



EARTH ENVIRONMENTAL
& GEOTECHNICAL

Remediation Method Statement

Berwick Farm

Berwick Lane

Hallen

South Gloucestershire

BS10 7RS

Report Ref: B3326/24/RMS

January 2024



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**REMEDICATION METHOD
STATEMENT**

BERWICK FARM

BERWICK LANE

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SOUTH GLOUCESTERSHIRE

BS10 7RS

Report Ref: B3326/24/RMS

DECEMBER 2023

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REMEDIATION METHOD STATEMENT

BERWICK FARM, BERWICK LANE, HALLEN, SOUTH GLOUCESTERSHIRE, BS10 7RS

Report Reference: B3362/24/RMS

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Date: 26th January 2024

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Definition of Version Code:

- D. Applied during initial drafting of the report before it has been reviewed.
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TABLE OF CONTENTS

1.0	GENERAL	5
2.0	BACKGROUND.....	6
3.0	REMEDICATION OF SOILS BENEATH HARDCOVER DEVELOPMENT	7
4.0	REMEDICATION OF PROPOSED SOFT LANDSCAPED AREAS.....	8
5.0	RE-USE OF SITE WON MATERIAL FROM FOUNDATION EXCAVATIONS.....	10
6.0	REMEDICATION OF UNANTICIPATED CONTAMINATION ENCOUNTERED DURING GROUNDWORKS	11
6.1	GENERAL	11
6.2	MONITORING AND WATCHING BRIEF	11
6.3	DEMOLITION/REMOVAL OF BUILDINGS	11
6.4	EXCAVATION	11
6.5	STOCKPILING EXCAVATED MATERIALS.....	12
6.6	LABORATORY TESTING OF EXCAVATED MATERIALS.....	12
6.7	DISPOSAL.....	12
6.8	PROTECTION OF EXCAVATIONS.....	13
7.0	GENERAL METHOD OF REMEDIATION.....	14
8.0	PROTECTION OF WATER SERVICES AND WATERCOURSES	15
9.0	FINAL VERIFICATION REPORT	16

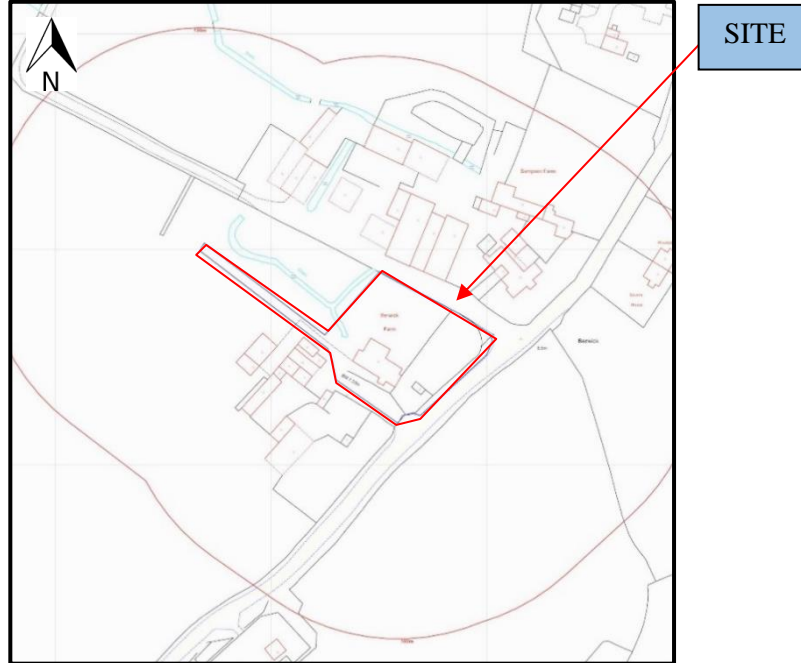
APPENDICES

Appendix 1	Drawings
Appendix 2	Report Limitations

1.0 GENERAL

The following method statement provides guidance for the remediation of soil contamination (identified from the intrusive investigation during site during groundworks) at Berwick Farm in Hallen, South Gloucestershire.

Figure 1 – Site Location Plan



It is proposed to redevelop the site with residential development with associated areas of hardstanding and soft landscaped areas.

2.0 BACKGROUND

A review of works previously completed at the assessment site has been undertaken and is summarised in the following sections.

