

Peabody

Generic Quantitative Environmental Risk Assessment

Former Holloway Prison, London

October 2021

Waterman Infrastructure & Environment Limited
Pickfords Wharf, Clink Street, London, SE1 9DG
www.watermangroup.com

Client Name: Peabody Construction Limited
Document Reference: WIE16172-100-R-2.4.1-GERA
Project Number: WIE16172

Quality Assurance – Approval Status

This document has been prepared and checked in accordance with Waterman Group's IMS (BS EN ISO 9001: 2015, BS EN ISO 14001: 2015 and BS EN ISO 45001:2018)

Issue	Date	Prepared by	Checked by	Approved by
2.4.1	October 2021	Ben Greenfield Principal Consultant	Robbie J Moore Senior Consultant	Freddie Alcock Senior Associate

Comments

2.3.1	Updated with design freeze information.
2.4.1	Updated with comments from Avison Young

Disclaimer

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Objectives

Environmental ground investigation at the Former Holloway Prison, London (hereafter termed "the Site").to identify potential ground contamination issues and to inform relevant mitigation measures.

Site Setting

Current Use	Former Holloway Prison; a complex of low-rise buildings of two to five storeys in height, with areas of hardstanding alongside landscaped green spaces.
History	Prison from 1852 with ancillary buildings including an infirmary, workshop, artesian well, pump, brick kiln, chapel, drying green and prison ward. Hospital blocks and an electricity sub-station were constructed in the 1940s/1950s. The prison was entirely redeveloped between 1971 and 1985, closed in 2016 and has remained vacant since.
Ground Conditions	Soil sample results were screened against GAC for residential end-use with plant uptake. In areas of shared landscaping, results were compared against GAC for Public Open Space close to residential housing Minor exceedances of metals and hydrocarbons were detected in Made Ground as well as the presence of some asbestos fibres. These represent a potential risk to future Site receptors, however can be controlled though installation of appropriate cover layers in area of soft landscaping. The built development and hardstanding will break the linkage in other areas.
Controlled Waters	Water present in the Made Ground is not a controlled water receptor. This water has limited lateral migration potential due to the cohesive makeup of this strata, and limited vertical migration potential due to the underlying London Clay Formation (LCF) acting as an aquiclude. Therefore, a controlled water receptor is absent above the LCF, the LCF also prevents migration of water in made ground to underlying aquifers and the absence of an aquifer above the LCF prevents migration of groundwater offsite. An abstraction well was present on-Site, and is recorded as decommissioned by the BGS in 1946. As part of the redevelopment works an attempt to locate the well should be made to determine if it has been adequately decommissioned.
Ground Gas/Vapour Regime	Results for Total Organic Carbon (TOC) content in soils and follow-up monitoring data confirm the Made Ground has a low ground gas generational potential. A ground gas risk to future Site users is absent and ground gas protection measures in built structures are not be required. Findings of soil headspace analysis, follow-up vapour monitoring, soil and groundwater laboratory analysis and comparison against SoBRA values indicate a significant vapour regime is absent on-Site and vapour mitigation measures would not be required in the bult development. During redevelopment works, a watching brief should be in place to assess for the presence of any unidentified hydrocarbon contamination in the location of the former fuel storage tanks on the north of the Site.

Conceptual Model

Potential contaminant linkages identified for the Site are as follows:

- Construction workers contacting contamination in shallow soils during redevelopment works;
- Residents surrounding the Site contacting shallow soil contamination via dust emissions or surface runoff from stockpiled soils during redevelopment works
- Future Site users contacting contamination in shallow soils via soft landscaping areas; and
- Plants in future landscaping contacting contamination in shallow soils via root uptake.

Conclusions

Overall the risk rating for the Site is assessed as **Low**, following implementation of the recommendations below the Site is unlikely to be capable of being classified as Contaminated Land under the Environmental Protection Act 1990, thus meeting the requirements of paragraphs 120 to 122 of the National Planning Policy Framework

Recommendations

- A Remediation Strategy should be prepared detailing the mitigation measures required during construction. The Remediation Strategy would be limited in its scope, due to the absence of considerable widespread contamination on the Site and primarily refer to construction practices required on all UK sites, these would include; appropriate waste handling and management, dust suppression, and water management. Given the cover layer requirement in soft landscaped areas the Remediation Strategy should also detail the cover layer thickness and contaminant threshold criteria for its make-up. The provision of a cover layer in soft landscaped areas is a common requirement on UK sites completed on brownfield land
- The Remediation Strategy should also detail measures to locate the former abstraction well on-Site in order to determine if it has been adequately decommissioned
- The Remediation Strategy should also include details of a watching brief during the demolition of the former fuel storage tanks on the Site and measures to be carried out if unforeseen contamination is encountered
- Following completion of the proposed development a Verification Report should be produced documenting the mitigation and/or validation measures employed during demolition and construction
- Construction workers should wear the appropriate PPE, if required RPE, adopt good hygiene and safety practice and adhere to the Confined Space Entry Regulations 1997, and Control of Asbestos Regulations 2012
- Concrete should be designed with due attention paid to the classifications set out in the separately produced Geotechnical Interpretative Report
- Thames water company should be consulted on the required potable water supply pipe specification, given the intrusive investigation results, and
- Any re-use of soils on-Site should be in accordance with the CL:AIRE Definition of Waste Code of Practice.

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1. Introduction

1.1 Objectives

Waterman Infrastructure & Environment Limited ("Waterman") were instructed by Peabody Construction Limited to prepare a Generic Quantitative Environmental Risk Assessment for ground contamination and waste classification at the Former Holloway Prison, London (hereafter termed "the Site"). This report has been prepared to identify ground contamination risk at the Site and support a future planning application for proposed redevelopment.

This assessment follows a Preliminary Environmental Risk Assessment (PERA) and Ground Investigation Strategy and Specification prepared by Waterman.

- PERA – WIE16172-100-R-1-3-1-PERA, October 2021.
- Ground Investigation Strategy and Specification – WIE16172-100-S-1-3-1-GI_SPEC, October 2020.

The purpose and objectives of the ground investigation and this report are the following;

- To build on the information included in the PERA, with an overall goal of updating the Site's conceptual model with respect to below ground contamination
- Identify and determine if there is an additional requirement for information over and above from the data collected and assessed as part of the ground investigation to adequately characterise ground conditions and the contamination status of the Site
- Provide recommendations related to ground contamination to facilitate the proposed Development and
- Undertake a preliminary waste assessment and classification of soils, to assist a contractor in assessing their options and associated costs regarding waste disposal from Site.

As part of the ground investigation an assessment of the soil properties to inform foundation design was undertaken concurrently through in-situ and ex-situ geotechnical testing. The results of this assessment has been detailed in a separate report.

Waterman undertook a part-time attendance at the Site as part of the ground investigation and were responsible for the scheduling of all contaminated land samples and design of monitoring well installations. The intrusive ground investigation works and post fieldwork monitoring were undertaken solely by Groundtech Consulting Ltd.

1.1.1 Development Description

The description of the development as set out in the approved planning permission is as follows:

> *'Phased comprehensive redevelopment including demolition of existing structures; site preparation and enabling works; and the construction of 985 residential homes including 60 extra care homes (Use Class C3), a Women's Building (Use Class F.2) and flexible commercial floorspace (Use Class E) in buildings of up to 14 storeys in height; highways/access works; landscaping; pedestrian and cycle connections; publicly accessible park; car (blue badge) and cycle parking; and other associated works.'*

1.1.2 Detailed Development Proposals

It is proposed to demolish all buildings on-Site, along with re-levelling works to form new development platforms. Following levelling, the Site will be redeveloped to include

- 985 residential units (Use Class C3). This includes 60 extra care homes (Use Class C3).
- 1,489 sqm (GIA) Women's Building (Use Class F.2)
- 1,822 sqm (GIA) Commercial Floorspace (Use Class E),

New hardstanding footpaths and roads, and managed soft landscaping will be installed surrounding all buildings.

Shared soft landscaped areas will be included in the development, however these will be centrally managed as part of landscaping maintenance. The development will include private hard landscaped terraces, but will not include private soft landscaped gardens. Plant uptake and direct contact with soil in a private setting is considered not relevant as a potential contaminant linkage at the completed development.

Breakdown for the development is as follows:

Plot A

- 235 residential units. The tenures in this Plot are social rent, London Shared Ownership and market. With communal outdoor space for residents.

Plot B

- 321 residential units. The tenures in this Plot are social rent, London Shared Ownership and market. With communal outdoor space for residents.
- Commercial floorspace.

Plot C

- 155 residential units. The tenure in this Plot is social rent only. With communal outdoor space for residents.
- Women's Building.
- Commercial floorspace.

Plot D

- 183 residential units. The tenures in this Plot are London Shared Ownership and market. With communal outdoor space for residents.
- Residents' facilities including concierge (1334 sqm).

Plot E

- 91 residential units, including 60 extra care units. The tenures in this Plot are social rent and market.

Proposed development plans are included in Appendix A.

