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4th November 2024

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Mr A Howarth
H3 Property Consultants
[Sent via email]

Dear Adam

Royd Edge Mill, Meltham – Local Authority Land Contamination Technical Comments Response

Further to the planning consultation response email dated 3rd October 2024, relating to discharge of Conditions 7 & 8, we are writing to address comments made by Kirklees Council on your behalf.

For ease of reference, Kirklees Council's comments are copied below in blue, with our responses in black.

1) *As the developer may be aware, the generic assessment screening values for several contaminants have been revised since the original report. We expect any updated report to reflect these changes.*

The screening criteria have been amended to more modern values i.e. LQM/CIEH S4ULs (2015) for Human Health Risk in the updated Interim Validation Report (Ref. REMD 3357VAL, dated April 2024) by Ashton Bennett. These screening criteria are considered to be appropriate for the site although it is noted that this relates to previously undertaken investigation and remediation works prior to 2011.

Lithos would propose that there should now be a focus on ensuring the importation of 'clean' soils and materials for the cover system with relevant and appropriate screening criteria. We would therefore propose the use of our inhouse screening criteria for the import of soils prescribed in Lithos' 'Protocol for importation & use of soil cover (capping)' which has been appended to this letter.

Lithos would also note that our in-house screening criteria for hydrocarbons are signfincatly lower than Ashton Bennett's which are based on LQM S4ULs. This is due to the derived LQM values being based on health risks only i.e. you could have screening criteria above the saturation limit (free product) which would technically be acceptable for gardens. Lithos do not consider this appropriate for the import of soils for cover systems.

2) *The revised report must ensure that naphthalene levels indicated in the WSG sample, along with a clear plan detailing the exact location of the WSG are included*

As per the Section 7.1 of the updated Interim Validation Report by Ashton Bennett borehole location WSG was within the previously (c.2011) remediated Area 4. This area was subject to excavation to 0.5m of the existing ground level at the time followed by disposal of arisings to landfill. The area was rechecked for signs of contamination by Ashton Bennett. Further to this the garden areas of these plots (and all plots on site where made ground is still present at the surface). These plots will therefore be covered with a 600mm clean cover system comprising 300mm virgin quarried stone and 300mm topsoil with a geotextile high visibility marker layer at the base. Lithos are in the process of validating these cover systems in terms of depths and also assessing the quality of soils (visually and chemical testing) and virgin quarried stone (visually checking quality) used within the cover system.

A plan of the approximate borehole positions overlaid with the proposed plot layout has been complied by the developers consulting engineers (Dudleys) based on the Ashton Bennett plans and is appended to this letter.

3) Furthermore, the report identifies areas of the gardens that require testing, which does not seem to have been completed to date.

On review of the Ashton Bennett reports it would seem that this testing is needed to decide whether a geotextile membrane is required or not. The developer has elected to install a geotextile membrane as part of the 600mm cover system in any plot where there is made ground remaining at the surface as a matter of course and as such we do not see any reason why they would require further testing.

Where natural soils are present, we will undertake a visual assessment of the strata to confirm this and potentially retrieve samples for chemical analysis to prove the natural ground has not been impacted with contamination. To date for plot 2 we have identified natural ground at the surface and the developer has still elected to install 600mm cover with visible marker layer below in any event. This will all be included in the final Verification Report for the site.

4) Subsequently, a revised risk assessment and conceptual site model (CSM) will be necessary.