Earth Environmental & Geotechnical (Southern) Ltd (EEGSL) undertook a Contamination Investigation, reference B3326/24, in January 2024.

The ground investigation included the drilling of 4 window sample boreholes and hand digging 8 nr trial pits at the assessment site and subsequent insitu and laboratory analysis. Two of the boreholes were installed with gas and groundwater monitoring standpipes and four rounds of subsequent monitoring have been completed.

For full details of the works completed, reference should be made to the original EEGSL Report.

As part of the ground investigation works completed, the following contaminates were recorded above the recommended residential screening values:

- **Arsenic** – identified within the Made Ground at HP08 (0.05-0.15mbgl).
- **Lead** – identified within the Made Ground at HP01 (0.30-0.40mbgl), HP02 (0.35-0.45mbgl), HP03 (0.20-0.30mbgl), HP06 (0.10-0.20mbgl) and hgP08 (0.05-0.15mbgl).

Locations of previously identified contamination are shown in the Sample Location Plan, included in Appendix 1.

Given the above analysis, remediation will be required in areas of soft landscaping.

Remediation beneath the proposed buildings or permanent hard standing, will not be required, as the presence of the buildings and hardstanding themselves will act as a physical barrier between the shallow contaminated soils and the future residential receptors (breaking the source-pathway-receptor linkage).

The following remediation method statement will focus on the remediation of shallow soils in proposed soft landscaped areas and will detail a discovery strategy for dealing with any unexpected contamination found present during construction.

3.0 REMEDIATION OF SOILS BENEATH HARDCOVER DEVELOPMENT

Validation testing and remediation of soils beneath hard cover development (including all proposed dwellings and any permanent hardstanding) will not be required.

However, all service runs beneath hard cover areas should be over excavated and backfilled with suitable clean inert material in preparation for future maintenance, should this be required.

4.0 REMEDIATION OF PROPOSED SOFT LANDSCAPED AREAS

Remediation of soft landscaped areas will need to consist of a clean capping system.

The capping system used for private garden areas will need to consist of:

- A layer of 600mm clean imported topsoil and subsoil (containing a minimum thickness of 150mm clean topsoil).
- Installation of a no dig barrier (hi vis geotextile) below the 600mm of clean imported materials.

If large trees or shrubs are planned for areas of public open space, then these should be planted within over excavated pits with clean imported soils reaching 300mm below the root ball or planted within dedicated raised beds.

Any imported topsoil should conform to BS 3882:2015, and all imported soils must be from a certified clean source (e.g., with appropriate evidence to confirm the absence of contamination).

Excavated materials will require disposal at a suitable landfill site, registered to take the levels of contamination encountered. The advice of the designated landfill should be sought as to their requirements for any additional testing to assist in classification of waste. Further testing such as Waste Acceptance Criteria (WAC) testing may be required.

Unless proven otherwise by laboratory testing, excavated material will not be suitable for re-use on site, unless placed beneath hard cover development.

Frequency of testing of imported soils should be as follows:

- Greenfield source - minimum of three samples from each source and thereafter one sample for 100m³ of soil imported.
- Brownfield source (and screed/recycled soil) - a minimum of six samples of each proposed source and thereafter one sample per 50m³ of soil imported.

5.0 RE-USE OF SITE WON MATERIAL FROM FOUNDATION EXCAVATIONS

If Made Ground material is to be re-used on site, it should be tested for a general suite of contamination including asbestos, toxic metals, speciated polyaromatic hydrocarbons and speciated total petroleum hydrocarbons.

The results of the testing should be reviewed against current residential guideline values.

Where excavated materials are suitable for re-use on site, these should be appropriately stockpiled on site in preparation for future use.

If the results of testing prove the material is unsuitable for re-use, the soils should be appropriately stockpiled (as detailed in section 6) and later disposed of to a suitable landfill.

6.0 REMEDIATION OF UNANTICIPATED CONTAMINATION ENCOUNTERED DURING GROUNDWORKS

6.1 General

The following section describes the methods for dealing with soil contamination unexpectedly encountered during the groundworks phase of construction.

6.2 Monitoring and Watching Brief

A watching brief will be undertaken on site by the Groundworks' Contractor.

6.3 Demolition/Removal of Buildings

Prior to any demolition/removal of existing buildings, an asbestos survey should be carried out. Any asbestos containing materials must be disposed of by appropriate contractors in accordance with current guidance/legislation.

