

DISCHARGE OF CONDITION 6 REMEDIATION STRATEGY May 2026 v1

1.0 SITE SOIL SURVEY SUMMARY

1.1 SOIL QUALITY

In terms of the proposed redevelopment of the site, the results of the analysis of the selected soil samples recovered during the site investigation indicated that the concentrations of *metals and metalloids* considered to be potentially toxic to humans were below the respective guideline values in all samples tested with the exception of elevated concentrations of lead, arsenic and zinc.

Organic contamination across the site was generally low and concentrations which may be considered to pose an unacceptable risk to human health should any viable pathway exist were generally not encountered with the exception of certain PAH compounds. Asbestos contamination was encountered within two soil samples in the form of chrysotile, and crocidolite cement and lagging.

1.1.1 Toxic Metals

Lead concentrations were above the 200 mg/kg Category 4 Screening Level within Made Ground soil samples retrieved from BH2 (gl.), TP1 (0.1m), TP3 (0.15m), TP5 (0.3m) and TP6 (0.1m) with concentrations of 1060mg/kg, 378mg/kg, 828mg/kg, 474mg/kg and 603mg/kg respectively.

Arsenic concentration were above the 37mg/kg Category 4 Screening Level within Made Ground soil samples retrieved from BH2 (gl.), TP1 (0.1m), TP3 (0.15m), TP5 (0.3m), TP6 (0.1m) and TP9 (0.4m) with concentrations of 43.5mg/kg, 41.2mg/kg, 41.3mg/kg, 43.2mg/kg, 49.1mg/kg and 56.2mg/kg respectively.

Zinc concentrations were above the 3700mg/kg Category 4 Screening Level within Made Ground soil samples retrieved from TP5 (0.3m) with a concentration of 5020mg/kg. All other samples had contaminant concentrations of below their relevant guideline values.

1.1.2 Phytotoxic Metals

Concentrations of phytotoxic metals copper, zinc and nickel were compared against the maximum permissible concentration in the Sewage Sludge (Use in Agriculture) Regulations 1989.

The concentrations for nickel were all found to be below the maximum permissible concentration for the relevant pH level.

The concentrations of zinc were above the maximum permissible concentration of 450mg/kg in locations BH2 (gl.), TP3 (0.15m), TP5 (0.3m) and TP6 (0.1m) with concentrations of 2930mg/kg, 3360mg/kg, 5020mg/kg and 2750mg/kg respectively.

The concentrations of copper were above the maximum permissible concentration of 200mg/kg in location TP1 (0.1m) with a concentration of 293mg/kg.

1.1.3 Organic Compounds

Concentrations of PAH were found to be below the inert waste acceptance criteria of 100 mg/kg as detailed in the Landfill (England and Wales) (Amended) Regulations 2004 in all of the samples tested with the exception of locations TP3 (0.15m) and TP5 (0.3m) with slightly elevated concentration of 107mg/kg and 104mg/kg respectively.

Speciated PAH

A number of exceedances of the relevant guideline values for certain PAH compounds were noted as per the table below.

Determinand	Guideline value (mg/kg)	Location	Result (mg/kg)
Naphthalene	1	TP1 (0.1m)	1.9
		TP3 (0.15m)	1.2
Benzo(a)anthracene	7.5	TP3 (0.15m)	8.5
		TP5 (0.3m)	8.7
Benzo(b)fluoranthene	2.6	TP5 (0.3m)	7.8
		TP6 (0.1m)	2.8
Benzo(a)pyrene	5	TP3 (0.15m)	11.3
		TP5 (0.3m)	8.5
Dibenzo(a,h)anthracene	0.24	BH2 (gl.)	1.0
		TP1 (0.1m)	0.7
		TP3 (0.15m)	1.5
		TP5 (0.3m)	1.2
		TP6 (0.1m)	0.6
		TP9 (0.4m)	0.4

See Appendix 1 Drawing P2 for locations of these hotspots

Total Petroleum Hydrocarbons

Concentrations of TPH were below the inert waste acceptance criteria of 500 mg/kg as detailed within the Landfill (England and Wales) Regulations 2004 and also within the UK Water Industry Research (UKWIR) in all soil samples tested and would therefore not pose a significant risk of significant harm to human health with the exception of the sample retrieved from location BH2 (g.l.) with a TPH concentration of 3110mg/kg.

