

# CONDITION 04

## Remediation / Verification

**PROJECT**

DEMOLISH EXISTING MOT CENTRE AND CONSTRUCT ONE BLOCK OF NINE FLATS WITH ASSOCIATED CAR PARKING AND AMENITY

**AT CHESTNUT SERVICE GARAGE, CRAYS HILL, BILLERICAY CM11 2YA**

**APPEAL REFERENCE**

APP/V1505/W/17/3184817 (Decision 23.01.2018)

**PLANNING REFERENCE**


17/00484/FUL (Decision 13.07.2017)

**CONTENTS:**

01) Remediation and Verification Report

REV. NO.	DATE	DESCRIPTION
A	07.03.19	Issued
B	01.11.23	As built photos and report of membrane added.

# G E O

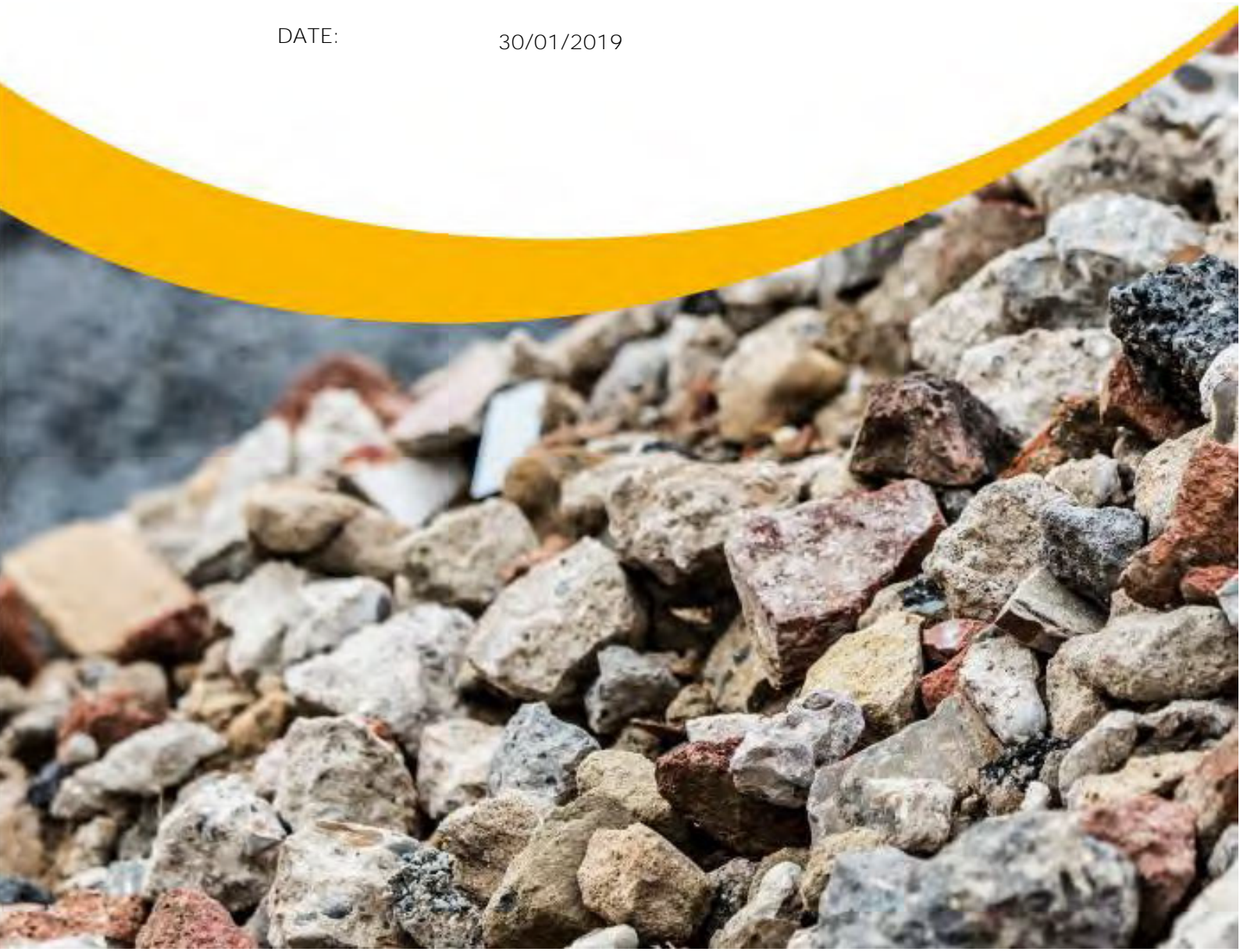


**GEOSPHERE ENVIRONMENTAL**

REPORT NUMBER: 3521,GI/VA/CS,TP/30-01-19/V1

SITE: Chestnuts, Crays Hill, Billericay, Essex, CM11 2YA

DATE: 30/01/2019





## DOCUMENT CONTROL SHEET

Report Number: 3521,GI/VA/CS,TP/30-01-19/V1  
Client: Brookman Capital Ltd  
Project Name: Chestnuts, Crays Hill, Billericay, Essex, CM11 2YA  
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## REVISION RECORD

Revision	Date	Revision Details	Prepared By:	Admin
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## 1. INTRODUCTION

Geosphere Environmental Ltd was commissioned by the Client, Brookman Capital Ltd, to undertake Remediation and Validation works at Chestnuts, Crays Hill, Billericay, Essex, CM11 2YA.

It was understood that the site is to be developed to comprise of a two and a half-storey building of nine flats over three floors, with 17 car parking spaces and associated landscaping and external amenity space for future residents.

The works undertaken within this report, are in accordance with the requirements detailed within the Geosphere Environmental Ltd Remediation Method Statement (RMS) – see section 2.1.

This report details the remediation works undertaken to mitigate the risks identified to ground workers and future site users, from contamination identified at the site.

### 1.1 Objectives

This completion report is intended to provide verification that the recommended risk mitigation methodology had been satisfactorily carried out, thereby confirming that the soil contamination source has been removed/covered.

The main objectives of this report are:

- Detail remedial and validation works undertaken;
- To highlight any amendments to the original remediation strategy made during the construction works;
- To recommend, if required, further mitigation measures to render the site suitable for its intended residential end-use.

### 1.2 Report Limitations and Conditions

This report refers, within the limitations stated, to the data supplied by Geosphere Environmental Ltd.

The comments given in this report, and the opinions expressed herein, are based upon the readily available information collated for the report, and an assessment based upon the current UK guidance, primarily the Contaminated Land Research, (CLR), Reports, and most importantly CLR Report 3, (ref. R.2.)

This report has been prepared for the sole use of the Client, for the purposes described, and no extended duty of care to any third party is implied or offered. Third parties using any information contained within this report do so at their own risk.



The report has been prepared in relation to the proposed end-use, should another end-use be intended a further reassessment may be required. It is likely that over time, practises will change and the relevant guidance and legislation be amended or superseded, which may necessitate a reassessment of the site.

The report is limited to those aspects of land contamination specifically reported on and is necessarily qualified accordingly, no liability shall be accepted for other aspects which may be the result of gradual or sudden pollution incidents, past or present unrecorded land uses both on and off site, and the potential for associated contaminant migration. The opinions expressed cannot be absolute, due to the limitations of time and resources imposed by the agreed brief.

The recorded test results should be regarded as a limited, but likely representative sample of the conditions encountered. The presence of the contamination at potentially elevated levels between the current exploratory holes, cannot be discounted.

The accuracy of any map extracts cannot be guaranteed. It is possible that different conditions existed on site, between and subsequent to the various map surveys appended.

Whilst the report may express an opinion upon possible configurations of strata between or beyond exploratory holes discussed, or on the possible presence of features based upon visual, verbal or published evidence, this is for guidance only, and no liability can be accepted for its accuracy.

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## 2. BACKGROUND

### 2.1 Reports by Geosphere Environmental Ltd

Geosphere Environmental Limited has been present during the majority of the CLR11 process, to undertake environmental assessment at the site, and ultimately develop a remediation strategy for managing the risks posed by identified contamination at the site.

### 2.2 Phase 1 Desk Study and Phase 2 Site Investigation Report – Geosphere Environmental Ltd, March 2018

A Phase 1 Desk Study and Phase 2 Site Investigation Report was undertaken by Geosphere Environmental Ltd in March 2018:

- **'Phase 1 and 2 – Desk Study and Site Investigation Report For A Proposed Residential Development – Chestnuts, Crays Hill, Billericay, Essex, CM11 2YA'**, Report Reference No. 2871,SI/SITEINV/GF,TP/08.03.2018/V1

The report summarised that:

- Based upon the findings of the desk study and walkover some contaminant sources and pathways to potential receptors had been identified – mainly human health receptors as significant contamination to controlled waters was considered unlikely based on the geologic data available and supported by shallow intrusive works;
- Asbestos – Quantification of asbestos within selected samples where presence was noted to be undertaken;
- Heavy Metals – A single exceedance of lead was encountered within exploratory hole WS08, located within the soft landscaped areas;
- Hydrocarbons – Hydrocarbons were encountered above threshold values within exploratory locations WS7 and WS12.

### 2.3 Remediation Method Statement – Geosphere Environmental Ltd, March 2018

A remediation method statement was prepared by Geosphere Environmental in March 2018:

- **'Remediation Method Statement For A Proposed Residential Development – Chestnuts, Crays Hill, Billericay, Essex, CM11 2YA'**, Report Reference No. 2871,SI/RMS/TP,PD/26-03-18/V2.

Asbestos quantification was also completed as recommended by the site investigation and determined the concentration of asbestos fibres to be very low, falling within a concentration 0.001% wt/wt to <0.01% wt/wt and therefore no further works were recommended.

## 2.4 Ground Gas Monitoring Summary

Although not strictly remediation, the previous report recommended either gas monitoring or a hydrocarbon resistant membrane be installed over the footprint of the development.

Ground gas monitoring has been omitted and it is anticipated that a specialist supplier/installer will provide the details of the membrane and specify a suitable product - a GX Flexi Hydrocarbon Barrier manufactured by Visqueen or equivalent membrane will likely be used.

Once completed the installation should be independently verified by a third party.

This will not be able to be completed until initial groundworks and development have taken place, and as such will not be completed until foundations in this phase of the site has been completed.

Details of installation and validation of the process should be retained and supplied to the local authority once completed.



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### 3. PROPOSED REMEDIATION METHOD SCHEME

#### 3.1 Objectives of the Proposed Remediation

The objective of the overall remediation works is to provide an economic and feasible methodology in line with current UK government guidelines, by:

- Breaking the source-pathway-receptor linkage;
- Mitigating identified significant risks to receptors.

The proposed scheme has the following key objectives:

- To limit the potential exposure, from elevated metal (lead) and Hydrocarbon determinants identified in the soil, to sensitive receptors such as human health end user and construction/maintenance worker receptors.

#### 3.2 Proposed Remedial and Investigative Strategy

This remediation strategy provided an outline but integrated solution, aiming to remediate or mitigate against the identified factors and reduce future remediation costs.

The remedial process was to be controlled by regular verification and validation testing throughout, to ensure the site-specific targets for re-use have been satisfied and the risk to receptors was suitably low.

On the basis of the available site data, the following key operations were required in order to deliver a site suitable for residential development:

- Removal of underground tanks that were considered the most likely source of contamination with other buried infrastructure, potentially acting as reservoirs to contamination. Following lines of best practice, it should be assumed that hydrocarbons were still present within the tanks toward the south of the site. The tanks and any pipework leading toward should be exposed along the entire length of the run and the surrounding soils be inspected for evidence of leakages. Any liquids remaining within the system should be transferred into a drum or IBC for removal from site, in order to minimise the risk of fugitive releases of product when the structures were excavated. Decommissioning and removal of underground tanks would remain the responsibility of the developer and their contractors, with a suitably qualified and experienced environmental consultant overseeing the works;
- Excavation of hydrocarbon impacted areas, primarily focussed on the areas highlighted in Drawing ref. 3521,GI,004/Rev 0 in Appendix 4 of this report. Dewatering and water disposal to be undertaken if required. Soils removed from the site should be appropriately classified and disposed of to a properly licensed facility with all transfer notes retained for inspection, and incorporated into verification

reporting. Primarily, soils will be screened on site via field identification methods (hydrocarbon odour, iridescence seen on soils and VOC detection using a PID MultiRAE Lite gas analyser). It was anticipated that overlying uncontaminated soils would be stripped back and only contaminated soils segregated during removal would be segregated for disposal. These would need to be placed on polythene sheeting and covered to prevent run-off occurring;

- The above excavation should also have been validated appropriately in order to prove that impacted soils have been removed, using the most stringent human health guideline values as a rough screening tool. The supervising environmental consultant would ultimately determine the extent of remedial excavation, sufficient to obtain appropriate validation. Further investigation (post remediation) may have been required;
- The sensitive areas for end users, (soft landscaping areas), should be subject to a soil cover system. The conservative design would comprise of the excavation of areas of soft landscaping to ensure a 600mm cover system is present from the finished ground level;
- **The importation and placement of chemically 'clean' and suitable for use subsoil and topsoil if required.** Alternatively, where site won soil was to be re-used for landscaping/garden areas, it must be verified, (via chemical analysis), that it was suitable for use;
- Installation of a suitable VOC resistant membrane i.e. Visqueen Flexi Hydrocarbon Barrier or similar, under affected areas with a qualified and competent quality control installation and validation;
- Information and records from the above works are to be compiled and included within a validation or completion report for the site, to be subsequently issued to the regulatory authorities, (detailed below). The report may also include recommendations for any further works.

### 3.3 Potential Variations from Agreed Scheme

The proposed scheme outlined above has the potential for further contamination across the site to be encountered, so vigilance should be paid during remedial investigative and groundwork activities. The outline Discovery Strategy included in this remedial strategy provides further guidance should contamination be encountered.

### 3.4 Validation and Reporting

A Remediation Validation / Verification Report will be prepared upon completion of the works including any recommendations for further works.

### 3.5 Imported Materials (if any are imported) or Site Won Soils for Use in Cover System

Any imported or site won topsoil or subsoil would be chemically suitable for use. The chemical criteria for imported soils is based upon the industry recognised **Environment Agency's Soil Guideline Values, (SGV), and LQM/CIEH's Generic Assessment Criteria, (GAC), and S4UL criteria for residential with private garden end use/plant uptake.**

Furthermore, soils used for backfilling would be compacted in layers to avoid subsequent settlement. Specific engineering of this should be sought from the scheme structural engineer and landscaping engineer.

### 3.6 Watching Brief / Discovery Strategy

There is the possibility that other sources of contamination may be present on the site which were not detected during the investigation. Should such contamination be identified or suspected during the site clearance or groundworks, these should be dealt with accordingly. A number of options are available for handling this material, which include:

- Having on-call a suitably experienced Environmental or Remediation Engineer/Consultant to assess any suspected contaminated material on the site;
- Sampling of any additional suspected contaminated material should be undertaken for verification purposes;
- If it is not feasible to keep the suspected material in-situ, then these should be removed and temporarily stored in a fenced area, whilst verification is undertaken. The storage area should be secured and contained to ensure that contamination does not migrate and affect other areas of the site. Depending upon the amounts of material under consideration, this could be either a skip or a lined area;
- If the suspected contaminated material is dry or is suspected to contain asbestos, the material should be dampened and covered to prevent airborne contamination in the form of dust or fibres;
- Upon verification of the suspected contamination the impacted material may be either treated or removed from site following suitable waste management licensing, or obtaining appropriate consents or agreements with relevant Regulatory Authorities;
- All contaminated material to be removed from site should be disposed of at a suitably licensed tip;
- Following excavation and removal any open excavations or service trenches should be backfilled with **soil that is suitable and certified as 'clean' (this may be either site-won or imported)**;
- This discovery strategy is applicable during both the remedial works and the construction phase of the development. Should for example, asbestos be identified in the excavation of a service run then the above procedures should be followed.



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## 4. REMEDIATION AND VERIFICATION

The proposed methodology for the mitigation of risks from contaminated soils was excavation, with suitable disposal and verification.

A suitably experienced person from Geosphere Environmental Limited, attended site during the tank removal works and during the excavation of impacted soils.

### 4.1 Heavy Metal (Lead) Impacted Soil Excavation

Removal of soil with elevated lead concentrations was undertaken at one location (VA6), using 'hotspot' removal techniques, supervised by a qualified and competent geo-environmental consultant of Geosphere Environmental Ltd on 15 November 2018. Soil was removed to a depth of 2.0m bgl, beneath the exceedance soil horizon (0.8m bgl), with impacted soils stockpiled, validated and then disposed of offsite with haulage and disposal undertaken by SRH Construction and Demolition.

### 4.2 Hydrocarbon Impacted Soil Excavation

Removal of the hydrocarbon impacted soil at six locations on the site **was undertaken by 'chasing' evidence** of visual or olfactory contamination and utilising PID readings from the former tank location source at the south of the site. This was undertaken in a controlled and phased manner by SRH Construction and Demolition over various sporadic dates October and into November 2018 under the supervision of Geosphere Environmental.

The areas excavated were large, in comparison to the site and access constraints, so to successfully and safely excavate the material, while also obtaining validation samples, a phased plan was developed between SRH Demolition and Construction and Geosphere Environmental.

Soils were excavated by stripping and stockpiling un-impacted overburden from the frontage of the site, and impacted soils were contained upon impermeable sheeting. This location was adjacent to the only access for lorries and was subsequently transferred to grab lorries and disposed of offsite.

Validation works started on 11 October 2018. Samples from the frontal impacted area were designated VA1 East, West, North, South and Base. Laboratory analysis of the samples indicated that exceedances of threshold values were still present within the base of the excavation (2.3m bgl).

Deepening of the excavation beneath VA1 and extension into the interceptor area (VA2) and exploratory hole WS7 (VA3), was undertaken on the 14 November 2018. Subsequent days included the removal of impacted soil around the former tanks in the frontal portion of the site (VA4 and VA7) and tracing / removing a damaged drainage pipe with obvious hydrocarbon contamination and surrounding soil at exploratory location WS12 (VA5). Validation was completed on 16 November 2018.

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Validation laboratory results are included in Appendix 3 of this report, and cover the following validation samples:

- Validation samples VA1 were obtained on 11 October 2018 - DETS laboratory results ref: 18-83727.1;
- Validation samples VA1 to VA3 were obtained on 14 November 2018 – DETS laboratory results ref: 18-85281.1;
- Validation samples VA4 to VA6 were obtained on 15 November 2018 – DETS laboratory results ref: 18-29862;
- Validation samples VA7 were obtained on 16 November 2018 – DETS laboratory results ref: 18- 85486.1.

Please refer to the validation location sampling plan, Drawing ref: 3521,GI,004/Rev 0, Remediation Locations included within Appendix 5 of this report to show locations of sampling.

No groundwater, or impacted groundwater was encountered during the works.

The waste tickets provided by the groundworks contractor that undertook muckaway, are included within Appendix 6 of this report.

#### 4.3 Variations from Proposed Strategy

The remedial works did not deviate from the agreed strategy, previous discussed.

#### 4.4 Backfill and Imported Soils

The excavations were backfilled with the overburden recovered from the remedial excavations which had previously been investigated as part of the original investigation. The majority of the site is also due to be covered by hardstanding.

It is anticipated that there will be a small amount of soft landscaping in the proposed development, once complete. If any soils are imported than the recommendations from Section 4.3 of the RMS still apply.

## 5. CONCLUSIONS AND RECOMMENDATIONS

### 5.1 Conclusions

On the basis of the validation works, the remediation specified by the remedial strategy for the site has been completed and validated to an acceptable degree, and the risks posed by the sources of hydrocarbon soil contamination to the proposed development and environmental receptors has been mitigated. The waste soil disposal information should be retained for record by the client.

The ground gas recommendations are still in place but are not covered by the scope of this report. It is anticipated that a separate report on installation and validation of the gas membrane will be provided by the companies who undertake those elements of the site development.

### 5.2 Recommendations

This report should be forwarded to the council for submission to discharge planning conditions.

The watching brief detailed in section 3.6 of this report should remain in place during development, should any anomalous materials be encountered during development works.

It is anticipated that there will be a small amount of soft landscaping in the proposed development once complete. If any soils are imported then the recommendations from Section 4.3 of the RMS still apply (or section 3.5 of this report).



# APPENDICES

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## Appendix 1 – Report Limitations and Conditions

This report refers, within the limitations stated, to the condition of the site at the time of the inspections. No warranty is given as to the possibility of future changes in the condition of the site.