6.4 Excavation

If soils with visual / olfactory evidence of contamination are encountered, these should be excavated using appropriate plant and the advice of a suitably qualified independent consultant should be sought.

The extent of the excavation should be of sufficient size to remove any visual/olfactory evidence of contamination, and it is recommended that excavations extend 0.5m beyond the lateral and vertical extent of contamination encountered.

All plant used for excavation should be cleaned appropriately to avoid mobilization of contamination and cross contamination of soils. Products from the wash-down process should be disposed of in accordance with current legislation. Wash-off water should not be allowed to drain into existing drainage.

Wash down water will require testing prior to disposal.

Testing of wash down water should include for:

pH, Sulphate (SO₄), Sulphide, Chloride, Ammonium (NH₄), Cyanide (total), Total Organic Carbon, BOD, COD, Arsenic, Boron, Cadmium, Chromium III, Chromium VI, Copper, Iron, Lead, Manganese, Mercury, Nickel, Zinc, PAH and TPH.

Should the soil analysis prove the presence of contamination in the excavation, the base/sides should be extended accordingly and the process above repeated until contamination has been removed. The general principals of the soil remediation are shown in the flow chart in Section 7.

6.5 Stockpiling Excavated Materials

All suspect excavated materials should be stockpiled whilst testing is completed.

Stockpiles of excavated material should be separated from the natural ground to avoid cross contamination. This can be done using separating membranes or appropriate containers (such as appropriately lined skips).

All stockpiles should be protected from wet weather and water ingress. Impermeable membranes should be used to cover the stockpiles and to prevent the creation of contaminated runoff.

6.6 Laboratory Testing of Excavated Materials

Representative samples of the excavated materials and the base and sides of the excavation should be collected by the independent consultant. The number of samples required will depend on the size of excavation, however it is suggested that samples are collected at a maximum of 3-5m centres for the sides and base of each excavation.

Should laboratory tests prove the presence of contamination in the excavation base and sides, the excavation should be extended accordingly, and the process above repeated until all contamination has been removed.

6.7 Disposal

Excavated contaminated materials will require disposal at a suitable landfill site, registered to take the levels of contamination encountered. It is essential the advice of the designated landfill should be sought as to their requirements for additional testing to assist in classification of waste. Further testing such as Waste Acceptance Criteria (WAC) testing may be required. Unless proven otherwise by laboratory testing, contaminated stockpiled material will not be suitable for re-use on site, unless it is placed beneath permanent hardstanding / development.

6.8 Protection of Excavations

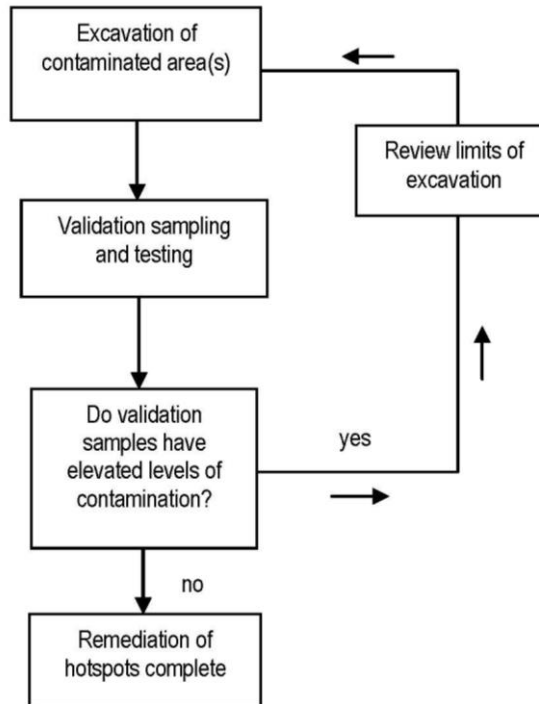
All excavations should be protected immediately from the effects of weather and groundwater.

Suitable protection measures against surface water run-off entering excavations will be required.

Suitable dust suppression methods should be used during excavation. If water is used in dust suppression, any run-off should not be allowed to drain into existing drainage, or any surface water features close to the site.

7.0 GENERAL METHOD OF REMEDIATION

The following flow chart summarises the general remediation process for excavation, removal and validation testing:



8.0 PROTECTION OF WATER SERVICES AND WATERCOURSES

All buried water services must be designed in accordance with UK Water Industry Research Report Ref 10/MW/03/21 Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites (2010).