Generic Assessment Criteria (GAC) for total petroleum hydrocarbons according to both their molecular weight and chemical structure and also for a range of soil organic matter (SOM) content values have been derived using CLEA software. The LQM CIEH GACs are presented according to their soil organic matter content and proposed end use of the land.

The maximum TPH concentration recorded on site during the site investigation was at location BH2 (g.l.) comprising of 706mg/kg within the aromatic C21-C35 range which is below the relevant GAC limit of 1100 mg/kg for this range and would therefore not pose a significant risk of significant harm to human health.

1.2 SOIL GAS

The results obtained from the short-term soil gas monitoring undertaken indicated that significantly elevated concentrations of soil gas are not present in the soils underlying the site.

2.0 DEVELOPMENT WATCHING BRIEF AND ACTION STRATEGY

Whilst no significantly elevated contaminant concentrations were encountered as part of this site investigation, should discreet hotspots be encountered which were not previously detected, these should be dealt with accordingly by informing all parties involved with the site and drafting new contamination proposals if necessary. A number of options are available for handling any such material, which include:

- The removal from site and disposal to a suitably licensed landfill of all material suspected of being contaminated.
- Short-term storage of the suspected material while undertaking verification testing for suspected contamination. The storage area should be a contained area to ensure that contamination does not migrate and affect other areas of the site. Depending upon the amounts of material under consideration, this could be either a skip or a lined area.
- Treatment of the identified contamination as discussed above.
- Having a suitably experienced Environmental Engineer either on-call or with a watching brief for the visual and olfactory assessment of the material, and sampling for verification purposes.

- Should a new source of contamination be suspected or identified then the relevant local authorities would be informed. A report indicating the nature of contamination and how this is to be dealt with would be submitted to their department and for their agreement. Any necessary remediation would then be detailed and verified in a supplementary remediation statement.

GES can confirm that such a watching brief should exist on this site during any demolition/construction works and should any contamination or potentially contaminative sources be discovered during the proposed demolition/enabling works all site works would cease and suitably competent consultants/engineers will attend site.

- In the event that further ACM is encountered during the site enabling works then the extent of such will be delineated under the supervision of a suitably competent consultant/engineer and the material will be removed from site in accordance with the hazardous waste regulations.
- Should any such material be encountered it is considered likely that a single dedicated skip provided by a suitably licensed asbestos handling company would prove sufficient. If further asbestos-containing material is found on site, then all the documentation regarding its remediation including duty of care and waste transfer notes would be forwarded to the appropriate authorities.

On the balance of the toxicological risks posed by the ground contamination encountered as part of the intrusive investigation undertaken by Soil Investigation Eastern Ltd, it is considered that the potential risks to site workers and future occupants could be adequately controlled as follows:

Site Workers

- Provision of appropriate personal protective equipment and hygiene facilities.
- Good working practice in line with current legislation when safely handling and disposing of asbestos material.
- Provision of appropriate dust suppression, to minimise the generation of potentially contaminated suspended particulates during site works.

Elevated levels of contaminants have been found at the site which could pose a risk to future occupants if exposed to the material for instance in a garden or area of soft landscaping. Current development proposals include private gardens.

- With regard to the areas which may be set to soft landscaping in the proposed development suitable growth media would need to be imported into these areas of the site. Any such imported growth media would require analytical testing to confirm its suitability as Growth media and its compliance with their relevant SGVs.
- Contaminated material will be excavated and certified clean sub soils and topsoil imported for the garden areas.

BRE cover system modelling has been carried out which confirms the thickness of clean soil required and the model results spreadsheet is attached at Appendix 2.

3.0. CONTAMINATION RISK ACTION

The significance of the risks to the receptors/targets identified is based on an evaluation of the potential pathways between the contaminant source and receptors based on the most sensitive end use, i.e. a residential with plant uptake end use.

