



Elemental **GI** Ltd

REPORT: REMEDIAL METHOD STATEMENT FOR SITE
OFF GOSBERTON ROAD, SURFLEET

CLIENT: SEAGATE HOMES (UK) LTD

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REMEDIAL METHOD STATEMENT: SITE OFF GOSBERTON ROAD, SURFLEET

CONTENTS

SEMI-TECHNICAL SUMMARY

1.0 INTRODUCTION

- 1.1 Report Status
- 1.2 Previous Reports

2.0 SITE SETTING

- 2.1 Location
- 2.2 Geo-Environmental Setting
- 2.3 Ground Conditions
- 2.4 Contamination Summary

3.0 CONCEPTUAL SITE MODEL

- 3.1 Sources
- 3.2 Pathways
- 3.3 Receptors
- 3.4 Pollutant Linkages

4.0 REMEDIATION SPECIFICATION

- 4.1 Excavation Works
- 4.2 Capping Works

5.0 VALIDATION REQUIREMENTS

- 5.1 General Procedures
- 5.2 Screening Criteria

6.0 RECOMMENDATIONS AND OTHER CONSIDERATIONS

- 6.1 General Considerations / Assumptions
- 6.2 Local Regulatory Requirements

APPENDICES

I DRAWINGS

II YALPAG GUIDANCE

Semi-Technical Summary

The reader is referred to the terms and conditions which accompany this report, and which are presented at the end of this document.

This semi-technical summary provides a brief overview of the main conditions which have been noted on site. These features / factors (alongside others) are explained fully in the following report and the following should therefore not be referred to in isolation. **No reliance should be placed on the summary until the whole report and related documents have been read in full.**

Contamination	Lead has been recorded in one the 'bund' in one area of the site, and PAHs have been recorded in made ground elsewhere.
Conceptual Site Model	Potential pollutant linkages exist which relate to the contamination and to the future residential end users. These need to be broken in order to ensure that risks to future site users are negated.
Remediation Specification	The Client is finalising details relating to the site's levels and layouts. At this stage a set of remedial measures have therefore been recommended comprising the capping of made ground with clean soils / materials where they remain <i>in situ</i>. Validation of these areas will then be required to verify the success of these remedial works.

1.0 INTRODUCTION

1.1 Report Status

Elemental GI Ltd were appointed by Seagate Homes (UK) Ltd (hereafter referred to as 'the Client') to prepare a Remedial Method Statement ("RMS") for the Site off Gosberton Road, Surfleet (hereafter referred to as 'the site').

This report has been prepared on the understanding that the site is to redevelopment to support residential housing. We have been supplied with a copy of the proposed layout, and extracts of this plan are presented in the Proposed Site Layout Plan (Drawing 001) in Appendix I.

This report has been prepared in accordance with our notes concerning the terms and conditions of these works and of our engagement, which are presented at the end of this report.

Should the development proposals alter, then the recommendations in this report may be subject to change. Whilst it may be utilised by others for reference purposes at the Client's discretion, it has not been prepared for any other purposes (e.g. waste classification etc.) and therefore additional works may be required by third parties dependent upon their own requirements / works. Users of any / all of our reports, letters etc. must always ensure that they are reading the latest version / revision before undertaking any works and / or making any assessments, designs, decisions or related ventures. Please stop and check that this is the latest version for this site / project before proceeding any further.

All recommendations are subject to the approval of the relevant Regulatory Authorities, and copies of this document should be submitted for approval by the Client before the start of any works on site.

It should be noted that this RMS has not been written to consider risks arising from the completion of foundation construction works (e.g. piling) and that risks from such works should be considered fully by the relevant contractor once their designs are confirmed. Approval may be required from the relevant regulators / warranty providers for such works.

The handling, remediation and assessment of asbestos is a specialist area requiring appropriate experience and associated insurance. Elemental GI Ltd are not specialists in the assessment and / or remediation of asbestos (including asbestos containing materials) and therefore a suitably licensed and experienced contractor should be appointed by the Client to manage and supervise all related remedial works. However, comments have been made herein relating to the detections of asbestos encountered during our recent works for information purposes and to help guide the works of such specialists.

1.2 Previous Reports

Elemental GI Ltd have been supplied with copies of the following documents by the Client which relate to the subject site:

- Erda Associates Ltd: 20 Gosberton Road, Surfleet - Phase I Geo-Environmental Assessment (dated August 2021 ref. EAL.63.21)

The above referenced documents have not been reproduced herein, and they should be referred to in full alongside this report.

In addition to the above, Elemental GI Ltd have prepared the following report which relates to the subject site:

- Elemental GI Ltd: Phase II Environmental Investigation, Site off Gosberton Road, Surfleet (Ref. E21106/2/1 Rev. 1 dated Oct. 2024).

The above referenced documents have not been reproduced herein, and they should be referred to in full alongside this report.

1.2.1 Summary of Previous Reports

Erda Associates Report

The site was recorded to be situated upon superficial Tidal Flat Deposits (clay and silt) overlying Oxford Clay Formation (mudstone). These are both reported to be ‘unproductive aquifers’.

The site was reported to be set within an area with a very low sensitivity to controlled waters risks, with source protection zones and abstractions both be absent within the site’s vicinity, although a watercourse is recorded nearby to the north.

The third party noted that *“The site is not within a Radon Affected Area as less than 1% of properties are above the action level. Therefore, the report indicates that radon protective measures are not necessary for the proposed development.”*

The third-party Phase I report noted that the site currently supports a car parking area across its southern areas and a residential dwelling with garden areas across northern parts. An above ground heating oil tank was noted on the northern boundary. The tank and former parking activities were identified as potential sources of contamination.