In this instance it is suggested that protective barrier pipe will be required for all potable water supply pipes at the assessment site. The client should confirm this requirement by contacting the local water supplier prior to the installation of water supply network.

The verification of the protection of buried water services should be included in the Final Verification Report.

Under no circumstances should site operations mobilise contamination into existing drainage runs or surfaces water features. Appropriate protection measures such as bunds, barriers etc should be used to prevent any contamination entering into these features.

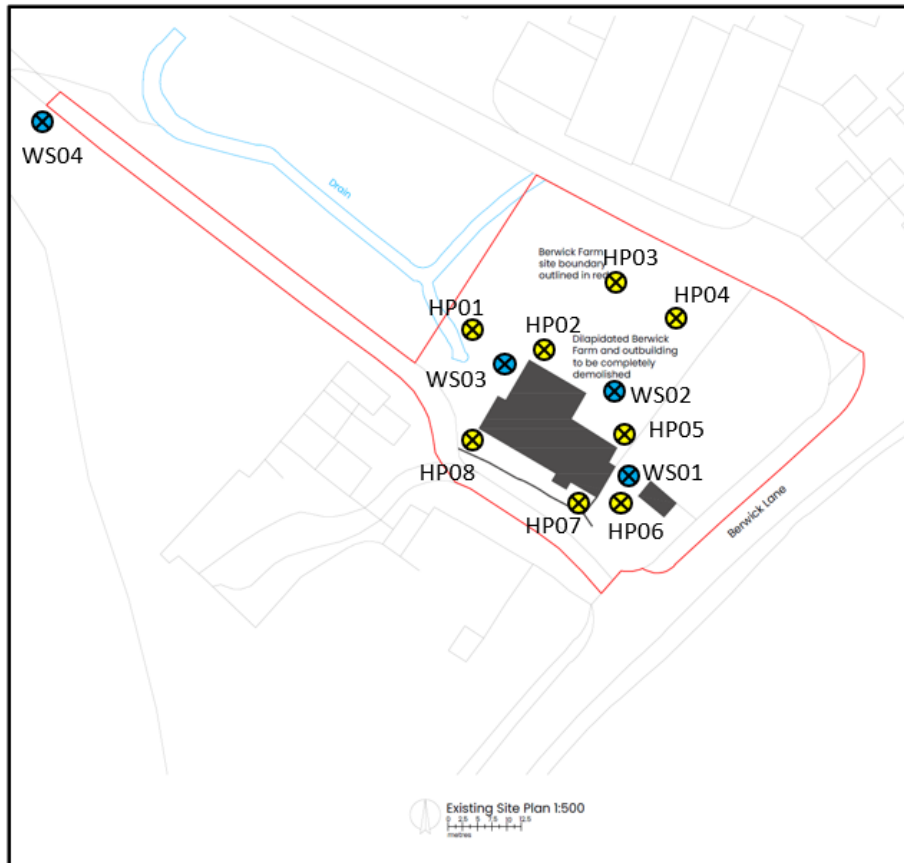
9.0 FINAL VERIFICATION REPORT

To facilitate the discharge of the outstanding planning condition, a Remediation Validation Report will be required post development. This report will contain a log of all remediation activities undertaken; including evidence of the installation of the clean capping layer, certificates and volumes of imported materials, waste transfer notes of exported material and evidence of any other remedial works undertaken.

The client will also need to confirm that service providers were consulted and that any requirements they had requested were included with in the development and records included within the Validation Report.

APPENDIX 1
DRAWINGS

SAMPLE LOCATION PLAN



SUMMARY OF CONTAMINATION

Location	Depth	Strata	Elevated contaminants in excess of:		Waste Classification
			Residential end use with homegrown produce	Residential end use without homegrown produce	
HP01	0.30-0.40m	Made Ground	Lead	Lead	Non-Hazardous
HP02	0.35-0.45m	Made Ground	Lead	Lead	Non-Hazardous
HP03	0.20-0.30m	Made Ground	Lead	-	Non-Hazardous
HP04	0.40-0.50m	Made Ground	-	-	Non-Hazardous
HP05	0.30-0.40m	Made Ground	-	-	Non-Hazardous
HP06	0.10-0.20m	Made Ground	Lead	Lead	Non-Hazardous
HP07	0.05-0.15m	Made Ground	-	-	Non-Hazardous
HP08	0.05-0.15m	Made Ground	Arsenic, Lead	Arsenic, Lead	Hazardous

APPENDIX 2
REPORT LIMITATIONS

REPORT LIMITATIONS

This contract was completed by Earth Environmental & Geotechnical Ltd on the basis of a defined programme and scope of works and terms and conditions agreed with the client. This report was compiled with all reasonable skill, and care, bearing in mind the project objectives, the agreed scope of works, the prevailing site conditions, the budget and staff resources allocated to the project.

