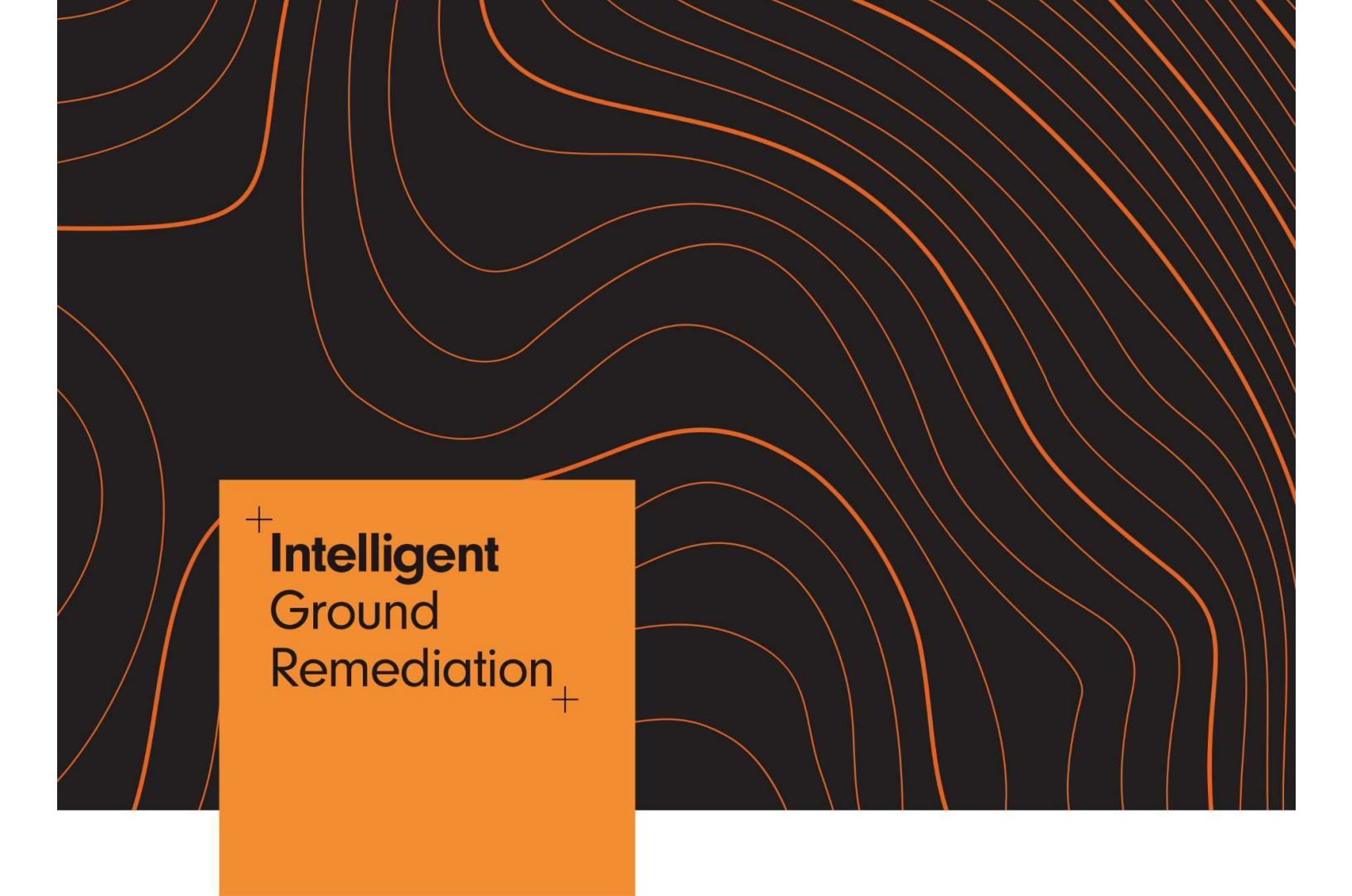




+ Intelligent Ground Remediation **+**

Remediation Strategy

Plot U2, Kingsway
Sir Isaac Newton Way,
Rochdale
OL16 4XB

For Euro Garages Limited

03 February 2023
Report ref. 23/1354.1.1



Report ref. 23/1354.1.1

Revision log

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Report Prepared By	Signature	Date
Siobhán Hyde Project Manager		03 February 2023
Report Reviewed By	Signature	Date
Steven Jackson Operations Manager		03 February 2023

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1.0 Introduction & Objectives

Geo² Remediation Limited were commissioned by Euro Garages Limited to compile a Remediation Strategy document for a site known as Plot U2, Kingsway Business Park, Rochdale. A site location plan is contained within Appendix A.

The Remediation Strategy has been compiled in order to:

- Ensure that any residual land contamination risks or unexpected contamination are appropriately managed, and
- To ensure the redevelopment works themselves are undertaken in such a fashion as to prevent the introduction of contaminated materials or may pose a risk to future site users, neighbours or the environment.

The site is currently a vacant grassed plot, bound by Sir Isaac Newton Way to the south, Michael Faraday Avenue to the east and Wallis Avenue to the north. The Hornet public house is to the west. It is understood that development plans include the construction of three commercial premises with associated car parking and soft landscaping. A proposed development plan is contained within Appendix A.

Geo-environmental reports for the site have previously been issued by BWB Consulting and the data from these reports has been summarised herein. The reports are referenced below:

- BWB Consulting, Phase 1 Geo-Environmental Assessment, ref: PUK-BWB-ZZ-XX-RP-YE-0001_Ph1, October 2022.
- BWB Consulting, Phase 2 Geo-Environmental Assessment, ref. PUK-BWB-ZZ-XX-RP-YE-0002-Ph2, December 2022.

This report provides guidance on appropriate steps which should be taken to mitigate risks and upon the collection of appropriate evidence to demonstrate that these works have been done successfully. Collated evidence should be retained to allow the completion of a Verification Report by Geo² prior to occupation of the property.

This strategy applies only to the commercial development of Plot U2 at Kingsway Business Park and is of relevance to the Principal Contractor and relevant sub-contractors involved in works from commencement onsite to the completion of all groundworks and foundation slabs.

This report does not provide any engineering or geotechnical guidance, this does not aim to address the health and safety implications of any system of work, nor does it inform the CDM Construction Phase Health, Safety and Environmental Plans.

2.0 Key Contacts

If you have any questions regarding this document or on site, please contact:

Contact	Email	Phone
Adam Wilson Technical Director	Adan.Wilson@geo2.co.uk	07779 604 026
Geo ² Head Office	info@geo2.co.uk	0113 257 5397

Table 1. Geo² Contact Details

3.0 Report Reliance

This report has been produced for use solely by Euro Garages Ltd and their appointed subcontractors.

This report reflects current guidance and legislation at the time of writing.

Any printed copy should be considered uncontrolled.

4.0 Remediation Strategy Tracking Plan

This document needs to be read alongside a Tracking Plan. This plan can be found in Appendix B. This plan is a useful checklist for the actions you need to take as a contractor and the information which Geo² would need at the end of the project to produce a Verification Report. This can be printed out during the work to check all the information required is being collected.

Some of the sections in the tracker are not relevant to all sites, if you have any doubt about which sections are relevant, please contact Geo².

5.0 Purpose of Remediation

The purpose of this Remediation Strategy is to make sure that there is no risk to:

- Workers on the site.
- Users of the site (visitors, customers and staff).
- Buildings or the materials used to make the building (water pipes, etc).
- Site neighbours and third parties who could be harmed by site (dusts, asbestos or fuel oils).
- Local controlled waters.

6.0 Summary of Phase 1 Desk Study

6.1 Desk Study Data

Information regarding the environmental setting of the site was obtained from the BWB Phase 1 PRA report (Ref. 1) and is summarised below in Table 2.

Site Geology	BGS data indicates bedrock consists of Pennine Lower Coal Measures. Superficial deposits are indicated to comprise Peat overlying Hummocky Glacial Deposits.
Coal	A review of the Coal Authority online interactive mapping indicates that while the site is located within a coal mining reporting area, the site is not located within a Development High Risk Area (DHRA) and the nearest recorded mine shafts, coal outcrops and probable shallow coal mine workings are all located >300m northeast. Therefore, the risk to the development from shallow coal mining is considered to be Low and no further assessment is considered necessary.
Radon	The site is in a low probability radon area (less than 1% of homes are estimated to be at or above the Action Level). As such, no radon protective measures are necessary in the construction of new dwellings or extensions.
Site Hydrogeology	The peat is classified as a Secondary Undifferentiated Aquifer while the hummocky glacial deposits and bedrock are classed as Secondary A Aquifers.
Site Hydrology	There are three watercourses within 150m of the site boundary, two of which are unnamed drains (21m east & 145m southeast). The Rochdale Canal is indicated 126m northwest.
Waste and Infilled Land	Records indicate eleven surface ground workings within 250m of the site, with two of these being on site and referring to refuse heaps in 1967 and 1976. Nine other records of surface workings relating to refuse heaps and canals are located 41m southwest and 112-120m northwest.
Unexploded Ordnance	A review of Zetica online risk mapping for the area indicates the site is located in a Low -risk area with respect to unexploded ordnance and no further assessment is considered necessary.

Table 2. Environmental Assessment of the Site.

6.2 Site History

The site remains predominantly undeveloped and as open fields from earliest historical mapping. Material appears to have been laid in the northwest section by 1955. From 2016-2018, the site is used as a compound related to the construction of the housing to the north, with containers, machinery and construction materials stored on site. A building related to the sales centre for the housing was constructed in the southeast corner.

Currently the site is vacant rough grassed land, with a tarmac walkway through the site generally aligned east-west. Some planted shrubs and trees are positioned along the southern and eastern boundaries.

Local land uses include a public house to the west, residential housing to the north and Kingsway Business Park east and south of the site.

7.0 Summary of Phase 2 Geo-Environmental Investigation

Following the issue of the BWB Phase 1 PRA report (Ref. 1), BWB undertook an intrusive investigation across the site in October 2022 in order to provide an assessment of potential contamination linkages and to obtain further information regarding the geology of the site and the quality of the soils and groundwater.

The intrusive investigation works, findings and recommendations are detailed within the BWB Phase 2 Geo-Environmental report (Ref. 2) and are summarised below.

7.1 Site Investigation Works

The intrusive investigation comprised the advancement of 6no cable percussion boreholes up to 15.45m bgl and 15no machine excavated trial pits up to 3.40m bgl. An exploratory hole location plan is included in Appendix A for reference.

