



Whilst Betts Geo Environmental Ltd cannot be held liable for the third party, Client furnished, results/data, it is suggested that it is reasonable to assume that the data provided in these reports have been undertaken with suitable care and due diligence by suitably experience consultants. As such the data is regarded as being of an appropriate standard to utilise within this report.

2. Site Location

The site is located at Bryn-Y-Groes, Gresford. The coordinates on National Grid are 334756, 354318. A Site Location Plan can be seen enclosed with this letter report.

3. Scope of Works

Additional Ground Investigation work was carried out on 19th September and 2nd October and included the following;

- Five (5 No) machine excavated trial holes to between 1.75mbgl (TP503) and 2.60mbgl (TP501);
- Chemical analysis (Metals, PAH's and TPH's) of five (5 No) samples.
- Analysis of five (5 No) samples for asbestos screening.

The trial pits were targeted to areas that were previous inaccessible due to ecological constraints and the former house in this area

The exploratory hole positions were selected and set out by Betts Geo Environmental (BGE) as shown on the Exploratory Hole Location Plan enclosed with this letter.

4. Ground Conditions

The exploratory holes were logged by an Engineer in general accordance with the recommendations of BS5930:1999+A2:2010. Detailed descriptions together with relevant comments are given in the exploratory hole logs enclosed with this letter.

Strata	General Description	Thickness m		No of Holes Located
		Top	Base	
TOPSOIL	Dark brown clayey SAND rare gravel of glass	0.00	0.60	TP502
MADE GROUND	MADE GROUND: Blackish brown gravel of ash and clinker rare gravel of brick and concrete	0.00	0.20	TP504
MADE GROUND (2)	MADE GROUND: brown fine-coarse SAND and GRAVEL (reworked) with some brick, concrete and rootlets	0.00	2.30	TP504, TP505
SAND & GRAVEL	Loose to medium dense brown fine to medium SAND & GRAVEL.	0.00	2.60+	All



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Welsh Road, Sealand
Flintshire CH5 2LY
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5. Contamination Assessment

Soil was sent to a UKAS accredited laboratory, and were generally analysed in accordance with ISO 17025 and/or MCERTS accreditation. The results are summarised in tabular and/or graphic form attached to this report.

Localised ash/clinker fill was encountered within TP504 and can be seen at surface. Amosite asbestos was encountered within the fill along with elevated lead levels (980mg/kg over the Atrisk 2017 guidance level of 200mg/kg). Given the location of this fill to the rear of the former building this may have been used to store ash waste/other materials and is visible at surface in this locality.

This material should be removed prior to placement of a garden in this locality to protect site end users. Photos should be taken post removal or evidentiary trial pits should be undertaken post placement of the garden area. Following removal, there is no significant ongoing risk from this source in this locality.

All determinants for Metals, TPH'S, PAH's and asbestos screening fell below the residential with home grown produce guidance levels other than one very slightly elevated level of lead (203mg/kg over the atrisk 2017 guidance level of 200mg/kg). This results is not deemed to be a statistical outlier, and is only very slightly elevated above guidance level therefore is not deemed to be a significant risk to receptors on site.

Following removal of the ashy fill in the vicinity of TP504, 300mm growing medium should be applied within garden areas as per NHBC guidance. This is anticipated to be made up from site won materials.

6. Geotechnical Assessment

6.1 Introduction

It is understood that the proposed development will consist of the construction of 2 storey residential properties with associated rear gardens, associated infrastructure, public open space and new highway.

6.2 Coal Mining

A coal mining report was undertaken for the adjacent site as part of the previous report which indicating low risk. The full report was not issued directly to Betts for review. Risk assessment not within the remit of this report

6.3 Ground Gas Risk

Low contamination and biogenic ground gas production risk given the low organic content encountered on site, however FULL RADON PROTECTION measures are required for new properties.

6.4 Site Preparation and Excavation

All excavations should be planned and due consideration should be given to providing temporary support or suitable battering. Excavations should be regularly inspected by a competent person to ensure continued safety. Further advice on the safety of excavations is given in *Health and Safety in Construction*. Consideration to supposed and suitable battering should be undertaken due to collapse within the natural sand and gravel, it is best practice to keep equipment on site in case of collapsing sand/varying ground conditions.



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6.5 Control of Groundwater

No significant groundwater was encountered within the trial pits. It is good practice to have control of groundwater equipment on standby in case of seasonal/abnormal weather conditions.

6.6 Foundations

Loose to medium dense reworked sands were encountered at depths of between circa 0.00mbgl – 2.30mbgl within this area. The natural SANDS & GRAVELS and CLAYS would allow for strip/trench foundations with a bearing capacity of 75kN/m².

Foundations should be excavated wholly on one stratum. Should proposed foundations span different strata, trenching and stepping of foundations and/or nominal reinforcement will be required. Calculations on the allowable bearing capacity indicate settlements of less than 25mm for a square pad using the above allowable bearing capacity.

6.7 Ground Floor Construction

Suspended floor construction e.g. either in-situ RC slabs or block and beam flooring is recommended as per NHBC guidance.

6.8 Heave/Shrinkage Potential

Given the general granular nature of the ground encountered on site, no significant risk form heave/shrinkage is anticipated. Should cohesive ground be encountered, please see previous reports/obtain additional advise from engineer.

6.9 Protection of Buried Concrete

It is considered for concrete design that greenfield site and mobile groundwater conditions are applicable and the results are summarised below;

Concrete Classification	
Design Sulphate Class	DS-1
ACEC Class	AC-1
Design Chemical Class	DC-1

We trust that this information is satisfactory and should you require any further clarification, please do not hesitate to contact me.

Yours sincerely



Beverley Lewis
Director
BETTS GEO ENVIRONMENTAL

Encl –



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Site Location Plan
Exploratory Hole Location Plan
Exploratory Holes Logs
Contamination and Geotechnical Testing Results