The comments given in this report, and the opinions expressed herein, are based upon the readily available information collated for the report and an assessment based upon the current UK guidance, primarily the Contaminated Land Research (CLR) Reports, and most importantly CLR Report 3, (ref. R.2).

This report has been prepared for the sole use of the Client for the purposes described and no extended duty of care to any third party is implied or offered. Third parties using any information contained within this report do so at their own risk.

This report is prepared and written for the use stated herein; it should not be used for any other purposes without reference to Geosphere Environmental Limited. The report has been prepared in relation to the proposed end-use should another end-use be intended a further re-assessment may be required. It is likely that over time practises will improve and the relevant guidance and legislation be amended or superseded, which may necessitate a re-assessment of the site.

The report is limited to those aspects of land contamination specifically reported on and is necessarily qualified accordingly, no liability shall be accepted for other aspects which may be the result of gradual or sudden pollution incidents, past or present unrecorded land uses both on- and off- site and the potential for associated contaminant migration. The opinions expressed cannot be absolute due to the limitations of time and resources imposed by the agreed brief.

The accuracy of any map extracts cannot be guaranteed. It is possible that different conditions existed on site, between and subsequent to the various map surveys appended.

Whilst the report may express an opinion on possible configurations of strata between or beyond exploratory holes discussed or on the possible presence of features based on visual, verbal or published evidence, this is for guidance only and no liability can be accepted for its accuracy.

The conceptual model is based on the information available at the time of conducting this assessment and is an interpretative assessment of the conditions at the site. It should be noted that the redevelopment and/or further investigation of the site may reveal additional information and therefore alter the conceptual model and the conclusion of this report.

## Appendix 2 – References

- R.1.** CLR 4, 'Sampling strategies for contaminated land'. Report by The Centre for Research into the Built Environment, the Nottingham Trent University, DoE, 1994.
- R.2.** CLR 3, 'Documentary research on industrial sites'. Report by the Department of the Environment: Contaminated Land Research Report, DoE 1994.
- R.3.** CLR 11, 'Model procedures for the management of contaminated land: Risk assessment procedure', DoE 2011.
- R.4.** BRE Digest 465, 'Cover Systems for Land Regeneration – Thickness Cover Systems for Contaminated Land', 2004.
- R.5.** British Standards Institute: BS 10175 'Code of practice for the investigation of potentially contaminated sites', BSI 2011+A1:2013.
- R.6.** British Standards Institute: BS 5930 'Code of practice for ground investigations', 2015.
- R.7.** SP1010 – Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, Final Project Report (Revision 2), Contaminated Land: Applications in Real Environments (CL:AIRE) September 2014.

## **Appendix 3 – Laboratory Analysis Test Reports**

18-83727.1

18-85281.1

18-29862

18-85486.1



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## DETS Report No: 18-83727

Site Reference: Chestnuts, Cray Hill

Project / Job Ref: 2871,SI

Order No: None Supplied

Sample Receipt Date: 17/10/2018

Sample Scheduled Date: 17/10/2018

Report Issue Number: 1

Reporting Date: 19/10/2018

Authorised by:

Russell Jarvis  
Associate Director of Client Services

**Soil Analysis Certificate**

<b>DETS Report No: 18-83727</b>	<b>Date Sampled</b>	11/10/18	11/10/18	11/10/18
<b>Geosphere Environmental Ltd</b>	<b>Time Sampled</b>	None Supplied	None Supplied	None Supplied
<b>Site Reference: Chestnuts, Cray Hill</b>	<b>TP / BH No</b>	VA1 SP	VA1 SP	VA1 SP
<b>Project / Job Ref: 2871,SI</b>	<b>Additional Refs</b>	J1	J2	J3
<b>Order No: None Supplied</b>	<b>Depth (m)</b>	None Supplied	None Supplied	None Supplied
<b>Reporting Date: 19/10/2018</b>	<b>DETS Sample No</b>	366701	366702	366703

Determinand	Unit	RL	Accreditation			
Asbestos Screen <sup>(S)</sup>	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected
pH	pH Units	N/a	MCERTS	8.8	9.9	8.5
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2
Complex Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2
Free Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2
W/S Sulphate as SO <sub>4</sub> (2:1)	mg/l	< 10	MCERTS	151	221	20
W/S Sulphate as SO <sub>4</sub> (2:1)	g/l	< 0.01	MCERTS	0.15	0.22	0.02
Organic Matter	%	< 0.1	MCERTS	1	0.5	0.7
Arsenic (As)	mg/kg	< 2	MCERTS	12	12	15
Barium (Ba)	mg/kg	< 5	NONE	56	75	28
Beryllium (Be)	mg/kg	< 0.5	NONE	1.1	0.8	0.8
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	49	39	56
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	22	17	16
Lead (Pb)	mg/kg	< 3	MCERTS	28	26	8
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1	< 1
Molybdenum (Mo)	mg/kg	< 1	NONE	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	34	23	19
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3
Vanadium (V)	mg/kg	< 2	NONE	65	52	72
Zinc (Zn)	mg/kg	< 3	MCERTS	71	66	37

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C  
 Subcontracted analysis (S)

Soil Analysis Certificate - Speciated PAHs					
<b>DETS Report No: 18-83727</b>	<b>Date Sampled</b>	11/10/18	11/10/18	11/10/18	
<b>Geosphere Environmental Ltd</b>	<b>Time Sampled</b>	None Supplied	None Supplied	None Supplied	
<b>Site Reference: Chestnuts, Cray Hill</b>	<b>TP / BH No</b>	VA1 SP	VA1 SP	VA1 SP	
<b>Project / Job Ref: 2871,SI</b>	<b>Additional Refs</b>	J1	J2	J3	
<b>Order No: None Supplied</b>	<b>Depth (m)</b>	None Supplied	None Supplied	None Supplied	
<b>Reporting Date: 19/10/2018</b>	<b>DETS Sample No</b>	366701	366702	366703	

Determinand	Unit	RL	Accreditation				
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	0.24	< 0.1	
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	0.16	< 0.1	
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	0.14	< 0.1	
Fluorene	mg/kg	< 0.1	MCERTS	0.20	0.38	< 0.1	
Phenanthrene	mg/kg	< 0.1	MCERTS	0.26	0.99	< 0.1	
Anthracene	mg/kg	< 0.1	MCERTS	0.18	0.37	< 0.1	
Fluoranthene	mg/kg	< 0.1	MCERTS	0.38	1.36	< 0.1	
Pyrene	mg/kg	< 0.1	MCERTS	0.35	1.19	< 0.1	
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.33	0.73	< 0.1	
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	0.44	< 0.1	
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.27	0.77	< 0.1	
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.23	< 0.1	
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.16	0.49	< 0.1	
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.36	0.60	< 0.1	
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.37	< 0.1	
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.23	0.42	< 0.1	
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	2.7	8.9	< 1.6	

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C

Soil Analysis Certificate - TPH CWG Banded						
<b>DETS Report No: 18-83727</b>	<b>Date Sampled</b>	11/10/18	11/10/18	11/10/18	11/10/18	11/10/18
<b>Geosphere Environmental Ltd</b>	<b>Time Sampled</b>	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
<b>Site Reference: Chestnuts, Cray Hill</b>	<b>TP / BH No</b>	VA1 East	VA1 East	VA1 West	VA1 West	VA1 North
<b>Project / Job Ref: 2871,SI</b>	<b>Additional Refs</b>	J1	J2	J1	J2	J1
<b>Order No: None Supplied</b>	<b>Depth (m)</b>	2.20	2.20	2.20	2.20	2.20
<b>Reporting Date: 19/10/2018</b>	<b>DETS Sample No</b>	366691	366692	366693	366694	366695

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	0.03	0.03	0.02	< 0.01	0.07
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	0.08	< 0.05	0.15
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	15	21	15
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	41	54	31
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3	76	93	28
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	18	32	< 3
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21	< 21	150	200	74
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	13	16	8
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2	< 2	74	77	28
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	38	41	< 3
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21	< 21	125	134	37
Total >C5 - C35	mg/kg	< 42	NONE	< 42	< 42	275	334	110

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C



Soil Analysis Certificate - TPH CWG Banded						
<b>DETS Report No: 18-83727</b>	<b>Date Sampled</b>	11/10/18	11/10/18	11/10/18	11/10/18	11/10/18
<b>Geosphere Environmental Ltd</b>	<b>Time Sampled</b>	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
<b>Site Reference: Chestnuts, Cray Hill</b>	<b>TP / BH No</b>	VA1 North	VA1 South	VA1 South	VA1 Base	VA1 Base
<b>Project / Job Ref: 2871,SI</b>	<b>Additional Refs</b>	J2	J1	J2	J1	J2
<b>Order No: None Supplied</b>	<b>Depth (m)</b>	2.20	2.20	2.20	2.30	2.30
<b>Reporting Date: 19/10/2018</b>	<b>DETS Sample No</b>	366696	366697	366698	366699	366700

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	0.11	0.09
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	0.33	0.31
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	27	476
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	40	647
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3	< 3	56	876
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3	19	505
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	135
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21	< 21	< 21	143	2638
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	0.02	0.09
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	0.60	11.50
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	2	< 2	< 2	36	943
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	5	< 2	< 2	59	700
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	15	< 2	< 2	138	1071
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	23	< 3	< 3	94	519
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	16	< 10	< 10	31	109
Aromatic (C5 - C35)	mg/kg	< 21	NONE	61	< 21	< 21	358	3354
Total >C5 - C35	mg/kg	< 42	NONE	61	< 42	< 42	500	5992

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C

Soil Analysis Certificate - TPH CWG Banded					
<b>DETS Report No: 18-83727</b>	<b>Date Sampled</b>	11/10/18	11/10/18	11/10/18	
<b>Geosphere Environmental Ltd</b>	<b>Time Sampled</b>	None Supplied	None Supplied	None Supplied	
<b>Site Reference: Chestnuts, Cray Hill</b>	<b>TP / BH No</b>	VA1 SP	VA1 SP	VA1 SP	
<b>Project / Job Ref: 2871,SI</b>	<b>Additional Refs</b>	J1	J2	J3	
<b>Order No: None Supplied</b>	<b>Depth (m)</b>	None Supplied	None Supplied	None Supplied	
<b>Reporting Date: 19/10/2018</b>	<b>DETS Sample No</b>	366701	366702	366703	

Determinand	Unit	RL	Accreditation				
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	0.04	0.08	< 0.01	
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	0.28	0.47	< 0.05	
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	16	19	< 2	
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	37	27	< 2	
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	95	41	< 3	
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	51	11	< 3	
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	< 10	< 10	
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	199	99	< 21	
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	11	< 2	
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	13	31	< 2	
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	78	85	< 2	
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	57	63	< 3	
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10	16	< 10	
Aromatic (C5 - C35)	mg/kg	< 21	NONE	148	205	< 21	
Total >C5 - C35	mg/kg	< 42	NONE	347	304	< 42	

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C



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Soil Analysis Certificate - BTEX / MTBE						
<b>DETS Report No: 18-83727</b>	<b>Date Sampled</b>	11/10/18	11/10/18	11/10/18	11/10/18	11/10/18
<b>Geosphere Environmental Ltd</b>	<b>Time Sampled</b>	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
<b>Site Reference: Chestnuts, Cray Hill</b>	<b>TP / BH No</b>	VA1 East	VA1 East	VA1 West	VA1 West	VA1 North
<b>Project / Job Ref: 2871,SI</b>	<b>Additional Refs</b>	J1	J2	J1	J2	J1
<b>Order No: None Supplied</b>	<b>Depth (m)</b>	2.20	2.20	2.20	2.20	2.20
<b>Reporting Date: 19/10/2018</b>	<b>DETS Sample No</b>	366691	366692	366693	366694	366695

Determinand	Unit	RL	Accreditation					
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	53
p & m-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	165
o-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	73
MTBE	ug/kg	< 5	MCERTS	31	26	< 5	< 5	< 5

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C



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Soil Analysis Certificate - BTEX / MTBE						
<b>DETS Report No: 18-83727</b>	<b>Date Sampled</b>	11/10/18	11/10/18	11/10/18	11/10/18	11/10/18
<b>Geosphere Environmental Ltd</b>	<b>Time Sampled</b>	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
<b>Site Reference: Chestnuts, Cray Hill</b>	<b>TP / BH No</b>	VA1 North	VA1 South	VA1 South	VA1 Base	VA1 Base
<b>Project / Job Ref: 2871,SI</b>	<b>Additional Refs</b>	J2	J1	J2	J1	J2
<b>Order No: None Supplied</b>	<b>Depth (m)</b>	2.20	2.20	2.20	2.30	2.30
<b>Reporting Date: 19/10/2018</b>	<b>DETS Sample No</b>	366696	366697	366698	366699	366700

Determinand	Unit	RL	Accreditation					
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	16	86
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	598	11449
Ethylbenzene	ug/kg	< 2	MCERTS	5	3	< 2	1047	7417
p & m-xylene	ug/kg	< 2	MCERTS	12	7	< 2	4864	146130
o-xylene	ug/kg	< 2	MCERTS	13	7	< 2	2822	76929
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C



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Soil Analysis Certificate - BTEX / MTBE						
<b>DETS Report No: 18-83727</b>	<b>Date Sampled</b>	11/10/18	11/10/18	11/10/18		
<b>Geosphere Environmental Ltd</b>	<b>Time Sampled</b>	None Supplied	None Supplied	None Supplied		
<b>Site Reference: Chestnuts, Cray Hill</b>	<b>TP / BH No</b>	VA1 SP	VA1 SP	VA1 SP		
<b>Project / Job Ref: 2871,SI</b>	<b>Additional Refs</b>	J1	J2	J3		
<b>Order No: None Supplied</b>	<b>Depth (m)</b>	None Supplied	None Supplied	None Supplied		
<b>Reporting Date: 19/10/2018</b>	<b>DETS Sample No</b>	366701	366702	366703		

Determinand	Unit	RL	Accreditation				
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	
Toluene	ug/kg	< 5	MCERTS	37	42	< 5	
Ethylbenzene	ug/kg	< 2	MCERTS	36	80	< 2	
p & m-xylene	ug/kg	< 2	MCERTS	243	255	< 2	
o-xylene	ug/kg	< 2	MCERTS	148	457	< 2	
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C



Soil Analysis Certificate - Sample Descriptions	
<b>DETS Report No: 18-83727</b>	
<b>Geosphere Environmental Ltd</b>	
<b>Site Reference: Chestnuts, Cray Hill</b>	
<b>Project / Job Ref: 2871,SI</b>	
<b>Order No: None Supplied</b>	
<b>Reporting Date: 19/10/2018</b>	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
366691	VA1 East	J1	2.20	16.3	Brown sandy clay
366692	VA1 East	J2	2.20	16.5	Brown sandy clay
366693	VA1 West	J1	2.20	16.9	Brown sandy clay
366694	VA1 West	J2	2.20	17	Brown sandy clay
366695	VA1 North	J1	2.20	15.4	Brown sandy clay
366696	VA1 North	J2	2.20	14.5	Brown sandy clay
366697	VA1 South	J1	2.20	15.8	Brown sandy clay
366698	VA1 South	J2	2.20	13.7	Brown sandy clay
366699	VA1 Base	J1	2.30	15.3	Brown sandy clay with stones
366700	VA1 Base	J2	2.30	16.6	Brown sandy clay
366701	VA1 SP	J1	None Supplied	14.9	Brown sandy clay
366702	VA1 SP	J2	None Supplied	13.5	Brown sandy clay with stones
366703	VA1 SP	J3	None Supplied	13.9	Brown sandy clay

*Moisture content is part of procedure E003 & is not an accredited test*

Insufficient Sample <sup>I/S</sup>

Unsuitable Sample <sup>U/S</sup>

<b>Soil Analysis Certificate - Methodology &amp; Miscellaneous Information</b>	
DETS Report No: 18-83727	
Geosphere Environmental Ltd	
Site Reference: Chestnuts, Cray Hill	
Project / Job Ref: 2871,SI	
Order No: None Supplied	
Reporting Date: 19/10/2018	

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

**D Dried**  
**AR As Received**



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## **DETS Report No: 18-85281**

**Site Reference:** Crays Hill

**Project / Job Ref:** 2871

**Order No:** None Supplied

**Sample Receipt Date:** 16/11/2018

**Sample Scheduled Date:** 16/11/2018

**Report Issue Number:** 1

**Reporting Date:** 22/11/2018

**Authorised by:**

Dave Ashworth  
Deputy Quality Manager

**Authorised by:**



**Soil Analysis Certificate - TPH CWG Banded**

<b>DETS Report No: 18-85281</b>	<b>Date Sampled</b>	14/11/18	14/11/18	14/11/18	14/11/18	14/11/18
<b>Geosphere Environmental Ltd</b>	<b>Time Sampled</b>	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
<b>Site Reference: Crays Hill</b>	<b>TP / BH No</b>	VA1 Base 1	VA1 Base 2	VA2 East	VA2 Base	VA2 South
<b>Project / Job Ref: 2871</b>	<b>Additional Refs</b>	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
<b>Order No: None Supplied</b>	<b>Depth (m)</b>	3.50	3.50	0.50	1.50	0.50
<b>Reporting Date: 22/11/2018</b>	<b>DETS Sample No</b>	372932	372933	372934	372935	372936

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	2	< 2	< 2
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3	12	6	7
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	7	< 3	5
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	< 10	38	70	15
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21	< 21	59	76	27
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2	< 2	10	4	< 2
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	31	27	12
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10	< 10	12	43	< 10
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21	< 21	53	73	< 21
Total >C5 - C35	mg/kg	< 42	NONE	< 42	< 42	112	149	< 42

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C



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Soil Analysis Certificate - TPH CWG Banded						
<b>DETS Report No: 18-85281</b>	<b>Date Sampled</b>	14/11/18	14/11/18	14/11/18	14/11/18	14/11/18
<b>Geosphere Environmental Ltd</b>	<b>Time Sampled</b>	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
<b>Site Reference: Crays Hill</b>	<b>TP / BH No</b>	VA2 West	VA2 North	VA3 NE	VA3 SW	VA3 Base 1
<b>Project / Job Ref: 2871</b>	<b>Additional Refs</b>	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
<b>Order No: None Supplied</b>	<b>Depth (m)</b>	0.50	0.50	1.50	1.50	2.40
<b>Reporting Date: 22/11/2018</b>	<b>DETS Sample No</b>	372937	372938	372939	372940	372941

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	3	< 2	< 2	< 2
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	15	< 3	< 3	< 3
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	6	< 3	< 3	< 3
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	22	< 10	< 10	< 10	< 10
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	22	24	< 21	< 21	< 21
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2	7	< 2	< 2	< 2
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	16	< 3	< 3	< 3
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21	23	< 21	< 21	< 21
Total >C5 - C35	mg/kg	< 42	NONE	< 42	47	< 42	< 42	< 42

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C



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Soil Analysis Certificate - TPH CWG Banded					
<b>DETS Report No: 18-85281</b>	<b>Date Sampled</b>	14/11/18	14/11/18	14/11/18	
<b>Geosphere Environmental Ltd</b>	<b>Time Sampled</b>	None Supplied	None Supplied	None Supplied	
<b>Site Reference: Crays Hill</b>	<b>TP / BH No</b>	VA3 NW	VA3 SE	VA3 Base 2	
<b>Project / Job Ref: 2871</b>	<b>Additional Refs</b>	None Supplied	None Supplied	None Supplied	
<b>Order No: None Supplied</b>	<b>Depth (m)</b>	1.50	1.50	2.40	
<b>Reporting Date: 22/11/2018</b>	<b>DETS Sample No</b>	372942	372943	372944	

Determinand	Unit	RL	Accreditation				
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21
Total >C5 - C35	mg/kg	< 42	NONE	< 42	< 42	< 42	< 42

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C



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Soil Analysis Certificate - BTEX / MTBE						
<b>DETS Report No: 18-85281</b>	<b>Date Sampled</b>	14/11/18	14/11/18	14/11/18	14/11/18	14/11/18
<b>Geosphere Environmental Ltd</b>	<b>Time Sampled</b>	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
<b>Site Reference: Crays Hill</b>	<b>TP / BH No</b>	VA1 Base 1	VA1 Base 2	VA2 East	VA2 Base	VA2 South
<b>Project / Job Ref: 2871</b>	<b>Additional Refs</b>	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
<b>Order No: None Supplied</b>	<b>Depth (m)</b>	3.50	3.50	0.50	1.50	0.50
<b>Reporting Date: 22/11/2018</b>	<b>DETS Sample No</b>	372932	372933	372934	372935	372936

