CONTAMINATION REMEDIATION STATEMENT

AT

PLANE STREET, HUDDERSFIELD

ON BEHALF OF

UNITY HOUSING ASSOCIATION

ARP GEOTECHNICAL LTD

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CLIENT: UTILITY HOUSING ASSOCIATION Ltd

JOB NUMBER: UHA/13

PROJECT: PLANE STREET, HUDDERSFIELD

REPORT TYPE: CONTAMINATION REMEDIATION STATEMENT

REPORT REFERENCE: UHA/13Rem1

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ISSUE	**DATE**	**STATUS**
1	25th MARCH 2024	V1 FINAL

1.0 Introduction

1.1 This document has been prepared to provide information for the Client and other interested parties, such as the regulatory authorities, outlining how contamination encountered on the site will be managed to ensure that the site is environmentally suitable for the intended residential use. The document should be agreed, prior to implementation, with the relevant regulatory authorities, usually the local planning authority and building control provider.

1.2 The Consultation Response from: Kirklees Council (KC) Environmental Health, dated 1st June 2022, reference WK/202217881, made comment to the March 2022 DB Remediation Strategy Report: '*The remediation strategy was authored prior to the additional investigation by Solmek, and it is unclear whether the remediation strategy has been revised in light of the additional findings. Furthermore, we require clarification on the proposed high visibility membrane and the clean cover system'.* KC Declined to discharge Condition 6 – Remediation Strategy on these grounds warranting an updated remediation strategy to address these issues. This report is the updated remediation strategy.

2.0 The Site

2.1 The Solmek Further Site Investigation Report, dated 5th May 2022 under reference S220220, makes an assessment of contamination, along with other aspects of the site in addition to the prior Solmek Phase 2 Site Investigation dated 20th September 2020 under reference S190939/SI both of which have been considered in this Remediation Statement. The DB Remediation Strategy Report dated 29th March 2022 reference 416.03.22RS, which only considered the initial September 2020 Phase 2 investigation as also been considered with respect to this Remediation Statement.

2.2 The conceptual site model is for residential dwellings with private gardens.

2.3 The site is accessed off Plane Street Huddersfield, at National Grid reference 414580 415390. The site is bounded to the north by Plane Street, to the east and west by residential housing with open land to the south.

2.4 The geological maps show the site to be underlain by undifferentiated mudstones, siltstones and sandstones Pennine Lower Coal Measures Formation. There are no drift/superficial deposits shown to be present on the site. No fault lines cross the site.

2.5 The bedrock aquifer beneath the site comprises a "Secondary A" Aquifer. There are no superficial/drift deposits identified on the site.

2.6 There are no watercourses on or adjacent to the site. The nearest watercourse downslope is the River Holme 228m to the southeast. The site is not at risk of river flooding.

2.7 The site is surfaced by made ground concrete and reworked topsoil. Made ground is typically between 0.3m and 1.2m but in one location, TPC, the base of the made ground was not encountered with the pit terminated at 0.6m on suspected foundations. The natural ground typically comprises firm to stiff clay encountered to a maximum depth of 3.0m bgl over mudstone. Shallow groundwater may be present.

2.8 In addition to the September 2020 Solmek Phase 2 reports findings the May 2022 Further Investigation reported elevated concentrations of arsenic, several PAHs and heavy end TPH aromatics being recorded in the made ground.

2.9 With reference to ground gas risk, the site has been classified as Green (with reference to the NHBC 'Traffic Light' classification system) within the Solmek Ground Gas Risk Assessment, dated 20th September 2020 under reference S190939/GAS and therefore deemed not to require gas protection.

3.0 Remediation Strategy

3.1 None of the limited/localised made ground topsoil on the site is considered to be suitable for re-use on the site. No natural or undisturbed topsoil has been identified on site. As such, any made ground topsoil, located in former landscaped areas of the site typically adjacent to the retaining wall separating the site from Plane Street, should be removed from site. The made ground present on site contains elevated contamination and requires a clean soil cover system if left in place. Waste Classification Testing and reporting (using HazWasteOnline) was undertaken on 11 samples of made ground as part of the Solmek May 2022 further SI report. Five samples were classified as hazardous and six classified as Non Hazardous. The decision on whether to accept exported waste from site or if further testing is required, is at the discretion of the waste disposal company.

3.2 Where any garden areas overlie made ground, a minimum 0.6m thickness of uncontaminated soils (topsoil and subsoil) as a cover system should be provided. In areas of hardstanding or building footprints where made ground is present, the cover system is not required. The proposed profile for garden areas, where the existing made ground is present, is provided below.

Thickness (m)	Description
Minimum 0.15	Topsoil
Minimum 0.45	Subsoil

For Public open space/planted borders and communal green spaces the proposed profile is provided below.

Thickness (m)	Description
Minimum 0.15	Topsoil
Minimum 0.15	Subsoil

3.3 If any cohesive material is to be used in the cover system, external levels and surface water drainage will need to be carefully designed to avoid localised surface water ponding.