7.2 Encountered Ground Conditions

Ground conditions generally comprised Made Ground or topsoil overlying glaciofluvial deposits which varied between sand and clay and included peat in northern and western areas of the site. Made ground was typically deeper in the western area of the site, with a maximum 3.10m thickness encountered in BH1 and BH2 and contained fragments of brick, concrete and clinker.

A bituminous odour was observed in Made Ground and sand material in TP12 at 0.20-0.95m bgl.

Peat was encountered across the western and northern areas of the site and the north-eastern boundary. Thicknesses ranged from 0.10m (TP04) to 0.90m (TP01). The material was generally described as soft brown fibrous peat. TP08 and TP10 located in the northeast of the site both recorded black sandy peat.

Interbedded cohesive and granular glacial deposits were recorded across the site up to a maximum depth of 15.45m bgl. No bedrock was encountered.

Within the machine excavated trial pits, groundwater strikes were recorded at depths ranging from 0.1-2.3m bgl in the Made Ground, 1.6-2.2m bgl in the Peat and 0.3-1.2m bgl in the Glacial Deposits.

7.3 Soils Analysis

Eighteen soil samples were selected and scheduled for a range of contaminants including heavy metals, phenols, cyanide, pH, PAHs and TPHs. One soil sample (TP12), where a bituminous odour was observed, was analysed for TPH-CWG, VOCs and SVOCs.

As the site is proposed to be developed as commercial units, the soil analysis testing results were compared against 'Commercial' end use Generic Assessment Criteria (GACs) thresholds with a conservative 1% Soil Organic Matter (SOM) utilised.

No Commercial GAC exceedances have been recorded in the site's shallow soils, confirming that the contamination concentrations within site soils present a **Low** risk to site end users, neighbouring residents and controlled waters.

Ten Made Ground soil samples were scheduled for asbestos identification screening. Of these, seven soil samples positively identified loose Chrysotile asbestos fibres at depths of 0.3-1.2m bgl. The locations of these samples are detailed in Table 3 on the following page and also shown on the exploratory hole plan included in Appendix A.

No quantitative analysis was undertaken on the positively identified asbestos samples.

Exploratory Hole	Depth m (m AOD)	Location
TP02	0.70 (145.87)	Northwestern area
TP03	0.40 (146.10)	
	0.70 (145.80)	
TP04	1.20 (145.36)	
TP05	1.20 (145.81)	Southwestern area
TP08	0.70 (145.77)	Northern boundary
TP15	0.30 (146.02)	Southeastern corner

Table 3. Location of Loose Chrysotile Asbestos Fibres

7.4 Ground Gas Monitoring

At the time of writing, data from three monitoring visits undertaken in November and December 2022 were available for review. Ground gas monitoring is on-going, and the final results will be reported separately by third parties..

All six exploratory holes had been installed for ground gas and groundwater level monitoring. BH01, BH04 and BH05 were installed to target the Made Ground and Peat (BH04) strata, while boreholes BH02, BH03 and BH06 were installed within the deeper granular glacial deposits.

BH04 has recorded the highest concentrations of carbon dioxide and methane to date, with maximum steady state concentrations of 0.6% v/v and 0.3% v/v recorded respectively. Ground gas monitoring visits have been undertaken across a range of atmospheric conditions, with atmospheric pressure ranging from 990-1003mB and including rising and falling atmospheric conditions. Maximum flow of 0.2l/hr has been recorded.

While low concentrations of ground gases have been recorded to date, elevated concentrations of Total Organic Carbon (TOC) have been recorded across the site soils:

- Peat TOC = 19% and 26% recorded in TP01 and TP07
- Made Ground TOC = 1.0-6.8%
- Glacial Deposits TOC = 1.2-3.5%

CL:AIRE RB17 (Ref. 3) and Table D.1 from BS8485:2015 (+A1) (Ref. 4) recommend a Characteristic Situation 2 (CS2) for TOC between $\leq 1.0\%$ and $\leq 1.5\%$ and a CS3 gas regime for TOB between $\leq 1.5\%$ and $\leq 4.0\%$ recorded in Made Ground with thicknesses of less than 3.0m that has been in place for less than 20 years,.

CL:AIRE RB17 (Ref. 3) recommends CS3 gas protection measures for natural soils with high organic content.

8.0 Conceptual Site Model

The qualitative risk assessment is undertaken, detailed in Table 424 on the following page, in line with guidance provided in CIRIA's Contaminated Land Risk Assessment: a guide to good practice CIRIA C552, 2001 (Ref 5). The purpose of this assessment is to determine the relative significance of the identified contamination linkages by assessing the probability of an impact occurring and by assessing the perceived severity of an impact to a receptor.

The perceived risk is based on a consideration of both the likelihood of an event (probability) occurring, and the severity of the potential consequence.

Those linkages considered as low risk or less on the basis of the available site data will not be considered any further in this assessment. Linkages considered to be more significant are identified as presenting potentially unacceptable risk to the identified receptor. In these instances, further works may be considered necessary.

Source	Pathway	Receptor	Probability	Severity	Risk Classification
Chrysotile asbestos fibres positively identified in seven Made Ground soil samples (of ten samples analysed). Asbestos recorded in soils at 0.30-1.20m bgl depth	Inhalation	Proposed Commercial site end users	Likely Asbestos fibres positively identified in shallow made ground soils	Medium Human Health	Moderate
		Site workers during groundworks			
		Neighbouring residents			
Organic made ground and natural soils including Peat with high TOC concentrations	Inhalation	Proposed Commercial site end users	Likely Potential for ground gases from organic site soils	Medium Human Health	Moderate
		Site workers during groundworks	Low Likelihood Limited enclosed spaces with only temporary site compound and cabins		Moderate / Low
		Neighbouring residents	Unlikely Housing is relatively new and if ground conditions were similar likely already have ground gas protection measures		Low

Table 42. Summary of Qualitative Risk Assessment

9.0 Remedial Objectives

This Remediation Strategy has been compiled in order to:

- Ensure that any residual land contamination risks or unexpected contamination are appropriately addressed, and
- To ensure the redevelopment works themselves are undertaken in such a fashion as to prevent the introduction of contaminated materials or may pose a risk to future site users, neighbours or the environment.

The following remediation measures are therefore proposed and detailed further in the following sections:

- Asbestos Management Plan – Section 10.0
- Ground Gas Protection Measures – Section 11.0
- Clean and Inert Capping Layer – Section 12.0

Other items which may arise as the development progresses which are also discussed in this report include:

- Imported Materials – Section 13.0
- Watching Brief for Unexpected Contamination – Section 14.0
- Waste Management – Section 15.0
- Health and Safety Considerations – Section 16.0

Upon completion of the development works, a Verification Report (otherwise known as a Remediation Strategy Completion report) will be required in line with anticipated contaminated land planning conditions. This Verification report will confirm that the development works have been undertaken in line with the agreed Remediation Strategy and confirm, with evidence, that the site as completed presents no contamination risk to human health for the site end users or controlled waters.

10.0 Asbestos Management Plan

The BWB Geo-Environmental investigation (Ref. 2) positively identified loose Chrysotile asbestos fibres in seven of ten made ground soil samples tested. No quantitative analysis was undertaken as a part of the October 2022 investigation.

It is therefore recommended that an Asbestos Management Plan is put in place with input from an asbestos specialist to safely manage the risk from asbestos in soils during groundworks and development of the site. All works should be undertaken in line with the Control of Asbestos (CAR) 2012 Regulations. Suitable mitigation measures may include dust suppression and the use of suitable PPE and RPE when required.

Further asbestos testing and quantification analysis may be required to further assess the risk to groundworkers and neighbouring residents or to confirm potential disposal costs of soils if required.

11.0 Ground Gas Protection Measures

Based on the elevated TOC concentrations recorded within shallow site soils, particularly the peat which recorded 19% and 26% and the made ground which recorded 1.0-6.8%, the site has been classified as gas regime CS3.

In line with BS8485:2015+A1:2019 (Ref. 4) and based on current development plans, the proposed buildings comply with Type C Buildings - commercial building with central building management control of any alterations to the building or its uses and central building management control of the maintenance of the building, including the gas protection measures. Single occupancy of ground floor and basement areas. Small to large size rooms with active ventilation or good passive ventilation of all rooms and other internal spaces throughout ground floor.

Consequently, the development will require minimum 3.0 points of protection to meet CS3 requirements in line with BS8485:2015+A1:2019 (Ref. 4). At the time of writing, no design drawings for the proposed buildings were available.

The following items will be required to comply with the minimum 3.0 points of protection:

- Structural Slab – cast in situ monolithic reinforced ground bearing raft or reinforced cast in situ suspended floor slab with minimal penetrations – 1.0 or 1.5 points.
- Ventilation – passive sub floor dispersal layer – 1.5 to 2.5 points.
- Membrane – installation of a gas protection membrane meeting all of the criteria set out in Table 7 of BS8485:2015+A1:2019 (Ref. 4) – 2 points.

Due to the presence of peat on site, up to 1m thick in the northwest corner, a methane-resistant gas membrane should be utilised.

Geo² consider that if, due to the peat's unsuitability as a founding stratum the peat is excavated and removed from site, the ground gas risk assessment could be revised.

12.0 Clean and Inert Capping Layer

Taking into account the absence of Commercial GAC exceedances in shallow site soils and the positive identification of loose Chrysotile fibres within made ground soils, a clean and inert capping will be required in all areas of soft landscaping. This clean and inert capping layer will break the source-pathway-receptor linkage between the made ground soils containing asbestos fibres and the Commercial site end user.

Across the remainder of the site, the source-pathway-receptor linkage will be broken by the building footprints and areas of hard standing for car parking and footpaths.

It is considered that a suitable cover system comprising a geotextile membrane, acting as a 'no-dig' layer, overlain by minimum 300mm clean and inert soils would be sufficient. It is proposed that the minimum 300mm clean and inert capping will comprise 150mm subsoil overlain by minimum 150mm topsoil.

Greater depths of capping may be required by the landscape architect, for example, for tree pits. No proposed landscape plans were available at the time of writing.

Any soils imported to site for use within a clean and inert capping layer will require environmental chemical analysis to confirm suitability for use of the soils as a capping layer. The suite of analysis and rate of testing is detailed in Section 13.0.

