



Elemental **GI** Ltd

REPORT: PHASE 2 GEO-ENVIRONMENTAL
INVESTIGATION FOR SITE OFF BARRIER
BANK, COWBIT, SPALDING

CLIENT: EAST ANGLIAN CIVILS LTD

PHASE 2 GEO-ENVIRONMENTAL INVESTIGATION: SITE OFF BARRIER BANK, COWBIT, SPALDING

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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. Please refer to the terms and conditions shown at the end of this report for an important list of exclusions / assumptions etc. Most importantly, the reliance upon / use of this report (in part or in full, including all text, drawings, logs, associated correspondence etc.) is prohibited unless all invoices relating to it are settled in full within the period specified on such invoices.

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 following summary until the whole report has been read in full.**

Ground Conditions / Foundations	The site is underlain by made ground (including 'capping soils') and then by natural brown and grey silty sand or sandy silt soils. Bands of peat were noted at most locations. Groundwater is typically at relatively shallow depths.
Contamination	Elevated PAHs have been recorded in made ground in one area. Discussions with the Client indicate that ground levels are to be modified in this area of the site and that at least 1000mm of 'clean' soils will be present on top of the PAH-impacted soils. A Remedial Method Statement (RMS) shall be required to fully describe these works (including pictorial presentation of site level changes) and to describe the necessary remedial works.
Other issues	Elevated ground gas has been detected and protection measures will be needed in all new buildings.
Recommendations	▪ Production of a Remedial Method Statement (RMS) confirm remediation requirements; ▪ Completion of final ground gas monitoring / assessment works and confirmation of ground gas classification to the satisfaction of the Local Authority and Warranty Providers; ▪ Where soils are to be removed from site for disposal it is recommended that these are fully characterised (i.e. to confirm material types and disposal options) and that advice is sought from the appointed contractors to determine any requirements for specific testing etc.

1.0 INTRODUCTION

1.1 Report Status

A Phase I Geo-Environmental Assessment has been undertaken for the site by ourselves (ref. E22131/1/0 dated June 2022). Please see section 1.2 below for further information.

Elemental GI Ltd were appointed by East Anglian Civils Ltd (hereafter referred to as 'the Client') to undertake a Phase II Geo-Environmental Investigation for the site off Barrier Bank, Cowbit, Spalding (hereafter referred to as 'the site').

This report has been prepared on the understanding that the site is undergoing 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 version of the report ('Rev. 1') has been written to incorporate some delineation works and the remaining ground gas monitoring visits which were undertaken following the release of our original Phase 2 Report.

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. Please refer to these terms and conditions for an important list of exclusions / assumptions etc.

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.

1.2 Previous Reports

Elemental GI Ltd have prepared the following report which relates to the subject site:

- Elemental GI Ltd: Phase 1 Geo-Environmental Assessment for Site off Barrier bank, Cowbit, Spalding (Ref. E22131/1/0 dated June 2022)

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

The following extracts have been taken from the Phase 1 Report:

“No records of artificial ground are recorded beneath the site on available 1:10,000 and 1:50,000 scale geological mapping. Drift deposits are recorded beneath the site on 1:50,000 scale mapping comprising Tidal Flat Deposits (clay and silt). The solid geology beneath the site on 1:50,000 scale mapping is recorded as Oxford Clay Formation, mudstone.

The drift deposits recorded beneath the site are classified as a ‘Unproductive’. The bedrock geology recorded beneath the site is classified as a ‘Unproductive’. No entries relating to abstractions are recorded within a 250m radius of the site. No entries relating to potable abstractions are recorded within a 2000m radius of the site. The site is not recorded to be within a source protection zone for total catchment. 19 No. entries relating to water networks are recorded within a 250m radius of site relating to small watercourses from 1m north-east of the site and the New River from 115m south-west of the site.

7 No. historic land use entries are identified within a 250m radius of the site. This includes nurseries from 138m north of the site, a smithy 241m north-west of the site, an unspecified tank 52m north-east of the site and an electricity substation 133m north-west. No records of waste entries identified within a 250m radius of the site. 6 No. current industrial land use entries are identified within a 250m radius of the site. This includes a CCTV business 115m south-east of the site, pumping stations 117m north-east, 161m north-west and 248m south-east of the site, an electricity substation 154m north-west of the site and a sewage pumping station 245m south-east of the site.

6 No. discharge consents are identified within a 250m radius of the site. These all relate to sewage discharges from a pumping station 135m north of the site.

The site is in an area where less than 1% of homes are estimated to be at or above the Action Level. Therefore, radon protective measures are not required, subject to regulatory approval.

[Historic maps show that]... it supported a small number of structures from 1887 on part of 3 No. fields / gardens. This was shown to become a single defined area with more structures developed from the 1970's supporting its current layout, with the exception of 2 No. greenhouses which were demolished from 2003.

Possible fuel tanks have been used in the western area of the site. The structures / barns in the eastern area of the site are shown to have housed livestock. Other structures on the site have been shown to be used for storage of various materials. The ‘U’ shaped structure in the centre of the site is shown to be used to burn materials.”

1.3 The Site

The site is situated to the north-east / east of Barrier Bank, Spalding, adjacent to the residential dwelling at No. 128 Barrier Bank. The site is roughly centred at National Grid Reference 526062, 317893.

1.3.1 Site:

- The site is approximately 0.26ha in area;
- The site forms an irregular shaped parcel of land which was mainly covered by gravel and tarmac in the western area of the site and by grass in the eastern area of the site. It currently supports an area of ground which has had the previous structures removed and which now contains features associated with the proposed residential redevelopment;
- The site previously supported a workshop and several derelict and dilapidated structures with various mounds around site containing building rubble and mixed soils;
- The workshop was present in the western area of the site and contained machinery, work benches, DIY materials and a small-scale storage of fuels, paints and cleaning fluids;
- There were 4 No. dilapidated structures on site. This comprised a disused shed in the northern area of the site, an open-sided barn in the north-eastern area of the site, a dilapidated barn (possible former livestock barn) in the eastern area of the site, and a disused barn in the western area of the site;
- Various materials were observed to be stored in some of the barns, mainly comprising wooden crates, pallets, machinery, gym equipment and electrical equipment;
- The small-scale storage of fluids in small drums was noted within some of these barns;
- A number of mounds and trial pits were found across the site. The mounds were shown to contain building rubble, cement and mixed soils. Trial pits had been undertaken (by the Client's Structural Engineer) and showed disturbed / made ground at surface;
- A 'U' shaped structure was found centrally on site built from breeze blocks. It was seen to contain evidence of previous bonfires with piled wood in its centre. Building rubble from demolished buildings was found in a mound south of this structure;
- A disused kennel was found in the north-western area of the site. Alongside the kennel, concrete bases with wooden pallets and stacked breeze blocks with pipe were noted. These indicated potential suspected tank bases which appeared to have been unbunded;
- Asbestos sheeting was noted across the site. This was mainly noted outside and around the workshop. Asbestos debris was also present in the barn in the eastern area of the site;
- A manhole cover was present in the central area of the site associated with a suspected sewer / drain running south-east;

- Mature trees were present around the shed in the north-eastern area of the site and alongside the eastern and southern boundaries;
- The tarmac driveway at the site entrance sloped at a downward gradient from the road onto a gravel area;
- The site is set within a mixed residential / agricultural area;
- Land to the north of the site supports Cowbit Village Hall, St Mary's Church and a residential area;
- Land to the east of the site supports open ground and a residential area;
- Land to the south of the site supports a residential area with Cowbit Park located south-west of the site;
- Land to the west of the site supports Barrier Bank and farmland; and
- Land in the wider area surrounding the site supports a number of small businesses set within a residential area and a new river (drain) running parallel west of Barrier Bank. This is surrounded by farmland and open fields.

The appendices contained in this report include a Site Location Plan (Drawing 002), Site Features Plan (Drawing 003) and a General Photographic Record (Drawing 004). A Site Investigation Plan is also presented (Drawing 005).

The description of the site provided above was taken following a relatively brief visit and should not be taken as a full and thorough description of all of the site's features, some of which may also have been obscured during our visit in inaccessible areas, hidden by vegetation etc.

Our original site 'walkover visit' was undertaken to inform the Phase 1 Report in 2022. In the intervening years the site has been demolished and 'cleared' to prepare a residential development platform, including the raising of topographical levels in far eastern areas and start of construction works in some areas.

2.0 SCOPE OF PHASE II INVESTIGATION

2.1 Potential Areas of Concern

The Phase I Report identified the following potential areas of concern at the site which would merit further inspection / investigation:

- Historic Livestock Barns;
- Made Ground (General Unknown Composition);
- Asbestos Sheeting and Debris;
- Western 'Storage Barn';
- Eastern 'Storage Barn';
- Mounds;
- 'U' Shaped Structure (possible used for burning materials);
- Suspected Tank / Storage Area;
- Barrier Bank (off-site, possible ground gas source).

Elemental GI Ltd agree that the potential sources / contaminants listed above are reasonable and should remain unchanged. Whilst the site has been demolished and 'cleared' since 2022, the locations of the above features was readily identifiable.

2.2 Site Investigation Layout

The following exploratory holes have been positioned at the site:

Table 2.1: Site Investigation Layout

Potential Source / Issue	Exploratory Holes
General Site Coverage	ALL HOLES
Historic Barns	HTP01, WS04
Made Ground	ALL HOLES
Asbestos Sheeting / Debris	WS01 to WS03
Western 'Barn'	WS06, WS07
Eastern 'Barn'	WS01, WS02
Mounds	WS04, WS05
'U' Shaped Structure	WS05
Suspected Tank / Storage Area	WS07
Barrier Bank	WS06
Ground Gas Monitoring Wells	WS02, WS03, WS06

Further to the works listed above, 3 No. additional 'delineation positions' designated HS-1 to HS-3 were completed around location WS04. These are discussed later in this report.

Whilst all reasonable efforts will be made to ensure sufficient coverage of the site / potential areas of concern, it should be noted that ground conditions may vary between exploratory

positions. The reader is referred to the terms, conditions and notes which are presented at the end of this report in relation to its potential limitations.

All arisings shall be inspected following completion of each exploratory hole, and samples will be selected for analysis on the basis of their appearance (including visual or olfactory evidence of contamination). Elemental GI Ltd shall arrange for samples to be delivered to a suitably accredited laboratory for subsequent testing.

Samples shall be tested for a general range of contaminants (in accordance with NHBC Standards Chapter 4.1 'Land Quality - managing ground conditions' and CLR 8 'Potential Contaminants for the Assessment of Land' (withdrawn but used for reference purposes where applicable)). Where appropriate they shall also be analysed for specific / targeted analyses, and at the subject site this shall include (but may not be limited to):

- Heavy Metals;
- Polycyclic Aromatic Hydrocarbons (PAHs);
- Phenols;
- Ph;
- Total Petroleum Hydrocarbons (TPH);
- Pathogenic Bacteria; and
- Asbestos.

3.0 SITE INVESTIGATION WORKS

3.1 Completion of Works

The recent site investigation works were completed by Elemental GI Ltd in general accordance with BS 5930:2015+A1: 2020.

A large sewer runs across the eastern / central area of the site, running in a north-west to south-east direction, and recently laid utilities are present in some other areas. A temporary easement was therefore imposed upon all works within the immediate vicinity of these features (where detected / recorded) as a precautionary measure. The Client has created initial dwelling construction areas, into which access was not possible at the time of our investigation. Some stockpiles are present on site which obscured access to some areas. Exploratory holes which were proposed in the vicinity of these features were re-positioned to alternative locations nearby.

3.2 Site Investigation Details

The exploratory holes were completed by Elemental GI Ltd at the site as listed in Table 2.1 (above). These were completed to a maximum total depth of 4.00m below existing ground level (begl). Table 3.1 (below) presents a summary of the works completed:

Table 3.1: Site Investigation Summary

Exploratory Hole(s) ID	Maximum Final Depth (m)	Notes
WS01 to WS07	4.00	Window Sampler Drilling Locations
WS02, WS03, WS06	4.00	Window Sampler Drilling Locations Completed as Monitoring Wells
HTP01	0.40	Hand-Dug Trial Pits

As mentioned in the previous section; further to the works listed above, 3 No. additional 'delineation positions' designated HS-1 to HS-3 were completed around location WS04. These are discussed later in this report.

A copy of the exploratory hole records from these works is presented in Appendix VI.

4.0 GEOTECHNICAL ASSESSMENT

4.1 General Ground Conditions

4.1.1 Made Ground

Made ground was encountered in all areas of the site to a maximum total depth of 1.90m below existing ground level (begl). This generally comprised either recently placed soft landscaped topsoil materials (generally brown sandy silty topsoil), or reworked granular materials which included fragments of brick and clinker.

The recent investigation has provided a 'snapshot' of the made ground materials but should not be taken as a full and complete description of all made ground materials which may be present on site. Such materials must therefore be investigated and classified / categorised fully by specialists undertaking their own works at the site (including but not limited to remedial works and geotechnical / groundworks) in advance of any estimates, works etc. so that the full composition of these materials can be understood by them to their own satisfaction (and to allow them to prepare a scheme of re-use and / or a schedule (including costings) for waste disposal purposes.). We cannot accept responsibility for ground conditions that have not been revealed by the exploratory holes, or which occur between / beneath them.

4.1.2 Topsoil

Topsoil was not encountered in any of the exploratory holes completed during the recent investigation, although reworked topsoil was present at some locations which may be visually / aesthetically suitable for retention / re-use if proven 'clean'.

4.1.3 Natural Soils / Bedrock

The natural soils at the subject typically comprised brown and grey silty sand or sandy silt soils. Bands of peat were noted at most locations.

4.1.4 Groundwater and Stability

Water was recorded at the following locations:

- WS01: Water encountered at 1.54m depth during drilling.
- WS02: Water encountered at 1.71m depth during drilling.
- WS03: Water encountered at 1.90m depth during drilling.
- WS04: Water encountered at 1.04m depth during drilling.
- WS05: Water encountered at 0.92m depth during drilling.
- WS06: No water encountered during drilling.
- WS07: Water encountered at 1.07m depth during drilling.

Return visits undertaken to site so far have recorded water ranging from 1.02m to 1.95m begl in monitoring wells.

Based on the above, it is considered likely that dewatering or other forms of water management are likely to be required for shallow short term excavations at the site. Surface, perched water or groundwater should not be allowed to collect within excavations.

In general, the exploratory holes which were recently completed as part of our investigation remained stable for the short time which they were left 'open'. However, very poor stability was noted in some exploratory holes at the site following their completion, which should be considered carefully in the context of health and safety and trench support as part of all future construction works (see Exploratory Hole records presented in Appendix VI for further information).

4.2 Geotechnical Laboratory Testing

Geotechnical laboratory testing was beyond the remit of the works described in this report.

4.3 *In Situ* Testing

In situ testing was beyond the remit of the works described in this report.

4.4 Geotechnical Considerations

Geotechnical recommendations are beyond the remit of the works described in this report.

4.5 Foundation Recommendations

Foundation recommendations are beyond the remit of the works described in this report.

5.0 ENVIRONMENTAL ASSESSMENT

5.1 Selection of Screening Values

The current UK screening values for the comparison of soil test data are presented by DEFRA within their 'Category 4 Screening Levels' (C4SLs). This includes screening values for a selected range of end-uses for 6 No. determinands, and is supplemented by the CL:AIRE 'Phase 2 C4SLs', which provide screening values for a selection of additional determinands. These screening values have been derived using an LLTC and are used as the primary comparison for risks from determinands within soil samples from the site. Where appropriate we have also reviewed and utilised screening values from other authoritative parties (e.g. LQM, CIEH etc.) who have calculated further screening values for additional determinands, although it is noted that these providers typically generate screening values which are based upon health criteria values (HCVs; as opposed to LLTCs) which represent a lower (minimal) risk level and are therefore more conservative.

At this stage screening values which assess the concentrations of determinands in comparison to a residential with plant uptake end-use have been adopted, which is considered to be appropriate for the proposed end-use at the site. However, alternative screening values (e.g. Public Open Space 1 or 2) may also be used where appropriate.

5.2 Environmental Laboratory Testing

Soil samples from the site were retrieved and submitted for laboratory analysis in accordance with Section 2.2 and Table 2.1 of this report.

Laboratory testing certificates are presented in Appendix VII, with Table 5.1 (overleaf) presenting a summary of the initial test data alongside the delineation testing data.

Table 5.1: Initial Laboratory Analysis of Soil Samples

Analyte	Concentrations Detected (mg/kg)	Screening Values (mg/kg)	No. of Samples	No. of Exceedances
Arsenic	6.6 - 17.7	37.0 ^b	7	0
Cadmium	<1.6*	11.0 ^b	7	0
Chromium (Total)	33.6 - 59.4	910.0 ^b	7	0
Chromium VI	<0.04*	6.0 ^b	7	0
Lead	26.4 - 175.4	200.0 ^a	7	0
Selenium	<3.0*	250.0 ^b	7	0
Nickel	16.4 - 28.6	130.0 ^b	7	0
Copper	22.9 - 52.9	2400.0 ^b	7	0
Zinc	73.7 - 358.8	3700.0 ^b	7	0
Mercury	<0.7 - 0.9	1.2 ^b	7	0
Benzo(a)pyrene	<0.02 - 52.92	2.2 ^b	10	3
Dibenzo(a,h)anthracene	<0.02 - 7.08	0.24 ^b	10	4
TPH Aliphatic EC ₅ -EC ₆	<0.01*	42.0 ^b	4	0
TPH Aliphatic EC ₆ -EC ₈	<0.01*	100.0 ^b	4	0
TPH Aliphatic EC ₈ -EC ₁₀	<0.01*	27.0 ^b	4	0
TPH Aliphatic EC ₁₀ -EC ₁₂	<1.0*	130.0 ^b	4	0
TPH Aliphatic EC ₁₂ -EC ₁₆	<0.5*	1100.0 ^b	4	0
TPH Aliphatic EC ₁₆ -EC ₃₅	<3.0*	65000.0 ^b	4	0
TPH Aromatic EC ₅ -EC ₇	<0.01*	70.0 ^b	4	0
TPH Aromatic EC ₇ -EC ₈	<0.01*	130.0 ^b	4	0
TPH Aromatic EC ₈ -EC ₁₀	<0.01*	34.0 ^b	4	0
TPH Aromatic EC ₁₀ -EC ₁₂	<0.6*	74.0 ^b	4	0
TPH Aromatic EC ₁₂ -EC ₁₆	<1.0*	140.0 ^b	4	0
TPH Aromatic EC ₁₆ -EC ₂₁	<4.5*	260.0 ^b	4	0
TPH Aromatic EC ₂₁ -EC ₃₅	<2.0*	1100.0 ^b	4	0
Benzene	<0.001*	0.087 ^b	1	0
Toluene	<0.001*	130.0 ^b	1	0
Ethylbenzene	<0.001*	47.0 ^b	1	0
Xylenes (sum of isomers)	<0.001*	56.0 ^b	1	0
SVOC	<DL	Varies ^d	1	0
VOC	<DL	Varies ^d	1	0
Pathogenic Bacteria	<DL	N/A	2	0
Asbestos	ND	D ^c	3	0

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

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

^c Elemental GI Ltd general screening level;

^d Contaminants all recorded below laboratory limits of detection; and

DL = Detection Limits, N/A = Not Applicable, ND = Not Detected, D = Detected.

Table 5.1 has identified the following exceedances in relation to the selected screening values (residential with private gardens):

- 3 No. exceedances of benzo(a)pyrene:
 - Samples from WS04 of made ground at 0.1m begl;
 - Samples from delineation positions (3 No.) surrounding WS04 designated HS-1 and HS-3;
- 4 No. exceedances of dibenzo(a,h)anthracene:
 - Samples from WS04 of made ground at 0.1m begl;
 - Samples from delineation positions (3 No.) surrounding WS04 designated HS-1 to HS-3.