Potential receptors/targets at the site and in the area in which the site is located include:

- future occupants and the general public;
- construction/maintenance workers;
- groundwater resources;
- underground services in and around the site;
- plants in proposed garden and soft landscaped areas.

3.1 CONTAMINANT SOURCES

No visual or olfactory evidence of organic contamination was noted during the intrusive investigation or noted in the detailed soil sampling logs. In general, the analytical testing of soils retrieved as part of the intrusive investigation did not reveal significantly elevated contaminant concentrations although as mentioned in Section 1.1 of this report, elevated heavy metal, PAH concentrations and asbestos containing material were encountered on site

3.2 RISK TO HUMAN HEALTH

Areas of the site to be covered by buildings and hardstanding would not pose a significant risk of significant harm as they would sever any potential pollutant pathway however it is considered that there is a potential risk to human health under the context of Part IIA in proposed garden areas and areas of soft landscaping.

As such, soils across the site would not be considered suitable to remain on site in areas where they could come into contact with future site users, i.e. proposed garden/soft landscaped areas.

Inorganic Compounds – Asbestos

At the low percentages as found during the Phase 2 investigation, hand picking is unlikely to be a viable option for reclassifying the waste soils.

- In the event that further ACM is encountered during the site enabling works then the extent of such will be delineated under the supervision of a suitably competent consultant/engineer and the material will be removed from site in accordance with the hazardous waste regulations. Should any such material be encountered it is considered likely that a single dedicated skip provided by a suitably licensed asbestos handling company would prove sufficient. If further asbestos-containing material is found on site, then all the documentation regarding its remediation including duty of care and waste transfer notes would be forwarded to the appropriate authorities.

On the balance of the toxicological risks posed by the ground contamination encountered as part of the intrusive investigation undertaken by Soil Investigation Eastern Ltd, it is

considered that the potential risks to site workers and future occupants could be adequately controlled as follows:

- **Site Workers**
Provision of appropriate personal protective equipment and hygiene facilities.
Good working practice in line with current legislation when safely handling and disposing of asbestos material.
Provision of appropriate dust suppression, to minimise the generation of potentially contaminated suspended particulates during site works.
- **Future Occupants**
Following the enabling works in the proposed garden areas on site material will be excavated and certified clean sub soils and topsoil imported for the garden areas. BRE cover system modelling has been carried out which confirms the thickness of clean soil required and the model results spreadsheet is attached at Appendix 2. Reference to the BRE 465 'Cover Systems for Land Regeneration, Thickness of Cover Systems for Contaminated Land' 2004 document shows that such a cover could reduce the risk of exposure.
It is recommended that a "deter to dig" contamination marker layer should be laid in areas of soft landscaping and garden areas, below any clean topsoil materials.
- The modelling results indicates that a simple cover system of approximately 550 mm soils would be required to sever the linkage of pollutants in the soil below in the proposed soft landscaped areas based on the worst-case contamination recorded on site. It should be noted that this would be considered a conservative approach since most of the contaminated Made Ground indicated in this area will be removed as part of the site enabling works. Typically, 150 mm topsoil over approximately 400 mm clean free draining subsoils would generally be considered sufficient.
- Where deep rooting shrubs / trees are proposed in any landscaping it may be necessary to locally deepen the clean cover to accommodate a healthy root bowl. No such clean cover has been laid on site yet and will not be brought to site and placed until the construction phase is completed to avoid over compaction by site plant.
- In areas which are to be covered by either buildings or hard standing, no such clean cover layer is required to sever the contain source to receptor pathway. Following implementation of the aforementioned remedial measures the site would not be considered to pose a potential risk of significant harm to human health in the context of Part 2A.

3.3 RISKS TO WATER RESOURCES

The site is underlain by the Holywell Chalk Formation which is designated as a Principal Aquifer. The site is located within a Groundwater Source Protection Zone 3. Significant levels of potentially soluble and therefore mobile organic contaminant sources were not measured on site within the samples tested. It is therefore considered risks to groundwater resources are considered to be classed as Low.

3.4 RISKS TO BUILDINGS & SERVICES

The risks to buried services from organic contamination such as TPH, which can degrade/permeate plastics and other polymer materials used to supply potable water is considered to be medium.