3.4 The local water company are likely to require details of the contaminants present on the site, to make a judgement on any requirement for protection if buried water supply pipes form chemical attack/ingress. Again, it is likely that, due to the anticipated reduction in levels, water pipes will be placed into natural ground. This should be considered by the local water company so that protective pipework is not specified unnecessarily.

3.5 Any soils used in the cover system, whether imported or site-won, will need to be verified as suitable by inspection and testing, in accordance with guidance supplied in the document produced by the Yorkshire and Lincolnshire Pollution Advisory Group (YALPAG): "Guidance on the Verification Requirements for Cover Systems". The measures described below will be required to ensure compliance with the document.

3.6 The DB Remediation Strategy Report dated 29th March 2022 reference 416.03.22RS, mentions the confirmation/validation of placement of a Hi-Viz membrane in CH4.2, but does not mention the requirement for this membrane earlier in the report or specify the membrane to be used. Due to the high TPH and PAH recorded within the made ground, ARP consider that where made ground is left in place, the use of a 'Ecogrid Hi-Vis Non-Woven orange geotextile membrane' or similar product is considered necessary, and to be placed below the cover layer as specified in paragraph 3.2 of this report.

4.0 Validation

4.1 When the made ground topsoil is removed from site, the surface will need to be inspected by an engineer, to confirm satisfactory removal. The area will be photographed and all the details included within a Validation Letter Report. The disposal/transfer documents should be retained for inclusion in the Validation Report.

4.2 In significant areas of the site the made ground is relatively thin and is likely to be less than 0.6m. If the made ground is removed from areas of the site (down to natural clay or even bedrock) to provide an effectively uncontaminated are of the site, then no cover system should be necessary. However, to verify this, an inspection should be carried out by an engineer to confirm that no made ground remains. It is not proposed for surface testing to be undertaken for this removal works as it should be easy to identify that the natural clay (or bedrock) has been exposed and the made ground has therefore been removed. The area will be photographed and all the details included within a Validation Letter Report. The disposal/transfer documents should be retained for inclusion in the Validation Report.

4.3 Where made ground remains, following placement of the 'Ecogrid Hi-Vis Non-Woven orange geotextile membrane' or similar and cover soils in residential garden areas and public open spaces, it will be necessary to confirm the presence of suitable membrane and required 0.6m or 0.3m of cover of uncontaminated soil has been placed, by excavating hand pits pits to 0.6m or 0.3m depth across these areas on the basis of a likely frequency of one pit per every three plots and pits on a maximum 25m spacing on public open space. The hand pits will be photographed, to include a reference scale, and the photographs included within any report to enable the location on site to be identified.

4.4 It is likely that natural clay/soils will be excavated during the development as foundation and sewer arisings. This natural material can be used within the subsoil of the cover system but will need to be inspected and approved for use by the environmental engineer.

5.0 Laboratory Testing

5.1 For any imported subsoil and topsoil used, or any site-won uncontaminated subsoil to be re-used on the site, the source will need to be confirmed, and the material tested for the attached suite of contaminants, to comply with the maximum screening values listed. The frequency of testing is given on the table below. Any samples already tested in the site investigation carried out to date can be considered part of the overall total required.

Material Type	Number of Samples
Topsoil or subsoil from greenfield / manufactured source	Minimum 3No. or 1 per 250m^3 (whichever is greater)
Topsoil or subsoil from brownfield / screened source	Minimum 6No. or 1 per 100m^3 (whichever is greater)

5.2 When a potential source of soil is identified, the Client may provide ARP Geotechnical Ltd with supplier certificates, and we will comment on the apparent acceptability of the material. If no certificates are available, the Client may wish us to sample the material at source prior to import, or sample an example load delivered to site, to minimise potential for any problems later. The test results will be available approximately one week, or slightly more, after the site visit.

5.3 Provided the results of the above are acceptable, there are two options for validation:-

A. Import a stockpile of material to site sufficient to complete the required areas, and invite ARP to take sufficient further samples of the stockpile for testing to fully approve it as a source. The stockpile should be isolated from any other materials on the site (becoming a "Quarantined Stockpile"), fenced off to avoid any cross contamination, and must not be added to without further testing. The test results will be available approximately one week, or slightly more, after the site visit.

OR:

B. Import and place the material as and when required, and invite ARP to sample the material when in place, during the inspection pits noted in Section 4.3. The samples will be issued to the laboratory for contamination testing to confirm acceptability. The test results will be available approximately one week, or slightly more, after the site visit. Our letter report will be available a day or two later. Therefore, Clients should allow for receiving the final letter report two weeks after the site visit.

5.4 Any cross contamination of materials should be avoided, and further testing carried out where any cross contamination is suspected to have occurred.

5.5 The results of all the laboratory analysis, excavation logs, plans, photographs, and import documents will form part of the Remediation Validation Report for the group of plots.

6.0 Timescales for Remediation and Validation

6.1 Once the site has been stripped of made ground topsoil, the engineer should be invited to inspect, and a letter report can usually be issued within a couple of days, providing confirmation of successful removal.