The initial investigation identified exceedances from samples taken from location WS04 at 0.1m begl. Made ground was recorded to extend to a depth of 0.45m begl in this area of the site (based on records from WS04). Further samples (HS-1 to HS3) were taken approx. 3.0m from the location of WS04 at the same depth and were tested for PAHs. Most of these delineation positions also recorded exceedances of PAHs, indicating that a small ‘hotspot’ is not present and that a wider area of impacted soils / made ground is within this area of the site.

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

This report has been summarised and presented to allow the reader and other professionals / stakeholders to view the most important points easily. However, some important notes and precautions apply, and these are presented in the ‘terms and conditions’ section of this report. These are not standard caveats, and they include important points which should be followed carefully within the context of this report.

The above testing included 2 No. soil samples taken from near / beneath the suspected livestock barns. No bacteria in excess of the detection limits were reported.

5.3 Sulphate Classification

Beyond the remit of the works described in this report.

5.4 Statistical Assessment

Statistical assessment of soil test data is only appropriate where a sufficient sample population is present. This requires a minimum number of soil samples from the same averaging zone. The data currently available for the subject site is not considered to be suitable for statistical assessment as the results may not prove reliable. As a conservative

alternative the direct comparison of soil test data to the selected screening values (as outlined in the sections above) shall be adopted at this stage.

5.5 Radon and Ground Gas

The site is not recorded to be within an area which is at risk from radon. Radon protective measures are not required for new structures at the site, subject to regulatory / warranty provider approval.

Within our Phase 1 Report the following was noted with regards to the ground gas conceptual site model (CSM):

“At this stage the following potential sources of ground gas have been identified:

- Made ground which may be present beneath and around previous structures and current structures;*
- Peat layers that may be present within the superficial deposits underlying the site and nearby; and*
- Organic materials which may have accumulated beneath and around the nearby watercourse.*

Following a review of the site’s geological setting, the following potential pathways have been identified for additional consideration:

- Granular made ground, which may permit the free lateral migration of ground gas in the local area; and*
- Services may be present beneath and around the site which may form a preferential pathway for ground gas migration.*

With regards to the proposed end-use at the site (as described in Section 1.0), residential end-users and the structures within which they will live have been considered as the main potential receptors at the site.

From the above it has been provisionally concluded that feasible sources, pathways and receptors may exist at / around the site. This provisional pollutant linkage has been considered alongside the following potential mitigating factors:

- The presence of underlying cohesive soils may inhibit the migration of ground gas; and*
- Shallow disturbed made ground was visible and this was not observed to contain any wood, organic materials or other putrescible degradable materials.”*

Our Phase 2 works investigated this CSM through the installation of 3 No. monitoring wells and a ground gas monitoring exercise was commissioned by the Client to assess potential risks further.

5.5.1 Monitoring Wells

Monitoring wells were installed at locations WS02, WS03 and WS06. The positions of these are shown on the Gas Well Monitoring Plan (Drawing 003).

The site's CSM indicated various potential sources and therefore general response zones were proposed in each of the wells, typically extending from 1.0m to the base of each hole. This was considered sufficient for initial assessment purposes.

5.5.2 Ground Investigation Findings (Sources)

The Phase 2 investigation encountered peat within most boreholes at variable depths.

The CIRIA C665 document describes peat sources as follows:

“Methane from these sources is produced by the microbial decay of organic material under anaerobic conditions, usually waterlogged vegetation. Carbon dioxide is usually produced by acid reaction on carbonate fraction in any alluvial soil, and also generated by methane oxidation. Trace gases include hydrogen sulphide and light hydrocarbons. Methane can migrate large distances through soils.”

It was considered likely that the peat that was encountered during the investigation was likely to act as a ground gas source. It was also suspected that these natural peat layers (which were typically saturated) may contain groundwater which contains high concentrations of dissolved methane, which may be volatilising from water within the monitoring wells and accumulating in the pore spaces within the unsaturated zone(s) and within the well's own voids, leading to high methane readings.

5.5.3 Ground Investigation Findings (Groundwater)

Water was recorded at the following locations during our Phase 2 investigation:

- WS01: Water encountered at 1.54m depth during drilling.
- WS02: Water encountered at 1.71m depth during drilling.
- WS03: Water encountered at 1.90m depth during drilling.
- WS04: Water encountered at 1.04m depth during drilling.
- WS05: Water encountered at 0.92m depth during drilling.
- WS06: No water encountered during drilling.
- WS07: Water encountered at 1.07m depth during drilling.

Return visits undertaken to site as part of our monitoring recorded water ranging from 1.02m to 1.95m begl in monitoring wells.

None of the monitoring wells were recorded to have ‘flooded’ response zones during any of the monitoring visits, although it is noted that water levels were in close proximity to ‘flooded’ levels during several visits.

It was noted that the groundwater elevations are shallow and variable at the site, with variable flows also noted during some visits. It was considered likely that a ‘piston effect’ was occurring, which temporarily increases flow rates. This is described in the CIRIA C665 document as follows:

“The groundwater level is typically routinely recorded during the monitoring. However, the significance of the groundwater is not always fully appreciated. If the water table is particularly high or varies greatly, there is the potential for the water to rise above the response zone. This can prevent the ingress of soil gas into the well. The lack of concentrations in the well can subsequently give false readings.

A rising groundwater level can cause an increase in gas concentration. Rising groundwater will reduce the pore space in which the soil gas exists. The soil gas will be displaced upwards causing the soil gas to migrate upwards and be released from the ground into the atmosphere, or into buildings or boreholes (the piston effect).”

5.5.4 Gas Monitoring Results

A copy of our gas monitoring records taken to date is presented in Appendix VIII.

6 No. ground gas monitoring visits were undertaken at the site. These visits were completed from the 5th June 2024 to 10th July 2024.

The atmospheric pressures recorded during the monitoring periods ranged from 1016mb to 999mb, including 2 No. visits during periods of ‘falling’ pressure.

The following results were recorded:

Table 5.2: Summary of Gas Monitoring Data

Exploratory Hole:	Maximum Flow (l/hr)		Max. Methane (CH ₄) % v/v		Max. Carbon Dioxide (CO ₂) % v/v		Min. Oxygen (O ₂) % v/v	
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady
WS02	0.0	0.0	0.0	0.0	11.8	11.8	8.0	8.0
WS03	0.0	0.0	0.0	0.0	6.8	6.8	13.0	13.0
WS06	48.9	3.9	68.4	15.6	14.0	3.4	0.0	16.4
OVERALL	48.9	3.9	68.4	15.6	14.0	11.8	0.0	8.0

In addition to the above, hydrogen sulphide (H₂S) and carbon monoxide (CO) were observed during all monitoring visits. Maximum concentrations of 0ppm (zero) and 0ppm (zero) were recorded respectively.

5.5.5 Consideration of ‘Peak’ and ‘Steady’ Readings

CIRIA C665 recommends the following in relation to ‘peak’ and ‘steady’ readings:

“It is common to get an initial high reading (peak) followed by a lower reading. This suggests that a small volume of higher concentration gas is present. Both the peak and steady reading should be recorded.”

And

“If very high readings are recorded on the monitoring equipment it is worth monitoring the well for a longer period (up to 10 minutes) to determine if the concentrations are related to build up of gas in the well (for example from a pocket of methane within a layer of alluvium) or are being constantly replenished by methane or carbon dioxide from the soil. The readings over time should be recorded on the gas monitoring sheets.”

Because extended monitoring (up to 20 minutes) indicates that gas flow rates and soil gas concentrations decrease significantly and remain ‘steady’ at much lower levels, it is not considered appropriate to use ‘peak’ data within the following risk assessments and calculations.

5.5.6 Gas Screening Values (GSVs) and C665 Thresholds

With reference to the C665 initial thresholds, from the table above it can be seen that methane commonly exceeded 1.0% at location WS06, and carbon dioxide commonly exceeded 5.0%.

The following initial volumetric flow rates have been calculated for the monitoring wells at the site based on ‘steady’ monitoring well readings:

Table 5.3: Summary of Calculated GSVs

Exploratory Hole:	Maximum Flow (l/hr)	GSV for Methane (CH ₄) (l/hr)	GSV for Max. Carbon Dioxide (CO ₂) (l/hr)
WS02	0.0	0.00	0.00
WS03	0.0	0.00	0.00
WS06	3.9	0.61	0.13
ALL HOLES	3.9	0.61	0.46

With reference to tables 8.5 and 8.7 of CIRIA 665 it is noted that the ‘CS1 to CS2’ GSV thresholds for carbon dioxide and methane are not exceeded at locations WS02 or WS03.

However, the GSV's for all holes (i.e. a site-wide worst case scenario) are exceeded. None of the GSVs exceed the 0.7 l/hr C665 threshold for a 'CS2 to CS3' increase.

WS06 exhibits the highest GSVs when each monitoring well is reviewed separately, with GSVs of 0.61l/hr and 0.13 l/hr generated for methane and carbon dioxide respectively.

5.5.7 Ground Gas Data Review

Current ground gas guidance strongly recommends that classification based solely upon gas concentrations and / or GSVs are typically inaccurate and do not represent 'best practice'. A more refined and detailed assessment which considered these data within the site's CSM and in conjunction with other evidence is encouraged.

The recent NHBC guidance (2023) recommends that *"Plotting gas concentrations on ternary plots can be useful in verifying that the data fits with the identified gas sources in the conceptual model. The ternary plot can help determine the signature of the gas."*

Ternary plots have been generated for the ground gas monitoring data at the site over all 6 No. visits, and copies are enclosed. Reference to the tables presented in the NHBC guidance (specifically Figure 3.2) indicates that the majority of the gas data from the site is within the zones described as being from natural / biological degradation and respiration. This assessment is considered to support the current assumption that the ground gas source at the site is likely to be the natural decomposition / degradation of organic materials (specifically peat).

5.5.8 Ground Gas Classification

As discussed above, current ground gas guidance and 'best practice' recommends that the final classification for a site should not be wholly based upon the calculated GSVs, but should instead be based upon the site's CSM, which use GSVs alongside other information / evidence to establish a suitably safe judgement by the assessor on a suitable GSV (or combination of GSVs) for the site.

At this stage the following factors have been considered:

- Significant potential sources of gas / vapour have not been identified within made ground at the site;
- Investigation of the ground did record potentially significant putrescible materials in the boreholes completed comprising multiple layers of peat at most locations;
- Typically cohesive soils are present above the peat layers which would typically inhibit migration. However a piled foundation solution has been adopted at the site which may provide a preferential pathway for methane to migrate;

- Depleted oxygen has been recorded, which should be considered in relation to risks to future site users and construction workers (particularly in underground chambers / trenches etc.);
- The monitoring has recorded positive gas flow rates at some locations although flow rates are generally 'low'.

A 'CS2' designation would be provisionally assigned to the monitoring locations based on the ground gas readings taken to date. However, whilst the thresholds provided in C665 (carbon dioxide concentration, methane concentration, borehole flow rate and volumetric flow rate) are not at levels sufficient to warrant a 'CS3' classification in isolation (based solely on the GSVs, which is discouraged by the current guidance), the CIRIA guidance strongly recommends considering increases to CS3 (or beyond) where significant exceedances of these thresholds are noted. Increases in monitoring duration (or other investigative / analytical techniques) are also recommended where significantly elevated concentrations of ground gas and / or flow rates are detected and when increased confidence in the data / calculations / model is required. For example, Box 8.1 of C665 presents a hypothetical site ('Example 3') where methane is at 14% v/v and flow rates are at 2.5l/hr (we note that these levels are not dissimilar to those recorded on the subject site). In this example C665 recommends that a CS2 classification would apply based solely on the GSV, although the concentration of methane detected would justify consideration of CS3 (NB in this example the receptor is a commercial / industrial unit which is of lower sensitivity than the proposed residential end-use at the subject site), noting that *"The further considerations will typically take into account factors such as the flow rate, the robustness of the data, the source characteristics and the specifics of the development (e.g. foundation conditions, footprint size...."*.

At this stage it is considered that the significant exceedance of the initial 1% threshold for methane at location WS06 is sufficient to warrant a provisional increase to CS3 for all plots around this location (effectively encompassing all structures apart from those shown along the site's eastern boundary).

In accordance with CIRIA C665 (and other guidance) it is noted and acknowledged that high concentrations of gas have been detected, and therefore commensurately 'high' levels of confidence are required in the accompanying classification / assessment. C665 recommends that a total of 12 visits are appropriate over a period of 6 months for a 'moderate' source and that the installation of additional wells (i.e. with specific / targeted response zones) may be required (subject to regulator and warranty provider approval). However, it is also recommended that the Client may wish to consider *in situ* / continuous monitoring which may allow a more rapid assessment to be completed for the site.

It is therefore noted that the above classifications are provisional and are subject to final classification based on any further ground gas monitoring data at the site and are subject to regulatory and warranty provider approval.

For clarity, ground gas protection measures equivalent to a **CS2** classification are likely to be required for structures shown along the site's eastern boundary, and ground gas protection measures equivalent to a **CS3** classification are likely to be required for all other structures at this stage. In accordance with the current guidance, further assessments / data may be required to justify the above classifications to the satisfaction of the c and therefore the installed monitoring wells must be fully protected from damage until completion of all works and full approval from the regulator and warranty provider is received.

5.5.9 Ground Gas Protection Measures

Specific ground gas protection measures should be formally described in a Ground Gas Pre-Verification Report which shall confirm details relating to these works including (but not limited to):

- General protection elements for both CS2 and CS3 classifications;
- Details of Gas Protection Measures Materials including:
 - Membrane Specifications;
 - Service Penetration Seal Proposals;
 - Design Drawings Showing Ventilation of Void;
 - Design Drawings Showing Membrane Across Floor and Cavity;
- 'Points Required' for Both CS2 and CS3 Classifications in Accordance with British Standard 8485:2015+A1:2019.

However, at this stage it is considered likely that both CS2 and CS3 classifications shall require the following as a minimum:

- Clear and well-ventilated sub-floor void;
- Adequate venting of external and 'sleeper' walls sufficient to allow free movement of air beneath each structure;
- Professional installation of an appropriate (i.e. BS8485 compliant) membrane (lapped and taped) across the footprint of all structures, being extended through each cavity in accordance with latest guidance (e.g. NHBC design recommendations);
- Full sealing of all service penetrations / exits with suitable details;
- Inspection and verification of all gas protection measures by a suitable third party:
 - NB robust comprehensive testing (e.g. air lancing or similar) is likely to be required.

6.0 UPDATED CONCEPTUAL SITE MODEL

The initial CSM was formed to set a basis for the assessment and investigation across the subject site. This has been used to provide focus and direction for certain parts of the site investigation works, and the data gathered from these works (including laboratory analyses and visual / olfactory observations) can now be used to update the CSM.

6.1 Human Health CSM

Historic maps show that the site supported a small number of structures from 1887 on part of 3 No. fields / gardens. It was shown to become a single defined area with more structures developed from the 1970's onwards. The structures at the site were recently demolished to support the ongoing residential redevelopment works.

An area of possible / potential historic fuel storage was noted in the western area of the site. The structures / barns in the eastern area of the site were shown to have housed livestock. Other structures on the site were shown to be used for storage of various materials. A 'U' shaped structure in the centre of the site was used to burn materials.

The site is situated on superficial deposits and on bedrock which are classified as an 'Unproductive Aquifer'. The site is not recorded to be within a Source Protection Zone. There are no entries relating to abstractions within a 500m radius of the site. Abstractions for potable water are not recorded locally. There are 9 No. surface water features within a 250m radius of the site relating to small watercourses.

The site appears to be situated within an area of low sensitivity in relation to controlled waters.

The laboratory testing of soils indicated the following exceedances in relation to the selected screening values (residential with private gardens):

- 3 No. exceedances of benzo(a)pyrene:
 - Samples from WS04 of made ground at 0.1m begl;
 - Samples from delineation positions (3 No.) surrounding WS04 designated HS-1 and HS-3;
- 4 No. exceedances of dibenzo(a,h)anthracene:
 - Samples from WS04 of made ground at 0.1m begl;
 - Samples from delineation positions (3 No.) surrounding WS04 designated HS-1 to HS-3.

In accordance with our standard risk assessment methodology (presented at the end of this report), the following sources, pathways and receptors have been identified at the subject site at this stage:

Table 6.1: Updated Human Health CSM

<i>Investigated Onsite Sources</i>	Pathways	Receptors	Comment / Risk Rating [#]
Historic Livestock Barns	- Leaching - Direct Contact - Plant Uptake - Ingestion - Dust Inhalation	- End Users - Groundwater	Risks ABSENT Pathogenic Bacteria not recorded during investigation works
Made Ground (General)	- Leaching - Direct Contact - Plant Uptake - Ingestion - Dust Inhalation - Ground Gas Migration	- End Users - Groundwater	LOW / MODERATE Elevated PAHs Recorded around WS04
Asbestos Sheeting and Debris	Dust Inhalation	End Users	Risks ABSENT Contamination not recorded during investigation works
Storage Barns	- Leaching - Direct Contact - Plant Uptake - Ingestion - Dust Inhalation - Ground Gas Migration	- End Users - Groundwater	Risks ABSENT Contamination not recorded during investigation works
Mounds	- Leaching - Direct Contact - Plant Uptake - Ingestion - Dust Inhalation	- End Users - Groundwater	Risks ABSENT Contamination not recorded during investigation works
'U' Shaped Structure / Bonfires	- Leaching - Direct Contact - Plant Uptake - Ingestion - Dust Inhalation	- End Users - Groundwater	Risks ABSENT Contamination not recorded during investigation works
Suspected Fuel Tanks (TPH)	- Leaching - Direct Contact - Plant Uptake - Ingestion - Dust Inhalation - Ground Gas / Vapour Migration	- End Users - Groundwater	Risks ABSENT Contamination not recorded during investigation works
<i>Investigated Offsite Sources</i>			
Barrier Bank	Ground Gas Migration	End Users	Risks ABSENT Ground Gas Recorded but Considered to be From Other Source (See Below / Section 5.5)

[#] Risk ratings are described in Table A1 within the 'Standard Risk Assessment - Considerations and Methodology' section at the end of this report.

Please note that gas-specific risks are addressed in section 5.5.

6.2 Potential Pollutant Linkages:

For an identified / confirmed pollutant linkage to be present, potential sources, pathways and receptors must be present. With reference to the proposed end use, feasible potential pollutant linkages have been identified at the site as outlined in table 6.1 above. Remediation works are therefore considered necessary to break these linkages to the satisfaction of the Client and regulatory authorities (and other parties, as appropriate e.g. NHBC).

6.3 Controlled Waters Summary

The site is situated on superficial deposits and on bedrock which are classified as an 'Unproductive Aquifer'. The site is not recorded to be within a Source Protection Zone. There are no entries relating to abstractions within a 500m radius of the site. Abstractions for potable water are not recorded locally. There are 9 No. surface water features within a 250m radius of the site relating to small watercourses.

Significant / mobile contaminants have not been recorded within soils at the site, with the exception of 1 No. potential PAH hotspot in shallow made ground. At this stage significant risks to controlled water have not been recorded / identified.

6.4 Model Status and Uncertainty

The potential significant linkages discussed in this section are based on available data reviewed to date.

7.0 RECOMMENDATIONS

A review of the available site information (as discussed herein) has been undertaken to inform the following conclusions and recommendations. However, this report should be submitted to the appropriate regulators (and other stakeholders, as necessary) by the Client prior to the start of any irrecoverable works associated with the site.

7.1 Foundations and Enabling Works

Foundation recommendations are beyond the remit of the works described in this report.

7.2 Groundwater

Water ingress was noted typically between 1.0m and 2.0m begl during the recent site works. A shallow groundwater regime appears to be present at the site at this stage.

