



Glebe House, Dalton-le-Dale

Phase 3 – Remediation Strategy

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GLEBE HOUSE, DALTON-LE-DALE, SEAHAM

PHASE 3 – REMEDIATION STRATEGY

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Client Address: Glebe House
Dalton-le-Dale
Seaham
SR7 8PX

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1 BACKGROUND

1.1 INTRODUCTION

As requested by Richard Cudmore, JC Consulting (JCC) was commissioned to carry out a Remediation Strategy for the development site situated at Glebe House, within the village of Dalton-le-Dale, Seaham. This was required to define the remediation recommendations and verification requirements to complete the development in accordance with best practices in order to render the site suitable for the proposed end use i.e. Residential with Plant Uptake / Gardens.

The following technical reports should be read in conjunction with this document:

- Phase 1 – Desk Top Study of Glebe House, Dalton-le-Dale by JC Consulting Ltd. (Doc Ref: JCC17-320-E-01, dated September 2017)
- Phase 2 – Site Investigation of Glebe House, Dalton-le-Dale by JC Consulting Ltd. (Ref: JCCGEO21-013-01-SI R01, dated June 2021).

1.2 SCOPE

From information provided by the client it is understood that the proposals comprise of the redevelopment of existing garage, workshop, derelict outbuildings and adjacent land to provide short term holiday accommodation. Comprising 6 no. apartments and 4 no. lodges with associated parking and external works.

Following completion of the ground contamination risk assessments within the site investigation report, elevated levels of lead have been recorded, therefore suitable protective measures are required to ensure the safety of future residents.

This report sets out the findings of the ground contamination risk assessment, the protective measures required to mitigate the identified contamination risk and the method of verification to ensure that the protective measures are installed correctly.

This strategy methodology is based on the following standards:

- YALPAG Version 11.2 2020, 'Development on Land Affected by Contamination' – Technical Guidance for Developers, Landowners and Consultants.
- YALPAG Version 1.1 2016, 'Verification requirements for cover systems' – Technical Guidance for Developers, Landowners and Consultants.
- YALPAG Version 1.1 2016, 'Verification requirements for gas protection systems' – Technical Guidance for Developers, Landowners and Consultants.

1.3 LIMITATIONS

1.3.1 GENERAL

This Report has been prepared by JC Consulting ('JCC') with all reasonable skill and care, within the terms and conditions of the formal appointment between JCC and the Client ("Contract") and within the limitations of the resources devoted to it by agreement with the Client. Any reliance upon the Report is subject to the Contract terms and conditions. The report is to be warranted to the successful land purchaser on completion and covered by JCC professional indemnity insurance.

JCC accepts no responsibility whatsoever to third parties to whom this document, or any part thereof, is made known. Any such party relies upon the Report at their own risk. The Contracts (Rights of Third Parties) Act 1999 does not apply to this Report nor the Contract and the provisions of the said Act are hereby excluded. Any third-party reports and / or information used are stated in the Report. This

information is considered correct by JCC therefore JCC shall not be liable if the information supplied is incorrect.

This Report shall not be used for engineering or contractual purposes unless signed above by the author, checker and the approver for and on behalf of JCC and unless the Report status is 'Final'.

1.3.2 GENERIC AND SCOPE

Unless specifically assigned or transferred within the terms and conditions of the Contract, JCC asserts and retains all Copyright and other Intellectual Property Rights in and over the Report and its contents. The Report may not be copied or reproduced, in whole or in part, without the written authorisation from JCC. JCC shall not be liable for any use of the Report for any purpose other than that for which it was originally prepared.

Whilst every effort has been made to ensure the accuracy of the data supplied and any analysis interpretation derived from it, the possibility exists of variations in the ground and groundwater conditions around and between the exploratory positions. No liability can be accepted for any such variations in these conditions. Furthermore, any recommendations are specific to the development as detailed in this Report and no liability will be accepted should they be used for the design of alternative schemes without prior consultant with JCC.

2 SITE SETTING

2.1 SITE LOCATION AND DESCRIPTION

The proposed development site within the village of Dalton-le-Dale is situated approximately 2.75 km south west of the seaside town of Seaham, County Durham; see site Location Plan (within Appendix A). The site is centred at the OS National Grid Reference of NZ 40782 47553 (E440782, N547553).