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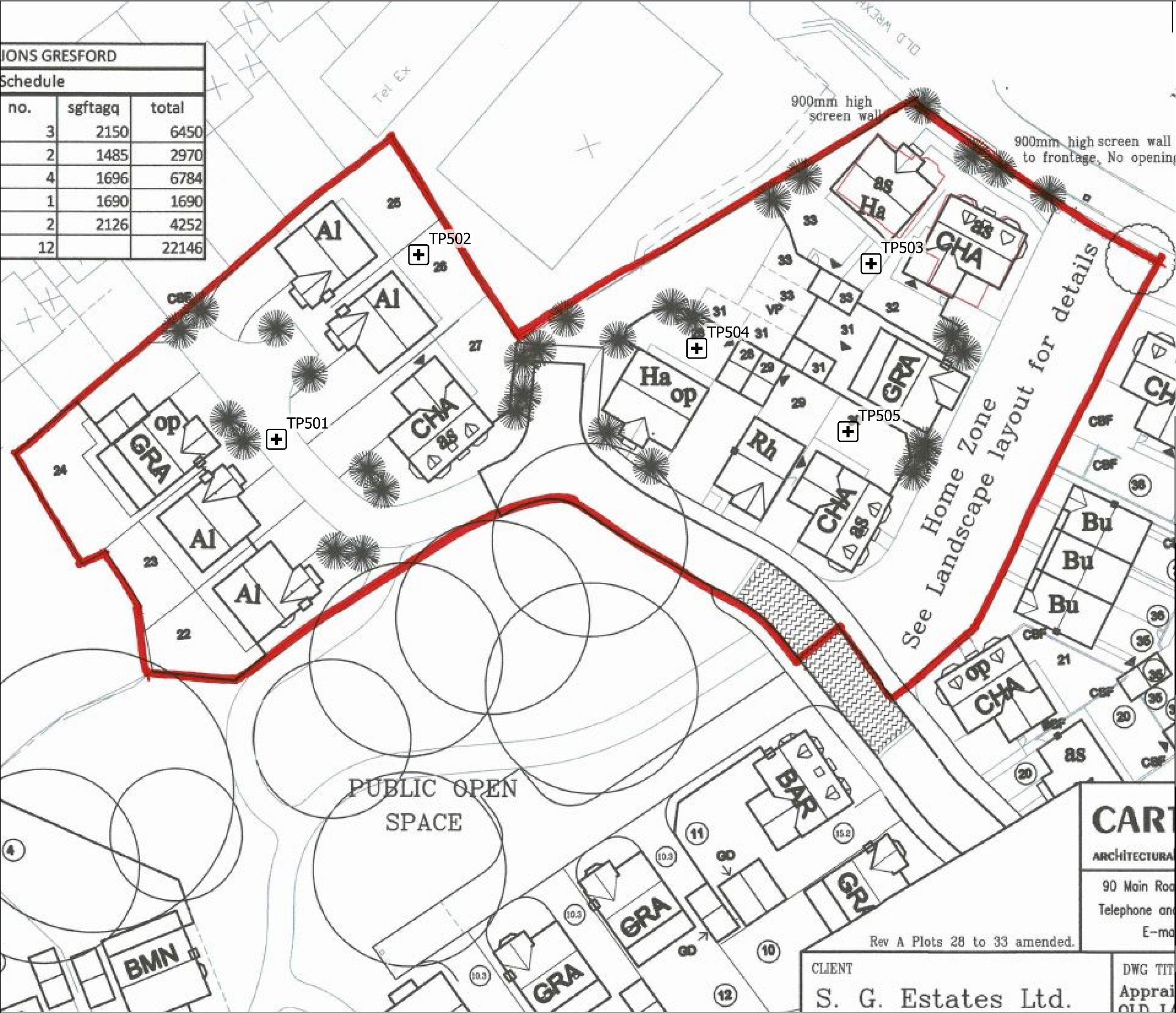


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IONS GRESFORD		
Schedule		
no.	sgftagq	total
3	2150	6450
2	1485	2970
4	1696	6784
1	1690	1690
2	2126	4252
12		22146



DO NOT SCALE

EXPLORATORY HOLE LOCATION PLAN
SHOWS INDICATIVE LOCATIONS OF TRIAL
PITS OVERLAIN DRAWING 'APPRAISAL
LAYOUT PHASE 5 (AREA) OLD LAYOUT REF
ONLY', No. PH5 SK3A, DATED JULY 2018
BY CARTWRIGHT.

+ TRIAL PIT

0	17/10/18	RD	DRAFT	BL
REV	DATE	BY	DESCRIPTION	CHK

DRAWING STATUS: DRAFT



BETTS GEO
CONSULTING ENGINEERS
Unit 6, Old Marsh Farm Barns, Welsh Road, Sealand, Flintshire CH5 2LY
Tel: 01244 288178 enquiries@betts-associates.co.uk



SG ESTATES
AWARD WINNING HOUSING DEVELOPER

PROJECT: GRESFORD WREXHAM

TITLE: EXPLORATORY HOLE LOCATION PLAN

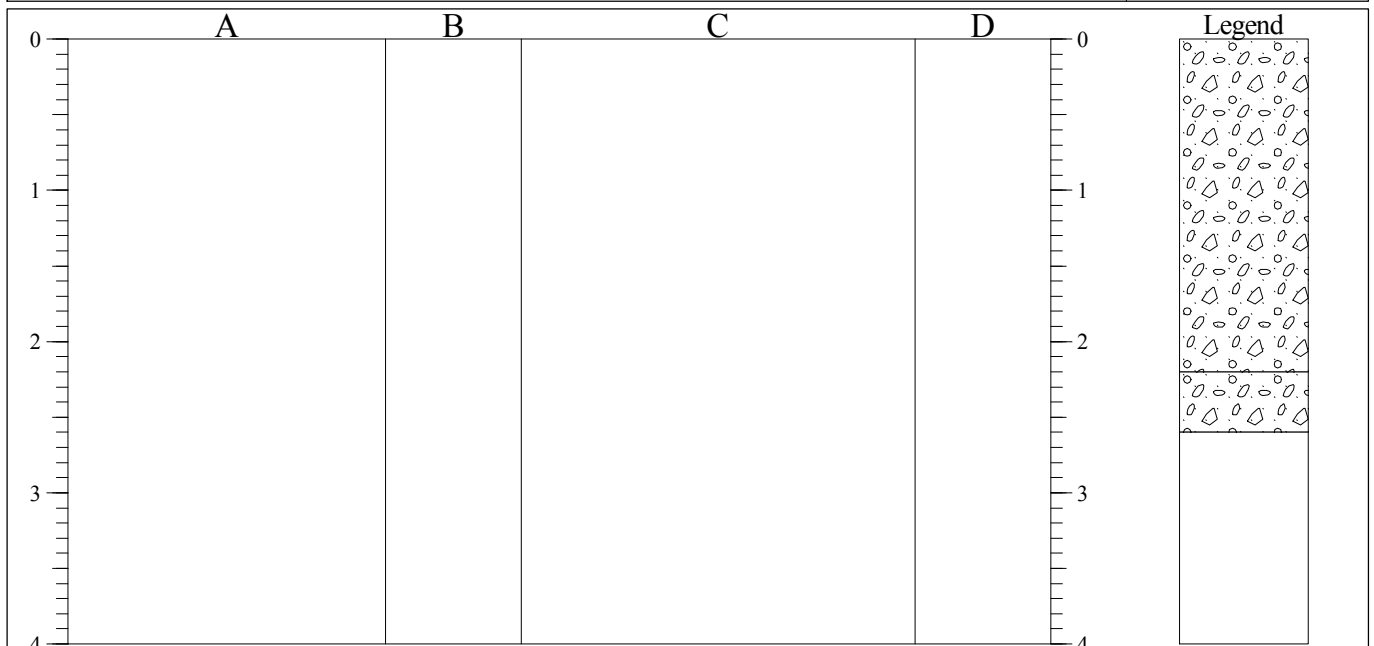
DATE: 17/10/18	SCALE @ SIZE: NTS	DRAWN: RD	CHECKED: BL
PROJECT No: 15SGE008	DRAWING No: 1	REV: 0	

CLIENT
S. G. Estates Ltd.

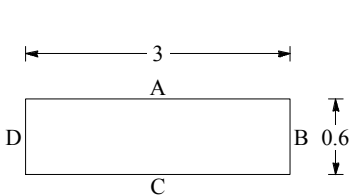
CARTWRIGHT
ARCHITECTURAL
90 Main Road
Telephone and
E-mail

TRIAL PIT LOG

Project Chester Rd, Gresford				TRIAL PIT No TP501
Job No 15SGE008	Date 19-09-18	Ground Level (m)	Co-Ordinates ()	
Contractor BETTS GEO Ltd				Sheet 1 of 1