2. Procedures

This Generic Quantitative Environmental Risk Assessment has been undertaken in general accordance with the Land contamination: risk management guidance (LCRM – Environment Agency, April 2021). The report includes the following:

- Review and confirmation of the overall site objectives
- GQRA objectives
- Outline Conceptual Model for the Site
- Results of Intrusive Ground Investigation
- Confirmation of Generic Assessment Criteria used to assess risks
- Assessment of results against Generic Assessment Criteria
- Formulation of a new Conceptual Model for the Site
- Identification of potentially unacceptable risks
- Record of findings and recommendations for further action

This report forms a decision record for the contaminant linkages identified, the generic assessment criteria used to assess risks, the unacceptable risks identified and the proposed next steps in relation to the Site. The report also provides an explanation of the refinement of the outline conceptual model following the ground investigation, the selection of criteria and assumptions, an assessment of uncertainties, degree of confidence and limitations, the evaluation of potential risks and the basis for the decision on what happens next.

3. Environmental Site Setting

A brief summary of current environmental conditions at the Site is set out below. A detailed review of the Site's environmental setting is detailed in the Waterman PERA, and Ground Investigation Specification and Strategy.

3.1 Site Description

The Site is currently disused and comprises the Former Holloway Prison, a complex of low-rise buildings of two to five storeys in height. Buildings cover 40% of the Site with hardstanding and landscaped green spaces covering 35% and 25% respectively. A Site location plan and Site plan are included in Appendix A.

Potentially contaminative Site uses identified during the PERA are set out in Table 1.

Table 1: Summary of Potentially Contaminative Activities on-Site

Potential Issue	Description	Condition
Aboveground Storage Tanks (and fuel lines)	Two 151,370 litre steel diesel tanks, stored in a brick bund. The presence of underground pipework could not be verified.	No evidence of staining around the fill point or outside of the brick bund. Steel tanks showed evidence of rust.
	One metal skinned tank of unknown capacity and construction. Fuel hose hung externally on tank side, not provided with secondary containment. No evidence of underground pipework.	Tank appeared to be in good condition. No evidence of staining around the fill point or outside of the brick bund.
Drainage	Separate surface and foul water drainage systems are assumed.	The maintenance and integrity of drainage systems is not known.
Hazardous Materials	One Intermediate Bulk Container (IBC) of unknown contents, labelling indicted hydrochloric acid to be contained within. Numerous 25L containers of water treatment chemicals, hydrochloric acid and herbicide. Some were provided with bunding, some were stored over hardstanding.	Some bottles open. Given the poor storage conditions the potential for leakage cannot be discounted.
Solid and Liquid Waste Storage	Six metal coffins on hardstanding on the north-eastern boundary. Labelling of the coffins indicated electrical waste to be stored within.	Evidence of rust to all coffins, the potential for leakage cannot be discounted.

3.2 History

Earliest available historical mapping information from 1852 indicates the Site as being occupied by a prison, with ancillary buildings including an infirmary, workshop, artesian well, pump, brick kiln, chapel, drying green and prison ward. Hospital blocks and an electricity sub-station were constructed in the 1940s/1950s. The prison was entirely redeveloped between 1971 and 1985, closed in 2016 and has remained vacant since.

3.3 Geology

A summary of the anticipated geology is provided in Table 2.

Table 2: Anticipated Site Geology

Stratum	Estimated Thickness (m)	Typical Description
Made Ground	1-5	Clay and sands with brick and concrete fragments
London Clay Formation	41	Clay, silt and sand
Lambeth Group	21	Green or yellow sand and clay.
Thanet Formation	3.9	Greenish grey fine to medium sand.
Seaford Chalk and Newhaven Chalk Formations	31.1 (thickness not proven)	Pale grey to white calcareous limestone.

Made Ground is anticipated across the Site from previous building demolition, and likely comprises brick and concrete fragments in a cohesive matrix. Superficial deposits are not recorded on-Site or in the immediate surrounding area.

3.4 Controlled Waters

The superficial deposits on-Site are recorded as unproductive strata. The Lambeth Group and Thanet Formation are recorded as Secondary A Aquifers, and the Chalk Formation is a Principal Aquifer.

The Site is not located in a groundwater Source Protection Zone and groundwater abstraction boreholes are absent in the surrounding area. Surface water receptors are absent in the surrounding area. The Site is therefore located in an area with a low sensitivity with respect to controlled waters.

The Made Ground is anticipated to retain a limited quantity of water sourced from surface water infiltration. Water sitting in the Made Ground is not a controlled water receptor and will have limited migration potential due to the heterogenous Made Ground composition and cohesive nature.

Thick deposits of London Clay Formation (40m thick) are present on-Site and in the surrounding area. The London Clay Formation is an effective aquiclude, preventing the vertical migration of water and contaminants from the overlying Made Ground from migrating to and impacting the underlying aquifers (Lambeth Ground, Thanet Formation, Chalk).

Historical mapping from 1872 indicates an artesian well in the central to north of the Site. The BGS log dated pre-1889 indicates that in June 1946 the Prison Commission confirmed the well was disused and that the well was located in a building which had been demolished. No information on installation details or decommissioning was provided in the log.

3.5 Ground Gas

Identified geology beneath the Site does not identify any significant sources of ground gas. Significant ground gas sources such as landfills/coal mines are absent in the surrounding area. Completion of a ground gas risk assessment as part of the PERA identified a very low ground gas risk. Additional ground investigation based on the anticipated ground conditions was not required.

3.6 Vapour

Potential sources of vapours have been identified at the Site, including diesel tanks and electrical substations. The ground investigation has targeted these features to confirm the presence/absence of volatile contamination and identify whether a significant vapour regime requiring vapour protection measures is required.

3.7 Potentially Significant Pollution Linkages

Potentially significant pollutant linkages identified in the PERA and investigated by the ground investigation include;

- Future Site users in areas of proposed soft landscaping, and construction workers may come into direct contact with contaminants;
- Vegetation in areas of proposed soft landscaping may come into direct contact with contaminants in the Made Ground;
- A significant vapour regime is potentially present locally on-Site, subject to assessment as part of a ground investigation. Future Site users, construction workers, and on-Site structures may be at risk;
- Where buried foundations or services come into contact with contaminated ground, an unacceptable level of risk may be present;
- Groundwater within the Secondary A and Principal aquifers underlying the London Clay Formation may be exposed to contamination via the former abstraction well.

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4. Site Activities and Results

The intrusive investigation work was undertaken in general accordance with the Code of Practice for Ground Investigation BS 5930 (2015) and the Code of Practice for the Investigation of Potentially Contaminated Sites BS 10175 (2017).

The ground investigation scope of works completed comprised;

- 21No. Boreholes to depths between 20 and 40mbgl (BH01 – BH21);
  - Cable percussive and sonic drilling methodology
- 12No. Window samples to 4.0mbgl (WS01 – WS12);
- 11No trial pits to 3.0mbgl (TP01 – TP11); and
- 3No. Trial pits for soakaway purposes to depths between 2.6 – 3.0mbgl (SA01 – SA03).

The ground investigation was undertaken in accordance with the Ground Investigation Strategy and Specification (WIE16172-100-S-1-1-4-GI_SPEC, October 2020) which should be referred to for a detailed review of the ground investigation methodology. Pertinent details have been included in Section 4 as required only to avoid repetition between documents.

The investigation locations and features targeted are included in Table 3.

Table 3: Ground Investigation Strategy

Feature	Exploratory Holes	Monitoring Wells
Aboveground fuel storage tanks and oil store at northernmost corner of the Site	BH02; WS01; WS11; TP09; TP10	Installed screening Made Ground and uppermost London Clay Formation at BH02, WS01 and WS11
Acid bath at northernmost corner of the Site	WS12	Installed screening Made Ground and uppermost London Clay Formation
Electrical substation at north of the Site	WS02	Installed screening Made Ground and uppermost London Clay Formation
Electrical substation at south-east of Site	WS04	None
Petrol and gardening chemicals store in centre of the Site	TP04	None

In addition to targeting potentially contaminative features the exploratory holes were located to inform characterisation for waste classification purposes and to inform foundation design.

An Unexploded Ordnance (UXO) risk was identified for the Site as part of the desk study. UXO briefings were provided to all personnel ahead of works commencing. A UXO specialist monitored all drilling and excavation works, and probed exploratory locations during excavation to maximum bomb penetration depth.

4.1 Deviations

The ground investigation encountered several obstructions which restricted the progress of several exploratory holes. These include;

- BH01 – Large concrete obstructions in five positions surrounding original location at 0.75mbgl – 1.35mbgl requiring borehole repositioning northwards. BH01 was completed to its scheduled depth in its repositioned location (BH01E).
- WS09 – Terminated at 0.9mbgl due to obstruction. WS09 repositioned and completed to scheduled depth;
- TP03 – Concrete obstruction at 0.8mbgl. TP03 repositioned and completed to scheduled depth;
- TP04 – Concrete obstructions encountered at 0.97mbgl and 1.7mbgl. Both obstructions broken through and trial pit completed to scheduled depth.

The deviations to the original ground investigation scope as detailed in the Waterman 2020 Ground Investigation Specification and Strategy did not affect the ground investigations ability to meet its objectives.

4.2 Ground Conditions

A summary of the geological strata encountered is shown in Table 5.

