

## TECHNICAL NOTE

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Project: Unit 2 &amp; 6 Reading Retail Park

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Subject: Contaminated Land Review and Management Strategy

Date: 11/09/24

Technical Note Prepared by:

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| Date       | Issue | Status | Description of Amendments              |
|------------|-------|--------|----------------------------------------|
| 11/09/2024 | P01   | S2     | First Issue                            |
| 01/10/2024 | P02   | S2     | Amending Planning Condition References |
|            |       |        |                                        |

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## Introduction

Clarkebond were engaged by Workman LLP on behalf of their client Threadneedle UK Property Authorised Investment Fund to address contaminated land conditions (Condition 4, 5, 6 & 7) applied to the site known as *Reading Retail Park Oxford Road Reading* following the grant of full planning approval under the application No. 221110.

Conditions applied have followed a conventional approach to contaminated land assessment with an initial requirement to assess the nature and extent of contamination (Condition 4). Given the extent of intrusive works likely to occur for the development and the existing body of work undertaken for the wider retail park, it is considered that a review of historic data shall be sufficient to inform a suitable human health risk assessment. Condition 5 requires a suitable remedial strategy to be developed in the event of unacceptable geoenvironmental risks being identified, while Conditions 6 and 7 relate to verification of the RMS and any actions required should unexpected contamination be identified.

The purpose of this review is therefore to submit reporting to enable discharge of Conditions 4 and 5, and to propose a methodology for the discharge of conditions 6 and 7, which can only be achieved upon completion of the groundworks associated with development.

The pertinent planning conditions are detailed below.

*4. No external works shall commence on site including demolition and any preparatory works until an assessment of the nature and extent of contamination has been submitted to and been approved in writing by the Local Planning Authority. This assessment must be undertaken by a competent person, and shall assess any contamination on the site, whether or not it originates on the site. Moreover, it must include:*

- i. a survey of the extent, scale and nature of contamination;*
- ii. an assessment of the potential risks to:*
  - human health,*

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- *property (existing or proposed) including buildings, crops, livestock, pets, woodland and service lines and pipes,*
- *adjoining land,*
- *groundwaters and surface waters,*
- *ecological systems,*
- *archaeological sites and ancient monuments;*

**REASON:** *These details are required due to insufficient information being contained within this submission and to ensure the development is suitable for its end use and the wider environment and does not create undue risks to occupiers of the site or surrounding areas in accordance with Policy EN16 of the Reading local Plan 2019.*

**5.** *No external works shall commence on site including demolition and any preparatory works until a detailed remediation scheme to bring the site to a condition suitable for the intended use by removing unacceptable risks to human health, buildings and other property and the natural and historical environment has been submitted to and been approved in writing by the Local Planning Authority. The scheme must include all works to be undertaken, proposed remediation objectives and remediation criteria, an appraisal of remedial options, and proposal of the preferred option(s), and a timetable of works and site management procedures. The scheme must ensure that the site will not qualify as contaminated land under Part 2A of the Environmental Protection Act 1990 in relation to the intended use of the land after remediation.*

**REASON:** *These details are required due to insufficient information being contained within this submission and to ensure the development is suitable for its end use and the wider environment and does not create undue risks to occupiers of the site or surrounding areas in accordance with Policy EN16 of the Reading local Plan 2019.*

**6.** *The approved remediation scheme under Condition 15 shall be implemented in accordance with the approved timetable of works. A validation report (that demonstrates the effectiveness of the remediation carried out) shall be submitted to and approved by the Local Planning Authority before construction above foundation level.*

**REASON:** *To ensure the development is suitable for its end use and the wider environment and does not create undue risks to occupiers of the site or surrounding areas in accordance with Policy EN16 of the Reading local Plan 2019.*

**7.** *In the event that contamination is found at any time when carrying out the approved development not previously identified, development shall be halted on that part of the site the contamination reported in writing to the Local Planning Authority.*

*An assessment of the nature and extent of contamination shall be undertaken and where remediation is necessary a remediation scheme, together with a timetable for its implementation, shall be submitted in writing to the Local Planning Authority for its written approval. The measures in the approved remediation scheme shall be implemented in accordance with the approved timetable. Halted works shall not be re-commenced until the measures identified in the approved remediation scheme have been*

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*completed and a validation report has been submitted to and been approved in writing by the Local Planning Authority.*

**REASON:** *To ensure the development is suitable for its end use and the wider environment and does not create undue risks to occupiers of the site or surrounding areas in accordance with Policy EN16 of the Reading local Plan 2019.*

## Site Description

The site is situated in the former Halfords and Carpetright units within the wider Reading Retail Park. The majority of the site is covered in hardstanding, with small areas within the car park area used as soft landscaped areas. Unit 2 & 6 are located at the southeast of the complex of units, backing onto residential properties.