Return visits undertaken to site so far have recorded water ranging from 1.02m to 1.95m begl in monitoring wells.

At this stage it is considered likely that dewatering (or similar) is likely to be required for further excavations across parts of the subject site during remaining construction.

7.3 Road Construction

Road construction recommendations are beyond the remit of the works described in this report.

7.4 Drainage

Drainage recommendations are beyond the remit of the works described in this report.

7.5 Radon and Ground Gas

The site is not set within an area which is known to be at risk from radon gas and therefore no precautions are necessary, subject to regulatory approval.

A ground gas monitoring programme has been commissioned for the site. Significant concentrations of ground gas have been recorded and therefore ground gas protection measure will be recommended for all future structures, subject to regulatory approval and completion of the final monitoring visits and associated works. Please see section 5 for further information.

7.6 Excavations

In general, the exploratory holes which were recently completed as part of our investigation remained stable for the short time which they were left 'open'. However, very poor stability was noted in some exploratory holes at the site following their completion, which should be considered carefully in the context of health and safety and trench support as part of all

future construction works (see Exploratory Hole records presented in Appendix VI for further information). All future excavations should therefore be assumed to be unstable as a conservative and risk-averse measure. The Client and / or site operators should assess risks associated with entry into excavations based upon these observations and should apply suitably safe working practices / support measures (in accordance with current best practice / guidance) to avoid risks to site workers / construction activities.

7.7 Contamination

The Phase II Conceptual Model and the Qualitative Risk Assessment outlined herein indicate that feasible pollutant linkages have been identified. This relates to elevated concentrations of various PAH compounds surrounding location (WS04) in shallow made ground.

Any future construction works within this area of the site should fully consider the risks from cross-contamination and creation of 'pathways'.

7.8 Remediation

Remediation works to protect human health are considered necessary. The Client has informed us that levels are to be raised in areas of the site surrounding WS04 and therefore it has been agreed that made ground shall be removed locally so that at least 1000mm of 'clean' soils are placed above all soft landscaped areas. This will include the front garden of Plot 5 and the rear garden of Plot 2, subject to Regulatory Authority / NHBC (or similar) approval.

A Remedial Method Statement (RMS) is likely to be required by planners and warranty providers to specify detailed steps through which the remediation shall be completed.

The movement of all materials on site must be fully tracked and recorded so that the fate of any remediated materials can be accurately recorded. All remediation proposals should be approved by the Regulatory Authority / NHBC (or similar) approval in advance of the start of any / all such works.

7.9 Topsoil / Management of Materials

Topsoil was not encountered in most areas of the site during the recent investigation, and importation of additional topsoil is therefore considered likely to be necessary.

As with all schemes / sites, all movements of all soils and similar materials (including their re-use on site, importation and exportation) must be undertaken in full compliance with all relevant licenses / permits / exemptions etc. as applicable (i.e. U1, MMP etc) and with all necessary regulatory permissions. These must be in place before any works take place. We would particularly draw your attention to the recently released Environment Agency guidance "*Excavated waste from utilities installation and repair: RPS 211 Updated 28 April 2023*".

Retrospective implementation of all such applications may not be permitted and therefore this should be established by the Client prior to the start of construction works.

Any soils which are brought onto site should be suitably tested and approved by the Local Authority in advance (this may include classification of 'topsoil' against standards such as BS3882: 2015 'Specification for Topsoil').

7.10 Mining

No mining issues have been identified at the site at this stage, subject to regulatory authority approval.

7.11 Further Works

Further works have been recommended in this report, including the following main recommendations:

- Production of a Remedial Method Statement (RMS) confirm remediation requirements across the site;
- Completion of final ground gas monitoring / assessment works and confirmation of ground gas classification to the satisfaction of the Local Authority and Warranty Providers;
- Where soils are to be removed from site for disposal it is recommended that these are fully characterised (i.e. to confirm material types and disposal options) and that advice is sought from the appointed contractors to determine any requirements for specific testing etc.

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.

Elemental GI Ltd - Our Standard Risk Assessment Approach

We have used various guidelines and current legislation in the preparation of this report. This includes (but is not limited to) 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 'Land contamination risk management (LCRM)' (2020, last updated April 2021) held at:
 - <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>

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, common pathways including (but not limited to) the following have been considered (amended on a site-specific basis):

- 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.

Receptors will be considered on a site-specific basis, but will usually include the current / future users of the site itself as well as users of surrounding sites. Other receptors including controlled waters will also be considered and assessed.

Risk Assessment Methodology

Our risk assessment methodology is based upon a phased approach which is created through the construction of the sites conceptual site model, and which takes the following steps (taken from LCRM Guidance):

1. *Identify the hazard - establish contaminant sources.*
2. *Assess the hazard - use a source-pathway-receptor (S-P-R) linkage approach to find out if there is the potential for unacceptable risk.*
3. *Estimate the risk - predict what degree of harm or pollution might result and how likely it is to occur by using the tiered approach to risk assessment.*
4. *Evaluate the risk - decide whether a risk is unacceptable.*

The meaning of the terms are:

- *hazard - a property or situation that in particular circumstances could lead to harm or pollution;*
- *risk - a combination of the probability, or frequency of occurrence of a defined hazard and the magnitude of the consequences of the occurrence;*
- *risk assessment - the formal process of identifying, assessing and evaluating the health and environmental risks that may be associated with a hazard;*
- *risk management - the formal process to identify, assess and determine the risks, and to select and take action to mitigate them.*

Our definitions and classification matrix for risk descriptions have been taken from the NHBC document “Guidance for the Safe Development of Housing on Land Affected by Contamination” (Ref. R&D P66, dated 2008)

Table A1: Risk Categorisation (Adapted from Table 1.8 of NHBC, R&D P66 (2008))

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

The R&D P66 document goes on to provide further descriptions of these risk levels, which are also reproduced below:

Table A2: Risk Level Descriptions (Adapted from Table 1.9 of NHBC, R&D P66 (2008))

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.

APPENDIX I

Proposed Site Layout Plan



CLIENT:



**EAST ANGLIAN
CIVILS LTD**

Commercial & Domestic Building & Groundworks

TITLE:

Proposed Site Layout Plan

DATE:

July 2024

DRAWING No:

E22131_001

SCALE@SIZE:

NOT TO SCALE

DESIGN/DRAWN:

JR

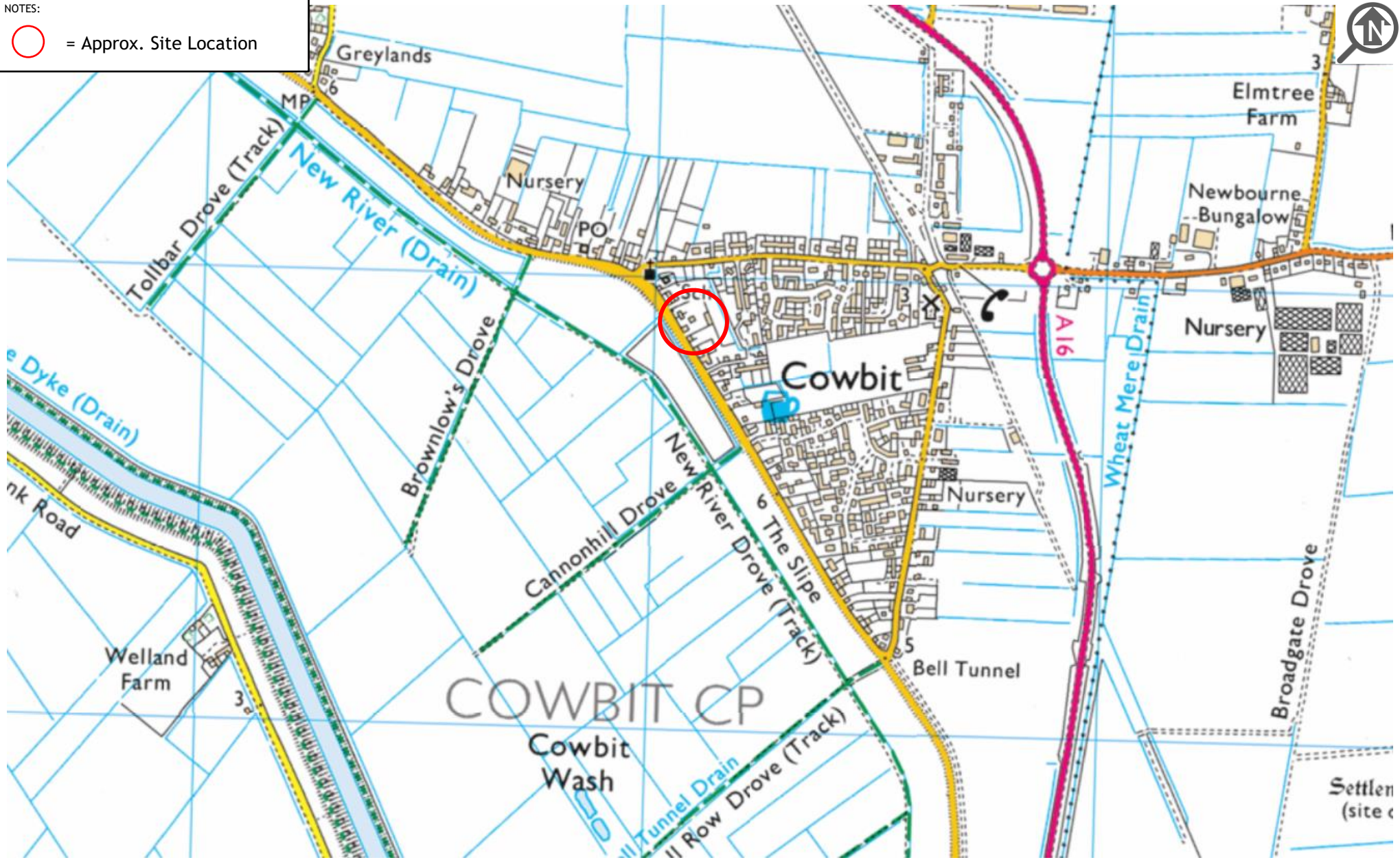
Elemental GI Ltd

APPENDIX II

Site Location Plan

NOTES:

 = Approx. Site Location



CLIENT:



TITLE:

Site Location Plan

DATE:

June 2024

DRAWING No:

E22131_002

SCALE@SIZE:

NOT TO SCALE

DESIGN/DRAWN:

JR

Elemental GI Ltd

APPENDIX III

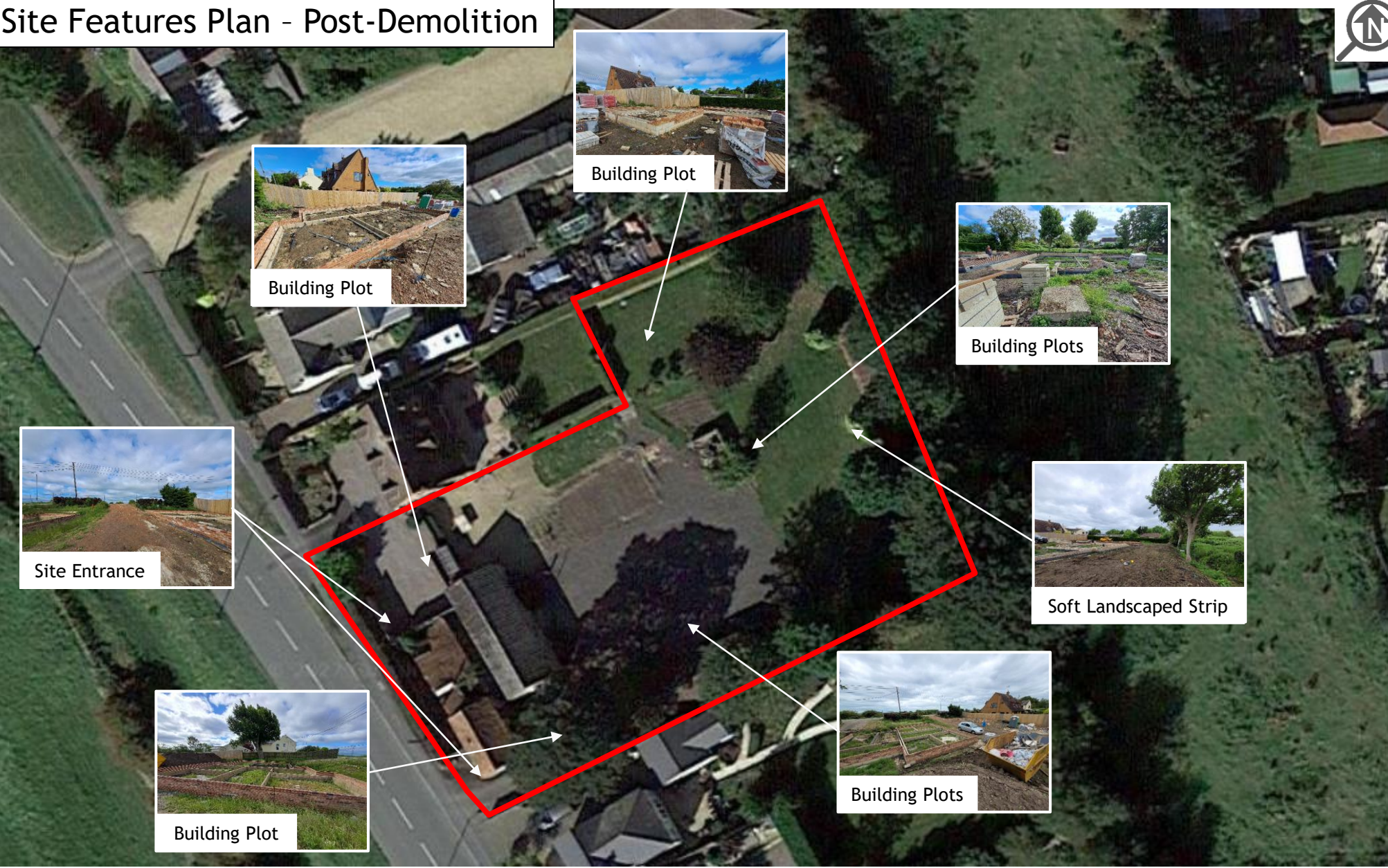
Site Features Plan

Site Features Plan - Pre-Demolition



CLIENT: EAST ANGLIAN CIVILS LTD Commercial & Domestic Building & Groundworks	TITLE: Site Features Plan - Pre-Demolition	DATE: June 2024 DRAWING No: E22131_003	SCALE@SIZE: NOT TO SCALE DESIGN/DRAWN: JR	Elemental GI Ltd
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Site Features Plan - Post-Demolition



CLIENT: EAST ANGLIAN CIVILS LTD Commercial & Domestic Building & Groundworks	TITLE: Site Features Plan - Post Demolition	DATE: June 2024 DRAWING No: E22131_003	SCALE@SIZE: NOT TO SCALE DESIGN/DRAWN: JR	Elemental GI Ltd
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APPENDIX IV

General Photographic Record



Photo 1 - Pre-Demolition Site from South-Eastern Corner.



Photo 2 - Pre-Demolition Site from South-Eastern Corner.



Photo 3 - Pre-Demolition Site from South-Eastern Corner.



Photo 4 - Pre-Demolition View of Entrance Road.

CLIENT:

EAC
EAST ANGLIAN
CIVILS LTD
Commercial & Domestic Building & Groundworks

TITLE:

General Site Photographs -
Pre-Demolition

DATE:

June 2024

DRAWING No:

E22131_004a

SCALE@SIZE:

NOT TO SCALE

DESIGN/DRAWN:

JR

Elemental GI Ltd



Photo 5 - Pre-Demolition Barn on Eastern Boundary.



Photo 6 - Pre-Demolition Barn on Eastern Boundary.



Photo 7 - Pre-Demolition Barn on Eastern Boundary.



Photo 8 - Pre-Demolition Barn on Southern Boundary.

CLIENT: EAST ANGLIAN CIVILS LTD Commercial & Domestic Building & Groundworks	TITLE: General Site Photographs - <u>Pre-Demolition</u>	DATE: June 2024 DRAWING No: E22131_004b	SCALE@SIZE: NOT TO SCALE DESIGN/DRAWN: JR	Elemental GI Ltd
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Photo 9 - Pre-Demolition Barn on Western Boundary.



Photo 10 - Pre-Demolition Yard/Suspected ACM Sheeting.



Photo 11 - Pre-Demolition Workshop.



Photo 12 - Pre-Demolition Suspected Former AST Base.

CLIENT:

EAC **EAST ANGLIAN**
CIVILS LTD
Commercial & Domestic Building & Groundworks

TITLE:

General Site Photographs -
Pre-Demolition

DATE:

June 2024

DRAWING No:

E22131_004c

SCALE@SIZE:

NOT TO SCALE

DESIGN/DRAWN:

JR

Elemental GI Ltd



Photo 13 - View Overlooking Site Entrance and Western Area of the Site.



Photo 14 - View Overlooking Eastern Area of the Site.



Photo 15 - View Overlooking Western Area of the Site.



Photo 16 - View Overlooking Northern Area of the Site.

CLIENT:

EAC
EAST ANGLIAN
CIVILS LTD
Commercial & Domestic Building & Groundworks

TITLE:

General Site Photographs -
Post-Demolition

DATE:

June 2024

DRAWING No:

E22131_004d

SCALE@SIZE:

NOT TO SCALE

DESIGN/DRAWN:

JR

Elemental GI Ltd



Photo 17 - WS06.



Photo 18 - WS07.



Photo 19 - WS07.



Photo 20 - WS06.