The third party confirmed that the site supported fields until the late 1940s when a small structure was recorded in its north-eastern corner, with the current dwelling recorded from

the early 1970s. The surrounding area is recorded to have supported light industrial activities (breweries, lime kilns etc.) until the mid-1950s, after which the current mix of surrounding land activities was recorded. The nearby engineering works (recently re-used as a car repair / recover garage) and garages / depots to the south of the site were identified as potential sources of contamination.

Elemental GI Ltd Phase II Report

Our Phase II Report for the subject site described the completion of the investigation works in 2021.

Topsoil was encountered in northern-central areas of the site to a maximum total depth of 0.25m. This generally comprised brown silty sandy topsoil which was covered in vegetation. Made ground was encountered in 5 No. of the 7 No. exploratory holes completed, to a maximum total depth of 1.80m (noted in trial pits TP01 and TP04 in the western area of the site). This generally comprised predominantly granular materials containing various anthropogenic inclusions including fragments of brick, pottery, concrete and tarmac and metal bars. Cobbles and boulders of brick and concrete were also present in some areas.

The natural soils at the subject typically comprised a mix of clay, silt and sand soils which generally became softer with depth. Sands were encountered in the south of the site (TP05 from 1.70m to 2.25m begl).

Water was recorded at the following locations:

- TP02: Very slight ingress encountered from 1.00m depth at southern end of pit;
- TP03: Slight ingress encountered from 1.50m depth at southern end of pit;
- TP05: Slow ingress encountered from 1.70m depth; and
- TP07: Ingress encountered from 1.50m depth.

Our sampling and testing scope which accompanied our investigation identified the following exceedances in relation to the selected screening values (residential with private gardens):

- 1 No. exceedance of lead comprising:
 - Samples from 'Bund 1' of made ground at 0.1m begl;
- 2 No. exceedances of benzo(a)pyrene including:
 - Samples from TP01 of made ground at 1.40m begl;
 - Samples from TP03 of made ground at 0.10 begl;
- 4 No. exceedances of dibenzo(a,h)anthracene including:
 - Samples from TP01 of made ground at 1.40m begl;
 - Samples from TP02 of reworked topsoil (made ground) at 0.10m begl;
 - Samples from TP03 of made ground at 0.10 begl; and
 - Samples from 'Bund 1' of made ground at 0.1m begl.

It is noted that the exceedances summarised above were all within samples retrieved from made ground materials. No exceedances were encountered within samples retrieved from the underlying natural soils.

Hydrocarbon odours were noted in an area of the site. Laboratory testing of samples from this area did not report exceedances when compared against the selected screening values although discussions with the Client have included a recommendation to maintain awareness of ground / water in this area and to alert us immediately should further suspected contamination be encountered.

An Exploratory Hole Layout Plan (Drawing 002) and a General Photographic Record (Drawing 003) are included in Appendix I.

Risks to controlled waters were not identified at the site.

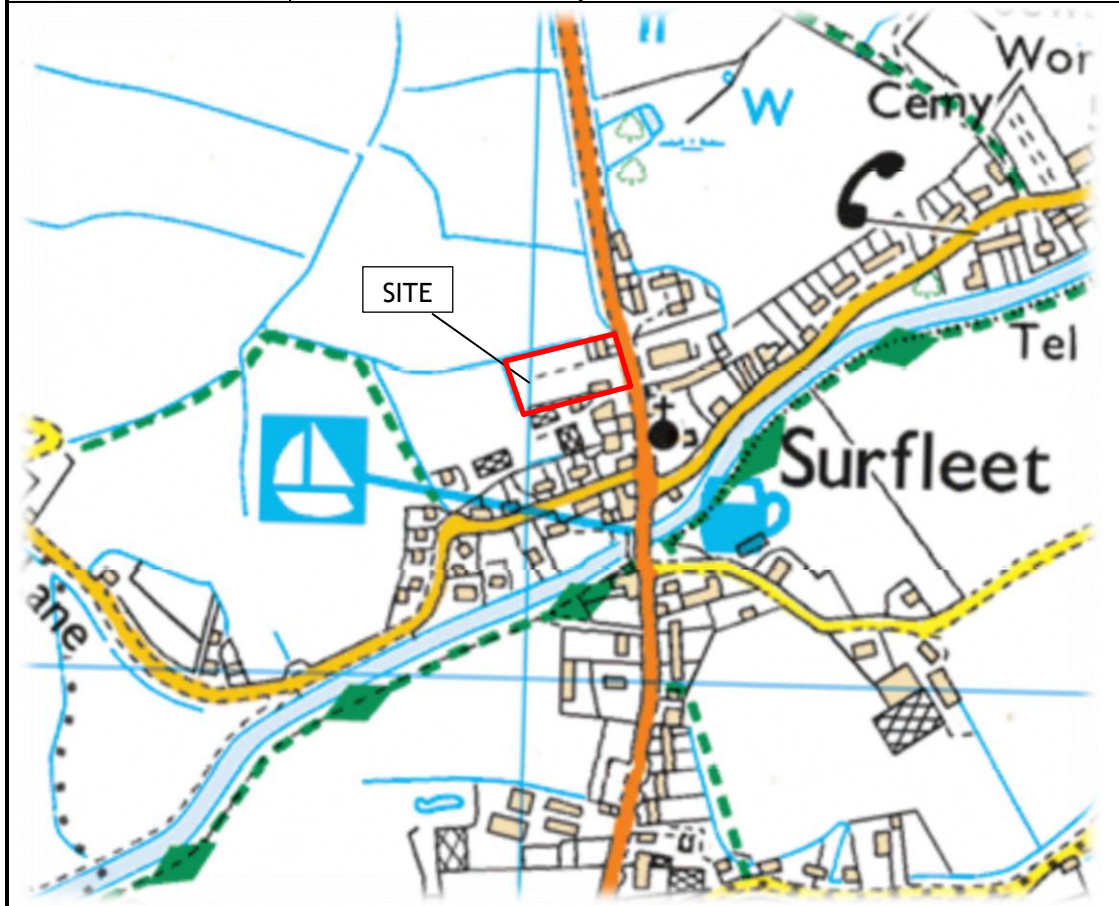
2.0 SITE SETTING

2.1 Location

The address and location of the subject site are shown in Table 2.0 below:

Table 2.0: Site Location and Dimensions

Site Address	Former Surfleet Café, West of Gosberton Road, Surfleet
National Grid Ref.	525057, 328283 (Approx.)
Area (Approx.)	0.4 ha (Approx.)
Access	Site is accessed directly from Gosberton Road.



2.2 Geo-Environmental Setting

The site is underlain by 'unproductive strata'. The nearest surface water body is a small watercourse in close proximity to the site to the north. The site is not recorded to be set within a 'source protection zone' and there aren't any water abstractions recorded within the site's vicinity.

2.2.1 Site Description (Taken from 2021 Site Visit):

- The site is approximately 0.44ha in area, and forms a roughly rectangular parcel of land;
- As described in the Phase I Report, the site currently supports an open area of land which currently supports overgrown garden areas to the north and a gravel-covered parking area across remaining parts. The ground slopes downward around the south-western, western and northern edges of the parking area, suggesting the ground has been topographically modified;
- A small structure (possible former bund) is present on the southern;
- A disused heating oil tank is present on the northern boundary;
- Anecdotal evidence from site users suggests that materials may have been placed across the parking area to create a plateau / platform associated with the adjacent Surfleet Café to the south;
- The site is set within a mixed agricultural, residential, commercial and ecumenical area of Surfleet. Land immediately surrounding the site supports housing to the north, car repair / recover garages to the east and south, a disused garden nursery to the south / south-west and open fields to the west.

2.3 Ground Conditions

Reference should be made to the reports referenced in section 1 of this RMS for a full description of the site's ground conditions, but in summary the site is underlain by made ground in most areas, beneath which are natural soils of the Tidal Flat Deposits. Water was encountered within several trial pits during excavation although this is considered to be possibly indicative of perched water.

2.4 Contamination Summary

We noted the following with regards to contamination at the site, which was assessed against screening criteria for a 'residential with plant uptake' end-use scenario:

- 1 No. exceedance of lead comprising:
 - Samples from 'Bund 1' of made ground at 0.1m begl;
- 2 No. exceedances of benzo(a)pyrene including:
 - Samples from TP01 of made ground at 1.40m begl;
 - Samples from TP03 of made ground at 0.10 begl;
- 4 No. exceedances of dibenzo(a,h)anthracene including:
 - Samples from TP01 of made ground at 1.40m begl;
 - Samples from TP02 of reworked topsoil (made ground) at 0.10m begl;
 - Samples from TP03 of made ground at 0.10 begl; and
 - Samples from 'Bund 1' of made ground at 0.1m begl.

3.0 CONCEPTUAL SITE MODEL

3.1 Sources

As summarised in Section 2.4 above, exceedances have been recorded at the site comprising lead (1 No. location) and PAH compounds (various locations).

These are considered to comprise ‘sources’ within the site’s conceptual site model (CSM).

3.2 Pathways

The following potential pathways have been identified at the site in relation to the above sources should they remain unchanged / *in situ*:

- Dermal Contact;
- Ingestion of Soil;
- Ingestion of Site-Grown Fruit / Vegetables;
- Ingestion of Soil Attached to Site-Grown Fruit / Vegetables;
- Inhalation of Dust;
- Inhalation of Vapours;

3.3 Receptors

The redevelopment proposals for the site comprise the construction of new residential dwellings which will include private gardens, soft landscaping, roads and parking areas.

The main / primary receptors considered within this CSM comprise the future site residents. However, other secondary receptors have also been considered, including ecology, groundwater, construction workers, neighbouring sites.

It is recommended that construction companies involved in any demolition / enabling / construction works should undertake their own health and safety risk assessments in relation to their own works and with due regards to the findings of the previous ground investigations. It is assumed that the Client will liaise directly with utility providers to confirm that they are satisfied with the selection of materials in relation to the findings of our Phase 2 Report.

3.4 Pollutant Linkages

Based on the above sections, sources, pathways and receptors have been identified at the site and therefore feasible pollutant linkages are considered to have been identified.

This RMS will present steps through which these pollutant linkages may be broken.

4.0 REMEDIATION SPECIFICATION

Elemental GI Ltd have discussed the site and the redevelopment proposals with our Client, and it is understood that the identified pollutant linkages shall be broken through the following steps:

- Step 1 - Identification of areas of site where made ground is present, and application of remedial measures to all such areas;
- Step 2 - Capping of all gardens / soft landscaping in all remaining areas where made ground remains *in situ* with 600mm clean topsoil/subsoil plus a marker membrane;
- Step 3 - Removal of contaminated materials from site for disposal (from excavated hotspots and any construction excavations);
- Step 4 - Validation of remedial measures (e.g. placement of capping materials) following their placement by Engineers from Elemental GI Ltd.

