Remediation Strategy

84 Swallowfield Way
Hayes
Middlesex
UB3 1DQ

August 2023

507947.0003.0000

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1.0 Introduction

1.1 Purpose

TRC Companies Limited (TRC) was commissioned by Wrenbridge (FRELD Hayes) LLP (the 'Client') to prepare a Remediation Strategy for the development located at 84 Swallowfield Way, Hayes UB3 1DQ (hereafter referred to as the 'Site').

A Site location plan is provided as Figure 1 in Annex A.

The recommended conditions were set out in the response from the Land Contamination Officer regarding planning ref. 63099/APP/2023/1608, received on 31st May 2023 (see Annex B):

> *"(i) The development hereby permitted (excluding demolition, site clearance and any additional ground investigation works) shall not commence until a scheme to deal with unacceptable contamination has been submitted to and approved by the Local Planning Authority (LPA). All works which form part of a remediation scheme shall be completed before any part of the development is occupied or brought into use unless the Local Planning Authority dispenses with any such requirement specifically and in writing. The scheme shall include the following measures unless the LPA dispenses with any such requirement specifically and in writing:*
>
> *(a) A written method statement providing details of the remediation scheme/s, (including design and independent validation of suitably selected gas protection measures), and how the completion of all remedial works will be verified, shall be agreed in writing with the LPA prior to commencement, along with the details of a watching brief to address any undiscovered and/or unacceptable concentrations of contamination. No deviation shall be made from this scheme without the express agreement of the LPA prior to its implementation."*

1.2 Proposed Development

The proposed development comprises the demolition of existing structures and the construction of four adjoining warehouse units with associated first floor office and mezzanine floor space across the eastern portion of the Site. The units will each have associated car parking, service yards, and soft landscaping in the northern / north-eastern portion of the Site.

A proposed development plan is presented as Figure 2 in Annex A.

1.3 Scope of Services

This report aims to present a Remediation Strategy for the Site to ensure appropriate measures are undertaken to mitigate contaminated land risk associated with the Site's historical uses.

The Remediation Strategy has been prepared with due regard to the following guidance:

- The National Planning Policy Framework;
- BS10175 (2017) Investigation of Potentially Contaminated Sites – Code of Practice;
- BS5930 (2020) Code of Practice for Ground Investigations;
- Land Contamination: Risk Management (LCRM);
- BS8485 (2019) Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings;
- Local Planning Policy for the London Borough of Hillingdon; and,
- BS8676:2013 'Guidance on Investigations for Ground Gas – Permanent Gases and Volatile Organic Compounds (VOCs).

1.4 Previous Reports

This report should be read in conjunction with the following documents:

- CBRE, Environmental Due Diligence Report, 84 Swallowfield Way, Hayes, (January 2022, report ref. 508CDO445236).
- CBRE, Phase II Geo-environmental Assessment, 84 Swallowfield Way, Hayes V02 (May 2022, report ref. 508CDO445236/PII).
- Lustre Consulting, Geotechnical Site investigation, 84 Swallowfield Way, Hayes (January 2021, report ref. R17SI1.0-4223).
- TRC Companies Ltd. Phase I Geo-environmental and Geotechnical Site Assessment, Swallowfield Way, Hayes Rev 02 (May 2023, ref. 507947.0000.0000).
- TRC Companies Ltd. Phase II Geo-environmental and Geotechnical Site Assessment, Swallowfield Way Rev 02 (May 2023 ref. 507947.0001.0000).

2.0 Site Summary

2.1 Site Details

Table 1: Summary of Site Details

Site Address	Swallowfield Way, Hayes, UB3 1DQ
Grid Reference	Easting 508415, Northing 179723
Approximate Size	The Site is approximately 1.17 ha.
Site Location	The Site is located to the south of Rigby Lane / Swallowfield Way, Hayes.
Current Site Use	The Site currently comprises two storage units occupied by an industrial crane hire company in the south-eastern portion of the Site, a refuelling station located in the central portion of the Site, and temporary offices located in the northern portion of the Site. There is a small area of soft landscaping in the south-western portion of the Site. The Site is accessed via Rigby Lane / Swallowfield Way.

2.2 Summary of Adjacent Land Uses

Land uses in the immediate vicinity include the following principal features:

Table 2: Adjacent Land Uses

Direction	Land Use
North	Swallowfield Way / Rigby Lane beyond which lies a number of warehouse units comprising part of the Waterway Business Park. Approximately 100m north of the Site lies the Grand Union Canal.
East	Light industrial and commercial units housing a variety of businesses including pharmaceutical and food distribution companies.
South	A series of railway tracks running over a beam bridge are present immediately to the south beyond which lie residential premises approximately 60m from the southern Site boundary.
West	Light industrial and commercial units housing a variety of businesses including a recycling centre and portable building manufacturer.

2.3 Summary of Site History

Earliest available mapping (1868) shows that the Site appeared to be undeveloped agricultural land. By 1935, a railway line south of the Site was extended onto the Site. Further rail infrastructure was onsite from 1960, with the Site appearing as vacant from 1975. By 1999, a small structure was constructed across the northern portion of the Site. By 2023, additional small structures had been constructed in the south-eastern portion of the Site.

2.4 Summary of Environmental Setting

2.4.1 Geology and Hydrogeology

Table 3: Summary of Geology and Hydrogeology

Strata	Description	Aquifer Classification
Made Ground	Greyish brown very sandy gravel or orangeish brown slightly clayey gravelly sand.	Not Classified
Langley Silt Member	Orange silty slightly gravelly clay.	Principal Aquifer
Lynch Hill Gravel Member	Clayey sandy gravel or sandy clay.	Principal Aquifer
London Clay Formation	Silty clay with occasional shell fragments.	Unproductive Aquifer

The Made Ground was encountered within all exploratory holes and consisted of a heterogeneous mix of greyish brown very sandy gravel or orangeish brown slightly clayey gravelly sand. Reinforced concrete 0.20m to 0.30m thick was encountered at the top of all boreholes, with the exception of WS01 and WS03.

The thickness of the Made Ground encountered across the Site ranged from 0.60m to 2.80m. Refusals due to concrete obstructions were encountered within the Made Ground in the exploratory holes WS03 – WS07.

The Langley Silt Member was encountered to a maximum depth of 3.50m below ground level (bgl) within CP01, WS02, and WS08. The Langley Silt Member generally consisted as soft to very stiff brownish orange silty slightly gravelly clay. Gravel was angular to sub-rounded, fine to coarse grained. Gravel consisted of flints.