CLIENT:

EAC
EAST ANGLIAN
CIVILS LTD
Commercial & Domestic Building & Groundworks

TITLE:

General Site Photographs -
Post-Demolition

DATE:

June 2024

DRAWING No:

E22131_004e

SCALE@SIZE:

NOT TO SCALE

DESIGN/DRAWN:

JR

Elemental GI Ltd

APPENDIX V

Site Investigation Plan

- NOTES:
-  Approx. Site Boundary
 -  Approx. Location of Boreholes
 -  Approx. Location of Ground Gas Monitoring Wells
 -  Approx. Location of Hand Dug Trial Pits

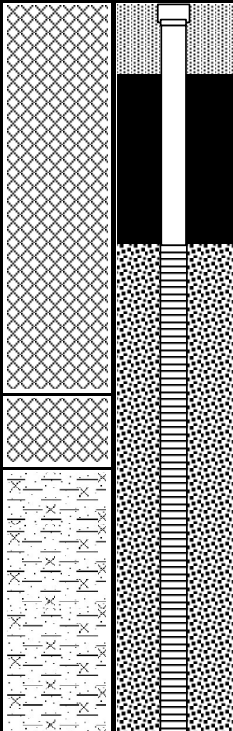


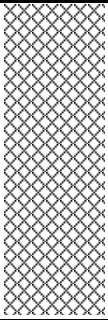
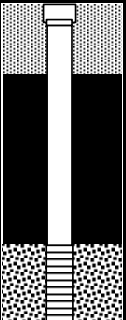
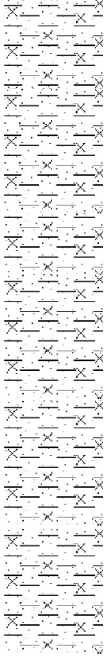
CLIENT:  EAST ANGLIAN CIVILS LTD Commercial & Domestic Building & Groundworks	TITLE: Exploratory Hole Layout Plan	DATE: June 2024 DRAWING No: E22131_005	SCALE@SIZE: NOT TO SCALE DESIGN/DRAWN: JR	Elemental GI Ltd
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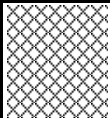
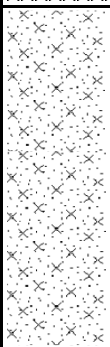
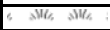
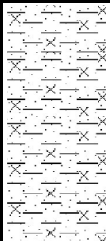
APPENDIX VI

Exploratory Hole Logs

Site:	Site Adjacent to 134 Barrier Bank, Cowbit, Spalding			Elemental GI Ltd			
Client:	East Anglian Civils Ltd						
Contractor: RP Drilling			Project No: E22131		Sheet: 1 of 1	WS01	
Equipment: Window Sampler Drilling Rig			Logged by: JR		Date: 23rd May 2024		
Field Monitoring and Sampling				Strata		Legend	Well
Depth	Type	Result	Depth	Description			
(m)		(SPT)	(m)				
0.10	JT			MADE GROUND (Comprising brown sandy silt with rare subangular to subrounded fine to coarse gravel of mixed lithology including brick and clinker).			
0.60	JVT		0.70	... with a 20cm band of subangular medium to coarse gravel and cobbles of mixed lithology including limestone, sandstone, brick and concrete present between 0.50m and 0.70m depth with insulation foam also noted.			
			1m	Firm brown and greyish brown sandy SILT.			
			2m	... becoming grey and with sand mostly absent from 2.10m depth.			
				... with decayed organic matter present from 2.30m depth.			
			3.00	Borehole completed at 3.00m depth.			
			4m				
			5m				
Water Observations:							
Water encountered at 1.54m depth during drilling.							
Remarks:							
1) Borehole terminated on completion of testing at 3.00m depth.							
2) Borehole collapsed to 2.50m depth after drilling.							
Where unaccompanied by in situ tests, strength descriptions of soils are based on Engineer's field description(s) and must not be relied upon.							
HSV = Hand Shear Vane (kPa), PP = Pocket Penetrometer (daN/cm ²)							

Site:		Site Adjacent to 134 Barrier Bank, Cowbit, Spalding		Elemental GI Ltd					
Client:		East Anglian Civils Ltd							
Contractor: RP Drilling			Project No: E22131		Sheet: 1 of 1		WS02		
Equipment: Window Sampler Drilling Rig			Logged by: JR		Date: 23rd May 2024				
Field Monitoring and Sampling			Strata				Legend	Well	
Depth	Type	Result	Depth	Description					
(m)		(SPT)	(m)						
0.10	JT			MADE GROUND (Comprising brown sandy silt). ... becoming slightly gravelly from 0.35m depth. Gravel is subangular to subrounded fine to coarse of mixed lithology including clinker and brick. ... with gravel becoming rare from 0.90m depth.					
1.00	JVT		1m						
			1.55	MADE GROUND (Comprising light brown slightly sandy silt with occasional rootlets). ... becoming very sandy with occasional decayed organic matter present from 1.70m depth.					
			1.90	Very soft dark grey and light brown sandy SILT with abundant decayed organic matter. ... with organic matter absent and becoming light grey from 2.00m depth.					
			3.00	... with occasional decayed organic matter present from 2.90m depth.					
				Borehole completed at 3.00m depth.					
			4m						
			5m						
Water Observations:									
Water encountered at 1.71m depth during drilling.									
Remarks:									
1) Borehole terminated on completion of testing at 3.00m depth.									
2) Borehole completed as a monitoring well.									
3) Borehole collapsed to 2.46m depth after drilling.									
Where unaccompanied by in situ tests, strength descriptions of soils are based on Engineer's field description(s) and must not be relied upon.									
HSV = Hand Shear Vane (kPa). PP = Pocket Penetrometer (daN/cm ²)									

Site:	Site Adjacent to 134 Barrier Bank, Cowbit, Spalding			Elemental GI Ltd			
Client:	East Anglian Civils Ltd						
Contractor: RP Drilling			Project No: E22131	Sheet: 1 of 1	WS03		
Equipment: Window Sampler Drilling Rig			Logged by: JR	Date: 23rd May 2024			
Field Monitoring and Sampling				Strata	Legend	Well	
Depth	Type	Result	Depth	Description			
(m)		(SPT)	(m)				
0.30	JT		1m	MADE GROUND (Comprising brown slightly gravelly silt. Gravel is subangular to subrounded fine to coarse of mixed lithology including clinker and brick).			
			1.25	Soft to firm grey and orangish brown mottled sandy SILT.			
			2m	... with a 10cm band of amorphous peat noted between 1.65m and 1.85m depth.			
			3m	... becoming very soft from 2.00m depth.			
4.00	... with sand mostly absent from 2.15m depth.		4.00	... becoming predominantly grey and dark grey mottled from 2.70m depth.			
5m	Borehole completed at 4.00m depth.						
Water Observations: Water encountered at 1.90m depth during drilling.							
Remarks: 1) Borehole terminated on completion of testing at 4.00m depth. 2) Borehole completed as a monitoring well.							
Where unaccompanied by in situ tests, strength descriptions of soils are based on Engineer's field description(s) and must not be relied upon. HSV = Hand Shear Vane (kPa), PP = Pocket Penetrometer (daN/cm ²)							

Site:		Site Adjacent to 134 Barrier Bank, Cowbit, Spalding				Elemental GI Ltd			
Client:		East Anglian Civils Ltd							
Contractor: RP Drilling				Project No: E22131		Sheet: 1 of 1		WS04	
Equipment: Window Sampler Drilling Rig				Logged by: JR		Date: 23rd May 2024			
Field Monitoring and Sampling				Strata				Legend	Well
Depth	Type	Result	Depth	Description					
(m)		(SPT)	(m)						
0.10	JT			MADE GROUND (Comprising brown and orange silty sandy subangular fine to coarse gravel of clinker, brick and concrete).					
			0.45						
				Dark brown very silty fine SAND.					
1.00	JT		1m	... becoming light brown and orangish brown mottled from 0.75m depth.					
			1.95						
			2.00	Dark brown amorphous PEAT.					
				Very soft dark brown very sandy SILT with frequent decayed organic matter.					
				... becoming light grey with rare pockets of decayed organic matter and rare decayed rootlets present from 2.20m depth.					
				... becoming slightly sandy from 2.55m depth.					
			3.00						
				Borehole completed at 3.00m depth.					
			4m						
			5m						
Water Observations:									
Water encountered at 1.04m depth during drilling.									
Remarks:									
1) Borehole terminated on completion of testing at 3.00m depth.									
2) Borehole collapsed to 1.60m depth after drilling.									
Where unaccompanied by in situ tests, strength descriptions of soils are based on Engineer's field description(s) and must not be relied upon.									
HSV = Hand Shear Vane (kPa). PP = Pocket Penetrometer (daN/cm ²)									

Site:	Site Adjacent to 134 Barrier Bank, Cowbit, Spalding			Elemental GI Ltd				
Client:	East Anglian Civils Ltd							
Contractor: RP Drilling			Project No: E22131		Sheet: 1 of 1	WS05		
Equipment: Window Sampler Drilling Rig			Logged by: JR		Date: 23rd May 2024			
Field Monitoring and Sampling				Strata		Legend	Well	
Depth	Type	Result	Depth	Description				
(m)		(SPT)	(m)					
0.10	JT			MADE GROUND (Comprising dark brown very sandy silt with rare subangular fine gravel of mixed lithology).				
			0.65					
			1m	Light brown and grey very silty fine SAND.				
			1.65					
			1.68	Black and orangish brown amorphous PEAT.				
		2m	Very soft to soft light grey and orangish brown very sandy SILT.					
		3.00	... becoming predominantly grey and with occasional decayed organic matter present from 2.75m depth.					
				Borehole completed at 3.00m depth.				
			4m					
			5m					
Water Observations: Water encountered at 0.92m depth during drilling.								
Remarks: 1) Borehole terminated on completion of testing at 3.00m depth. 2) Borehole collapsed to 2.39m depth after drilling.								
Where unaccompanied by in situ tests, strength descriptions of soils are based on Engineer's field description(s) and must not be relied upon. HSV = Hand Shear Vane (kPa), PP = Pocket Penetrometer (daN/cm ²)								

Site:		Site Adjacent to 134 Barrier Bank, Cowbit, Spalding		Elemental GI Ltd					
Client:		East Anglian Civils Ltd							
Contractor: RP Drilling			Project No: E22131		Sheet: 1 of 1		WS06		
Equipment: Window Sampler Drilling Rig			Logged by: JR		Date: 23rd May 2024				
Field Monitoring and Sampling			Strata				Legend	Well	
Depth	Type	Result	Depth	Description					
(m)		(SPT)	(m)						
0.10	JVT			MADE GROUND (Comprising reworked brown and orangish brown very silty gravelly sand. Gravel is subangular fine to coarse of mixed lithology including brick, clinker and sandstone).					
1.00	JV		0.90	MADE GROUND (Comprising reworked greyish brown very silty fine sand).					
			1.50	Orange, black and greyish brown silty SAND.					
			1.75	Very soft light grey and dark grey mottled very sandy SILT. ... with a small (8cm) pocket of decayed organic matter at 1.80m depth. ... with rare decayed roots/rootlets noted from 2.00m depth.					
3.80	T		2m	... with a band of intermixed amorphous peat present between 2.60m and 2.70m depth.					
			3m	... with a band of semi-amorphous brown peat present between 3.75m and 3.90m depth.					
			4.00	Borehole completed at 4.00m depth.					
			5m						
Water Observations: No water encountered during drilling.									
Remarks: 1) Borehole terminated on completion of testing at 4.00m depth. 2) Borehole completed as a monitoring well.									
Where unaccompanied by in situ tests, strength descriptions of soils are based on Engineer's field description(s) and must not be relied upon. HSV = Hand Shear Vane (kPa). PP = Pocket Penetrometer (daN/cm ²)									

Site:		Site Adjacent to 134 Barrier Bank, Cowbit, Spalding			Elemental GI Ltd				
Client:		East Anglian Civils Ltd							
Contractor: RP Drilling				Project No: E22131		Sheet: 1 of 1		WS07	
Equipment: Window Sampler Drilling Rig				Logged by: JR		Date: 23rd May 2024			
Field Monitoring and Sampling				Strata				Legend	Well
Depth	Type	Result	Depth	Description					
(m)		(SPT)	(m)						
0.10	T			MADE GROUND (Comprising brown and orange silty sandy subangular fine to coarse gravel of clinker, brick and concrete).					
0.50	JVT		0.45	Light brown and grey very silty fine SAND.					
1.90	JV		1m	... with frequent black and orange stained pockets present between 1.30m and 1.40m depth.					
			2m	... becoming dark grey/black from 1.70m depth.					
			2.75	... becoming dark grey and light grey mottled from 2.10m depth.					
			2.75	... with abundant decayed organic matter present from 2.55m depth.					
			3.00	Dark brown amorphous and semi-amorphous PEAT.					
				Borehole completed at 3.00m depth.					

Site:	Site Adjacent to 134 Barrier Bank, Cowbit, Spalding			Elemental GI Ltd		
Client:	East Anglian Civils Ltd					
Contractor: RP Drilling			Project No: E22131	Sheet: 1 of 1	HTP01	
Equipment: Hand Tools			Logged by: JR	Date: 23rd May 2024		
Field Monitoring and Sampling				Strata	Legend	
Depth	Type	Result	Depth	Description		
(m)		(HSV/PP)	(m)			
0.15	JT		0.10	MADE GROUND (Comprising reworked light brown very silty fine sand).		XXXXXX
				MADE GROUND (Comprising dark brown silty gravelly sand. Gravel is subangular to subrounded fine to coarse of mixed lithology including brick and concrete).		XXXXXX
			0.40	Hand dug trial pit completed at 0.40m depth.		
			1m			
			2m			
			3m			
			4m			
			5m			
Water Observations: No water encountered during excavation.						
Remarks: 1) Completed as a shallow hand dug pit at 0.40m depth. 2) Hand dug trial pit undertaken to assess localised ground conditions.						
Where unaccompanied by in situ tests, strength descriptions of soils are based on Engineer's field description(s) and must not be relied upon. HSV = Hand Shear Vane (kPa), PP = Pocket Penetrometer (daN/cm ²)						

APPENDIX VII

Laboratory Testing Data



ANALYTICAL TEST REPORT

Contract no: 133649

Contract name: E22131 Barrier Bank

Client reference: -

Clients name: Elemental GI

Clients address: Suite 8
Riverside Business Centre
Foundry Lane, Milford
DE56 0RN

Samples received:

Analysis started: 28 May 2024

Analysis completed: 06 June 2024

Report issued: 06 June 2024

Key

U	UKAS accredited test
M	MCERTS & UKAS accredited test
\$	Test carried out by an approved subcontractor
I/S	Insufficient sample to carry out test
N/S	Sample not suitable for testing
NAD	No Asbestos Detected

Approved by:

Abbie Neasham-Bourn
Senior Reporting Administrator

Chemtech Environmental Limited

SAMPLE INFORMATION

MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
133649-1	HTP01	0.15	Loamy Clay with Gravel	-	-	22.9
133649-2	WS01	0.10	Loamy Clay with Gravel	-	-	24.5
133649-3	WS01	0.60	Loamy Clay with Gravel	-	-	22.6
133649-4	WS02	0.10	Loamy Clay	-	-	20.6
133649-5	WS02	1.00	Loamy Clay with Roots	-	-	23
133649-6	WS03	0.30	Loamy Clay with Gravel	-	-	21.1
133649-7	WS04	0.10	Sand with Gravel	-	-	14.1
133649-8	WS04	1.00	Loamy Clay	-	-	22.7
133649-9	WS05	0.10	Loamy Clay	-	-	21.8
133649-10	WS06	0.10	Loamy Clay	-	-	17.5
133649-11	WS06	1.00	Sandy Clay	-	-	21.8
133649-12	WS06	3.80	Sandy Clay	-	-	75.1
133649-13	WS07	0.10	Sand with Gravel	-	-	15.4
133649-14	WS07	0.50	Sandy Clay	-	-	23.8
133649-15	WS07	1.00	Sandy Clay	-	-	24.6

Chemtech Environmental Limited

SOILS

Lab number Sample id Depth (m) Date sampled			133649-1 HTP01 0.15 23/05/2024	133649-2 WS01 0.10 23/05/2024	133649-3 WS01 0.60 23/05/2024	133649-4 WS02 0.10 23/05/2024	133649-5 WS02 1.00 23/05/2024	133649-6 WS03 0.30 23/05/2024
Test	Method	Units						
Moisture Content	CE001	% w/w	-	-	22.6	20.6	-	21.1
Arsenic (total)	CE264 ^M	mg/kg As	-	-	13.7	14.8	-	13.9
Cadmium (total)	CE264 ^M	mg/kg Cd	-	-	<1.6	<1.6	-	<1.6
Chromium (total)	CE264 ^U	mg/kg Cr	-	-	56.8	51.9	-	46.3
Chromium (VI)	CE263	mg/kg CrVI	-	-	<0.04	<0.04	-	<0.04
Copper (total)	CE264 ^M	mg/kg Cu	-	-	41.8	43.8	-	38.9
Lead (total)	CE264 ^U	mg/kg Pb	-	-	66.8	77.2	-	65.2
Mercury (total)	CE264 ^U	mg/kg Hg	-	-	<0.7	0.9	-	<0.7
Nickel (total)	CE264 ^M	mg/kg Ni	-	-	28.0	28.6	-	26.2
Selenium (total)	CE264	mg/kg Se	-	-	<3	<3	-	<3
Zinc (total)	CE264 ^M	mg/kg Zn	-	-	172.7	176.1	-	178.8
pH	CE004 ^M	units	-	-	7.5	7.5	-	7.5
Sulphate (2:1 water soluble)	CE061 ^U	mg/l SO ₄	-	-	147	33	-	36
Phenols (total)	CE078	mg/kg PhOH	-	-	<0.5	<0.5	-	<0.5
Total Organic Carbon (TOC)	CE197	% w/w C	-	-	3.5	2.6	-	2.6
PAH								
Naphthalene	CE087 ^M	mg/kg	-	0.03	<0.02	<0.02	-	<0.02
Acenaphthylene	CE087 ^M	mg/kg	-	0.03	<0.02	<0.02	-	<0.02
Acenaphthene	CE087 ^M	mg/kg	-	0.04	<0.02	<0.02	-	<0.02
Fluorene	CE087 ^U	mg/kg	-	0.03	<0.02	<0.02	-	<0.02
Phenanthrene	CE087 ^M	mg/kg	-	0.39	0.11	0.04	-	0.07
Anthracene	CE087 ^U	mg/kg	-	0.15	0.04	<0.02	-	0.02
Fluoranthene	CE087 ^M	mg/kg	-	1.09	0.62	0.10	-	0.17
Pyrene	CE087 ^M	mg/kg	-	0.96	0.60	0.09	-	0.15
Benzo(a)anthracene	CE087 ^U	mg/kg	-	0.68	0.53	0.08	-	0.12
Chrysene	CE087 ^M	mg/kg	-	0.70	0.55	0.07	-	0.11
Benzo(b)fluoranthene	CE087 ^M	mg/kg	-	1.09	0.79	0.08	-	0.14
Benzo(k)fluoranthene	CE087 ^M	mg/kg	-	0.46	0.34	0.04	-	0.06
Benzo(a)pyrene	CE087 ^U	mg/kg	-	0.90	0.63	0.06	-	0.10
Indeno(123cd)pyrene	CE087 ^M	mg/kg	-	0.90	0.54	0.06	-	0.09
Dibenz(ah)anthracene	CE087 ^M	mg/kg	-	0.18	0.12	<0.02	-	0.02
Benzo(ghi)perylene	CE087 ^M	mg/kg	-	0.72	0.43	0.05	-	0.08
PAH (total of USEPA 16)	CE087	mg/kg	-	8.36	5.30	0.68	-	1.13
BTEX & TPH								
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	-	-	<0.01	-	<0.01	-
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	-	-	<0.01	-	<0.01	-
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	-	-	<0.01	-	<0.01	-
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	-	-	<0.6	-	<0.6	-
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	-	-	<1	-	<1	-
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	-	-	<1.5	-	<1.5	-
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	-	-	<4.5	-	<4.5	-