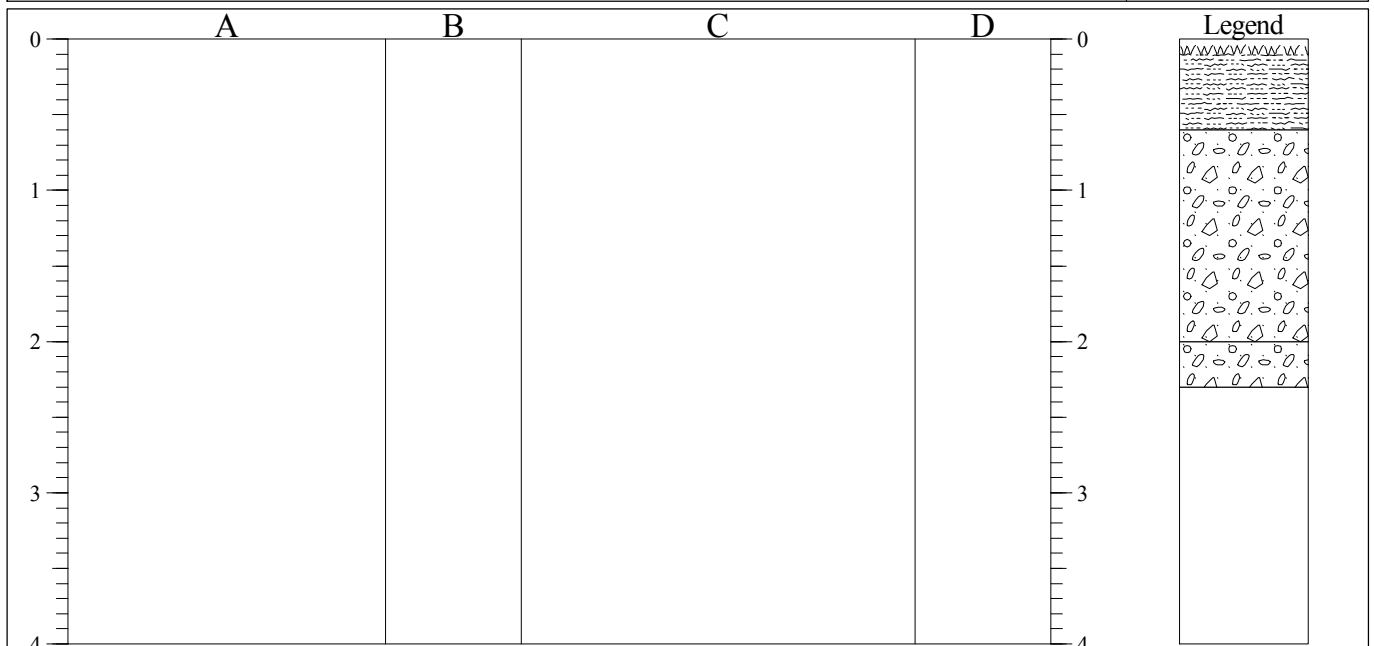
STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-2.20		Loose brown fine to coarse SAND & GRAVEL. Gravel is subrounded to rounded. Frequent tree roots.	0.50	ES	
2.20-2.60		Medium dense brown fine to coarse SAND & GRAVEL. Gravel is subrounded to rounded.			

Shoring/Support: Stability: Stable.	GENERAL REMARKS Dry.
	

All dimensions in metres Scale 1:50	Client S.G.Estates	Method/ Plant Used 12t Tracked Excavator	Logged By BL
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TRIAL PIT LOG

Project Chester Rd, Gresford				TRIAL PIT No TP502
Job No 15SGE008	Date 19-09-18	Ground Level (m)	Co-Ordinates ()	
Contractor BETTS GEO Ltd				Sheet 1 of 1



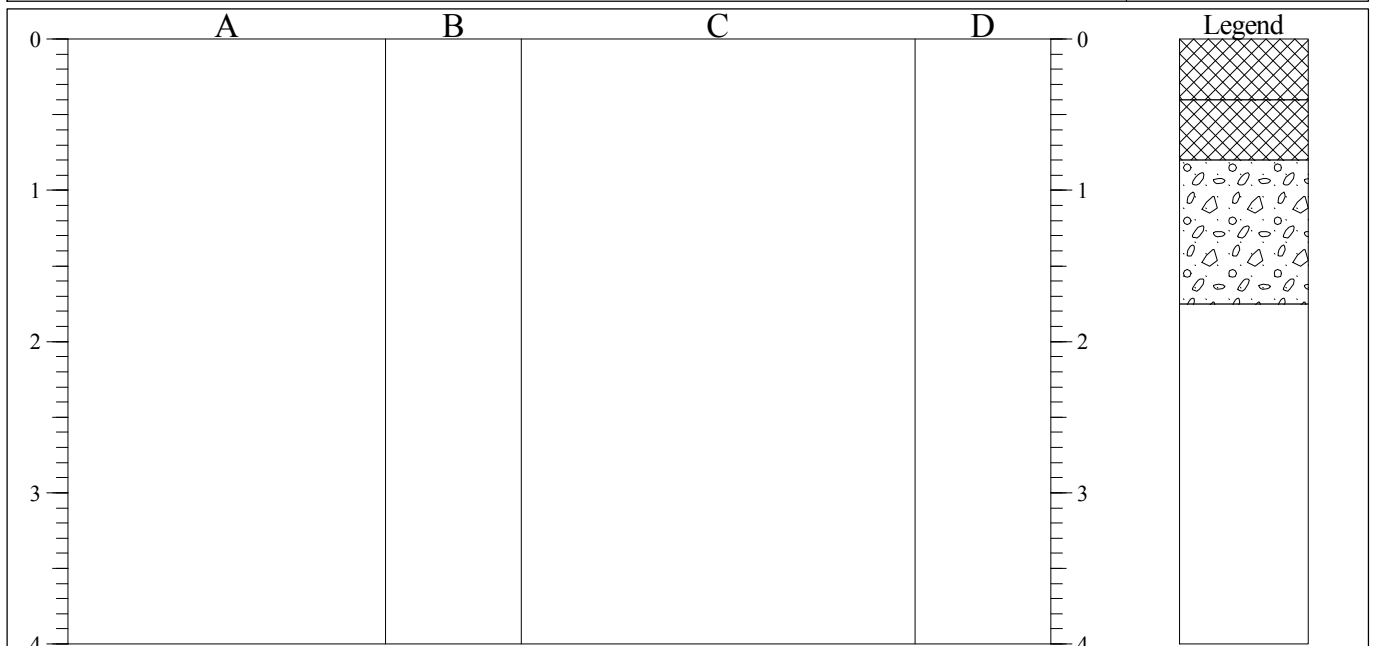
STRATA				SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests	
0.00-0.60		TOPSOIL: Dark brown clayey SAND. Rare gravel of glass.	0.30	ES		
0.60-2.00		Loose brown fine to coarse SAND & GRAVEL. Gravel is subrounded to rounded. Frequent tree roots.				
2.00-2.30		Medium dense brown fine to coarse SAND & GRAVEL. Gravel is subrounded to rounded.				

Shoring/Support: Stability: Stable.			GENERAL REMARKS
			Dry.

All dimensions in metres Scale 1:50	Client S.G.Estates	Method/ Plant Used 12t Tracked Excavator	Logged By BL
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TRIAL PIT LOG

Project Chester Rd, Gresford				TRIAL PIT No TP503
Job No 15SGE008	Date 02-10-18	Ground Level (m)	Co-Ordinates ()	
Contractor BETTS GEO Ltd				Sheet 1 of 1