Lithos' opinion is that the risks are being adequately managed at this development based on the following:

- The contaminated areas previously identified (Areas 1 to 4) have been remediated in 2011 by excavation and removal from site including the removal of underground tanks. This included any visibly contaminated ground e.g. hydrocarbon impacted made ground which was validated by Ashton Bennett.
- The risks of ground gases has been deemed to be low and do not warrant specific gas protection measures to be installed in the properties although radon protection measures are required. The developer is employing a professional installer (PAGeo Ltd) to install the radon membranes with a number of these being independently verified by Lithos. The remaining plots will be subject to QA/QC by PAGeo Ltd. In conjunction with the radon membrane the properties will also benefit from a ventilated sub floor void. As such it is considered that the risk of ground gases (e.g. vapours, radon, methane or carbon dioxide) entering the properties is negligible.
- Lithos have a continued presence on site for validation of soil cover and the radon membrane installations and this includes a watching brief for unexpected contamination that may be encountered, for example whilst excavating footings. Should such contamination be encountered, Lithos will attend site to advise the developer on any necessary assessment/remediation requirements. The details of any such activity will be included in the final Verification Report.
- Where made ground remains at the surface a 600mm cover system with visible marker layer at the base will be installed which will sever any non-volatile pathways between residual/ potentially contaminated made ground below and the end users of the site.

Based on the above a revised risk assessment and new conceptual site model is not considered warranted.

5) To facilitate our review, it would be helpful if any revised report clearly states the revisions made (or if this could be provided in an email ahead of a submission)

Due to the nature of the pdfs (the older reports are not in a readable format for pdf comparison) it would be extremely time consuming to list all the individual amendments/updates. However, from working with the developer and on review of the reports the significant changes are considered to be:

Remediation Strategy

- There was an inconsistency in the reports as to whether radon or ground gas protection measures were required in the properties. Ashton Bennett confirmed on the basis of their ground gas monitoring programme that only radon protection measures were required, and this was made consistent within the two updated reports.
- Clarification within the report that the cover system should comprise topsoil/subsoil with visible marker layer below. The developer has elected to use virgin quarried stone within the cover system to act as a subsoil/drainage layer. This will also have the added benefit of acting as a 'hard to dig' layer.

Interim Validation Report

- Section 6.2 provides details relating to the remediation works of Areas 1 to 4 in October 2011 which comprised the excavation and removal off site of previously identified contaminated areas. Figure 3 has also been added demonstrating the extents of these areas. Section 7.1 also goes into further detail about the previous remediation of these areas.
- Section 7.2.2 updates the screening criteria to more modern values i.e. LQM/CIEH S4ULs (2015) for Human Health Risk.

The rest of the changes are considered to be either cosmetic (i.e. updating formatting etc) or incidental to the overall risk and remediation of this site.

Should you require any further information, please contact the undersigned.

Lithos would be happy to attend a meeting with the regulators should this be deemed beneficial.

Yours sincerely

Principal Engineer (Remediation)
for and on behalf of
LITHOS CONSULTING LIMITED

DO NOT SCALE

DESIGNERS HAZARD IDENTIFICATION

IT IS ASSUMED THAT ALL WORKS WILL BE UNDERTAKEN BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT. IN ADDITION TO THE HAZARDS TYPICALLY ASSOCIATED WITH THE TYPES OF CONSTRUCTION DETAILED ON THIS DRAWING, ANY KNOWN ABNORMAL HAZARDS SPECIFIC TO THIS SCHEME HAVE BEEN IDENTIFIED.

ABNORMAL HAZARD REFERENCE

KEY

XX INDICATES SITE INVESTIGATE LOCATION

WS1A WS2A WS3A WS4A WS5A WS6 WS7 WS8 WS9A WS10A WS11A WS12 WS13 WS14 WS14A WS15 WS16 WS17 WS18 WS19 WS20 WS21 WS22 WS23 WS24 WS25 WS26 WS27 WS28 WS30 WS31 WS32 WS33 WS34 WS35 WS36 WS37 WS38 WS39 WS40 WS41 WS2 WS3 WS4 WS5 WS6A WS7A WS8A WS9 WS10 WS11 WS12A WS13A WSA WSB WSC WSD WSE WSF WSG WSH WSI WSJ WSK WSL WSM WSN WSO WSP WSQ WSR WSS WST WSU BH1 BH2

NOTE:

SITE INVESTIGATION LOCATIONS ARE APPROXIMATE, THESE LOCATION ARE NOT TO BE TAKEN AS EXACT.

