ROBERTS
ENVIRONMENTAL LTD

23 Grey Street
Newcastle upon Tyne
NE1 6EE

Our Ref: 180813.RS.01
13 November 2018

SOUTH TYNESIDE COUNCIL
22 NOV 2018
AREA PLANNING

Mr C Leach,
Gentoo Group Limited,
Emperor House
2 Emperor Way
Doxford Park
Sunderland
SR3 3XR

Re: Proposed Remediation Strategy – Dunelm House, East Boldon.

Dear Chris,

Please find outlined below our proposed Remediation Strategy for the site at the former Dunelm House, East Boldon. This Remediation Strategy should be submitted to the Local Authority for consideration.

Background

When taking into consideration the findings of the REL, 2016 Phase I & Phase II Geo-Environmental Site Investigation and Risk Assessment undertaken at the site (Reference: 161107.R.001), contamination including Lead, Arsenic and Organics were noted in localised areas of the site.

During the REL, 2018 Contaminant Delineation Investigation – Dunelm House, East Boldon (Reference: 180813.02), olfactory evidence of hydrocarbon impact was noted on localised areas of made ground and upper natural deposits, although no further chemical exceedences were recorded from laboratory results, suggesting hydrocarbon impact is limited spatially and vertically.

A significant risk to Controlled Waters was not identified during either of the above investigations, with limited evidence noted to suggest on site contamination was adversely impacting underlying groundwaters, and with impermeable superficial deposits providing a vertical barrier restricting migration to deeper aquifer deposits.

The REL Ground Gas Addendum report (Reference: 161107.02), characterised the site under Characteristic Situation 2, as such basic gas protection measures are required in future residential properties. The requirement for vapour protection was also noted.

CEnv
Chartered Environmentalist

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The site is currently secured with Heras fencing with access limited in frequency and duration to authorised personnel. Ground workers may come into direct contact with residual contamination in soils underlying the site and must be subject to a suitable and sufficient risk assessment and be provided with and make use of appropriate Personal Protective Equipment (PPE).

However, due to the presence of elevated concentrations of contaminants recorded locally during previous investigations, further remedial works are required in order to address the residual risk to future site users particularly from the direct contact, ingestion/inhalation of soils, dusts and/or vapour pathways.

The direct contact and ingestion/inhalation of soils and dusts pathways would represent a risk in areas of future soft landscaping and gardens, when considering the heavy metal and organic contaminants recorded.

The vapour risk, which will be more pertinent to organic contaminants and particularly Trichloroethene would be most relevant in future properties and/or confined spaces in which there may be a potential for harmful concentrations of contaminants to build up. Although, recorded concentrations are not excessive.

Vapours arising beneath soft landscaping would be expected to disperse into the atmosphere and as such, for the proposed residential end use, this is not considered to represent a significant concern, particularly when considering the relatively low concentrations recorded.

This is supported by the contributions to total exposure of Trichloroethene, as presented in Table 24-5 of *'The LQM/CIEH S4ULs for Human Health Risk Assessment'* (Ref: S4UL3239), which, for a Residential with Plant Uptake land use scenario, consider the principal pathway of concern as the Inhalation of Vapour (Indoors), which account for 94.8% and 95.1% of the exposure (When considering respective SOM values).

The second highest contributing pathway is noted to be Consumption of Homegrown Produce and Attached Soil which accounts for between 4.8% and 5.2% (When considering respective SOM values).

A 0% contribution is attributed to the Inhalation of Vapour (Outdoor) pathway which is consistent with remaining organic exceedences including Benzo(a)Pyrene (B(a)P), Benzo(b)Fluoranthene (B(b)F) and Dibenzo(a.h)Anthracene (D(a,h)A). However, with regard B(a)P, B(b)F and D(a,h)A, the risk from the Inhalation of Vapour (Indoor) is also noted to be negligible.

As such, taking the above into consideration and making reference to the above mentioned REL reports, the following remediation strategy is proposed.

Remediation Strategy

Where heavily impacted soils exist in areas of future soft landscaping, it is recommended that impacted soils be either removed from site, and or a 600mm clean soil cover layer be provided in future soft landscaping to provide a suitable level of protection.