Chemtech Environmental Limited

SOILS

Lab number Sample id Depth (m) Date sampled			133649-1 HTP01 0.15 23/05/2024	133649-2 WS01 0.10 23/05/2024	133649-3 WS01 0.60 23/05/2024	133649-4 WS02 0.10 23/05/2024	133649-5 WS02 1.00 23/05/2024	133649-6 WS03 0.30 23/05/2024
Test	Method	Units						
EPH Aromatic (>EC35-EC44)	CE250	mg/kg	-	-	<2	-	<2	-
VPH Aliphatic (>C5-C6)	CE067	mg/kg	-	-	<0.1	-	<0.1	-
VPH Aliphatic (>C6-C8)	CE067	mg/kg	-	-	<0.1	-	<0.1	-
VPH Aliphatic (>C8-C10)	CE067	mg/kg	-	-	<0.1	-	<0.1	-
EPH Aliphatic (>C10-C12)	CE250	mg/kg	-	-	<1	-	<1	-
EPH Aliphatic (>C12-C16)	CE250	mg/kg	-	-	<0.5	-	<0.5	-
EPH Aliphatic (>C16-C35)	CE250	mg/kg	-	-	<3	-	<3	-
EPH Aliphatic (>C35-C44)	CE250	mg/kg	-	-	<0.5	-	<0.5	-
Volatiles								
MTBE	\$	mg/kg	-	-	-	-	-	-
Benzene	\$	mg/kg	-	-	-	-	-	-
Toluene	\$	mg/kg	-	-	-	-	-	-
Ethylbenzene	\$	mg/kg	-	-	-	-	-	-
m & p-Xylene	\$	mg/kg	-	-	-	-	-	-
o-Xylene	\$	mg/kg	-	-	-	-	-	-
Dichlorodifluoromethane	CE174	mg/kg	-	-	-	-	-	-
Chloromethane	CE174	mg/kg	-	-	-	-	-	-
Vinyl chloride	CE174	mg/kg	-	-	-	-	-	-
Bromomethane	CE174	mg/kg	-	-	-	-	-	-
Chloroethane	CE174	mg/kg	-	-	-	-	-	-
Trichlorofluoromethane	CE174	mg/kg	-	-	-	-	-	-
1,1-Dichloroethene	CE174	mg/kg	-	-	-	-	-	-
Trans-1,2-Dichloroethene	CE174	mg/kg	-	-	-	-	-	-
1,1-Dichloroethane	CE174	mg/kg	-	-	-	-	-	-
2,2-Dichloropropane	CE174	mg/kg	-	-	-	-	-	-
Cis-1,2-Dichloroethene	CE174	mg/kg	-	-	-	-	-	-
Bromochloromethane	CE174	mg/kg	-	-	-	-	-	-
Chloroform	CE174	mg/kg	-	-	-	-	-	-
1,1,1-Trichloroethane	CE174	mg/kg	-	-	-	-	-	-
Carbon tetrachloride	CE174	mg/kg	-	-	-	-	-	-
1,1-Dichloro-1-propene	CE174	mg/kg	-	-	-	-	-	-
1,2-Dichloroethane	CE174	mg/kg	-	-	-	-	-	-
Trichloroethene	CE174	mg/kg	-	-	-	-	-	-
1,2-Dichloropropane	CE174	mg/kg	-	-	-	-	-	-
Dibromomethane	CE174	mg/kg	-	-	-	-	-	-
Bromodichloromethane	CE174	mg/kg	-	-	-	-	-	-
cis-1,3-Dichloro-1-propene	CE174	mg/kg	-	-	-	-	-	-
trans-1,3-Dichloro-1-propene	CE174	mg/kg	-	-	-	-	-	-
1,1,2-Trichloroethane	CE174	mg/kg	-	-	-	-	-	-
Tetrachloroethene	CE174	mg/kg	-	-	-	-	-	-
1,3-Dichloropropane	CE174	mg/kg	-	-	-	-	-	-

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Lab number Sample id Depth (m) Date sampled			133649-1 HTP01 0.15 23/05/2024	133649-2 WS01 0.10 23/05/2024	133649-3 WS01 0.60 23/05/2024	133649-4 WS02 0.10 23/05/2024	133649-5 WS02 1.00 23/05/2024	133649-6 WS03 0.30 23/05/2024
Test	Method	Units						
Dibromochloromethane	CE174	mg/kg	-	-	-	-	-	-
1,2-Dibromoethane	CE174	mg/kg	-	-	-	-	-	-
Chlorobenzene	CE174	mg/kg	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	CE174	mg/kg	-	-	-	-	-	-
Styrene	CE174	mg/kg	-	-	-	-	-	-
Tribromomethane	CE174	mg/kg	-	-	-	-	-	-
Isopropylbenzene	CE174	mg/kg	-	-	-	-	-	-
Bromobenzene	CE174	mg/kg	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	CE174	mg/kg	-	-	-	-	-	-
1,2,3-Trichloropropane	CE174	mg/kg	-	-	-	-	-	-
Propylbenzene	CE174	mg/kg	-	-	-	-	-	-
2-Chlorotoluene	CE174	mg/kg	-	-	-	-	-	-
4-Chlorotoluene	CE174	mg/kg	-	-	-	-	-	-
1,3,5-Trimethylbenzene	CE174	mg/kg	-	-	-	-	-	-
tert-Butylbenzene	CE174	mg/kg	-	-	-	-	-	-
1,2,4-Trimethylbenzene	CE174	mg/kg	-	-	-	-	-	-
sec-Butylbenzene	CE174	mg/kg	-	-	-	-	-	-
1,3-Dichlorobenzene	CE174	mg/kg	-	-	-	-	-	-
4-Isopropyltoluene	CE174	mg/kg	-	-	-	-	-	-
1,4-Dichlorobenzene	CE174	mg/kg	-	-	-	-	-	-
1,2-Dichlorobenzene	CE174	mg/kg	-	-	-	-	-	-
Butylbenzene	CE174	mg/kg	-	-	-	-	-	-
1,2-Dibromo-3-chloropropane	CE174	mg/kg	-	-	-	-	-	-
1,2,4-Trichlorobenzene	CE174	mg/kg	-	-	-	-	-	-
Hexachloro-1,3-butadiene	CE174	mg/kg	-	-	-	-	-	-
1,2,3-Trichlorobenzene	CE174	mg/kg	-	-	-	-	-	-
VOC Tentatively Identified Compounds	CE174	-	-	-	-	-	-	-
Semi-volatiles								
N-Nitrosodimethylamine	CE189	mg/kg	-	-	-	-	-	-
Phenol	CE189	mg/kg	-	-	-	-	-	-
Bis(2-chloroethyl)ether	CE189	mg/kg	-	-	-	-	-	-
2-Chlorophenol	CE189	mg/kg	-	-	-	-	-	-
1,3-Dichlorobenzene	CE189	mg/kg	-	-	-	-	-	-
1,4-Dichlorobenzene	CE189	mg/kg	-	-	-	-	-	-
2-Methylphenol	CE189	mg/kg	-	-	-	-	-	-
1,2-Dichlorobenzene	CE189	mg/kg	-	-	-	-	-	-
Bis(2-chloroisopropyl)ether	CE189	mg/kg	-	-	-	-	-	-
3&4-Methylphenol	CE189	mg/kg	-	-	-	-	-	-
N-Nitrosodi-n-propylamine	CE189	mg/kg	-	-	-	-	-	-
Hexachloroethane	CE189	mg/kg	-	-	-	-	-	-
Nitrobenzene	CE189	mg/kg	-	-	-	-	-	-

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Lab number Sample id Depth (m) Date sampled			133649-1 HTP01 0.15 23/05/2024	133649-2 WS01 0.10 23/05/2024	133649-3 WS01 0.60 23/05/2024	133649-4 WS02 0.10 23/05/2024	133649-5 WS02 1.00 23/05/2024	133649-6 WS03 0.30 23/05/2024
Test	Method	Units						
Isophorone	CE189	mg/kg	-	-	-	-	-	-
2,4-Dimethylphenol	CE189	mg/kg	-	-	-	-	-	-
2-Nitrophenol	CE189	mg/kg	-	-	-	-	-	-
Bis(2-chloroethoxy)methane	CE189	mg/kg	-	-	-	-	-	-
2,4-Dichlorophenol	CE189	mg/kg	-	-	-	-	-	-
1,2,4-Trichlorobenzene	CE189	mg/kg	-	-	-	-	-	-
4-Chloroaniline	CE189	mg/kg	-	-	-	-	-	-
Hexachlorobutadiene	CE189	mg/kg	-	-	-	-	-	-
4-Chloro-3-methylphenol	CE189	mg/kg	-	-	-	-	-	-
2-Methylnaphthalene	CE189	mg/kg	-	-	-	-	-	-
1-Methylnaphthalene	CE189	mg/kg	-	-	-	-	-	-
Hexachlorocyclopentadiene	CE189	mg/kg	-	-	-	-	-	-
2,4,6-Trichlorophenol	CE189	mg/kg	-	-	-	-	-	-
2,4,5-Trichlorophenol	CE189	mg/kg	-	-	-	-	-	-
2-Chloronaphthalene	CE189	mg/kg	-	-	-	-	-	-
2-Nitroaniline	CE189	mg/kg	-	-	-	-	-	-
Dimethyl phthalate	CE189	mg/kg	-	-	-	-	-	-
2,6-Dinitrotoluene	CE189	mg/kg	-	-	-	-	-	-
3-Nitroaniline	CE189	mg/kg	-	-	-	-	-	-
2,4-Dinitrophenol	CE189	mg/kg	-	-	-	-	-	-
4-Nitrophenol	CE189	mg/kg	-	-	-	-	-	-
2,4-Dinitrotoluene	CE189	mg/kg	-	-	-	-	-	-
Dibenzofuran	CE189	mg/kg	-	-	-	-	-	-
Diethyl phthalate	CE189	mg/kg	-	-	-	-	-	-
4-Chlorophenylphenyl ether	CE189	mg/kg	-	-	-	-	-	-
4-Nitroaniline	CE189	mg/kg	-	-	-	-	-	-
2-Methyl-4,6-dinitrophenol	CE189	mg/kg	-	-	-	-	-	-
Azobenzene	CE189	mg/kg	-	-	-	-	-	-
4-Bromophenylphenyl ether	CE189	mg/kg	-	-	-	-	-	-
Hexachlorobenzene	CE189	mg/kg	-	-	-	-	-	-
Pentachlorophenol	CE189	mg/kg	-	-	-	-	-	-
Carbazole	CE189	mg/kg	-	-	-	-	-	-
Di-n-butyl phthalate	CE189	mg/kg	-	-	-	-	-	-
Butylbenzyl phthalate	CE189	mg/kg	-	-	-	-	-	-
Bis(2-ethylhexyl)phthalate	CE189	mg/kg	-	-	-	-	-	-
Di-n-octyl phthalate	CE189	mg/kg	-	-	-	-	-	-
SVOC Tentatively Identified Compounds	CE189	-	-	-	-	-	-	-
Subcontracted Analysis								
Asbestos (qualitative)	\$	-	-	NAD	-	NAD	-	-
β-Glucuronidase Positive Escherichia coli	\$	cfu/g	<10	<10	-	-	-	-
Coliforms (total)	\$	colonies/g	<10	<10	-	-	-	-

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Lab number Sample id Depth (m) Date sampled			133649-7 WS04 0.10 23/05/2024	133649-9 WS05 0.10 23/05/2024	133649-10 WS06 0.10 23/05/2024	133649-11 WS06 1.00 23/05/2024	133649-13 WS07 0.10 23/05/2024	133649-14 WS07 0.50 23/05/2024
Test	Method	Units						
Moisture Content	CE001	% w/w	14.1	22.7	21.8	-	-	23.8
Arsenic (total)	CE264 ^M	mg/kg As	12.7	17.7	8.0	-	-	6.6
Cadmium (total)	CE264 ^M	mg/kg Cd	<1.6	<1.6	<1.6	-	-	<1.6
Chromium (total)	CE264 ^U	mg/kg Cr	59.4	43.6	37.4	-	-	33.6
Chromium (VI)	CE263	mg/kg CrVI	<0.04	<0.04	<0.04	-	-	<0.04
Copper (total)	CE264 ^M	mg/kg Cu	30.9	52.9	25.0	-	-	22.9
Lead (total)	CE264 ^U	mg/kg Pb	71.0	175.4	35.1	-	-	26.4
Mercury (total)	CE264 ^U	mg/kg Hg	<0.7	<0.7	<0.7	-	-	<0.7
Nickel (total)	CE264 ^M	mg/kg Ni	20.1	27.7	16.4	-	-	17.5
Selenium (total)	CE264	mg/kg Se	<3	<3	<3	-	-	<3
Zinc (total)	CE264 ^M	mg/kg Zn	91.5	358.8	106.9	-	-	73.7
pH	CE004 ^M	units	7.9	7.2	7.8	-	-	7.3
Sulphate (2:1 water soluble)	CE061 ^U	mg/l SO ₄	53	44	110	-	-	122
Phenols (total)	CE078	mg/kg PhOH	<0.5	<0.5	<0.5	-	-	<0.5
Total Organic Carbon (TOC)	CE197	% w/w C	3.4	3.8	1.7	-	-	1.6
PAH								
Naphthalene	CE087 ^M	mg/kg	0.25	<0.02	<0.02	<0.02	-	<0.02
Acenaphthylene	CE087 ^M	mg/kg	0.35	<0.02	0.03	<0.02	-	<0.02
Acenaphthene	CE087 ^M	mg/kg	0.86	<0.02	0.03	<0.02	-	<0.02
Fluorene	CE087 ^U	mg/kg	0.77	<0.02	0.02	<0.02	-	<0.02
Phenanthrene	CE087 ^M	mg/kg	10.82	0.17	0.25	<0.02	-	0.02
Anthracene	CE087 ^U	mg/kg	3.64	0.05	0.09	<0.02	-	<0.02
Fluoranthene	CE087 ^M	mg/kg	27.78	0.46	0.87	<0.02	-	0.06
Pyrene	CE087 ^M	mg/kg	24.06	0.37	0.84	<0.02	-	0.07
Benzo(a)anthracene	CE087 ^U	mg/kg	15.32	0.26	0.46	<0.02	-	0.09
Chrysene	CE087 ^M	mg/kg	16.29	0.27	0.48	<0.03	-	0.08
Benzo(b)fluoranthene	CE087 ^M	mg/kg	24.83	0.33	0.67	<0.02	-	0.13
Benzo(k)fluoranthene	CE087 ^M	mg/kg	10.44	0.14	0.26	<0.03	-	0.06
Benzo(a)pyrene	CE087 ^U	mg/kg	19.05	0.25	0.51	<0.02	-	0.11
Indeno(123cd)pyrene	CE087 ^M	mg/kg	18.79	0.22	0.48	<0.02	-	0.10
Dibenz(ah)anthracene	CE087 ^M	mg/kg	4.12	0.05	0.10	<0.02	-	0.02
Benzo(ghi)perylene	CE087 ^M	mg/kg	15.50	0.18	0.42	<0.02	-	0.08
PAH (total of USEPA 16)	CE087	mg/kg	192.87	2.75	5.52	<0.34	-	0.84
BTEX & TPH								
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	-	-	-	-	-	<0.01
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	-	-	-	-	-	<0.01
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	-	-	-	-	-	<0.01
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	-	-	-	-	-	<0.6
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	-	-	-	-	-	<1
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	-	-	-	-	-	<1.5
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	-	-	-	-	-	<4.5

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Lab number Sample id Depth (m) Date sampled			133649-7 WS04 0.10 23/05/2024	133649-9 WS05 0.10 23/05/2024	133649-10 WS06 0.10 23/05/2024	133649-11 WS06 1.00 23/05/2024	133649-13 WS07 0.10 23/05/2024	133649-14 WS07 0.50 23/05/2024
Test	Method	Units						
EPH Aromatic (>EC35-EC44)	CE250	mg/kg	-	-	-	-	-	<2
VPH Aliphatic (>C5-C6)	CE067	mg/kg	-	-	-	-	-	<0.1
VPH Aliphatic (>C6-C8)	CE067	mg/kg	-	-	-	-	-	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	-	-	-	-	-	<0.1
EPH Aliphatic (>C10-C12)	CE250	mg/kg	-	-	-	-	-	<1
EPH Aliphatic (>C12-C16)	CE250	mg/kg	-	-	-	-	-	<0.5
EPH Aliphatic (>C16-C35)	CE250	mg/kg	-	-	-	-	-	<3
EPH Aliphatic (>C35-C44)	CE250	mg/kg	-	-	-	-	-	<0.5
Volatiles								
MTBE	\$	mg/kg	-	-	-	<0.001	-	-
Benzene	\$	mg/kg	-	-	-	<0.001	-	-
Toluene	\$	mg/kg	-	-	-	<0.001	-	-
Ethylbenzene	\$	mg/kg	-	-	-	<0.001	-	-
m & p-Xylene	\$	mg/kg	-	-	-	<0.001	-	-
o-Xylene	\$	mg/kg	-	-	-	<0.001	-	-
Dichlorodifluoromethane	CE174	mg/kg	-	-	-	<0.01	-	-
Chloromethane	CE174	mg/kg	-	-	-	<0.01	-	-
Vinyl chloride	CE174	mg/kg	-	-	-	<0.01	-	-
Bromomethane	CE174	mg/kg	-	-	-	<0.01	-	-
Chloroethane	CE174	mg/kg	-	-	-	<0.01	-	-
Trichlorofluoromethane	CE174	mg/kg	-	-	-	<0.01	-	-
1,1-Dichloroethene	CE174	mg/kg	-	-	-	<0.01	-	-
Trans-1,2-Dichloroethene	CE174	mg/kg	-	-	-	<0.01	-	-
1,1-Dichloroethane	CE174	mg/kg	-	-	-	<0.01	-	-
2,2-Dichloropropane	CE174	mg/kg	-	-	-	<0.01	-	-
Cis-1,2-Dichloroethene	CE174	mg/kg	-	-	-	<0.01	-	-
Bromochloromethane	CE174	mg/kg	-	-	-	<0.01	-	-
Chloroform	CE174	mg/kg	-	-	-	<0.01	-	-
1,1,1-Trichloroethane	CE174	mg/kg	-	-	-	<0.01	-	-
Carbon tetrachloride	CE174	mg/kg	-	-	-	<0.01	-	-
1,1-Dichloro-1-propene	CE174	mg/kg	-	-	-	<0.01	-	-
1,2-Dichloroethane	CE174	mg/kg	-	-	-	<0.01	-	-
Trichloroethene	CE174	mg/kg	-	-	-	<0.01	-	-
1,2-Dichloropropane	CE174	mg/kg	-	-	-	<0.01	-	-
Dibromomethane	CE174	mg/kg	-	-	-	<0.01	-	-
Bromodichloromethane	CE174	mg/kg	-	-	-	<0.01	-	-
cis-1,3-Dichloro-1-propene	CE174	mg/kg	-	-	-	<0.01	-	-
trans-1,3-Dichloro-1-propene	CE174	mg/kg	-	-	-	<0.01	-	-
1,1,2-Trichloroethane	CE174	mg/kg	-	-	-	<0.01	-	-
Tetrachloroethene	CE174	mg/kg	-	-	-	<0.01	-	-
1,3-Dichloropropane	CE174	mg/kg	-	-	-	<0.01	-	-

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Lab number Sample id Depth (m) Date sampled			133649-7 WS04 0.10 23/05/2024	133649-9 WS05 0.10 23/05/2024	133649-10 WS06 0.10 23/05/2024	133649-11 WS06 1.00 23/05/2024	133649-13 WS07 0.10 23/05/2024	133649-14 WS07 0.50 23/05/2024
Test	Method	Units						
Dibromochloromethane	CE174	mg/kg	-	-	-	<0.01	-	-
1,2-Dibromoethane	CE174	mg/kg	-	-	-	<0.01	-	-
Chlorobenzene	CE174	mg/kg	-	-	-	<0.01	-	-
1,1,1,2-Tetrachloroethane	CE174	mg/kg	-	-	-	<0.01	-	-
Styrene	CE174	mg/kg	-	-	-	<0.01	-	-
Tribromomethane	CE174	mg/kg	-	-	-	<0.01	-	-
Isopropylbenzene	CE174	mg/kg	-	-	-	<0.01	-	-
Bromobenzene	CE174	mg/kg	-	-	-	<0.01	-	-
1,1,2,2-Tetrachloroethane	CE174	mg/kg	-	-	-	<0.01	-	-
1,2,3-Trichloropropane	CE174	mg/kg	-	-	-	<0.01	-	-
Propylbenzene	CE174	mg/kg	-	-	-	<0.01	-	-
2-Chlorotoluene	CE174	mg/kg	-	-	-	<0.01	-	-
4-Chlorotoluene	CE174	mg/kg	-	-	-	<0.01	-	-
1,3,5-Trimethylbenzene	CE174	mg/kg	-	-	-	<0.01	-	-
tert-Butylbenzene	CE174	mg/kg	-	-	-	<0.01	-	-
1,2,4-Trimethylbenzene	CE174	mg/kg	-	-	-	<0.01	-	-
sec-Butylbenzene	CE174	mg/kg	-	-	-	<0.01	-	-
1,3-Dichlorobenzene	CE174	mg/kg	-	-	-	<0.01	-	-
4-Isopropyltoluene	CE174	mg/kg	-	-	-	<0.01	-	-
1,4-Dichlorobenzene	CE174	mg/kg	-	-	-	<0.01	-	-
1,2-Dichlorobenzene	CE174	mg/kg	-	-	-	<0.01	-	-
Butylbenzene	CE174	mg/kg	-	-	-	<0.01	-	-
1,2-Dibromo-3-chloropropane	CE174	mg/kg	-	-	-	<0.01	-	-
1,2,4-Trichlorobenzene	CE174	mg/kg	-	-	-	<0.01	-	-
Hexachloro-1,3-butadiene	CE174	mg/kg	-	-	-	<0.01	-	-
1,2,3-Trichlorobenzene	CE174	mg/kg	-	-	-	<0.01	-	-
VOC Tentatively Identified Compounds	CE174	-	-	-	-	ND	-	-
Semi-volatiles								
N-Nitrosodimethylamine	CE189	mg/kg	-	-	-	<0.1	-	-
Phenol	CE189	mg/kg	-	-	-	<0.1	-	-
Bis(2-chloroethyl)ether	CE189	mg/kg	-	-	-	<0.1	-	-
2-Chlorophenol	CE189	mg/kg	-	-	-	<0.1	-	-
1,3-Dichlorobenzene	CE189	mg/kg	-	-	-	<0.1	-	-
1,4-Dichlorobenzene	CE189	mg/kg	-	-	-	<0.1	-	-
2-Methylphenol	CE189	mg/kg	-	-	-	<0.1	-	-
1,2-Dichlorobenzene	CE189	mg/kg	-	-	-	<0.1	-	-
Bis(2-chloroisopropyl)ether	CE189	mg/kg	-	-	-	<0.1	-	-
3&4-Methylphenol	CE189	mg/kg	-	-	-	<0.1	-	-
N-Nitrosodi-n-propylamine	CE189	mg/kg	-	-	-	<0.1	-	-
Hexachloroethane	CE189	mg/kg	-	-	-	<0.1	-	-
Nitrobenzene	CE189	mg/kg	-	-	-	<0.1	-	-