Table 4: Geological Strata Encountered

Soil Type	Depth of Top of Stratum (m bgl)	Thickness (m)	Typical Description
Made Ground	0m	0.36 to 2.6	Concrete, tarmac, brick or topsoil in soft landscaping areas over soft orange brown slightly sandy gravelly clay. Gravel is subangular to subrounded fine to coarse, mixed lithologies including fragments of brick and concrete, chert and quartzite.
London Clay Formation	0.36 to 2.6	Base not proven at 40m	Soft, dark brown clay with claystone bands. Claystone bands found between 0.2 and 0.8m thick encountered at depths between 2.0m and 28.2, bgl in boreholes BH01, BH02, BH06, BH10, BH13, BH18 and BH21.

Soil samples were taken in accordance with the methodology set out in the Ground Investigation Strategy and Specification, and scheduled for the previously identified contaminants of concern given the Site's historical and current uses. The soil samples were tested at I2 Analytical a UKAS and MCERT accredited laboratory. The soil laboratory results are included in Appendix C. Assessment of the laboratory results against the Generic Assessment Criteria (GAC) relevant to the proposed end use is included in Section 5.

4.2.1 Visual and Olfactory Observations

During excavation works, olfactory evidence for hydrocarbon contamination was observed at the following locations

Table 5: Evidence for Contamination Encountered During Works

Exploratory Hole	Soil Type	Depths (m bgl)	Description
BH02	Made Ground	0.35 to 1.9	Hydrocarbons
BH03	Uppermost London Clay Formation	0.4 to 0.65	Hydrocarbons/Diesel
BH09	Made Ground	0.2 to 0.6	Organic/hydrocarbons
BH19	London Clay Formation	2.0 to 3.2	Hydrocarbons
WS01	Made Ground	1.5 to 2.2	Hydrocarbons
WS12	Made Ground	0.15 to 1.55	Hydrocarbons
TP09	Made Ground	0.4 to 1.35	Hydrocarbons/Diesel

4.2.2 Controlled Waters

Consistent with the strategy detailed in the 2020 Ground Investigation Specification and Strategy boreholes completed to scheduled depths were installed with response zones in the Made Ground and uppermost London Clay Formation to identify if perched groundwater is present and to assess its quality. The primary purpose of the groundwater sampling and analysis is to inform the construction contractor of the quality of perched water that may be encountered in excavations with respect to its discharge to the Thames Water foul sewer.

Two rounds of follow-up groundwater level monitoring have been undertaken, with collection of samples. Deeper installations have been placed within the London Clay Formation to assess water level for geotechnical purposes. Groundwater samples have not been collected from wells installed at depth. Table 6 details the installation design.

Table 6: Monitoring Well Installations

Location	Depth (m bgl)	Response Zone (m bgl)	Targeted Strata	Installation Purpose
BH01 (deep)	35.00	31.00 – 35.00	London Clay Formation	Geotechnical
BH01 (shallow)	3.00	1.00 – 3.00	London Clay Formation	Groundwater and vapour
BH02 (deep)	25.00	21.00 – 25.00	London Clay Formation	Geotechnical
BH02 (shallow)	3.00	1.00 – 3.00	London Clay Formation	Groundwater and vapour
BH04	35.00	31.00 – 35.00	London Clay Formation	Geotechnical
BH05	35.00	31.00 – 35.00	London Clay Formation	Geotechnical
BH06	8.00	5.00 – 8.00	London Clay Formation	Groundwater and vapour
BH08	8.00	5.00 – 8.00	London Clay Formation	Groundwater and vapour
BH09	35.00	31.00 – 35.00	London Clay Formation	Geotechnical
BH10	35.00	31.00 – 35.00	London Clay Formation	Geotechnical
BH12	8.00	5.00 – 8.00	London Clay Formation	Groundwater and vapour
BH14	35.00	31.00 – 35.00	London Clay Formation	Geotechnical
BH16	35.00	31.00 – 35.00	London Clay Formation	Geotechnical

Location	Depth (m bgl)	Response Zone (m bgl)	Targeted Strata	Installation Purpose
BH18	8.00	5.00 – 8.00	London Clay Formation	Groundwater and vapour
BH19	35.00	31.00 – 35.00	London Clay Formation	Geotechnical
BH21	35.00	31.00 – 35.00	London Clay Formation	Geotechnical
WS01	4.00	1.00 – 4.00	Made Ground	Groundwater and vapour
WS02	4.00	1.00 – 4.00	Made Ground	Groundwater and vapour
WS05	4.00	1.00 – 4.00	Made Ground	Groundwater and vapour
WS07	4.00	1.00 – 4.00	Made Ground	Groundwater and vapour
WS08	4.00	1.00 – 4.00	Made Ground	Groundwater and vapour
WS10	4.00	1.00 – 4.00	Made Ground	Groundwater and vapour
WS11	4.00	1.00 – 4.00	Made Ground	Groundwater and vapour
WS12	4.00	1.00 – 4.00	Made Ground	Groundwater and vapour

Two post fieldwork monitoring rounds (05 February and 11 March 2021) have been completed, which included groundwater level monitoring, and groundwater sampling on both occasions.

Groundwater levels in monitoring wells installed in the Made Ground were recorded between 0.75mbgl and 2.20mbgl. A groundwater flow direction is absent, consistent with water in the Made Ground not being a controlled water receptor and having a low migration potential. Groundwater levels in the London Clay Formation in monitoring wells installed at depth were recorded between 7.79mbgl to 24.11mbgl.

Groundwater samples have been recovered on two occasions (05 February and 11 March 2021). On each occasion, water was collected from all locations where sufficient head of water was present. The following groundwater samples were analysed for the contaminants of concern on each occasion;

- 5 February 2021 - BH6, BH18.
- 11 March 2021 – BH6, BH18, BH12, WS01, WS02.

4.2.3 Ground Gas

Ground conditions encountered during the ground investigation were as anticipated with a shallow inert Made Ground overlying the cohesive inert London Clay. Evidence of significant organic matter in the Made Ground was absent, consistent with the Made Ground having a low ground gas generational potential as identified in the PERA.

To enable a robust assessment of the Site's ground gas regime wells installed in the Made Ground have been monitored for ground gas on two occasions. The ground gas monitoring results are included in the Groundtech Factual Report in Appendix B, and can be summarised as the following.

- Ground gas flow - <0.1l/hr (below detection limit);
- Methane - <0.1% (below detection limit)
- Carbon dioxide - <0.1 – 4.6%. (0.1% detection limit).

Total Organic Carbon (TOC) analysis was undertaken on Made Ground samples. Whilst forensic description of the Made Ground was not undertaken the relative homogeneity of the Made Ground, and absence of bulk material typically associated with landfills (wood, branches, textiles, cloth, vegetable matter etc) indicates the TOC fraction recorded is representative.

The TOC concentration recorded in the Made Ground samples was between 0.1% and 3.3% with an average value of 0.77%. As detailed in BS8485 (2015+A12019) and in the 2012 CL:AIRE RB17 document a TOC concentration <1.0% as consistent with a CS1 classification. The low TOC Concentration is consistent with a Made Ground which has a low ground gas generation potential.

4.2.4 Vapours

The Site's vapour regime has been assessed in a multiple lines of evidence through using soil headspace analysis, vapour monitoring, volatile soil and groundwater laboratory analysis, and vapour sample results. A qualitative review of the data identifies the following;

Soil Headspace Analysis

Headspace analysis for the majority of soil samples collected did not record concentrations above the limit of detection for the equipment at 0.1ppm. Minor elevated concentrations up to 29.8ppm were recorded in occasional samples of Made Ground, however these were not consistently encountered at any area of the Site and are not thought to represent a significant source.

Soil Laboratory Analysis

Volatile contaminants in exceedance of the laboratory limit of detection were absent in the soil laboratory analysis complete.

Groundwater Laboratory Analysis

Analysis of groundwater samples for Volatile Organic Contaminants (VOC), Semi-Volatile Organic Contaminants (SVOC), BTEX (Benzene, Toluene, Ethyl Benzene, Xylene), Petroleum Hydrocarbons recorded all volatile contaminants below the laboratory limit of detection consistent with the soil laboratory results.

Vapour Monitoring

Vapour monitoring results in the two monitoring events did not identify significant concentrations, with values recoded between <0.1ppm and 1.8 ppm.

A quantitative assessment of the groundwater laboratory results and vapour sample results is included in Section 6.

5. Human Health Risk – Soil

5.1 Generic Assessment Criteria – Soil

The proposed Development will incorporate mixed residential and commercial end-uses, and will include areas of shared open space. Private hard landscaped terraces are proposed at ground level however private soft landscaping is not proposed. The Generic Assessment Criteria (GAC) used to assess the soil contamination results have therefore be dictated by the proposed end use and include the following;

- Areas to be occupied by buildings and soft landscaping; Residential without plant uptake GAC (RESI) and
- Areas of shared landscaping – Public Open Space close to residential housing GAC (POS_{RESI})

The RESI GAC have been used to initially screen all soil results. Where identified, exceedances have been subject to further analysis using the POS_{RESI} GAC, where the sample is in a location where shared landscaping is proposed.

In areas of proposed hardstanding future Site users will be prevented from coming into direct contact with contaminants and therefore no further assessment is considered necessary.

