

**Phase 1A, Waldmers Wood, Tetrosyl
(Excluding Plot 145 (Show Home) and Plots
22-38 (Compound Area))**

Validation Completion Report

For: Barratt Homes Manchester

August 2025

R2174-R22-v2

DOCUMENT CONTROL SHEET

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Validation Completion Report

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Signed for Smith Grant LLP

	Name	Position	Signature	Date
Author	C. McHugh BSc GradIEMA	Consultant		20.08.25
Reviewer	D Wayland BSc MSc AssocMCIWM MCIWEM C.WEM	Partner	pp. 	20.08.25

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PHASE 1A, WALDMERS WOOD, TETROSYL (EXCLUDING PLOT 145 (SHOW HOME) AND PLOTS 22-38 (COMPOUND AREA))

VALIDATION COMPLETION REPORT

CONTENTS

1. Introduction
2. Developer Remediation Requirements
3. Gas Protection Validation
4. Soil Cover Validation
5. Conclusions and Recommendations

DRAWINGS

D01 Phase 1A Completion Drawing 2024

APPENDICES

- A SGP Gas Membrane Certificates
- B GeoEnginSeer Ltd Integrity Testing Certificates
- C GeoEnginSeer Ltd Trace Gas Assessment Plots 143-146
- D Plot 48 Vapour Risk Assessment
- E Soil Depth Validation Certificates
- F Topsoil Assessment Letter – Rossendale Road
- G MMP & Declaration

1. Introduction

- 1.1. Barratt Homes Manchester (BHM) instructed Smith Grant LLP (SGP) to undertake the verification and validation of works to address risks from ground contamination during the construction phase of residential development at Waldmers Wood, Bury.

Table 1.1: Site Details

Address	Waldmers Wood, Walmersley Old Road, Bury, BL9 6SB
National Grid Reference	380950, 413950
Local Authority	Bury Metropolitan Borough Council
Current Nature of Site	Completed residential development with Phase 1A of the wider development (excluding Plots 22-38 & 145)
Planning Reference	63533