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Lab number Sample id Depth (m) Date sampled			133649-7 WS04 0.10 23/05/2024	133649-9 WS05 0.10 23/05/2024	133649-10 WS06 0.10 23/05/2024	133649-11 WS06 1.00 23/05/2024	133649-13 WS07 0.10 23/05/2024	133649-14 WS07 0.50 23/05/2024
Test	Method	Units						
Isophorone	CE189	mg/kg	-	-	-	<0.1	-	-
2,4-Dimethylphenol	CE189	mg/kg	-	-	-	<0.1	-	-
2-Nitrophenol	CE189	mg/kg	-	-	-	<0.1	-	-
Bis(2-chloroethoxy)methane	CE189	mg/kg	-	-	-	<0.1	-	-
2,4-Dichlorophenol	CE189	mg/kg	-	-	-	<0.1	-	-
1,2,4-Trichlorobenzene	CE189	mg/kg	-	-	-	<0.1	-	-
4-Chloroaniline	CE189	mg/kg	-	-	-	<0.1	-	-
Hexachlorobutadiene	CE189	mg/kg	-	-	-	<0.1	-	-
4-Chloro-3-methylphenol	CE189	mg/kg	-	-	-	<0.1	-	-
2-Methylnaphthalene	CE189	mg/kg	-	-	-	<0.1	-	-
1-Methylnaphthalene	CE189	mg/kg	-	-	-	<0.1	-	-
Hexachlorocyclopentadiene	CE189	mg/kg	-	-	-	<0.1	-	-
2,4,6-Trichlorophenol	CE189	mg/kg	-	-	-	<0.1	-	-
2,4,5-Trichlorophenol	CE189	mg/kg	-	-	-	<0.1	-	-
2-Chloronaphthalene	CE189	mg/kg	-	-	-	<0.1	-	-
2-Nitroaniline	CE189	mg/kg	-	-	-	<0.1	-	-
Dimethyl phthalate	CE189	mg/kg	-	-	-	<0.1	-	-
2,6-Dinitrotoluene	CE189	mg/kg	-	-	-	<0.1	-	-
3-Nitroaniline	CE189	mg/kg	-	-	-	<0.1	-	-
2,4-Dinitrophenol	CE189	mg/kg	-	-	-	<0.1	-	-
4-Nitrophenol	CE189	mg/kg	-	-	-	<0.1	-	-
2,4-Dinitrotoluene	CE189	mg/kg	-	-	-	<0.1	-	-
Dibenzofuran	CE189	mg/kg	-	-	-	<0.1	-	-
Diethyl phthalate	CE189	mg/kg	-	-	-	<0.1	-	-
4-Chlorophenylphenyl ether	CE189	mg/kg	-	-	-	<0.1	-	-
4-Nitroaniline	CE189	mg/kg	-	-	-	<0.1	-	-
2-Methyl-4,6-dinitrophenol	CE189	mg/kg	-	-	-	<0.1	-	-
Azobenzene	CE189	mg/kg	-	-	-	<0.1	-	-
4-Bromophenylphenyl ether	CE189	mg/kg	-	-	-	<0.1	-	-
Hexachlorobenzene	CE189	mg/kg	-	-	-	<0.1	-	-
Pentachlorophenol	CE189	mg/kg	-	-	-	<0.1	-	-
Carbazole	CE189	mg/kg	-	-	-	<0.1	-	-
Di-n-butyl phthalate	CE189	mg/kg	-	-	-	<0.1	-	-
Butylbenzyl phthalate	CE189	mg/kg	-	-	-	<0.1	-	-
Bis(2-ethylhexyl)phthalate	CE189	mg/kg	-	-	-	<0.1	-	-
Di-n-octyl phthalate	CE189	mg/kg	-	-	-	<0.1	-	-
SVOC Tentatively Identified Compounds	CE189	-	-	-	-	ND	-	-
Subcontracted Analysis								
Asbestos (qualitative)	\$	-	-	-	-	-	NAD	-
β-Glucoronidase Positive Escherichia coli	\$	cfu/g	-	-	-	-	-	-
Coliforms (total)	\$	colonies/g	-	-	-	-	-	-

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SOILS

Lab number			133649-15
Sample id			WS07
Depth (m)			1.00
Date sampled			23/05/2024
Test	Method	Units	
Moisture Content	CE001	% w/w	-
Arsenic (total)	CE264 ^M	mg/kg As	-
Cadmium (total)	CE264 ^M	mg/kg Cd	-
Chromium (total)	CE264 ^U	mg/kg Cr	-
Chromium (VI)	CE263	mg/kg CrVI	-
Copper (total)	CE264 ^M	mg/kg Cu	-
Lead (total)	CE264 ^U	mg/kg Pb	-
Mercury (total)	CE264 ^U	mg/kg Hg	-
Nickel (total)	CE264 ^M	mg/kg Ni	-
Selenium (total)	CE264	mg/kg Se	-
Zinc (total)	CE264 ^M	mg/kg Zn	-
pH	CE004 ^M	units	-
Sulphate (2:1 water soluble)	CE061 ^U	mg/l SO ₄	-
Phenols (total)	CE078	mg/kg PhOH	-
Total Organic Carbon (TOC)	CE197	% w/w C	-
PAH			
Naphthalene	CE087 ^M	mg/kg	-
Acenaphthylene	CE087 ^M	mg/kg	-
Acenaphthene	CE087 ^M	mg/kg	-
Fluorene	CE087 ^U	mg/kg	-
Phenanthrene	CE087 ^M	mg/kg	-
Anthracene	CE087 ^U	mg/kg	-
Fluoranthene	CE087 ^M	mg/kg	-
Pyrene	CE087 ^M	mg/kg	-
Benzo(a)anthracene	CE087 ^U	mg/kg	-
Chrysene	CE087 ^M	mg/kg	-
Benzo(b)fluoranthene	CE087 ^M	mg/kg	-
Benzo(k)fluoranthene	CE087 ^M	mg/kg	-
Benzo(a)pyrene	CE087 ^U	mg/kg	-
Indeno(123cd)pyrene	CE087 ^M	mg/kg	-
Dibenz(ah)anthracene	CE087 ^M	mg/kg	-
Benzo(ghi)perylene	CE087 ^M	mg/kg	-
PAH (total of USEPA 16)	CE087	mg/kg	-
BTEX & TPH			
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	<0.01
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	<0.6
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	<1
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	<1.5
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	<4.5

Chemtech Environmental Limited

SOILS

Lab number			133649-15
Sample id			WS07
Depth (m)			1.00
Date sampled			23/05/2024
Test	Method	Units	
EPH Aromatic (>EC35-EC44)	CE250	mg/kg	<2
VPH Aliphatic (>C5-C6)	CE067	mg/kg	<0.1
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	<0.1
EPH Aliphatic (>C10-C12)	CE250	mg/kg	<1
EPH Aliphatic (>C12-C16)	CE250	mg/kg	<0.5
EPH Aliphatic (>C16-C35)	CE250	mg/kg	<3
EPH Aliphatic (>C35-C44)	CE250	mg/kg	<0.5
Volatiles			
MTBE	\$	mg/kg	-
Benzene	\$	mg/kg	-
Toluene	\$	mg/kg	-
Ethylbenzene	\$	mg/kg	-
m & p-Xylene	\$	mg/kg	-
o-Xylene	\$	mg/kg	-
Dichlorodifluoromethane	CE174	mg/kg	-
Chloromethane	CE174	mg/kg	-
Vinyl chloride	CE174	mg/kg	-
Bromomethane	CE174	mg/kg	-
Chloroethane	CE174	mg/kg	-
Trichlorofluoromethane	CE174	mg/kg	-
1,1-Dichloroethene	CE174	mg/kg	-
Trans-1,2-Dichloroethene	CE174	mg/kg	-
1,1-Dichloroethane	CE174	mg/kg	-
2,2-Dichloropropane	CE174	mg/kg	-
Cis-1,2-Dichloroethene	CE174	mg/kg	-
Bromochloromethane	CE174	mg/kg	-
Chloroform	CE174	mg/kg	-
1,1,1-Trichloroethane	CE174	mg/kg	-
Carbon tetrachloride	CE174	mg/kg	-
1,1-Dichloro-1-propene	CE174	mg/kg	-
1,2-Dichloroethane	CE174	mg/kg	-
Trichloroethene	CE174	mg/kg	-
1,2-Dichloropropane	CE174	mg/kg	-
Dibromomethane	CE174	mg/kg	-
Bromodichloromethane	CE174	mg/kg	-
cis-1,3-Dichloro-1-propene	CE174	mg/kg	-
trans-1,3-Dichloro-1-propene	CE174	mg/kg	-
1,1,2-Trichloroethane	CE174	mg/kg	-
Tetrachloroethene	CE174	mg/kg	-
1,3-Dichloropropane	CE174	mg/kg	-

Chemtech Environmental Limited

SOILS

Lab number			133649-15
Sample id			WS07
Depth (m)			1.00
Date sampled			23/05/2024
Test	Method	Units	
Dibromochloromethane	CE174	mg/kg	-
1,2-Dibromoethane	CE174	mg/kg	-
Chlorobenzene	CE174	mg/kg	-
1,1,1,2-Tetrachloroethane	CE174	mg/kg	-
Styrene	CE174	mg/kg	-
Tribromomethane	CE174	mg/kg	-
Isopropylbenzene	CE174	mg/kg	-
Bromobenzene	CE174	mg/kg	-
1,1,2,2-Tetrachloroethane	CE174	mg/kg	-
1,2,3-Trichloropropane	CE174	mg/kg	-
Propylbenzene	CE174	mg/kg	-
2-Chlorotoluene	CE174	mg/kg	-
4-Chlorotoluene	CE174	mg/kg	-
1,3,5-Trimethylbenzene	CE174	mg/kg	-
tert-Butylbenzene	CE174	mg/kg	-
1,2,4-Trimethylbenzene	CE174	mg/kg	-
sec-Butylbenzene	CE174	mg/kg	-
1,3-Dichlorobenzene	CE174	mg/kg	-
4-Isopropyltoluene	CE174	mg/kg	-
1,4-Dichlorobenzene	CE174	mg/kg	-
1,2-Dichlorobenzene	CE174	mg/kg	-
Butylbenzene	CE174	mg/kg	-
1,2-Dibromo-3-chloropropane	CE174	mg/kg	-
1,2,4-Trichlorobenzene	CE174	mg/kg	-
Hexachloro-1,3-butadiene	CE174	mg/kg	-
1,2,3-Trichlorobenzene	CE174	mg/kg	-
VOC Tentatively Identified Compounds	CE174	-	-
Semi-volatiles			-
N-Nitrosodimethylamine	CE189	mg/kg	-
Phenol	CE189	mg/kg	-
Bis(2-chloroethyl)ether	CE189	mg/kg	-
2-Chlorophenol	CE189	mg/kg	-
1,3-Dichlorobenzene	CE189	mg/kg	-
1,4-Dichlorobenzene	CE189	mg/kg	-
2-Methylphenol	CE189	mg/kg	-
1,2-Dichlorobenzene	CE189	mg/kg	-
Bis(2-chloroisopropyl)ether	CE189	mg/kg	-
3&4-Methylphenol	CE189	mg/kg	-
N-Nitrosodi-n-propylamine	CE189	mg/kg	-
Hexachloroethane	CE189	mg/kg	-
Nitrobenzene	CE189	mg/kg	-

Chemtech Environmental Limited

SOILS

Lab number Sample id Depth (m) Date sampled			133649-15 WS07 1.00 23/05/2024
Test	Method	Units	
Isophorone	CE189	mg/kg	-
2,4-Dimethylphenol	CE189	mg/kg	-
2-Nitrophenol	CE189	mg/kg	-
Bis(2-chloroethoxy)methane	CE189	mg/kg	-
2,4-Dichlorophenol	CE189	mg/kg	-
1,2,4-Trichlorobenzene	CE189	mg/kg	-
4-Chloroaniline	CE189	mg/kg	-
Hexachlorobutadiene	CE189	mg/kg	-
4-Chloro-3-methylphenol	CE189	mg/kg	-
2-Methylnaphthalene	CE189	mg/kg	-
1-Methylnaphthalene	CE189	mg/kg	-
Hexachlorocyclopentadiene	CE189	mg/kg	-
2,4,6-Trichlorophenol	CE189	mg/kg	-
2,4,5-Trichlorophenol	CE189	mg/kg	-
2-Chloronaphthalene	CE189	mg/kg	-
2-Nitroaniline	CE189	mg/kg	-
Dimethyl phthalate	CE189	mg/kg	-
2,6-Dinitrotoluene	CE189	mg/kg	-
3-Nitroaniline	CE189	mg/kg	-
2,4-Dinitrophenol	CE189	mg/kg	-
4-Nitrophenol	CE189	mg/kg	-
2,4-Dinitrotoluene	CE189	mg/kg	-
Dibenzofuran	CE189	mg/kg	-
Diethyl phthalate	CE189	mg/kg	-
4-Chlorophenylphenyl ether	CE189	mg/kg	-
4-Nitroaniline	CE189	mg/kg	-
2-Methyl-4,6-dinitrophenol	CE189	mg/kg	-
Azobenzene	CE189	mg/kg	-
4-Bromophenylphenyl ether	CE189	mg/kg	-
Hexachlorobenzene	CE189	mg/kg	-
Pentachlorophenol	CE189	mg/kg	-
Carbazole	CE189	mg/kg	-
Di-n-butyl phthalate	CE189	mg/kg	-
Butylbenzyl phthalate	CE189	mg/kg	-
Bis(2-ethylhexyl)phthalate	CE189	mg/kg	-
Di-n-octyl phthalate	CE189	mg/kg	-
SVOC Tentatively Identified Compounds	CE189	-	-
Subcontracted Analysis			
Asbestos (qualitative)	\$	-	-
β-Glucuronidase Positive Escherichia coli	\$	cfu/g	-
Coliforms (total)	\$	colonies/g	-

133649
E22131 Barrier Bank
-

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE001	Moisture Content	Gravimetry, reported on Wet Weight basis	As received		0.1	% w/w
CE264	Arsenic (total)	Aqua Regia Extraction, ICPOES	Dry	M	1.8	mg/kg As
CE264	Cadmium (total)	Aqua Regia Extraction, ICPOES	Dry	M	1.6	mg/kg Cd
CE264	Chromium (total)	Aqua Regia Extraction, ICPOES	Dry	U	2	mg/kg Cr
CE146	Chromium (VI)	Acid extraction, Colorimetry	Dry		1	mg/kg CrVI
CE264	Copper (total)	Aqua Regia Extraction, ICPOES	Dry	M	1.6	mg/kg Cu
CE264	Lead (total)	Aqua Regia Extraction, ICPOES	Dry	U	2.3	mg/kg Pb
CE264	Mercury (total)	Aqua Regia Extraction, ICPOES	Dry	U	0.7	mg/kg Hg
CE264	Nickel (total)	Aqua Regia Extraction, ICPOES	Dry	M	2.1	mg/kg Ni
CE264	Selenium (total)	Aqua Regia Extraction, ICPOES	Dry	U	3	mg/kg Se
CE264	Zinc (total)	Aqua Regia Extraction, ICPOES	Dry	M	4	mg/kg Zn
CE004	pH	Based on BS 1377, pH Meter	As received	M	-	units
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry	U	10	mg/l SO ₄
CE078	Phenols (total)	Extraction, Continuous Flow Colorimetry	As received		0.5	mg/kg PhOH
CE197	Total Organic Carbon (TOC)	Carbon Analyser	Dry		0.1	% w/w C
CE087	Naphthalene	Solvent extraction, GC-MS	As received	M	0.016	mg/kg
CE087	Acenaphthylene	Solvent extraction, GC-MS	As received	M	0.015	mg/kg
CE087	Acenaphthene	Solvent extraction, GC-MS	As received	M	0.013	mg/kg
CE087	Fluorene	Solvent extraction, GC-MS	As received	U	0.013	mg/kg
CE087	Phenanthrene	Solvent extraction, GC-MS	As received	M	0.014	mg/kg
CE087	Anthracene	Solvent extraction, GC-MS	As received	U	0.017	mg/kg
CE087	Fluoranthene	Solvent extraction, GC-MS	As received	M	0.017	mg/kg
CE087	Pyrene	Solvent extraction, GC-MS	As received	M	0.016	mg/kg
CE087	Benzo(a)anthracene	Solvent extraction, GC-MS	As received	U	0.012	mg/kg
CE087	Chrysene	Solvent extraction, GC-MS	As received	M	0.028	mg/kg
CE087	Benzo(b)fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(k)fluoranthene	Solvent extraction, GC-MS	As received	M	0.025	mg/kg
CE087	Benzo(a)pyrene	Solvent extraction, GC-MS	As received	U	0.019	mg/kg
CE087	Indeno(123cd)pyrene	Solvent extraction, GC-MS	As received	M	0.019	mg/kg
CE087	Dibenz(ah)anthracene	Solvent extraction, GC-MS	As received	M	0.017	mg/kg
CE087	Benzo(ghi)perylene	Solvent extraction, GC-MS	As received	M	0.019	mg/kg
CE087	PAH (total of USEPA 16)	Solvent extraction, GC-MS	As received		0.028	mg/kg
CE067	VPH Aromatic (>EC5-EC7)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC7-EC8)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC8-EC10)	Headspace GC-FID	As received		0.01	mg/kg
CE250	EPH Aromatic (>EC10-EC12)	Solvent extraction, GCxGC-FID	As received		0.6	mg/kg
CE250	EPH Aromatic (>EC12-EC16)	Solvent extraction, GCxGC-FID	As received		1	mg/kg
CE250	EPH Aromatic (>EC16-EC21)	Solvent extraction, GCxGC-FID	As received		1.5	mg/kg
CE250	EPH Aromatic (>EC21-EC35)	Solvent extraction, GCxGC-FID	As received		4.5	mg/kg
CE250	EPH Aromatic (>EC35-EC44)	Solvent extraction, GCxGC-FID	As received		2	mg/kg
CE067	VPH Aliphatic (>C5-C6)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C6-C8)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C8-C10)	Headspace GC-FID	As received		0.1	mg/kg
CE250	EPH Aliphatic (>C10-C12)	Solvent extraction, GCxGC-FID	As received		1	mg/kg