Organic matter concentrations within soil samples varied between <0.1% and 5.8%, with an average of 1.24%. Therefore, a Soil Organic Matter (SOM) content correction of 1% was applied to the GAC.

The assessment of Polycyclic Aromatic Hydrocarbons (PAHs) was undertaken through the use of benzo(a)pyrene as a surrogate marker for all carcinogenic PAHs. This approach was set out by the Health Protection Agency (now Public Health England) and adopted in the 2013 C4SL guidance. The surrogate marker approach assumes the cancer risk of PAHs in a complex mixture is proportional to the concentration of a surrogate marker benzo(a)pyrene, and therefore accounts for the insufficiencies present in the toxicity database for the less well studied PAH contaminants.

The use of benzo(a)pyrene as a surrogate marker is only valid where the PAH soil profile is sufficiently similar to the coal tars mixtures used as the toxicological benchmarks in tests by Culp et al (1998). Screening of the PAH concentrations using the LQM 2015 profiling tool identifies all samples as being consistent with the coal tars making the application of the surrogate marker approach as valid.

5.2 Quantitative Risk Assessment – Soil

Future Site users

The initial assessment of the soil laboratory results against the Residential end use with plant uptake identified the following contaminant exceedances set out in Table 7.

Table 7: Soil Laboratory Results Exceedances

Contaminant	Exploratory Holes (Depth (m))	Soil Sample Concentrations (mg/kg)	RESI Threshold Value (mg/kg)	POS_{RESI} Threshold Value (mg/kg)	POS_{RESI} Exceedances
Beryllium	BH04 (0.5)	2.3	1.7	2.2	Yes
Mercury	WS01 (1.5), WS10 (0.5)	1.7 – 1.8	310	16	No
Benzo(a)pyrene	BH02 (0.5, 1.7), TP09 (1.0), TP10 (0.7)	3.7 – 14.0	3.2	5.7	Yes

The soil laboratory results are consistent with those typical of an inner city brownfield Site in which elevated metals and PAH are not unexpected. The concentrations of metal and PAH contaminants relative to the threshold values are marginally elevated only.

At three investigation locations where hydrocarbon contamination was identified deeper into the Made Ground, additional specific sampling and testing for TPH was undertaken. This comprised sampling from BH03 at 1m and 1.7m bgl, WS01 at 2.5m bgl and WS12 at 2m and 3m bgl. Of these samples, none identified any fraction of TPH above the limit of detection.

The distribution of exceedances are predominately along the northern Site elevation, with few exceedances to the south. Exceedances of both RESI GAC and POS_{RESI} GAC were identified outside areas of hardstanding/building footprint, where future soft landscaping is proposed.

Asbestos fibres have been identified in seven locations, with a lateral distribution across the Site. Quantification analysis records asbestos between <0.001% and 0.015%. The presence of asbestos fibres within Made Ground is not uncommon in inner city sites.

Laboratory exceedances were not recorded in any samples collected from the London Clay Formation.

The soil laboratory results provide a snapshot of ground conditions and the Site's contamination status. The laboratory results identify the contamination status of the Made Ground as consistent with an inner city site, with marginal metal and PAH exceedances and infrequent asbestos fibres.

Where future Site users are able to come into direct contact with the Made Ground in areas of soft landscaping, a complete pollutant linkage exists which will require mitigation.

Details of how these pollutant linkages will be broken will be included in a Remediation Strategy, and will include the following;

- Buildings and areas of hardstanding will break the pollutant linkage by forming a barrier between soil and future Site users, with no further mitigation required;
- The earthworks required to create a level platform across the Site will remove Made Ground in some areas and increase levels in other areas. Where the Made Ground is removed down to the underlying London Clay Formation, removal of this source would break the pollutant linkage to future receptors and further mitigation measures would not be required;

- In instances where Site won Made Ground or imported material is used to increase levels, if this material cannot be confirmed as free from contaminant concentrations above GAC, the pollutant linkage will be broken by a suitable thickness of certified clean cover material;
- In soft landscaping areas, a cover layer of suitable topsoil and subsoil verified as compliant with the applied GAC will be required (anticipated at least 0.3m thickness). Material used in the cover layer should also be demonstrated to be suitable for landscaping requirements, as detailed by the appointed landscaping contractor;
- The results of the soil analysis did not indicate the presence of gross hydrocarbon contamination in the location of the former fuel storage tanks on the north of the Site. However, during demolition and removal of the tanks a watching brief should be in place to assess for the presence of unchartered hydrocarbon contamination in this area. Should unchartered contamination be encountered, a method for its removal and validation of the area would be agreed.

6. Human Health Risk - Vapours

6.1 Generic Assessment Criteria - Vapours

A qualitative and quantitative assessment of the risk posed by vapours to future human health receptors has been undertaken.

The risk from vapours to future Site users has been assessed using soil headspace analysis, vapour monitoring and VOC laboratory testing of soil, and groundwater, and through comparison of the groundwater sample results against the Society of Brownfield Risk Assessment (SoBRA) derived vapour GAC (VAP_{GW}).

The SoBRA VAP_{GW} builds in several precautionary assumptions into its model, including;

- No biodegradation is occurring between the source term, and the receptor;
- The groundwater is at 0.65mbgl;
- The geology on-Site is a sandy stratum; and
- The omission of capillary fringe between the saturated and unsaturated zones.

Given the differences in the proposed Development and ground conditions on-Site relative to the SoBRA model, and the geological and hydrogeological conditions at the Site, comparison of the groundwater results against the SoBRA VAP_{GW} will form a conservative approach.

6.2 Quantitative Risk Assessment – Vapours

A review of the lines of evidence used to assess if a significant vapour regime is present on-Site records the following;

- Soil headspace analysis recorded low vapour concentrations within all soil samples taken, with results generally below the limit of detection. Minor elevated concentrations up to 29.8ppm were noted, however these were not consistent across the Site and are not considered to represent a vapour source.
- Follow-up vapour monitoring within installed monitoring wells recorded low vapour concentrations between <0.1ppm and 1.8ppm in all monitoring wells.
- Soil and groundwater laboratory analysis of volatile contaminants recorded them below the laboratory limit of detection. Assessment of soil laboratory results against the residential with plant uptake GAC recorded contaminants with a significant vapour pathway as below the threshold values.
- Comparison of the groundwater laboratory results against the SoBRA VAP_{GW} recorded all contaminants below the threshold values.

The above lines of evidence indicate a significant vapour regime is absent on-Site and vapour mitigation measures would not be required in the bult development.

As set out in Section 5.2, a watching brief should be in place to assess for the presence of unchartered hydrocarbon contamination in the location of the former fuel storage tanks on the north of the Site.

7. Human Health Risk – Ground Gas

The Site's ground gas regime has been assessed as part of the PERA as presenting a low risk. As part of the ground investigation laboratory analysis of soil samples for TOC, and completion of two rounds of ground gas monitoring were undertaken to increase the robustness of this initial assessment.

The TOC concentrations in soil laboratory results were recorded at a maximum of 1.9%, with an average of 0.8%.

The ground gas monitoring results recorded low methane (0.1% v/v) and carbon dioxide concentrations (<0.1% - 4.7% v/v) and ground gas flow below the detection limit (<0.1l/hr).

The TOC and ground gas data confirm the initial assessment in the PERA in that the Made Ground has a low ground gas generational potential. A ground gas risk to future Site users is absent and ground gas protection measures in built structures would not be required.

8. Risk to Vegetation

The results of soil analysis were assessed against the criteria in Table 8 assuming an average soil pH of 8.5.

Table 8: Soil Criteria for Phytotoxic Metals

Contaminant*	pH		
	<6	6.0 to 7.0	>7
Zinc (Nitric acid extractable**)	<200mg/kg	<200mg/kg	<300mg/kg
Copper (Nitric acid extractable**)	<100mg/kg	<135mg/kg	<200mg/kg
Nickel (Nitric acid extractable**)	<60mg/kg	<75mg/kg	<110mg.kg

Footnotes: * The lower of the Generic Assessment Criteria for chemical contaminants (human health and the environment) and phytotoxicity shall be used for topsoil

** The method of testing is given in Annex D to BS3882:2015 Specification for topsoil and requirements for use.

Three samples contained zinc greater than the 200m/kg threshold BH06 0.5m (290mg/kg), TP02 0.5m (430mg/kg) and BH9 0.5m (310mg/kg), and a single sample TP02 0.5m (280mg/kg) contained copper above the threshold concentration. Nickel was not detected in exceedance of the threshold.

With respect to the phytotoxins zinc, copper and nickel the exceedances recorded are very few in number and it is considered soil in Site does not pose a significant risk to vegetation.

Soft landscaping areas should be provided with a cover layer of at least 0.3m to break the linkage between future plants in landscaped areas and phytotoxins in the underlying Made Ground. The thickness of the material may be greater to achieve adequate protection depending on the planting strategy and should meet the full criteria of BS3882:2015.

9. Risk to Water Supply Pipes

Drinking water supply pipes are to be placed into clean service corridors using barrier pipe. The UKWIR project steering group decided that barrier pipes would provide sufficient protection for the supply of drinking water in all Brownfield site conditions. This approach would need to be agreed with Thames Water.