13.0 Imported Materials

If, due to the peat's unsuitability as a founding stratum the peat on site is excavated and removed from site, then it is considered likely that a suitable founding material would need to be imported to retain site levels. Environmental chemical analysis of imported material will be required to confirm that the material is clean and inert and will not present a risk to site end users or the local environment. Testing requirements are set out in the below Sections.

Should imported soils be used during the development of the site for a clean and inert capping layer within soft landscaping, it must be ensured that the following criteria are met, in line with Yorkshire and Lincolnshire Pollution Advisory Groups (YALPAGs) Verification Requirements for Cover Systems (Ref. 5). A copy of the YALPAG Verification Requirements for Cover Systems is included in Appendix C for reference.

The YALPAG guidance is accepted by a number of councils across England, but it should be noted that Rochdale Borough Council may have its own requirements.

13.1 Sampling Criteria

Imported topsoil must be able to demonstrate suitability for use; this should include information demonstrating the source of the materials origin and suitable chemical analysis.

Sampling of imported material should be undertaken on a minimum frequency of 3 samples, or 1 per 250m³ for greenfield/manufactured sourced materials, or 6 samples with 1 sample per 100m³ for brownfield sourced materials (whichever is greater).

Imported crushed stone should be sampled on a frequency of 1 per 1,000m³ (or a minimum of 3 samples).

13.2 Lab Analysis

Soils analysis should include the following:

- **Imported crushed stone** – CLEA metals suite and including speciated PAH and asbestos identification for reused crushed materials.
- **Imported subsoil / topsoil** – CLEA metals suite, speciated PAH, asbestos identification, pH and soil organic matter. Include TPH-CWG and additional relevant analysis if deemed appropriate when materials are imported from a brownfield source.

All samples will be submitted to an appropriate MCERTS and UKAS accredited laboratory for analysis. All samples will be collected and submitted in line with best practice guidelines. All analysis should consider the required target concentrations and ensure a suitable level of detection is specified.

All environmental chemical analysis should be compared to appropriate generic screening criteria (GACs) drawn from the following sources:

- Environment Agency SGV Values.
- LQM / CIEH's Suitable for Use Levels (S4ULs)
- DEFRA Category 4 Screening Levels (C4SLs).
- EIC Soil Generic Assessment Criteria for Human Health (2010).

14.0 Watching Brief for Unexpected Contamination

It is recommended that a watching brief be undertaken by contractors during future development works, to ensure any previously unidentified contamination impacts may be appropriately addressed. Contractors should be briefed on areas of expected contamination in advance.

If any significant unexpected contamination is uncovered during the redevelopment, measures to be enacted are detailed in the contractors Watching Brief Method Statement, in Appendix D. The purpose of the Watching Brief is to ensure such material is appropriately characterised and suitable measures are enacted to ensure no potential current or future hazards are created by this material.

It should be noted that although a number of soil samples have been collected from across the site during the October 2022 investigation, this may not be representative of any waste materials potentially encountered and therefore further testing, including Waste Acceptance Criteria (WAC) and asbestos quantification testing, may be required.

15.0 Waste Management

15.1 Preliminary Waste Classification

As a part of the BWB Oct 2022 investigation (Ref. 2), the environmental analysis soil results were characterised against hazardous waste criteria using the Hazwaste online waste assessment. Of the 19no soil samples, 3no were classified as hazardous, with the remainder classified as non-hazardous (stable non-reactive).

The three soil samples which were classified as hazardous are all made ground soil samples: TP02 at 0.70m, TP05 at 1.20m and TP15 at 0.10m bgl.

Of the sixteen non-hazardous soil samples, ten were made ground soils, one peat sample (TP01 at 2.40m bgl), two clay and three sand samples.

However, it should be noted that as asbestos quantification analysis has not been completed, the above results should be treated as preliminary, as soils containing asbestos concentrations of >0.1% are classified as hazardous for disposal.

Landfill operators are not obliged to accept waste and, if they were to do so, may have specific requirements beyond those outlined above prior to acceptance. Landfill operators should be contacted to confirm the above classifications or otherwise.

15.2 Material Management Plan (MMP)

Made Ground soils may be suitable for reuse onsite as part of the site's development. Should the developer choose to retain site won materials, it should be ensured that this material cannot be considered a waste product.

This can be achieved by complying with the CL:AIRE Definition of Waste : Code or Practice (DoWCoP) (Ref. 6), or through use of an appropriate exemption. Advice should be sought with respect to either circumstance to ensure compliance.

To enable material to be reused under the CL:AIRE DoWCoP it is recommended that a Materials Management Plan (MMP) is put in place before redevelopment works commence. Guidance and relevant forms are available from the industry body CL:AIRE at www.claire.co.uk.

The MMP requires information, such as source and sampling data to be kept regarding re-use of materials on site to build an auditable trail to be kept for each volume of material re-used. This information will ultimately be

used to produce a MMP Verification Report for re-used materials on site, to prove compliance with the MMP and CL:AIRE guidance.

15.3 Ancillary Wastes

While none have been reported to date, if any invasive species are identified during the development works then treatment / removal of the infected area should be undertaken by a specialist contractor.

Should any liquid wastes be identified during the development works it may be necessary to dispose of the wastes through the use of a vacuum tanker.

Any general waste generated during the works should be disposed of by the contractors.

All relevant waste transfer notes and consignment notes should be retained by the contractors for inclusion within the Verification Report.

15.4 Excess or Unsuitable Material

Where excess or unsuitable materials are produced, such as site won material that cannot be processed, if material is found to be contaminated or if it is unsuitable for geotechnical reasons then this material will need to be removed from site following the appropriate procedures and all relevant transfer notes and consignment notes should be retained.

While preliminary waste classification (Section 15.1) has been undertaken utilising the environmental chemical soil results, Waste Acceptance Criteria (WAC) testing and asbestos quantification analysis may be required for soils to be removed from site to suitably licenced facilities.

16.0 Health and Safety Considerations

The Principal Contractor is required to have appropriate risk assessments and method statements in place under the Construction (Design and Management) Regulations, 2015.

Other health and safety factors that should be considered, taking into consideration the unexpected identification of asbestos fibres in Made Ground soils are:

- **Dusts:** To minimise risks from dusts (potentially containing asbestos fibres) damping down or covering of stockpiles may be considered necessary. Movement of contamination off site on vehicle wheels shall be minimised by cleaning of vehicle wheels and/or use of a road sweeper, as required.
- **Welfare:** Washing facilities and a clean mess room from which work boots and overalls are excluded. Provision must be allowed to permit adequate hygiene to be maintained and to ensure provision of appropriate PPE.

As recommended in Section 10.0, an Asbestos Management Plan will be required prior to any groundworks commencing on site.

17.0 Verification Report

Upon completion of the development works, a Verification Report (otherwise known as a Remediation Strategy Completion report) will be required in line with anticipated contaminated land planning conditions.

The aim of the Verification Report will be to demonstrate that the measures proposed in this Remediation Strategy have been undertaken.

To ensure that the Verification Report can be completed, the following information should be requested from suppliers or retained for inclusion in the report:

Remediation Report Section	Item	Examples of Information Required (not an exhaustive list)
Section 10.0	Asbestos Management Plan	- A copy of the Asbestos Management Plan - Any testing results for additional asbestos identification and quantification analysis of soils - Any monitoring results, etc. if required by the asbestos management plan
Section 11.0	Ground Gas Protection Measures	- Drawings showing the specification for the installation of the ground gas protection measures - Confirmation of the membrane used - Photographic record of the installed membrane, in line with Table 7 of BS8485:2015+A1:2019 NOTE: If the peat is removed and ground gas risk assessment is reclassified, this will need to be accepted by planning prior to construction
Section 12.0	Clean and Inert Capping	- Proposed landscape drawing - Name and address of the source sites for the subsoil and topsoil material(s) - Volume of material(s) imported to site - Photographic record of the no-dig geotextile layer - Photographic record showing the correctly installed depth of minimum 300mm clean and inert capping, in line with YALPAG recommendations
Section 13.0	Imported Materials	- Name and address of the source sites for hard core, subsoil and topsoil materials - Volumes of each material imported and delivery notes provided - Minimum 3no soil samples collected by Geo² on site for each material / source site, or testing as per Section 13.0 - Environmental testing results for all imported hard core / soils
Section 14.0	Watching Brief for Unexpected Contamination	- If any unexpected contamination is encountered, contractor to contact Geo² for soil / water environmental testing and recommendations, in line with Watching Brief in Appendix D - If unexpected contamination encountered, evidence should be provided to demonstrate its classification, volume and how it was treated - If no unexpected contamination, Principal Contractor to provide a statement on a headed letter confirming this
Section 15.0	Waste Management	- Copies of all Waste Transfer Notes (WTNs) / Consignment notes to be provided - Details to be provided regarding what waste materials (soils) have been removed from site and what area and depth of the site.

Table 5. Requirements for Verification Report

18.0 Limitations

Geo²'s conclusions, recommendations and opinions are based on information gathered at the time of the report from a variety of third party sources. Therefore, there may be conditions at the site that have not been taken into account which were not apparent at the time of investigation.