Values of SPTs in the Langley Silt Member were between 13 and 17, highlighting the stiff nature of the material.

The Lynch Hill Gravel Member was encountered in all of the exploratory holes not terminating in Made Ground from depths of between 0.80 – 3.50m bgl. The Lynch Hill Gravel Member generally comprised light brown sandy gravel or brownish orange slightly clayey, very gravelly sand. Sand was fine to coarse grained. Gravel was very angular to sub-rounded, fine to coarse grained. Gravel consisted of flint. Refusals due to the very dense nature of the material was encountered at depths between 1.65m and 4.00m bgl.

Variable values of SPTs were noted in the Lynch Hill Gravel Member where N60 values ranged between 21 and 56. The high variability likely relates to the variable gravel content of the stratum observed during the site investigation but also reflects the variable engineering properties of the material.

The London Clay Formation was encountered to a maximum proven depth of 10.0m bgl. It was recorded as homogenous in nature comprising stiff brown clay over stiff to very stiff grey clay.

2.4.2 Groundwater

During the TRC ground investigation, groundwater was encountered between 0.50m bgl and 4.0m bgl within Made Ground and the Lynch Hill Gravel Member. On two occasions after the groundwater was struck, the groundwater level rose in the boreholes, indicating subartesian groundwater conditions are present at the Site.

During subsequent gas and groundwater monitoring, groundwater resting levels were recorded between 2.48m bgl and 3.82m bgl.

Groundwater may be subject to seasonal variations especially after periods of prolonged rain or drought.

2.5 Previous Environmental Assessments, Investigations or Remediation

A summary of the previous assessments are detailed in Table 4.

Table 4: Summary of Previous Site Assessments

Report Title	Summary of Findings
Environmental Due Diligence Report, Ref. 50BCD0445236 – V02, Jan 2022, CBRE Limited	The report was prepared by CBRE Limited exclusively for CBRE Investment Management as Trustee for EDS Pension Plans Investment Fund. A modest potential for contamination has been identified associated with the former / current uses of the Site, which have included the commercial abstraction of clay and possible infilling, a number of railway tracks serving adjacent works, and a crane hire depot with associated vehicle maintenance / refuelling activities. However, in view of the current and proposed industrial uses of the Site (i.e. predominance of hardstanding and open plan configuration of buildings) and predominately industrial nature of the surrounding properties (which have a similar potential for contamination), the overall risks are reduced. In the context of the proposed industrial redevelopment of the Site, CBRE considers that there is a low to medium risk of the Site currently attracting the attention of the regulatory authorities or representing a significant risk to identified receptors. According to the EA 'Flood Map for Planning (Rivers and Sea)', the Site is located within Flood Zone 1, equivalent to an annual chance of flooding less than 1 in 1,000 (0.1%). As such it is concluded that the Site has a very low risk of flooding from rivers in the present day. The Site is considered to be situated in an area of high sensitivity with respect to groundwater resources given the underlying Principal Aquifer of the River Terrace Gravel. The Site is considered to be situated in an area of moderate sensitivity in relation to surface water resources, given that, whilst the Grand Union Canal is located c.100m north of the Site, it is suggested man-made brick/concrete lined nature is anticipated to reduce hydraulic continuity with shallow groundwater. The Site is situated in an area of low sensitivity in relation to environmental sensitive land uses due to the absence of an ecologically designated areas within 1km. An Asbestos Management Survey was completed for the Site in January 2005. No asbestos containing materials (ACM) were identified within the fabric of the building from two samples obtained, however, presumed ACM was identified at a single location within a rope/woven textile in the hire office safe.
Geotechnical Site Investigation Report, Ref. R17 – SI-01.0_4223, Lustre Consulting, Jan 2022	The report was prepared by Lustre Consulting Limited for CBRE Limited and presents the findings of a Geotechnical Site Investigation to identify ground hazards, determine engineering soil parameters and provide a foundation design appraisal. <u>Geotechnical Hazards</u>

Report Title	Summary of Findings
	Lustre reported variable ground conditions, buried structures foundations and other obstructions, shallow groundwater, stability of excavations and thick Made ground to 2.4m bgl. Foundation Solution Based on the presumed loadings, Lustre consider that pad foundations could be placed within the River Terrace Gravels at an average depth of 1.50m bgl. In some locations these may need to be deepened due to the thickness of the Made Ground. If loadings are higher or basements are proposed within the structures, then Lustre consider that a piled foundation solution may be more appropriate with piles taken through the superficial deposits and terminating within the London Clay Formation.
Phase II Geoenvironmental Assessment, Ref. 50BCD0445236/PII – V02, 24 May 2022, ESG on behalf of CBRE Limited	The report was prepared by CBRE Limited exclusively for CBRE Investment Management as Trustee for EDS Pension Plans Investment Fund. Ground Conditions Ground conditions encountered comprised variable thicknesses of Made Ground (0.6m – 2.4m thick), typically described as silty or clayey sandy gravel, which was subsequently underlain by a gravelly sand and a sandy gravelly clay. Inclusions of concrete, brick, granite, flint, clinker and ash, as well as rare inclusions of wood, metal and glass were identified within Made Ground deposits across the Site. The Made Ground was overlain by concrete hardstanding or a gravelly fill. Concrete and brick obstructions considered to be indicative of relict former slabs were encountered in multiple locations across the Site at depths of between 0.7 – 1.4mbgl. A layer of tarmacadam with plastic meshing was also identified between 0.25 – 1.0mbgl in the west and south of the Site. Superficial deposits of Alluvium were encountered in the central east, south-west and north of the Site directly underlying the MG, between 0.15 – 0.6m thickness, typically comprising a slightly gravelly silty clay, underlain by 1.5 – 4.4m of River Terrace Gravels (RTG), which typically comprised a clayey sandy gravel or a sandy clay. The London Clay was encountered beneath the superficial deposits as a silty clay with occasional shell fragments at depths of between 3.9 – 20mbgl, the full thickness of which was not proven beyond 16.1m. Post investigation monitoring recorded resting groundwater levels between 1.78m and 3.91mbgl. Contamination The results of the investigation show that soils beneath the Site are not significantly impacted by site-wide contamination, and the general ground conditions are considered typical of brownfield land. Asbestos was encountered within shallow Made Ground deposits (12 of 29 samples analysed) at the Site. However, quantification analysis has confirmed that concentrations of free fibre asbestos (chrysotile, amosite and crocidolite) identified across the Site were in low concentrations (<0.076%w/w) and the anticipated predominance of hard-standing following