10. Controlled Waters

As detailed in Section 3.4, controlled water receptors on-Site and in the surrounding area are limited to the sensitive aquifers underlying the London Clay Formation at depth; comprising Secondary A Aquifers in the Lambeth Group and Thanet Formation, and the Principal Aquifer in the Chalk Group. Water present in the Made Ground is not a controlled water receptor. This water has limited lateral migration potential due to the cohesive makeup of this strata, and limited vertical migration due to the underlying London Clay Formation acting as an aquiclude.

A potential risk to the sensitive aquifers underlying London Clay Formation is present due to a disused abstraction well identified on the 1872 historical maps. The BGS record for this historical abstraction well identifies it as being decommissioned in June 1946 with the surrounding building demolished. Whilst the details of its decommissioning are not known it is unlikely the abstraction well remains as a preferential pathway. Notwithstanding the former location of abstraction well should be investigated as part of future earthworks.

Groundwater samples collected from available locations across the Site on two occasions were tested for the contaminants of concern. The laboratory results are included in Appendix C. As set out in Section 4.2.2 the purpose of the groundwater laboratory analysis was to inform future contractors in determining whether treatment of encountered water in the Made Ground was required prior to its discharge to foul sewer.

A review of the groundwater laboratory analysis results identifies; generally low metal concentrations, and petroleum hydrocarbon, PAH, BTEX, VOC, and SVOC below the laboratory detection limit. The groundwater laboratory results are consistent with the soil laboratory results identifying gross contamination or significant mobile contamination plumes as being absent on-Site.

11. Preliminary Waste Classification Assessment

11.1 Introduction

A Preliminary Waste Classification Assessment has been undertaken on discreet soil samples recovered from exploratory holes undertaken as part of the contaminated land assessment for the Site. The samples collected from each location are discreet and have not been sampled in strict accordance with UK Environment Agencies guidance WM3 *"Guidance on the classification and assessment of waste" (1st Edition v1.1 2018)"*. The assessment should be regarded as indicative only. Further assessment will be required once it is known how the waste will arise, and what off-site recovery or disposal options are available. The process of waste classification is set out in Appendix G.

The assessment considers whether or not the waste displays hazardous properties, and the potential for landfill as an off-site disposal option for the wastes based the findings of additional waste acceptance criteria (WAC) testing.

The hazardous property assessment has been undertaken using HazWasteOnline™. HazWasteOnline™ is a web-based tool for classifying hazardous waste. The tool follows the latest Environment Agencies guidance and European regulations. A summary of the assessment results is provided in Section 11.2.

11.2 Hazardous Property Assessment

The dry soils chemical analysis results from the ground investigation have been entered into HazWasteOnline™. A total of seventy-three soil samples have been screened for hazardous properties, comprising:

- Fifty-one samples of Made Ground; and
- Twenty-two samples of London Clay Formation.

Results from the HazWasteOnline™ assessment are included in Appendix G.

Chemical Determinants

A single sample of Made Ground was identified as containing hazardous properties by HazWasteOnline™. The sample, collected from BH02 in the north of the Site at 0.5m bgl recorded TPH concentrations at 1,780mg/kg. Although elevated hydrocarbons were recorded in other Made Ground samples in this area of the Site, none contained concentrations high enough to exceed the hazardous property threshold.

None of the London Clay Formation samples screened returned hazardous properties for any determinant, including samples from locations adjacent to BH02.

Asbestos

Forty-seven of the fifty-one Made Ground samples collected were screened for the presence of asbestos, of which detections were recorded in seven. Asbestos findings are set out in Table 9.

Table 9: Asbestos Detections within Made Ground

Location	Depth (m bgl)	Asbestos Type		Quantification (%)
BH02	0.50	Amosite	Sheeting/board debris	0.004
WS10	0.50	Chrysotile	Loose fibres	< 0.001
WS12	0.20	Chrysotile	Loose fibres	0.005
TP05	0.50	Amosite	Loose fibres	< 0.001
TP09	1.00	Chrysotile	Loose fibres	0.001
TP10	0.70	Crocidolite	Loose fibres	0.015
SA02	0.50	Chrysotile	Bitumen	< 0.001

Visible fragments of potentially asbestos containing materials were identified during field work, including sheeting/board debris and within bitumen. The hazardous waste threshold for asbestos that is not visible to the naked eye in soils is 0.1%. Therefore, the samples reported as containing asbestos as loose fibres did not return hazardous properties due to asbestos concentrations.

Where asbestos is present as identifiable fragments, but quantified at concentrations of less than 0.1%, waste soils are classified as a non-hazardous mixed waste.

11.3 Waste Acceptance Criteria

In addition to the HazWasteOnline™ assessment, Waste Acceptance Criteria (WAC) analysis was undertaken on six samples of Made Ground and a single sample of London Clay Formation. Testing was undertaken to indicate if soils may be suitable for disposal as inert waste or, if they contain hazardous properties whether they are suitable for disposal to hazardous waste landfill without further treatment.:

- BH02 at 0.5m bgl (Made Ground);
- BH04 at 0.5m bgl (Made Ground);
- BH06 at 0.5m bgl (Made Ground);
- BH09 at 0.5m bgl (Made Ground);
- WS04 at 0.3m bgl (Made Ground);
- WS10 at 0.5m bgl (Made Ground); and
- WS04 at 2.0m bgl (Made Ground/London Clay Formation interface)

Findings are summarised in Table 10.

Table 10: Summary of Waste Acceptance Criteria Results

Sample Reference	Strata	Hazard Property Assessment	Failed Waste Acceptance Criteria	Comment
BH02; 0.5m bgl	Made Ground	Non-Hazardous	None	Sample passes the inert landfill WAC
BH04; 0.5m bgl		Non-Hazardous	Fluoride at 12mg/kg Sulphate at 10,000mg/kg Total dissolved solids at 5,400mg/kg	Sample fails the inert landfill WAC
BH06; 0.5m bgl		Non-Hazardous	TPH at 780mg/kg PAH at 119mg/kg	Sample fails the inert landfill WAC
BH09; 0.5m bgl		Non-Hazardous	None	Sample passes the inert landfill WAC
WS04; 0.3m bgl		Non-Hazardous	None	Sample passes the inert landfill WAC
WS10; 0.5m bgl		Non-Hazardous	None	Sample passes the inert landfill WAC
WS04; 2.0m bgl	London Clay Formation	Non-Hazardous	None	Sample passes the inert landfill WAC

11.4 Preliminary Waste Classification Assessment Summary

WAC analysis undertaken on Made Ground samples indicated some Made Ground displaying no hazardous properties may be suitable for disposal as non-hazardous waste at an inert landfill, subject to further sampling and assessment in accordance with WM3. However, Made Ground containing asbestos is unlikely to be accepted at an inert landfill. The samples of Made Ground identified as containing hazardous chemical properties or asbestos fragments would not be suitable for disposal as inert, however could be disposed of as non-hazardous. The underlying London Clay Formation natural soils could be disposed of as inert.

The Preliminary Waste Classification Assessment has indicated the following European Waste Catalogue (EWC) code for the disposal of the materials.

- The majority of Made Ground and all London Clay Formation at the Site is classified as non-hazardous (EWC code 17 05 04: “soil and stones not containing hazardous properties”);
- Where visible asbestos or asbestos containing material (ACM) fragments are identified, the Made Ground is classified as EWC code 17 05 03*: “soils and stones containing hazardous substances”.

11.5 Options Appraisal

Removal of soils from the Site can be minimised by their re-use on-Site to facilitate filling where required, provided they are chemically and geotechnically suitable.

Any re-use of soils on-Site should be in accordance with the CL:AIRE Definition of Waste: Development Industry Code of Practice (DoWCoP), subject to appropriate sampling and testing, risk assessment and compliance with the requirements of the DoWCoP.

Further validation and waste classification pursuant to WM3, in particular Appendix D on waste sampling should be undertaken on materials to be removed from Site to confirm the most appropriate waste classification and receiving site. In accordance with the waste hierarchy, preference should be given to receiving sites able to recover value from the excavation wastes rather than landfill disposal facilities.

Natural uncontaminated soils may be used directly at sites operating in accordance with the DoWCoP in England and Wales. Uncontaminated concrete may be recovered for re-use on-Site subject to compliance with the WRAP Quality Protocol for Production of Aggregates from Inert Waste or recovered as inert waste subject to acceptance at an appropriately permitted facility.

Acceptance of waste is at the discretion of the receiving location. It is recommended the receiving site operator is consulted at the appropriate time to discuss the conditions of its Environmental Permit.

Segregation of different waste streams would be required prior to disposal of materials off-Site. “Mixed wastes” should be separated where technically and economically feasible. Where this is not feasible the waste is regarded as a mixed waste and classified accordingly. Separation may include mechanical screening or hand picking of materials, subject to relevant waste management regulatory controls and health and safety requirements.

12. Conclusions

As part of the GERA potential pollutant linkages were re-evaluated in relation to the additional information obtained. The re-assessment is summarised in Table 11.