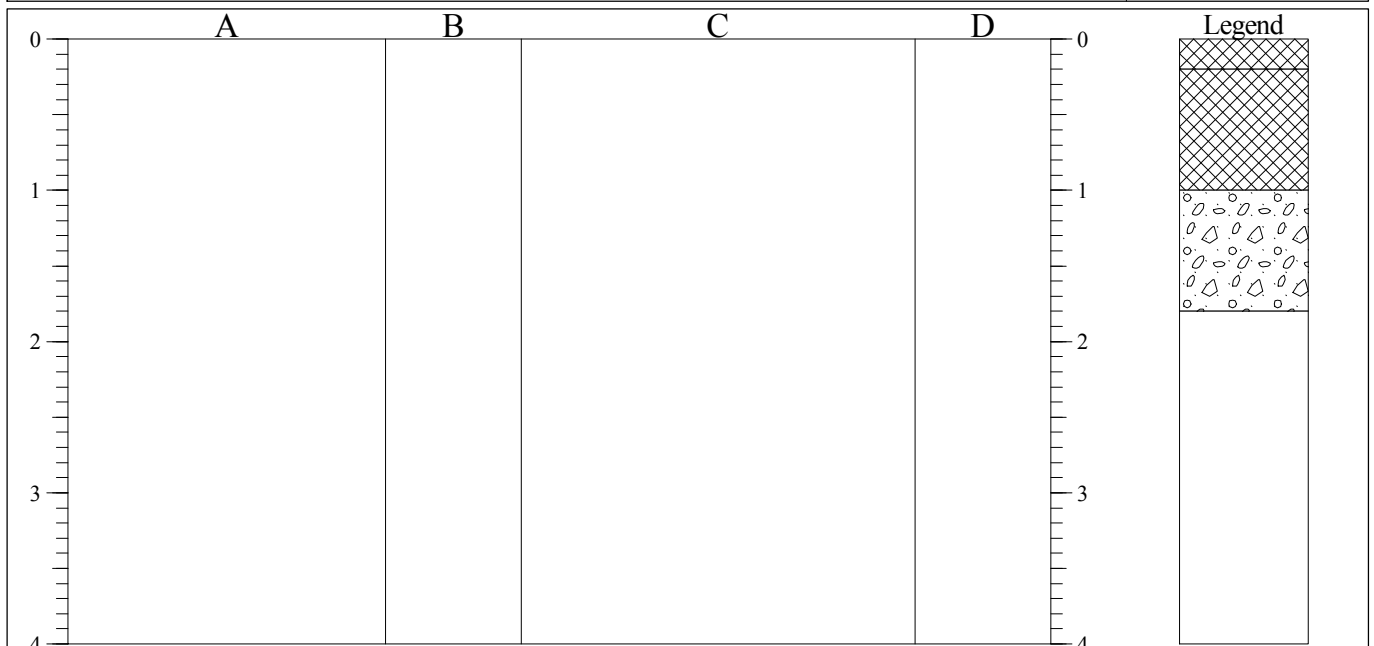
STRATA				SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests	
0.00-0.40		MADE GROUND: Dark brown SAND & GRAVEL of brick and concrete. Slightly ashy.	0.10	ES		
0.40-0.80		POSSIBLE MADE GROUND: Loose brown SAND & GRAVEL. Possibly reworked.				
0.80-1.75		Loose to medium dense brown coarse SAND & GRAVEL. Gravel is subrounded to rounded.				

Shoring/Support: Stability: Collapse in SAND & GRAVEL from 1.20mbgl. 				GENERAL REMARKS	
				Dry.	

All dimensions in metres Scale 1:50	Client S.G.Estates	Method/ Plant Used 12t Tracked Excavator	Logged By BL
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TRIAL PIT LOG

Project Chester Rd, Gresford				TRIAL PIT No TP504
Job No 15SGE008	Date 02-10-18	Ground Level (m)	Co-Ordinates ()	
Contractor BETTS GEO Ltd				Sheet 1 of 1



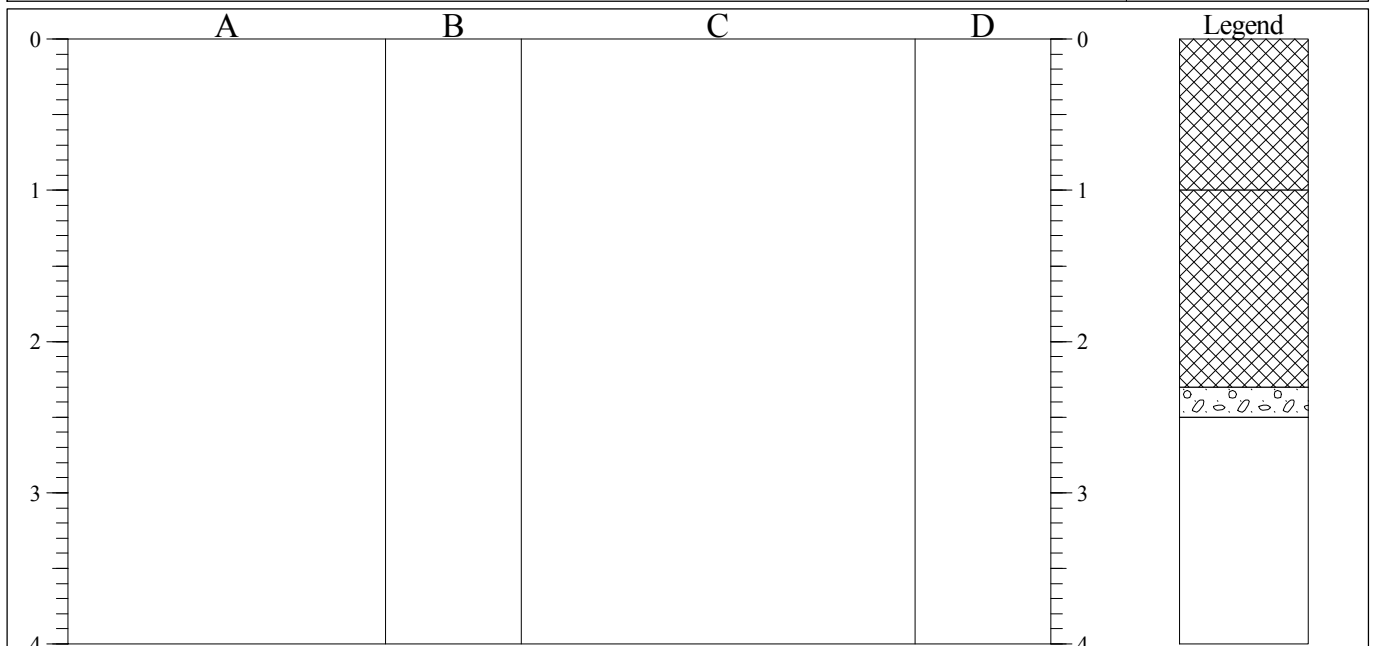
STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.20		MADE GROUND: Blackish brown SAND & GRAVEL of ash and clinker. Rare gravel of brick and concrete.	0.20	ES	
0.20-1.00		MADE GROUND: Brown very sandy GRAVEL & COBBLE of brick.			
		0.80 Land drain.			
1.00-1.80		Loose to medium dense brown coarse SAND & GRAVEL. Gravel is subrounded to rounded.			

Shoring/Support: Stability: Collapse in SAND & GRAVEL from 1.00mbgl. 				GENERAL REMARKS	
				Dry.	

All dimensions in metres Scale 1:50	Client S.G.Estates	Method/ Plant Used 12t Tracked Excavator	Logged By BL
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TRIAL PIT LOG

Project Chester Rd, Gresford				TRIAL PIT No TP505
Job No 15SGE008	Date 02-10-18	Ground Level (m)	Co-Ordinates ()	
Contractor BETTS GEO Ltd				Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-1.00		MADE GROUND: Black SAND & GRAVEL of brick and concrete.	0.30	ES	
1.00-2.30		MADE GROUND: Black reworked SAND & GRAVEL. Frequent rootlets.			
2.30-2.50		Loose to medium dense brown coarse SAND & GRAVEL. Gravel is subrounded to rounded.			
		Stone block at end of pit - possible basement or foundation.			

Shoring/Support: Stability: Collapse in SAND & GRAVEL from 2.30mbgl. 				GENERAL REMARKS	
				Dry.	