6.2 When/if areas of made ground are stripped leaving natural soils exposed (and no requirement for a cover system), the engineer should be invited to inspect, and a letter report can usually be issued within a couple of days, providing confirmation of successful removal.

6.3 Where a clean cover system is required, then it is anticipated that this will be placed progressively around a group of plots as their construction is nearing completion (usually following removal of scaffolding) and not sooner. This is to ensure that the soils will not be subjected to trafficking or cross contamination by construction activities once placed.

6.4 As soon as the soils are in place around a group of plots, validation can take place via inspection pits, as per Section 4.3 above.

6.5 Soils in any landscaped areas can be placed as soon as those areas are safe from any further construction trafficking.

6.6 If imported soils are to be used on the site then these can be imported at any time, for future use as quarantined stockpiles, provided there is sufficient space for storage.

6.7 The very latest a Validation Report for a group of plots should be issued is a week before the programmed Council of Mortgage Lenders "Finalling", and preferably before. The Planning Condition relating to contamination remediation validation cannot normally be discharged for a site until all the validation reports have been issued to the local authority, on completion of the development, or a combined Validation Report for the whole site is issued.

7.0 Unexpected Contamination

7.1 Any unexpected contamination uncovered during the works shall be inspected, sampled and analysed in laboratory for the suite of determinands appended to this Remediation Statement, and compared to the maximum concentration levels listed on the enclosure. Works on the affected materials shall cease until the appraisal is complete and, if necessary, a revised Remediation Statement is to be prepared and approved by the Planning Authority before work is recommenced.

8.0 Protection of Workers and the Public During Development Works

8.1 Damping down of the contaminated made ground must be implemented during dry periods, and timely placement of the contaminated material below barriers.

8.2 Washing facilities and a clean mess room from which work boots and overalls are excluded should be provided.

8.3 Site fencing will be provided to exclude access to members of the public, and contaminated material will be contained within the site boundary, and placed below barriers as soon as possible.

8.4 Workers will be educated to use adequate hygiene and PPE.

8.5 Movement of contamination off-site on vehicle wheels shall be minimised by cleaning of vehicle wheels and/or use of road sweeper, as required.

ARP GEOTECHNICAL LIMITED
SOIL CONTAMINANT SCREENING VALUES
RESIDENTIAL WITH HOME-GROWN PRODUCE

Determinand	S4UL (mg/kg)			C4SL (mg/kg)		
Arsenic	37			37		
Cadmium	11			22		
Chromium (trivalent)	910					
Chromium (hexavalent)	6			21		
Copper	2400					
Lead				200		
Inorganic Mercury	40					
Nickel	180					
Selenium	250					
Zinc	3700					
Acidity (pH)	*Should be Greater Than 5			*Should be Greater Than 5		
	1% SOM	**2.5% SOM**	**6% SOM**	**1% SOM**	**2.5% SOM**	**6% SOM**
Naphthalene	2.3	5.6	13			
Acenaphthylene	170	420	920			
Acenaphthene	210	510	1,100			
Fluorene	170	400	860			
Phenanthrene	95	220	440			
Anthracene	2,400	5,400	11,000			
Fluoranthene	280	560	890			
Pyrene	620	1,200	2,000			
Benzo(a)anthracene	7.2	11	13			
Chrysene	15	22	27			
Benzo(b)fluoranthene	2.6	3.3	3.7			
Benzo(k)fluoranthene	77	93	100			
Benzo(a)pyrene	2.2	2.7	3			5
Indeno(1,2,3-cd)pyrene	27	36	41			
Dibenzo(a,h)anthracene	0.24	0.28	0.30			
Benzo(g,h,I)perylene	320	340	350			
Phenols	120	200	380			
Total TPH	*Above 500, speciate and compare with values below:					
C5 to C6 Aliphatic	42	78	160			
C6 to C8 Aliphatic	100	230	530			
C8 to C10 Aliphatic	27	65	150			
C10 to C12 Aliphatic	130	330	760			
C12 to C16 Aliphatic	1100	2,400	4,300			
C16 to C35 Aliphatic	65,000	92,000	110,000			
C35 TO C44 Aliphatic	65,000	92,000	110,000			
C5 to C7 Aromatic (Benzene)	70	140	300			
C7 to C8 Aromatic (Toluene)	130	290	660			
C8 to C10 Aromatic	34	83	190			
C10 to C12 Aromatic	74	180	380			
C12 to C16 Aromatic	140	330	660			
C16 to C21 Aromatic	260	540	930			
C21 TO C35 Aromatic	1100	1,500	1,700			
C35 TO C44 Aromatic	1100	1,500	1,700			
Asbestos	*Should be None Detected			*Should be None Detected		

* In House Value/Approach   S4UL = Suitable 4 Use Level, CIEH/LQM 2014   C4SL = Cat 4 Screening Level, DEFRA, 2014

Blank cell indicates no published value or in-house value.   Some values presented are above saturation limits.