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE250	EPH Aliphatic (>C12-C16)	Solvent extraction, GCxGC-FID	As received		0.5	mg/kg
CE250	EPH Aliphatic (>C16-C35)	Solvent extraction, GCxGC-FID	As received		3	mg/kg
CE250	EPH Aliphatic (>C35-C44)	Solvent extraction, GCxGC-FID	As received		0.5	mg/kg
\$	Asbestos (qualitative)	HSG 248, Microscopy	Dry	U	-	-
\$	MTBE	Headspace GC-FID	As received	U	0.001	mg/kg
\$	Benzene	Headspace GC-FID	As received	U	0.001	mg/kg
\$	Toluene	Headspace GC-FID	As received	U	0.001	mg/kg
\$	Ethylbenzene	Headspace GC-FID	As received	U	0.001	mg/kg
\$	m & p-Xylene	Headspace GC-FID	As received	U	0.001	mg/kg
\$	o-Xylene	Headspace GC-FID	As received	U	0.001	mg/kg
CE174	Dichlorodifluoromethane	Headspace GC-MS	As received		0.01	mg/kg
CE174	Chloromethane	Headspace GC-MS	As received		0.01	mg/kg
CE174	Vinyl chloride	Headspace GC-MS	As received		0.01	mg/kg
CE174	Bromomethane	Headspace GC-MS	As received		0.03	mg/kg
CE174	Chloroethane	Headspace GC-MS	As received		0.01	mg/kg
CE174	Trichlorofluoromethane	Headspace GC-MS	As received		0.01	mg/kg
CE174	1,1-Dichloroethene	Headspace GC-MS	As received		0.01	mg/kg
CE174	Trans-1,2-Dichloroethene	Headspace GC-MS	As received		0.01	mg/kg
CE174	1,1-Dichloroethane	Headspace GC-MS	As received		0.01	mg/kg
CE174	2,2-Dichloropropane	Headspace GC-MS	As received		0.01	mg/kg
CE174	Cis-1,2-Dichloroethene	Headspace GC-MS	As received		0.01	mg/kg
CE174	Bromochloromethane	Headspace GC-MS	As received		0.01	mg/kg
CE174	Chloroform	Headspace GC-MS	As received		0.01	mg/kg
CE174	1,1,1-Trichloroethane	Headspace GC-MS	As received		0.01	mg/kg
CE174	Carbon tetrachloride	Headspace GC-MS	As received		0.01	mg/kg
CE174	1,1-Dichloro-1-propene	Headspace GC-MS	As received		0.01	mg/kg
CE174	1,2-Dichloroethane	Headspace GC-MS	As received		0.01	mg/kg
CE174	Trichloroethene	Headspace GC-MS	As received		0.01	mg/kg
CE174	1,2-Dichloropropane	Headspace GC-MS	As received		0.01	mg/kg
CE174	Dibromomethane	Headspace GC-MS	As received		0.01	mg/kg
CE174	Bromodichloromethane	Headspace GC-MS	As received		0.01	mg/kg
CE174	cis-1,3-Dichloro-1-propene	Headspace GC-MS	As received		0.01	mg/kg
CE174	trans-1,3-Dichloro-1-propene	Headspace GC-MS	As received		0.01	mg/kg
CE174	1,1,2-Trichloroethane	Headspace GC-MS	As received		0.01	mg/kg
CE174	Tetrachloroethene	Headspace GC-MS	As received		0.01	mg/kg
CE174	1,3-Dichloropropane	Headspace GC-MS	As received		0.01	mg/kg
CE174	Dibromochloromethane	Headspace GC-MS	As received		0.01	mg/kg
CE174	1,2-Dibromoethane	Headspace GC-MS	As received		0.01	mg/kg
CE174	Chlorobenzene	Headspace GC-MS	As received		0.01	mg/kg
CE174	1,1,1,2-Tetrachloroethane	Headspace GC-MS	As received		0.01	mg/kg
CE174	Styrene	Headspace GC-MS	As received		0.01	mg/kg
CE174	Tribromomethane	Headspace GC-MS	As received		0.01	mg/kg
CE174	Isopropylbenzene	Headspace GC-MS	As received		0.01	mg/kg
CE174	Bromobenzene	Headspace GC-MS	As received		0.01	mg/kg

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE174	1,1,2,2-Tetrachloroethane	Headspace GC-MS	As received		0.01	mg/kg
CE174	1,2,3-Trichloropropane	Headspace GC-MS	As received		0.01	mg/kg
CE174	Propylbenzene	Headspace GC-MS	As received		0.01	mg/kg
CE174	2-Chlorotoluene	Headspace GC-MS	As received		0.01	mg/kg
CE174	4-Chlorotoluene	Headspace GC-MS	As received		0.01	mg/kg
CE174	1,3,5-Trimethylbenzene	Headspace GC-MS	As received		0.01	mg/kg
CE174	tert-Butylbenzene	Headspace GC-MS	As received		0.01	mg/kg
CE174	1,2,4-Trimethylbenzene	Headspace GC-MS	As received		0.01	mg/kg
CE174	sec-Butylbenzene	Headspace GC-MS	As received		0.01	mg/kg
CE174	1,3-Dichlorobenzene	Headspace GC-MS	As received		0.01	mg/kg
CE174	4-Isopropyltoluene	Headspace GC-MS	As received		0.01	mg/kg
CE174	1,4-Dichlorobenzene	Headspace GC-MS	As received		0.01	mg/kg
CE174	1,2-Dichlorobenzene	Headspace GC-MS	As received		0.01	mg/kg
CE174	Butylbenzene	Headspace GC-MS	As received		0.01	mg/kg
CE174	1,2-Dibromo-3-chloropropane	Headspace GC-MS	As received		0.01	mg/kg
CE174	1,2,4-Trichlorobenzene	Headspace GC-MS	As received		0.01	mg/kg
CE174	Hexachloro-1,3-butadiene	Headspace GC-MS	As received		0.01	mg/kg
CE174	1,2,3-Trichlorobenzene	Headspace GC-MS	As received		0.01	mg/kg
CE174	VOC Tentatively Identified Compounds	Headspace GC-MS	As received		-	-
CE189	N-Nitrosodimethylamine	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	Phenol	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	Bis(2-chloroethyl)ether	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	2-Chlorophenol	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	1,3-Dichlorobenzene	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	1,4-Dichlorobenzene	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	2-Methylphenol	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	1,2-Dichlorobenzene	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	Bis(2-chloroisopropyl)ether	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	3&4-Methylphenol	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	N-Nitrosodi-n-propylamine	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	Hexachloroethane	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	Nitrobenzene	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	Isophorone	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	2,4-Dimethylphenol	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	2-Nitrophenol	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	Bis(2-chloroethoxy)methane	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	2,4-Dichlorophenol	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	1,2,4-Trichlorobenzene	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	4-Chloroaniline	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	Hexachlorobutadiene	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	4-Chloro-3-methylphenol	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	2-Methylnaphthalene	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	1-Methylnaphthalene	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	Hexachlorocyclopentadiene	Solvent extraction, GC-MS	As received		0.1	mg/kg

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE189	2,4,6-Trichlorophenol	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	2,4,5-Trichlorophenol	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	2-Chloronaphthalene	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	2-Nitroaniline	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	Dimethyl phthalate	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	2,6-Dinitrotoluene	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	3-Nitroaniline	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	2,4-Dinitrophenol	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	4-Nitrophenol	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	2,4-Dinitrotoluene	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	Dibenzofuran	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	Diethyl phthalate	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	4-Chlorophenylphenyl ether	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	4-Nitroaniline	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	2-Methyl-4,6-dinitrophenol	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	Azobenzene	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	4-Bromophenylphenyl ether	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	Hexachlorobenzene	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	Pentachlorophenol	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	Carbazole	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	Di-n-butyl phthalate	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	Butylbenzyl phthalate	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	Bis(2-ethylhexyl)phthalate	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	Di-n-octyl phthalate	Solvent extraction, GC-MS	As received		0.1	mg/kg
CE189	SVOC Tentatively Identified Compounds	Solvent extraction, GC-MS	As received		-	-

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DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
133649-1	HTP01	0.15	N	
133649-2	WS01	0.10	Y	PAH (IC)
133649-3	WS01	0.60	N	
133649-4	WS02	0.10	Y	PAH (IC)
133649-5	WS02	1.00	Y	PAH (IC)
133649-6	WS03	0.30	Y	PAH (IC)
133649-7	WS04	0.10	Y	PAH (IC)
133649-8	WS04	1.00	Y	PAH (IC)
133649-9	WS05	0.10	Y	PAH (IC)
133649-10	WS06	0.10	Y	PAH (IC)
133649-11	WS06	1.00	Y	PAH (IC)
133649-12	WS06	3.80	Y	PAH (IC)
133649-13	WS07	0.10	Y	PAH (IC)
133649-14	WS07	0.50	Y	PAH (IC)
133649-15	WS07	1.00	Y	PAH (IC)

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ADDITIONAL INFORMATION

Notes

Opinions and interpretations expressed herein are outside the UKAS accreditation scope.

Samples have been prepared and tested in accordance with the ADEPT guidance note (version 2013.12).

This sample matrix is outside the scope of the laboratory's accreditation. The corresponding method used for soils is UKAS and MCERTS accredited.

Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.

Sampling was undertaken by Chemtech Environmental Limited and is outside the UKAS accreditation scope.

All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.

Methods, procedures and performance data are available on request.

Results reported herein relate only to the material supplied to the laboratory.

This report shall not be reproduced except in full, without prior written approval.

Soil/Solid samples will be disposed of 4 weeks from initial receipt unless otherwise agreed.

Waters and leachate samples will be disposed of 2 weeks from report issue unless otherwise agreed.

DEFRA Licence for the introduction and movement within England of prohibited soil for chemical and physical analysis Licence No: 132693/469907-0

BTEX compounds are identified by retention time only and may include interference from co-eluting compounds.

For soils and solids, all results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

For soils and solids, analytical results are inclusive of stones, where applicable.

Moisture Content Calculated on a Wet Weight basis



ANALYTICAL TEST REPORT

Contract no: 134961

Contract name: E22131 Barrier Bank

Client reference: E22131

Clients name: Elemental GI

Clients address: Suite 8
Riverside Business Centre
Foundry Lane, Milford
DE56 0RN

Samples received: 03 July 2024

Analysis started: 03 July 2024

Analysis completed: 12 July 2024

Report issued: 12 July 2024

Key

U	UKAS accredited test
M	MCERTS & UKAS accredited test
\$	Test carried out by an approved subcontractor
I/S	Insufficient sample to carry out test
N/S	Sample not suitable for testing
NAD	No Asbestos Detected

Approved by:

Abbie Neasham-Bourn
Senior Reporting Administrator

Chemtech Environmental Limited

SAMPLE INFORMATION

MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
134961-1	HS-1	0.10	Loamy Sand with Gravel & Roots	-	-	3
134961-2	HS-2	0.10	Loamy Sand with Gravel & Roots	-	-	9.1
134961-3	HS-3	0.10	Loamy Sand with Gravel & Roots	-	-	2.4

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SOILS

Lab number			134961-1	134961-2	134961-3
Sample id			HS-1	HS-2	HS-3
Depth (m)			0.10	0.10	0.10
Date sampled			01/07/2024	01/07/2024	01/07/2024
Test	Method	Units			
PAH					
Naphthalene	CE087 ^M	mg/kg	0.37	0.06	0.03
Acenaphthylene	CE087 ^M	mg/kg	0.84	0.12	0.07
Acenaphthene	CE087 ^M	mg/kg	0.75	0.04	0.08
Fluorene	CE087 ^U	mg/kg	0.57	0.05	0.07
Phenanthrene	CE087 ^M	mg/kg	6.74	0.73	0.79
Anthracene	CE087 ^U	mg/kg	3.40	0.34	0.27
Fluoranthene	CE087 ^M	mg/kg	37.56	3.82	2.82
Pyrene	CE087 ^M	mg/kg	38.39	3.35	2.63
Benzo(a)anthracene	CE087 ^U	mg/kg	25.67	2.05	1.67
Chrysene	CE087 ^M	mg/kg	27.72	1.72	1.56
Benzo(b)fluoranthene	CE087 ^M	mg/kg	45.71	2.89	3.12
Benzo(k)fluoranthene	CE087 ^M	mg/kg	23.70	1.20	1.16
Benzo(a)pyrene	CE087 ^U	mg/kg	52.92	2.11	2.51
Indeno(123cd)pyrene	CE087 ^M	mg/kg	39.86	1.82	1.99
Dibenz(ah)anthracene	CE087 ^M	mg/kg	7.08	0.31	0.35
Benzo(ghi)perylene	CE087 ^M	mg/kg	27.84	1.43	1.86
PAH (total of USEPA 16)	CE087	mg/kg	339	22.1	21.0

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE087	Naphthalene	Solvent extraction, GC-MS	As received	M	0.016	mg/kg
CE087	Acenaphthylene	Solvent extraction, GC-MS	As received	M	0.015	mg/kg
CE087	Acenaphthene	Solvent extraction, GC-MS	As received	M	0.013	mg/kg
CE087	Fluorene	Solvent extraction, GC-MS	As received	U	0.013	mg/kg
CE087	Phenanthrene	Solvent extraction, GC-MS	As received	M	0.014	mg/kg
CE087	Anthracene	Solvent extraction, GC-MS	As received	U	0.017	mg/kg
CE087	Fluoranthene	Solvent extraction, GC-MS	As received	M	0.017	mg/kg
CE087	Pyrene	Solvent extraction, GC-MS	As received	M	0.016	mg/kg
CE087	Benzo(a)anthracene	Solvent extraction, GC-MS	As received	U	0.012	mg/kg
CE087	Chrysene	Solvent extraction, GC-MS	As received	M	0.028	mg/kg
CE087	Benzo(b)fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(k)fluoranthene	Solvent extraction, GC-MS	As received	M	0.025	mg/kg
CE087	Benzo(a)pyrene	Solvent extraction, GC-MS	As received	U	0.019	mg/kg
CE087	Indeno(123cd)pyrene	Solvent extraction, GC-MS	As received	M	0.019	mg/kg
CE087	Dibenz(ah)anthracene	Solvent extraction, GC-MS	As received	M	0.017	mg/kg
CE087	Benzo(ghi)perylene	Solvent extraction, GC-MS	As received	M	0.019	mg/kg
CE087	PAH (total of USEPA 16)	Solvent extraction, GC-MS	As received		0.028	mg/kg

DEVIATING SAMPLE INFORMATION

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

[illegible]

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ADDITIONAL INFORMATION

Notes

Opinions and interpretations expressed herein are outside the UKAS accreditation scope.

Samples have been prepared and tested in accordance with the ADEPT guidance note (version 2013.12).

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Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.

Sampling was undertaken by Chemtech Environmental Limited and is outside the UKAS accreditation scope.

All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.

Methods, procedures and performance data are available on request.

Results reported herein relate only to the material supplied to the laboratory.

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Soil/Solid samples will be disposed of 4 weeks from initial receipt unless otherwise agreed.

Waters and leachate samples will be disposed of 2 weeks from report issue unless otherwise agreed.

DEFRA Licence for the introduction and movement within England of prohibited soil for chemical and physical analysis Licence No: 132693/469907-0

BTEX compounds are identified by retention time only and may include interference from co-eluting compounds.

For soils and solids, all results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

For soils and solids, analytical results are inclusive of stones, where applicable.

Moisture Content Calculated on a Wet Weight basis

APPENDIX VI

Gas and Groundwater Monitoring Sheets

SITE	E22131 - Site off Barrier Bank, Cowbit	ENGINEER	JR
DATE	5th June 2024	PRESSURE (START)	1014 mb
EQUIPMENT	GFM 456 Gas Analyser and Dipmeter	PRESSURE (START)	1013 mb
WEATHER	Sunny, dry and breezy		

Borehole	Flow (l/hr)		Methane % v/v		Carbon Dioxide % v/v		Oxygen % v/v		Hydrogen Sulphide (ppm)	Carbon Monoxide (ppm)	Depth to Water (m)	Depth to Base (m)
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady				
AMBIENT	-	0.0	-	0.0	-	0.0	-	20.4	0	0	N/A	N/A
WS02	0.0	0.0	0.0	0.0	10.2	10.2	8.0	8.0	0	0	1.60	2.72
WS03	0.0	0.0	0.0	0.0	3.1	3.1	16.6	16.6	0	0	1.78	3.96
WS06	0.0	0.0	0.8	0.4	0.5	0.4	20.2	20.2	0	0	1.02	3.97
MAX:	0.0	0.0	0.8	0.4	10.2	10.2	20.2	20.2	0.0	0.0	1.78	3.97

Comments:

WS06 - Borehole bailed after reading. Slow recharge noticed.

Notes:

- Peak readings are the maximum results recorded for flow, CH₄ or CO₂ and the minimum results recorded for O₂.
- Steady readings are the values recorded after approx. 90 to 120 seconds of monitoring. Where values fluctuate then this period will have been lengthened.
- Gas analyser calibration certificates are available upon request.

SITE	E22131 - Site off Barrier Bank, Cowbit	ENGINEER	JR
DATE	14th June 2024	PRESSURE (START)	1001 mb
EQUIPMENT	GFM 456 Gas Analyser and Dipmeter	PRESSURE (START)	999 mb
WEATHER	Sunny, dry and breezy		

Borehole	Flow (l/hr)		Methane % v/v		Carbon Dioxide % v/v		Oxygen % v/v		Hydrogen Sulphide (ppm)	Carbon Monoxide (ppm)	Depth to Water (m)	Depth to Base (m)
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady				
AMBIENT	-	0.0	-	0.0	-	0.0	-	20.4	0	0	N/A	N/A
WS02	0.0	0.0	0.0	0.0	11.1	11.1	8.8	8.8	0	0	1.63	2.73
WS03	0.0	0.0	0.0	0.0	3.9	3.9	15.7	15.7	0	0	1.88	3.98
WS06	48.9	3.9	44.0	15.6	6.5	2.7	11.9	16.4	0	0	1.15	3.99
MAX:	48.9	3.9	44.0	15.6	11.1	11.1	15.7	16.4	0.0	0.0	1.88	3.99

Comments:

WS06 - Flow rate reduced quickly from peak levels, settling at around 60 secs to 0.0 l/hr, but observed to fluctuate c.+3.9 l/hr briefly every 10-15 seconds thereafter. 'Piston effect' suspected.
WS06 - Monitored for 5 mins.

Notes:

- Peak readings are the maximum results recorded for flow, CH4 or CO2 and the minimum results recorded for O2.
- Steady readings are the values recorded after approx. 90 to 120 seconds of monitoring. Where values fluctuate then this period will have been lengthened.
- Gas analyser calibration certificates are available upon request.