Determinand	Unit	RL	Accreditation					
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Toluene	ug/kg	< 5	MCERTS	< 5	19	9	< 5	< 5
Ethylbenzene	ug/kg	< 2	MCERTS	< 2	17	< 2	< 2	< 2
p & m-xylene	ug/kg	< 2	MCERTS	< 2	60	< 2	10	< 2
o-xylene	ug/kg	< 2	MCERTS	< 2	20	< 2	< 2	< 2
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C





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Soil Analysis Certificate - BTEX / MTBE						
<b>DETS Report No: 18-85281</b>	<b>Date Sampled</b>	14/11/18	14/11/18	14/11/18	14/11/18	14/11/18
<b>Geosphere Environmental Ltd</b>	<b>Time Sampled</b>	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
<b>Site Reference: Crays Hill</b>	<b>TP / BH No</b>	VA2 West	VA2 North	VA3 NE	VA3 SW	VA3 Base 1
<b>Project / Job Ref: 2871</b>	<b>Additional Refs</b>	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
<b>Order No: None Supplied</b>	<b>Depth (m)</b>	0.50	0.50	1.50	1.50	2.40
<b>Reporting Date: 22/11/2018</b>	<b>DETS Sample No</b>	372937	372938	372939	372940	372941

Determinand	Unit	RL	Accreditation					
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
p & m-xylene	ug/kg	< 2	MCERTS	< 2	< 2	11	15	16
o-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	9	10
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C



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Soil Analysis Certificate - BTEX / MTBE					
<b>DETS Report No: 18-85281</b>	<b>Date Sampled</b>	14/11/18	14/11/18	14/11/18	
<b>Geosphere Environmental Ltd</b>	<b>Time Sampled</b>	None Supplied	None Supplied	None Supplied	
<b>Site Reference: Crays Hill</b>	<b>TP / BH No</b>	VA3 NW	VA3 SE	VA3 Base 2	
<b>Project / Job Ref: 2871</b>	<b>Additional Refs</b>	None Supplied	None Supplied	None Supplied	
<b>Order No: None Supplied</b>	<b>Depth (m)</b>	1.50	1.50	2.40	
<b>Reporting Date: 22/11/2018</b>	<b>DETS Sample No</b>	372942	372943	372944	

Determinand	Unit	RL	Accreditation				
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	
Ethylbenzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	
p & m-xylene	ug/kg	< 2	MCERTS	< 2	9	10	
o-xylene	ug/kg	< 2	MCERTS	< 2	6	5	
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C



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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/2								
DETS Report No: 18-85281		Date Sampled	14/11/18		<b>Landfill Waste Acceptance Criteria Limits</b>			
Geosphere Environmental Ltd		Time Sampled	None Supplied					
Site Reference: Crays Hill		TP / BH No	MA1					
Project / Job Ref: 2871		Additional Refs	None Supplied					
Order No: None Supplied		Depth (m)	None Supplied					
Reporting Date: 22/11/2018		DETS Sample No	372945					
<b>Determinand</b>	<b>Unit</b>	<b>MDL</b>						
TOC <sup>MU</sup>	%	< 0.1	1.1			3%	5%	6%
Loss on Ignition	%	< 0.01	3.10			--	--	10%
BTEX <sup>MU</sup>	mg/kg	< 0.05	8.13			<b>6</b>	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1			1	--	--
Mineral Oil <sup>MU</sup>	mg/kg	< 10	446			500	--	--
Total PAH <sup>MU</sup>	mg/kg	< 1.7	17.5			100	--	--
pH <sup>MU</sup>	pH Units	N/a	8.2			--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	< 1			--	To be evaluated	To be evaluated
<b>Eluate Analysis</b>			<b>10:1</b>			<b>Cumulative 10:1</b>	<b>Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)</b>	
			<b>mg/l</b>			<b>mg/kg</b>		
Arsenic <sup>U</sup>		< 0.01			< 0.1	0.5	2	25
Barium <sup>U</sup>		< 0.02			< 0.2	20	100	300
Cadmium <sup>U</sup>		< 0.0005			< 0.005	0.04	1	5
Chromium <sup>U</sup>		< 0.005			< 0.05	0.5	10	70
Copper <sup>U</sup>		< 0.01			< 0.1	2	50	100
Mercury <sup>U</sup>		< 0.0005			< 0.01	0.01	0.2	2
Molybdenum <sup>U</sup>		0.010			0.10	0.5	10	30
Nickel <sup>U</sup>		< 0.007			< 0.07	0.4	10	40
Lead <sup>U</sup>		< 0.005			< 0.05	0.5	10	50
Antimony <sup>U</sup>		0.006			0.06	<b>0.06</b>	0.7	5
Selenium <sup>U</sup>		< 0.005			< 0.05	0.1	0.5	7
Zinc <sup>U</sup>		< 0.005			< 0.05	4	50	200
Chloride <sup>U</sup>		4			42	800	15000	25000
Fluoride <sup>U</sup>		0.9			9	10	150	500
Sulphate <sup>U</sup>		33			325	1000	20000	50000
TDS		125			1250	4000	60000	100000
Phenol Index		0.03			0.3	1	-	-
DOC		7.7			77	500	800	1000
<b>Leach Test Information</b>								
Sample Mass (kg)			0.11					
Dry Matter (%)			79.6					
Moisture (%)			25.6					
<b>Stage 1</b>								
Volume Eluate L10 (litres)			0.88					
Results are expressed on a dry weight basis, after correction for moisture content where applicable Stated limits are for guidance only and QTS Environmental cannot be held responsible for any discrepancies with current legislation M Denotes MCERTS accredited test U Denotes ISO17025 accredited test								

Soil Analysis Certificate - Sample Descriptions	
<b>DETS Report No: 18-85281</b>	
<b>Geosphere Environmental Ltd</b>	
<b>Site Reference: Crays Hill</b>	
<b>Project / Job Ref: 2871</b>	
<b>Order No: None Supplied</b>	
<b>Reporting Date: 22/11/2018</b>	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
372932	VA1 Base 1	None Supplied	3.50	20.4	Brown sandy clay
372933	VA1 Base 2	None Supplied	3.50	22.1	Light brown sandy clay
372934	VA2 East	None Supplied	0.50	16	Brown sandy clay with stones
372935	VA2 Base	None Supplied	1.50	17.2	Brown sandy clay with stones
372936	VA2 South	None Supplied	0.50	12.9	Brown sandy clay with stones
372937	VA2 West	None Supplied	0.50	16.9	Brown sandy clay with stones
372938	VA2 North	None Supplied	0.50	20.9	Brown sandy clay with stones
372939	VA3 NE	None Supplied	1.50	19.4	Brown sandy clay with stones and brick
372940	VA3 SW	None Supplied	1.50	22.2	Brown sandy clay
372941	VA3 Base 1	None Supplied	2.40	24.5	Brown sandy clay
372942	VA3 NW	None Supplied	1.50	10.5	Brown sandy clay with stones
372943	VA3 SE	None Supplied	1.50	20.6	Brown sandy clay
372944	VA3 Base 2	None Supplied	2.40	24.1	Brown sandy clay
372945	MA1	None Supplied	None Supplied	20.4	Brown sandy clay with stones

*Moisture content is part of procedure E003 & is not an accredited test*

Insufficient Sample <sup>1/S</sup>

Unsuitable Sample <sup>U/S</sup>



<b>Soil Analysis Certificate - Methodology &amp; Miscellaneous Information</b>	
<b>DETS Report No: 18-85281</b>	
<b>Geosphere Environmental Ltd</b>	
<b>Site Reference: Crays Hill</b>	
<b>Project / Job Ref: 2871</b>	
<b>Order No: None Supplied</b>	
<b>Reporting Date: 22/11/2018</b>	

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

**D Dried**  
**AR As Received**



# DETS

## Certificate of Analysis

*Certificate Number* 18-29862

02-Jan-19

*Client* Geosphere Environmental Ltd  
Unit 11  
Brightwell Barns  
Ipswich Road  
Brightwell Suffolk  
IP10 0BJ

*Our Reference* 18-29862

*Client Reference* 2871

*Order No* (not supplied)

*Contract Title* Crays Hill (Billericay)

*Description* 16 Soil samples.

*Date Received* 21-Dec-18

*Date Started* 21-Dec-18

*Date Completed* 02-Jan-19

*Test Procedures* Identified by prefix DETSn (details on request).

*Notes* Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

*Approved By*

Adam Fenwick  
Contracts Manager





## Summary of Chemical Analysis

### Soil Samples

Our Ref 18-29862

Client Ref 2871

Contract Title Crays Hill (Billericay)

<b>Lab No</b>	1439157	1439158	1439159	1439160	1439161	1439162	1439163
	VA5	VA5	VA5	VA5	VA5	VA5	VA4
<b>Sample ID</b>	NORTH	EAST	SOUTH	WEST	BASE 1	BASE 2	NORTH
<b>Depth</b>	1.00	1.00	1.00	1.00	1.50	1.50	1.50
<b>Other ID</b>	1	1	1	1	1	1	1
<b>Sample Type</b>	ES	ES	ES	ES	ES	ES	ES
<b>Sampling Date</b>	15/11/18	15/11/18	15/11/18	15/11/18	15/11/18	15/11/18	16/11/18
<b>Sampling Time</b>	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units							
<b>Metals</b>										
Lead	DETSC 2301#	0.3	mg/kg							
<b>Petroleum Hydrocarbons</b>										
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10	< 10





## Summary of Chemical Analysis

### Soil Samples

Our Ref 18-29862

Client Ref 2871

Contract Title Crays Hill (Billericay)

<b>Lab No</b>	1439164	1439165	1439166	1439167	1439168	1439169	1439170
	VA4	VA4	VA4	VA4	VA6	VA6	VA6
<b>Sample ID</b>	EAST	WEST	SOUTH	BASE	NORTH	WEST	EAST
<b>Depth</b>	1.50	1.50	1.50	2.50	1.50	1.50	1.50
<b>Other ID</b>	1	1	1	1	1	1	1
<b>Sample Type</b>	ES	ES	ES	ES	ES	ES	ES
<b>Sampling Date</b>	16/11/18	16/11/18	16/11/18	16/11/18	15/11/18	16/11/18	16/11/18
<b>Sampling Time</b>	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units							
<b>Metals</b>										
Lead	DETSC 2301#	0.3	mg/kg					11	9.7	8.1
<b>Petroleum Hydrocarbons</b>										
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01			
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01			
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01			
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5			
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2			
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5			
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4			
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10			
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01			
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01			
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01			
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9			
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5			
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6			
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4			
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10			
TPH Ali/Aro Total	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10			

# Summary of Chemical Analysis

## Soil Samples

Our Ref 18-29862

Client Ref 2871

Contract Title Crays Hill (Billericay)

Lab No	1439171	1439172
	VA6	VA6
Sample ID	SOUTH	BASE
Depth	1.50	2.00
Other ID	1	1
Sample Type	ES	ES
Sampling Date	16/11/18	16/11/18
Sampling Time	n/s	n/s

Test	Method	LOD	Units		
<b>Metals</b>					
Lead	DETSC 2301#	0.3	mg/kg	12	8.7
<b>Petroleum Hydrocarbons</b>					
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg		
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg		
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg		
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg		
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg		
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg		
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg		
Aliphatic C5-C35	DETSC 3072*	10	mg/kg		
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg		
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg		
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg		
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg		
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg		
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg		
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg		
Aromatic C5-C35	DETSC 3072*	10	mg/kg		
TPH Ali/Aro Total	DETSC 3072*	10	mg/kg		

## Information in Support of the Analytical Results

Our Ref 18-29862  
 Client Ref 2871  
 Contract Crays Hill (Billericay)

### Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1439157	VA5 NORTH 1.00 SOIL	15/11/18	GJ 250ml		
1439158	VA5 EAST 1.00 SOIL	15/11/18	GJ 250ml		
1439159	VA5 SOUTH 1.00 SOIL	15/11/18	GJ 250ml		
1439160	VA5 WEST 1.00 SOIL	15/11/18	GJ 250ml		
1439161	VA5 BASE 1 1.50 SOIL	15/11/18	GJ 250ml		
1439162	VA5 BASE 2 1.50 SOIL	15/11/18	GJ 250ml		
1439163	VA4 NORTH 1.50 SOIL	16/11/18	GJ 250ml		
1439164	VA4 EAST 1.50 SOIL	16/11/18	GJ 250ml		
1439165	VA4 WEST 1.50 SOIL	16/11/18	GJ 250ml		
1439166	VA4 SOUTH 1.50 SOIL	16/11/18	GJ 250ml		
1439167	VA4 BASE 2.50 SOIL	16/11/18	GJ 250ml		
1439168	VA6 NORTH 1.50 SOIL	15/11/18	GJ 250ml		
1439169	VA6 WEST 1.50 SOIL	16/11/18	GJ 250ml		
1439170	VA6 EAST 1.50 SOIL	16/11/18	GJ 250ml		
1439171	VA6 SOUTH 1.50 SOIL	16/11/18	GJ 250ml		
1439172	VA6 BASE 2.00 SOIL	16/11/18	GJ 250ml		

Key: G-Glass J-Jar

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

### Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

### Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



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Geosphere Environmental Ltd  
Brightwell Barns  
Ipswich Road  
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Suffolk  
IP10 0BJ

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## DETS Report No: 18-85486

Site Reference: Chestnuts, Cray Hill

Project / Job Ref: 2871,SI

Order No: 2871

Sample Receipt Date: 21/11/2018

Sample Scheduled Date: 21/11/2018

Report Issue Number: 1

Reporting Date: 27/11/2018

Authorised by:

Kevin Old  
Associate Director of Laboratory



**DETS Ltd**  
**Unit 1, Rose Lane Industrial Estate**  
**Rose Lane**  
**Lenham Heath**  
**Maidstone**  
**Kent ME17 2JN**  
**Tel : 01622 850410**



Soil Analysis Certificate - TPH CWG Banded						
<b>DETS Report No: 18-85486</b>	<b>Date Sampled</b>	16/11/18	16/11/18	16/11/18	16/11/18	16/11/18
<b>Geosphere Environmental Ltd</b>	<b>Time Sampled</b>	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
<b>Site Reference: Chestnuts, Cray Hill</b>	<b>TP / BH No</b>	VA7 North	VA7 West	VA7 South	VA7 Base	VA7 East
<b>Project / Job Ref: 2871,SI</b>	<b>Additional Refs</b>	J1	J1	J1	J1	J1
<b>Order No: 2871</b>	<b>Depth (m)</b>	1.50	1.50	1.50	2.50	1.50
<b>Reporting Date: 27/11/2018</b>	<b>DETS Sample No</b>	373764	373765	373766	373767	373768

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21	< 21
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21	< 21
Total >C5 - C35	mg/kg	< 42	NONE	< 42	< 42	< 42	< 42	< 42

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C





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**Tel : 01622 850410**



Soil Analysis Certificate - BTEX / MTBE						
<b>DETS Report No: 18-85486</b>	<b>Date Sampled</b>	16/11/18	16/11/18	16/11/18	16/11/18	16/11/18
<b>Geosphere Environmental Ltd</b>	<b>Time Sampled</b>	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
<b>Site Reference: Chestnuts, Cray Hill</b>	<b>TP / BH No</b>	VA7 North	VA7 West	VA7 South	VA7 Base	VA7 East
<b>Project / Job Ref: 2871,SI</b>	<b>Additional Refs</b>	J1	J1	J1	J1	J1
<b>Order No: 2871</b>	<b>Depth (m)</b>	1.50	1.50	1.50	2.50	1.50
<b>Reporting Date: 27/11/2018</b>	<b>DETS Sample No</b>	373764	373765	373766	373767	373768

Determinand	Unit	RL	Accreditation					
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
p & m-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
o-xylene	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C

Soil Analysis Certificate - Sample Descriptions	
<b>DETS Report No: 18-85486</b>	
<b>Geosphere Environmental Ltd</b>	
<b>Site Reference: Chestnuts, Cray Hill</b>	
<b>Project / Job Ref: 2871,SI</b>	
<b>Order No: 2871</b>	
<b>Reporting Date: 27/11/2018</b>	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
373764	VA7 North	J1	1.50	21.6	Brown clayey sand
373765	VA7 West	J1	1.50	20.2	Brown clayey sand
373766	VA7 South	J1	1.50	20.8	Brown clayey sand
373767	VA7 Base	J1	2.50	22.2	Brown clayey sand
373768	VA7 East	J1	1.50	21.6	Brown clayey sand

*Moisture content is part of procedure E003 & is not an accredited test*

Insufficient Sample <sup>I/S</sup>

Unsuitable Sample <sup>U/S</sup>

<b>Soil Analysis Certificate - Methodology &amp; Miscellaneous Information</b>	
DETS Report No: 18-85486	
Geosphere Environmental Ltd	
Site Reference: Chestnuts, Cray Hill	
Project / Job Ref: 2871,SI	
Order No: 2871	
Reporting Date: 27/11/2018	

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

**D Dried**  
**AR As Received**



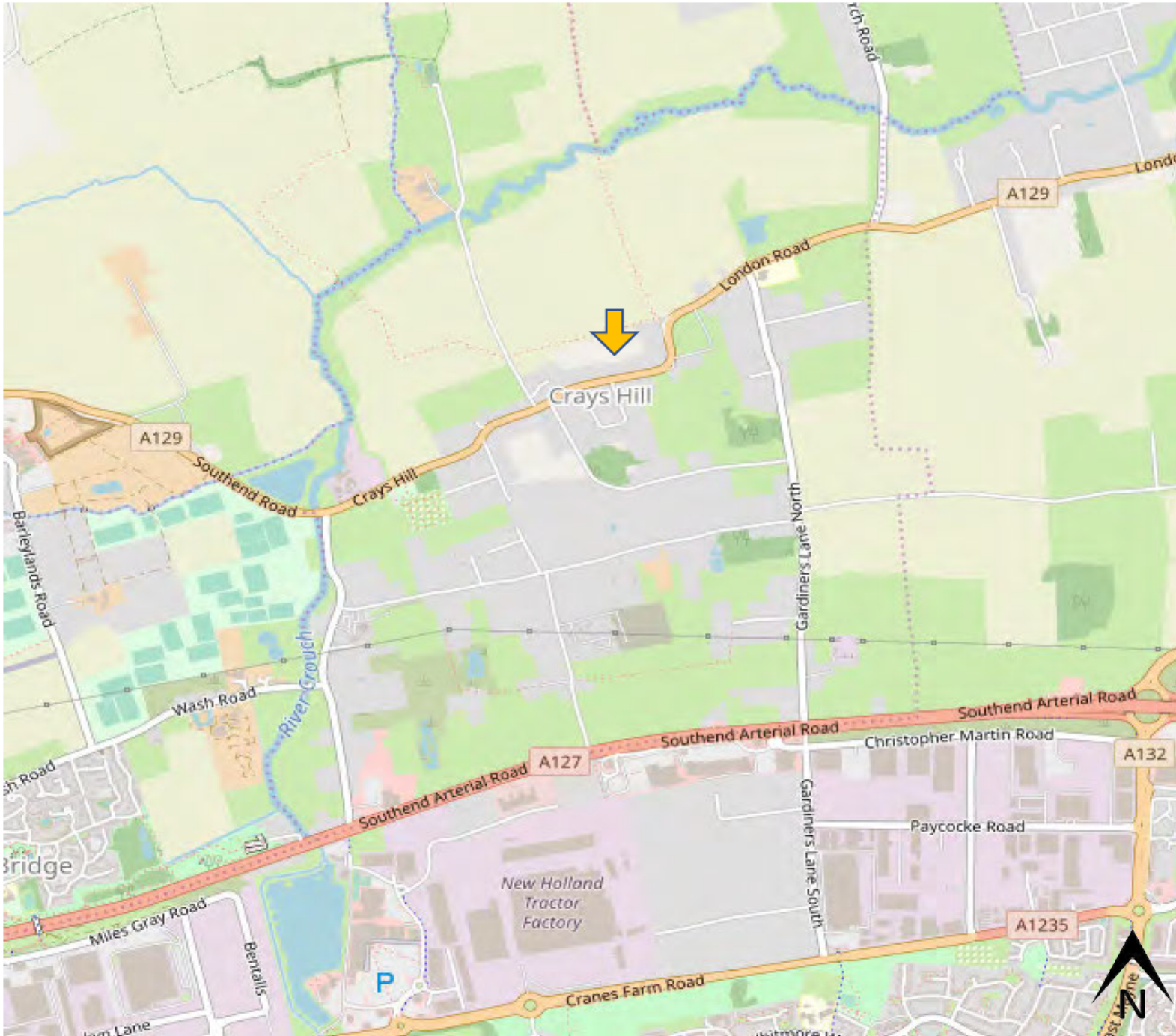
## Appendix 4 – Drawings

Site Location Plan – Drawing ref. 3521,GI,001/Rev 0

Proposed Development Plan \_ Drawing ref. 3521,GI,002/Rev 0

Exploratory Hole Location Plan – Drawing ref. 3521,GI,003/Rev 0

Remediation Locations Plan – Drawing ref. 3521,GI,004/Rev 0



**LEGEND**



Site Location

**SOURCE**

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**PROJECT**

CHESTNUTS, Crays Hill, Billericay, Essex, CM11 2YA

**TITLE**

Site Location Plan

**DRAWING NUMBER**

3521,GI/001/Rev 0

**SCALE**

As marked

**DATE**

16/01/2019

**DRAWN BY**

CS

**CHECKED BY**

TP





GEOSPHERE ENVIRONMENTAL

LEGEND

 Red Line Boundary



SOURCE

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PROJECT

CHESTNUTS, Crays Hill, Billericay, Essex,  
CM11 2YA

TITLE

Proposed Development Plan

DRAWING NUMBER

3521, GI /002/Rev 0

SCALE

As marked

DRAWN BY

CS




DATE

16/01/2019

CHECKED BY

TP

**LEGEND**

-  Red Line Boundary
-  Interceptor
-  Window Sample



**SOURCE**

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**PROJECT**

CHESTNUTS, Crays Hill, Billericay, Essex, CM11 2YA

**TITLE**

Exploratory Hole Locations

**DRAWING NUMBER**

3521,GI/003/Rev 0

**SCALE**

As marked

**DATE**

16/01/2019

**DRAWN BY**

CS



**CHECKED BY**

TP



GEOSPHERE ENVIRONMENTAL

LEGEND

-  Red Line Boundary
-  Lateral Extent of Excavated Soil



SOURCE

[© OpenStreetMap contributors](#)

PROJECT

CHESTNUTS, Crays Hill, Billericay, Essex, CM11 2YA

TITLE

Remediation Locations

DRAWING NUMBER

3521,GI/004/Rev 0

SCALE

As marked

DATE

16/01/2019

DRAWN BY

CS

CHECKED BY

TP

## Appendix 5 - Photographs

3521,GI, Remediation Photographs



Photograph 1



Photograph 2



Photograph 3



Photograph 4



**LEGEND**

Photograph 1

Former location of petroleum tanks toward the frontage of the site (VA1), looking east. VA2 located behind boom arm of excavator.