Other than that expressly contained in the above paragraph, Earth Environmental & Geotechnical Ltd provides no other representation or warranty whether express or implied, is made in relation to the services. Unless otherwise agreed this report has been prepared exclusively for the use and reliance of the client in accordance with generally accepted consulting practices and for the intended purposes as stated in the agreement under which this work was completed. This report may not be relied upon, or transferred to, by any other party without the written agreement of a Director of Earth Environmental & Geotechnical Ltd.

If a third party relies on this report, it does so wholly at its own and sole risk and Earth Environmental & Geotechnical Ltd disclaims any liability to such parties.

It is Earth Environmental & Geotechnical Ltd understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was an important factor in determining the scope and level of the services. Should the purpose for which the report is used, or the proposed use of the site change, this report will no longer be valid and any further use of, or reliance upon the report in those circumstances by the client without Earth Environmental & Geotechnical Ltd review and advice shall be at the client's sole and own risk.

The report was written in 2024 and should be read in light of any subsequent changes in legislation, statutory requirements and industry best practices. Ground conditions can also change over time and further investigations or assessment should be made if there is any significant delay in acting on the findings of this report. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of Earth Environmental & Geotechnical Ltd. In the absence of such written advice of Earth Environmental & Geotechnical Ltd, reliance on the report in the future shall be at the client's own and sole risk. Should Earth Environmental & Geotechnical Ltd be requested to review the report in the future, Earth Environmental & Geotechnical Ltd shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between Earth Environmental & Geotechnical Ltd and the client.

The observations and conclusions described in this report are based solely upon the services that were provided pursuant to the agreement between the client and Earth Environmental & Geotechnical Ltd. Earth Environmental & Geotechnical Ltd has not performed any observations, investigations, studies or testing not specifically set out or mentioned within this report.

Earth Environmental & Geotechnical Ltd is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, Earth Environmental & Geotechnical Ltd did not seek to evaluate the presence on or off the site of electromagnetic fields, lead paint, radon gas or other radioactive materials.

The services are based upon Earth Environmental & Geotechnical Ltd observations of existing physical conditions at the site gained from a walkover survey of the site together with Earth Environmental & Geotechnical Ltd interpretation of information including documentation, obtained

from third parties and from the client on the history and usage of the site. The findings and recommendations contained in this report are based in part upon information provided by third parties, and whilst Earth Environmental & Geotechnical Ltd have no reason to doubt the accuracy and that it has been provided in full from those it was requested from, the items relied on have not been verified.

No responsibility can be accepted for errors within third party items presented in this report. Further Earth Environmental & Geotechnical Ltd was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the services. Earth Environmental & Geotechnical Ltd is not liable for any inaccurate information, misrepresentation of data or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to Earth Environmental & Geotechnical Ltd and including the doing of any independent investigation of the information provided to Earth Environmental & Geotechnical Ltd save as otherwise provided in the terms of the contract between the client and Earth Environmental & Geotechnical Ltd.

Where field investigations have been carried out these have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions can also be variable and as investigation excavations only allow examination of the ground at discrete locations. The potential exists for ground conditions to be encountered which are different to those considered in this report. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on site. In addition, chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and Earth Environmental & Geotechnical Ltd] based on an understanding of the available operational and historical information, and it should not be inferred that other chemical species are not present.

The groundwater conditions entered on the exploratory hole records are those observed at the time of investigation. The normal speed of investigation usually does not permit the recording of an equilibrium water level for any one water strike. Moreover, groundwater levels are subject to seasonal variation or changes in local drainage conditions and higher groundwater levels may occur at other times of the year than were recorded during this investigation.

Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan, but is (are) used to present the general relative locations of features on, and surrounding, the site.