Report Title	Summary of Findings
	redevelopment will provide a barrier between future site-users and any asbestos contamination. In addition, whilst it is acknowledged that these contaminants represent a potential risk to construction works involved in groundworks, the risks can be adequately mitigated through the incorporation of standard health & safety measures. The groundwater analysis recorded localised concentrations of polycyclic aromatic hydrocarbons (PAH) and total petroleum hydrocarbons (TPH) that marginally exceeded the applied screening values. However, the contaminants recorded are largely considered representative of background groundwater quality and given the conservative nature of the applied screening values, the industrial use of the surrounds, and the absence of any sensitive groundwater abstractions or surface water receptors in the near vicinity of the Site, the recorded concentrations are not considered to be significant. A medium risk from UXO is defined within the detailed UXO report attached as an annex. UXO Specialist on-site support is recommended for any intrusive works.
Tier 1 Geoenvironmental and Geotechnical Site Assessment, Ref. 507947.0000.0000, 27 March 2023, TRC Companies Ltd.	Earliest available mapping (1868) indicated that the Site was undeveloped, however located in a brick field with numerous pits in close proximity. The Site remained undeveloped until 1935 when the railway to the south of the Site was expanded and encroached on the southern Site boundary. Further rail infrastructure was located at the Site from 1960 with several sidings covering the property. By 1975, the Site was recorded as vacant with all rail infrastructure having been removed. The Site remained vacant until 1999 when a small structure was constructed across the northern portion of the Site. By 2023 additional small structures had been constructed in the south-eastern portion of the Site. The Site has historical and current uses which include a fuel filling station, and electrical substation. There is potential for contamination associated with this land use including heavy metals, hydrocarbons and polychlorinated biphenyls (PCB). Made Ground from previous phases of development is anticipated at the Site, including railway historical sidings. These soils may contain contamination depending on the source and nature of these materials. Made Ground soils may be a source of asbestos fibres, heavy metals, polycyclic aromatic hydrocarbons (PAH), total petroleum hydrocarbons, and ground gas. The presence of hardstanding on the existing development will provide protection to the underlying soils and groundwater from potential surface releases of oils and chemicals that may have been used on-Site. Groundwater sensitivity is considered high. Further investigation was recommended to further appraise the potential for soil and groundwater contamination. It is assumed that any future development will largely be covered in hardstanding and capping in areas of soft landscaping. It is expected that this

Report Title	Summary of Findings
	design feature will provide a suitable barrier and mitigation against potential risk to human health from potential contamination in underlying soils and groundwater. The following potential geotechnical hazards were identified: • Made ground to depths in excess of 2.4m; • Soft clays; • Settlement prone soils, such as organic clays, peat; • Buried obstructions, such as old foundations and basements; • Volume change potential of soils; • Soil desiccation; • Ground conditions aggressive to buried concrete; • Shallow groundwater level; • Adjacent third party assets, railway lines on an extensive beam bridge south of the Site; and, Requirement for Environment Agency approvals given superficial deposits comprise a Principal Aquifer.
Tier 2 Geoenvironmental and Geotechnical Site Assessment, Ref. 507947.0001.0000, dated May 2023	Made Ground was encountered between ground level and 2.8m bgl, recording a maximum thickness of 2.8m. Superficial deposits from the Langley Silt Member and the Lynch Hill Gravel Member were encountered. The Langley Silt Member was encountered to depths of between 1.2m and 3.5m bgl. The Lynch Hill Gravel Member was encountered to depths of between 4.3m and 5.3m bgl. Bedrock geology of the London Clay Formation was encountered to a maximum proven depth of 10.0m bgl. During the Site investigation, groundwater was encountered at depths of between 0.5m bgl and 4.0m bgl within Made Ground and Lynch Hill Gravel Member. During subsequent monitoring, groundwater was encountered sporadically within Made Ground and at about 2.5m bgl within the Lynch Hill Gravel Member. Localised exceedances of inorganic and organic compounds were detected within the soils underlying the Site, which exceeded the GAC for a commercial end use. Groundwater samples obtained exceedances of the EQS/DWS for copper, nickel, zinc, and hydrocarbons. However, the Site is not located within a Source Protection Zone, and the nearest receptor is the Grand Union Canal, which lies 100m to the north of the Site. The concentrations were largely considered to be marginal, and no evidence of significant heavy metals or hydrocarbons were identified during the soil screening. Therefore, it is likely that this represents that natural baseline of the Site and wider area. Gas monitoring indicates that the Site would be classified as Characteristic Situation 2 (low risk). It is considered that gas protection measures would be required at the proposed development, which may include floor design and / or the installation of gas membranes.

Report Title	Summary of Findings
	Shallow pad or strip foundations founded within the Lynch Gravel Member will be appropriate to support the proposed structures at a minimum foundation depth of 1.5m bgl. Ground bearing slabs can be considered for the Site, but will require some form of ground improvement to ensure that the in-situ soils have appropriate engineering properties to meet the design requirements. A design sulphate class of DS-2 and an ACEC class of AC-2 is appropriate for Made Ground. A design sulphate class of DS-1 and an ACEC class of AC-1 is appropriate for all other strata encountered at the Site. It is recommended that in areas of proposed soft landscaping that a geotextile membrane and a 300mm layer of topsoil should be used to act as a barrier to prevent contact, ingestion, and inhalation exposure. It is recommended to incorporate gas protection measures in the proposed development, which might involve designing the floors accordingly and/or installing gas membranes beneath sensitive ground floor spaces. It is recommended that a specialist ground improvement contractor should be sought at an early stage should a ground improvement solution be selected for the foundations of the proposed structures.

3.0 Remediation Drivers

3.1 Conceptual Site Model

The proposed development will comprise the demolition of the existing structures and the construction of four adjoined warehouse units with an associated first floor office and mezzanine floor space around the eastern portion of the Site. Each unit will have an associated service yard and car parking with limited soft landscaping in the northern portion of the Site.

Based on the intrusive investigation results and the proposed development design, TRC has prepared a revised Conceptual Site Model (CSM) to include the findings from the Site investigation, which is presented in Table 5 below.