Figure 1.1: Site Location

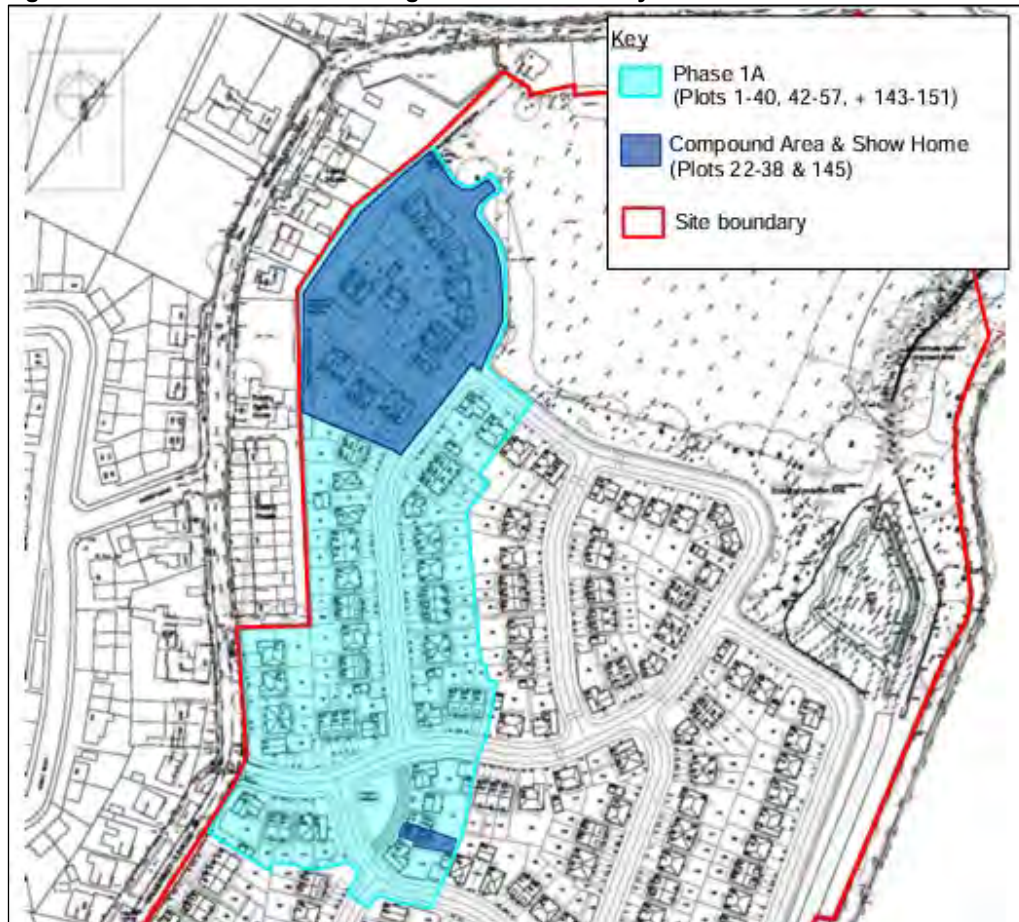


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- 1.1. The site is covered by an outline remediation strategy (ref: R2174-R01-v2, dated May 2019) produced by SGP. SGP has also since undertaken supplementary site investigations and produced phased Developer-Stage Remediation Strategies for submission to Bury Metropolitan Borough Council (BMBC).
- 1.2. The remedial earthworks were completed within the area referred to as Phase 1A (**Plots 1-40, 42-57 + 143-151**) under the Outline Remediation Strategy. With exception of the show home (Plot 145) and Plots 22-38 (compound area), BHM have since completed the construction phase remedial works within this area as per the requirements of the Phase 1A Developer-Stage Remediation Strategy (ref: R2174-R07-v5). This report relates to the developer-stage mitigation measures implemented across Phase 1A, including the installation of gas / VOC membranes and soil cover systems.

- 1.3. This report contains details of the validation works carried out to date on Phase 1A, the extent of which is indicated in Drawing D01 (ref: Phase 1A Completion Drawing 2024). This report covers **Plots 1-21, 39-40, 42-57 & 143-144 + 146-151 (47 plots)**.
- 1.4. The remaining plots within Phase 1A are not yet developed. **Plots 22-38** are located within the current developer compound area and **Plot 145** is a show home. These plots will be subject to validation reporting at a later date as it is understood that these will be built at the end of the development. It was therefore considered appropriate to produce this completion report for all of the plots completed within Phase 1A to date.

Figure 1 – Extract from D01 showing Phase 1A boundary



2. Developer Remediation Requirements

Gas Protection

- 2.1. Gas monitoring and assessment across Phase 1A determined that the site is classed as CIRIA CS2 “Low Risk” / NHBC Amber-1 condition, requiring basic gas protection measures to be installed within all plots.
- 2.2. Volatile Organic Compound (VOC) monitoring undertaken as part of the Phase I Supplementary Site Investigation works (ref. R2174-R02-v1) reported some elevated VOCs in the east of the site and duly recommended that VOC resistant measures were installed within **Plots 39-40 + 42-57 and 143-146**.
- 2.3. The Phase 1A Developer Remediation Strategy (ref. R2174-R07-v5) outlined the required verification requirements of the installed gas protection measures referring to current guidance as per CIRIA C735. It was acknowledged that due to site-specific circumstances, visual inspections of all installed gas membranes would be completed on a plot-by-plot basis and that those plots where a VOC membrane is installed would also be subject to air lance testing by a specialist verifier.
- 2.4. As Phase 1A (excluding show home and compound area) consists of 47 plots, **this would require visual inspection of all 47 plots and air lance testing on 22 plots**