## Site History

A review of published historic maps gives a timeline of the historic land use for the wider Reading Retail Park site. The site was comprised of undeveloped land, presumed to be used for agricultural purposes, up until the late 19<sup>th</sup> century. Throughout the early and mid-20<sup>th</sup> century, various buildings were constructed as part of the expanding Pulsometer Engineering Works. By the early 1960s the engineering works occupied a majority of the site and had further expanded to the east of the current site boundary. The site is expected to have remained in this configuration and use until mapping records from 1989-1990 that demonstrates the redevelopment of the site into its current use as a Retail Park.

The timing of the redevelopment was during the initial development of the current contaminated land appraisal system, with “*Guidance on the assessment and redevelopment of contaminated land*” (ICRCL 59/83 2<sup>nd</sup> ed) being published in 1987 and associated industry profiles being published in the 1990’s. As such basic remedial measures are likely to have been implemented, although at that time this typically involved removal of gross contamination to landfill. However, no records are available detailing the redevelopment undertaken to construct the retail park. As such the current condition of the land has been assessed from the subsequent investigations detailed below.

## Previous Investigation

Previous investigations were carried out by CBRE Limited (2016) and Clarkebond (UK) Limited (2022). The CBRE investigation covered the whole of the Reading Retail Park site and comprised the following

- 10 Dynamic Sampler Boreholes
- 7 Cable Percussive Boreholes
- 2 Rotary Core Boreholes

Clarkebond carried out a singular rotary borehole in 2022 to inform pile design.

## Ground conditions

A summary of the strata encountered is presented in the following sections. For full details of the strata encountered reference should be made to the enclosed exploratory hole logs and photographs.

### Made Ground

Tarmacadam/Concrete ground bearing slab with sub-base overlayed the made ground in all bar one of the exploratory holes (CBRE WS4).

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The underlying made ground consisted of one or more of the following general descriptions:

- Reddish, dark brown, sandy, clayey gravel. Gravel is fine to coarse, sub-angular to sub-rounded flint, limestone, brick, clinker and concrete. Occasional cobbles of flint, limestone and brick and pockets of ash.
- Reddish, dark brown, gravelly, sandy, silty clay. Gravel is fine to coarse, sub-angular to sub-rounded limestone, flint, brick, chalk, clinker, mortar and concrete. Occasional cobbles of flint and concrete and pockets of ash.
- Dark brown gravelly, clayey, sandy silt. Gravel is fine to coarse angular to sub-rounded flint, chalk, limestone, sandstone and brick. Occasional cobbles of brick and flint and pockets of ash.

The drilling often encountered deeper concrete obstructions associated with former industrial use, causing many exploratory holes to refuse at shallow depths. The made ground ranged from 0.11m bgl (CBRE BH8) to 3.1m bgl (CBRE BH3).

### Taplow Gravel Member

The superficial Taplow Gravel Member was identified frequently, ranging in encountered depths from 0.11m bgl to 6.2m bgl. The superficial deposit was encountered as both a granular and a cohesive soil, often with the granular overlying the cohesive soils. The granular strata consisted of a dark brown, very gravelly, slightly clayey, locally silty, sand, or brown, fine to coarse sand and gravel of flint. The cohesive strata consisted of dark brown or orange-brown, very sandy, slightly gravelly silt or clay.

### Seaford Chalk and Newhaven Chalk Formation

The Chalk Formation was proven below the Taplow Gravel Member as structureless grade Dm chalk to a depth of 10.0m bgl. The structureless chalk was recovered as brown, cream and white, gravelly, clayey silt. The gravel was variably fine to coarse, angular to sub-angular black flint and weak low density white, with occasional black speckles, sub-angular clasts of chalk. With increased depth the chalk locally becoming weak medium density chalk gravel.

### Groundwater

Groundwater was encountered within the bedrock geology of the chalk group during the investigation at depths between 4.0m and 8.8m bgl. During the subsequent monitoring visit, the static water level was recorded at depths between 1.25m and 8.39m bgl (37.06mAOD and 43.23mAOD).