The site levels are still being configured. We therefore to amend the above once final specific details are confirmed, which may mean amending these steps slightly and conservatively. However, no remedial works would be needed in future in any areas of the site where made ground was absent or where >1000mm of 'clean' soils / materials had been placed above made ground as part of site topographical changes.

4.1 Excavation Works

Made ground materials may be excavated at the site during construction (e.g. movement of the 'bund' or for 'roads and sewers'). Made ground may be retained on site (subject to regulatory approval and prior activation of appropriate permits / exemptions e.g. MMP) beneath hardstanding or at depths greater than 1000mm. However, all such retention of materials must be approved in advance by the regulators and must be fully recorded by site staff.

Where excavated materials are to be removed from site it is recommended that the following are undertaken:

- Either materials should be excavated and loaded directly into wagons for off-site disposal;
- Or materials should be excavated and placed on an impermeable membrane on site (with a system in place to contain and remove all run-off fluids) awaiting removal. If materials are stored on site, they must be fully covered with an impermeable membrane until their removal to prevent the creation of additional leachate and to prevent migration of dust etc.

Other 'best practice' rules and requirements will apply (as usual) with regards to other steps including the removal, segregation, crushing etc. of hardstanding, which should be confirmed with the Client prior to the start of works.

4.2 Capping Works

Our recent Phase II investigation confirmed that the topsoil and natural underlying soils at the site are 'clean' and have recorded concentrations of determinands below the selected screening values.

Subject to regulatory approval, site-won natural topsoil / soil may therefore be re-used for capping if required, although (as always) the movement, import/export and deposition of all soils must be undertaken in accordance with all relevant permits / exemptions (U1, MMP etc.). For example (and to be confirmed in advance of any such works appropriately), 'clean' natural materials from some areas (e.g. northern areas where depths of made ground were at their 'thinnest') arising from the excavation of foundations, roads, sewers, topographical changes etc. could be utilised elsewhere on site if needed to raise levels elsewhere including gardens etc.

Elemental GI Ltd should be notified once suitable soils are identified for these capping works.

5.0 VALIDATION REQUIREMENTS

5.1 General Procedures

It will be necessary to confirm that the full extent of the significant contamination has been removed from the ground and that areas have been successfully capped etc.

The following validation steps are recommended and would apply variably to each area depending on the remediation which had been completed. Where further contamination is encountered (or where insufficient capping thicknesses are recorded) then these steps should be repeated in full until no further contamination is recorded (to be reviewed by Supervising Engineer).

Capping Validations:

- **Step 1** - Thicknesses of capping materials to be verified on site at a ratio of 1 No. inspection point per rear garden by an Engineer;
- **Step 1a** - Presence of membrane (if present) to be verified by either the exposure on site during 'Step 1' or by the review of photographs of placement by the Client;
- **Step 2** - Letter Report of findings to be sent to Client for submission to regulators / warranty providers.

Excavation Validations (Areas Where Made Ground is Removed):

- **Validation Step 1** - Sampling for either PAHs or lead (as appropriate) around edge of excavation (each side);
- **Validation Step 2** - Samples to be analysed for exceedances.

5.2 Screening Criteria

Screening values (e.g. 'Residential with gardens') shall be used if / when assessment of soil quality is needed at the site. Other screening values can be adopted where appropriate (e.g. 'POS' values for small soft landscaped strips).

The following main screening criteria shall be used for all delineation / validation purposes (see Tables 5.0 and 5.1 overleaf):

Table 5.0: General Screening Values - Gardens

Analyte	Screening Values (mg/kg)
Arsenic	37.0 ^b
Cadmium	11.0 ^b
Chromium (Total)	910.0 ^b
Chromium VI	6.0 ^b
Lead	200.0 ^a
Selenium	250.0 ^b
Nickel	130.0 ^b
Copper	2,400.0 ^b
Zinc	3,700.0 ^b
Mercury	1.20 ^b
Benzo(a)pyrene	2.2 ^b
Dibenzo(a,h)anthracene	0.24 ^b
Asbestos	D ^c

^a DEFRA C4SL values for a 'residential with gardens' end-use;

^b Third party UK screening values e.g. CIEH, CL:AIRE, Elemental GI Ltd and LQM 'S4UL' values for a "residential with gardens" end-use (licence S4UL3849);

^c 'D' = 'Detected', which is an Elemental GI Ltd general screening level. **A threshold of >0.001% is applicable if / when asbestos is detected as an action level beyond which further remediation should be considered.**

Further Testing may be required depending upon the hotspot / source / regulatory requirements.

Testing in accordance with BS3882 may be required where topsoil requires formal verification

Table 5.1: General Screening Values - Public Open Space 'POS1' Areas

Analyte	Screening Values (mg/kg)
Arsenic	79.0 ^b
Cadmium	120.0 ^b
Chromium (Total)	1,500.0 ^b
Chromium VI	7.7.0 ^b
Lead	630.0 ^a
Selenium	1100.0 ^b
Nickel	230.0 ^b
Copper	12,000.0 ^b
Zinc	81,000.0 ^b
Mercury	16.0 ^b
Benzo(a)pyrene	5.7 ^b
Dibenzo(a,h)anthracene	0.57 ^b
Asbestos	D ^c

^a DEFRA C4SL values for a 'POS1' end-use;

^b Third party UK screening values e.g. CIEH, CL:AIRE, Elemental GI Ltd and LQM 'S4UL' values for a 'POS1' end-use (licence S4UL3849);

^c 'D' = 'Detected', which is an Elemental GI Ltd general screening level. **A threshold of >0.001% is applicable if / when asbestos is detected as an action level beyond which further remediation should be considered.**

Further Testing may be required depending upon the hotspot / source / regulatory requirements.