Overall the risk rating for the Site is assessed as **Low**. Following implementation of the recommendations in Section 13 the Site is unlikely to be capable of being classified as Contaminated Land under the Environmental Protection Act 1990, thus meeting the requirements of paragraphs 120 to 122 of the National Planning Policy Framework

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Table 11: Conceptual Site Model

Receptor	Potential Sources	Pathways	Risk	Justification / Mitigation	Residual Risk
Human Health					
Future Site users	Contaminants within Made Ground	Dermal contact, ingestion, and inhalation	Medium	Elevated contaminants are present in the Made Ground. The proposed Development will include hardstanding. In hardstanding areas the direct pathway to future Site users will be removed, breaking the pollutant linkage. In areas of soft landscaping the potential exists for future Site users to come into contact with Made Ground. In these areas a cover layer of not less than 300mm (public open space areas) of suitable for use material will be required where it cannot be demonstrated material present at formation level is suitable with respect to the risk pose to future Site users and from a landscaping perspective. Upon implementation of the cover layer in soft landscaping areas the risk to future Site users will be mitigated and no further remedial measures will be required. The cover layer details will be set out in a Remediation Strategy. A watching brief should be in place during the removal of the former fuel storage tanks on the north of the site to assess of unchartered contamination is present.	Low
	Ground gas	Accumulation in internal and confined spaces with potential risk of explosion, inhalation and asphyxiation.	Low	A significant ground gas regime is absent and ground gas protection measures will not be required in built developments.	Low
	Vapour		Low	A significant vapour regime is absent and vapour protection measures will not be required in built developments.	Low
Construction Workers	Contaminants within the Made Ground and perched groundwater	Dermal contact, ingestion and inhalation	Low	Contaminants and asbestos fibres have been recorded in the Made Ground. During construction, ground workers will come into direct contact with contaminants, exposing them to an unacceptable risk without mitigation measures being taken. Construction workers should wear the appropriate Personal Protection Equipment (PPE), Respiratory Protective Equipment (RPE), adhere to good hygiene and safe working practices, the Confined Space Regulations 1997, and the Control of Asbestos Regulations 2012.	Low
Off-site residents/users	Contaminants within the Made Ground	Dispersion off-site through wind entrainment leading	Medium	Contaminants have been recorded in the Made Ground which could disperse off-site during construction works notably during earthworks.	Low

Receptor	Potential Sources	Pathways	Risk	Justification / Mitigation	Residual Risk
		to direct contact and inhalation.		During construction good working practices for dust suppression should be employed to limit dust creation and migration as far as is practically possible.	
Property					
On-Site structures	Potentially hazardous ground conditions	Chemical attack on buried services and foundations	Low	Buried foundations and services will be designed to meet ensure they are resistant to chemical attack given the parameters recorded during the ground investigation. The appropriate buried concrete design classifications will be detailed in the Geotechnical Assessment for the Site, reported separately.	Low
Controlled Waters					
Deep groundwater (Secondary A and Principal Aquifer)	Potential contamination in perched groundwater	Migration of contaminants through pathway created by historical abstraction well, to deeper aquifers.	Low	There is no aquifer present on-Site above the London Clay Formation, hence a shallow controlled water receptor is not present. The absence of an aquifer above the London Clay formation removes a plausible pathway for migration of groundwater off site. The London Clay prevents downward migration of contaminants to underlying aquifers. The historical abstraction well was recorded as decommissioned by the BGS in 1946 restricting its potential to act as a preferential pathway. As part of the development construction works the presence and status of this abstraction well should be investigated.	Low

13. Recommendations

The following actions are recommended to address the potentially unacceptable risks that remain:

- A Remediation Strategy should be prepared detailing the mitigation measures required during construction. The Remediation Strategy would be limited in its scope, due to the absence of considerable widespread contamination on the Site and primarily refer to construction practices required on all UK sites, these would include appropriate waste handling and management, dust suppression, and water management. Given the cover layer requirement in soft landscaped areas the Remediation Strategy should also set out the cover layer thickness and contaminant threshold criteria for its make-up. Again, the provision of a cover layer in soft landscaped areas is a common requirement on UK sites completed on brownfield land;
- The Remediation Strategy should also detail measure to locate the former abstraction well on-Site in order to determine if it has been adequately decommissioned;
- The Remediation Strategy should also include details of a watching brief during the demolition of the former fuel storage tanks on the Site and measures to be carried out if unforeseen contamination is encountered.
- Following completion of the proposed development a Verification Report should be produced documenting the mitigation and/or validation measures employed during demolition and construction;.
- Construction workers should wear the appropriate PPE, if required RPE, adopt good hygiene and safety practice and adhere to the Confined Space Entry Regulations 1997, and Control of Asbestos Regulations 2012;
- Concrete should be designed with due attention paid to the classifications set out in the separately produced Geotechnical Interpretative Report;
- The appropriate water company should be consulted on the required potable water supply pipe specification, given the intrusive investigation results; and
- Any re-use of soils on-Site should be in accordance with the CL:AIRE Definition of Waste Code of Practice.

APPENDICES

Appendix A Site Plans

- A1: Site Location Plan
- A2: Site Plan
- A3: Ground Investigation Plan
- A4: Conceptual Site Model
- A5: Proposed Development Plans, Plots A-E

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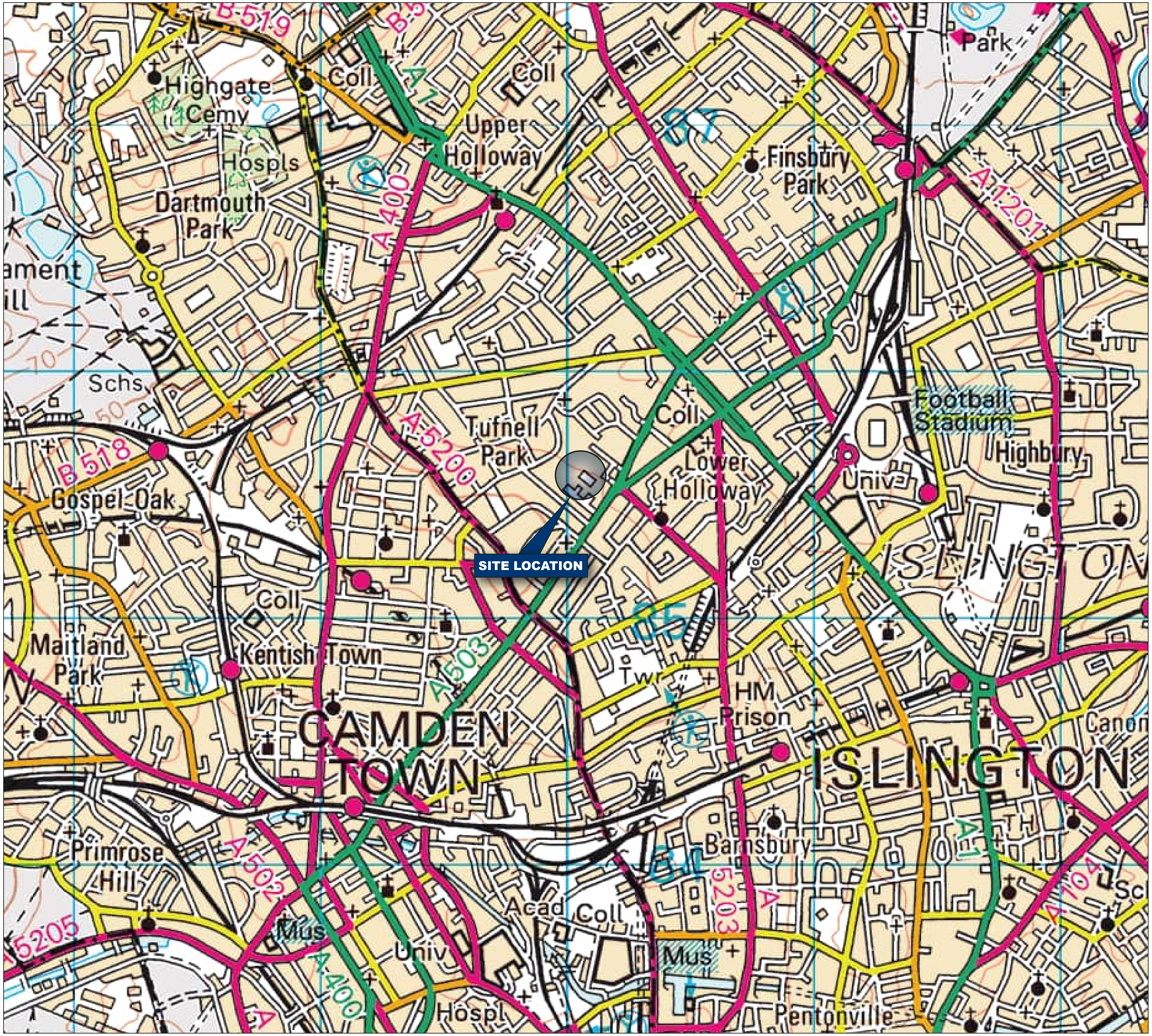

Project Details	WIE16172-100: Holloway Prison, Parkhurst Road, London N7 0NU
Figure Title	Figure A1: Site Location Plan
Figure Ref	WIE16172-100_GR_PERA_A1A
Date	September 2019
File Location	\\s-lncs\wiel\projects\wie16172\100\graphics\pera\issued figures