Photograph 2

Excavation of former petroleum tanks around VA1, looking west.

Photograph 3

Impacted soils being removed from VA3.

Photograph 4

Excavation of VA3, looking east.

**PROJECT**

Chestnuts, Crays Hill, Billericay, Essex, CM11 2YA

**PROJECT NUMBER**

3521,GI

**TITLE**

Selected Photographs Relating To Remediation of Chestnuts, Crays Hill, Billericay

**DATE**

30/01/2019

**PAGE NO.**

1 of 3



Photograph 5



Photograph 6



**LEGEND**

Photograph 5  
Excavation of former petroleum tank in the southwest of the site, view of base and western side wall (VA4).

Photograph 6  
Plan view of damaged terracotta drainage pipe, acting as a transportation mechanism for hydrocarbons (VA5).

Photograph 7  
Close-up of hydrocarbon staining with drainage pipe (VA5).

Photograph 8  
Excavation of impacted soil along drainage pipe route, looking north (VA5).

Photograph 7



Photograph 8



**PROJECT**

Chestnuts, Crays Hill, Billericay, Essex, CM11 2YA

**PROJECT NUMBER**

3521,GI

**TITLE**

Selected Photographs Relating To Remediation of Chestnuts, Crays Hill, Billericay

**DATE**

30/01/2019

**PAGE NO.**

2 of 3



Photograph 9



Photograph 10



**LEGEND**

Photograph 9  
Excavation of soil with elevated lead concentrations (VA6).

Photograph 10  
Excavation of former petroleum tank (VA7), adjacent to VA4.

Photograph 11  
Visqueen membrane.

Photograph 11



Photograph 12



Photograph 12  
Excavated spoil stockpiled on visqueen.

**PROJECT**

Chestnuts, Crays Hill, Billericay, Essex,  
CM11 2YA

**PROJECT NUMBER**

3521,GI

**TITLE**

Selected Photographs Relating To  
Remediation of Chestnuts, Crays  
Hill, Billericay

**DATE**

30/01/2019

**PAGE NO.**

3 of 3

## **Appendix 6 – Waste Tickets**

3521,GI, Waste Tickets

# SEALES ROAD HAULAGE LTD.

17 JULIETTE WAY, PURFLEET INDUSTRIAL PARK  
SOUTH OCKENDON, ESSEX RM15 4YD  
Tele: 01708 863110 Fax: 01708 867263  
Mobile: 07860 324472

Waste Carrier's Licence No. **ESS/317138/1**

## DUTY of CARE

Date: 10/12/18

TICKET No.

103462

Customer (Current Holder of Waste)  
Brookman Capital  
Old Service Station  
London Road  
Cray S Hill

Vehicle Reg: Big 9125  
Driver's Name (Print) DAN  
1x8 wheel Tipper  
Low Level -  
Non Haz  
Away  
( Loading time is 20 minutes )  
anything over 20 minutes is chargeable

Inert  Non Haz

Description of Waste being Transferred

Soil + Stone	17-05-04	<input checked="" type="checkbox"/>
Concrete	17-01-01	<input type="checkbox"/>
Hardcore	17-01-07	<input type="checkbox"/>
Construction / Demolition	17-09-04	<input type="checkbox"/>
Factory / Office Waste	20-03-01	<input type="checkbox"/>
Timber / Wood	17-02-01	<input type="checkbox"/>
Plasterboard	17-08-02	<input type="checkbox"/>
Other (Specify)		<input type="checkbox"/>

Customer's Signature  
Customer's Name (Print)

Place of Delivery  
SEALES ROAD HAULAGE LTD, 17 JULIETTE WAY  
PURFLEET INDUSTRIAL PARK  
SOUTH OCKENDON, ESSEX RM15 4YD  
Other  
SIC Code: 49410



I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste ( England and Wales ) Regulations 2011.  
Yes

White: Customer Copy

Blue: Tip Copy

Pink / Yellow: Office Copy



# SEALES ROAD HAULAGE LTD.

17 JULIETTE WAY, PURFLEET INDUSTRIAL PARK  
SOUTH OCKENDON, ESSEX RM15 4YD  
Tele: 01708 863110 Fax: 01708 867263  
Mobile: 07860 324472

Waste Carrier's Licence No. **ESS/317138/1**

## DUTY of CARE

Date: 9/11/18

TICKET No.

100149

Customer (Current Holder of Waste)  
BROCKMAN CAPITOL  
OLD SERVICE STATION  
CRAYS HILL  
LONDON ROAD

Vehicle Reg: B1G 9126  
Driver's Name (Print) DANNY BARNBY  
1 X 8 WHEEL  
LOW LEVEL  
NON HAZ  
AWAY  
(Loading time is 20 minutes )  
anything over 20 minutes is chargeable

Inert  Non Haz

Description of Waste being Transferred

Soil + Stone	17-05-04	<input checked="" type="checkbox"/>
Concrete	17-01-01	<input type="checkbox"/>
Hardcore	17-01-07	<input type="checkbox"/>
Construction / Demolition	17-09-04	<input type="checkbox"/>
Factory / Office Waste	20-03-01	<input type="checkbox"/>
Timber / Wood	17-02-01	<input type="checkbox"/>
Plasterboard	17-08-02	<input type="checkbox"/>
Other (Specify)		<input type="checkbox"/>

Customer's Signature  
Customer's Name (Print)

Place of Delivery  
SEALES ROAD HAULAGE LTD, 17 JULIETTE WAY  
PURFLEET INDUSTRIAL PARK  
SOUTH OCKENDON, ESSEX RM15 4YD   
Other   
SIC Code: 49410



I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste ( England and Wales ) Regulations 2011.  
Yes

White: Customer Copy

Blue: Tip Copy

Pink / Yellow: Office Copy



# SEALES ROAD HAULAGE LTD.

17 JULIETTE WAY, PURFLEET INDUSTRIAL PARK  
SOUTH OCKENDON, ESSEX RM15 4YD  
Tele: 01708 863110 Fax: 01708 867263  
Mobile: 07860 324472

Waste Carrier's Licence No. **ESS/317138/1**

## DUTY of CARE

Date: **10/12/18** TICKET No. **103429**

Customer (Current Holder of Waste)  
**Brockman Capital**  
**Oldsevic Str**  
**London Road**  
**Crays Hill**

Vehicle Reg: **EU67WVP**  
Driver's Name (Print) **Peter**  
**1 x 4 LOAD**  
**low level non-HAZ**  
**m/away**  
( Loading time is 20 minutes )  
anything over 20 minutes is chargeable

Inert  Non Haz

Description of Waste being Transferred

Soil + Stone	17-05-04	<input checked="" type="checkbox"/>
Concrete	17-01-01	<input type="checkbox"/>
Hardcore	17-01-07	<input type="checkbox"/>
Construction / Demolition	17-09-04	<input type="checkbox"/>
Factory / Office Waste	20-03-01	<input type="checkbox"/>
Timber / Wood	17-02-01	<input type="checkbox"/>
Plasterboard	17-08-02	<input type="checkbox"/>
Other (Specify)		<input type="checkbox"/>

Customer's Signature  
.....  
Customer's Name (Print)

Place of Delivery  
SEALES ROAD HAULAGE LTD, 17 JULIETTE WAY   
PURFLEET INDUSTRIAL PARK  
SOUTH OCKENDON, ESSEX RM15 4YD   
Other   
SIC Code: 49410



I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste ( England and Wales ) Regulations 2011.  
Yes

White: Customer Copy

Blue: Tip Copy

Pink / Yellow: Office Copy

**SEALES ROAD HAULAGE LTD.**  
 17 JULIETTE WAY, PURFLEET INDUSTRIAL PARK  
 SOUTH OCKENDON, ESSEX RM15 4YD  
 Tele: 01708 863110 Fax: 01708 867263  
 Mobile: 07860 324472  
 Waste Carrier's Licence No. **ESS/317138/1**

**DUTY of CARE**

Date: 10/12/18 **TICKET No.**  
**102401**

Customer (Current Holder of Waste)  
Brookman CAPITAL  
OLD SERVICE STATION  
LONDON ROAD  
CLAYS HILL

Vehicle Reg: B169179  
 Driver's Name (Print) Rob  
1x8 WHEEL TIPPER  
LOW LEVEL -  
NON HAZ  
ALWAY  
 ( Loading time is 20 minutes )  
 anything over 20 minutes is chargeable

Inert  Non Haz

Description of Waste being Transferred

Soil + Stone	17-05-04	<input checked="" type="checkbox"/>
Concrete	17-01-01	<input type="checkbox"/>
Hardcore	17-01-07	<input type="checkbox"/>
Construction / Demolition	17-09-04	<input type="checkbox"/>
Factory / Office Waste	20-03-01	<input type="checkbox"/>
Timber / Wood	17-02-01	<input type="checkbox"/>
Plasterboard	17-08-02	<input type="checkbox"/>
Other (Specify)		<input type="checkbox"/>

Customer  
 ..  
 Customer's Name (Print)

Place of Delivery  
 SEALES ROAD HAULAGE LTD, 17 JULIETTE WAY   
 PURFLEET INDUSTRIAL PARK  
 SOUTH OCKENDON, ESSEX RM15 4YD   
 Other   
 SIC Code: 49410



I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste ( England and Wales ) Regulations 2011.  
 Yes

White: Customer Copy

Blue: Tip Copy

Pink / Yellow: Office Copy



**SEALES ROAD HAULAGE LTD.**  
 17 JULIETTE WAY, PURFLEET INDUSTRIAL PARK  
 SOUTH OCKENDON, ESSEX RM15 4YD  
 Tele: 01708 863110 Fax: 01708 867263  
 Mobile: 07860 324472  
 Waste Carrier's Licence No. **ES5/317138/1**

**DUTY of CARE**

Date: 10/12/18

**TICKET No.**  
**97297**

Customer (Current Holder of Waste)  
BROOKMAN CAPITAL  
OLD SERVICE STATION  
LONDON ROAD  
CLAYS HILL

Vehicle Reg: BIG9179  
 Driver's Name (Print) ROB  
1 x 8 WHEEL TIPPER  
LOW LEVEL NON HAZ-  
AWAY  
 ( Loading time is 20 minutes )  
 anything over 20 minutes is chargeable

Inert  Non Haz   
LOW LEVEL

Description of Waste being Transferred

Soil + Stone	17-05-04	<input checked="" type="checkbox"/>
Concrete	17-01-01	<input type="checkbox"/>
Hardcore	17-01-07	<input type="checkbox"/>
Construction / Demolition	17-09-04	<input type="checkbox"/>
Factory / Office Waste	20-03-01	<input type="checkbox"/>
Timber / Wood	17-02-01	<input type="checkbox"/>
Plasterboard	17-08-02	<input type="checkbox"/>
Other (Specify)		<input type="checkbox"/>

Customer's Sign  
 .....  
 Custor  
 .....

Place of Delivery  
 SEALES ROAD HAULAGE LTD, 17 JULIETTE WAY   
 PURFLEET INDUSTRIAL PARK  
 SOUTH OCKENDON, ESSEX RM15 4YD  
 Other   
 SIC Code: 49410



I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste ( England and Wales ) Regulations 2011.  
 Yes

White: Customer Copy

Blue: Tip Copy

Pink / Yellow: Office Copy

# SEALES ROAD HAULAGE LTD.

17 JULIETTE WAY, PURFLEET INDUSTRIAL PARK  
SOUTH OCKENDON, ESSEX RM15 4YD  
Tele: 01708 863110 Fax: 01708 867263  
Mobile: 07860 324472

Waste Carrier's Licence No. **ESS/317138/1**

## DUTY of CARE

Date: **10/12/18**

TICKET No.  
**102867**

Customer (Current Holder of Waste)  
**Brookman**  
**Capital**  
**Old Service Station**  
**London Rd**  
**CRAYS HILL**

Vehicle Reg: **B199124**

Driver's Name (Print): **Jeff**

**1 X 8 WHEELER**  
**LOAD**  
**LOW LEVEL**  
**NON HAZ**  
**MUCK AWAY**

(Loading time is 20 minutes )  
anything over 20 minutes is chargeable

Inert  Non Haz

Description of Waste being Transferred

Soil + Stone	17-05-04	<input checked="" type="checkbox"/>
Concrete	17-01-01	<input type="checkbox"/>
Hardcore	17-01-07	<input type="checkbox"/>
Construction / Demolition	17-09-04	<input type="checkbox"/>
Factory / Office Waste	20-03-01	<input type="checkbox"/>
Timber / Wood	17-02-01	<input type="checkbox"/>
Plasterboard	17-08-02	<input type="checkbox"/>
Other (Specify)		<input type="checkbox"/>

Customer's Signature

Place of Delivery

SEALES ROAD HAULAGE LTD, 17 JULIETTE WAY   
PURFLEET INDUSTRIAL PARK  
SOUTH OCKENDON, ESSEX RM15 4YD  
Other   
SIC Code: 49410



I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England and Wales) Regulations 2011.  
Yes

White: Customer Copy

Blue: Tip Copy

Pink / Yellow: Office Copy



# SEALES ROAD HAULAGE LTD.

17 JULIETTE WAY, PURFLEET INDUSTRIAL PARK  
SOUTH OCKENDON, ESSEX RM15 4YD  
Tele: 01708 863110 Fax: 01708 867263

Mobile: 07860 324472

Waste Carrier's Licence No. ESS/317138/1

## DUTY of CARE

Date: 10/12/18

TICKET No.

100807

Customer (Current Holder of Waste)  
BROOKMAN CAPITAL  
OLD SERVICE STATION  
LONDON ROAD  
CLAYS HILL

Vehicle Reg: B16 9923  
Driver's Name (Print): STARNES  
1x LOAD.  
LOW LEVEL  
NON HAZ.  
MUCK AWAY  
( Loading time is 20 minutes )  
anything over 20 minutes is chargeable

Inert  Non Haz

Description of Waste being Transferred

Soil + Stone	17-05-04	<input checked="" type="checkbox"/>
Concrete	17-01-01	<input type="checkbox"/>
Hardcore	17-01-07	<input type="checkbox"/>
Construction / Demolition	17-09-04	<input type="checkbox"/>
Factory / Office Waste	20-03-01	<input type="checkbox"/>
Timber / Wood	17-02-01	<input type="checkbox"/>
Plasterboard	17-08-02	<input type="checkbox"/>
Other (Specify)		<input type="checkbox"/>

Customer's  
Customer's Name (Print)

Place of Delivery  
SEALES ROAD HAULAGE LTD, 17 JULIETTE WAY  
PURFLEET INDUSTRIAL PARK  
SOUTH OCKENDON, ESSEX RM15 4YD  
Other   
SIC Code: 49410



I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste ( England and Wales ) Regulations 2011.  
Yes

White: Customer Copy

Blue: Tip Copy

Pink / Yellow: Office Copy



# SEALES ROAD HAULAGE LTD.

17 JULIETTE WAY, PURFLEET INDUSTRIAL PARK  
SOUTH OCKENDON, ESSEX RM15 4YD  
Tele: 01708 863110 Fax: 01708 867263  
Mobile: 07860 324472

Waste Carrier's Licence No. **ESS/317138/1**

## DUTY of CARE

Date: 10/12/18

TICKET No.

102832

Customer (Current Holder of Waste)  
MCD Service Station  
London Rd  
Crayford

Vehicle Reg: 9122  
Driver's Name (Print) Tony Luray  
1x 8 wheel Grad  
M/A  
(Loading time is 20 minutes )  
anything over 20 minutes is chargeable

Inert  Non Haz

Description of Waste being Transferred

Soil + Stone	17-05-04	<input checked="" type="checkbox"/>
Concrete	17-01-01	<input type="checkbox"/>
Hardcore	17-01-07	<input type="checkbox"/>
Construction / Demolition	17-09-04	<input type="checkbox"/>
Factory / Office Waste	20-03-01	<input type="checkbox"/>
Timber / Wood	17-02-01	<input type="checkbox"/>
Plasterboard	17-08-02	<input type="checkbox"/>
Other (Specify)		<input type="checkbox"/>

Customer's Signature  
Customer's Name (Print)

Place of Delivery  
SEALES ROAD HAULAGE LTD, 17 JULIETTE WAY  
PURFLEET INDUSTRIAL PARK  
SOUTH OCKENDON, ESSEX RM15 4YD  
Other  
SIC Code: 49410



I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England and Wales) Regulations 2011:  
Yes

White: Customer Copy

Blue: Tip Copy

Pink / Yellow: Office Copy

**SEALES ROAD HAULAGE LTD.**  
 17 JULIETTE WAY, PURFLEET INDUSTRIAL PARK  
 SOUTH OCKENDON, ESSEX RM15 4YD  
 Tele: 01708 863110 Fax: 01708 867263  
 Mobile: 07860 324472  
 Waste Carrier's Licence No. **ESS/317138/1**

**DUTY of CARE**

Date: 10.12.18 **TICKET No.**  
**102780**

Customer (Current Holder of Waste)  
Brockman Capital  
Old Service Station  
Crays Hill

Vehicle Reg: Big 9127  
 Driver's Name (Print) JAY  
1x Load  
Low Level  
NON HAZ  
m/p  
 ( Loading time is 20 minutes )  
 anything over 20 minutes is chargeable

Inert  Non Haz

Description of Waste being Transferred

Soil + Stone	17-05-04	<input checked="" type="checkbox"/>
Concrete	17-01-01	<input type="checkbox"/>
Hardcore	17-01-07	<input type="checkbox"/>
Construction / Demolition	17-09-04	<input type="checkbox"/>
Factory / Office Waste	20-03-01	<input type="checkbox"/>
Timber / Wood	17-02-01	<input type="checkbox"/>
Plasterboard	17-08-02	<input type="checkbox"/>
Other (Specify)		<input type="checkbox"/>

Customer's Name (Print)

Place of Delivery  
 SEALES ROAD HAULAGE LTD, 17 JULIETTE WAY   
 PURFLEET INDUSTRIAL PARK   
 SOUTH OCKENDON, ESSEX RM15 4YD   
 Other   
 SIC Code: 49410



I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste ( England and Wales ) Regulations 2011.  
 Yes

White: Customer Copy

Blue: Tip Copy

Pink / Yellow: Office Copy



**SEALES ROAD HAULAGE LTD.**

17 JULIETTE WAY, PURFLEET INDUSTRIAL PARK  
SOUTH OCKENDON, ESSEX RM15 4YD  
Tele: 01708 863110 Fax: 01708 867263  
Mobile: 07860 324472

Waste Carrier's Licence No. **ESS/317138/1**

**DUTY of CARE**

Date: 10.12.18 **TICKET No.**  
**102781**

Customer (Current Holder of Waste)  
Brookman capital  
Old Service Station  
London Road  
clays Hill

Vehicle Reg: Big 9127  
Driver's Name (Print) JAY  
1x Load  
Low Level  
NON HAZ  
M/A  
( Loading time is 20 minutes )  
anything over 20 minutes is chargeable

Inert  Non Haz

Description of Waste being Transferred

Soil + Stone	17-05-04	<input checked="" type="checkbox"/>
Concrete	17-01-01	<input type="checkbox"/>
Hardcore	17-01-07	<input type="checkbox"/>
Construction / Demolition	17-09-04	<input type="checkbox"/>
Factory / Office Waste	20-03-01	<input type="checkbox"/>
Timber / Wood	17-02-01	<input type="checkbox"/>
Plasterboard	17-08-02	<input type="checkbox"/>
Other (Specify)		<input type="checkbox"/>

Custom  
Customer's Name (Print)

Place of Delivery  
SEALES ROAD HAULAGE LTD, 17 JULIETTE WAY   
PURFLEET INDUSTRIAL PARK  
SOUTH OCKENDON, ESSEX RM15 4YD   
Other   
SIC Code: 49410



I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste ( England and Wales ) Regulations 2011.  
Yes

White: Customer Copy

Blue: Tip Copy

Pink / Yellow: Office Copy

# SEALES ROAD HAULAGE LTD.

17 JULIETTE WAY, PURFLEET INDUSTRIAL PARK  
SOUTH OCKENDON, ESSEX RM15 4YD

Tele: 01708 863110 Fax: 01708 867263

Mobile: 07860 324472

Waste Carrier's Licence No. **ESS/317138/1**

# DUTY of CARE

Date: **10/12/18**

TICKET No.