Past historical land uses on and off-site, including the fuel filling station and electrical substation were considered to present a potential contaminated land risk. The potential contaminants included asbestos, heavy metals, TPHs, PAHs, PCBs, and ground gases.

During TRC's previous investigation (report ref. 507947.0001.0000) and CBRE's previous investigation (report ref. 50BCD0445236/PII), minor exceedances of PAH compounds and heavy metals in soils in excess of Generic Assessment Criteria (GAC) for the proposed commercial end use were detected.

Asbestos was identified within twelve samples analysed at the Site.

Groundwater was encountered during the TRC investigation at a depth of between 0.50m bgl and 4.00m bgl within Made Ground and the Lynch Hill Gravel Member.

The Langley Silt Member and Lynch Hill Gravel Member are classified as Principal Aquifers and the underlying London Clay Formation is classified as Unproductive Strata. The Site does not lie within a groundwater source protection zone (SPZ) and there is one active groundwater abstraction within 426m north of the Site; however, this is used for business park water supply.

The nearest surface water receptor is the Grand Union Canal, which lies 100m north of the Site.

During TRC's previous investigation (report ref. 507947.0001.0000) and CBRE's previous investigation (report ref. 50BCD0445236/PII), groundwater was analysed, and the results were compared against relevant Drinking Water Standard (DWS) and Environmental Quality Standards (EQS). Exceedances for copper, nickel, zinc, PAH compounds, and hydrocarbons were identified. TRC considers that the concentrations recorded do not pose a significant risk to controlled waters receptors.

Ground gas monitoring indicated that the Site would be classified as Characteristic Situation 2 (low risk). Based on these results, it is considered that gas protection measures would be required at the proposed development, which may include floor design and / or the installation of gas membranes.

TRC consider that the environmental sensitivity of the Site is moderate to high.

Table 5: Revised Conceptual Site Model

Source	Pathway	Receptor	Risk
On-Site Sources			
Made Ground soil associated with current and former developments and	Dermal contact, ingestion and inhalation pathways	Future Site users	**Low to Moderate** It is unlikely that this will present a significant risk to human health within the future proposed development scenario as hardstanding and the building footprint will provide a

Source	Pathway	Receptor	Risk
historical operations at the Site. Minor exceedances of four PAH compounds in excess of the GACs in WS04. Asbestos in soil was encountered during a previous investigation (report ref. 50BCD0445236/PII).			physical barrier against contact with contaminants. Soft landscaped areas can be appropriately managed via an appropriate capping layer (150mm topsoil and 150mm subsoil), with a geotextile membrane installed at the base of the excavation. This should be validated by a geo-environmental specialist to ensure compliance.
		Neighbouring site users	**Low** Neighbouring site users could be exposed to contaminated soil dust, particularly during the construction phase. Mitigation measures could include construction site management solutions such as dust control.
		Construction workers	**Low to Moderate** Risk pathway to be mitigated via Personal Protective Equipment (PPE), good hygiene practices and construction Site management. If significant asbestos is discovered during construction, an Asbestos Plan of Works will be commissioned to address risks. It is recommended that construction workers at the Site have asbestos awareness training prior to commencement of works. It is also recommended that an asbestos watching brief is in place during the groundworks, as further asbestos could be encountered, which warrants a change to the control measures recommended in this report.
	Contact with buried services	Buried services	**Low to Moderate** Proposed development to consider risk of residual contamination and incorporate protective measures as appropriate. This may include clean service corridors and / or use of chemically resistant pipework.
Hydrocarbons in excess of DWS in groundwater.	Leaching of contaminants and	Groundwater (Principal Aquifer in	**Low to Moderate** The Site is underlain by superficial deposits (Langley Silt Member and the

Source	Pathway	Receptor	Risk
Copper, nickel and zinc in excess of EQS in groundwater.	vertical migration into groundwater	superficial deposits and Unproductive Strata in bedrock deposits)	Lynch Hill Gravel Member), which are classified as Principal Aquifers. This is in turn underlain by unproductive strata from the London Clay Formation. The Site does not lie within a groundwater SPZ. The nearest active groundwater abstraction is 426m north of the Site for a business park water supply. Only one minor hydrocarbon exceedance of the DWS was identified during this assessment. The proposed development will predominantly be covered in hardstanding, which will limit potential infiltration.
	Lateral migration in groundwater/surface runoff	Surface Water	**Low to Moderate** There nearest surface water feature is located approximately 100m north. The proposed development will predominantly be covered in hardstanding, which will limit potential infiltration.
Ground gas concentrations indicative of Characteristic Situation 2 (low risk).	Migration of ground gases onto Site and ingress into buildings	Future Site users	**Low** Gas monitoring results indicated that the Site is classified as Characteristic Situation 2 (low risk). It is considered that gas protection may be required i.e. floor design and / or installation of ground gas membrane.
		Construction workers	**Low** Pathway to be managed through good construction practices and mitigation of risks when working in confined spaces.

3.2 Summary of Remediation Drivers

Based on the findings of the environmental assessment to date, it is considered that no active remediation is required at the Site. Residual contaminant risks to future site users will be addressed through development design actions as follows:

- The presence of hardstanding/buildings across the majority of the Site, providing a physical barrier against contact with potential contaminants; and,
- Placement of engineered clean capping over a geotextile marker layer in areas of proposed landscaping – to remove potential pathways between underlying soils that may contain elevated contamination and future Site users. This capping layer will also serve to provide a suitable

growing medium for landscaping purposes. The capping layer should be a minimum of 300mm thick comprising 150mm topsoil 150mm subsoil.
- Installation of ground gas mitigation measures i.e. floor design and / or ground gas membrane installation.

TRC notes that the following issues will be mitigated during construction:

- Risks to construction workers during redevelopment: worker exposure will be appropriately managed via PPE and good hygiene practices, and an asbestos watching brief;
- Risks to neighbouring Site users during groundworks / construction phase: dust mitigation measures will be appropriately followed;
- Use of appropriate materials for buried services in accordance with statutory provider requirements; and,
- Appropriate sealed drainage design to prevent potential infiltration of contaminants.

4.0 Remediation Approach

4.1 Objectives

The development design shall remove any pollutant linkages through severing of risk pathways to ensure that residual contaminant risks to human health and controlled waters are mitigated. The remediation approach for this Site does not include the protection of demolition or construction workers, as this will be managed through a health and safety plan, and the protection of buried services.

4.2 Outline Remediation Strategy

Based on the findings from the previous investigations at the Site, it is considered that the following remediation actions will be required at the Site.

