

Our Ref: R3213-L01
Planning Ref: P/2023/0138 (previously P/2021/0519)

25th July 2023

Ms Angela Guy
Contaminated Land Officer - Environmental Protection
Economy and Planning,
16 Lambpit Street,
Wrexham
LL11 1AR

by email care of Mr John Williams: moorbridge@btconnect.com

Dear Angela,

REMEDIATION STRATEGY: Land South of Nant Cottage, Lower Road, Coedpoeth, Wrexham

Further to our Phase 1 Contamination Assessment (ref. R2259-R01-v1 – produced for a neighbouring site but is understood to have been submitted, and accepted, for the site covered by this report) and our Stage 2 Contamination assessment (ref: R3213-R02-v1 Final – produced specifically for the site), I am writing to provide details of the proposed Remediation Strategy to deal with the borderline lead contamination identified in the shallow soils (given the significantly elevated lead found on the neighbouring site, the borderline lead levels were considered indicative of a potential lead contamination issue). As discussed in the reports, the development encompasses an area of land which has not been subjected to any known specific contaminative use: the elevated lead concentrations appear to be the result of aerial deposition from the nearby historical spoil tips or smelting works.

Risk Assessment

Information provided within the Stage 2 Contamination Assessment was used to produce a Conceptual Site Model (CSM) to identify the sources of contamination, identify receptors and their vulnerability, and to identify the potential pathways of exposure. It was concluded that the main risks were to human health (construction workers and future site users) as summarised below:

- exposure of future residents to lead within the shallow soils;
- radon gas.

Risks to controlled waters and other receptors than future residents were considered to be minimal. A summary of the pollutant linkages under development and residential use are reproduced below:

Table 1. Summary of the identified pollutant linkages

receptors	pathways	contaminant sources
human health (construction workers)	Direct contact / dust & soil ingestion; inhalation (short term exposure)	Presence of lead
human health (future site residents)	Direct contact / dust & soil ingestion; inhalation	Presence of lead
	Accumulation within voids, confined spaces and service runs	ground gas (radon)

Remediation Objectives

The remediation objectives, strategy and implementation plan described below addresses the contamination identified to date. If additional contamination is encountered, and subsequent investigations / risk assessment indicates the requirement for any substantial revisions to the Strategy, these will be submitted to the Local Planning Authority for approval.

The key remediation objectives are to break any potential pollution linkages and allow development of the site for its intended use without harm to human health, property or the environment. Each of the viable potential human health contaminant linkages identified in the site conceptual model and risk assessment will be appropriately addressed for the Remediation Strategy to allow construction to continue.

Options Appraisal

Options for the remediation of the potential contamination sources are summarised below:

Table 2 Remedial Options

Method	Advantages	Disadvantages.	Feasibility
Do nothing	No cost.	Does not address risks posed from lead and radon.	Not acceptable given the future residential use of the site.
Physical Barriers	Well understood technology.	Requirement to install capping system and gas protection.	Well understood technology, verification of materials and installation likely to be required.
In-situ treatment (thermal/chemical/biological)	Treat contamination at source reducing disposal cost and waste generation.	Techniques not appropriate for inorganic contaminants	Not feasible treatment method for radon or lead.
In-situ treatment (stabilisation/solidification)	Stabilisation / solidification is an effective means of isolating inorganic substances which are not amenable to treatment using destructive techniques.	Impractical and costly option for small quantity of material.	Expensive and impractical option for small scale sites.
Excavation followed by ex-situ treatment or disposal	Well understood technology. Method can reduce source volume, contaminant level and can be validated on a short timescale.	Disposal would entail additional haulage, tipping and landfill tax costs.	Well understood technology. Would require vehicle movements to remove materials offsite.

The ground on site may locally contain concentrations of contaminants that in the absence of mitigation could pose a risk to the health of future site users. The "do nothing" option containing no specific measure to remediate ground contamination is therefore inappropriate and not considered to be acceptable.

Physical barriers such as hardstanding, the presence of a building, or a 600mm 'clean' cover capping system would effectively cut the possible exposure pathways relating to inhalation, ingestion and direct contact, and would have the benefit of reducing disposal costs and environmental impact (lorry movements, landfill space, etc.). This is the preferred remedial option.