Testing in accordance with BS3882 may be required where topsoil requires formal verification

6.0 RECOMMENDATIONS AND OTHER CONSIDERATIONS

6.1 General Considerations / Assumptions: The following assumptions have been made concerning the site and the remedial works described herein:

- It always remains possible that ground and groundwater conditions may change between each exploratory hole and therefore such variations cannot be discounted. Seasonal variations may also be expected in relation to groundwater observations etc.
- We have assumed that the Client and their appointed contractors will follow all relevant regulatory requirements including health and safety and demolition works (e.g. Construction (Design and Management) Regulations 2015).
- A suitable environmental advisor (i.e. Elemental GI Ltd) should be appointed to supervise and validate all works described herein. However, representatives of Elemental GI Ltd may not always be on site and cannot verify / approve works which they have not seen or been informed of. Other advisors / contractors may be involved with the site (e.g. remedial contractors) and they would be wholly responsible for their own works as agreed with the Client.
- The importation and re-location of all soils (site-won or otherwise) must be undertaken in full accordance with the relevant permits / exemptions / regulations. The Client / developer should ensure that these are all in place in advance of relevant works. Where soils are re-used on site, or are imported onto site, it is assumed that they will be tested for suitable determinands prior to their re-use / importation. Please contact us for further advice in advance of all such works.
- Any previously unexpected / unidentified contamination should be reported to Elemental GI Ltd immediately, and works may need to stop until we can review and discuss the associated risks with you. The regulatory authorities should also be informed.
- The Client / developer should discuss utility construction requirements with the appropriate providers prior to the start of works.
- All soil samples must be retrieved by an Engineer from Elemental GI Ltd, and should be scheduled for analysis at a suitably accredited laboratory.
- The excavation, movement or any other disturbance of contaminated soils could result in the spreading of contamination to other areas of the site. Suitable management procedures should be put in place prior to all such works (e.g. dust suppression) to manage this at all times.
- Site staff are responsible for ensuring that all relevant environmental management procedures are in place throughout the works. This includes the safe and appropriate storage of contaminated soils (e.g. on suitable membranes) to ensure that cross-

contamination and off-site contamination (e.g. through dust migration) are not possible.

- The Client is responsible for ensuring that their site staff are sufficiently protected from health and safety risks associated with the works outlined herein.

6.2 Local Regulatory Requirements:

Where we have not been made aware of soil sampling / import test criteria it is assumed that the 'YALPAG' Guidance on Cover Verification (4.1) applies. A copy is presented in the appendices of this report for your reference, and it must be followed.

Terms and Conditions

Consideration of factors such as concrete design class, desiccation, settlement and related matters may need to be undertaken separately once this information is known / provided and this has not been assessed unless stated otherwise as it is assumed that your appointed Structural Engineers have made sufficient allowances etc. and / or have assessed such factors directly. Specific details relating to construction (e.g. concrete design class) MUST be assessed conservatively and directly by the parties finalising those aspects of the project as part of their own works once the project details can be considered holistically by them.

We have obtained and reviewed information relating to the site, but this may not be complete, and liability cannot be accepted for information not available to Elemental GI Ltd at the time of writing this report. This report has been written in consideration of construction / development proposals (or similar) as described in Section 1.0 of this report. If any of these proposals change (e.g. layout), then this report may be subject to change. Environmental factors may change over time (including climate change, water / rainfall conditions etc) which may present conditions not experienced during the works described herein. We cannot accept liability for any conditions not identified / experienced during the works described herein, and it is assumed that suitable contingencies are therefore included within site designs by your other appointed Engineers (and similar professionals) in accordance with best practice and appropriate precautions.

The actual measurable area of the site which has been physically inspected (e.g. through drilling / excavations etc.) as part of the works discussed in this report is very small when compared to the total area of the site, and therefore our findings should not be seen as being complete, thorough or comprehensive in relation to the ground / water conditions at this stage. Whilst we have endeavoured to assess and investigate the site in accordance with the scope of these works, it always remains possible that ground conditions will vary between and beneath locations. This may include ground type, strength and groundwater conditions. There may therefore be conditions prevailing on site which have not been revealed by this assessment and which have not been taken into account by this report. The best way to ensure that recommendations (including foundation recommendations) are appropriate is to appoint a suitably experienced and qualified Engineer to inspect all formations (foundation excavations) prior to construction. It is therefore always recommended that the Client undertakes this for all sites, **and this advice applies to the site discussed in this report.** Responsibility cannot be accepted for any works undertaken which deviate from the recommendations presented herein and for all / any conditions not revealed by this investigation and assessment. It should be noted that groundwater levels etc. may vary due to seasonal and other effects. Whilst it may be utilised by others for reference purposes at the Client's discretion, it has not been prepared for any other purposes (e.g. waste classification, drainage excavations etc.) and therefore additional works may be required by third parties dependent upon their own requirements / works. Any works which are proposed at greater depths than reported herein may require confirmatory investigation works as necessary.

This report has been prepared for the sole use and reliance of the Client. No other third party may rely upon or reproduce the content of this report without our prior written approval. If any unauthorised third party comes into possession of this report, they rely upon it entirely at their own risk and the authors do not owe them any warranty, duty of care or skill.

Our report, including the conclusions and recommendations, are considered reasonable based on the findings of the various assessments. However, these cannot be guaranteed to gain regulatory approval and therefore the

Client should submit it to them (as necessary) for their comments and approval prior to undertaking any irrecoverable works associated with the subject site.