## Geoenvironmental Assessment

The analytical suites undertaken by CBRE and Clarkebond are summarised in Table 1 and Table 2 respectively. Made ground, natural soils and groundwater were assessed to delineate the areas of concern across the entirety of the Reading Retail Park including many taken from exploratory holes surrounding Unit 2 & 6.

Table 1 Summary CBRE Testing Suites

| Analytical Suite                                                                                      | No. of Soil Samples | No. of Groundwater Samples |
|-------------------------------------------------------------------------------------------------------|---------------------|----------------------------|
| Metals (arsenic, cadmium, total chromium, copper, lead, mercury, nickel, selenium, vanadium and zinc) | 35                  | 8                          |
| Speciated TPH                                                                                         | 37                  | 8                          |
| PAH (US EPA 16)                                                                                       | 38                  | 8                          |
| VOC                                                                                                   | 31                  | 8                          |
| Semi Volatile Organic Compounds (SVOC)                                                                | 22                  | 0                          |

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|                                                     |    |   |
|-----------------------------------------------------|----|---|
| Polychlorinated Biphenyls (PCBs) (WHO 12 Congeners) | 3  | 0 |
| Asbestos                                            | 15 | 0 |
| pH                                                  | 12 | 8 |
| Total Organic Carbon (TOC)                          | 12 | 8 |
| Total Hardness (as CaCO3)                           | 0  | 8 |

Table 2 Summary of Clarkebond Testing Suites

| Analytical Suite                                                                   | No. of Soil Samples |
|------------------------------------------------------------------------------------|---------------------|
| Metals (Arsenic, Cadmium, Copper, Chromium, Lead, Mercury, Nickel, Selenium, Zinc) | 3                   |
| PAH (US EPA 16)                                                                    | 3                   |
| Speciated TPH (TPHWG)                                                              | 3                   |
| SOM                                                                                | 3                   |
| pH                                                                                 | 3                   |
| Soluble Sulphate                                                                   | 3                   |

The proposed development layout (Ref: APP-SK03-45 PLOTS), dated May 2022, indicates the site to be formed entirely from ‘hardstanding’. As such, the combined analytical data set has been compared against the relevant available guidelines for “commercial end-use” to identify chemicals of potential concern.

The results have been used for subsequent comparison with:

- Cl:AIRE/EIC/AGS Soil Generic Assessment Criteria for Human Health Risk assessment, January 2010 and
- The LQM/CIEH S4ULs for Human Health Risk Assessment. Ref: S4UL3269, released January 2015, Land Quality Press, Nottingham and
- EA Science Report SC050021.

## Metals

The results of the chemical analysis for heavy metal concentrations within the soil samples are summarised in Table 3:

**Table 3 Values for Metals in Soils**

| Determinant      | GAC    | Concentration Range |       | No. samples tested | No. samples exceed GAC |
|------------------|--------|---------------------|-------|--------------------|------------------------|
|                  |        | Min                 | Max   |                    |                        |
| Arsenic          | 640    | 2.75                | 47.4  | 38                 | 0                      |
| Cadmium          | 8600   | <0.2                | 1.0   | 38                 | 0                      |
| Chromium (VI)    | 33     | <1.8                | <1.8  | 3                  | 0                      |
| Chromium (total) | 8400   | 5.08                | 47.7  | 38                 | 0                      |
| Copper           | 69000  | 4.39                | 2860  | 38                 | 0                      |
| Lead             | 2330   | 4.3                 | 630.2 | 38                 | 0                      |
| Mercury          | 3600   | <0.3                | 2.0   | 38                 | 0                      |
| Nickel           | 1700   | 5.27                | 52.7  | 38                 | 0                      |
| Selenium         | 13000  | <0.5                | <2.0  | 38                 | 0                      |
| Zinc             | 670000 | 16.6                | 429.8 | 38                 | 0                      |

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*Note Chromium (VI) only analysed within 2022 Clarkebond Suite*

None of the results exceeded the GAC values for commercial uptake end-use.

### Organics – Soil Organic Matter

SOM tests were undertaken on three samples and TOC tests on twelve samples. The combined data, once converted into SOM, ranged between <0.1% (below detection limits) and 0.5%. As such a figure of 1.0% SOM has been adopted when selecting the Generic Assessment Criteria (GAC) screening values for organics in the following sections.

### Organics – PAHs

The results of the chemical analysis for Poly-Aromatic Hydrocarbon (PAH) within the soil samples are summarised in Table 4.