General Approach

The general approach to site preparatory / remediation works is described in Table 3 below:

Table 3. General requirements

Materials recovery / Waste Treatment	It is not envisaged that site generated soil arisings will be recoverable due to the lead content. These materials will therefore require either removal from the site as waste or sequestration at depths or in locations where future exposure will not occur (i.e. below permanent hardstanding, the dwelling or beneath a suitably deep clean soil cover system). If removed, these will be considered waste soils and will require classification for disposal at a waste management facility licenced to accept such materials and transfer documentation must be retained.
Earthworks completion	On completion, the site regrade will be required to leave a 600mm void in garden areas to accommodate the required soil cover system. Clean imported soils will be placed to achieve final development levels.
Construction	Full radon protection measures will be installed in the dwelling.

Validation – Clean Cover Soils

SGP will attend the site to verify the specific remedial actions relating to soil contamination. Dedicated visits are required only to verify the placement of the appropriate thickness of the soil cover system in the specified garden areas and to collect samples to demonstrate material of a sufficient quality has been used. Depths will be recorded by the excavation of 2 hand dug trial pits in the rear garden area and the thickness of the placed material will be compared to a graduated staff. A clear, photographic record will be maintained.

The clean cover soils to be used in future garden areas should be greenfield sourced (brownfield or unknown sources are not considered appropriate in the context of a small amount of soil as the amount of verification and materials management controls are disproportionate to the cost of the materials) and should be tested for a range of common urban contaminants (asbestos, metals, speciated hydrocarbons and PAHs (speciated 16). Given the limited size of the garden areas and the total volume of cover soils required, 3 samples per source is considered sufficient.

Soil samples shall be subject to the analysis and acceptability criteria as below, mainly comprising LQM/CIEH suitable for use levels (S4ULs) but also the Defra Category 4 Screening Level (C4SL) for lead. Reference is initially made to the S4ULs derived for a soil with 1% organic matter as a conservative assumption for screening purposes. All samples shall be submitted to an MCERTs and/or UKAS accredited laboratory in a chilled cool box within 48 hours of collection. Chain of custody documentation will be retained.

Table 4: Generic Assessment Criteria for Residential Use

Contaminant	Screening criteria for Residential Use (mg/kg unless stated)
Asbestos f bre	<i>Below quantifiable levels (<0.001%)</i>
Arsenic	37 (S4UL)
Cadmium	11 (S4UL)
Chromium III	910 (S4UL)
Chromium VI	6 (S4UL)
Copper	2400 (C4SL)
Lead	200 (C4SL)
Mercury (elemental)	1.2 (C4SL)
Nickel	130 (S4UL)
Zinc	3700 (S4UL)
Naphthalene	2.3 (S4UL)
Acenaphthene	210 (S4UL)

Contaminant	Screening criteria for Residential Use (mg/kg unless stated)
Acenaphthylene	170 (S4UL)
Fluorene	170 (S4UL)
Phenanthrene	95 (S4UL)
Anthracene	2400 (S4UL)
Fluoranthene	280 (S4UL)
Pyrene	620 (S4UL)
Benzo(a) anthracene	7.2 (S4UL)
Chrysene	15 (S4UL)
Benzo(b) fluoranthene	2.6 (S4UL)
Benzo(k) fluoranthene	77 (S4UL)
Benzo(a) pyrene	2.2 (S4UL)
Indeno(123cd) pyrene	27 (S4UL)
Dibenzo(ah) anthracene	0.24 (S4UL)
Benzo(ghi) perylene	320 (S4UL)
Aliphatic C5-C6	42 (S4UL)
Aliphatic C6-C8	100 (S4UL)
Aliphatic C8-C10	27 (S4UL)
Aliphatic C10-C12	130 (48) vap (S4UL)
Aliphatic C12-C16	1100 (24) sol (S4UL)
Aliphatic C16-C35	65000 (8.48) sol (S4UL)
Aromatic C6-C7	70 (S4UL)
Aromatic C7-C8	130 (S4UL)
Aromatic C8-C10	34 (S4UL)
Aromatic C10-C12	74 (S4UL)
Aromatic C12-C16	140 (S4UL)
Aromatic C16-C21	260 (S4UL)
Aromatic C21-C35	1100 (S4UL)

The results of the soil analysis and the depth validation record will be compiled into a validation report for submission to WCBC.

I trust this is of assistance and would be grateful if you could confirm your agreement with the proposed remedial and validation measures. Please do not hesitate to contact us if you require any further information.

Yours sincerely
for: Smith Grant LLP

Scott Miller (Senior Environmental Consultant)
BSc MCIWEM