Soil Cover System

- 2.5. Due to the presence of made ground across Phase 1A which contained elevated concentrations of typical urban contaminants, it was a requirement that 600mm of clean, validated soils were placed within garden areas. It was also determined that where made ground is present at the formation surface, an underlying 100mm+ break layer or barrier geotextile would be required (Plots 147-151 only due to the presence of sandstone bedrock at the base of all other plots).
- 2.6. It was stipulated by the Local Authority that verification of the appropriate depth of soil cover was to be completed on a plot-by-plot basis with a single depth validation hole excavated in each of the rear gardens. **This requires a total of 47 depth entries to be undertaken.**
- 2.7. Soils placed within the garden cover systems were to be chemically tested to determine suitability at the following agreed frequencies:
 - Topsoil and subsoil: 1 sample per 250m³ (well characterised greenfield source)
 - Topsoil and subsoil: 1 sample per 100m³ (unknown / well characterised brownfield source)
 - Site-won subsoil: 1 per 50m³ (if natural soils recovered from the wider development)

Material Management Plan (MMP)

- 2.8. No site-won soils suitable for reuse as part of the garden clean cover system were available and so the developer was required to import clean, natural soils for placement within private gardens.
- 2.9. The MMP identified that 4,824m³ of topsoil and 4,824m³ of subsoil (total 9,648m³) was required to be imported for placement within the garden's 600mm cover system. The MMP (v1 final) was initially produced in January 2021, however, as additional donor sites or changes in proposed import volumes were identified, then the MMP was revised as follows:

Table 2.1 Summary MMP versions

MMP Version	Donor Sites	Volumes	Declaration
V1	Donor 1: Hattersley Ph6	Topsoil: 1,500m ³	01/09/2021 12:13:38
	Donor 2: Leyland Test Track	Topsoil: 1,500m ³	
	Donor 3: Buxton	Topsoil: 1,500m ³	
	Donor 4: Chipping Lane	Topsoil: 1,500m ³	
V1.1	Donor 1: Hattersley Ph6	Topsoil: 1,500m ³	2021-11-25 14:46:01
	Donor 2: Leyland Test Track	Topsoil: 1,000m ³ <i>[edited volume from v1]</i>	
	Donor 3: Buxton	Topsoil: 1,000m ³ <i>[edited volume from v1]</i>	
	Donor 4: Chipping Lane	Topsoil: 1,000m ³ <i>[edited volume from v1]</i>	
	Donor 5: Cottam Way	Topsoil: 500m ³ Subsoil: 500m ³	
V2	Donor 6: Cottam Way	Topsoil: 1,500m ³	2022-12-19 10:56:00

- 2.10. A copy of the final MMP (v2) along with the QP declaration is presented in Appendix G.

3. Gas Protection Validation

- 3.1. A summary of the inspections of the installed gas protection measures within Phase 1A is summarised in the table below.
- 3.2. An open subfloor void specified to dilute and disperse any gas emissions below buildings to the outside air via ventilation provided by external air bricks has been constructed within Phase 1A. SGP has not undertaken dedicated inspections of the void but has confirmed the presence of air bricks used to vent the underfloor void whilst undertaking membrane inspections.
- 3.3. Three types of membranes have been utilised within Phase 1A; the Alderprufe HC Geomembrane, Visqueen Gas Barrier and Radbar Amber 1 Gas Membrane. Gas membranes have been installed by membrane specialists, PRS Manchester.
- 3.4. Copies of the visual inspection certificates undertaken by SGP is provided in Appendix A with copies of the visual inspection and air lancing undertaken by GeoEnginSeer provided in Appendix B.
- 3.5. The following table summarises the completed verification regime and the completed inspection.