**Table 4 Values for PAH in Soils**

| Determinant            | GAC    | Concentration Range |       | No. samples tested | No. samples exceed GAC |
|------------------------|--------|---------------------|-------|--------------------|------------------------|
|                        |        | Min                 | Max   |                    |                        |
| Acenaphthene           | 84000  | <0.05               | 3.1   | 41                 | 0                      |
| Acenaphthylene         | 83000  | <0.05               | 0.39  | 41                 | 0                      |
| Anthracene             | 520000 | <0.05               | 13.3  | 41                 | 0                      |
| Benz(a)anthracene      | 170    | <0.05               | 68.1  | 41                 | 0                      |
| Benzo(a)pyrene         | 76     | <0.05               | 76.5  | 41                 | 1                      |
| Benzo(b)fluoranthene   | 44     | <0.05               | 93.4  | 41                 | 1                      |
| Benzo(ghi)perylene     | 3900   | <0.05               | 41.1  | 41                 | 0                      |
| Benzo(k)fluoranthene   | 1200   | <0.05               | 31.4  | 41                 | 0                      |
| Chrysene               | 350    | <0.05               | 67.3  | 41                 | 0                      |
| Dibenz(a,h)anthracene  | 3.5    | <0.05               | 2.45  | 41                 | 0                      |
| Fluoranthene           | 23000  | <0.05               | 103.6 | 41                 | 0                      |
| Fluorene               | 63000  | <0.05               | 2.6   | 41                 | 0                      |
| Indeno(1,2,3-cd)pyrene | 500    | <0.05               | 54.8  | 41                 | 0                      |
| Naphthalene            | 190    | <0.05               | 1.0   | 41                 | 0                      |
| Phenanthrene           | 22000  | <0.05               | 31.6  | 41                 | 0                      |
| Pyrene                 | 54000  | <0.05               | 115.0 | 41                 | 0                      |

One exploratory hole location recorded elevated PAH compounds, relating to exceedances of Benzo(a)pyrene and Benzo(b)fluoranthene screening values. The two samples were from WS2 at 1.60m to 1.80m, within the Made Ground.

### Organics – TPH

The results of the chemical analysis for Total Petroleum Hydrocarbon (TPH) concentrations within the soil samples are summarised in Table 5:

**Table 5 Values for TPH in Soils**

| Determinant     | GAC  | Concentration Range |        | No. samples tested | No. samples exceed GAC |
|-----------------|------|---------------------|--------|--------------------|------------------------|
|                 |      | Min                 | Max    |                    |                        |
| Aliphatic C5-C6 | 3200 | <0.001              | <0.001 | 40                 | 0                      |
| Aliphatic C6-C8 | 7800 | <0.001              | <0.001 | 40                 | 0                      |

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| Determinant       | GAC     | Concentration Range |        | No. samples tested | No. samples exceed GAC |
|-------------------|---------|---------------------|--------|--------------------|------------------------|
|                   |         | Min                 | Max    |                    |                        |
| Aliphatic C8-C10  | 2000    | <0.001              | <0.001 | 40                 | 0                      |
| Aliphatic C10-C12 | 9700    | <1.0                | <1.0   | 40                 | 0                      |
| Aliphatic C12-C16 | 59000   | <2.0                | 15.1   | 40                 | 0                      |
| Aliphatic C16-C21 | 800000  | <5.0                | 266    | 40                 | 0                      |
| Aliphatic C21-C35 | 800000  | <9.1                | 2610   | 40                 | 0                      |
| Aliphatic C35-C44 | 1600000 | <8.4                | 2890   | 40                 | 0                      |
| Aromatic C5-C7    | 26000   | <0.001              | <0.001 | 40                 | 0                      |
| Aromatic C7-C8    | 56000   | <0.001              | <0.001 | 40                 | 0                      |
| Aromatic C8-C10   | 3500    | <0.001              | <0.001 | 40                 | 0                      |
| Aromatic C10-C12  | 16000   | <1.0                | <1.0   | 40                 | 0                      |
| Aromatic C12-C16  | 36000   | <4.0                | 22.9   | 40                 | 0                      |
| Aromatic C16-C21  | 28000   | <4.0                | 108.1  | 40                 | 0                      |
| Aromatic C21-C35  | 28000   | <9.1                | 820    | 40                 | 0                      |
| Aromatic C35-C44  | 28000   | <8.4                | 24     | 3                  | 0                      |
| Benzene           | 28      | <0.001              | 0.006  | 40                 | 0                      |
| Toluene           | 870     | <0.005              | 0.013  | 40                 | 0                      |
| Ethylbenzene      | 520     | <0.002              | 0.007  | 40                 | 0                      |
| m&p-Xylene        | 605     | <0.004              | 0.039  | 40                 | 0                      |
| o-Xylene          | 480     | <0.002              | 0.008  | 40                 | 0                      |
| MTBE              | 7900    | <0.005              | <0.005 | 40                 | 0                      |