- Based on current guidance, the need to protect incoming water supplies, e.g. by the use of barrier pipes, is likely given the contaminant levels encountered as part of this investigation, however it is always advisable that confirmation from utility suppliers should be sought.

3.5 GAS RISK ASSESSMENT

The levels of soil gas underlying the site have been monitored as part of a short-term soil gas monitoring programme carried out across the site during August 2023.

Based on the worst-case gas characteristic situation, the worst case implied CS derived by combining the maximum observed concentrations from different window sample standpipes during any monitoring event and a worst-case flow rate of 1.0 l/h

On the basis of the measurements in the table above, the GSV is taken to be 0.015 l/h, which is the worst case for methane and carbon dioxide. A GSV of 0.015 l/h lies within the GSV values for **CS1** (<0.07 l/h) which has a very low hazard potential.

Given that the site has an implied CS1, the minimum gas protection score required for a

Type A building is 0, which means that no gas protection measures would be required as part of the proposed development based on current gas concentrations.

3.6 WASTE DISPOSAL

Should an excess volume of soil be required to be disposed of off-site then a waste classification may be required.

For a waste classification to be undertaken, materials may need to be subjected to chemical testing which would give an indication to the contaminants present and, therefore those most toxic to the environment in the waste. Following the assessment of the waste as hazardous or non-hazardous waste acceptance criteria leachate testing allows the appropriate disposal pathway to a suitably licensed disposal facility to be further determined.

The preliminary waste assessment based on the results of materials tested to date, suggests that a proportion of any surplus soils requiring off-site disposal would be classified as EWC 17 05 03* stabilised non-reactive hazardous waste and following WAC testing to determine their leachable content, may or may not be acceptable at a waste facility licenced to accept non-hazardous material. Any soils found to contain in excess of 0.1% asbestos would be classified as hazardous.