Table 3.1 SGP Gas Membrane Inspection summary

Plots	Protection Measure	Date of Inspections	Inspection Area	Findings
1 & 5	CS2	18.06.21	Airbricks & Gas membrane	Radbar Amber 1 Gas Membrane; Full coverage of the building footprint; good condition within minimal track marks. Visqueen Zedex CPT High Performance DPC (600mm) taped to gas membrane using double sided tape and spans external walls successfully. Air bricks visible.
2-4	CS2	07.07.21	Airbricks & Gas membrane	
6-8	CS2	19.07.21	Airbricks & Gas membrane	
9	CS2	13.08.21	Airbricks & Gas membrane	
10 & 11	CS2	26.08.21	Airbricks & Gas membrane	
12	CS2	14.09.21	Airbricks & Gas membrane	
14 & 500	CS2	28.09.21	Airbricks & Gas membrane	
15	CS2	06.10.21	Airbricks & Gas membrane	
16 & 17	CS2	26.10.21	Airbricks & Gas membrane	

18 & 20-21	CS2	17.11.21	Airbricks & Gas membrane	Radbar Amber 1 Gas Membrane; Full coverage of the building footprint; good condition within minimal track marks. Visqueen Zedex CPT High Performance DPC (600mm) taped to gas membrane using double sided tape and spans external walls successfully. Air bricks visible.
19	CS2	17.01.22	Airbricks & Gas membrane	
39-41	VOC	31.01.22	Airbricks & VOC membrane	Visqueen HC Bloc Proprietary Membrane Full coverage of building footprint spanning internal and external walls. Wind damage observed resulting in approximately 20 repairs. Air bricks visible. Air lance testing complete. Note Plot 41 located in Ph2A.
42-44	VOC	12.01.22	Airbricks & VOC membrane	Visqueen HC Bloc Proprietary Membrane Full coverage of building footprint spanning internal and external walls. Overall good condition. Air bricks visible. Air lance testing complete.
45-47	VOC	25.10.21	Airbricks & VOC membrane	
48	VOC	06.10.21	Airbricks & VOC membrane	Visqueen Gas Barrier Full coverage of building footprint spanning internal and external walls. Several repairs made during inspection. Air bricks visible. Air lance testing complete. Due to a non-VOC membrane being installed, further VOC risk assessment was undertaken (see Sections 3.7-3.9)
49-51	VOC	18.09.21	Airbricks & VOC membrane	Alderprufe HC membrane. Full coverage of building footprint spanning internal and external walls. Several repairs made during inspection. Air bricks visible. Air lance testing complete.
52-53	VOC	10.09.21	Airbricks & VOC membrane	Alderprufe HC membrane. Full coverage of building footprint spanning internal and external walls. Membrane in excellent condition. Air bricks visible. Air lance testing complete.
54	VOC	31.08.21	Airbricks & VOC membrane	Alderprufe HC membrane. Full coverage of building footprint spanning internal and external walls. Several repairs made during inspection. Air bricks visible. Air lance testing complete.

55-57	VOC	29.04.22	Airbricks & VOC membrane	Visqueen HC Bloc Proprietary Membrane. Full coverage of building footprint spanning internal and external walls. Overall good condition with 2 repairs required. Air bricks visible. Air lance testing complete.
143-146	VOC	08.09.21	Airbricks & VOC membrane	Alderprufe HC Geomembrane. Full coverage of building footprint spanning internal and external walls. One puncture mark identified on Plot 146 which was repaired with sheet of membrane jointed with double sided and single sided tape. Overall good condition. Air bricks visible. Air lance testing <u>not</u> completed so trace gas testing undertaken by specialist verifier.
147-151	CS2	27.04.23	Airbricks & Gas membrane	Visqueen gas barrier. Full coverage of building footprint, membrane extended across external wall providing 100% coverage. Membrane in good condition, no punctures identified. No DPC installed at the time of inspection. Air bricks visible.

- 3.6. In error, only a visual inspection of the installed VOC membrane was conducted within Plots 143-146 with no air lance testing undertaken. To provide further confidence on the integrity of the installed membrane, GeoEnginSeer Ltd. (as specialist, independent verifiers) carried out tracer gas testing. The test results concluded that *'ground-gas protection measures implemented at this site are adequate and functional'*. A full copy of the report is attached in Appendix C for further information.