*Note Aliphatic C35-C44 and Aromatic C35-C44 only analysed within 2024 Clarkebond Suite*

None of the results exceeded the GAC values for commercial end-use.

## Summary

Only one sample exceeded the GAC for commercial end-use, WS2, which is located approximately 130m northeast of the proposed development. The exploratory holes located within the vicinity of the proposed development (GBRE's BH5, BH6, BH7, BH101, WS7, WS8, WS9, WS10 and Clarkebond's BH01) tested below the GAC and require no remediation.

## Discussion and Recommendations

The current hard surfacing across the site acts as an effective barrier to the made ground materials below. Given the presence of the hardstanding, and the single marginal exceedance of the screening criteria, no further assessment is considered necessary in terms of risk to end users of the site.

Due to the relatively 'clean' shallow soils and made ground in comparison with the GAC for commercial end-use (potentially significant contamination has only been identified at one location across the entire site), a detailed remedial strategy is not required to progress with the development of the site. It would be recommended that a standard watching brief is followed throughout the duration of the development. These aspects are expanded upon in relation to the relevant planning conditions.

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## Planning Conditions

### Condition 4

The above summary and assessment is considered sufficient to satisfy the requirements for a suitable human health risk assessment for the proposed development. The assessment has demonstrated that the site is suitable for redevelopment in its current condition with no systematic remedial actions required.

### Condition 5

Given the outcome of the environmental assessment no formal Remedial Method Statement (RMS) is required. As such no formal documentation is considered necessary to enable the discharge of Condition 5.

However, as with any site, potential exists for encountering materials that were not recorded during the original site investigation works. Therefore a watching brief should be maintained during the groundworks for signs of unexpected ground that may be contaminated.

Should any previously unidentified material suspected (by visual or olfactory means) of being contaminated be encountered during the development of the site, then the following protocol should be implemented:

- Site activities in the immediate vicinity shall cease and Clarkebond or other geoenvironmental specialist shall be contacted and provided with a summary of the observations made;
- Clarkebond or other geoenvironmental specialist to attend site and undertake appropriate investigations to establish the extent of the materials in question, including chemical assessment of the soils. Depending upon the extent and hence volume of material present, the materials may be removed and temporarily stockpiled (on heavy grade polythene sheeting) to enable construction activities to continue;
- The resultant chemical analyses shall be compared with the appropriate trigger concentrations for the land use in question. The findings and recommendations shall be discussed and agreed with the relevant Regulator(s); and
- In the majority of cases it would be proposed that any further unexpected contaminative issues are dealt with via independent correspondence.

### Condition 6

A completion report will be required once the groundworks are completed. The site agent will be best suited to produce this document due to their presence on site and the expected duration of the groundworks. It is recommended that supporting evidence is collected during the works in the form of progress and completion photographs.

In the event that unexpected contamination is identified, measures implemented to manage it should be detailed in a site report. Remedial actions, treatment details and any off-site disposal should be recorded, along with associated verification actions. This should be submitted to the local authority upon completion of the groundwork to provide a record of the actions undertaken.

If ground conditions are as anticipated and no geoenvironmental remedial actions are required, the Main Contractor, who is best placed to provide this detail, should prepare a statement recording this fact for submission to the Local Authority.

Either of these actions would be sufficient to discharge Planning Condition 6.

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**Condition 7**

Condition 7 is only triggered in the event of unexpected contamination being encountered.

Should this occur guidance should be sought from Clarkebond or another geoenvironmental consultant to provide guidance on the appropriate course of action and agree requirements with the Local Authority. Reporting of the actions agreed with the Local Authority shall be in accordance with those agreements. It is anticipated the processes required will be as detailed above.

As for Condition 6, if ground conditions are as anticipated and no unexpected ground conditions are encountered, the Main Contractor, who is best placed to provide this detail, should prepare a statement recording this fact for submission to the Local Authority.