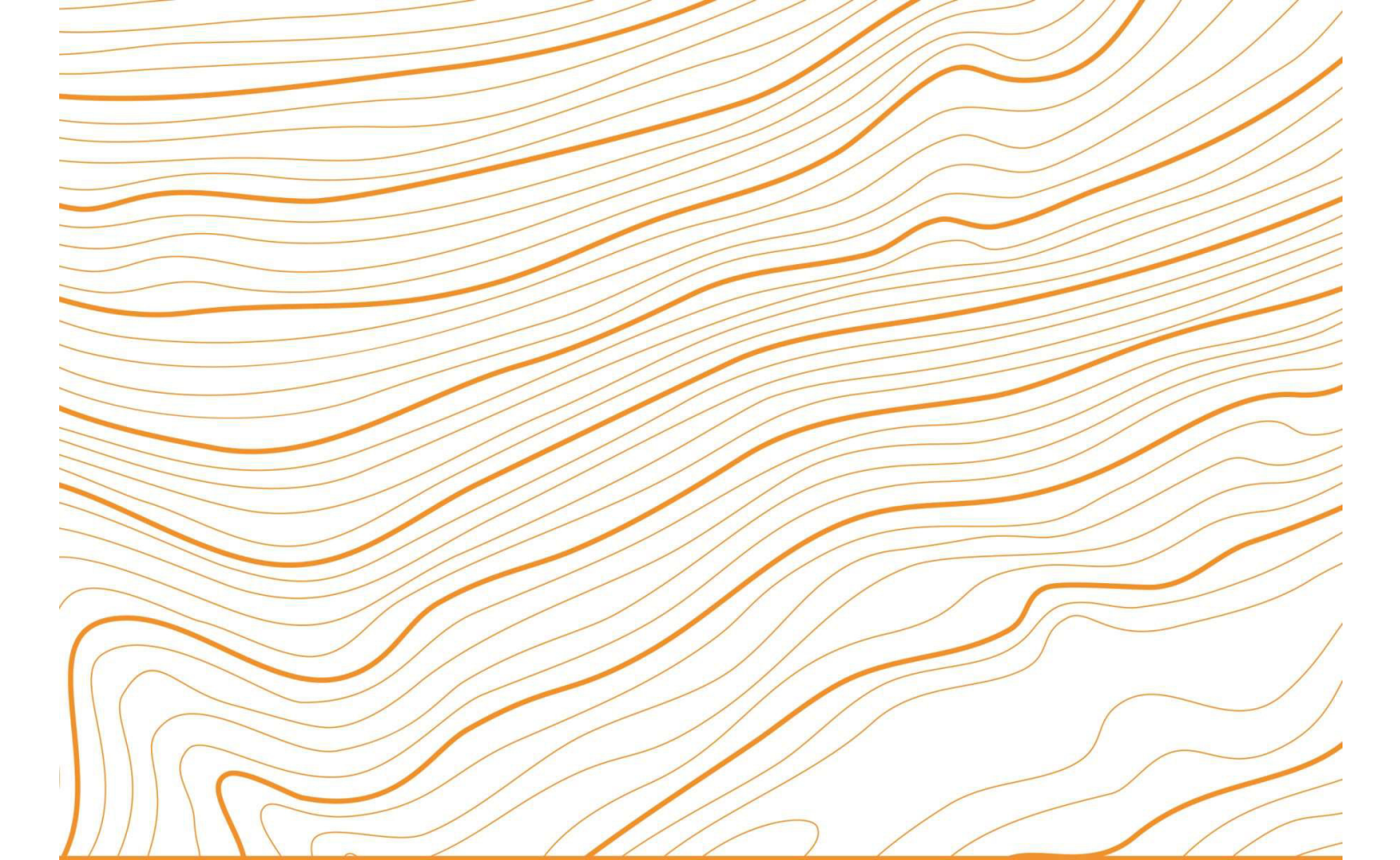
A portion of this report is based solely upon information provided by third parties. The information has not been independently verified by Geo². Whilst this report and the opinions given in it are accurate to the best knowledge of Geo², Geo² cannot guarantee the completeness or accuracy of any descriptions, opinions or conclusions based solely upon information that has not been independently verified.

The recommendations contained within this report represent our professional opinions. These opinions were arrived at in accordance with currently accepted industry practices and hydrological and engineering practices at this time. As such they are not a guarantee that the site is free of hazardous materials or conditions.

Geo² prepared this report for our Client; any third parties using this report do so entirely at their risk. Geo² makes no warranty or representation whatsoever, express or implied, with respect to the use by a third party of any information contained in this report or its suitability for any purpose. Geo² assumes no responsibility for any costs, claims, damages or expenses (including any consequential damages) resulting from the use of this report or any information contained in this report by a third party.

19.0 References

- 1.0 BWB Consulting, Oct 2022, Phase 1 Geo-Environmental Assessment, ref: PUK-BWB-ZZ-XX-RP-YE-0001_Ph1
- 2.0 BWB Consulting, Dec 2022, Phase 2 Geo-Environmental Assessment, ref. PUK-BWB-ZZ-XX-RP-YE-0002-Ph2
- 3.0 CL:AIRE, Nov 2012, Research Bulletin 17: A Pragmatic Approach to Ground Gas Risk Assessment, ref. RB17
- 4.0 BSI, 2019: Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings, ref. BS8485:2015 +A1:2019
- 5.0 CIRIA, 2001, Contaminated Land Risk Assessment, a guide to good practice, C552
- 6.0 CL:AIRE Definition of Waste : Code of Practice (DoWCoP)



Appendix A – Figures



Figure 1 - Site Location - Plot U2 Kingsway

NOT TO SCALE

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Geo² Remediation Limited, The Coniston, Louisa Street, Idle, West Yorkshire, BD10 8NE

Tel: (0113) 2575397

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NOTES	
1. DO NOT SCALE THIS DRAWING. ALL DIMENSIONS MUST BE CHECKED/ VERIFIED ON SITE. IF IN DOUBT ASK.	
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALISTS DRAWINGS AND SPECIFICATIONS.	
3.ALL DIMENSIONS IN MILLIMETRES UNLESS NOTED OTHERWISE. ALL LEVELS IN METRES UNLESS NOTED OTHERWISE.	
4. ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.	

LEGEND	
	Borehole Locations
	Trial Pit Location



Building, Infrastructure and Environmental Consultancy

5th Floor, Waterfront House, Station Street,
Nottingham, NG2 3DQ

Client:
Wilson Bowden Developments Ltd

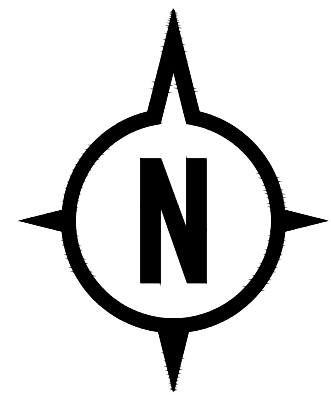
Project Title:
Plot U, Kingsway Business Park

Drawing Title:
Exploratory Hole Location Plan

Scale: Not to Scale	Date: Dec-22	Drawn: O.Stewart	Authorised: M.Harper
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Drawing Status:
FINAL

Drawing No: 001	Revision: R1
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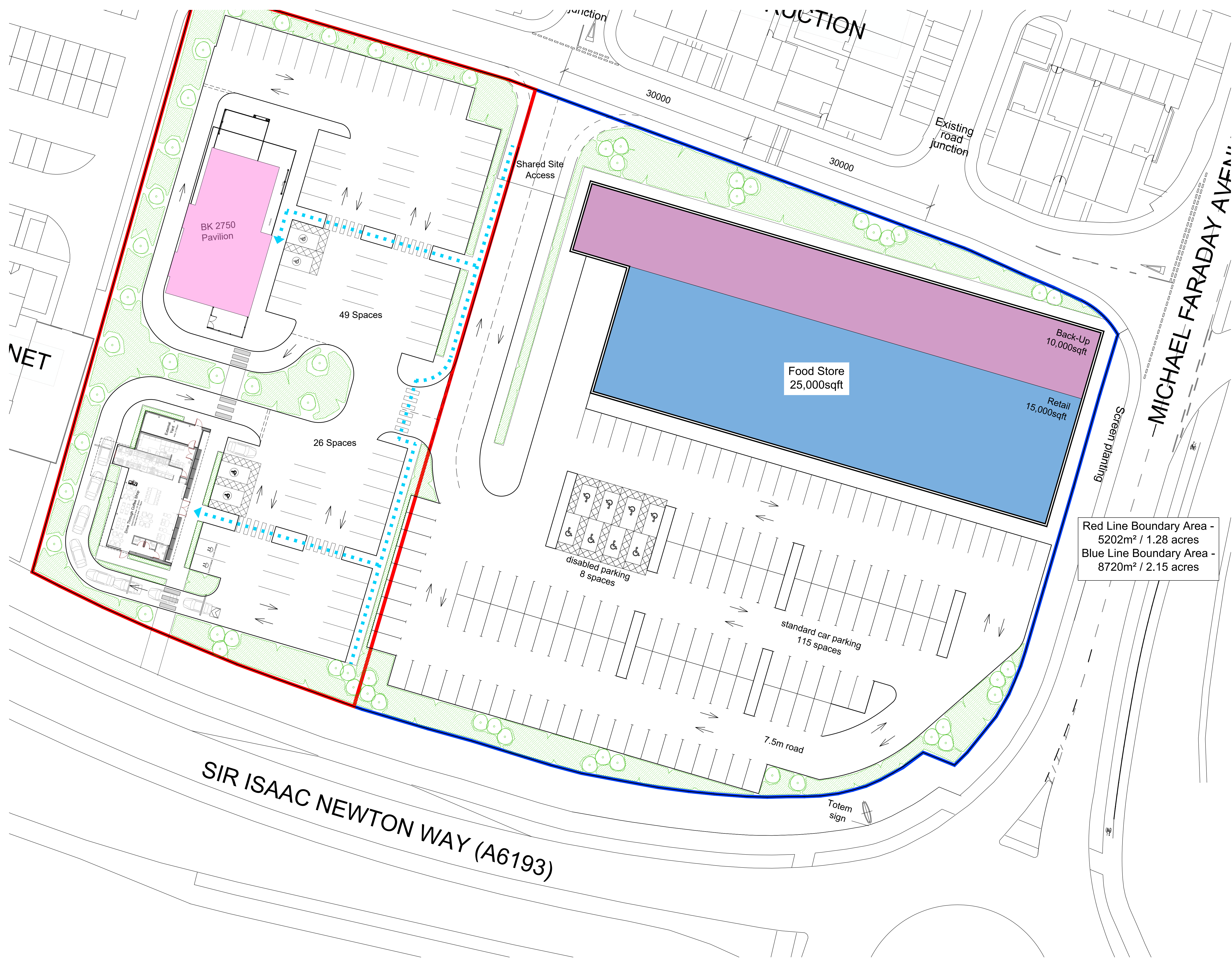
SCHEME SUBJECT TO TRACKING ANALYSIS AND TOPOGRAPHICAL SURVEY