DATE	REVISION DESCRIPTION	BY	CHK	REV.
18.10.24	PRELIMINARY ISSUE	KB	AMW	P01

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PROJECT: ROYD EDGE DYEWORKS MELTHAM

JOB: 23127

TITLE: BOREHOLE LOG SITE PLAN

SCALE	PAPER	STAGE	STATUS
1:200 @ A0	A0	PRELIMINARY	XX

DRAWING NO.: 23127-DCE-XX-XX-D-S-001

REV.: P01

1 INTRODUCTION

1.1 Isolation of made ground in garden and landscaped areas beneath a cover of "clean" subsoil, and topsoil is often recommended on new developments; most notably when the made ground contains inorganic (and non-volatile organic) contaminants at concentrations above relevant guidance threshold values. A cover solution is not appropriate for volatile or semi-volatile organic contaminants (fuels, solvents etc); removal or treatment will usually be required.

1.2 The thickness of cover is dependent on the end use of the development, nature and degree of contamination (and sometimes the Local Authority whose area the site lies within), Typically for a commercial development between 300mm and 1,000mm thickness is required and for a residential development between 600mm and 1,000mm thickness is required. Regardless of the type of development, where contamination is more significant a granular hard-dig layer or geotextile marker membrane may also be required at the base of the cover.

1.3 The "clean" soil cover blocks potential linkages between the contaminated made ground and future site users. Soil cover is not required beneath areas of hardcover including buildings, private drives, carparking and roads.

1.4 If the made ground is essentially "clean", but contains materials generally considered undesirable as near-surface material in garden and landscaped areas (e.g. oversize materials such as construction/demolition rubble) then placement of cover is also required. In private gardens, in accordance with NHBC Standards Chapter 10.2, a 450mm thick soil cover should be adequate. In landscaped areas a 300mm thick soil cover should be adequate. For both gardens and landscaped areas if the made ground is essentially "clean" and comprises reworked natural soil, the only cover likely to be required is 100mm topsoil.

1.5 The CML initiative came into force in April 2003 and relates specifically to residential developments. It requires housebuilders to submit to NHBC (or other warranty providers) a validation report confirming the thickness and quality (i.e. contaminant-free) of the placed soil cover. Validation reports should normally be prepared by independent geoenvironmental consultants.

1.6 Failure to submit cover validation reports promptly will delay issue of the cover note by the warranty provider, which will subsequently delay the release of mortgage funds and hence legal completion; i.e. the financial implications are significant. Consequently, it is essential that cover validation is requested at least 2 weeks prior to the anticipated finalling date.

1.7 For all land uses soil cover is usually placed many weeks after completion of the preparatory/remediation works, and issue of the associated Verification Report, typically at a relatively late stage in the construction programme.

1.8 Prior to placement of soil cover, the appointed remediation contractor and/or groundworker should ensure that ground levels are low enough to accommodate the required cover thickness, taking account of any boundary issues, and, where relevant, without compromising the DPC and any sub-floor ventilation.

1.9 Ideally soil quality should initially be determined by sampling of the source (at least 7 working days before importation to the development site) to demonstrate suitability for use. Further sampling of the material at the site may also be required to demonstrate cross contamination did not occur during the importation process. Samples could also be obtained from stockpiles of site won material on site; there may comprise surplus natural ground development arisings. Soil samples could be obtained after placement of the cover layer, but this is not recommended.

1.10 Imported topsoil should be subject to testing, unless it is being sourced from a reputable commercial supplier able to provide robust certification (certificate date less than 2 months prior to import date). In addition, some analysis in accordance with BS3882 may occasionally be appropriate.

1.11 Where sampling of the source has been carried out, and on receipt of the laboratory results, Lithos will issue a confirmation of soil suitability for importation to the client, who will in turn instruct his contractor to commence importation.