The development site is irregular in shape encompassing an area of approximately 1.00ha (10,000 m²), which forms the client's private residence. At present the site can be accessed via the gated access off the B1285 highway. The site comprises of a large residential dwelling, garage, workshop and a series of derelict outbuildings as well as associated driveway and garden areas.

The site typically comprises of a combination of hard and soft landscaped areas such as; block paving and turfed / grass areas and planted flower beds.

The proposed development comprises the redevelopment of existing garage, workshop, derelict outbuildings and adjacent land to provide short term holiday accommodation. Comprising 6 no. apartments and 4 no. lodges with associated parking and external works.

The site surroundings are summarised below:

- **North** – Adjoining vacant land, assumed agricultural / storage use.
- **East** – Adjacent woodland / agricultural fields beyond the B1285 highway.
- **South** – Adjoining woodland / Glebe Farm.
- **West** – Adjoining agricultural land of Glebe Farm.

Historic OS maps have been reviewed dating back to 1856, in summary; Glebe House was historically recorded as The Vicarage with several outbuildings. Over several decades additional outbuildings and extensions were recorded until the 1950's, where no further alterations were noted. Several collieries and quarries were however recorded within the surrounding area.

2.2 PREVIOUSLY COMPLETED REPORTS

The following technical reports should be read in conjunction with this document:

- Phase 1 – Desk Top Study of Glebe House, Dalton-le-Dale by JC Consulting Ltd. (Doc Ref: JCC17-320-E-01, dated September 2017)
- Phase 2 – Site Investigation of Glebe House, Dalton-le-Dale by JC Consulting Ltd. (Ref: JCCGEO21-013-01-SI R01, dated June 2021).

3 SCOPE OF GROUND INVESTIGATION

For informative purposes the previous intrusive site investigations are summarised below:

- Four (4 no.) boreholes were sunk utilising the window sampling technique.
- In-situ geotechnical testing comprising SPT's and HSV's were taken at varying depths.
- Geochemical and geotechnical samples were taken at varying depths.
- Ground gas and water monitoring between the 30th of April 2021 and the 15th of June 2021.

Within the CLEA Risk Assessment Model for Human Health, the potential receptors are assessed initially on the site end use, with default settings for Residential, Commercial, Allotment and Public Open Space. Key generic assumptions for Residential and Commercial end use are also based upon a typical residential property, consisting of a two-storey small terraced house, with private garden, and a typical commercial or light industrial property, consisting of a three-storey office building. No building is anticipated for Allotment and Public Open Space end uses. Within the CLEA Risk Assessment Model for Human Health there are 6 no. generic end use categories;

The best fit end use category for this site has been taken by 'JCC' as '**Residential with Plant Uptake / Gardens**'.

4 GROUND AND GROUNDWATER CONDITIONS

4.1 STRATIGRAPHY

For an accurate description of the ground conditions encountered within each investigation then reference must be made to the reports stated in Section 2.2 of this Remediation Strategy. Exploratory hole records can be found within the appendices of the above-mentioned reports.

The site typically comprises of a combination of hard and soft landscaped areas such as; block paving and turfed / grass areas and planted flower beds.

At the time of the site works, several mounds of demolished building material (comprising brick, stone and timber). In addition, a large area of ash and burnt timber was present within the centre of the site i.e. evidence of a bonfire. Two large trenches were also present across the site, comprising field drainage investigations.

All the exploratory boreholes of WS01, WS02, WS03 and WS04 were completed within the external areas. WS01 and WS02 within the turfed / grassed areas whilst WS03 and WS04 were completed within close proximity of the derelict outbuildings (exposed made ground surfacing).

Turfed dark brown organic silty clayey loam topsoil was encountered within WS01 and WS02 immediately to a maximum depth of 0.32mbgl. Roots and rootlets were encountered throughout.

Dark brown gravelly clay made ground was encountered within WS03 and WS04 immediately to a maximum depth of 0.82mbgl. Gravel was fine to coarse, angular fragments of coal, limestone and sandstone. Anthropogenic debris comprising ash, clinker, plastic and metals. Within WS02 some made ground was also encountered beneath the topsoil to a maximum depth of 0.34mbgl.