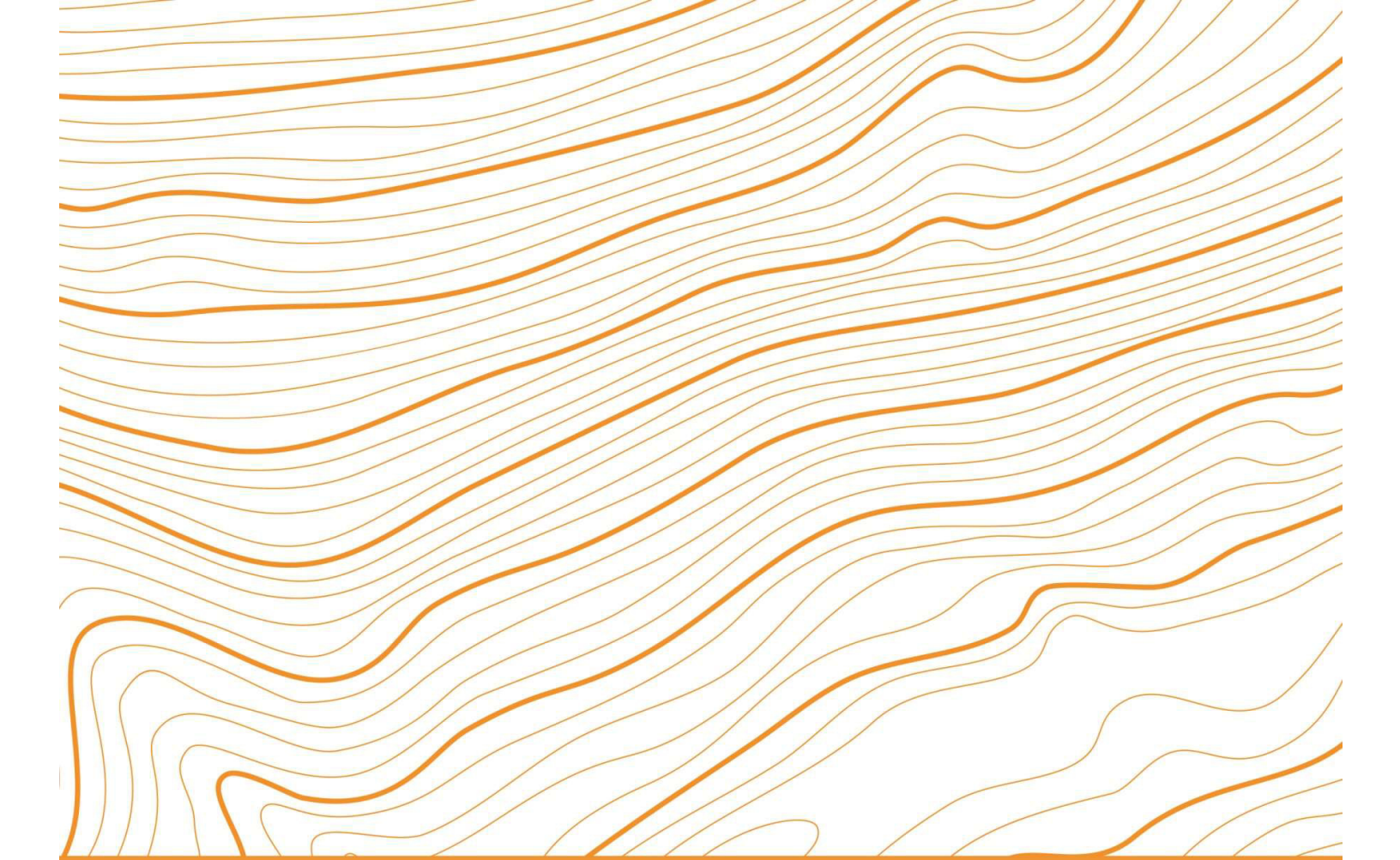
—MICHAEL FARADAY AVENUE—

Screen planting

Red Line Boundary Area -
5202m² / 1.28 acres
Blue Line Boundary Area -
8720m² / 2.15 acres

A	21.06.22	FOOD STORE AMENDED
REVISIONS	▲	
CLIENT	EURO GARAGES LTD	
PROJECT	KINGSWAY ROCHDALE OL16 4PS	
TITLE	FEASIBILITY	
DATE	31.05.22	
SCALE	1:250 @ A1	
JOB ID	1826	
DWG	4a	





Appendix B – Tracking Plan

Site Name: Plot U2 Kingsway, Rochdale, OL16 4XB



Remediation Strategy Evidence Tracker

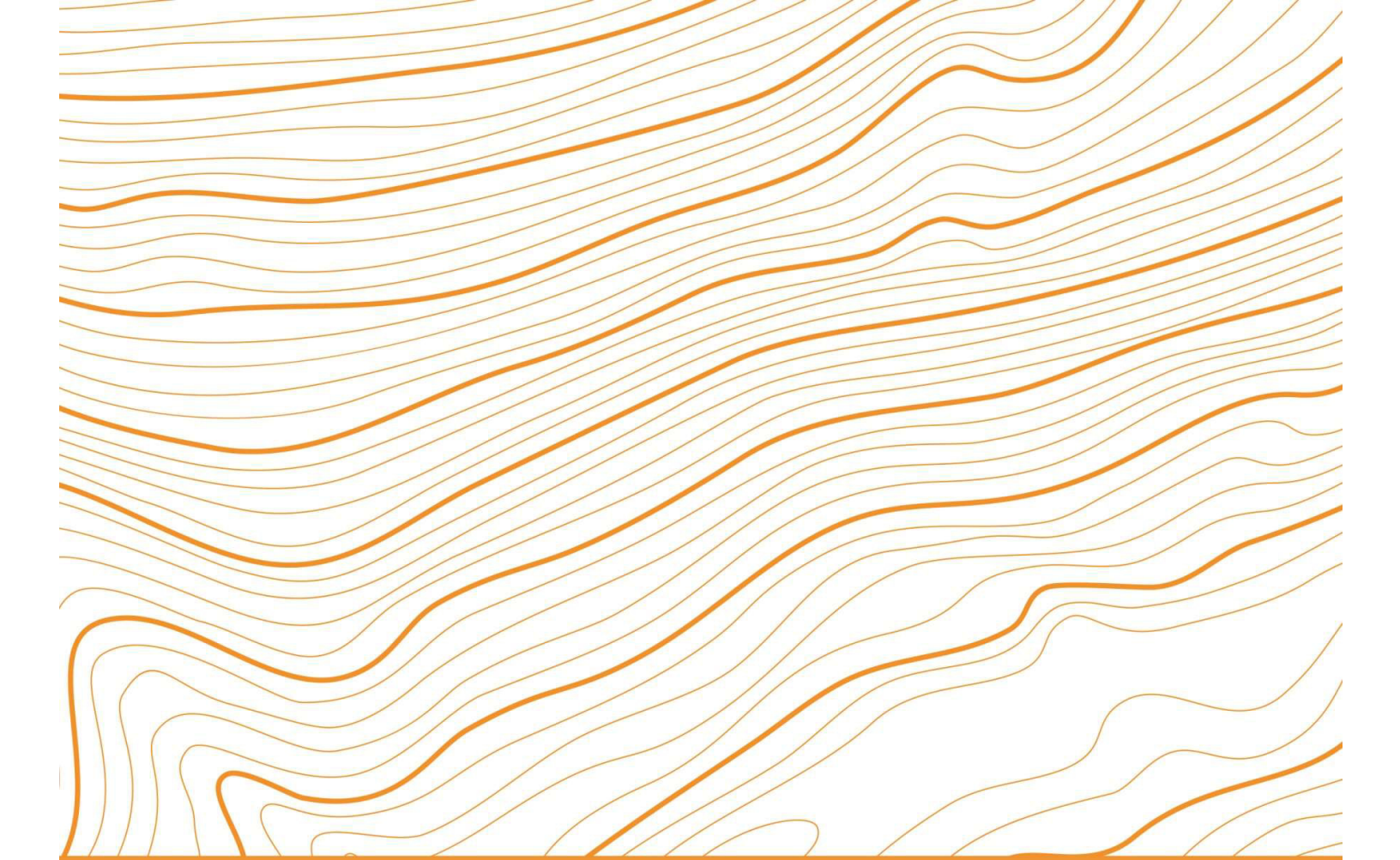
Based on Geo2 Remediation Strategy 23/1354.1.1, Feb 2023

Section No	Item	Detail Required	Evidence Provided	Sufficient ?	Further Detail Required
10	Asbestos Management Plan	A copy of the Asbestos Management Plan Any testing results for additional asbestos identification and quantification analysis of soils Any monitoring results, etc if required by the asbestos management plan			
11	Ground Gas Protection Measures	Drawings showing the specification for the installation of the ground gas protection measures Confirmation of the membrane used Photographic record of the installed membrane, in line with Table 7 of BS8485:2015+A1:2019 NOTE: If the peat is removed and ground gas risk assessment is reclassified, this will need to be accepted by planning prior to construction			
12	Clean and Inert Capping	Proposed landscape drawing Name and address of the source sites for the subsoil and topsoil material(s) Volume of material(s) imported to site Photographic record of the no-dig geotextile layer Photographic record showing the correctly installed depth of minimum 300mm clean and inert capping, in line with YALPAG recommendations			
13	Imported Materials	Name and address of the source sites for hard core, subsoil and topsoil materials Volumes of each material imported and delivery notes provided Minimum 3no soil samples collected by Geo2 on site for each material / source site, or testing as per Section 13.0, Remediation Strategy Environmental testing results for all imported hard core / soils			
14	Watching Brief for Unexpected Contamination	If any unexpected contamination is encountered, contractor to contact Geo2 for soil / water environmental testing and recommendations, in line with Watching Brief in Appendix D, Remediation Strategy If unexpected contamination encountered, evidence should be provided to demonstrate its classification, volume and how it was treated If no unexpected contamination, Principal Contractor to provide a statement on a headed letter confirming this			
15	Waste Management	Copies of all Waste Transfer Notes (WTNs) / Consignment notes to be provided Details to be provided regarding what waste materials (soils / Peat?) have been removed from site and what area and depth of the site.			

Colour Key

	Further detail required
	Further detail would be helpful, however, if this is a low risk item or there are few other outstanding issues, consideration can be given to providing further evidence
	No further detail required

Questions: adam.wilson@geo2.co.uk info@geo2.co.uk Tel - 0113 257 5397



Appendix C – YALPAG Verification Requirements for Cover Systems



VERIFICATION REQUIREMENTS FOR COVER SYSTEMS

Technical Guidance for
Developers,
Landowners and
Consultants



**Yorkshire and Lincolnshire
Pollution Advisory Group**

Version 4.1 – June 2021

The purpose of this guidance is to promote consistency and good practice for development on land affected by contamination. The Local Authorities in Yorkshire, Lincolnshire, the North East of England, East Anglia, Greater Manchester and St Helens who have adopted this guidance are shown below:



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Appendix 2 – Checklist for Verification Reports.....	10
Appendix 3 – Examples of Good Quality Photographs	11

Disclaimer

This guidance is intended to serve as an informative and helpful source of advice. YALPAG will review this guidance every three years, but readers must note that legislation, guidance and practical methods are inevitably subject to change and therefore should be aware of current UK policy and best practice. This note should be read in conjunction with prevailing legislation and guidance, as amended, whether mentioned here or not. Where legislation and documents are summarised this is for general advice and convenience, and must not be relied upon as a comprehensive or authoritative interpretation. Ultimately it is the responsibility of the person/company involved in the development or assessment of land to apply up-to-date working practices to determine the contamination status of a site and the remediation and verification requirements.