**103428**

Customer (Current Holder of Waste)

**Brockman Capital  
old service STN  
London Road  
Crays Hill**

Vehicle Reg:

**EU67 WVP**

Driver's Name (Print)

**Peter**

**1 8x4 LOAD**

**low level non-HAZ  
M/AWAY**

( Loading time is 20 minutes )

anything over 20 minutes is chargeable

Inert

Non Haz

Description of Waste being Transferred

Soil + Stone 17-05-04

Concrete 17-01-01

Hardcore 17-01-07

Construction / Demolition 17-09-04

Factory / Office Waste 20-03-01

Timber / Wood 17-02-01

Plasterboard 17-08-02

Other (Specify)

Customer's Signature

Customer's Name (Print)

Place of Delivery

SEALES ROAD HAULAGE LTD, 17 JULIETTE WAY

PURFLEET INDUSTRIAL PARK

SOUTH OCKENDON, ESSEX RM15 4YD

Other

SIC Code: 49410



White: Customer Copy



Blue: Tip Copy

**I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste ( England and Wales ) Regulations 2011.**

Yes

Pink / Yellow: Office Copy



# SEALES ROAD HAULAGE LTD.

17 JULIETTE WAY, PURFLEET INDUSTRIAL PARK  
SOUTH OCKENDON, ESSEX RM15 4YD

Tele: 01708 863110 Fax: 01708 867263

Mobile: 07860 324472

Waste Carrier's Licence No. **ESS/317138/1**

## DUTY of CARE

Date: 10.12.18

TICKET No.

**103023**

Customer (Current Holder of Waste)  
BROOKMAN CAPITAL  
LONDON RD  
CRAYS HILL

Vehicle Reg: B10 9171  
Driver's Name (Print) ALAN  
1 x 8 wheel axle  
LOW LEVEL  
NON HAZ  
Away  
( Loading time is 20 minutes )  
anything over 20 minutes is chargeable

Inert  Non Haz

Description of Waste being Transferred ✓

Soil + Stone	17-05-04	<input type="checkbox"/>
Concrete	17-01-01	<input type="checkbox"/>
Hardcore	17-01-07	<input type="checkbox"/>
Construction / Demolition	17-09-04	<input type="checkbox"/>
Factory / Office Waste	20-03-01	<input type="checkbox"/>
Timber / Wood	17-02-01	<input type="checkbox"/>
Plasterboard	17-08-02	<input type="checkbox"/>
Other (Specify)		<input type="checkbox"/>

Customer's Signature \_\_\_\_\_  
Customer's Name (Print) \_\_\_\_\_

Place of Delivery  
SEALES ROAD HAULAGE LTD, 17 JULIETTE WAY   
PURFLEET INDUSTRIAL PARK  
SOUTH OCKENDON, ESSEX RM15 4YD  
Other   
SIC Code: 49410



I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste ( England and Wales ) Regulations 2011.  
Yes

White: Customer Copy

Blue: Tip Copy

Pink / Yellow: Office Copy



## The hazardous waste regulations 2005: Consignment note

sales@mickgeorge.co.uk  
www.mickgeorge.co.uk  
www.mickgeorgeships.co.uk  
T 01480 498 099  
F 01480 498 077

Mick George Limited  
6 Lancaster Way  
Ermine Business Park  
Huntingdon  
Cambridgeshire PE29 6XU

### PART A - NOTIFICATION DETAILS

1. Consignment note code: **SEALES / 00004**

2. The waste described is to be removed from (name, address, postcode, telephone, email, facsimile):  
**CHESTNUTS PETROL GARAGE, CRAY HILL, BILLERICAY, CM11 2XZ**

3. Premises code (where applicable) **SEALES**

4. The waste will be taken to (name, address and postcode):  
**MGL MEPAL MEPAL WASHING PLANT BLOCK FEN MEPAL CB6 2AY**

5. The waste producer was (if different from 2) (name, address, postcode, telephone, email, facsimile):  
**Seales Road Haulage Ltd, 17 Juliet Way, Purfleet IndEst, South Ockendon, RM154YD**

### PART B - DESCRIPTION OF THE WASTE If continuation sheet used, tick here

1. The process giving rise to the waste(s) was: **CONSTRUCTION**

2. SIC for the process giving rise to the waste:  
Ticket Number: 1422691 **4 3 . 1 2 /**

3. WASTE DETAILS (where more than one waste type is collected all of the information given below must be completed for each EWC identified)

Description of waste	List of wastes (EWC Code) (6 digits)	Quantity (kg)	The chemical/biological components of the waste and their concentrations are: Component / Concentration (% or mg/kg)	Physical form (gas, liquid, solid, powder, sludge or)	Hazard code(s)	Container type, number and size
HAZARDOUS SOILS	1 7 0 5 0 3		LEAD <0.11%	SOLID	HP7	8 WHEEL TIPPER

The information below is to be completed for each EWC identified

WAF:11773 Collection

EWC code	Packing group(s)	UN Identification number(s)	Proper shipping name(s)	UN class(es)	Special handling requirements

### PART C - CARRIER'S CERTIFICATE PART D - CONSIGNOR'S CERTIFICATE

(If more than one carrier is used, please attach schedule for subsequent carriers. If a schedule of carriers is attached tick here. )

I certify that I today collected the consignment and that the details in A2, A4 and B3 are correct, and I have been advised of any specific handling requirements.

1. Carrier Name:  
On behalf of **Mick George Ltd**  
**6 Lancaster Way, Ermine Business Park, Huntingdon, PE29 6XU 01480 498099**

2. Carrier registration no. /reason for exemption  
**CB/DU87105**

3. Vehicle registration no. (or mode of transport if not road)  
**KX16ZPW**

Signature **KX16ZPW**

Date **10/12/2015** Time

I certify that the information in A B and C above is correct, that the carrier is registered or exempt and was advised of the appropriate precautionary measures. All of the waste is packaged and labelled correctly and the carrier has been advised of any special handling requirements

1. Consignor name  
On behalf of (name, address, postcode, telephone, email, facsimile)

Signature

Date **10/12/18** Time **14:48**

By signing this Duty of Care Waste Transfer Note the producer/holder of the waste confirms that they have fulfilled their duty to apply the waste hierarchy as required by Regulation 12 of the waste (England and Wales) Regulations 2011

### PART E - CONSIGNEE'S CERTIFICATE (where more than one waste type is collected all of the information given below must be completed for each EWC)

Individual EWC code(s) received	Quantity of each EWC code received (kg)	EWC code accepted / rejected	Waste management operation (R or D code)

1. I received the waste at the address given in A4 on Date  Time

2. Vehicle Registration no. (or mode of transport if not road)

3. Where waste is rejected please provide details Name  
On behalf of (name, address, postcode, telephone, email and facsimile)

I Certify that waste management licence/permit/authorised exemption no(s).

authorise the management of the waste described in B at the address given in A4. Date  Time



**The hazardous waste regulations 2005:  
Consignment note**

sales@mickgeorge.co.uk  
www.mickgeorge.co.uk  
www.mickgeorgesklips.co.uk  
T 01480 498 099  
F 01480 498 077

Mick George Limited  
6 Lancaster Way  
Ermine Business Park  
Huntingdon  
Cambridgeshire PE29 6XU

**PART A - NOTIFICATION DETAILS**

1. Consignment note code: **SEALES / 00003**

2. The waste described is to be removed from (name, address, postcode, telephone, email, facsimile):  
**CHESTNUTS PETROL GARAGE, CRAY HILL, BILLERICAY, CM11 2XZ**

3. Premises code (where applicable) **SEALES**

4. The waste will be taken to (name, address and postcode):  
**MGL MEPAL MEPAL WASHING PLANT BLOCK FEN MEPAL CB6 2AY**

5. The waste producer was (if different from 2) (name, address, postcode, telephone, email, facsimile)  
**Seales Road Haulage Ltd, 17 Juliet Way, Purfleet IndEst, South Ockendon, RM154YD**

**PART B - DESCRIPTION OF THE WASTE**

If continuation sheet used, tick here

1. The process giving rise to the waste(s) was: **CONSTRUCTION**

2. SIC for the process giving rise to the waste:  
Ticket Number: 1422691 **4 3 . 1 2 /**

3. WASTE DETAILS (where more than one waste type is collected all of the information given below must be completed for each EWC identified)

Description of waste	List of wastes (EWC Code) (6 digits)	Quantity (kg)	The chemical/biological components of the waste and their concentrations are: Component / Concentration (% or mg/kg)	Physical form (gas, liquid, solid, powder, sludge or)	Hazard code(s)	Container type, number and size
HAZARDOUS SOILS	1 7 0 5 0 3		LEAD <0.11%	SOLID	HP7	8 WHEEL TIPPER

The information below is to be completed for each EWC identified

WAF:11773

Collection

EWC code	Packing group(s)	UN identification number(s)	Proper shipping name(s)	UN class(es)	Special handling requirements

**PART C - CARRIER'S CERTIFICATE**

**PART D - CONSIGNOR'S CERTIFICATE**

(If more than one carrier is used, please attach schedule for subsequent carriers. If a schedule of carriers is attached tick here. )

I certify that the information in A B and C above is correct, that the carrier is registered or exempt and was advised of the appropriate precautionary measures. All of the waste is packaged and labelled correctly and the carrier has been advised of any special handling requirements.

1. Consignor name  
On behalf of (name, telephone, email, facsimile)  
Signature

Date **10/22/2015** Time **1200**

By signing this Duty of Care Waste Transfer Note the producer/holder of the waste confirms that they have fulfilled their duty to apply the waste hierarchy as required by Regulation 12 of the waste (England and Wales) Regulations 2011

I certify that I today collected the consignment and that the details in A2, A4 and B3 are correct, and I have been advised of any specific handling requirements.

1. Carrier Name  
On behalf of **Mick George Ltd**  
**6 Lancaster Way, Ermine Business Park, Huntingdon, PE29 6XU 01480 498099**

2. Carrier registration no. /reason for exemption  
**CB/DU87105**

3. Vehicle registration no. (or mode of transport if not road)

Signature

Date **10/22/2015** Time **1200**

**PART E - CONSIGNEE'S CERTIFICATE** (where more than one waste type is collected all of the information given below must be completed for each EWC)

Individual EWC code(s) received	Quantity of each EWC code received (kg)	EWC code accepted / rejected	Waste management operation (R or D code)

1. I received the waste at the address given in A4 on Date  Time

2. Vehicle Registration no. (or mode of transport if not road)

3. Where waste is rejected please provide details Name On behalf of (name, address, postcode, telephone, email and facsimile)

I certify that waste management licence/permit/authorised exemption no(s).

authorise the management of the waste described in B at the address given in A4. Date  Time



## The hazardous waste regulations 2005: Consignment note

sales@mickgeorge.co.uk  
www.mickgeorge.co.uk  
www.mickgeorgeships.co.uk  
T 01480 498 099  
F 01480 498 077

Mick George Limited  
6 Lancaster Way  
Ermine Business Park  
Huntingdon  
Cambridgeshire PE29 6XU

### PART A - NOTIFICATION DETAILS

1. Consignment note code: **SEALES / 00001**

2. The waste described is to be removed from (name, address, postcode, telephone, email, facsimile):  
**CHESTNUTS PETROL GARAGE, CRAY HILL, BILLERICAY, CM11 2XZ**

3. Premises code (where applicable) **SEALES**

4. The waste will be taken to (name, address and postcode):  
**MGL MEPAL MEPAL WASHING PLANT BLOCK FEN MEPAL CB6 2AY**

5. The waste producer was (if different from 2) (name, address, postcode, telephone, email, facsimile)  
**Seales Road Haulage Ltd, 17 Juliet Way, Purfleet IndEst, South Ockendon, RM154YD**

### PART B - DESCRIPTION OF THE WASTE

If continuation sheet used, tick here

1. The process giving rise to the waste(s) was: **CONSTRUCTION**

2. SIC for the process giving rise to the waste:  
Ticket Number: 1422691 **4 3 . 1 2 /**

3. WASTE DETAILS (where more than one waste type is collected all of the information given below must be completed for each EWC identified)

Description of waste	List of wastes (EWC Code) (6 digits)	Quantity (kg)	The chemical/biological components of the waste and their concentrations are: Component / Concentration (% or mg/kg)	Physical form (gas, liquid, solid, powder, sludge or)	Hazard code(s)	Container type, number and size
HAZARDOUS SOILS	1 7 0 5 0 3		LEAD <0.11%	SOLID	HP7	8 WHEEL TIPPER

The information below is to be completed for each EWC identified

WAF:11773

Collection

EWC code	Packing group(s)	UN Identification number(s)	Proper shipping name(s)	UN class(es)	Special handling requirements

### PART C - CARRIER'S CERTIFICATE

(If more than one carrier is used, please attach schedule for subsequent carriers. If a schedule of carriers is attached tick here. )

I certify that I today collected the consignment and that the details in A2, A4 and B3 are correct, and I have been advised of any specific handling requirements.

1. Carrier Name  
On behalf of **Mick George Ltd**  
**6 Lancaster Way, Ermine Business Park, Huntingdon, PE29 6XU 01480 498099**

2. Carrier registration no. /reason for exemption  
**CB/DU87105**

3. Vehicle registration no. (or mode of transport if not road):

Signature

Date **10/12/2018** Time **11/20**

### PART D - CONSIGNOR'S CERTIFICATE

I certify that the information in A B and C above is correct, that the carrier is registered or exempt and was advised of the appropriate precautionary measures. All of the waste is packaged and labelled correctly and the carrier has been advised of any special handling requirements.

1. Consignor name  
On behalf of (name, address, postcode, telephone, email, facsimile)

Sign:

Date **10/12/18** Time **11/20**

By signing this Duty of Care Waste Transfer Note the producer/holder of the waste confirms that they have fulfilled their duty to apply the waste hierarchy as required by Regulation 12 of the waste (England and Wales) Regulations 2011

### PART E - CONSIGNEE'S CERTIFICATE (where more than one waste type is collected all of the information given below must be completed for each EWC)

Individual EWC code(s) received	Quantity of each EWC code received (kg)	EWC code accepted / rejected	Waste management operation (R or D code)

1. I received the waste at the address given in A4 on Date  Time

2. Vehicle Registration no. (or mode of transport if not road)

3. Where waste is rejected please provide details Name On behalf of (name, address, postcode, telephone, email and facsimile)

I certify that waste management licence/permit/authorised exemption no(s).

authorise the management of the waste described in B at the address given in A4.

Date  Time



**The hazardous waste regulations 2005:  
Consignment note**

sales@mickgeorge.co.uk  
www.mickgeorge.co.uk  
www.mickgeorgeskips.co.uk  
T 01480 498 099  
F 01480 498 077

Mick George Limited  
6 Lancaster Way  
Ermine Business Park  
Huntingdon  
Cambridgeshire PE29 6XU

**PART A - NOTIFICATION DETAILS**

1. Consignment note code: 

S	E	A	L	E	S	/
---	---	---	---	---	---	---

 00002

2. The waste described is to be removed from (name, address, postcode, telephone, email, facsimile):  
**CHESTNUTS PETROL GARAGE, CRAY HILL, BILLERICAY, CM11 2XZ**

3. Premises code (where applicable) 

S	E	A	L	E	S
---	---	---	---	---	---

4. The waste will be taken to (name, address and postcode):  
**MGL MEPAL MEPAL WASHING PLANT BLOCK FEN MEPAL CB6 2AY**

5. The waste producer was (if different from 2) (name, address, postcode, telephone, email, facsimile)  
**Seales Road Haulage Ltd, 17 Juliet Way, Purfleet IndEst, South Ockendon, RM154YD**

**PART B - DESCRIPTION OF THE WASTE**

If continuation sheet used, tick here

1. The process giving rise to the waste(s) was: **CONSTRUCTION**

2. SIC for the process giving rise to the waste: Ticket Number: 1422691 

4	3	.	1	2	/
---	---	---	---	---	---

3. WASTE DETAILS (where more than one waste type is collected all of the information given below must be completed for each EWC identified)

Description of waste	List of wastes (EWC Code) (6 digits)	Quantity (kg)	The chemical/biological components of the waste and their concentrations are: Component / Concentration (% or mg/kg)	Physical form (gas, liquid, solid, powder, sludge or)	Hazard code(s)	Container type, number and size
HAZARDOUS SOILS	1 7 0 5 0 3		LEAD <0.11%	SOLID	HP7	8 WHEEL TIPPER

The information below is to be completed for each EWC identified

EWC code	Packing group(s)	UN identification number(s)	Proper shipping name(s)	UN class(es)	Special handling requirements
				WAF:11773	Collection

**PART C - CARRIER'S CERTIFICATE**

**PART D - CONSIGNOR'S CERTIFICATE**

(If more than one carrier is used, please attach schedule for subsequent carriers. If a schedule of carriers is attached tick here. )

I certify that I today collected the consignment and that the details in A2, A4 and B3 are correct, and I have been advised of any specific handling requirements.

1. Carrier Name  
On behalf of **Mick George Ltd**  
**6 Lancaster Way, Ermine Business Park, Huntingdon, PE29 6XU 01480 498099**

2. Carrier registration no./reason for exemption  
**CB/DU87105**

3. Vehicle registration no. (or mode of transport if not road)

Signature: *YAO EKLG*  
*KU64JYB*

Date 

1	0	1	2	2	0	1	8
---	---	---	---	---	---	---	---

 Time 

1	1	4	5
---	---	---	---

I certify that the information in A B and C above is correct, that the carrier is registered or exempt and was advised of the appropriate precautionary measures. All of the waste is packaged and labeled correctly and the carrier has been advised of any special handling requirements.

1. Consignor name  
On behalf of (name, address, postcode, telephone, email, facsimile)

Signature

Date 

1	0	1	2	2	0	1	8
---	---	---	---	---	---	---	---

 Time 

--	--	--	--

By signing this Duty of Care Waste Transfer Note the producer/holder of the waste confirms that they have fulfilled their duty to apply the waste hierarchy as required by Regulation 12 of the waste (England and Wales) Regulations 2011

**PART E - CONSIGNEE'S CERTIFICATE** (where more than one waste type is collected all of the information given below must be completed for each EWC)

Individual EWC code(s) received	Quantity of each EWC code received (kg)	EWC code accepted / rejected	Waste management operation (R or D code)

1. I received the waste at the address given in A4 on Date 

--	--	--	--	--	--	--	--

 Time 

--	--	--	--

2. Vehicle Registration no. (or mode of transport if not road)

3. Where waste is rejected please provide details

Name  
On behalf of (name, address, postcode, telephone, email and facsimile)

I certify that waste management licence/permit/authorised exemption no(s).  