4.2.1 Active Remediation

It is not considered that active remediation is required at the Site, therefore no remediation options appraisal will be required as part of this remediation strategy.

4.2.2 Development Led Remediation

Key development characteristics will complete the remediation via the removal of risk pathways. This will eliminate the key pollutant pathways ensuring protection of the future Site users and underlying soil and groundwater conditions. The design considerations will include:

- Construction of hardstanding across the majority of the Site including building footprints, paved roadways and footpaths;
- Placement of engineered capping across area of proposed landscaping including a clean cover of 300mm (150mm topsoil and 150mm subsoil) overlying a geotextile membrane;
- Installation of ground gas mitigation measures i.e. floor design and / or installation of ground gas membrane in the proposed development;
- Use of appropriate materials for buried services in accordance with statutory provider requirements; and,
- Appropriate sealed drainage design to prevent potential infiltration of contaminants.

4.3 Discovery Strategy

TRC recognise that there may be unidentified contamination encountered during the groundworks phase of the development. Risks associated with this potentially variable ground conditions will be managed via a discovery strategy, as detailed in Section 5.1.

5.0 Outline Remediation Methodology

The following section provides an outline of the requirements for the Client to manage the required remediation works and appropriately mitigate contaminant risks. It is recommended that there is appropriate oversight and verification, where applicable.

5.1 Discovery Strategy

Due to the heterogeneous nature of Made Ground soils beneath the Site, consideration should be given towards the potential for the development works to encounter previously unidentified contamination. A discovery strategy will be employed to ensure that groundworkers identify and manage suspected areas of ground contamination should they be encountered.

In order to manage previously unidentified contamination, TRC recommends the following procedure if suspected contamination is identified:

1. Stop Works – cease current works to allow assessment and report to environmental manager;
2. Isolate – isolate the area of work to contain the contamination and minimise exposure to unauthorised persons and surrounding users;
3. Protect – take necessary actions to mitigate risks to surrounding environmental receptors through run-off, leaching or contamination of surrounding materials. Actions may include covering of materials, use of spill kits or containment and temporary sealing of drainage;
4. Report – notify the Local Planning Authority (LPA) within 48 hours of discovery;
5. Assess – investigate contaminated materials and identify an appropriate course of action which may comprise a revised risk assessment; and
6. Record – record findings and any changes in working method statements as necessary to mitigate risks in the Site files.

Findings of any contamination discovery would be documented and reported to regulatory stakeholders including the Local Planning Authority (LPA) and the Environment Agency (EA). Any further assessment and remediation would be performed in consultation with those stakeholders to ensure compliance with regulatory, planning and permitting requirements as relevant.

5.2 Permits and Consents

Various environmental permits and consents may be required as part of any remediation / demolition / enabling works. These would include, but are not limited to, a Materials Management Plan (MMP) to manage movement of materials around the Site and off-Site, abstraction licence if groundwater is to be abstracted and discharge consents for disposal of perched water in excavations. The contractor should apply for and manage these consents and permits as relevant to ensure compliance.

5.3 Additional Environmental Controls

The contractor should implement management procedures to ensure the highest level of environmental management at the Site. Key considerations for the Site are:

- Management of potentially contaminated materials;
- Controls of dust and debris;
- Noise;
- Odours;
- Vibration;
- Control of debris on highways;
- Vehicle movements;
- Access / egress; and,
- Working hours.

5.4 Soft Landscaping

Soft landscaping is proposed within the development plans issued to TRC. Any soft landscaping within areas of Made Ground should be capped with a minimum thickness of 300mm of clean material over a geotextile marker layer (150 mm topsoil and 150 mm subsoil).

Imported or re-used Site won materials should be validated via sampling and laboratory testing for the following: heavy metals, PAH, Total Petroleum Hydrocarbons – Criteria Working Group (TPH-CWG) and asbestos screening. Testing frequency should also be one sample for every 250 m^3 (with a minimum of three per source). In addition to chemical testing, any imported topsoil to be used for the Site should be tested in accordance with BS3882:2015 to determine its suitability for use.

Hand pits shall be excavated within any soft landscaped areas to verify the thicknesses of the topsoil and subsoil. The frequency of this should be discussed with a qualified environmental professional.

5.5 Stockpile Management

It is anticipated that as part of the enabling works stockpiles will be generated. As mentioned previously, materials generated from the Site require suitability testing to verify their appropriateness for re-use within the development or classification for disposal.

A management plan should be adopted detailing the location and content of each stockpile (including source) and volumes of stockpiles. Should suspected contamination be present in the stockpile, these need to be bunded and covered to prevent contamination run-off.

Stockpiles should be managed in a manner that does not cause a nuisance to surrounding land users or create a risk to subsidence or surround properties.

5.6 UXO Risk

A Detailed UXO Risk Assessment was undertaken for the Site and the findings of the assessment classified the Site as Medium Risk from items of German aerial delivered UXO. There is also an assessed Low Risk from Allied UXO across the Site. A copy of the risk assessment was provided as part of the CBRE Phase II report.

The following risk mitigation measures are recommended to support the proposed works for the Site:

- UXO Risk Management Plan;
- Site Specific UXO Awareness Briefings to all personnel conducting intrusive works;
- UXO Specialist On-site Support; and,
- Intrusive Magnetometer Survey of all borehole and pile locations/clusters down to maximum bomb penetration depth.

5.7 Borehole Decommissioning

There may be a need to decommission the existing boreholes on the Site in order to prevent potential preferential pathways for gas migration.

In preparing this document, TRC has consulted the publication of 'Good Practice for Decommissioning Redundant Boreholes and Wells'. The decommissioning methodology requires the backfilling of the entire borehole annulus from the base back to ground level with a low permeability bentonite / cement grout. This methodology usually requires some time for the grout to settle in the well which may require more grout after decommissioning.

The headworks should be removed (if possible) and if not contaminated these will be removed from the Site as general waste. The final 2 m to ground surface will be filled with a concrete cap that extends 1 m around the surface of the borehole. The borehole will be reinstated at surface to the same standard as the

surrounding ground, which will include a concrete/aggregate or topsoil finish, depending upon the surrounding landscape.

Detailed records will be written during monitoring which will include:

1. The reason for the abandonment;
2. Groundwater level prior to decommissioning;
3. Any removal of pipework or attempt to remove the pipework;
4. The depth, position and nature of backfill materials; and,
5. Problems encountered during decommissioning.