Acknowledgments

YALPAG would like to thank North Lincolnshire Council, Leeds City Council, City of Bradford Metropolitan District Council, Barnsley Metropolitan Borough Council, Rotherham Metropolitan Borough Council, Wakefield Council, and Tameside Metropolitan Borough Council, for producing this guidance.

YALPAG would also like to acknowledge Liverpool City Council's Contaminated Land Team, Coopers Consulting Engineers for allowing us to use their guidance document and photographs and WSP Environmental Ltd for also donating photographs.

Consultation

39 Local Authorities and 6 Environmental Consultants were consulted over a four week period in 2010 during the production of the initial guidance. At that time, consultation comments were considered by the review panel and a number of revisions were made to the guidance to reflect these comments.

49 Local Authorities and 25 Environmental Consultants were consulted in 2021, during the production of this version [4.1] of the guidance. Consultation comments were considered by the review panel and a number of revisions were made to the guidance to reflect these comments.

Introduction

This guidance has been produced to help developers ensure that they can demonstrate that material brought onto a development site for gardens or areas of soft landscaping are suitable for use and do not present harm to people, the environment and/or property. It is intended to improve the quality of reports submitted to Local Authorities on this matter and to give contractors/consultants a point of reference to obtain approval for such work from their client. This guidance does not cover the geotechnical suitability of soils or materials, chemical suitability that does not affect human health e.g. sulphates, or importing soils contaminated with invasive (or injurious) plants.

The verification of cover systems should be an integral part of the remediation project and agreed between developers and regulators at an early stage in the project.

UK guidelines for remediation verification are set out within Land Contamination Risk Management¹ (LCRM) and the document on Verification of Remediation of Land Contamination². This guidance note should be considered as supplementary advice in conjunction with these documents.

This guidance relates to the remediation of land contamination by using cover systems; however, the verification of the quality of imported material is equally important in other situations, such as raising levels for flood prevention or general landscaping works. This guidance could also be used in such instances.

The Process of Verification

Implementation plans for remedial works should always be site specific. Where a cover system and potentially, excavation, is the main remedial method or a component of an overall site remediation, specific goals will need to be set that are linked directly to the risk management strategy for the site in question.

For cover and containment systems, verification will normally depend upon the provision of defensible measurements, observations and records. Critical factors to be considered are:

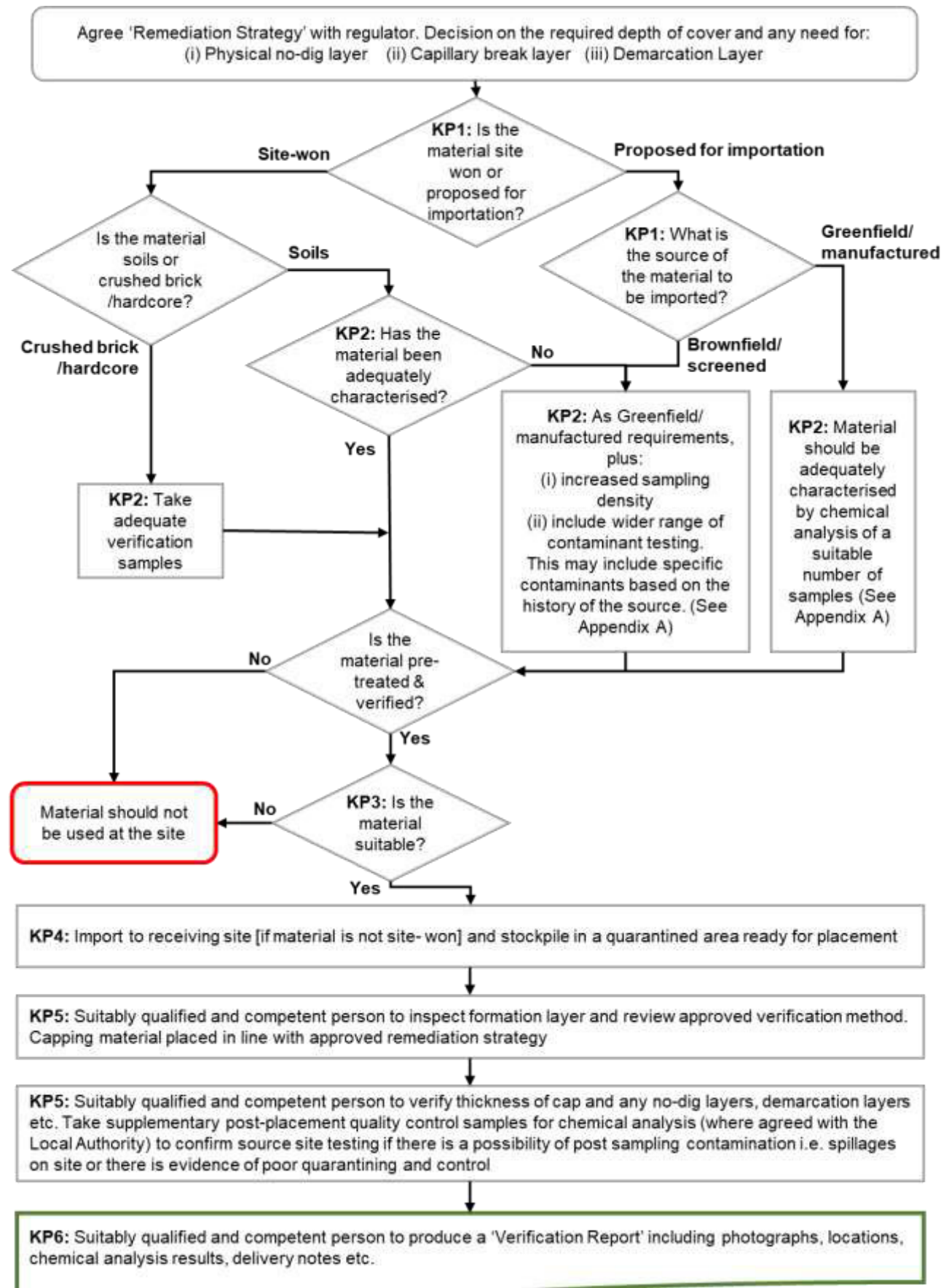
- What should be measured?
- When should they be measured?
- Where measurements need to be taken, what is the appropriate monitoring regime i.e. number and frequency of samples?
- Statistical constraints on sampling.

National Planning Policy Framework (NPPF) states that “planning policies and decisions should ensure that after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990”. The Verification Report is a key document to demonstrate compliance with NPPF, and the responsibility rests with the developer/applicant to submit the required Verification Report to complete the remediation and to discharge any planning conditions.

¹ Land Contamination Risk Management, Environment Agency, Oct 2020

² Verification of Remediation of Land Contamination. Environment Agency, Feb 2010

Overview Flowchart



Key Points

KP1: Source of Material

Material can be sourced from site won material i.e. crushed brick/hardcore or site-won soils from existing open or landscaped areas. In the interest of sustainability, Local Authorities promote the use of such site-won material providing that they are suitable for the intended end use of the site.

Alternatively, material can be sourced from other developments and commercial companies. Dependent on the source of the material it can be classified as either from a 'Greenfield/Manufactured' or 'Brownfield/Screened' source.

Broadly speaking material can be classified as follows:

Greenfield – Where documentary evidence is provided confirming that the source site has not been developed and that no past contaminative uses have occurred. Should evidence not be provided or approved by the Local Authority, please note that the source would be expected to be assessed as though it were a brownfield source.

Manufactured – from a commercial company who manufacture material by mixing or blending mineral soils (subsoil or sand) with an organic amendment (compost). If other soil component sources are used, documentary evidence should be provided confirming that the source site has not been developed and that no past contaminative uses have occurred. Should documentary evidence not be provided or approved by the Local Authority, please note that the source would be expected to be assessed as though it were a brownfield source.

Brownfield – material from a donor site that has previously been developed

Screened – material from a company who deal with skip/demolition waste which is screened for unsuitable material i.e. bricks, wood, plastic etc.

KP2: Characterisation of Material

It is essential that material is suitable for its intended use. Documentary evidence of the source of the material should be provided to the Local Authority. This may include desk study or site investigation reports. A defensible method is required to ensure the verification proposals are site specific and that the level of sampling reflects the need to ensure that imported material are suitable for their intended use.

Due to the diminishing supply of suitable Greenfield topsoil sources it has been found that the chemical quality of Greenfield sources is less reliable in certain areas. As a result the recommended analytical rate for the intended use of the development may vary between Local Authorities [see **Appendix 1a**].

When should this be done?

Sampling of material should be undertaken as early as possible i.e. prior to placement [for site won material] and prior to importation [for imported material]. This is to avoid the costly exercise of re-excavating unsuitable material and the possibility of cross contamination. Where the assessor has confidence that the material is of sufficient quality (i.e. tested by supplier, used previously) it is acceptable to test the material on site. Although, if it is deemed unsuitable it would have to be either removed off site or pre-treated at the cost and time of the developer. It is recommended that some verification samples are also taken once this material has been delivered to site to confirm suitability for use. Soils can become contaminated during transportation or when stockpiled on site.

What about certificates from commercial suppliers?

Where the material is provided by a commercial company, certificates or other industry Quality Protocol compliance i.e. WRAP, DoWCoP, will normally be accepted. This is on the proviso that it: (i) relates to the actual material being imported to the site and the type and amount of analysis is in line with what is prescribed in Appendix 1a; and, (ii) the certificates are less than two months old.

It is recommended that some additional verification samples are taken once this material has been delivered to site. Soils can become contaminated during transportation or when stockpiled on site.

Extreme caution should be given to importing material that has been recycled from demolition or skip waste as they could easily be contaminated e.g. asbestos containing materials. Please refer to “questions you should be asking your supplier” in **Appendix 1b** and include the responses in your report.