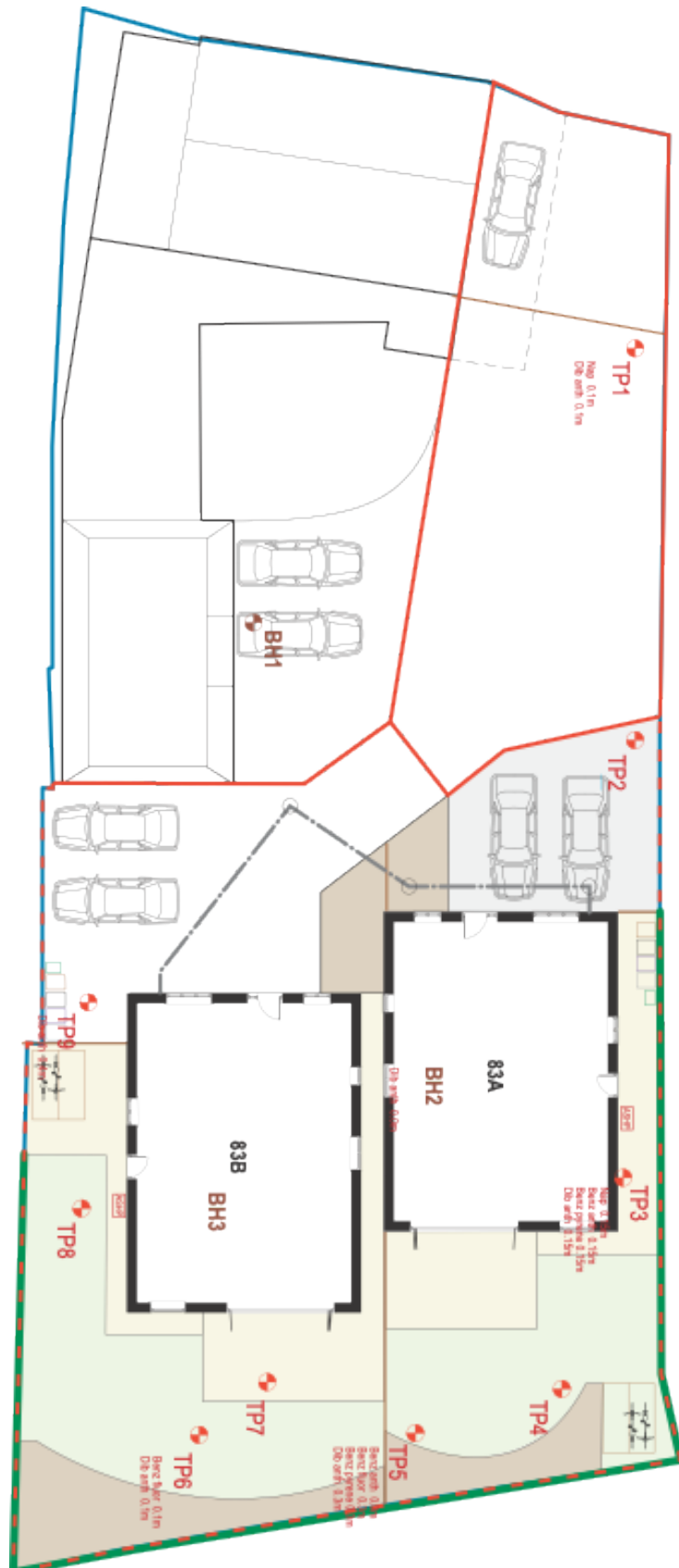
4.0 CONCLUSIONS AND RECOMMENDATIONS

It is recommended that a watching brief is implemented on this site, as outlined above, during enabling works and should any contamination or potentially contaminative sources be discovered during the proposed enabling works all site works would cease and suitably competent consultants/engineers will attend site to agree a formal remediation strategy.

Based on the principles and definitions outlined under section 57 of the Environment Act 1995, the site would not be considered to be "Contaminated Land" based on its proposed residential redevelopment end use following implementation of the above remedial measures.

APPENDIX 1

Borehole and Trial Pit Locations



APPENDIX 2

Calculations based on mixed zone (M)	600	mm
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Contaminant	Site Data				Expressed as a Factor of Target Guideline Value				Cover Thickness Required for Compliance to Specified Target Guideline Value	
	Contamination of Ground (Cg)	Contamination of Cover (Cc)	Res with PU	RwPU	Soil / Res with PU	Cover / Res with PU	Soil / RwPU	Cover / RwPU	Res with PU	RwPU
	Units	Units	Units	Units	Fraction	Fraction	Fraction	Fraction	(mm)	(mm)
Arsenic	56.2	1	37	40	1.5	0.0	1.4	0.0	209	176
Beryllium										
Chromium										
Chromium (VI)										
Mercury										
Selenium										
Copper										
Nickel										
Zinc	5020	100	3700	40000	1.4	0.0	0.1	0.0	161	None
Lead	1060	100	200	310	5.3	0.5	3.4	0.3	538	469
Boron (Water sol)										
Sulphate (total)										
Phenols										
Sulphide										
Cyanide										
Solvent Extractable Matter										
BAP										
Dibenz(a,h)anthracene	1.5	0.1	0.24	0.31	6.3	0.4	4.8	0.3	540	510
Benzo(a)anthracene	8.7	0.1	7.5	12	1.2	0.0	0.7	0.0	84	None
Naphthalene	1.9	0.1	1	1	1.9	0.1	1.9	0.1	300	300
Benzo(b)fluoranthene	7.8	0.1	2.6	3.9	3.0	0.0	2.0	0.0	405	304
Benzo(a)pyrene	11.3	0.1	2.2	3.2	5.1	0.0	3.5	0.0	488	434
Indeno(1,2,3-cd) pyrene										

Summary		
	Res with PU	RwPU
Number of contaminants	17	23
Number of contaminants with no thickness calculation	15	15
Breakdown - Number for which no TV specified	15	15
Breakdown - Number for which no soil specified	15	15
Breakdown - Number for which no cover specified	15	15
Breakdown - Number for which cover > TV	0	0
Number of contaminants with thickness calculation	2	8
Breakdown - Number for which no cover required	0	2
Breakdown - Number for which cover required	2	6
Overall thickness of cover required	540	510