6.0 Verification Plan

6.1 Purpose

A verification plan is required to document and record the work completed at the Site. The verification plan may serve to meet data requirements of future planning condition discharges and warranty providers.

6.2 Verification Actions

The following verification actions are proposed for the Site. It should be noted that the Site will undergo enabling works which are not covered within this environmental specific remediation strategy.

6.2.1 Action Triggered by the Discovery Strategy

Any actions triggered by the discovery strategy should be reported in full. This will include investigation, risk assessment and remediation as required to mitigate risks. These actions will be reported under separate cover and once complete would be summarised within the verification report.

6.2.2 Buried Services

The contractor should contact the local water supplier to confirm that materials used for water pipe supply are compatible with ground conditions as well as the water supplier's requirements.

6.2.3 Materials Import

Regraded soft landscaping is proposed within areas of Made Ground, the construction contractor shall complete the works through the placement of capping in areas of soft landscaping. This capping shall be formed of 300 mm layer of clean imported material (comprising 150 mm subsoil and 150 mm topsoil). In addition to this, a geotextile marker layer should be installed beneath the capped layer.

Should there be any material import, documentary evidence would be provided to confirm the source, materials quality (including chemical and geotechnical testing), acceptance procedures and use within the property development. The following testing for environmental suitability should be undertaken: heavy metals, PAH, TPH-CWG and asbestos screening. Sampling frequency of this material should be approximately 1 sample per 250 m^3 (minimum of three samples per source). This information would be included in the verification report.

6.2.4 Materials Re-use

If site won material is to be re-used on Site, then this re-use materials should be carried out under a Site MMP.

For any material's re-use, the material needs to be tested both environmentally and geotechnically to confirm its suitability for the development and proposed re-use. The following testing for environmental suitability should be undertaken: heavy metals, PAH, TPH-CWG and asbestos screening. Testing frequency should be one sample for every 250 m^3 (with a minimum of three per source) and results should be screened against the GAC for a commercial end use.

6.2.5 Materials Disposal

For materials disposal during the construction phases, a comprehensive materials management plan with waste records should be maintained by the Principal Contractor managing the phase of work. The documentary evidence shall include a minimum of materials testing, waste consignment and disposal documentation to demonstrate appropriate duty of care and compliance with relevant waste regulation. This information should be made available to the LPA.

6.2.6 Soft Landscaping

Hand pits shall be excavated in the soft landscaped areas to verify the thicknesses of the topsoil and subsoil. Photographs of each pit will be taken to show the thicknesses of the capped areas.

6.2.7 Verification Criteria

Should any materials be either imported to Site or re-used on Site, suitable testing should be undertaken as stated in Sections 6.2.3 and 6.2.4. Results should be screened against the GAC for a Commercial End Use to confirm suitability.

The soil results should be screened against verification criteria based upon the following :

- Land Quality Management Limited and Chartered Institute of Environmental Health (November 2014), the LQM/CIEH S4ULs for Human Health Risk Assessment. Document reference: S4UL3435.
- Development of Category 4 Screening Levels for assessment of land affected by contamination - SP1010 (September 2014).
- LQM S4ULs: evaluation of 2017 USEPA Toxicological Review of Benzo[a]pyrene.
- LQM/CIEH S4ULs for Nickel according to land use (Revised August 2015).

6.3 Verification Report

A verification report should be prepared to confirm that all necessary remediation actions have been satisfactorily completed at the Site. The report will contain the following key information:

- Summary of works carried out;
- Drawings showing the proposed building design;
- Field records including records of borehole decommissioning;
- Photographic and other media records;
- Findings of any actions triggered in association with the discovery strategy;
- Verification of ground gas membrane installation;
- Confirmation of materials compatibility for buried services; and,
- Confirmation of any material's re-use import or disposal from Site as may be relevant during the construction works.

TRC considers that the verification report will be prepared and submitted following the main phase of remediation action completed during Site clearance.

7.0 Assumptions and Reliance

7.1 Significant Assumptions

This Remediation Strategy presents TRC's observations, findings, and conclusions as they existed on the date that this report was issued. This report is subject to modification if TRC becomes aware of additional information after the date of this report that is material to its findings and conclusions.

The reliability of information provided by others to TRC cannot be guaranteed to be accurate or complete. Performance of this Remediation Strategy is intended to reduce, but not eliminate, uncertainty of environmental conditions associated with the subject Site; therefore, the findings and conclusions made in this report should not be construed to warrant or guarantee the subject Site, or express or imply, including without limitation, warranties as to its marketability for a particular use. TRC found no reason to question the validity of information received unless explicitly noted elsewhere in this report.