1.12 Clearly, if soil cover is imported and placed before confirmation of its suitability, no guarantee can be given that validation work will yield the desired results. It may therefore be necessary to excavate and export the placed soil cover and/or import further "clean" soil.

1.13 It is likely that it will be necessary to stockpile imported soil cover material at the site. Where soils have been confirmed as suitable for use and temporarily stockpiled on site, stockpiles should be fenced-off and marked as containing certified topsoil/subsoil. The soil should be inspected prior to placement to confirm that it is the same material as previously tested, and that it has not been cross-contaminated with miscellaneous arisings generated during the construction works. Where material has been stockpiled on site for an extensive period of time further sampling may be required at the development site to demonstrate cross contamination has not taken place.

1.14 Soil thickness can only be checked after placement; this should be done before turfing / landscaping, but ideally after scaffolding has been dismantled.

1.15 *Sampling Frequency (to check Soil Quality):* The number of samples tested will be dependent on the nature of the source, and the quantity of material to be imported. However, in accordance with current YALPAG (Yorkshire & Lincolnshire Pollution Advisory Group) guidance[1], the testing frequency should be as follows:

Nature of source	Number of samples (from any single source material)	
	Up to 500m³	Per additional 500m³
Greenfield	At least 3#	1*
Brownfield	At least 6#	1*
Crushed product	At least 3	1*

* To be agreed with the relevant Local Authority

\# But could be up to 10 samples (if 500m³), depending on the Local Authority area within which the site is located.

1.16 On a typical residential development where gardens comprise a total area of 100m² (front and rear), and a soil cover thickness of 600mm including 100mm topsoil, for a brownfield source this testing frequency equates to approximately one topsoil sample per ten plots and one subsoil sample per two plots. Given the requirement to test a minimum number of samples from any one source, the testing frequency effectively increases for sites with only a small number of plots.

[1] *Verification Requirements for Cover Systems: Technical Guidance for Developers, Landowners & Consultants; Version 4.1, June 2021.*

1.17 Inspection Frequency (to check soil thickness): The number of inspection pits excavated to check cover thickness (and collect samples, if required) should be dependent on the end use of the development.

1.18 For residential developments the number of plots associated with a given site will dictate the number of inspection pits. The following frequencies are recommended for residential plots.

No. plots within development	Frequency of inspection pits	Remarks
1 to 5	1 pit per plot	e.g. for 3 plots, dig 3 inspection pits
6 to 20	1 pit per 2 plots	e.g. for 9 plots, dig 5 inspection pits
21 to 30	1 pit per 3 plots	e.g. for 23 plots, dig 8 inspection pits
≥ 30	1 pit per 4 plots	e.g. for 39 plots, dig 10 inspection pits

1.19 For areas of landscaping, regardless of development type, a minimum of 3 pits per area of soft landscaping are recommended where the landscaped area is greater than 25m^2. In individual landscaped areas smaller than 25m^2 inspection pits are not required.

1.20 Photographs should be taken of each inspection pit to show:

- The thickness of cover material present
- The presence of any geotextile marker or granular hard-dig layer (if required)
- The position of each inspection pit in relation to the plot/area of landscaping

1.21 Soil Material Suitability: Inspection pits should be excavated through the entire thickness of any proposed in-situ source material, or cover material (if inspection is post-placement). Stockpiles should be assessed from both the surface and by digging into the "core", to ensure the material is reasonably homogenous.

1.22 The soil material should comply with the following requirements:

- Be clean and free of foreign debris, building waste materials, glass sharps, and contaminants
- Topsoil should not have a gravel content of greater than 30% by dry weight and should generally have a maximum stone size of 50mm in any one direction
- Subsoil should generally have a maximum stone size of 75mm in any one direction
- Not have been sourced from an area within 7m laterally, or 3m vertically, of Japanese Knotweed plants, and not contain any Japanese Knotweed fragments (rhizomes, leaves, stems etc)

1.23 Laboratory Analysis: Whether samples are taken at source, from stockpiles on site, or from gardens and landscaped areas after placement, they should be forwarded to an analytical laboratory for testing in accordance with one of the Schedules detailed in Table 1 overleaf.