Where materials are to be removed from site as waste, appropriate waste classification would be required, and potentially, depending on the chosen waste disposal option, Waste Acceptance Criteria (WAC) testing may be required.

Based on observations made during these latest intrusive investigation works and when taking into consideration the locations of exceedence previously recorded, it is considered that hydrocarbon impact is largely limited to the southwest, with the only notable exception being WS1 to the north.

A range of exceedences were recorded in WS1 to the north including Lead, Dibenzo[ah]anthracene and a more notable concentrations of Trichloroethene. However, no such exceedences were recorded in WS2, TP1, or TP2 also progressed in the northern area of the site indicating the contamination recorded in WS1 is localised. As such, and as stated above, remedial works could comprise localised excavation and/or the placement of 600mm clean cover across soft landscaping and gardens within the northern portion of the site.

Please refer to Remediation Strategy Plan enclosed for locations in which impacted soil excavation and/or a 600mm clean soil cover layer would be required.

The ground gas regime at the site has been classified as Characteristic Situation 2 in accordance with CIRIA C665, as such basic gas protection measures are required in future residential properties. In addition, due to the recorded concentrations of Trichloroethene and the migration potential across the wider site, gas protection should be upgraded to provide reassurance with respect to organic vapours, to future site users.

As such, any membrane intended to be installed in future residential properties, should be approved prior to installation to ensure it provides protection against both Carbon Dioxide and vapours, specifically Trichloroethene. Gas/vapour protection measures should be installed by an experienced contractor with all joints and penetrations sealed using appropriate methods and materials, with reference to CIRIA C735 *'Good practice on the testing and verification of protection systems for buildings against hazardous ground gases'*.

Validation Requirements

Should full removal of impacted soils be adopted, following removal, representative samples of remaining soils would need to be recovered and submitted for laboratory screening to confirm remaining soils are suitable for retention on site. Should any further exceedences be recorded, additional excavation and soil removal may be required, with further validation sampling an analysis undertaken.

Where a 600mm clean soil cover is to be placed across impacted soils, these soils would need to be subject to suitability for use testing. This testing should be undertaken prior to spreading to avoid the need for removal should testing determine this material is not suitable. Soils should be sourced from a reputable supplier.

Following placement of the clean cover, validation inspection pits would need to be excavated, to confirm a suitable depth of clean cover have been achieved. Following installation of vapour protection within residential properties, validation inspections would be required to ensure they have been installed to an appropriate standard within each property. This can be undertaken on a plot by plot basis.

Upon completion of remediation and validation works, a Validation Report would be produced and submitted to the Local Authority to allow for final regulatory sign-off.

We trust the information we have provided to you is to your satisfaction. However, if you require any further information or clarification, please do not hesitate to contact us.

Yours sincerely,

Andrew Cuthbert BSc(Hons), MSc, MIEMA, CEnv
Principal Consultant
For and on behalf of Roberts Environmental Ltd

Appendices

Enclosure I – Remediation Strategy Plan



SOUTH TYNESIDE CO
22 NOV 2018
AREA PLANNING

DO NOT SCALE

Key

WS — 2016 Windowless Sampling Borehole Locations

TP — 2018 Trial Pit Locations

Heavy Metal or Organic Impacted Soil Excavation or 600mm Clean Soil Cover

Exceedences Recorded During REL Investigations

Determinands	WS1 (AC)	WS4 (AC)	WS5a (AC)	WS6 (AC)	WS9 (AC)
Arsenic	-	-	38 (37)	-	-
Lead	288.7 (200)	-	6512 (200)	222 (200)	-
Benzo[a] pyrene	-	-	3.84 (3.0)	-	-
Benzo[b]fluoranthene	-	-	4.71 (3.7)	-	-
Dibenzo[ah]anthracene	0.36 (0.3)	-	1.12 (0.3)	-	-
Trichloroethene	0.2 (0.075)	0.05 (0.016)	-	-	0.02 (0.016)

AC – Assessment Criteria

CLIENT: Gentoo Group Limited

PROJECT: Dunelm House, East Boldon

TITLE: Remediation Strategy Plan

DESIGN / DRAWN:	DATE:
AWC	November 2018
PROJECT NO:	DRAWING NO:
180813	180813.02

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Enclosure I

Remediation Strategy Plan