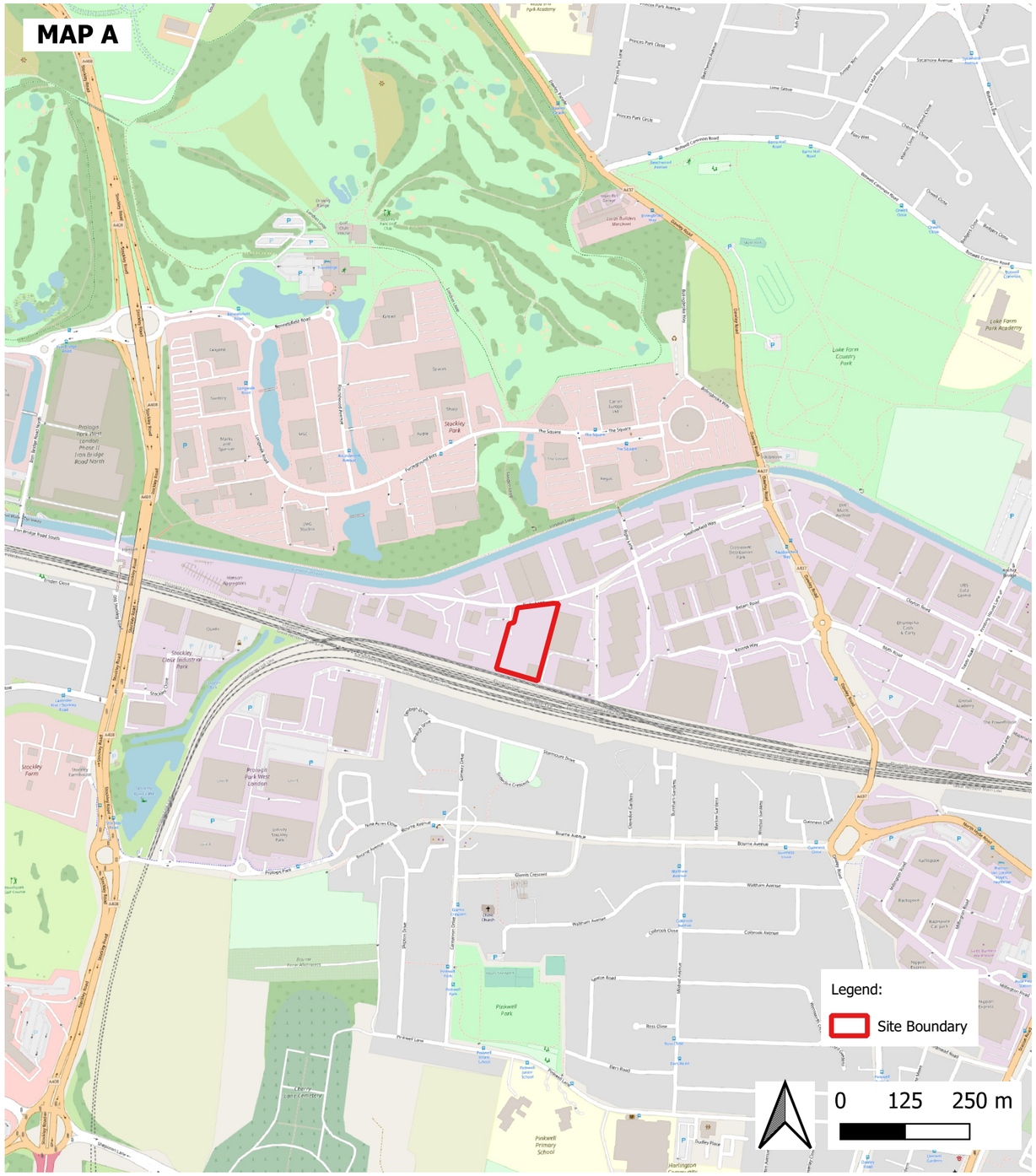
7.2 User Reliance

This report was prepared for Wrenbridge (FRELD Hayes) LLP. Reliance on the Report by any other third party is subject to requesting and fully executing a reliance letter between TRC and the third party that acknowledges the TRC Standard Terms and Conditions with the Client, to the same extent as if they were the Client thereunder.

TRC has been provided with information from third parties for information purposes only and without representation or warranty, express or implied as to its accuracy or completeness and without any liability on such third parties part to revise or update the information. Where reliance has been provided by third parties to potential purchasers this is noted in our report.

Annex A: Figures

MAP A



MAP B

NOTES	COPYRIGHT NOTES Google imagery June 2018 © OpenStreetMap contributors- data is available under the Open Database License. Cartography licensed as CC BY-SA.	REVISIONS P01 FIRST ISSUE — Initials NJ NJ 26/05/23 REV. REVISION NOTES/COMMENTS — Initials	TRC Work.Life Red Lion Street London WC1R 4PQ WRENBRIDGE (FRELD HAYES) LLP PROJECT SWALLOWFIELD WAY	TITLE SITE LOCATION PLAN TRC PROJECT NO. 507947 SCALE MAP A- 1:10000 @ A3 MAP B- 1:1000 @ A3 PURPOSE OF ISSUE SUITABLE FOR INFORMATION STATUS DRAWING NO FIGURE 01 REVISION PO1	

Total Site Area: 1.18 ha / 2.93 acres

Unit 1 GIA:	m²	ft²
Ground Floor	1,521	16,372
First Floor Office (15%)	226	2,433
First Floor Mezzanine	313	3,369
Total:	**2,060**	**22,174**

Unit 2 GIA:	m²	ft²
Ground Floor	1,078	11,604
First Floor Office (15%)	156	1,679
First Floor Mezzanine	145	1,561
Total:	**1,379**	**14,844**

Unit 3 GIA:	m²	ft²
Ground Floor	1,349	14,521
First Floor Office (15%)	202	2,174
First Floor Mezzanine	177	1,905
Total:	**1,728**	**18,600**

Unit 4 GIA:	m²	ft²
Ground Floor	1,772	19,074
First Floor Office (18.5%)	277	2,982
First Floor Mezzanine	223	2,400
Total:	**2,272**	**24,456**

Total GIA	m²	ft²
	7,439	**80,074**

Blg Area to Site Ratio: 27,329ft² per acre

ALL AREAS SUBJECT TO DETAILED DESIGN

Parking:		
Unit	**No.**	**GIA Ratio**
Unit 1	13	1:158
Unit 2	12	1:115
Unit 3	14	1:123
Unit 4	22	1:103
Total	**61**	**1:122**

Unit 1 GEA:	m²	ft²
Ground Floor	1,579	16,997
First Floor Office	254	2,734
First Floor Mezzanine	335	3,606
Total:	**2,168**	**23,337**

Unit 2 GEA:	m²	ft²
Ground Floor	1,108	11,927
First Floor Office	171	1,841
First Floor Mezzanine	157	1,690
Total:	**1,436**	**15,458**

Unit 3 GEA:	m²	ft²
Ground Floor	1,385	14,908
First Floor Office	219	2,357
First Floor Mezzanine	191	2,056
Total:	**1,795**	**19,321**

Unit 4 GEA:	m²	ft²
Ground Floor	1,836	19,763
First Floor Office	306	3,294
First Floor Mezzanine	239	2,573
Total:	**2,381**	**25,630**

Total GEA	m²	ft²
	7,780	**83,746**

Blg Area to Site Ratio: 28,582ft² per acre

GEA calculations based on an external wall build-up of 480mm to the Warehouse measured from grid-lines.