1.24 Additional determinands may be scheduled dependent on the history of the source site, although if this is considered necessary it may suggest the material is unlikely to be suitable for use as clean cover.

Table 1 – Test schedule

Source	Test schedule
Greenfield & Manufactured topsoil	pH, total metals (Cu, Ni, Zn, Cr III, Cr VI, As, Hg, Se, Cd & Pb), water soluble boron. TOC & speciated PAH Asbestos ID
Brownfield & Soil transfer stations	pH, total metals (Cu, Ni, Zn, Cr III, Cr VI, As, Hg, Se, Cd & Pb), water soluble boron. TOC, Speciated PAH & banded TPH* Asbestos ID
Crushed product	pH, total metals (Cu, Ni, Zn, Cr III, Cr VI, As, Hg, Se, Cd & Pb), water soluble boron. TOC & Speciated PAH Asbestos ID

Note: The schedules detailed above have been prepared in accordance with the Secondary Model Procedures and Land Contamination Risk Management, 2020. This document states that analysis should be relevant to potential sources and not merely a set list of parameters applied to each site.

* The YALPAG guidance recommends speciated TPH (TPH CWG) analysis for brownfield sources, but this should not be necessary unless the banded TPH analysis fails the assessment criteria detailed in Table 2 below.

Where crushed product is used at least 600mm below finished garden level, only asbestos analysis will be required.

1.25 Chemical assessment (Tier 1) criteria for imported soils are provided in Table 2, these reflect exposure and toxicological amendments proposed within the C4SL report. Where no C4SL value has been published generic assessment criteria have been derived based on the C4SL assumptions using the CLEA model (version 1.701).

Table 2 - Chemical assessment criteria for imported soils

Contaminant	Source	Tier 1 assessment criteria (mg/kg)	Comments/notes
pH	CLEA		
As	C4SL	37	
Cd	C4SL	26	
Cr (III)	CLEA	4000	
Cr (VI)	C4SL	21	
Pb	C4SL	200	
Ni	CLEA	109	Assessment of human health risk only.
Se	CLEA	434	
Hg	CLEA	199	Assumes mercury present as an inorganic compound (cf elemental metal or within organic compound). See Science Report SC050021/Mercury SGV.
Vn	CLEA	584	
B	Lithos	5	Based on phytotoxic risks as plants are the more sensitive receptor (Cu is pH dependent).
Cu	DoE	100	
Zn	DoE	200	
Benzo(a)pyrene	C4SL	5	
Naphthalene	CLEA	6	
GRO	CLEA	22	Conservative value based on value for aromatic fraction C7 to C8 range, but assuming indoor inhalation pathway still relevant (it shouldn't be).
DRO	CLEA	215	Conservative value based on value for aliphatic fraction C10 to C12 range, but assuming indoor inhalation pathway still relevant (it shouldn't be).
LRO	CLEA	1,000	Calculated value above hazardous waste screen in WM3, therefore 1,000mg/kg adopted. This may be reviewed on a site specific basis depending on the source and nature of transfer.

2 VALIDATION REPORTS

2.1 The analytical testing will usually be undertaken on a 3 or 5-day turnaround and the Client/Contractor will be notified of the soil's suitability (or otherwise) immediately after receipt of the results.

2.2 Interim plot validation certificates for residential plots should be issued to warranty providers on a plot by plot (or block by block) basis as development proceeds. Once the full development has been completed these should be pulled together into a final verification report, for submission to the Local Authority to satisfy planning conditions.

2.3 Interim validation certificates will be issued by Lithos for each landscaped area or set of landscaped areas once completed. After Lithos have been able to confirm placement of agreed thicknesses of suitable soil cover in all landscaped areas across the site, and where required to satisfy a Local Authority planning condition, we will prepare and submit a final validation letter report.