British Standard

Imported soils should be as specified in BS 3882:2015 for topsoil and BS8601:2013 for subsoil as ‘suitable for their intended purpose’. Both British Standards relate mostly to nutrient content of topsoil and phytotoxic contamination and they do not consider contaminants that pose a risk specifically to human health. Soils should be tested for contaminants that are considered to pose a risk to human health in addition to those specified in the relevant British Standards to ensure that they are suitable for their intended use.

Initial screening

A visual / olfactory inspection of the material should be carried out by a suitably qualified and competent person to ensure that:

- It is a suitable growing medium;
- It is free from obvious contamination i.e. staining/free product etc.;
- It has not come from areas where Japanese Knotweed or other invasive or injurious plants, as specified by the Environment Agency, are suspected to have been growing;
- It is not odorous (could be considered a statutory nuisance);
- It is free from unsuitable material i.e. bricks, brick ties, timber and glass etc.); and,
- There are no visible signs of asbestos containing material (ACMs).

Testing schedule & number of samples

Chemical testing will normally be required on any materials that are to be used as cover material, even where this includes first generation quarried material. This should be carried out by a suitably qualified and competent person.

Appendix 1a explains in detail the sampling and testing requirements for a typical residential development. These are only guidelines and it may be necessary to deviate away from them depending on local and site-specific factors. It is recommended that the developer discusses any deviation with the Local Authority.

The following criteria sets out the requirements for sampling and testing:

- **Virgin Quarried Material** sampling needs to be 1 or 2 samples depending on the type of stone utilised, to confirm the inert nature of the material. Testing to include standard metals/metalloids (should include as a minimum As, Cd, Cr, CrVI, Cu, Hg, Ni, Pb, Se, Zn).
- **Crushed Hardcore, Stone, Brick (excluding asphalt)** a minimum of 1 sample per 500m³. Testing to include standard metals/metalloids (as above), PAH (16 USEPA speciation), asbestos, total TPH. Any additional analysis dependant on the history of the donor site (e.g. phenol, total cyanide, BTEX, MTBE).
- **Greenfield/ Manufactured Soils** a minimum of 3 samples or, dependent on source and receptor, between 1 per 50m³ and 1 per 250m³. Testing to include standard metals/metalloids (as above), PAH (16 USEPA speciation), asbestos, pH and soil organic matter (SOM) (or calculated from total organic carbon (TOC)).
- **Brownfield/ Screened Soils** a minimum of 6 samples or dependent on source and receptor, between 1 per 50m³ and 1 per 100m³. Standard metals/ metalloids (as above), PAH (16 USEPA speciation), TPH (CWG banded), asbestos, pH and SOM (or calculated from TOC). Any additional analysis dependant on the history of the donor site (e.g. phenol, total cyanide, BTEX, MTBE).

The assessment criteria need to be UK based, e.g. LQM S4ULs, Defra C4SLs or other similarly derived GACs.

KP3: Suitability of Material

Based on the characterisation of material above, the material should be either deemed suitable or unsuitable. Obviously unsuitable material should not be used (unless it is treated to reduce levels of contaminants below agreed target levels i.e. bioremediation – this would have to be agreed and included within the Remediation Strategy) and an alternative source of material should be sought by the developer. If the material is considered suitable it can be imported (if not site won) and stockpiled in a suitably quarantined area [refer to **KP4**].

KP4: Stockpiling & Quarantining of Material

It is essential that the 'suitable' material is either placed in its intended area straight away i.e. soft/landscaped areas or stockpiled in a suitable quarantine area to prevent on-site contamination.

In the event that an assessor finds material has been stored in an unsuitable area, samples should be taken to confirm that no cross contamination has occurred (including a visual/olfactory check of the material). The material should then be suitably quarantined or placed at its intended location immediately.

KP5: Verification of Required Depth

In line with the agreed Remediation Strategy, it is important to establish that the required depth has been achieved and is consistent across the site. There are two main ways to achieve this:

Depth testing in situ – small trial pit excavated to allow measurement of its depth by standardised tape measure or measuring staff.

Topographical surveys – accurate survey of the base and final formation layer height to establish the depth of cover.

Specific Local Authority Policy

Please check with the local Contaminated Land Officer to establish:

- Which type of method for testing depth is accepted; and,
- The number of verification areas per property, plot, landscaped area or garden area (some Local Authorities recommend at least 2 per plot for residential developments).

Important Note: Where demarcation, physical no-dig and capillary break layers exist they should be verified for their thickness and presence during the time of their installation. Details of the demarcation layer should be agreed with the Contaminated Land Officer prior to placement. This will include the design, type and strength of the geotextile separator or visual warning membrane. The verification of depth and confirmation of such layers should be carried out by a suitably qualified and competent person.

KP6: Reporting

The purpose of verification documentation is to provide transparent reasoning why the remediation was required, a methodology about how it was to be undertaken and proof that the specified works have been undertaken and to provide confirmation that the site is “suitable for its intended use”.

The document is utilised not only to satisfy conditions of planning permissions but also is to be kept on record by the Local Authority should queries be raised during the lifetime of the development and to confirm to future purchasers that the site is suitable for use.

National Planning Policy Framework (NPPF) states that “planning policies and decisions should ensure that after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990”. The Verification Report is a key document to demonstrate compliance with NPPF, and the responsibility rests with the developer/applicant to submit the required Verification Report to complete the remediation and to discharge any planning conditions.

It is also essential that other supporting documentation is included within a report carried out by a suitably qualified and competent person e.g. laboratory analysis results, delivery tickets for material, certificates for imported material (or if unavailable, documented evidence of the source of the Greenfield material), trial pit logs etc. A checklist has been included in **Appendix 2** to give an idea on what information should be recorded.

Additionally, any reporting should include details of any measures required to maintain the cover system integrity in the future e.g. successive construction phases (management plans) and longer term (restrictive covenants on title deeds).

Photographic evidence for validating the depth of cover

The Local Authority ideally would recommend the following programme of photographs to be taken of the placement of inert cover:

- Photographs of any stockpiles and quarantine areas
- Proof that the depth of inert cover has been installed
- Proof of the quality of the material to be used as inert cover
- Proof there is a geotextile separator and visual warning membranes if used between the underlying material and suitable for use soils.
- Proof of the method of placement and different layers if appropriate
- Proof of the completed project
- Inclusion of background features which will aid locating the photograph
- Inclusion of site identification boards within the photos which show the date, position taken i.e. corner of plot 3 and the site name.
- Inclusion of photographs of site stockpiles and quarantine areas.

The presence of good quality photographs is essential to prove beyond doubt that the remediation has been done as specified both by method and position, and that the images have been taken from the specific area stated.

Refer to **Appendix 3** for examples of good photographic evidence.

Appendix 1a – Sampling & Testing Matrix

Type	Number of Samples	Testing Schedule	Assessment Criteria
Please note that these guidelines apply to a typical residential development, and relaxation of the guidelines or more stringent requirements may apply dependent on local and site specific factors. Therefore, <u>all parameters need to be agreed with the Local Authority.</u>			
Virgin Quarried Material	1 or 2 depending on the type of stone utilised, to confirm the inert nature of the material.	Standard metals/metalloids (should include as a minimum As, Cd, Cr, CrVI, Cu, Hg, Ni, Pb, Se, Zn)	The assessment criteria need to be UK based, e.g. LQM S4ULs, Defra C4SLs or other similarly derived GACs.
Crushed Hardcore, Stone, Brick (excluding asphalt)	Minimum 1 per 500m ³	Standard metals/metalloids (as above), PAH (16 USEPA speciation), asbestos, total TPH. Any additional analysis dependant on the history of the donor site (e.g. phenol, total cyanide, BTEX, MTBE).	
Greenfield/ Manufactured Soils	Minimum 3 Dependent on source and receptor, between 1 per 50m ³ and 1 per 250m ³	Standard metals/metalloids (as above), PAH (16 USEPA speciation), asbestos, pH and soil organic matter (SOM) (or calculated from total organic carbon (TOC)).	
Brownfield/ Screened Soils	Minimum 6 Dependent on source and receptor, between 1 per 50m ³ and 1 per 100m ³	Standard metals/ metalloids (as above), PAH (16 USEPA speciation), TPH (CWG banded), asbestos, pH and SOM (or calculated from TOC). Any additional analysis dependant on the history of the donor site (e.g. phenol, total cyanide, BTEX, MTBE).	

Appendix 1b – Questions to Ask Your Soil Supplier Relating to Soil Quality

- What is the source of the material (refer to KP1)? If the source is Greenfield, can they provide evidence of this?
- Will all of the material be coming from the same source?
- Are you satisfied that the material is a suitable growing medium for the proposed end use?
- Has the supplier used an appropriate sampling protocol to ensure a representative sample is analysed? What volume of soil is represented by the analysis and does it comply with Appendix 1a?
- Does the testing include analysis of contaminants identified in Appendix 1a?
- Does the laboratory conducting the analysis have UKAS and MCERTS accreditation for the tests they are carrying out?
- Does the material comply with relevant waste regulations?
- Can I have a copy of the whole analysts report and does it include an interpretive section?
- Will the provided certificate be dated within the last 2 months?

Appendix 2 – Checklist for Verification Reports

Example only. Not to be considered as typical minimum requirements. Additional information should be included for non-cover systems aspects of the remediation i.e. gas protection measures etc.

Site Details	
Site Name / location	
Developer name	
Development use	
Plot No / description of landscaped area (inc plan of inspection areas)	
National Grid Reference	
Inspection visit date	
Supporting Evidence	
Description of remediation (as per agreed Remediation Method Statement including depths / thickness checks, topographical readings)	
Material tracking information (including way tickets etc.)	
Name of groundwork's remediation contractor	
Name of supervising environmental consultant	
Site Specific chemical analysis results	
Verification Photographs (inc. remarks)	
Recommendations	
Pass/fail	
If material fails, how will this be managed i.e. removed, treated	
Detail any further remedial works and/or inspection	
Signed off	

Failure to provide any of the above information may prevent planning conditions from being discharged.

Appendix 3 – Examples of Good Quality Photographs



© Coopers
Consulting
Engineers

Photograph 1:
Depth check of inert
cover within area of
public open space.
Physical break layer
and topsoil visible.



© WSP

Photograph 2:
Depth check of inert
cover with Site &
Location Information
Board.



© **Coopers Consulting Engineers**

Photograph 3:
Depth check of inert cover within areas of front gardens.



© **Coopers Consulting Engineers**

Photograph 4:
Depth check of inert cover within areas of front gardens.