Thereafter the natural superficial strata (i.e. Till, Devensian – Diamicton) was encountered within all of the exploratory holes to a maximum depth of 3.45mbgl, varying between cohesive and granular layers. The cohesive strata comprises reddish brown / brown sandy clay / sandy gravelly laminated clay. Sand was fine to coarse. Gravel was fine to coarse, sub-angular limestone and dolostone. Clay was soft to very stiff

throughout. Roots and rootlets present at shallow depths. The granular strata comprises light brown clayey silty gravelly sand / sandy silty gravel. Sand was fine to coarse. Gravel was fine to coarse, sub-angular sandstone, limestone and dolostone. Granular strata was medium dense.

The sites bedrock / solid geology i.e. 'Ford Formation (Shelf-edge Reef) – Dolostone was not encountered within any of the exploratory holes however is thought to be present underlying the site at a depth of circa 10.00 – 20.00m below ground level.

4.2 GROUNDWATER

Groundwater was not encountered during the intrusive investigations, the sandy bands within the exploratory boreholes were saturated / damp, however this I thought to be indicative of perched pockets of water and a standing groundwater level is not expected within the shallow superficial strata across the site. Therefore, a standing groundwater level is not expected across the site.

Groundwater monitoring of the well installations has also recorded levels ranging between approx. 2.40m and 3.29m below ground level (as well as completely dry). Such levels are not considered representative of a standing groundwater level at the site and are likely to be a result of minor seepages from localised sources or perched pockets which have later collected in the well.

5 CONTAMINATION RISK ASSESSMENT

5.1 GENERIC CONTAMINATION

The preliminary conceptual site model developed from the desk study information has been revised in light of the ground investigation and the chemical analysis results presented previously. The revised conceptual model has been developed for the proposed future land use (**residential with gardens**). This summarises the understanding of surface and sub-surface features, the potential contaminant sources, transport pathways and receptors.

In summary, the revised CSM has identified the following potential pollutant linkages which could result in an unacceptable risk to the proposed end-use, denoted as a moderate or higher risk on the CSM:

- Human Health:
During the intrusive investigations, a source of contamination was identified across the site in the form of made ground. In view of the results from the chemical testing, two samples indicated elevated concentrations of Lead (WS02 @ 0.25m and WS04 @ 0.15m) above the relevant GAC, **therefore remedial measures are required to protect human health from contamination risks.**

Given the nature of the made ground encountered across the site and its variable nature would not suggest a widespread contamination issue given that 50% of the samples exceeded the proposed GAC's for the site end use, and if the made ground were to remain / be accessible, it could present a risk to the proposed end users.

Although no asbestos was reported within any of the made ground, given the evidence of previous structures within the site which were constructed prior to the year 2000 where the use of asbestos containing material was banned, therefore a watching brief should be adopted across the site for asbestos containing material (ACM).

Risks to the site user possible through areas of soft landscaping and plant uptake.

Ground gas risks to the site user considered negligible.

Risks to construction and maintenance workers considered negligible through appropriate health and safety plan and PPE measures.

Risks to offsite receptors considered negligible due to limited made ground and thick layer of cohesive / impermeable superficial strata.

Remedial Action;

Removal of localised made ground 'hot-spots' for off-site disposal / landfill or reinstate in a less sensitive locations such as; beneath areas of hard standing / beneath any proposed buildings (removal of the contamination source) would be considered suitable if required.

Following review of the proposed site information and further discussions with the client, locations where elevated lead contamination has been encountered are thought to be situated underlying the proposed building / hard landscaped features. In addition, it is suggested that the proposed garden spaces and grassed access track are to be provided with a clean cover soft landscaping system (i.e. removal of the pathway).

Any potential risks to development workers will be mitigated by the use of appropriate PPE and good site practice. Potential risks to future site users from contaminants exceeding their respective GAC's may also be mitigated by the presence of the building cover and hard standing areas across the development site.

Soil screening results can be seen within in the various appendices of the reports stated in Section 2.2 of this Remediation Strategy. The maximum concentration values for each generic analyte at each sample location have been compared to the most relevant and appropriate published guidance values. Chosen guidance values include the following: CLEA SGV, Category 4 Screening Levels C4SL, LQM CIEH S4UL 2015 and LQM CIEH GAC 2009.