The findings and recommendations made in this report are based on published information (as presented in the accompanying appendices). Elemental GI Ltd cannot accept responsibility for the reliability and authenticity of published information or reports prepared by third parties.

The conclusions and recommendations presented herein are considered reasonable based on the assessments of the site undertaken by Elemental GI Ltd. However, these cannot be guaranteed to gain regulatory approval and therefore copies of this report should be sent to the appropriate regulatory authorities and / or other organisations (as appropriate) by the Client for their comments and approval prior to undertaking any irrecoverable works associated with the site.

The possibility of significant variation in ground conditions existing between / beneath test locations / depths cannot be discounted and must be considered within the design proposals for the subject site. All soakaway designs should be approved by the relevant statutory authority prior to implementation and must adhere to the standard design and ground setting requirements, upon which your appointed drainage design engineers should advise you. Where comments / recommendations have been made relating to specific depths it cannot be guaranteed that ground conditions shall be similar at surrounding / underlying depths, which should be taken into consideration as necessary by others.

With respect to the document to which this sheet is appended, the warranty provided with our works / reports etc. shall only apply once all invoices that we have sent in relation to the same site / project discussed herein (i.e. the site discussed within this document) have been paid by the Client within the payment period specified on each invoice. The warranty and all reliance upon / use of this report (in part or in full, including all text, drawings, logs, associated correspondence etc.) is both voided and prohibited unless all invoices relating to it are settled in full within the period (i.e. 'Terms' e.g. 'Net 20') specified on such invoices.

Standard Risk Assessment - Considerations and Methodology

Elemental GI Ltd have based our standard risk assessment methodology upon current legislation and prevailing best practice and available guidance. This includes the following:

- DEFRA / EA document 'Contaminated Land Report 11 (CLR11) Model Procedures for the Management of Land Contamination' (2004) [*withdrawn but used for general reference purposes*];
- NHBC / EA / CIEH document 'Guidance for the Safe Development of Housing on Land Affected by Contamination' (2008);
- DEFRA 'Environmental Protection Act 1990: Part 2A - Contaminated Land Statutory Guidance (2012); and
- Environment Agency 'Collection: Land Contamination Technical Guidance (2014) held at:
 - <https://www.gov.uk/government/collections/land-contamination-technical-guidance>

Construction of Conceptual Site Model

Elemental GI Ltd have based our standard risk assessment methodology upon current legislation and prevailing best practice and available guidance. This includes the assessment of potentially contaminated land in terms of 'significant pollutants' and 'pollutant linkages', using SOURCE-PATHWAY-RECEPTOR scenarios for the site. For a pollutant linkage to exist all three of these elements must be present. These have been clearly defined in the guidance as follows:

- potential source as 'a contaminant which is in, or under the land and which has the potential to cause significant harm or to cause pollution of controlled waters'.
- potential pathway as 'one or more routes or means by, or through, which a receptor is being exposed to, or affected by a contaminant, or could be so exposed or affected'.
- potential receptor as 'a living organism, a group of living organisms, an ecological system or a piece of property which is being or could be, harmed by a contaminant or controlled waters which are being, or could be, polluted by a contaminant'.

Within this report, pathways including the following have been considered:

- Ingestion of soil;
- Ingestion of site-grown vegetables;
- Ingestion of site-reared livestock / fish;
- Dermal contact with soils;
- Inhalation of vapours;
- Inhalation of soil-derived dust.

The receptors which we have considered are described in Section 1.0 of this report.

Risk Assessment Methodology

Our risk assessment methodology is based upon a phased approach, which takes the following steps:

1. Hazard Identification and Assessment:
 - a. Establishing potential contaminant sources through the derivation of initial conceptual site model (CSM); and
 - b. Analysing the potential for unacceptable risks (what pathways and receptors could be present, what pollutant linkages could result and what could the effects be).
2. Risk Estimation and Evaluation:
 - a. Prediction of the magnitude and probability of the possible consequences;
 - b. Investigation of the potential risks;
 - c. Completion of Generic Quantitative Risk Assessment (GQRA); and
 - d. Evaluation of risks / confirmation of pollutant linkages (leading onto step '3' if identified).
3. Remediation Design / Implementation / Verification:
 - a. Completion of Detailed Quantitative Risk Assessment (DQRA) if necessary;
 - b. Collation of remedial strategy;
 - c. Implementation of remedial strategy / validation; and
 - d. Final reporting.

Risk terminology and classification is defined through standard wording and descriptions, as contained in the documents referenced above. This includes the balance, comparison and assessment of risk as a dynamic categorisation / classification of probability vs. possible consequence(s), as shown in the table A1 below:

Table A1: Risk Categorisation

Probability (Likelihood)		Consequence			
		Severe	Medium	Mild	Minor
	High Likelihood	Very High Risk	High Risk	Moderate Risk	Moderate / Low Risk
	Likely	High Risk	Moderate Risk	Moderate / Low Risk	Low Risk
	Low Likelihood	Moderate Risk	Moderate / Low Risk	Low Risk	Very Low Risk
	Not likely	Moderate / Low Risk	Low Risk	Very Low Risk	Very Low Risk

Risk levels are described as follows:

Table A2: Risk Level Descriptions

Term	Description
Very High Risk	A high probability exists that severe / significant harm could arise to someone or something from the hazard which has been identified. Remedial action is required.
High Risk	Harm is likely to arise to someone or something from the hazard which has been identified. Remedial action is usually required.
Moderate Risk	Harm could potentially arise to someone or something from the hazard which has been identified without remedial action, although it is considered to be relatively <u>unlikely</u> that such harm would be severe.
Low Risk	Harm could theoretically arise to someone or something from the hazard which has been identified without remedial action, although it is considered that any effects would be mild.
Very Low Risk	Harm is not likely to arise to someone or something from the hazard which has been identified.