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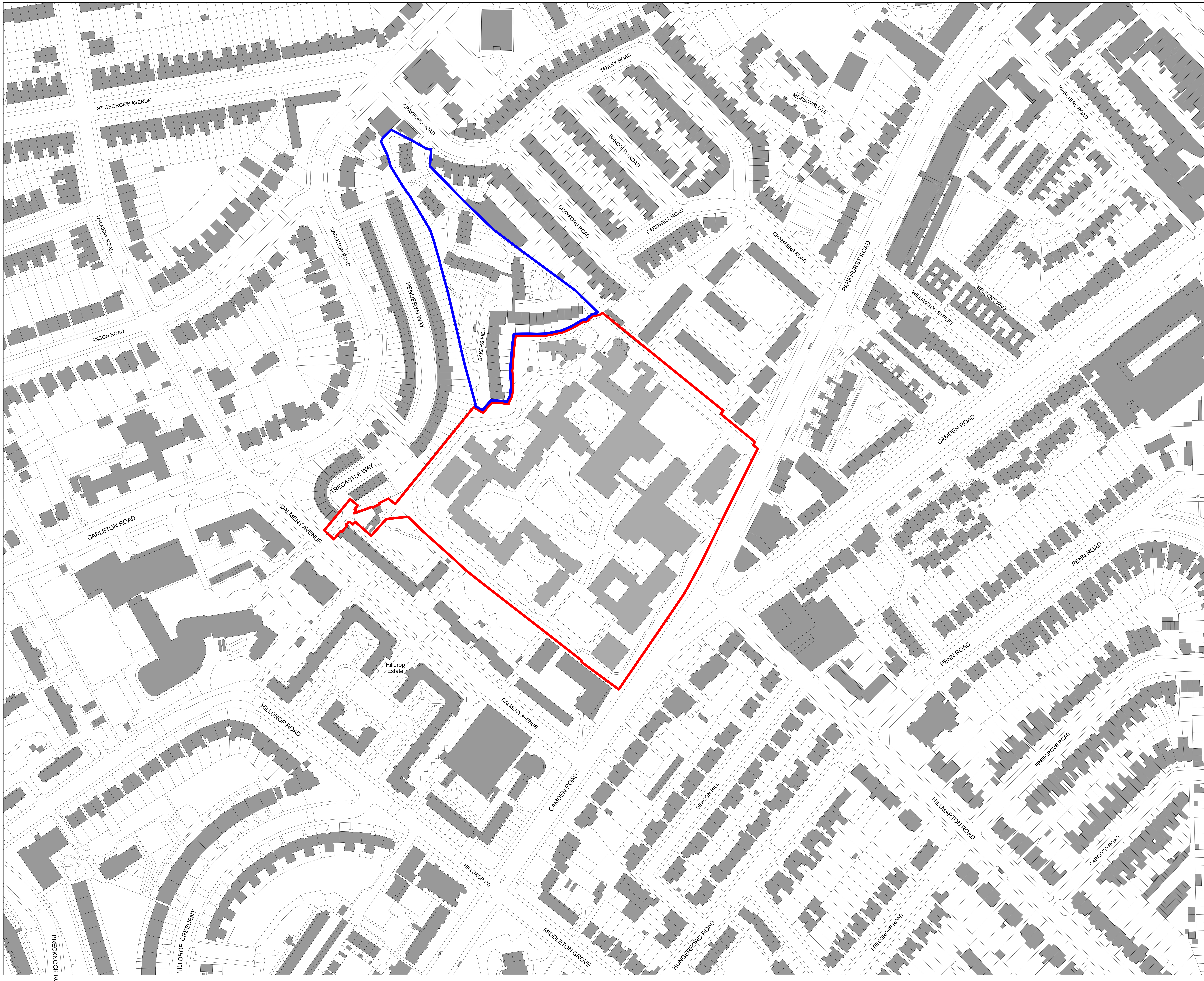

KEY

Application boundary

Land in the ownership of the applicant which is outside the application site
Peabody Freehold Title (NGL805622)

Application boundary area: 4.16 Hectares

REV	DATE	
D	15/10/2021	DRAFT PLANNING
C	08/10/2021	INFORMATION
B	01/10/2021	INFORMATION
A	27/08/2021	DESIGN FREEZE 1
-	26/08/2021	DRAFT FOR INFORMATION

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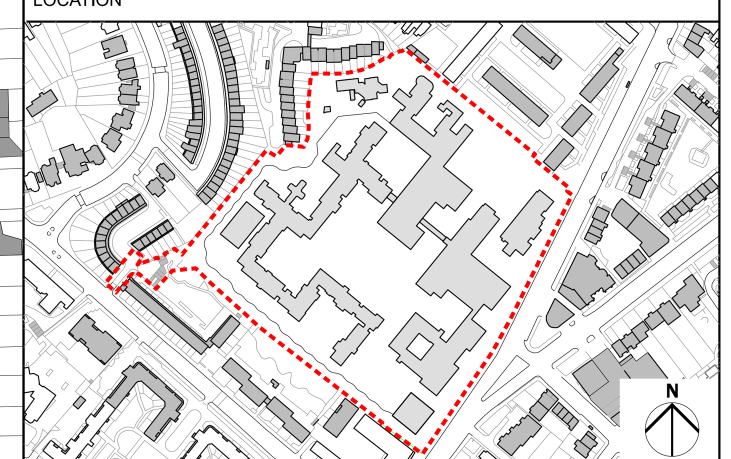
LOCATION



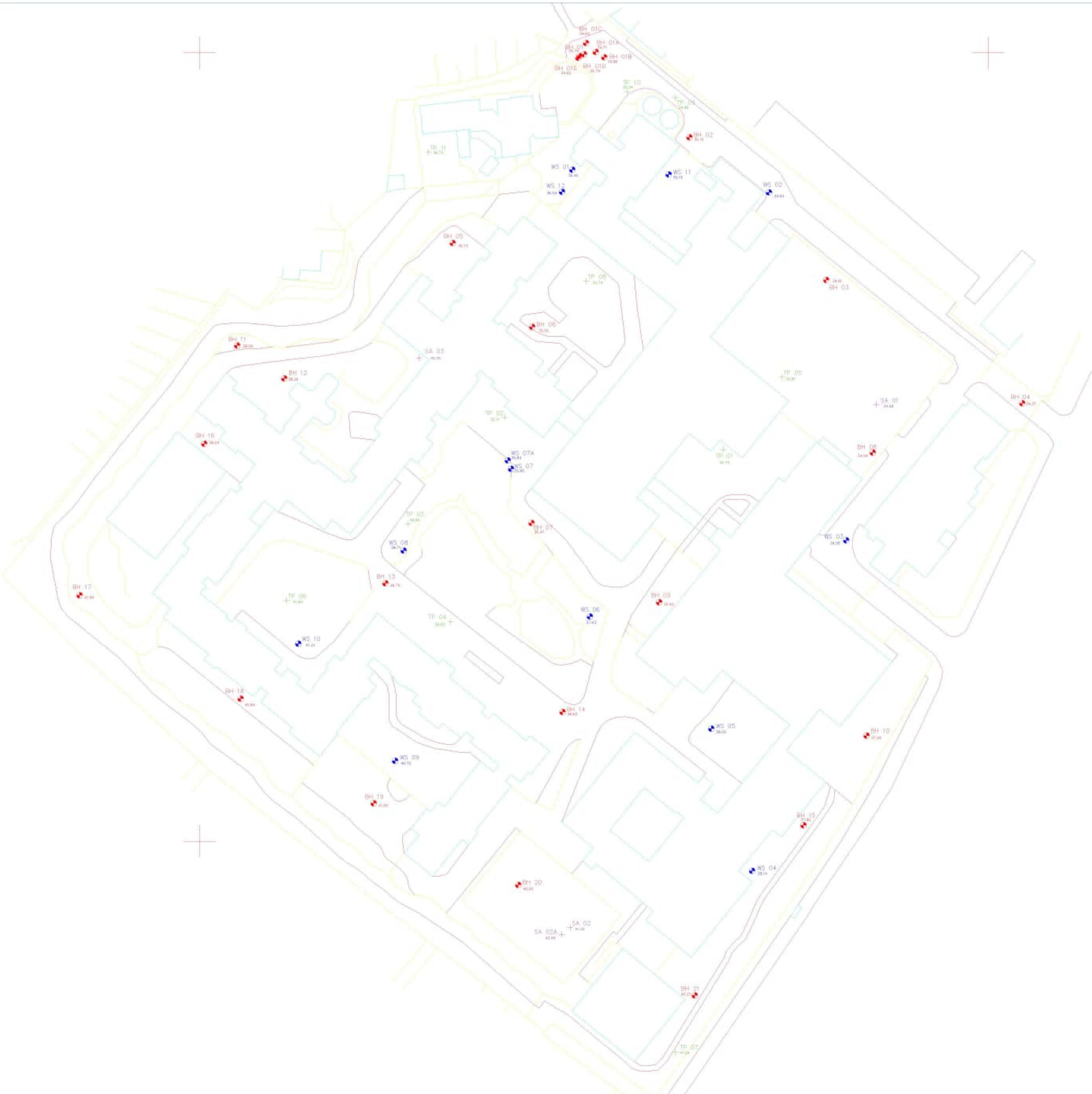
ALLFORD HALL MONAGHAN MORRIS
ARCHITECTS Ltd
MORELANDS, 5-23 OLD STREET LONDON EC1V 9HL
TEL 020 7251 5261 FAX 020 7251 5123 WEB WWW.AHMM.CO.UK