6 CONTAMINATION REMEDIATION: OFF-SITE DISPOSAL

Excavations and off-site waste disposal will be managed by the Principal Contractor during the development, at this stage it is not expected that off-site disposal will be required. If it is required, then to reduce the amount of soil which would be classified as 'Hazardous' waste incurring a higher disposal cost. An attempt should be made to more appropriately classify and segregate excavated material on site based upon material type and contamination evidence.

Where topsoil and made ground materials need to be removed from site, the results of the soil testing undertaken as part of the site investigations can be used as a preliminary assessment and the anticipated waste disposal facility should be provided with a copy of the results for review and any other relevant information. It may be the case that the waste facility requires additional contamination screening to aid the characterisation of the made ground for off-site disposal i.e. Waste Acceptance Criteria (WAC) testing.

6.1 VALIDATION REQUIREMENT

Any waste transfer / removal tickets / documentation and relevant laboratory testing results are to be included within the Validation Report to provide a traceable line of the waste disposal elements of the project.

During the removal of the topsoil and made ground material it is the Principal Contractors responsibility to collect appropriate validation information proving the depth of material removed i.e. topographical survey and photographs of the material being removed including excavations with a measuring staff / tape present etc.

7 CONTAMINATION REMEDIATION: HARD LANDSCAPING (HARDCOVER SYSTEM)

Where contaminants are likely to remain in-situ then there is a potential risk to human health therefore requiring a permanent physical barrier to be in place post development that will prohibit the proposed end users from coming into contact with any potentially contaminated ground, either by dermal, inhalation and ingestion.

If a barrier is provided appropriately, the established 'Source – Pathway – Receptor' pollutant linkage model will effectively be broken due to the removal of the 'pathway' element by permanent hard landscaping.

Any contaminated material / made ground is considered suitable to remain / be utilised as engineering fill beneath proposed hard landscaping. The proposed development comprises a large percentage of future hardcover (building and external hardstanding) therefore this system can be utilised.

The hardcover finished are designed to be in place for the life of the development and is present to ensure that future end users do not come into direct contact with any underlying contaminated made ground.

Refer to **Appendix A** for the remediation designation plan showing all areas of hard and soft landscaping which are currently known by JCC, and all other areas of existing soft landscaping are to remain.

7.1 VALIDATION REQUIREMENT

Once the hard landscaping system is in place it is the Principal Contractors responsibility to collect appropriate validation information proving the presence of hard landscaping i.e. photographs of the systems in place.

8 CONTAMINATION REMEDIATION: SOFT LANDSCAPING (CLEAN COVER SYSTEM)

Where contaminants are likely to remain in-situ then there is a potential risk to human health therefore requiring a permanent physical barrier to be in place post development that will prohibit the proposed end users from coming into contact with any potentially contaminated ground, either by dermal, inhalation and ingestion.

If a barrier is provided appropriately, the established 'Source-Pathway-Receptor' pollutant linkage model will effectively be broken due to the removal of the 'pathway' element by permanent soft landscaping i.e. clean cover system.

As the proposed development comprises a percentage of future hardcover (building and external hardstanding) and soft landscaping (grass, borders and planting etc.) the only future risk to human health is considered to be through any areas of proposed soft landscaping.

Due to the nature and type of contamination identified on site, it is proposed to emplace a clean cover system, **totalling 0.60m in thickness** (in accordance with the Local Authority requirement), within areas of soft landscaping an indication of which is summarised below:

- Minimum of 150mm Clean Topsoil (at ground level)
- Minimum of 450mm Clean Sub Soil (beneath topsoil)

The clean cover material is designed to be in place for the life of the development and is present to ensure that future end users do not come into direct contact with any underlying contaminated made ground.

During the completion of these remedial works, monitoring and laboratory certification of the clean cover materials will be required prior to placement to ensure that contaminated materials are not brought to site. This will be the responsibility of the Client and Main Contractor across the site.

Refer to **Appendix A** for the remediation designation plan showing all areas of hard and soft landscaping which are currently known by JCC, and all other areas of existing soft landscaping are to remain.