--	--	--	--	--	--	--	--

authorise the management of the waste described in B at the address given in A4. Date 

--	--	--	--	--	--	--	--

 Time 

--	--	--	--



# Waste transfer note

sales@mickgeorge.co.uk  
www.mickgeorge.co.uk

6 Lancaster Way  
Ermine Business Park  
Huntingdon  
Cams  
PE29 6XU

Carrier licence:

**CBDU87105**

T 01480 498 099  
F 01480 498 077

Issued by:

**Environment Agency**

SIC for the process giving rise to the waste:

--	--	--	--	--	--	--	--	--	--

WAF No.

11773

Date

10/1/14

Time

## DUTY OF CARE SECTION

Customer's name  
SEAL'S ROAD WAREHOUSE

Collect address  
COAT HILL  
BULLERICK

Driver's name  
NORIE

Driver's signature

Vehicle registration  
K66 210

	Vehicle type	EWC Code	Customers signature	Print name
1	MW	150303	[Signature]	SEAL'S
2				
3				
4				
5				
6				
7				
8				

## WASTE DESCRIPTION

<input type="checkbox"/> Inert Sub-soil	<input type="checkbox"/> Plasterboard	<input type="checkbox"/> Hardcore/Brick	<input type="checkbox"/> Metals
<input type="checkbox"/> Card/Paper	<input type="checkbox"/> Wood	<input type="checkbox"/> Green Waste	<input type="checkbox"/> Tarmac
<input type="checkbox"/> Mixed Waste	<input type="checkbox"/> Plastic/Polythene	<input type="checkbox"/> Topsoil	

## DISPOSAL SECTION

Operator  
MG

Licence no.  
EPR/EP/0750

Issued by  
E.A.

Site name  
MEPA

Site address  
BLOCK PEN

Print name

Signature

## AGGREGATES SECTION

Customer's name

Customer's signature

Driver's name

Vehicle registration/hautier

Collect address

Product description

Delivery address

**GROSS**

**TARE**

**NET**

**By signing this Duty of Care Waste Transfer Note the producer/holder of the waste confirms that they have fulfilled their duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England and Wales) Regulations 2011.**

Copies: White → Office    Pink → Customer    Yellow → Site    Green → Remains in book



# Waste transfer note

sales@mickgeorge.co.uk  
www.mickgeorge.co.uk

6 Lancaster Way  
Ermine Business Park  
Huntingdon  
Cambs  
PE29 6XU

Carrier licence: **CBDU87105**

T 01480 498 099  
F 01480 498 077

Issued by: **Environment Agency**

SIC for the process giving rise to the waste: 

--	--	--	--	--	--	--	--	--	--

WAF No. 

--	--	--	--	--	--	--	--	--	--

Date: **10-12-18**

Time: 

--	--	--	--	--	--	--	--	--	--

## DUTY OF CARE SECTION

Customer's name  
**Searles Road Haulage**

Collect address  
**Billerica**

Driver's name  
**990**

Vehicle registration  
**[REDACTED]**

	Vehicle type	EWC Code	Customers signature	Print name
1	<b>GWL</b>		<b>[Signature]</b>	
2				
3				
4				
5				
6				
7	<b>Contaminated Soil</b>			
8	<b>Hazardous</b>			

## WASTE DESCRIPTION

Inert Sub-soil     Plasterboard     Hardcore/Brick     Metals  
 Card/Paper     Wood     Green Waste     Tarmac  
 Mixed Waste     Plastic/Polythene     Topsoil

## DISPOSAL SECTION

Operator: **MGL**

Licence no.:

Issued by: **EA**

Site name: **Mepal**

Site address: **Mepal**

Print name:

Signature:

## AGGREGATES SECTION

Customer's name:

Customer's signature:

Driver's name:

Vehicle registration/haulier:

Collect address:

Product description:

Delivery address:

**GROSS**

**TARE**

**NET**

**By signing this Duty of Care Waste Transfer Note the producer/holder of the waste confirms that they have fulfilled their duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England and Wales) Regulations 2011.**



# Waste transfer note

Carrier licence:

**CBDU87105**

Issued by:

382 5383

**Environment Agency**

WAF No.

sales@mickgeorge.co.uk  
www.mickgeorge.co.uk

T 01480 498 099  
F 01480 498 077

6 Lancaster Way  
Ermine Business Park  
Huntingdon  
Cambs  
PE29 6XU

SIC for the process giving rise to the waste:

--	--	--	--	--	--	--	--	--	--

Date: 16/12/18

Time:

## DUTY OF CARE SECTION

Customer's name  
Seales Rd Huntingdon

Collect address  
chestnuts Detol St  
Cray Hill  
Huntingdon

Driver's name

Ve

	Vehicle type	EWC Code	Customers signature	Print name
1	1x8 wheel Haulage	170503	[Signature]	[Print Name]
2				
3				
4				
5				
6				
7				
8				

## WASTE DESCRIPTION

<input type="checkbox"/> Inert Sub-soil	<input type="checkbox"/> Plasterboard	<input type="checkbox"/> Hardcore/Brick	<input type="checkbox"/> Metals
<input type="checkbox"/> Card/Paper	<input type="checkbox"/> Wood	<input type="checkbox"/> Green Waste	<input type="checkbox"/> Tarmac
<input type="checkbox"/> Mixed Waste	<input type="checkbox"/> Plastic/Polythene	<input type="checkbox"/> Topsoil	

## DISPOSAL SECTION

Operator

Licence no.

Issued by

Site name

Site address

Print name

Signature

## AGGREGATES SECTION

Customer's name

Customer's signature

Driver's name

Vehicle registration/haulier

Collect address

Product description

Delivery address

**GROSS**

**TARE**

**NET**

**By signing this Duty of Care Waste Transfer Note the producer/holder of the waste confirms that they have fulfilled their duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England and Wales) Regulations 2011.**

Copies: White → Office    Pink → Customer    Yellow → Site    Green → Remains in book



GEOSPHERE ENVIRONMENTAL

**Ec**

**Ecology.**

**Fr**

**Flood Risk.**

**Ge**

**Geotechnical.**

**En**

**Environmental.**

**Kw**

**Knotweed.**

**GEOSPHERE ENVIRONMENTAL LTD**

Brightwell Barns, Ipswich Road, Brightwell, Suffolk, IP10 0BJ

T: 01603 298076 | 01473 353519 | E: [info@geosphere-environmental.co.uk](mailto:info@geosphere-environmental.co.uk) | W: [geosphere-environmental.co.uk](http://geosphere-environmental.co.uk)



Added 01.11.2023

Evidence and report of installed membrane

Photos in Descending order.







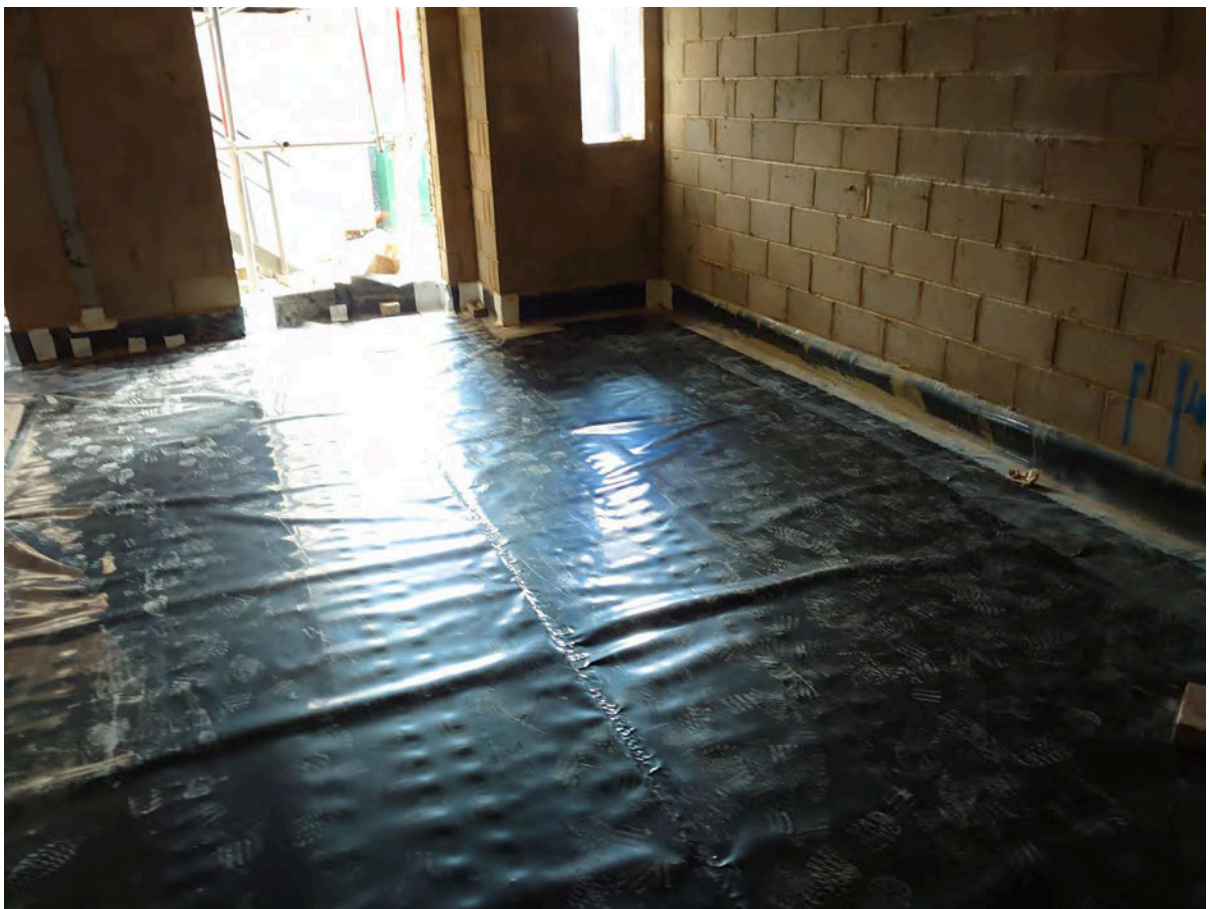


































# GeoShield Verification Plan



## PROJECT DESCRIPTION

Omega Lining Solutions Limited,  
Chestnuts,  
Crays Hill,  
Billericay,  
CM11 2YA

The proposed development for which gas protection measures are required involves a two and a half-storey building of nine flats over three floors, with 17 car parking spaces and associated landscaping and external amenity space for future residents.

The points system is not applicable due to the site as only being classified as having hydrocarbons and VOC's, however Geoshield have adopted the highest design and verification principles associated with BS8485:2015 + A1 2019, BR 211, Public Health England, NHBC Technical Extra April 2016 and CIRIA 735.

This pre-verification plan reviews the design to ensure it is compliant with the developer and planning authority requirements and in conjunction with the relevant investigation report in accordance with BS8485:2015 +A1 2019.

In summary, the design does achieve a required level of attention to detail with its robust specific gas membrane design, the structural barrier of a block and beam floor with a passive 225mm ventilated subfloor void connected to telescopic air vents.

The pre-verification plan confirms how the installation will be tested in accordance with CIRIA735. The verification visits will be documented in verification reports during the project that are suitable for submission to the local planning authority in order to satisfy and discharge planning consent.

All faults identified during inspection and verification site visits of the ground gas membrane will be a required remediation before sign off.



# GeoShield Verification Plan



## PROJECT DESCRIPTION

### Pre-Verification Plan

GeoShield are appointed by the Client to carry out independent validation, verification and integrity testing of the ground gas protection system on site. The Pre-Verification plan sets out the requirements and procedures that GeoShield will adopt to ensure that the installation is in line with the proposed design, relevant UK standards and guidance.

GeoShield take no responsibility for any warranties to third parties for the design of the system or the installation.

### Limitations

The Pre-Verification plan prepared by GeoShield Limited is limited to the proposed ground gas protection measures installed. The Pre-Verification plan has been prepared in line with the relevance UK Standards and Guidance (BS8485:2015+A1:2019 & CIRIA 735) alongside the information made available to GeoShield by the Client. The conclusions made in the report are considered to be correct at the time of writing, but additional information provided/discovered may require amendments to the Plan. GeoShield recognises that changes to relevant standard and guidance may occur at any time which may cause the conclusions made to be incorrect - GeoShield do not accept any responsibility or liability for the implications of such changes.

The Pre-Verification plan does not in itself constitute verification that the membrane has been installed in accordance with this document. Validation and verification of the installed membrane will be covered in separate verification reports following physical inspection of the gas barrier and will include photographic evidence of the installation.

Waterproofing elements (where applicable) do not fall into the remit of this Pre-Verification plan or future inspections. GeoShield will provide the opinion on membrane's suitability for ground gas protection purposes – no liability is offered or implied for the waterproofing element which should be checked by others.



# GeoShield Verification Plan



PROJECT REFERENCE: GEO102657

PROJECT: Chestnuts, Crays Hill

PROJECT ADDRESS: Chestnuts,

Crays Hill, Billericay,

CM11 2YA

SPECIFICATION: Verified in accordance CIRIA 735.

Design in accordance with BS8485 2015 + 2019 for Methane and Carbon Dioxide.

Substrate prepared in-accordance with manufactures instructions and BS8485:2019.

JUTA Titanflex

JUTA GP SAM





# GeoShield Verification Plan



## INFORMATION INCLUDED

3521,GI,VAL,TP,PD,.30-01-19,V1 - Chestnuts Report

Chestnut Serv.Garage\_409.B2\_2019.03.21

Chestnut Serv.Garage\_415.B3\_2019.07.15

Chestnut Serv.Garage\_416.B3\_2019.07.15

Chestnut Serv.Garage\_420.B3\_2019.05.14

JUTA Material Specification Technical Data Sheets

Radon Maps UK - (Map 1) Site Location

Information presented to at the pre-verification stage assumed correct

Any change client will let GeoShield know or this Pre-verification Plan will be void.



# GeoShield Verification Plan



NAME OF SURVEYOR:

Liam White

VERIFICATION COMPANY:

GeoShield Limited

Icon Business Centre

4100 Park Approach

Thorpe Park

Leeds

CONTACT NUMBER:

07584 222 519

EMAIL ADDRESS:

lwhite@geoshield.co.uk

ORDER NUMBER:

To be confirmed

PER VISIT:

YES:

NO:

PROJECT:

YES:

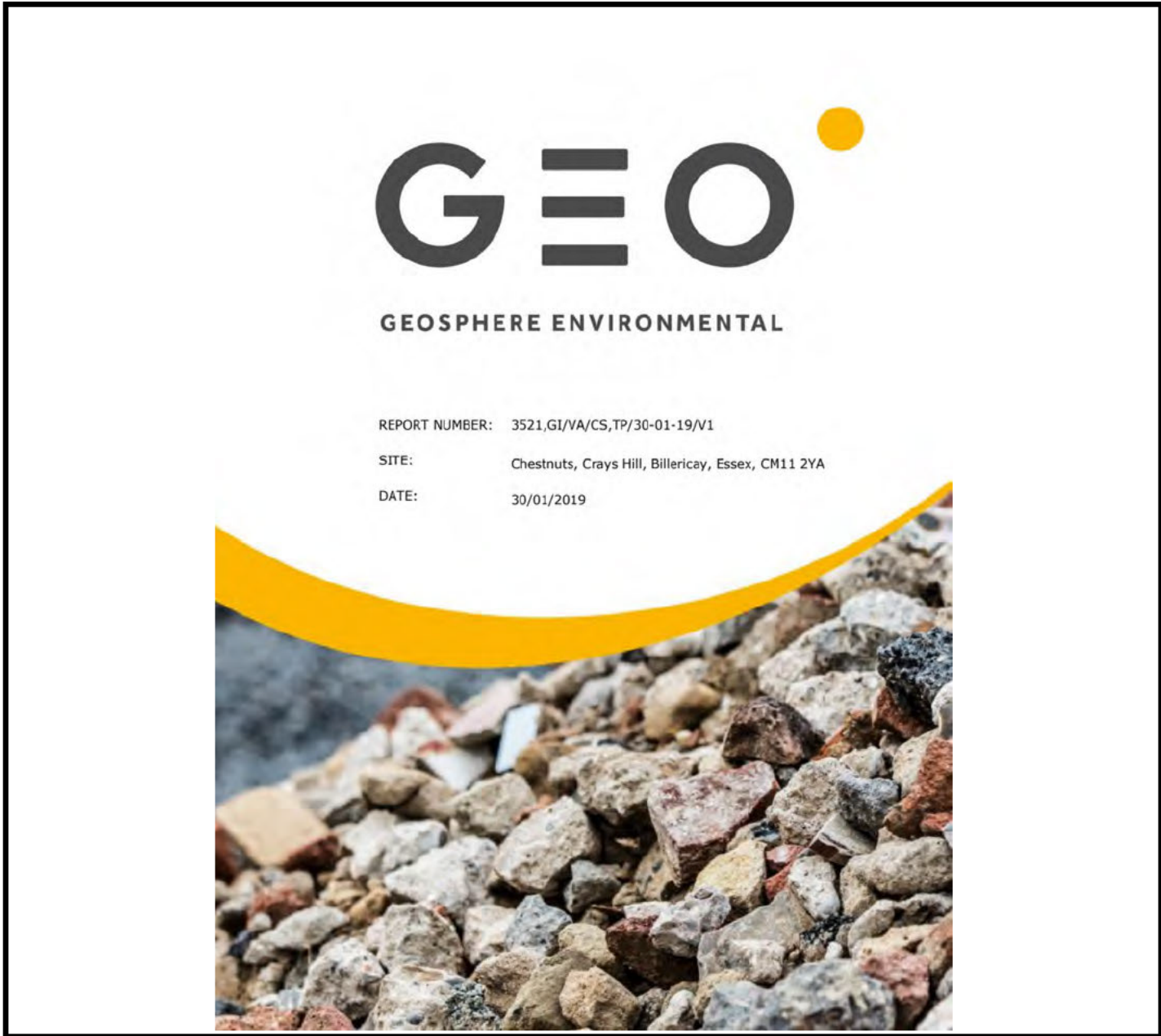
NO:



# GeoShield Verification Plan



## SPECIFICATION



### Title Reference & Description:

3521,GI,VAL,TP,PD,.30-01-19,V1 - Chestnuts Report





## SPECIFICATION

- potential receptors had been identified – mainly human health receptors as significant contamination to controlled waters was considered unlikely based on the geologic data available and supported by shallow intrusive works;
- **Asbestos** – Quantification of asbestos within selected samples where presence was noted to be undertaken;
- **Heavy Metals** – A single exceedance of lead was encountered within exploratory hole WS08, located within the soft landscaped areas;
- **Hydrocarbons** – Hydrocarbons were encountered above threshold values within exploratory locations WS7 and WS12.

### 3.3 Remediation Method Statement – Geosphere Environmental Ltd, March 2018

A remediation method statement was prepared by Geosphere Environmental in March 2018:

- **‘Remediation Method Statement For A Proposed Residential Development – Chestnuts, Crays Hill, Billericay, Essex, CM11 2YA’**, Report Reference No. 2871, SI/RMS/TP/PD/26-03-18/V2.

Asbestos quantification was also completed as recommended by the site investigation and determined the concentration of asbestos fibres to be very low, falling within a concentration 0.001% wt/wt to <0.01% wt/wt and therefore no further works were recommended.

### 2.4 Ground Gas Monitoring Summary

Although not strictly remediation, the previous report recommended either gas monitoring or a hydrocarbon resistant membrane be installed over the footprint of the development.

Ground gas monitoring has been omitted and it is anticipated that a specialist supplier/installer will provide the details of the membrane and specify a suitable product - a GX Flexi Hydrocarbon Barrier manufactured by Visqueen or equivalent membrane will likely be used.

Once completed the installation should be independently verified by a third party.

This will not be able to be completed until initial groundworks and development have taken place, and as such will not be completed until foundations in this phase of the site has been completed.

Details of installation and validation of the process should be retained and supplied to the local authority once completed.

Title Reference & Description:

3521, GI, VAL, TP, PD, .30-01-19, V1 - Chestnuts Report

2.4 Ground Gas Monitoring Summary




# GeoShield Verification Plan



## SPECIFICATION

Chestnuts, Crays Hill, Billericay, Essex, CM11 2YA



**5. CONCLUSIONS AND RECOMMENDATIONS**

**5.1 - Conclusions**

On the basis of the validation works, the remediation specified by the remedial strategy for the site has been completed and validated to an acceptable degree, and the risks posed by the sources of hydrocarbon soil contamination to the proposed development and environmental receptors has been mitigated. The waste soil disposal information should be retained for record by the client.