The NHBC / EA / CIEH document 'Guidance for the Safe Development of Housing on Land Affected by Contamination' (2008) defines the following (reproduced verbatim):

“Severity (consequence) can be defined as the adverse effects (or harm) arising from a defined hazard, which impairs the quality of human health or the environment in the short or longer term. For example a consequence defined as “Severe” could be defined as “Highly elevated concentrations likely to result in ‘significant harm’ to human health as defined by the EPA 1990, Part 2A, if exposure occurs”. The type and form of the contaminant needs to be known in order to understand the effect on humans and therefore severity of potential harm. For instance different forms of cyanide behave differently. Complex cyanide (“blue billy”) is relatively “non toxic” whereas free cyanide is “highly toxic” (Environment Agency 2002b).

Probability can be defined as the chance of a particular event occurring in a given period of time. For example, a “High Likelihood” could be defined as “where an event would appear very likely in the short-term and almost inevitable over the long-term, or there is evidence at the receptor of harm or pollution”.

APPENDIX I
DRAWINGS



CLIENT:



TITLE:

Proposed Site Layout Plan

DATE:

Jan. 2025

DRAWING No:

E21106_001

SCALE@SIZE:

NOT TO SCALE

DESIGN/DRAWN:

JR

Elemental GI Ltd

NOTES:



= Approx. Site Location



CLIENT:



TITLE:

Site Location Plan

DATE:

Jan. 2025

DRAWING No:

E21106_002

SCALE@SIZE:

NOT TO SCALE

DESIGN/DRAWN:

JR

Elemental **GI** Ltd

NOTES:



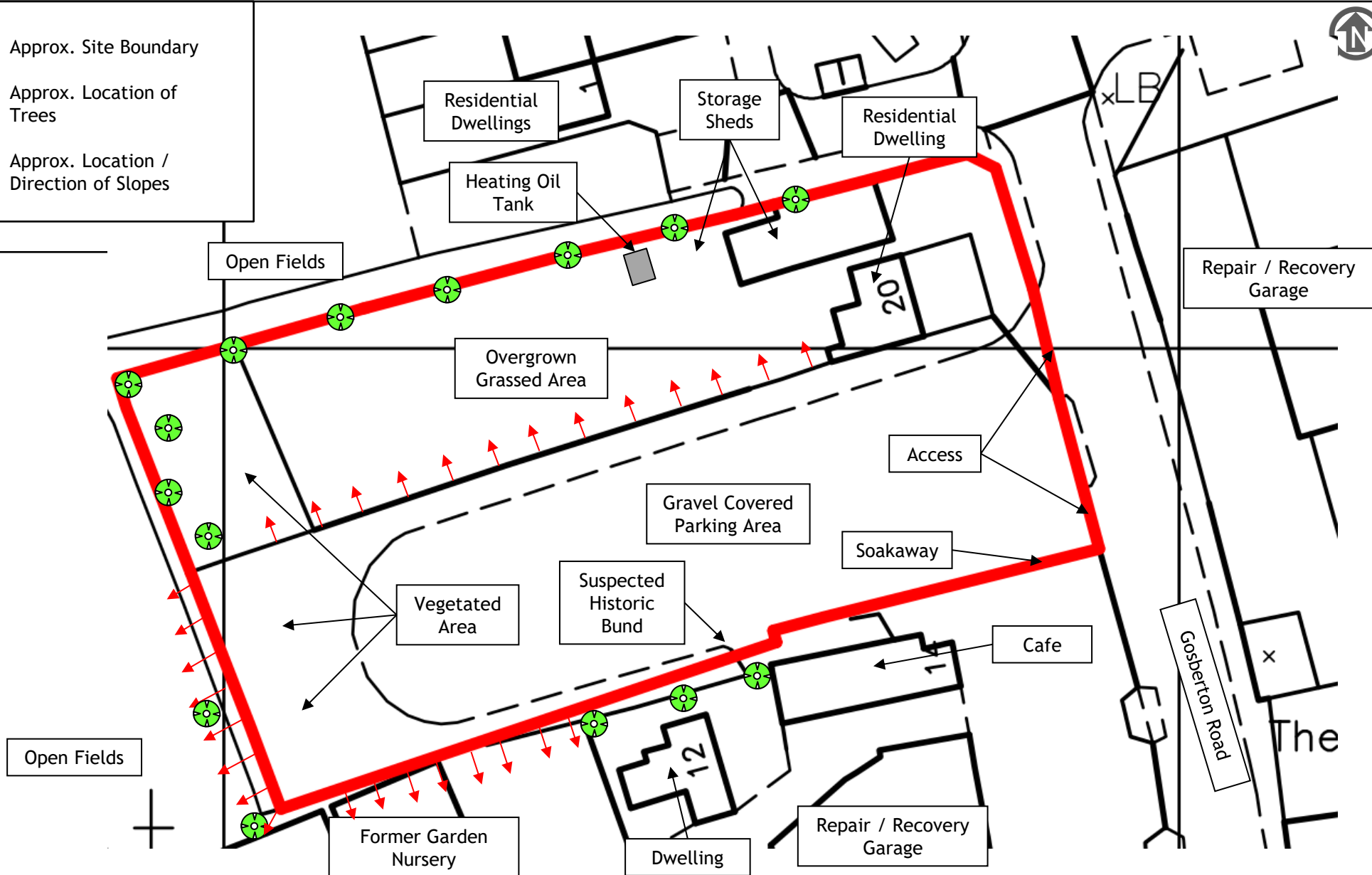
Approx. Site Boundary



Approx. Location of Trees



Approx. Location / Direction of Slopes



CLIENT:



TITLE:

Site Features Plan (2021)

DATE:

Jan. 2025

SCALE@SIZE:

NOT TO SCALE

DRAWING No:

E21106_003

DESIGN/DRAWN:

JR

Elemental GI Ltd



Photo 1 - Eastern Area of Site



Photo 2 - View of Site from West



Photo 3 - View of Site from Gosberton Rd.