job title
PROJECT HOLLOWAY

drawing title / location
LOCATION PLAN

drawn by	checked	scale	status
AC	LL	1:1250@A1; 1:2500@A3	INFORMATION

project	zone	source	classification	drawing no.	revision
17105	0	-	(00)	_001	D



GROUNDTECH
CONSULTING

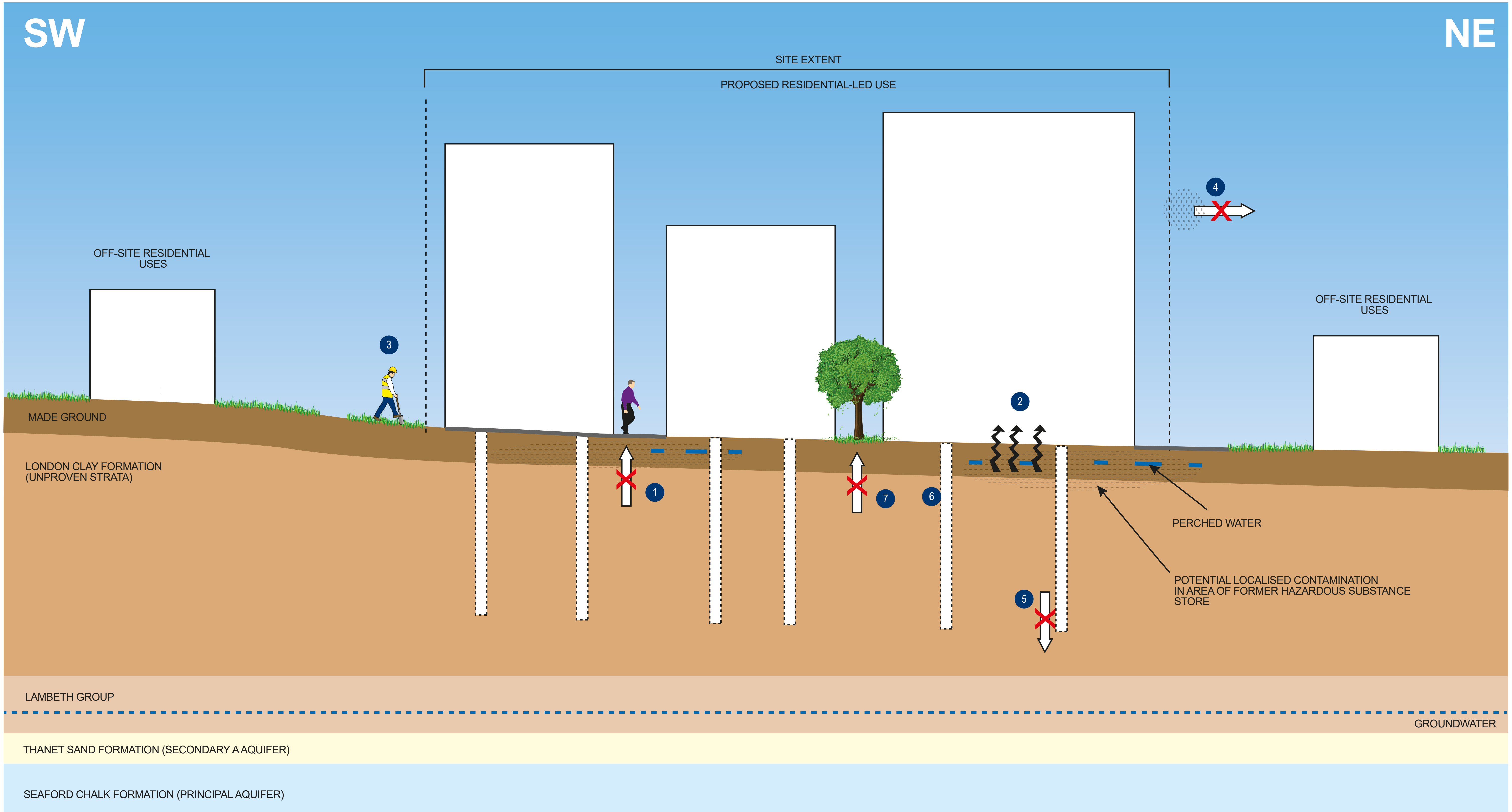
CLIENT	DATE
WATERMAN I&E	APRIL 2021
PROJECT TITLE	SCALE
HMP HOLLOWAY	NTS
PLAN TITLE	PLAN NUMBER
EXPLORATORY HOLE LOCATION PLAN	GRO-20291-P02

Rev.	Details	Date

Status	
Preliminary	
Draft	
Issued	●
For Comment	
Approved	

Notes

- WINDOW SAMPLE LOCATION
- CABLE PERCUSSIVE / SONIC BOREHOLE LOCATION
- SOIL PERCOLATION TEST LOCATION
- MACHINE EXCAVATED TRAIL PIT LOCATION



1. Potential for localised contamination in Made Ground, shallow natural soils and groundwater. Contamination pathway to future Site users will be blocked by hardstanding, building cover and managed soft landscaping.
2. Potential ground gas and vapour risk from localised soil and groundwater contamination, if present. Ground investigation to confirm the requirement for ground gas/vapour monitoring and protection measures. Ground investigation to include environmental sampling and analysis, PID headspace monitoring and exploratory observations.
3. Construction workers will need to be provided with appropriate Personal and Respiratory Protective Equipment (PPE/RPE), adopt good hygiene Standards and undertake works in line with relevant legislation.
4. Contamination dust pathway blocked by Construction Environmental Management Plan (CEMP) implementation.
5. Potential deep groundwater contamination pathway blocked by London Clay Formation. Foundations are likely to terminate in the London Clay Formation.
6. The results of ground investigation should be used to determine the design specification of buried foundations and services..
7. topsoil used for communal soft landscaping will be confirmed as suitable for use.

Project Details	WIE16172-100: Holloway Prison, Parkhurst Road, London N7 0NU
Figure Title	Figure A4: Conceptual Site Model
Figure Ref	WIE16172-100_GR_PERA_A4A
Date	September 2019
File Location	\\s-lncs\wiel\projects\wie16172\100\graphics\pera\issued figures

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KEY

1 BED	CYCLE STORE
2 BED	EXTRA-CARE
3 BED	AFFORDABLE TENURE
4 BED	MARKET TENURE
WOMENS CENTER	ROOF PRIVATE TERRACE
REFUSE STORE	SITE BOUNDARY
COMMERCIAL	
MEP	
HEAT PUMPS	

0 1m 2m 5m 10m

LANDSCAPE AND PUBLIC REALM INDICATIVE. REFER TO LANDSCAPE ARCHITECT INFORMATION.

ROAD LAYOUT IS INDICATIVE AND TO BE CO-ORDINATED

REV	DATE	
G	31/08/21	DESIGN FREEZE 1
F	24/08/21	INFORMATION
E	13/08/21	INFORMATION
D	02/08/21	INFORMATION
C	02/07/21	INFORMATION
B	30/06/21	INFORMATION
A	25/06/21	INFORMATION
-	10/06/21	INFORMATION

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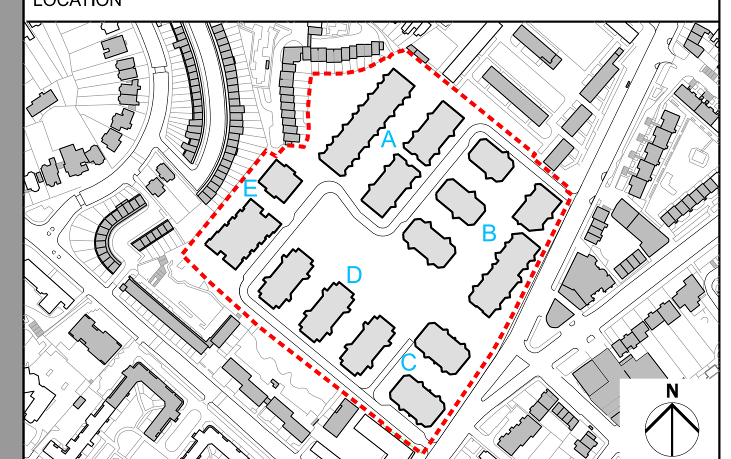

ALLFORD HALL MONAGHAN MORRIS
ARCHITECTS Ltd
MORELANDS, 5-23 OLD STREET LONDON EC1V 9HL
TEL 020 7251 5261 FAX 020 7251 5123 WEB WWW.AHMM.CO.UK

job title
PROJECT HOLLOWAY

drawing title / location
MASTERPLAN
UPPER GROUND FLOOR

drawn by	checked	scale	status
AC	LL	1:500@A1; 1:1000@A3	INFORMATION

project	zone	source	classification drawing no.	revision
17105	0	-	(00)_118	G