All dimensions in metres Scale 1:50	Client S.G.Estates	Method/ Plant Used 12t Tracked Excavator	Logged By BL
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FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 18/07637
Issue Number: 1

Date: 28 September, 2018

Client: Betts Geo Environmental
Old Marsh Farm Barns
Welsh Road
Sealand
Flintshire
UK
CH5 2LY

Project Manager: Betts Geolab/Beverley Lewis
Project Name: Gresford
Project Ref: 15SGE008
Order No: BG2983
Date Samples Received: 20/09/18
Date Instructions Received: 21/09/18
Date Analysis Completed: 28/09/18

Prepared by:



Georgia King
Admin & Client Services Supervisor

Approved by:



Richard Wong
Client Manager

Envirolab Job Number: 18/07637

Client Project Name: Gresford

Client Project Ref: 15SGE008

Lab Sample ID	18/07637/1	18/07637/2							Units	Method ref
Client Sample No										
Client Sample ID	TP501	TP502								
Depth to Top	0.50	0.30								
Depth To Bottom										
Date Sampled	19-Sep-18	19-Sep-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	4A	4AE								
% Stones >10mm _A	21.7	26.3							% w/w	A-T-044
pH _D ^{M#}	7.91	7.75							pH	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.03	0.03							g/l	A-T-026s
Organic matter _D ^{M#}	1.1	4.1							% w/w	A-T-032 OM
Arsenic _D ^{M#}	3	7							mg/kg	A-T-024s
Cadmium _D ^{M#}	<0.5	0.7							mg/kg	A-T-024s
Copper _D ^{M#}	6	17							mg/kg	A-T-024s
Chromium (hexavalent) _D	<1	<1							mg/kg	A-T-040s
Lead _D ^{M#}	19	168							mg/kg	A-T-024s
Mercury _D	<0.17	<0.17							mg/kg	A-T-024s
Nickel _D ^{M#}	14	15							mg/kg	A-T-024s
Selenium _D [#]	<1	<1							mg/kg	A-T-024s
Zinc _D ^{M#}	45	122							mg/kg	A-T-024s
VPH total (>C5-C10)	<1	<1							mg/kg	Calc-stone+mois

Envirolab Job Number: 18/07637

Client Project Name: Gresford

Client Project Ref: 15SGE008

Lab Sample ID	18/07637/1	18/07637/2							Units	Method ref
Client Sample No										
Client Sample ID	TP501	TP502								
Depth to Top	0.50	0.30								
Depth To Bottom										
Date Sampled	19-Sep-18	19-Sep-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	4A	4AE								
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	NAD	NAD								A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A								

Envirolab Job Number: 18/07637

Client Project Name: Gresford

Client Project Ref: 15SGE008

Lab Sample ID	18/07637/1	18/07637/2							Units	Method ref
Client Sample No										
Client Sample ID	TP501	TP502								
Depth to Top	0.50	0.30								
Depth To Bottom										
Date Sampled	19-Sep-18	19-Sep-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	4A	4AE								
PAH-16MS										
Acenaphthene _A ^{M#}	<0.01	0.02							mg/kg	A-T-019s
Acenaphthylene _A ^{M#}	<0.01	0.06							mg/kg	A-T-019s
Anthracene _A ^{M#}	<0.02	0.11							mg/kg	A-T-019s
Benzo(a)anthracene _A ^{M#}	<0.04	0.64							mg/kg	A-T-019s
Benzo(a)pyrene _A ^{M#}	<0.04	0.80							mg/kg	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	<0.05	0.70							mg/kg	A-T-019s
Benzo(ghi)perylene _A ^{M#}	<0.05	0.29							mg/kg	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	<0.07	0.35							mg/kg	A-T-019s
Chrysene _A ^{M#}	<0.06	0.71							mg/kg	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04	0.07							mg/kg	A-T-019s
Fluoranthene _A ^{M#}	<0.08	1.22							mg/kg	A-T-019s
Fluorene _A ^{M#}	<0.01	0.02							mg/kg	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	<0.03	0.45							mg/kg	A-T-019s
Naphthalene _A ^{M#}	<0.03	<0.03							mg/kg	A-T-019s
Phenanthrene _A ^{M#}	<0.03	0.36							mg/kg	A-T-019s
Pyrene _A ^{M#}	<0.07	1.08							mg/kg	A-T-019s
Total PAH-16MS _A ^{M#}	<0.08	6.88							mg/kg	A-T-019s

Envirolab Job Number: 18/07637

Client Project Name: Gresford

Client Project Ref: 15SGE008

Lab Sample ID	18/07637/1	18/07637/2							Units	Method ref
Client Sample No										
Client Sample ID	TP501	TP502								
Depth to Top	0.50	0.30								
Depth To Bottom										
Date Sampled	19-Sep-18	19-Sep-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	4A	4AE								
TPH CWG										
Ali >C5-C6 _A [#]	<0.01	<0.01							mg/kg	A-T-022s
Ali >C6-C8 _A [#]	<0.01	<0.01							mg/kg	A-T-022s
Ali >C8-C10 _A ^{M#}	<1	<1							mg/kg	A-T-055s
Ali >C10-C12 _A ^{M#}	<1	<1							mg/kg	A-T-055s
Ali >C12-C16 _A ^{M#}	<1	<1							mg/kg	A-T-055s
Ali >C16-C21 _A ^{M#}	<1	<1							mg/kg	A-T-055s
Ali >C21-C35 _A	<1	6							mg/kg	A-T-055s
Total Aliphatics >C5-C35 _A	<1	6							mg/kg	A-T-055s
Aro >C5-C7 _A [#]	<0.01	<0.01							mg/kg	A-T-022s
Aro >C7-C8 _A [#]	<0.01	<0.01							mg/kg	A-T-022s
Aro >C8-C10 _A ^{M#}	<1	<1							mg/kg	A-T-055s
Aro >C10-C12 _A ^{M#}	<1	<1							mg/kg	A-T-055s
Aro >C12-C16 _A	<1	4							mg/kg	A-T-055s
Aro >C16-C21 _A ^{M#}	<1	33							mg/kg	A-T-055s
Aro >C21-C35 _A ^{M#}	<1	219							mg/kg	A-T-055s
Total Aromatics >C5-C35 _A	<1	257							mg/kg	A-T-055s
TPH (Ali & Aro >C5-C35) _A	<1	264							mg/kg	A-T-055s
BTEX - Benzene _A [#]	<0.01	<0.01							mg/kg	A-T-022s
BTEX - Toluene _A [#]	<0.01	<0.01							mg/kg	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01	<0.01							mg/kg	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01	<0.01							mg/kg	A-T-022s
BTEX - o Xylene _A [#]	<0.01	<0.01							mg/kg	A-T-022s
MTBE _A [#]	<0.01	<0.01							mg/kg	A-T-022s

REPORT NOTES

General:

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

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

SUMMARY OF CONTAMINATION ANALYSIS: SOIL

SUMMARY OF CONTAMINATION ANALYSIS: METALS

Project Name Gresford
Project No 15SGE008
Date 19/09/2018

SOIL TYPE	-	-
SAMPLE LOCATION	TP501	TP502
DEPTH (m)	0.50	0.30
pH	7.91	7.75
Sulphate (water sol 2:1)	0.03	0.03
Organic matter	1.1	4.1
Arsenic	3	7
Cadmium	<0.5	0.7
Copper	6	17
Chromium (hexavalent)	<1	<1
Lead	19	168
Mercury	<0.17	<0.17
Nickel	14	15
Selenium	<1	<1
Zinc	45	122
Asbestos in Soil	NAD	NAD
Asbestos Matrix	N/A	N/A
Quantification	NAD	NAD
Organic matter	1.1	4.1

Metals	Mean Value Test *	Range		AtRisk 2017 (mg/kg)	AtRisk 2017 (mg/kg)	DEFRA C4SL 2017
	US ₉₅	Largest Value (mg/kg)	Smallest Value (mg/kg)	With Homegrown Produce (1% SOM)	With Homegrown Produce (6% SOM)	
pH	-	7.91	7.75			-
Sulphate (water sol 2:1)	-	0.03	0.03			-
Organic matter	-	4.10	1.10			
Arsenic	-	7.00	3.00	32	32	37
Cadmium	-	0.70	<0.5	10	10	22.1
Copper	-	17.00	6.00	4730	4790	-
Chromium (hexavalent)	-	<1	<1	3.62	3.63	20.5
Lead	-	168.00	19.00			200
Mercury	-	<0.17	<0.17	8.81	15.8	-
Nickel	-	15.00	14.00	EA/AtRisk withdrawn Aug 2015		
Selenium	-	<1	<1	375	375	-
Zinc	-	122.00	45.00	20000	20300	-

NOTE:

Any individual results and mean value tests above SGVs are shown RED highlighted.