Photo 4 - Central Area of Site

CLIENT:



TITLE:

General Photographic
Record

DATE:

Jan. 2025

DRAWING No:

E21106_004

SCALE@SIZE:

NOT TO SCALE

DESIGN/DRAWN:

JR

Elemental GI Ltd

APPENDIX II
YALPAG GUIDANCE



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:



Contents

Introduction	1
The Process of Verification	1
Overview Flowchart	2
Key Points	3
KP1: Source of Material	3
KP2: Characterisation of Material	3
KP3: Suitability of Material	5
KP5: Verification of Required Depth	6
KP6: Reporting	6
Appendix 1a – Sampling & Testing Matrix	8
Appendix 1b – Questions to Ask Your Soil Supplier Relating to Soil Quality	9
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:

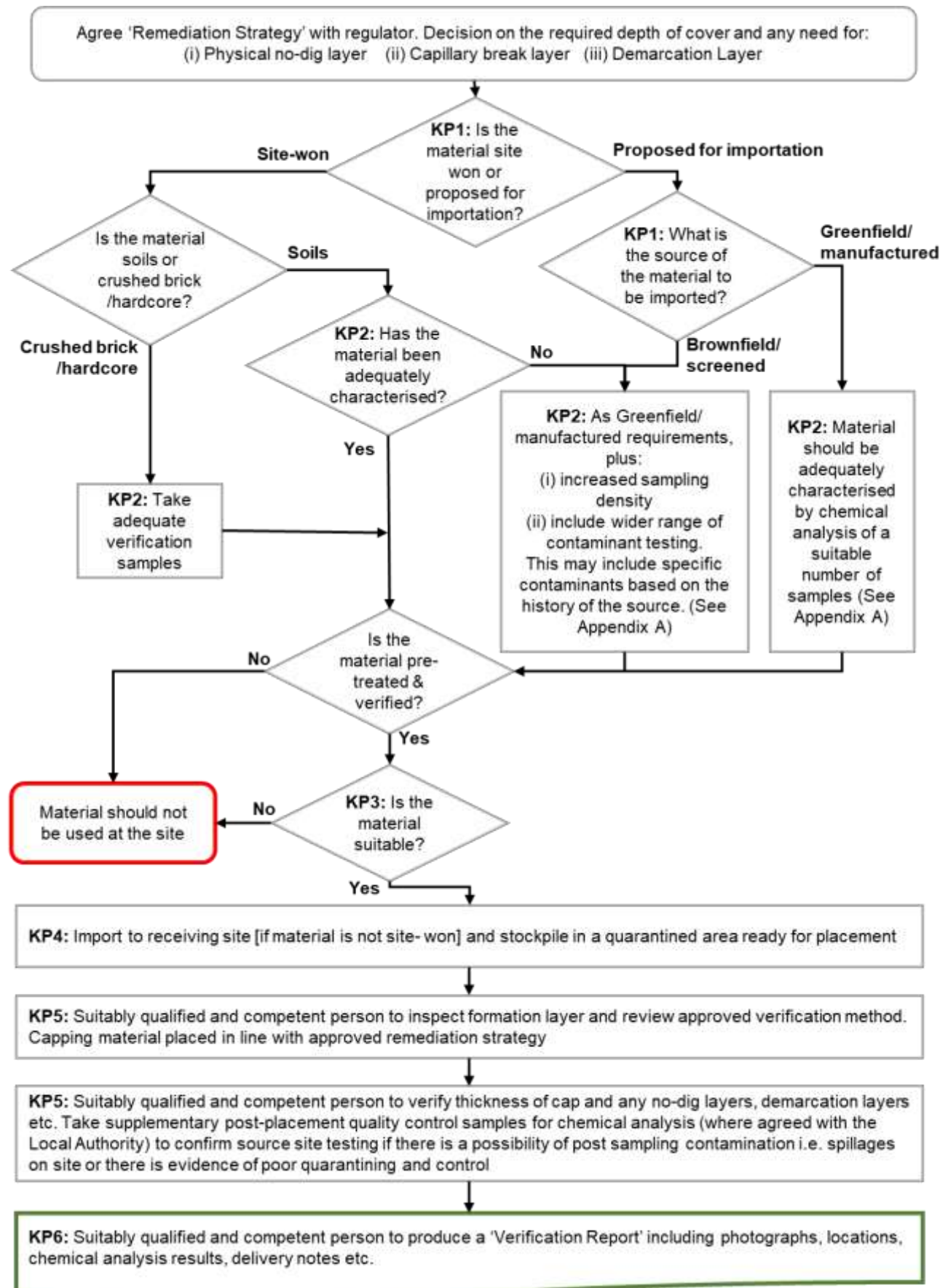
- What should be measured?
- When should they be measured?
- Where measurements need to be taken, what is the appropriate monitoring regime i.e. number and frequency of samples?
- Statistical constraints on sampling.

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.