SITE	E22131 - Site off Barrier Bank, Cowbit	ENGINEER	JR
DATE	21st June 2024	PRESSURE (START)	1014 mb
EQUIPMENT	GFM 456 Gas Analyser and Dipmeter	PRESSURE (START)	1014 mb
WEATHER	Sunny, dry and still		

Borehole	Flow (l/hr)		Methane % v/v		Carbon Dioxide % v/v		Oxygen % v/v		Hydrogen Sulphide (ppm)	Carbon Monoxide (ppm)	Depth to Water (m)	Depth to Base (m)
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady				
AMBIENT	-	0.0	-	0.0	-	0.0	-	20.4	0	0	N/A	N/A
WS02	0.0	0.0	0.0	0.0	11.8	11.8	8.5	8.5	0	0	1.68	2.76
WS03	0.0	0.0	0.0	0.0	6.0	2.3	13.0	19.0	0	0	1.90	3.98
WS06	10.9	0.0	41.9	2.2	9.1	3.0	8.9	19.1	0	0	1.10	3.99
MAX:	10.9	0.0	41.9	2.2	11.8	11.8	13.0	19.1	0.0	0.0	1.90	3.99

Comments:

WS02 - Borehole monitored for 3 mins.
 WS03 - Borehole monitored for 15 mins.
 WS03 - Readings stayed unchanged at 15 mins.
 WS06 - Borehole monitored for 13 mins.
 WS06 - Flow recorded at 0.0 l/hr after 60 secs.
 WS06 - Readings stayed unchanged at 13 mins.

Notes:

- Peak readings are the maximum results recorded for flow, CH4 or CO2 and the minimum results recorded for O2.
- Steady readings are the values recorded after approx. 90 to 120 seconds of monitoring. Where values fluctuate then this period will have been lengthened.
- Gas analyser calibration certificates are available upon request.

SITE	E22131 - Site off Barrier Bank, Cowbit	ENGINEER	JR
DATE	25th June 2024	PRESSURE (START)	1015 mb
EQUIPMENT	GFM 456 Gas Analyser and Dipmeter	PRESSURE (START)	1016 mb
WEATHER	Sunny, dry, still and warm		

Borehole	Flow (l/hr)		Methane % v/v		Carbon Dioxide % v/v		Oxygen % v/v		Hydrogen Sulphide (ppm)	Carbon Monoxide (ppm)	Depth to Water (m)	Depth to Base (m)
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady				
AMBIENT	-	0.0	-	0.0	-	0.0	-	20.6	0	0	N/A	N/A
WS02	0.0	0.0	0.0	0.0	10.8	10.8	12.1	12.1	0	0	1.73	2.75
WS03	0.0	0.0	0.0	0.0	4.0	4.0	16.2	16.2	0	0	1.91	3.97
WS06	28.8	0.0	34.5	0.5	8.7	3.4	10.9	19.1	0	0	1.23	3.96
MAX:	28.8	0.0	34.5	0.5	10.8	10.8	16.2	19.1	0.0	0.0	1.91	3.97

Comments:

WS06 - Borehole monitored for 15 mins.

WS06 - Flow recorded at 0.0 l/hr after 20 secs.

WS06 - Readings stayed unchanged at 8 mins.

Notes:

- Peak readings are the maximum results recorded for flow, CH₄ or CO₂ and the minimum results recorded for O₂.
- Steady readings are the values recorded after approx. 90 to 120 seconds of monitoring. Where values fluctuate then this period will have been lengthened.
- Gas analyser calibration certificates are available upon request.

SITE	E22131 - Site off Barrier Bank, Cowbit	ENGINEER	JR
DATE	1st July 2024	PRESSURE (START)	1016 mb
EQUIPMENT	GFM 456 Gas Analyser and Dipmeter	PRESSURE (START)	1016 mb
WEATHER	Overcast, dry and slightly breezy		

Borehole	Flow (l/hr)		Methane % v/v		Carbon Dioxide % v/v		Oxygen % v/v		Hydrogen Sulphide (ppm)	Carbon Monoxide (ppm)	Depth to Water (m)	Depth to Base (m)
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady				
AMBIENT	-	0.0	-	0.0	-	0.0	-	20.6	0	0	N/A	N/A
WS02	0.0	0.0	0.0	0.0	10.8	10.8	13.3	13.3	0	0	1.78	2.76
WS03	0.0	0.0	0.0	0.0	5.2	5.2	15.1	15.1	0	0	1.95	3.97
WS06	0.0	0.0	68.4	1.1	14.0	1.4	0.0	20.2	0	0	1.35	3.98
MAX:	0.0	0.0	68.4	1.1	14.0	10.8	15.1	20.2	0.0	0.0	1.95	3.98

Comments:

Notes:

- Peak readings are the maximum results recorded for flow, CH4 or CO2 and the minimum results recorded for O2.
- Steady readings are the values recorded after approx. 90 to 120 seconds of monitoring. Where values fluctuate then this period will have been lengthened.
- Gas analyser calibration certificates are available upon request.

SITE	E22131 - Site off Barrier Bank, Cowbit	ENGINEER	JR
DATE	10th July 2024	PRESSURE (START)	1009 mb
EQUIPMENT	GFM 456 Gas Analyser and Dipmeter	PRESSURE (START)	1009 mb
WEATHER	Overcast, dry and windy		

Borehole	Flow (l/hr)		Methane % v/v		Carbon Dioxide % v/v		Oxygen % v/v		Hydrogen Sulphide (ppm)	Carbon Monoxide (ppm)	Depth to Water (m)	Depth to Base (m)
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady				
AMBIENT	-	0.0	-	0.0	-	0.0	-	20.6	0	0	N/A	N/A
WS02	0.0	0.0	0.0	0.0	10.9	10.9	10.3	10.3	0	0	1.65	2.75
WS03	0.0	0.0	0.0	0.0	6.8	6.8	13.0	13.0	0	0	1.93	3.96
WS06	27.3	0.0	50.3	1.2	12.0	2.2	4.5	19.9	0	0	1.26	3.97
MAX:	27.3	0.0	50.3	1.2	12.0	10.9	13.0	19.9	0.0	0.0	1.93	3.97

Comments:

WS06 - Borehole monitored for 20 mins.

WS06 - Flow recorded at 0.0 l/hr after 20 secs.

WS06 - Readings stayed unchanged at 20 mins.

Notes:

- Peak readings are the maximum results recorded for flow, CH₄ or CO₂ and the minimum results recorded for O₂.
- Steady readings are the values recorded after approx. 90 to 120 seconds of monitoring. Where values fluctuate then this period will have been lengthened.
- Gas analyser calibration certificates are available upon request.

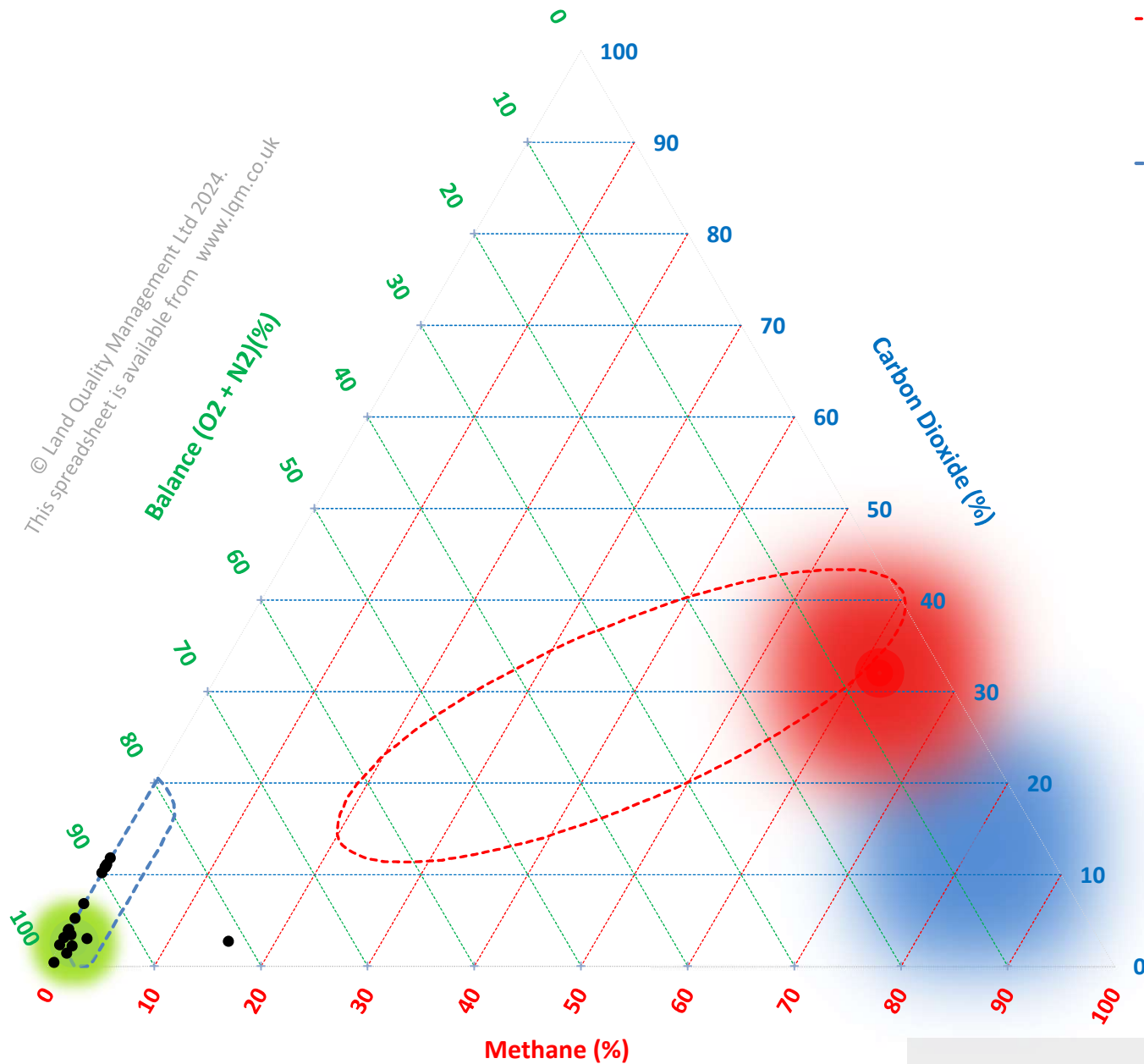
SITE	E22131 - Site off Barrier Bank, Cowbit
SHEET	Summary of All Visits
EQUIPMENT	GFM 456 Gas Analyser and Dipmeter
NOTES	Generated Summary

Borehole	Flow (l/hr)		Methane % v/v		Carbon Dioxide % v/v		Oxygen % v/v (MINIMUM)		Hydrogen Sulphide (ppm)	Carbon Monoxide (ppm)	Potential Gas Screening Values (GSVs (l/hr):	
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady			Methane	Carbon Dioxide
WS02	0.0	0.0	0.0	0.0	11.8	11.8	8.0	8.0	0.0	0.0	0.00	0.00
WS03	0.0	0.0	0.0	0.0	6.8	6.8	13.0	13.0	0.0	0.0	0.00	0.00
WS06	48.9	3.9	68.4	15.6	14.0	3.4	0.0	16.4	0.0	0.0	0.61	0.13

Summary Tables:

ALL HOLES (MAX)	48.9	3.9	68.4	15.6	14.0	11.8	13.0	16.4	0.0	0.0		
ALL HOLES (Steady)											0.61	0.46
ALL HOLES (Peak)											33.45	6.85

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----- Illustrative of landfill gas migration based on a source gas of 60%:40% CH₄:CO₂ & assuming no chemical changes or oxidation of CH₄ (below 20% CH₄ and 13% CO₂ migration relationship becomes unclear)

----- Indicative of microbial respiration of organic materials in soil (Zero methane and low flow)

● Indicative of ambient air (80% N₂, 20% O₂) with zero methane and carbon dioxide

● Indicative of geogenic gas

● Indicative of landfill gas

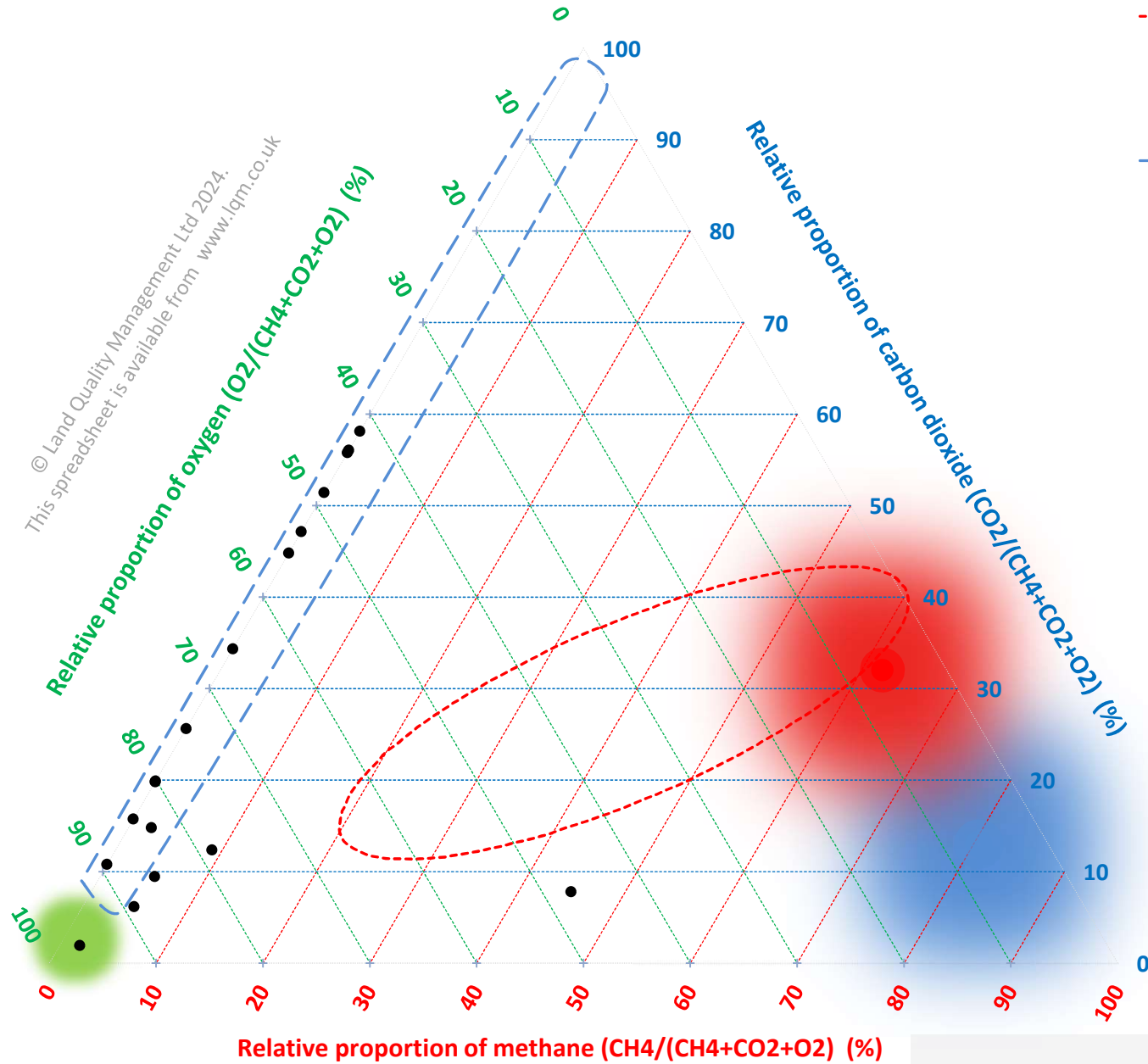
● Gas data



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----- Illustrative of landfill gas migration based on a source gas of 60%:40% $CH_4:CO_2$ & assuming no chemical changes or oxidation of CH_4 (below 20% CH_4 and 13% CO_2 migration relationship becomes unclear)

--- Indicative of air / CO_2 mixing

● Indicative of ambient air (80% N_2 , 20% O_2) with zero methane and carbon dioxide

● Indicative of geogenic gas

● Indicative of landfill gas

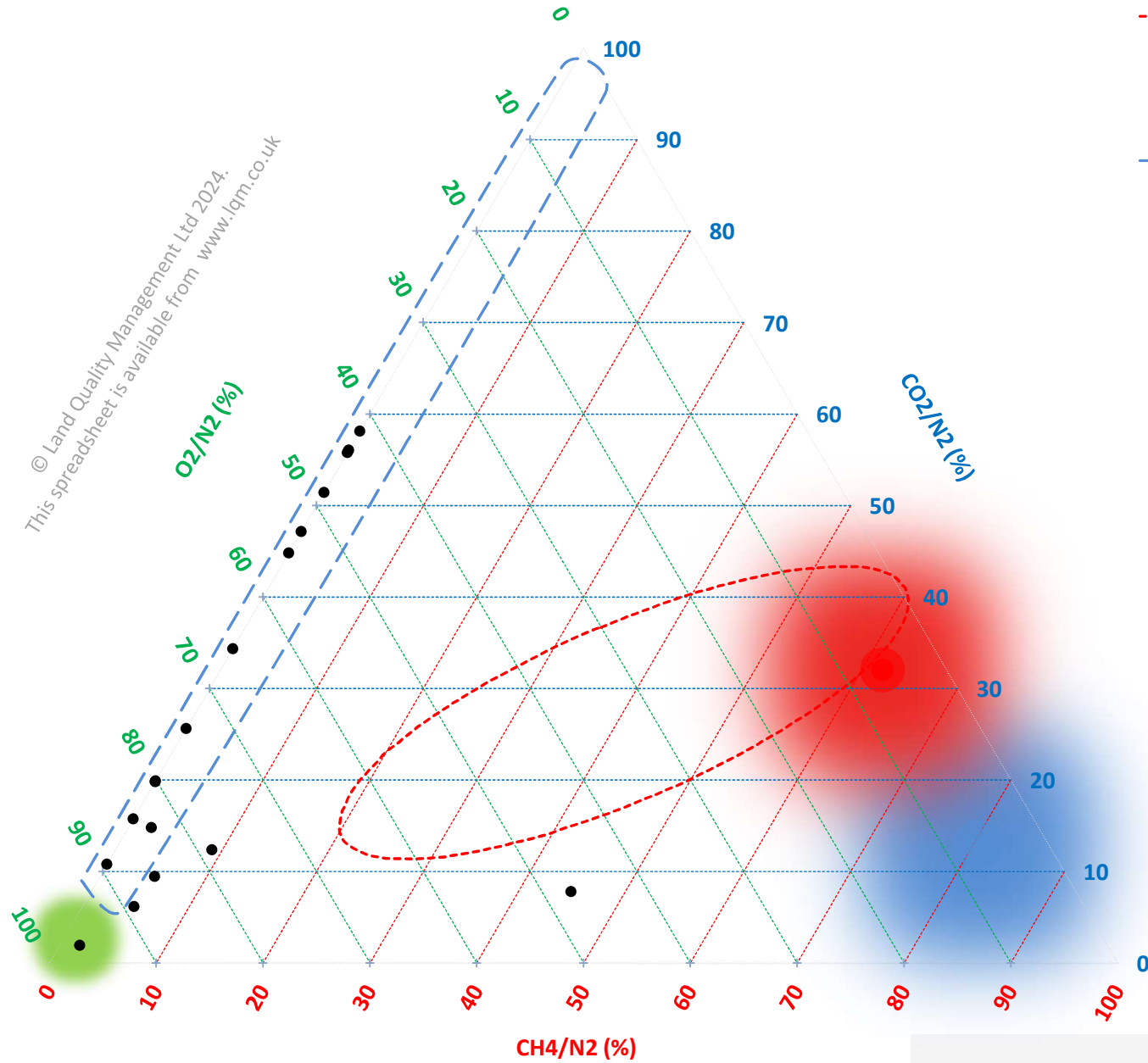
● Gas data



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--- Illustrative of landfill gas migration based on a source gas of 60%:40% CH₄:CO₂ & assuming no chemical changes or oxidation of CH₄ (below 20% CH₄ and 13% CO₂ migration relationship becomes unclear)

--- Indicative of air / CO₂ mixing

● Indicative of ambient air (80% N₂, 20% O₂) with zero methane and carbon dioxide

● Indicative of geogenic gas

● Indicative of landfill gas

● Gas data



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