The ground gas recommendations are still in place but are not covered by the scope of this report. It is anticipated that a separate report on installation and validation of the gas membrane will be provided by the companies who undertake those elements of the site development.

**5.2 - Recommendations**

This report should be forwarded to the council for submission to discharge planning conditions.

The watching brief detailed in section 3.6 of this report should remain in place during development, should any anomalous materials be encountered during development works.

It is anticipated that there will be a small amount of soft landscaping in the proposed development once complete. If any soils are imported than the recommendations from Section 4.3 of the RMS still apply (or section 3.5 of this report).

Title Reference & Description:

3521,GI,VAL,TP,PD,.30-01-19,V1 - Chestnuts Report

5.1 - Conclusions

BGA  
British Geomembrane Association

# GeoShield Verification Plan



## SPECIFICATION

CHESTNUTS, CRAYS HILL  
RESIDENTIAL DEVELOPMENT OF 596 FLATS



**Control Stations:**

Name	Code	Area	Code
Station 1	5561	Station 2	5562
Station 3	5563	Station 4	5564

**Tree Schedule:**

Type	Quantity	Value	Total
T100	10	100	1000
T200	20	200	4000
T300	30	300	9000

- Topographical Key:**
- CHS - Chimney Height
  - CC - Drainage Channel
  - CP - Crown Height
  - EP - Eave Height
  - FP - First Floor
  - GP - Gully
  - LP - Lorry Pad
  - OP - Overhead Pipe
  - RC - Road
  - RI - Ridge Line
  - RWP - Rain Water Pipe
  - TS - Top Surface
  - UC - Inspection Chamber - Unfinished
  - UM - Manhole - Unfinished
  - VS - Vent Pipe
  - WP - Waste Piped From
  - WV - Valve - Above

Title Reference & Description:

Chestnut Serv.Garage\_409.B2\_2019.03.21

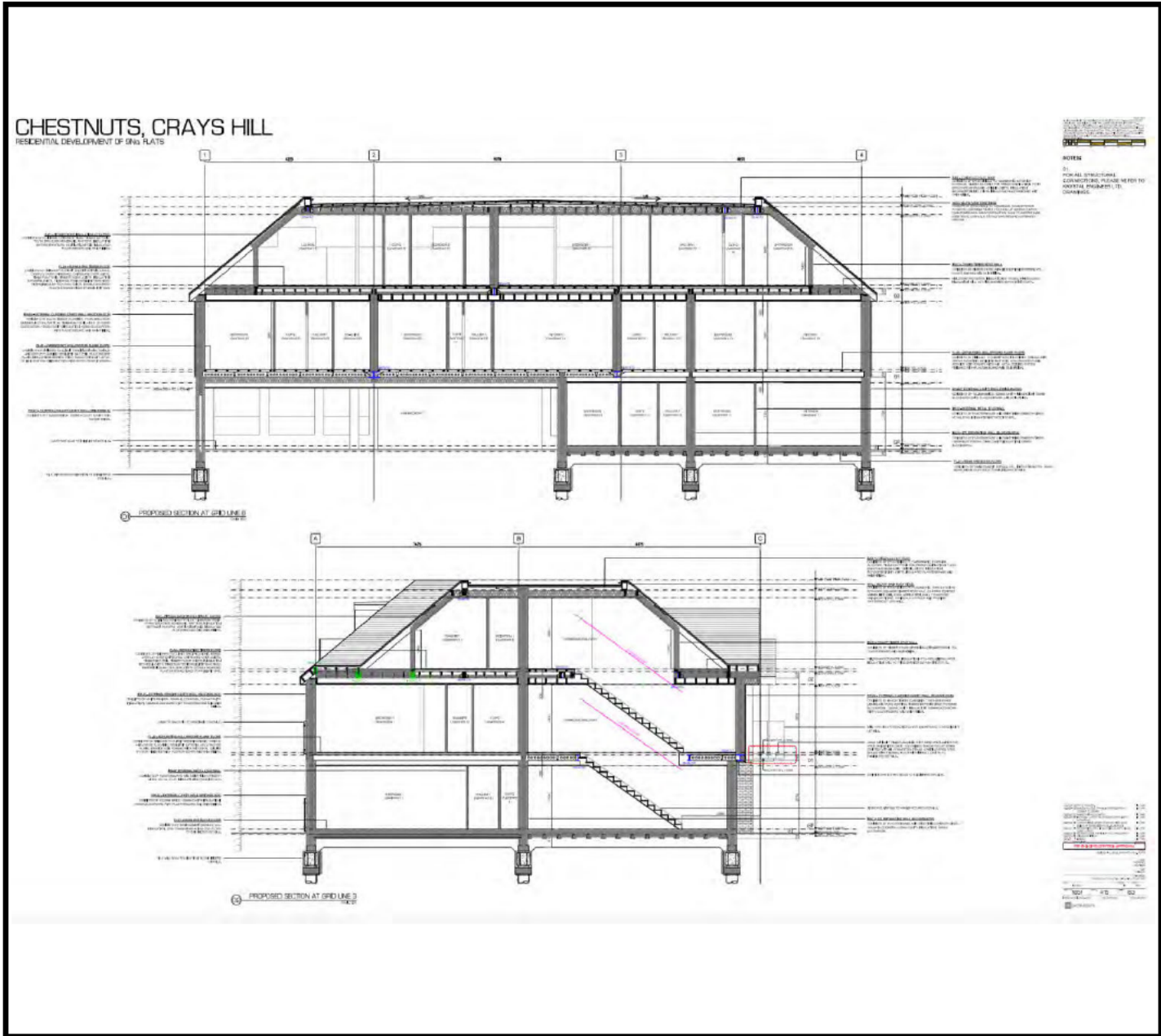




# GeoShield Verification Plan



## SPECIFICATION



Title Reference & Description:

Chestnut Serv.Garage\_415.B3\_2019.07.15

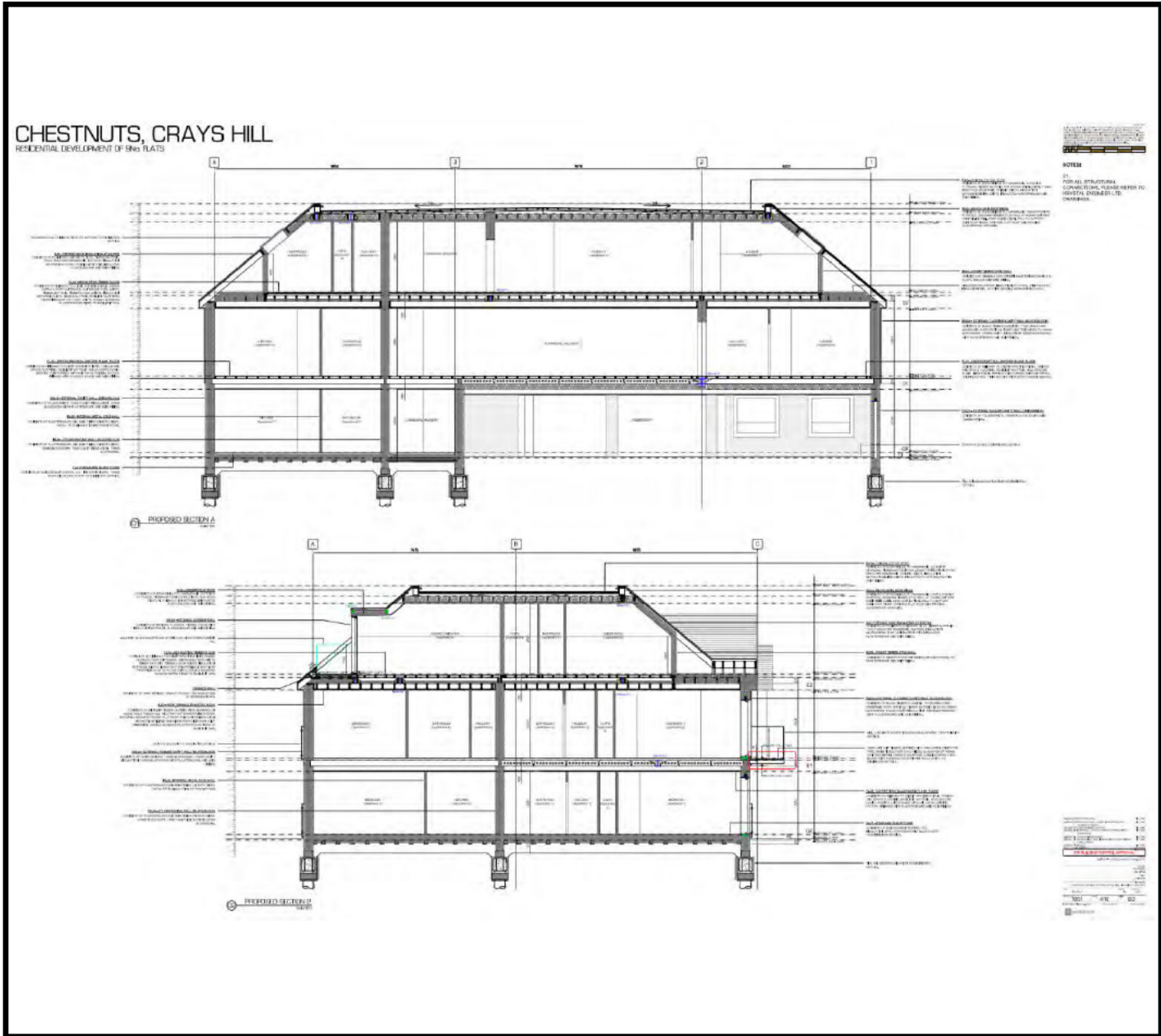




# GeoShield Verification Plan



## SPECIFICATION



Title Reference & Description:

Chestnut Serv.Garage\_416.B3\_2019.07.15

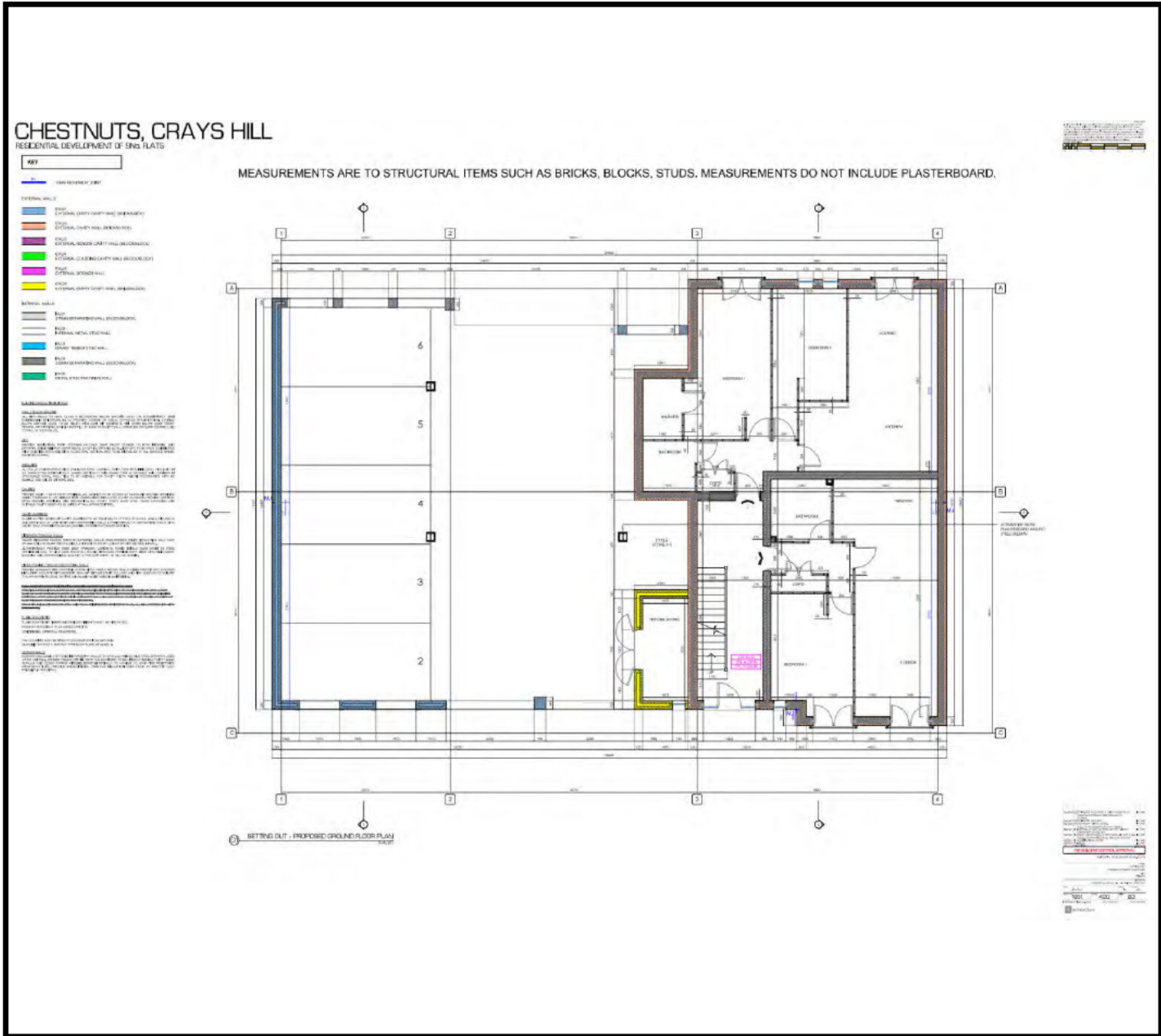




# GeoShield Verification Plan



## SPECIFICATION



Title Reference & Description:

Chestnut Serv.Garage\_420.B3\_2019.05.14





## SPECIFICATION

### GP® TITANFLEX

GP® TITANFLEX - Gas and hydrocarbon barrier is a multi-layer, polyethylene membrane. GP® TITANFLEX is specifically designed, manufactured, tested and certified to perform as a methane, carbon dioxide, radon, ground gas, VOC, air & moisture and hydrocarbon protection system.

GP® TITANFLEX complies with the latest codes of practice as published by BRE, CIRIA (C748) and BS1 (BS 8485:2015). Suitable for use as Ground Gas/Hydrocarbon protection for NHBC, GREEN, AMBER1, AMBER 2 and RED site characterisations.

CHARACTERISTICS	TEST METHOD	UNIT	GP® TITANFLEX
PHYSICAL PROPERTIES			
THICKNESS	EN 1849-2	mm	0.5
WIDTH	EN 1849-2	m	2
LENGTH	EN 1849-2	m	50
WEIGHT	EN 1849-2	G/M <sup>2</sup>	500
HYDRAULIC PROPERTIES			
WATER VAPOUR TRANSMISSION RATE	EN 1931	G/M <sup>2</sup> /DAY	0.11-0.18
WATERTIGHTNESS (60 kPa)	EN 1928	-	PASS
WATERTIGHTNESS (196 kPa - 20m WATER HEAD) (BASEMENT APPLICATION)	EN 1928	-	PASS
MECHANICAL PROPERTIES			
RESISTANCE TO STATIC LOAD	EN 12730-B	Kg	>20
PUNCTURE RESISTANCE	EN 13236	kJ	>2.0
TENSILE STRENGTH (MD)	EN 12311-1	N/50mm	>550
TENSILE STRENGTH (CMD)	EN 12311-1	N/50mm	>400
TENSILE ELONGATION (MD/CMD)	EN 12310-1	%	>550
TEAR RESISTANCE (MD/CMD)	EN 12310-1	N	>300
RESISTANCE TO IMPACT	EN 12601-B	mm	650
REACTION TO FIRE	EN 13501-1	CLASS	E
RESISTANCE TO ARTIFICIAL AGEING	EN 1296/EN 1928	-	PASS
RESISTANCE TO CHEMICALS	EN 1847/EN 1928	-	PASS
COMPLIANCE AND CERTIFICATION			
CE MARK - EN13967:2012			
NHBC STANDARDS COMPLIANT			
CIRIA C748 COMPLIANT			
BS 8485:2015 COMPLIANT			



- ⊕ Quick and easy installation.
- ⊕ Can be a fully welded system.
- ⊕ High resistance to ground gases.
- ⊕ Exceptional Chemical Resistance.
- ⊕ Manufactured to meet the most up to date British Standards and guidance.
- ⊕ Long Term Durability (performance guaranteed for the lifetime of the building).

Contact us to find out more information.  
[info@juta.co.uk](mailto:info@juta.co.uk) | 01772 754177 | JUTA.CO.UK  
 Melton Grove Works, Church Road, Lytham, FY8 5PL



Title Reference & Description:

JUTA Titanflex Technical Data Sheet



# GeoShield Verification Plan



## SPECIFICATION

### TECHNICAL DATA

CHARACTERISTICS	TEST METHOD	UNIT	GP <sup>®</sup> TITANFLEX
VAPOUR PERMEABILITY 100% CONCENTRATION			
TRANSMISSION RATE OF BENZENE	EN ISO 15105-2	mg/m <sup>2</sup> /day	<3.6
TRANSMISSION RATE OF TOLUENE	EN ISO 15105-2	mg/m <sup>2</sup> /day	<13.8
TRANSMISSION RATE OF ETHYL BENZENE	EN ISO 15105-2	mg/m <sup>2</sup> /day	<2.7
TRANSMISSION RATE OF XYLENES (M,P,O)	EN ISO 15105-2	mg/m <sup>2</sup> /day	<7.7
TRANSMISSION RATE OF HEXANE	EN ISO 15105-2	mg/m <sup>2</sup> /day	<0.6
TRANSMISSION RATE OF VINYL CHLORIDE	EN ISO 15105-2	mg/m <sup>2</sup> /day	<0.05
TRANSMISSION RATE OF TRICHLOROETHENE (TCE)	EN ISO 15105-2	mg/m <sup>2</sup> /day	<54.7
TRANSMISSION RATE OF TETRACHLOROETHENE (PCE)	EN ISO 15105-2	mg/m <sup>2</sup> /day	<26.2
TRANSMISSION RATE OF NAPHTHALENE	EN ISO 15105-2	mg/m <sup>2</sup> /day	<0.0006
TRANSMISSION RATE OF CIS-1,2-DICHLOROETHYLENE	EN ISO 15105-2	mg/m <sup>2</sup> /day	<1.1
GAS PERMEABILITY			
METHANE PERMEABILITY	EN ISO 15105-1	ml/m <sup>2</sup> /day/atm	0.13
METHANE PERMEABILITY (JOINTED)	EN ISO 15105-1	ml/m <sup>2</sup> /day/atm	1.00
CARBON DIOXIDE PERMEABILITY	EN ISO 15105-1	ml/m <sup>2</sup> /day/atm	3.91
VINYL CHLORIDE GAS PERMEABILITY	EN ISO 15105-1	ml/m <sup>2</sup> /day/atm	0.04
RADON PERMEABILITY	K124/02/195	m <sup>2</sup> /s	1.0 x 10 <sup>-18</sup>
DURABILITY AND CHEMICAL RESISTANCE			
Chemical Resistance - SULFURIC ACID (10% Solution of Sulfuric Acid (H <sub>2</sub> SO <sub>4</sub> )) 50° For 56 Days.	EN 14414-A	TENSILE STRENGTH RETAINED	100%
		RESULT	PASS
Chemical Resistance - BASIC (Calcium Hydroxide Saturated Suspension) 50° For 56 Days.	EN 14414-B	TENSILE STRENGTH RETAINED	100%
		RESULT	PASS
Chemical Resistance - SOLVENTS (35% Diesel, 35% Paraffin, 30% Di H <sub>2</sub> O (Voll)) 50° For 56 Days.	EN 14414-C	TENSILE STRENGTH RETAINED	>80%
		RESULT	PASS
Chemical Resistance - SYNTHETIC LEACHATE (Mixture of 14 Acids, Chlorides, Sulphates & Phosphates) 50° for 56 days.	EN 14414-D	TENSILE STRENGTH RETAINED	100%
		RESULT	PASS
Resistance to Leaching - HOT WATER (Deionised water) 50° For 56 days.	EN 14415-A	TENSILE STRENGTH RETAINED	100%
		RESULT	PASS
Resistance to Leaching - AQUEOUS ALKALINE (Saturated Calcium Hydroxide) 50° for 56 days.	EN 14415-B	TENSILE STRENGTH RETAINED	100%
		RESULT	PASS
Resistance to Leaching - ORGANIC ALCOHOL (30% METHANOL, 30% ISOPROPANOL, 40% GLYCOL) 50° for 56 days.	EN 14415-C	TENSILE STRENGTH RETAINED	100%
		RESULT	PASS
Chemical Resistance - BENZENE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED	95% (MD) 102%(CMD)
		RESULT	PASS
Chemical Resistance - TOLUENE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED	94% (MD) 81%(CMD)
		RESULT	PASS
Chemical Resistance - ETHYL BENZENE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED	99% (MD) 97%(CMD)
		RESULT	PASS
Chemical Resistance - XYLENES - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED	91% (MD) 106%(CMD)
		RESULT	PASS
Chemical Resistance - TCE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED	99% (MD) 93%(CMD)
		RESULT	PASS
Chemical Resistance - PCE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED	93% (MD) 93%(CMD)
		RESULT	PASS
Chemical Resistance -NAPHTHALENE- 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED	101% (MD) 93%(CMD)
		RESULT	PASS
Chemical Resistance - HEXANE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED	99% (MD) 104%(CMD)
		RESULT	PASS

FOR THE NEEDS OF TODAY AND THE DEMANDS OF TOMORROW.