© **Coopers Consulting Engineers**

Photograph 5:
Depth check of inert cover within rear gardens. Taut string line spans across excavation.



© Coopers
Consulting
Engineers

Photograph 6:
Depth check of inert
cover within rear
gardens. Taut string
line spans across
excavation.



© Coopers
Consulting
Engineers

Photograph 7:
Shows the spatial
location of the
verification pit.



© Coopers Consulting Engineers

Photograph 8:
Excavation within public open space and verification pit showing the presence of a remediation break layer at the base, a crushed sandstone inert fill overlain by topsoil.



© Coopers Consulting Engineers

Photograph 9:
Inert crushed sandstone being delivered. The spatial area of the remediation can be observed from these photographs (old terrace housing).



© Coopers Consulting Engineers

Photograph 10: Inert crushed sandstone being delivered with visible remediation break layer. The spatial area of the remediation can be observed from these photographs (traffic lights).



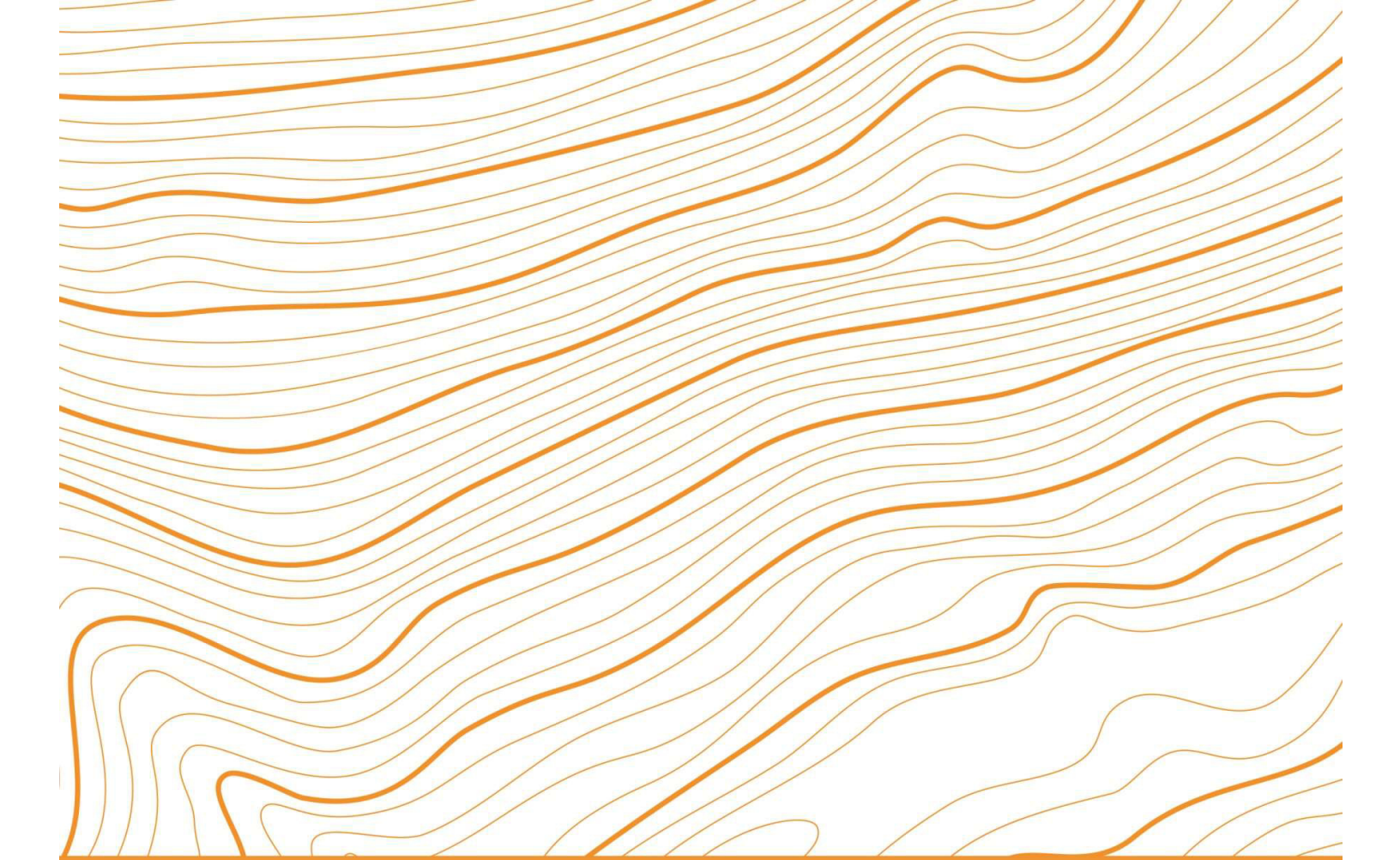
© Coopers
Consulting
Engineers

Photograph 11:
Shows the
remediation of the
rear garden, with a
significant depth
(1.0m) of inert cover.
This photograph has
been stitched to form
a panoramic
photograph and
hence there is slight
distortion



© Coopers
Consulting
Engineers

Photograph 12:
Shows the
remediation of the
rear garden, with a
significant depth
(1.0m) of inert cover.
Remediation break
layer visible at the
base of the
excavation.



Appendix D – Watching Brief



Geo2 Remediation Ltd
Coniston House,
Louisa St. Idle
Bradford
BD10 8NE

Phone 0113 257 5397
Email info@geo2.co.uk
Web www.geo2.co.uk

Generic Watching Brief Method Statement

This method statement aims to establish a structure by which site works / development contractors will be able to effectively meet the requirements of a watching brief. A watching brief is frequently proposed as part of planning conditions imposed onto any brownfield site, or a site potentially affected by contaminants. This methodology proposed a strategy which allows the site workers to effectively undertake these works themselves without the need for a full time environmental specialist.

Requirements of a Nominated Competent Person (CP)

The party undertaking the site works will nominate a Competent Person (CP) who will be responsible for providing a watching brief over all excavation, soil handling works associated with construction and for ensuring site workers conform to appropriate PPE requirements at all times. The CP will be on-site during all enabling, and construction works.

The CP will be briefed by Geo² on environmental management during or in advance of the groundworks at an on-site meeting to be held prior to the commencement of works. This would typically address the following issues;

- A review of any existing site information with regard to areas of potential contamination both identified and unidentified,
- Types of contamination which may be encountered and also potential for unexpected contamination, and means of identification,
- Potential risks associated with contaminants, with regard to health and safety concerns of construction workers,
- Potential for waste disposal issues,
- Ensuring that the CP is confident and capable of undertaking the practical responsibilities identified,
- Any additional site specific concerns or factors which may prove relevant to works, such as any visual monitoring / inspection requirements (e.g. daily observations of adjacent streams etc).

The CP would be required to maintain records of any issues, as detailed above, which would be encountered during the programme of works. Records should detail the time and date, nature of any incident, or detail of potentially contaminated soils encountered, location of this material, where possible extent and the actions undertaken to ensure this was appropriately classified. These would be required to be submitted to the client and Geo² to ensure that an appropriate validation report

could be complied to enable the planning conditions to be lifted. Records should be available onsite at all times for inspection as required.

The CP is also responsible for contacting Geo² in the event of encountering situations requiring environmental management. A Geo² contact will be ascribed to each site, so suitable site specific advice will be available over the phone as necessary. Site visits can be arranged at short notice to assist with any potentially significant issues.

Unexpected Contamination

Unexpected contamination may comprise impacted sub-soil, or structures such as underground storage tanks (UST), subsurface features, pipes, sumps or chambers with associated contamination observed beneath the site during the redevelopment works.

Where apparently contaminated sub-soils (or waters) are encountered, the permanent nominated CP should be contacted for assessment.

As a guide, apparently contaminated sub-soils or waters may comprise visually impacted and strongly odorous material. Encountered odours could be petrol, diesel, solvents or oil-like. Should materials of this description, or other description following a site specific briefing, be encountered and this material be considered to be unidentified, Geo² should be contacted. In such circumstances, the affected area should be isolated and work in the area stopped, pending the Geo² consultant visit to sample or assess the soil. The area should remain isolated whilst the samples are analysed at an appropriate laboratory, if considered necessary.

Based on the results and in comparison with adopted screening criteria, Geo² will determine whether the identified materials present a significant environmental risk. Should the soil need to be removed in line with the proposed development programme, or as a result of a risk based analysis, validation samples will be collected from the edge of the excavation by a Geo² site engineer.

All waste should be appropriately isolated and stored to prevent spreading contamination across the site. Waste should then be classified and disposed of in accordance with the applicable waste management regulations under full duty of care documentation. Potential exists for hazardous waste to be present, and this should also be dealt with in accordance with the relevant legislation.

Should unidentified underground features be encountered, such as tanks or fuel delivery lines, that require removal in line with the proposed development, they should be appropriately decommissioned. Decommissioning should comprise pumping and removal of waste water and any sediment in accordance with the applicable waste management regulations under full duty of care documentation. Water and sediment waste may need to be sampled and analysed to determine whether it needs to be disposed of as hazardous.

Should any structure encountered remain in situ, Geo² should be contacted to ensure that any potential impact that may be associated with this feature can be appropriately addressed, if necessary. This process may entail additional sampling works, which would require the identified area to be isolated until Geo² site staff are able to attend site.

Following removal of any such structure, the CP should inspect the excavations for apparently impacted materials. Should apparently contaminated material be identified beneath or adjacent to the structure, Geo² should be contacted to undertake further sampling and analysis. All results will be included in the Validation Report.

The relevant planning authorities will be notified should any unexpected contamination be identified and any remedial actions that are required as a result of encountered materials will be agreed prior to the work being carried out.

Sampling Procedure

All samples obtained by Geo² will be stored in appropriate vessels for the required analysis and stored in controlled conditions prior to submission to an appropriately accredited laboratory. All samples will be obtained in line with standard industry guidance.

Validation Report

This typically forms the final part of any contaminated land planning condition and allows the client or local authority certainty that any contaminated land encountered during works has been appropriately addressed and the condition of remaining soils (and groundwater if applicable) is understood. This may be compiled by Geo² (typically in the event of unexpected contamination being encountered) or by the Client (this may take the form of a brief letter, stating the completed nature of the site and a brief description of conditions encountered).

Geo² Contact

A Geo² contact will be prescribed to the site upon implementation of the watching brief. If there are any other queries Geo² can be contacted on the office number at 0113 257 5397