Any outlier values which exceed relevant SGVs are shown in red

* - The calculations for the mean value test include outliers

** - Results for this determinand are assessed with no background levels taken into account

Results are expressed as mg/kg unless otherwise stated

ALL RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

SGVs are derived from the EA 2009 SGVs which are taken from AtRisk 2015. Category 4 screening levels have been adopted by the EA and have been included as new guidance.

Note: The SGV for elemental mercury has been used to assess total mercury concentrations at the site. The Environment Agency's Science Report SC050021 /Mercury SGV states that 'for general surface contamination and to simplify the assessment the SGV's for inorganic mercury can normally be compared with chemical analysis for total mercury content...'. Based on the latter, SGV for elemental mercury (170mg/kg) in the soil assessment is used

NAD - NO ASBESTOS DETECTED

TS - Topsoil, MG - Made Ground and N - Natural Ground

SUMMARY OF CONTAMINATION ANALYSIS: TPH

Project Name Gresford
Project No 15SGE008
Date 19/09/2018

SOIL TYPE	-	-
SAMPLE LOCATION	TP501	TP502
DEPTH (m)	0.50	0.30
Ali >C5-C6	<0.01	<0.01
Ali >C6-C8	<0.01	<0.01
Ali >C8-C10	<1	<1
Ali >C10-C12	<1	<1
Ali >C12-C16	<1	<1
Ali >C16-C21	<1	<1
Ali >C21-C35	<1	6
Total Aliphatics	<1	6
Aro >C5-C7	<0.01	<0.01
Aro >C7-C8	<0.01	<0.01
Aro >C8-C10	<1	<1
Aro >C10-C12	<1	<1
Aro >C12-C16	<1	4
Aro >C16-C21	<1	33
Aro >C21-C35	<1	219
Total Aromatics	<1	257
TPH (Ali & Aro)	<1	264
BTEX - Benzene	<0.01	<0.01
BTEX - Toluene	<0.01	<0.01
BTEX - Ethyl Benzene	<0.01	<0.01
BTEX - m & p Xylene	<0.01	<0.01
BTEX - o Xylene	<0.01	<0.01
MTBE	<0.01	<0.01
Organic Matter	1.1	4.1

TPH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA C4SL 2017
	US ₉₅	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Ali >C5-C6	-	<0.01	<0.01	42.7	369	-
Ali >C6-C8	-	<0.01	<0.01	99.3	1240	-
Ali >C8-C10	-	<1	<1	13.9	204	-
Ali >C10-C12	-	<1	<1	81.7	1180	-
Ali >C12-C16	-	<1	<1	385	4130	-
Ali >C16-C21	-	<1	<1	210000	210100	-
Ali >C21-C35	-	6.00	<1			
Total Aliphatics	-	6.00	<1			
Aro >C5-C7	-	<0.01	<0.01	0.137	0.871	-
Aro >C7-C8	-	<0.01	<0.01	113	780	-
Aro >C8-C10	-	<1	<1	20.5	232	-
Aro >C10-C12	-	<1	<1	70	468	-
Aro >C12-C16	-	4.00	<1	165	830	-
Aro >C16-C21	-	33.00	<1	319	1040	-
Aro >C21-C35	-	219.00	<1	1120	1710	-
Total Aromatics	-	257.00	<1			
TPH (Ali & Aro)	-	264.00	<1			
BTEX - Benzene	-	<0.01	<0.01	0.0493	0.33	0.871
BTEX - Toluene	-	<0.01	<0.01	113	780	-
BTEX - Ethyl Benzene	-	<0.01	<0.01	50.7	453	-
BTEX - m & p Xylene	-	<0.01	<0.01	24	312	-
BTEX - o Xylene	-	<0.01	<0.01	26.4	336	-
MTBE	-	<0.01	<0.01	27.6	220	

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR44 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed against RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.

UU Drinking Water Guidelines	
PE Threshold	
Total BTEX & MTBE	0.1
EC5-EC10 Ali-Aro	2
EC10-EC16 Ali-Aro	10
EC16-EC40 Ali-Aro	500

Total BTEX & MTBE	0.1
EC5-EC10 Ali-Aro	2
EC10-EC16 Ali-Aro	10
EC16-EC40 Ali-Aro	500

SUMMARY OF CONTAMINATION ANALYSIS: PAH

Project Name Gresford
Project No 15SGE008
Date 19/09/18

SOIL TYPE	-	-
SAMPLE LOCATION	TP501	TP502
DEPTH (m)	0.50	0.30
Acenaphthene	<0.01	0.02
Acenaphthylene	<0.01	0.06
Anthracene	<0.02	0.11
Benzo(a)anthracene	<0.04	0.64
Benzo(a)pyrene	<0.04	0.8
Benzo(b)fluoranthene	<0.05	0.7
Benzo(ghi)perylene	<0.05	0.29
Benzo(k)fluoranthene	<0.07	0.35
Chrysene	<0.06	0.71
Dibenzo(ah)anthracene	<0.04	0.07
Fluoranthene	<0.08	1.22
Fluorene	<0.01	0.02
Indeno(123-cd)pyrene	<0.03	0.45
Naphthalene	<0.03	<0.03
Phenanthrene	<0.03	0.36
Pyrene	<0.07	1.08
Organic Matter	1.1	4.1

PAH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA's C4SL 2017
	US ₉₅	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Acenaphthene	-	0.02	<0.01	608	2760	-
Acenaphthylene	-	0.06	<0.01			-
Anthracene	-	0.11	<0.02	10200	26200	-
Benzo(a)anthracene	-	0.64	<0.04	4.52	8.54	-
Benzo(a)pyrene	-	0.80	<0.04	1.51	2.05	4.95
Benzo(b)fluoranthene	-	0.70	<0.05	7.72	9.86	-
Benzo(ghi)perylene	-	0.29	<0.05	96.2	103	-
Benzo(k)fluoranthene	-	0.35	<0.07	84.4	100	-
Chrysene	-	0.71	<0.06	585	927	-
Dibenzo(ah)anthracene	-	0.07	<0.04	0.838	1	-
Fluoranthene	-	1.22	<0.08	983	2980	-
Fluorene	-	0.02	<0.01	735	2610	-
Indeno(123-cd)pyrene	-	0.45	<0.03	7.31	9.75	-
Naphthalene	-	0.00	<0.03	0.829	12.2	-
Phenanthrene	-	0.36	<0.03			-
Pyrene	-	1.08	<0.07	668	2120	-

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed against **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 18/08110
Issue Number: 1
Date: 10 October, 2018

Client: Betts Geo Environmental
Old Marsh Farm Barns
Welsh Road
Sealand
Flintshire
UK
CH5 2LY

Project Manager: Betts Geolab/Beverley Lewis
Project Name: Gresford
Project Ref: 15SGE008
Order No: BG3010
Date Samples Received: 03/10/18
Date Instructions Received: 04/10/18
Date Analysis Completed: 10/10/18

Prepared by:



Melanie Marshall
Laboratory Coordinator

Approved by:



Georgia King
Admin & Client Services Supervisor

Envirolab Job Number: 18/08110

Client Project Name: Gresford

Client Project Ref: 15SGE008

Lab Sample ID	18/08110/1	18/08110/2	18/08110/3						Units	Method ref
Client Sample No										
Client Sample ID	TP503	TP504	TP505							
Depth to Top	0.10	0.20	0.30							
Depth To Bottom										
Date Sampled	02-Oct-18	02-Oct-18	02-Oct-18							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	6A	4A	4ABE							
% Stones >10mm _A	17.6	<0.1	43.2						% w/w	A-T-044
pH _D ^{M#}	7.60	7.48	7.49						pH	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.08	0.38	0.30						g/l	A-T-026s
Organic matter _D ^{M#}	2.6	3.3	1.1						% w/w	A-T-032 OM
Arsenic _D ^{M#}	17	14	12						mg/kg	A-T-024s
Cadmium _D ^{M#}	0.7	<0.5	<0.5						mg/kg	A-T-024s
Copper _D ^{M#}	17	11	11						mg/kg	A-T-024s
Chromium (hexavalent) _D	<1	<1	<1						mg/kg	A-T-040s
Lead _D ^{M#}	80	980	203						mg/kg	A-T-024s
Mercury _D	<0.17	<0.17	0.32						mg/kg	A-T-024s
Nickel _D ^{M#}	16	10	10						mg/kg	A-T-024s
Selenium _D [#]	<1	<1	<1						mg/kg	A-T-024s
Zinc _D ^{M#}	109	53	78						mg/kg	A-T-024s
VPH total (>C5-C10)	<1	<1	<1						mg/kg	Calc-stone+mois

Envirolab Job Number: 18/08110

Client Project Name: Gresford

Client Project Ref: 15SGE008

Lab Sample ID	18/08110/1	18/08110/2	18/08110/3						Units	Method ref
Client Sample No										
Client Sample ID	TP503	TP504	TP505							
Depth to Top	0.10	0.20	0.30							
Depth To Bottom										
Date Sampled	02-Oct-18	02-Oct-18	02-Oct-18							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	6A	4A	4ABE							
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	NAD	Amosite	NAD							A-T-045
Asbestos Matrix (microscope) _A	-	Loose fibres	-							A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A							

Envirolab Job Number: 18/08110

Client Project Name: Gresford

Client Project Ref: 15SGE008

Lab Sample ID	18/08110/1	18/08110/2	18/08110/3						Units	Method ref
Client Sample No										
Client Sample ID	TP503	TP504	TP505							
Depth to Top	0.10	0.20	0.30							
Depth To Bottom										
Date Sampled	02-Oct-18	02-Oct-18	02-Oct-18							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	6A	4A	4ABE							
PAH-16MS										
Acenaphthene _A ^{M#}	0.02	<0.01	<0.01						mg/kg	A-T-019s
Acenaphthylene _A ^{M#}	0.02	0.01	0.01						mg/kg	A-T-019s
Anthracene _A ^{M#}	0.07	0.07	0.03						mg/kg	A-T-019s
Benzo(a)anthracene _A ^{M#}	0.57	0.56	0.19						mg/kg	A-T-019s
Benzo(a)pyrene _A ^{M#}	0.71	0.62	0.21						mg/kg	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	0.81	0.76	0.25						mg/kg	A-T-019s
Benzo(ghi)perylene _A ^{M#}	0.45	0.39	0.12						mg/kg	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	0.27	0.25	0.09						mg/kg	A-T-019s
Chrysene _A ^{M#}	0.57	0.57	0.19						mg/kg	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	0.10	0.09	<0.04						mg/kg	A-T-019s
Fluoranthene _A ^{M#}	0.94	0.86	0.33						mg/kg	A-T-019s
Fluorene _A ^{M#}	0.02	<0.01	<0.01						mg/kg	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	0.53	0.48	0.15						mg/kg	A-T-019s
Naphthalene _A ^{M#}	<0.03	<0.03	<0.03						mg/kg	A-T-019s
Phenanthrene _A ^{M#}	0.22	0.21	0.10						mg/kg	A-T-019s
Pyrene _A ^{M#}	0.89	0.76	0.30						mg/kg	A-T-019s
Total PAH-16MS _A ^{M#}	6.19	5.63	1.97						mg/kg	A-T-019s

Envirolab Job Number: 18/08110

Client Project Name: Gresford

Client Project Ref: 15SGE008

Lab Sample ID	18/08110/1	18/08110/2	18/08110/3						Units	Method ref
Client Sample No										
Client Sample ID	TP503	TP504	TP505							
Depth to Top	0.10	0.20	0.30							
Depth To Bottom										
Date Sampled	02-Oct-18	02-Oct-18	02-Oct-18							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	6A	4A	4ABE							
TPH CWG										
Ali >C5-C6 _A [#]	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Ali >C6-C8 _A [#]	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Ali >C8-C10 _A ^{M#}	<1	<1	<1						mg/kg	A-T-055s
Ali >C10-C12 _A ^{M#}	<1	<1	<1						mg/kg	A-T-055s
Ali >C12-C16 _A ^{M#}	<1	<1	<1						mg/kg	A-T-055s
Ali >C16-C21 _A ^{M#}	2	2	<1						mg/kg	A-T-055s
Ali >C21-C35 _A	10	4	5						mg/kg	A-T-055s
Total Aliphatics >C5-C35 _A	12	6	7						mg/kg	A-T-055s
Aro >C5-C7 _A [#]	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Aro >C7-C8 _A [#]	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Aro >C8-C10 _A ^{M#}	<1	<1	<1						mg/kg	A-T-055s
Aro >C10-C12 _A ^{M#}	<1	<1	<1						mg/kg	A-T-055s
Aro >C12-C16 _A	3	<1	5						mg/kg	A-T-055s
Aro >C16-C21 _A ^{M#}	13	2	6						mg/kg	A-T-055s
Aro >C21-C35 _A ^{M#}	97	20	27						mg/kg	A-T-055s
Total Aromatics >C5-C35 _A	114	22	38						mg/kg	A-T-055s
TPH (Ali & Aro >C5-C35) _A	126	28	45						mg/kg	A-T-055s
BTEX - Benzene _A [#]	<0.01	<0.01	<0.01						mg/kg	A-T-022s
BTEX - Toluene _A [#]	<0.01	<0.01	<0.01						mg/kg	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01	<0.01	<0.01						mg/kg	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01	<0.01	<0.01						mg/kg	A-T-022s
BTEX - o Xylene _A [#]	<0.01	<0.01	<0.01						mg/kg	A-T-022s
MTBE _A [#]	<0.01	<0.01	<0.01						mg/kg	A-T-022s

REPORT NOTES

General:

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

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

SUMMARY OF CONTAMINATION ANALYSIS: SOIL

SUMMARY OF CONTAMINATION ANALYSIS: METALS

Project Name Gresford
Project No 15SGE008
Date 02/10/2018

SOIL TYPE	-	-	-
SAMPLE LOCATION	TP503	TP504	TP505
DEPTH (m)	0.10	0.20	0.30
pH	7.6	7.48	7.49
Sulphate (water sol 2:1)	0.08	0.38	0.3
Organic matter	2.6	3.3	1.1
Arsenic	17	14	12
Cadmium	0.7	<0.5	<0.5
Copper	17	11	11
Chromium (hexavalent)	<1	<1	<1
Lead	80	980	203
Mercury	<0.17	<0.17	0.32
Nickel	16	10	10
Selenium	<1	<1	<1
Zinc	109	53	78
Asbestos in Soil	NAD	Amosite	NAD
Asbestos Matrix	N/A	Loose fibres	N/A
Quantification	NAD	0	NAD
Organic matter	2.6	3.3	1.1

Metals	Mean Value Test *	Range		AtRisk 2017 (mg/kg)	AtRisk 2017 (mg/kg)	DEFRA C4SL 2017
	US ₉₅	Largest Value (mg/kg)	Smallest Value (mg/kg)	With Homegrown Produce (1% SOM)	With Homegrown Produce (6% SOM)	
pH	-	7.60	7.48			-
Sulphate (water sol 2:1)	-	0.38	0.08			-
Organic matter	-	3.30	1.10			
Arsenic	-	17.00	12.00	32	32	37
Cadmium	-	0.70	<0.5	10	10	22.1
Copper	-	17.00	11.00	4730	4790	-
Chromium (hexavalent)	-	<1	<1	3.62	3.63	20.5
Lead	-	980.00	80.00			200
Mercury	-	0.32	0.32	8.81	15.8	-
Nickel	-	16.00	10.00	EA/AtRisk withdrawn Aug 2015		
Selenium	-	<1	<1	375	375	-
Zinc	-	109.00	53.00	20000	20300	-

NOTE:

Any individual results and mean value tests above SGVs are shown RED highlighted.