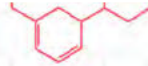
Title Reference & Description:

JUTA Titanflex Technical Data Sheet

## SPECIFICATION

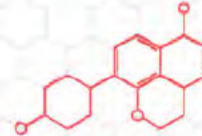
### GP® SAM

Rev. June 2019



Ground Gas  
Protection

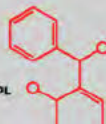
JUTA GP® SAM - Gas Protection - Self Adhesive Membrane, is a bituminous gas proof and water proof sheet, composed of self-adhesive SBS polymer modified bitumen incorporating an aluminium foil with an upper surface finish of white cross laminated HDPE, and a lower surface finish of siliconized paper release film. JUTA GP® SAM is used for the gas/waterproofing of underground structures where harmful ground gasses are anticipated.



JUTA GP® SAM			
Characteristic	Test Method	Unit	GP® SAM
<b>Physical Properties</b>			
Thickness	EN 1849-2	mm	1.00
Width	EN 1849-2	M	0.3 or 1
Length	EN 1849-2	M	20
Weight	EN 1849-2	g/m <sup>2</sup>	1100
<b>Hydraulic Properties</b>			
Watertightness	EN 1928	-	PASS
Water Vapour Transmission	EN 1931	g/m <sup>2</sup> /day	0.013
<b>Mechanical Properties</b>			
Tensile Strength (MD/CMD)	EN12311-2	N/mm <sup>2</sup>	3
Elongation (MD/CMD)	EN 12311-2	%	>120
Resistance to Static Load	EN 12370	Rg	20kg
Joint Strength	EN 12317-2	N	>30
Durability and Water tightness (ageing and chemicals)	EN 1847	-	PASS
Resistance to Nail Tear (MD/CMD)	EN 12310-1	N	>100
Reaction to Fire	EN 13501	Euro Class	F
<b>Gas Permeability</b>			
Methane Permeability	BS EN ISO 15105 - 1	ml/m <sup>2</sup> /day/atm	< 0.53
Carbon Dioxide Permeability	BS EN ISO 15105 - 1	ml/m <sup>2</sup> /day/atm	< 0.53
Radon Permeability	K124/02/95	m <sup>2</sup> /s	5.0 x 10 <sup>-14</sup>

JUTA GP® SAM complies with the latest codes of practice as published by BRE, CIRIA and BSI (BS 8485:2015).

Contact us to find out more information.  
[info@juta.co.uk](mailto:info@juta.co.uk) | 01772 754177 | [JUTA.CO.UK](http://JUTA.CO.UK)  
 Melton Grove Works, Church Road, Lytham, FY8 5PL



**JUTA**



riba  
product  
selector

Title Reference & Description:

JUTA GP SAM Technical Data Sheet



BGA  
British Geomembrane Association

# GeoShield Verification Plan



## SPECIFICATION

### Additional Information

**Ground Gas Protection**

**HANDLING**

Roll weights can be in excess of 20kg (approx. 33kg/roll) and hence appropriate care and equipment is required for unloading and handling. This product is non-toxic nor flammable.

**STORAGE**

Rolls of JUTA GP® SAM should be stored horizontally, and pallets should not be stacked on top of one another.

JUTA GP® SAM should be stored in a cool, dry place, and be protected from exposure to rain, sun, heat and cold temperatures prior to installation. Exposure to sunlight for extended period of time could cause difficulty with removal of the release film.

**INSTALLATION**

JUTA GP® SAM should be installed in accordance with the product installation guidelines, and in accordance with BS 8485:2015.

It is recommended that JUTA GP® SAM is not applied in temperatures below 10 °C, in colder weather the material can be warmed slightly to aid adhesion.

**ACCESSORY PRODUCTS**

- JUTA GP® Primer
- JUTA GP® Protection Board
- JUTA GP® Protection Fleece

PLEASE CONTACT JUTA UK DIRECTLY FOR MORE INFORMATION ON JUTA GP® SAM

Contact us to find out more information.  
[info@juta.co.uk](mailto:info@juta.co.uk) | 01772 754177 | [JUTA.CO.UK](http://JUTA.CO.UK)  
Melton Grove Works, Church Road, Lytham, FY8 5PL

**JUTA**

BBA  
CE  
riba product selector

Title Reference & Description:

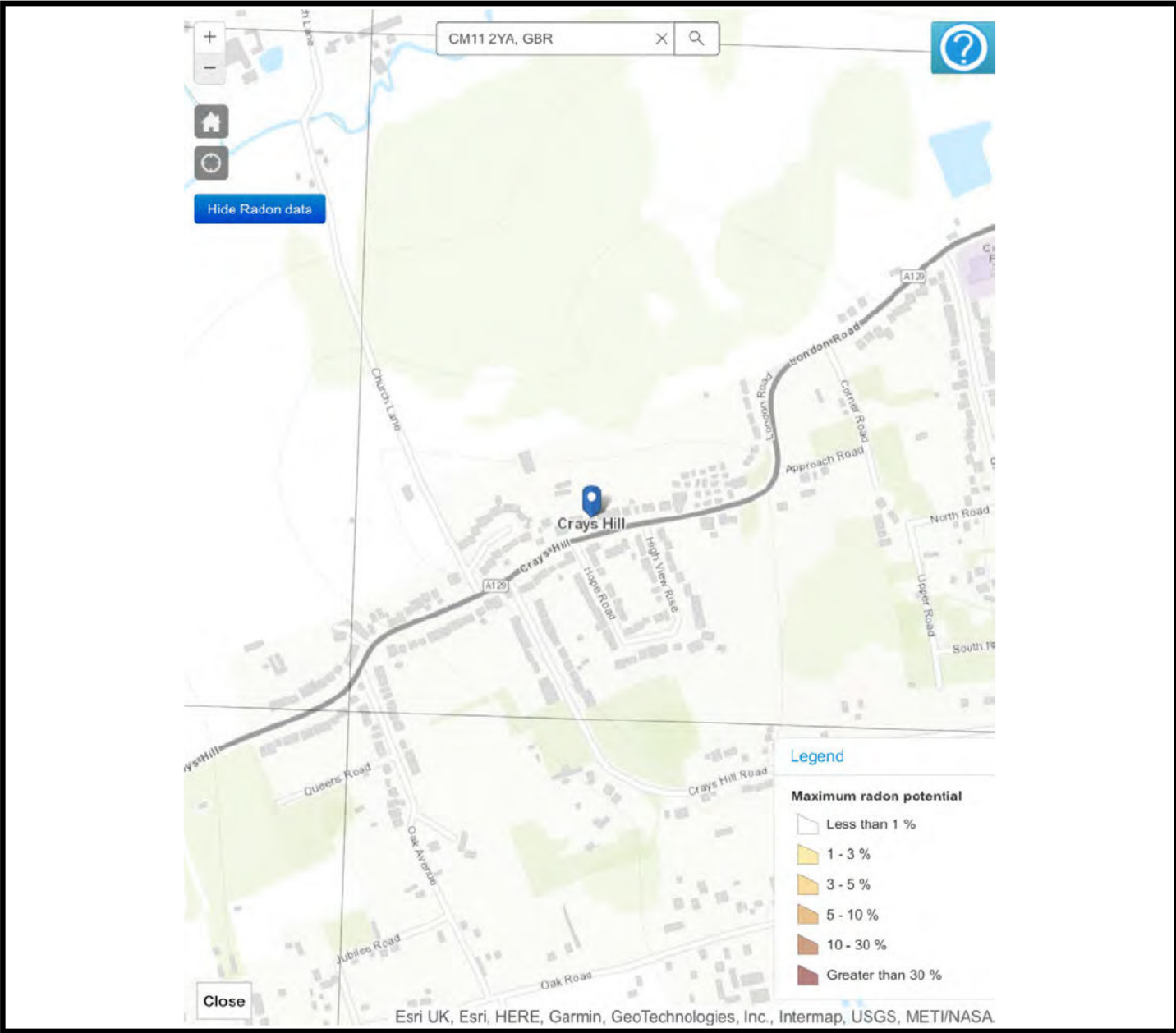
JUTA GP SAM Technical Data Sheet



# GeoShield Verification Plan



## RADON MAPS UK - (Map 1) Site Location



Maximum Radon Potential:

Less than 1%

Description:

No radon protection measures are required.

Postcode:

CM11 2YA



# GeoShield Verification Plan



## CLIENT DETAILS

CLIENT CONTACT: Ricky Cooper

CONTACTS ROLE:

MOBILE PHONE:

EMAIL ADDRESS:

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CLIENT CONTACT:

CONTACTS ROLE:

MOBILE PHONE:

EMAIL ADDRESS

NOTES:





# GeoShield Verification Plan



## APPLICATOR'S DETAILS

APPLICATOR NAME:

COMPANY:

APPLICATOR TEL:

APPLICATOR EMAIL:

---

APPLICATOR NAME:

COMPANY:

APPLICATOR TEL:

APPLICATOR EMAIL:

NOTES:



# GeoShield Verification Plan



## APPLICATOR'S DETAILS

### TRAINING LEVEL:

SPECIALIST CONTRACTOR:	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
NVQ LEVEL 2:	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
NVQ LEVEL 4:	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
COMPETENT APPLICATOR :	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>

### REASON FOR VISIT:

DURING INSTALLATION:	<input checked="" type="checkbox"/>	UNDERSLAB VENTILATION	<input checked="" type="checkbox"/>
PRE - POUR:	<input type="checkbox"/>	DPC MEMBRANE CONNECTION	<input checked="" type="checkbox"/>
TESTING:	<input checked="" type="checkbox"/>	OTHER (PLEASE SPECIFY):	<input type="checkbox"/>

NOTES:

NOTES:

# GAS REGIME

In accordance with guidance from CIRIA 735 and BS8485:2019:

In accordance with the NHBC Traffic Light System:

- CS2
- CS3
- CS4
- CS5 or above
- VOC

- Green
- AMBER 1
- AMBER 2
- RED

Radon gas protection measures specify to the guidance from the BR 211 document:

RADON BASIC

RADON FULL

Building Type: TYPE A

POINTS REQUIRED UNDER BS8485:2019 N/A

## POINTS GAINED FROM BS8485:2019

Score for Structural Barrier: N/A

Grade 2 Basement: N/A

Grade 3 Basement: N/A

Score for Venting: N/A

Car Park: N/A

Score for Membrane: N/A

POINTS ACHIEVED UNDER BS8485 2019: N/A





# GeoShield Verification Plan



## TESTING

VISUAL: PICK & PROBE/MECHANICAL POINT STRESS TEST:

NON-DESTRUCTIVE COMPRESSED AIR LANCE TEST:

NON-DESTRUCTIVE SMOKE TEST:

DESTRUCTIVE JOINT TESTING:

NON-DESTRUCTIVE TRACER GAS TESTING:

DIELECTRIC POROSITY TEST:

PUMP TEST FOR "Twinny" WELD

NOTES: From the risk assessment GeoShield will initially conduct a visual

NOTES: and pick and probe testing regime for this project.

NOTES: Air lance testing will be conducted to test the installed membrane in

NOTES: accordance with CIRIA 735.

NOTES:

NOTES: Only if the application falls below the accepted standard will other testing

NOTES: be used.

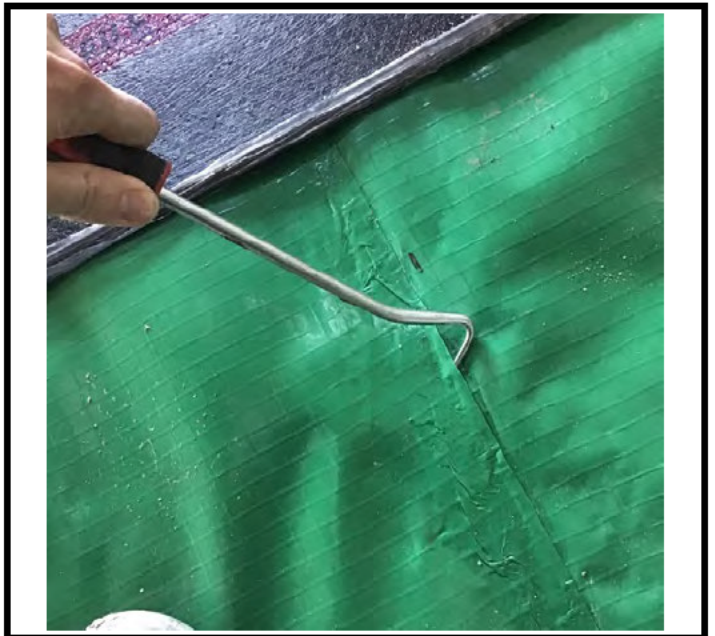
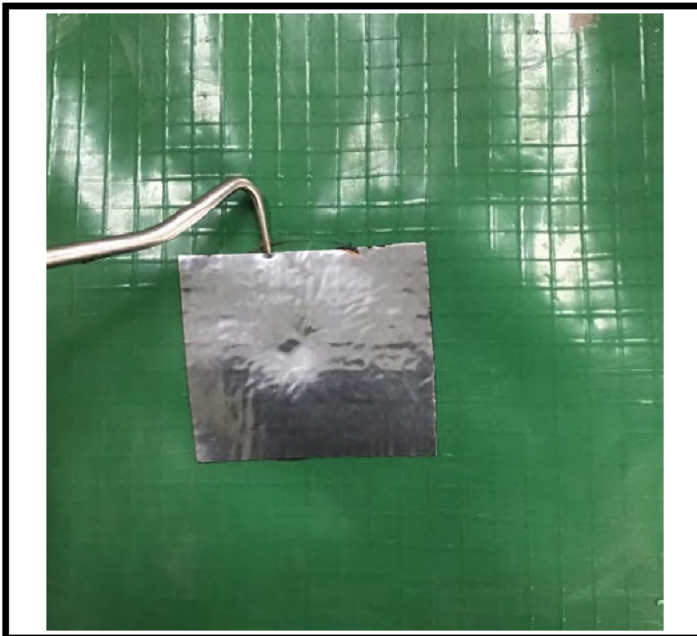


# GeoShield Verification Plan



## SPECIFICATION

### Mechanical Point Stress/ 'Pick and Probe' Testing



#### CIRIA 735

4.3.2 - Mechanical point stress tests involve running a blunt instrument (e.g. a screwdriver) along the edge of a seam to identify any unbonded seams. This method is not as effective as air lancing but it can be especially useful in hard to reach areas where it is not possible to air lance.

The instrument used should not puncture the gas membrane. This method is less appropriate for materials that are easily punctured where an air lance test is more suitable (although if a gas membrane can be easily punctured its suitability as a membrane is open to question).



# GeoShield Verification Plan



## SPECIFICATION

### Air Lance Testing



#### CIRIA 735

4.3.3 - Air lance testing identifies unbonded areas of seam by directing a high pressure jet of air at the seam. The air is at a minimum pressure of 345kPa via a 4.8mm nozzle and is located no more than 50mm from the seam being tested.

In order to achieve the requirements of ASTM D4437-08:2013 bespoke specialist equipment is required to maintain the required pressure.





# GeoShield Verification Plan



## RISK ASSESSMENT

SITE SPECIFIC CIRCUMSTANCES	1	2	3	4	5
Complexity of Design			✓		
Repetition of design		✓			
Experience of workforce	✓				
Gas regime		✓			
Project management experience	✓				
Installation conditions (exposed?)		✓			
Robust Project specific gas design	✓				

TYPE OF RISK	RANGE	RISK
High Risk	23 - 30	
Medium High Risk	19 - 22	
Medium Risk	15 - 18	18
Medium Low Risk	11 - 14	
Low Risk	0 - 10	

GeoShield have classed this project as a medium risk.

GeoShield will lay all perimeters down for standards at the pre-verification meeting to assist both the installer and the main contractor.



# GeoShield Verification Plan



## VERIFICATION PLAN

### METHOD STATEMENT

**EXPECTED VISITS:-** 1 site visit is deemed necessary for verification, however extra visits may be considered for potential remediations before sign off.

**TESTING:-** Mechanical Point Stress (Pick & Probe) testing on taped areas.

Air lance testing will be conducted where access allows for use of equipment.

**PURPOSE:-** Geoshield are 3rd party gas membrane verifiers and in order of this project to be compliant with BS8485:2019 and in accordance with CIRIA 735.

This project will NOT achieve sign off for gas membrane installation unless independent verification is carried out.

**REPORTING:-** Each site visit be accompanied with a written and electronic report.

Any remediations either completed on the visit or outstanding for a later date will

be recorded and logged, sign off will not be achieved for each section area until

all remediations has been completed. This will be fully recorded at all times.



# GeoShield Verification Plan



## VERIFICATION PLAN

### METHOD STATEMENT

**GROUND GAS RISK:-** From detail design drawings this project has been classified as having VOC/Hydrocarbons present on the site so a VOC resistant gas barrier system must be installed based of CIRIA 735 guidance. This will be achieved by 3rd party verification, slab or ground type and ventilation provision. A combination of which will achieve the necessary requirements.

**GAS MEMBRANE PROTECTION:-** It is essential that upon satisfactory install of gas membrane and after verification work is completed.

In addition warning labels will be issued by Geoshield to advise on the need to restrict access to the installed area by follow on trades and their due diligence.

This will help to reduce potential damage caused. This is essential before the final slab or screed is poured over the membrane.

**FINAL:-** Geoshield will liaise with the projects site supervision and all relevant parties prior to the installation start. This plan will be presented and reviewed, all points made clear as previously stated. Any alterations will be listed at the end of this plan as an all party agreed way forward.





# GeoShield Verification Plan



## VERIFICATION PLAN

### METHOD STATEMENT

### VERIFICATION STRATEGY:

Percentage Strategy: 1st 10 Plots (100%), 11-50 Plots (1:5) & 51 or > (1:10)

Percentage Strategy: 100% Verification for VOC/Hydrocarbons

Verification Percentage on site:  Not Specified

Remarks:

It is recommended that the installers are present at the time of testing so any

remediations can be rectified. If remediations are not rectified the nature of the fault

found will determine whether or not extra visits are required to test remediations.

Protection Type:-  Protection Board  Protection Fleece

Insulation  Remarks:



# GeoShield Verification Plan



## PRE-CONTRACT MEETING

- Items for discussion at the Pre-Contract meeting
- >Induction Procedure
- >Identification of installation team and point of contact
- >Identification of Project management team
- >Identification of Sub-Contractors associated with membrane installation
- >Validation of Membrane and design specification
- >Verification procedure
- >Notifications for Verification
- >Preparation of substrate
- >Program of works
- >Utility entry
- >Protection of Membrane
- >Remediation Procedure
- >Testing Procedures
- >Sign off Procedure
- >Installer PI

All information is assumed correct at time of issue.

DATE:



# GeoShield Verification Plan



## PRE-CONTRACT MEETING SUMMARY

A pro-forma quality assurance document will be discussed during the Pre-Verification meeting and training undertaken with the management team for non verified areas.

The Pre-Verification meeting will be led by Geoshield and should include all relevant parties who have an impact on the installation and future protection. Geoshield will provide guidance and strategy for all parties.

The site specific checklist will be covered as well as the risk assessment.

This site has been classified as having VOC/Hydrocarbons present on site.

Any design alterations will be discussed and included in a revised Pre-Verification Plan.

Any specification changes must also be included in a revised Pre-Verification Plan.

All items will be minuted by the Geoshield representative.

This Pre-Verification plan follows all current guidance and the aim is to make all parties aware of the ramifications of poor installation and their responsibilities if they damage the membrane.