Scale Bar - metres: 0 2 4 6 8 16

N

Based on ordnance and topographical measured survey

Ordnance Survey Licence Number: 100022432

Topographical & measured building survey prepared by Terrain Surveys: Drawing Number TS23-044-1

Landscape shown illustratively only, refer to Landscape Architects Plan for full details

- Planning Boundary
- 2.4m Palladin Fence
- Existing fence retained
- Active EVCP Pedestal
- Passive EVCP Space
- Refuse Area
- Cycle parking shelters
- Space can be be used to park 2 cargo bikes or 1 car
- 3.5m high acoustic fence
- Retaining wall
- Existing Tree
- Proposed Tree

Rev PL15: Verge line removed. MS - 29.08.2023
Rev PL14: Cycle lane removed. MS - 08.08.2023
Rev PL13: Cargo bikes relocated. Cycle lane and pedestrian crossing points added. MS - 26.07.2023
Rev PL12: Planning Issue. MS - 24.05.2023

Drawing Status: PLANNING ISSUE

CMP Architects

Client: Wrenbridge (FRELD Hayes) LLP

Project: Ainscough Crane Hire Site, 84 Swallowfield Way, Hayes, London, UB3 1DQ

Title: Proposed Site Plan

Scale	Drawn	Date
1:250@A1 1:500@A3	MS	01.03.2023

Drg.No. **H067-CMP-SI-ZZ-DR-A-00100** Revision **PL15**

NOTES

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REVISIONS

REV.				
P01	FIRST ISSUE			
	Initials	LS	LS	30/08/23
REV.	REVISION NOTES/COMMENTS			
	Initials			

Work.Life
Red Lion Street
London
WC1R 4PQ

WRENBRIDGE (FRELD HAYES) LLP

PROJECT: SWALLOWFIELD WAY

TITLE: PROPOSED DEVELOPMENT PLAN

TRC PROJECT NO.: 507947

SCALE: N/A

PURPOSE OF ISSUE: SUITABLE FOR INFORMATION

STATUS:

DRAWING NO: FIGURE 02

REVISION: PO1

Annex B: Land Contamination Officer Conditions

Planning Specialist Observations			
Specialism(s)	Land Contamination		
Officer	Simon Snape		
Site	LAND AT AINSCOUGH CRANES, UNIT 84, HAYES INDUSTRIAL PARK SWALLOWFIELD WAY HAYES		
Proposal	The demolition of existing structures and redevelopment for Use Classes E(g)(iii), B2 and B8 (applied flexibly) including hard and soft landscaping, servicing and associated works.		
Planning Ref	63099/APP/2023/1608	Date	31-05-2023

Objection	Condition	Informative	Comments	Discharge of Condition
-	yes	-	See below	-

1 Summary of Comments:

I have reviewed a copy of the geo-environmental information contained within the following reports submitted in support of the application:

- Title: Environmental Due Diligence Report; Ref: 5OBCD0445236 Version 02; Date: 25 January 2022; Prepared by: ESG Consultancy Ltd For and on behalf of CBRE Limited.

- Title: Phase II Geo-environmental Assessment; Ref: 5OBCD0445236/PII Version 02; Date: May 2022; Prepared by: ESG Consultancy Ltd For and on behalf of CBRE Limited

- Title: Phase II Geo-environmental and Geotechnical Site Assessment; Ref: 507947.0001.0000; Date: 26/05/2023; Prepared by: TRC Companies Limited

The reports provide details of an environmental due diligence study and two Phase II site investigations conducted at the site.

The initial and updated conceptual site model in the latest Phase II report clearly indicate that various contaminative substances are present, with some detected concentrations shown to exceed the applied generic acceptance criteria (GAC) and other authoritative criteria for the proposed commercial land use involving introduction of warehousing premises.

The phase II report identifies the following contaminants which exceeded the applicable criteria:

- Polycyclic Aromatic Hydrocarbons (PAH)

- Heavy Metals
- Asbestos
- Ground gases

The updated conceptual site model outlines the assessed risks, associated with the identified contaminant linkages, and categorises them as low to moderate risk (to linkages involving on-site contractors and controlled waters) and low risk (for other identified linkages).

The report states "*the proposed development will primarily consist of hardstanding, which considerably reduce the risk of contaminated groundwater and sever any potential connection to pollutants.*" The report details are wholly acceptable in terms of the significant coverage of hardstanding at the site.

However, requirements for works to address aspects of the site where unacceptable risks from contaminants would exist are identified within the report, it is understood such works would involve the following actions:

- Incorporation of an appropriate barrier/cover system within in landscaped areas having exposed soils.

- Introduction of ground gas protection measures within the proposed buildings (including any other areas of enclosed spaces).

It is considered the abovementioned works represent remediation actions that are required to mitigate the associated risks as identified.

The Local Planning Authority shall require further details concerning the abovementioned remedial actions which would be applicable at the site, including any further remedial actions that may be identified as the proposed development advances.

I therefore recommend the following conditions to be imposed if planning permission is awarded:

(i) The development hereby permitted (excluding demolition, site clearance and any additional ground investigation works) shall not commence until a scheme to deal with unacceptable contamination has been submitted to and approved by the Local Planning Authority (LPA). All works which form part of a remediation scheme shall be completed before any part of the development is occupied or brought into use unless the Local Planning Authority dispenses with any such requirement specifically and in writing. The scheme shall include the following measures unless the LPA dispenses with any such requirement specifically and in writing:

(a) A written method statement providing details of the remediation scheme/s, (including design and independent validation of suitably selected gas protection measures), and how the completion of all remedial works will be verified, shall be agreed in writing with the LPA prior to commencement, along with the details of a watching brief to address any undiscovered and/or unacceptable concentrations of

contamination. No deviation shall be made from this scheme without the express agreement of the LPA prior to its implementation.

(ii) If during remedial or development works contamination not addressed in the submitted remediation scheme is identified an addendum to the remediation scheme shall be agreed with the LPA prior to implementation; and

(iii) Upon completion of the approved remedial works, this condition will not be discharged until a comprehensive verification report has been submitted to and approved by the LPA. The report shall include the details of the final remediation works and their verification to show that the works have been carried out in full and in accordance with the approved methodology.

(iv) No contaminated soils or other materials shall be imported to the site. All imported soils for landscaping and/or engineering purposes shall be clean and free of contamination. Before any part of the development is occupied, all imported soils shall be independently tested for chemical contamination, and the factual results and interpretive reports of this testing shall be submitted to and approved in writing by the Local Planning Authority.

REASON To ensure that risks from land contamination to the future users of the land and neighbouring land are minimised, together with those to controlled waters, property and ecological systems and the development can be carried out safely without unacceptable risks to workers, neighbours and other offsite receptors in accordance with Hillingdon Local Plan: Part 2 (January 2020) Policies - DMEI 11: Protection of Ground Water Resources and DMEI 12: Development of Land Affected by Contamination.

2 Reason for Refusal (if objecting):

N/A

3 Observations:

Name: Simon Snape.

Title: Contaminated Land Officer.

Date: 30/06/2023