8.1 VALIDATION REQUIREMENT

During the completion of these remedial works, monitoring and laboratory certification of the clean cover materials will be required prior to placement to ensure that contaminated materials are not brought to site in accordance with the 'YALPAG Technical Guidance for cover systems'. Various sampling and testing will be required subject to the type of material as shown in the table below:

Type	Number of Samples	Testing Schedule
Virgin Quarried Material	1 or 2 depending on the type of stone utilised, to confirm the inert nature of the material.	Standard metals / metalloids (as a minimum; As, Cd, Cr, CrVI, Cu, Hg, Ni, Pb, Se and Zn).
Crushed Hardcore, Stone or Brick	Minimum of 1 per 1000m ³ .	Standard metals / metalloids (as above), PAH (USEPA 16 Speciation) and Asbestos.

Greenfield / Manufactured Soils	Minimum of 3 or 1 per 250m ³ (whichever is greater).	Standard metals / metalloids (as above), PAH (USEPA 16 Speciation) and Asbestos.
Brownfield / Screened Soils	Minimum of 6 or 1 per 100m ³ (whichever is greater).	Standard metals / metalloids (as above), PAH (USEPA 16 Speciation), TPH (CWG banded), Asbestos and any specific analysis depending on the history of the donor site.

Any proposed clean cover is to be validated in accordance with the table above depending on the type of material. Certification and / or soil testing results should be reviewed by a suitably experienced and qualified geo-environmental engineer prior to acceptance of the material on site.

Once the clean cover system is in place it is the Principal Contractors responsibility to collect appropriate validation information proving the depth of clean cover i.e. photographs of material in place with measuring staff / tape present etc. as described within the YALPAG document.

9 GENERAL VALIDATION COMMENTS

It is the responsibility of the Client or Principal Contractor to collate the following validation information whilst the works are being completed in accordance with YALPAG verification requirements:

- Description of the remedial works completed on site and / or any changes from the agreed remediation strategy.
- Photographic evidence of the completed remedial works (before / during and after) and verification of the depth / thickness of clean cover system.
- Details of who completed the works.
- Laboratory testing results.
- Imported / exported material testing.
- Waste disposal / carrier documentation

Once the works are completed and the above information is obtained by the Principal Contractor, a validation report can be completed by JCC to confirm that the remedial measures have been completed in accordance with the agreed strategy.

It is recommended that a 'watching brief' be applied to this site to ensure that if ground conditions appear to vary from those identified within this report (i.e. Asbestos Containing Material or unforeseen contamination) then advice should be sought from a suitably qualified and experienced Engineering Geologist, Geotechnical or Geo-environmental Engineer.

During the completion of these remedial works, monitoring and laboratory certification of the clean cover materials will be required prior to placement to ensure that contaminated materials are not brought to site in accordance with the 'YALPAG Technical Guidance for cover systems'.