Any outlier values which exceed relevant SGVs are shown in red

* - The calculations for the mean value test include outliers

** - Results for this determinand are assessed with no background levels taken into account

Results are expressed as mg/kg unless otherwise stated

ALL RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

SGVs are derived from the EA 2009 SGVs which are taken from AtRisk 2015. Category 4 screening levels have been adopted by the EA and have been included as new guidance.

Note: The SGV for elemental mercury has been used to assess total mercury concentrations at the site. The Environment Agency's Science Report SC050021 /Mercury SGV states that 'for general surface contamination and to simplify the assessment the SGV's for inorganic mercury can normally be compared with chemical analysis for total mercury content...'. Based on the latter, SGV for elemental mercury (170mg/kg) in the soil assessment is used

NAD - NO ASBESTOS DETECTED

TS - Topsoil, MG - Made Ground and N - Natural Ground

SUMMARY OF CONTAMINATION ANALYSIS: TPH

Project Name Gresford
Project No 15SGE008
Date 02/10/2018

SOIL TYPE	-	-	-
SAMPLE LOCATION	TP503	TP504	TP505
DEPTH (m)	0.10	0.20	0.30
Ali >C5-C6	<0.01	<0.01	<0.01
Ali >C6-C8	<0.01	<0.01	<0.01
Ali >C8-C10	<1	<1	<1
Ali >C10-C12	<1	<1	<1
Ali >C12-C16	<1	<1	<1
Ali >C16-C21	2	2	<1
Ali >C21-C35	10	4	5
Total Aliphatics	12	6	7
Aro >C5-C7	<0.01	<0.01	<0.01
Aro >C7-C8	<0.01	<0.01	<0.01
Aro >C8-C10	<1	<1	<1
Aro >C10-C12	<1	<1	<1
Aro >C12-C16	3	<1	5
Aro >C16-C21	13	2	6
Aro >C21-C35	97	20	27
Total Aromatics	114	22	38
TPH (Ali & Aro)	126	28	45
BTEX - Benzene	<0.01	<0.01	<0.01
BTEX - Toluene	<0.01	<0.01	<0.01
BTEX - Ethyl Benzene	<0.01	<0.01	<0.01
BTEX - m & p Xylene	<0.01	<0.01	<0.01
BTEX - o Xylene	<0.01	<0.01	<0.01
MTBE	<0.01	<0.01	<0.01
Organic Matter	2.6	3.3	1.1

TPH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA C4SL 2017
	US ₉₅	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Ali >C5-C6	-	<0.01	<0.01	42.7	369	-
Ali >C6-C8	-	<0.01	<0.01	99.3	1240	-
Ali >C8-C10	-	<1	<1	13.9	204	-
Ali >C10-C12	-	<1	<1	81.7	1180	-
Ali >C12-C16	-	<1	<1	385	4130	-
Ali >C16-C21	-	2.00	2.00	210000	210100	-
Ali >C21-C35	-	10.00	4.00			
Total Aliphatics	-	12.00	6.00			
Aro >C5-C7	-	<0.01	<0.01	0.137	0.871	-
Aro >C7-C8	-	<0.01	<0.01	113	780	-
Aro >C8-C10	-	<1	<1	20.5	232	-
Aro >C10-C12	-	<1	<1	70	468	-
Aro >C12-C16	-	5.00	<1	165	830	-
Aro >C16-C21	-	13.00	2.00	319	1040	-
Aro >C21-C35	-	97.00	20.00	1120	1710	-
Total Aromatics	-	114.00	22.00			
TPH (Ali & Aro)	-	126.00	28.00			
BTEX - Benzene	-	<0.01	<0.01	0.0493	0.33	0.871
BTEX - Toluene	-	<0.01	<0.01	113	780	-
BTEX - Ethyl Benzene	-	<0.01	<0.01	50.7	453	-
BTEX - m & p Xylene	-	<0.01	<0.01	24	312	-
BTEX - o Xylene	-	<0.01	<0.01	26.4	336	-
MTBE	-	<0.01	<0.01	27.6	220	

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed against RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.

UU Drinking Water Guidelines	
PE Threshold	

Total BTEX & MTBE	0.1
EC5-EC10 Ali-Aro	2
EC10-EC16 Ali-Aro	10
EC16-EC40 Ali-Aro	500

SUMMARY OF CONTAMINATION ANALYSIS: PAH

Project Name Gresford
Project No 15SGE008
Date 02/10/18

SOIL TYPE	-	-	-
SAMPLE LOCATION	TP503	TP504	TP505
DEPTH (m)	0.10	0.20	0.30
Acenaphthene	0.02	<0.01	<0.01
Acenaphthylene	0.02	0.01	0.01
Anthracene	0.07	0.07	0.03
Benzo(a)anthracene	0.57	0.56	0.19
Benzo(a)pyrene	0.71	0.62	0.21
Benzo(b)fluoranthene	0.81	0.76	0.25
Benzo(ghi)perylene	0.45	0.39	0.12
Benzo(k)fluoranthene	0.27	0.25	0.09
Chrysene	0.57	0.57	0.19
Dibenzo(ah)anthracene	0.1	0.09	<0.04
Fluoranthene	0.94	0.86	0.33
Fluorene	0.02	<0.01	<0.01
Indeno(123-cd)pyrene	0.53	0.48	0.15
Naphthalene	<0.03	<0.03	<0.03
Phenanthrene	0.22	0.21	0.1
Pyrene	0.89	0.76	0.3
Organic Matter	2.6	3.3	1.1

PAH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA's C4SL 2017
	US ₉₅	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Acenaphthene	-	0.02	<0.01	608	2760	-
Acenaphthylene	-	0.02	0.01			-
Anthracene	-	0.07	0.03	10200	26200	-
Benzo(a)anthracene	-	0.57	0.19	4.52	8.54	-
Benzo(a)pyrene	-	0.71	0.21	1.51	2.05	4.95
Benzo(b)fluoranthene	-	0.81	0.25	7.72	9.86	-
Benzo(ghi)perylene	-	0.45	0.12	96.2	103	-
Benzo(k)fluoranthene	-	0.27	0.09	84.4	100	-
Chrysene	-	0.57	0.19	585	927	-
Dibenzo(ah)anthracene	-	0.10	<0.04	0.838	1	-
Fluoranthene	-	0.94	0.33	983	2980	-
Fluorene	-	0.02	<0.01	735	2610	-
Indeno(123-cd)pyrene	-	0.53	0.15	7.31	9.75	-
Naphthalene	-	<0.03	<0.03	0.829	12.2	-
Phenanthrene	-	0.22	0.10			-
Pyrene	-	0.89	0.30	668	2120	-

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed against **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**