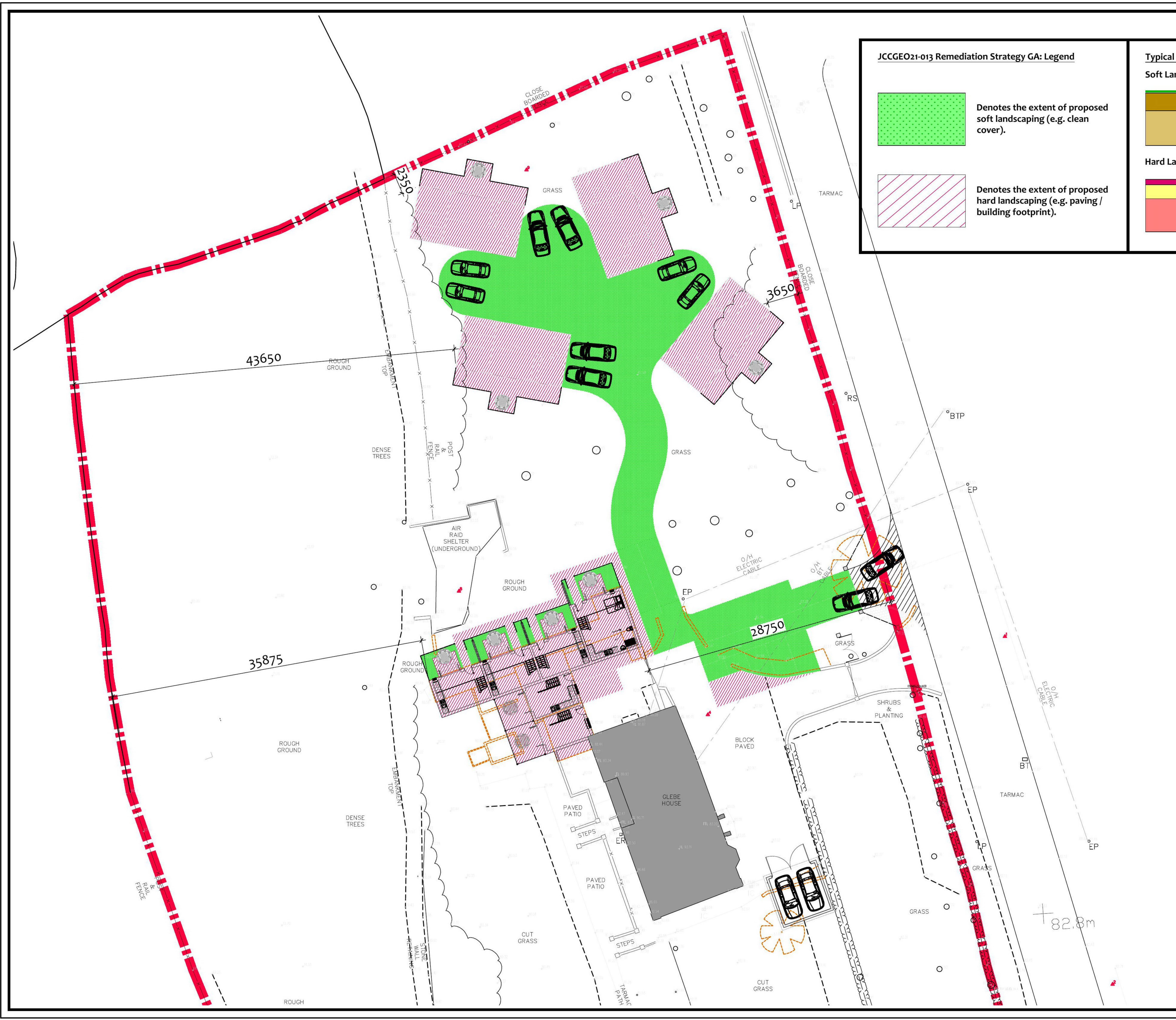
Where contaminants are likely to remain in-situ then there is a potential risk to human health therefore requiring a permanent physical barrier to be in place post development that will prohibit the proposed end users from coming into contact with any affected material.

LIST OF APPENDICES

APPENDIX A: HARD & SOFT LANDSCAPING DESIGNATION

APPENDIX A

HARD & SOFT LANDSCAPING DESIGNATION



JCCGEO21-013 Remediation Strategy GA: Legend

Denotes the extent of proposed soft landscaping (e.g. clean cover).

Denotes the extent of proposed hard landscaping (e.g. paving / building footprint).

Typical Sections:

Soft Landscaping (Clean Cover System)

- 150mm Clean Topsoil (where trafficked plastic reinforcement to be used over).
- 450mm Clean Subsoil

Hard Landscaping (Hard Cover System)

- Hard Finishes (e.g. paving / building footprint) laid directly over suitable sub-base on existing made ground.

C	Site egress site road amended.	ND	18.12.19	
B	4No lodges added to scheme.	ND	16.09.18	
A	Unit 5 and double garage added.	ND	22.05.18	
Rev	Description	By	CHK	Date

Drawing Status: **PLANNING**
 All works subject to approval from Local Authority Planning & Building Control.

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Project: **Proposed Extension and Alterations to Glebe House, Dalton-le-Dale, Seaham, Co Durham SR7 8PX**

Drawing Title: **Proposed Site Plan**

Scale:	A1 = 1:200	Drawn:	ND	Date:	Feb'18	Clk:		Date:	
	A3 = 1:400								

Project No:	THD17-037	Drawing No:	THD17-037 - 20	C
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