Plot 48

- 3.7. Installation of a VOC membrane was required in Plot 48, however in error a Visqueen Proprietary Gas Barrier was installed. This was subject to visual inspection and air lance testing; however, it was recognised that further assessment would be required. A scope of works was duly presented by GeoEnginSeer to Bury Council on 13.02.22 with a response received on 18.10.22 generally approving the scope but advising that obtaining data from Plot 48 would be preferable.
- 3.8. The following scope of works which adopted a multiple lines of evidence approach was therefore proposed and implemented:
- Monitoring of target VOC concentrations within the sub-floor void of Plot 68 (Phase 2)
 - Monitoring of target VOC concentrations with the sub-floor void of Plot 48
 - Monitoring of target VOC concentrations within Plot 48

- 3.9. The assessment was presented in the 'Vapour Risk Assessment: Plot 48' report (ref. R2174-R13), with a copy provided in Appendix D. The assessment concluded that there were no elevated VOCs above derived inhalation criteria within the telescopic vent of Plot 48 or within the living space of Plot 48 and that there is no risk to human health from the installation of a non-VOC membrane. This assessment was duly accepted by both Bury Council and the National Home Builders Council (NHBC).
- 3.10. The installed gas / VOC protection measures have been validated on a plot-by-plot basis and where VOC protection measures were proposed, these have been subject to independent specialist verification including air lance testing.

4. Soil Cover Validation

4.1. Soil cover validation certificates have been produced which detail the chemical testing and depth validation works for various plots (included in Appendix E). A summary of the validation results, as detailed within these certificates, is presented below:

4.2. Soil Testing Regime

4.2.1. The compliance criteria for soils were set as 'residential with plant uptake' in accordance with the LQM/CIEH S4ULs published in 2015 as per the Remediation Strategy for the site in 2019 (ref: R2174-R01-v2 May 2019). These were applied to both soils in stockpile as well as placed materials.

4.2.2. Testing and analysis of soils has either been carried out in stockpile, prior to spreading within garden and landscaped areas, or in-situ after placement into gardens.

4.2.3. Two topsoil sources were used in the areas under consideration as summarised in the table below. No subsoil was imported or used within the garden cover system.

Table 4.1 Summary of soil sources used on site

Topsoil Source & Description	
Barratt Homes development site: 'Site 15' off Cottam Way, Preston. <i>Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.</i>	Barratt Homes development site off Rossendale Road, Burnley (well characterised Greenfield site): stockpile 'T2'. <i>Blackish brown slightly gravelly sandy clayey topsoil with grass roots.</i>

4.2 Topsoil Inspection Record

4.2.1 SGP attended site on fourteen occasions to validate the depth of placed soils in the gardens of the plots under consideration (Plots 1-12, 500(13), 14-21, 39-40, 42-57, 143-144, 146- 151).

4.2.2 The testing regime of both topsoil sources have been summarised in Table 4.2 below.

Table 4.2 Topsoil Sources and Testing Regime

Plots	Source	Testing Regime	Findings
Plots 147-151	Barratt Homes development site off Rossendale Road, Burnley (well characterised Greenfield site): stockpile 'T2'.	6 topsoil samples collected from an approximate placed volume of 253.4m³ achieving a 1 per 42.2m ³ sampling rate.	Lab certs: 23-20765 & 23-50455-1 Exceedances: Naphthalene, Benz(a)anthracene Benzo(b)fluoranthene, Benzo(a)pyrene and Dibenzo(ah)anthracene. See Appendix D for Topsoil Assessment Letter and CLO approval.

Plots	Source	Testing Regime	Findings
Plots 1-12, 500, 14-21, 39-40, 42-57, 143-144, 146	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.	12 topsoil samples collected from an approximate placed volume of 1,114.6m³ achieving a 1 per 92.8m ³ sampling rate.	Lab certs: 22-07010-1 & 21/17783 No exceedances reported.
Total Topsoil Import:		1,368m³	

4.2.3 The testing frequency for the imported topsoil (well-characterised Greenfield source) of 1 sample per 250m³ has been met for both topsoil sources.

4.2.4. While various PAH exceedances have been reported during sampling of the Rossendale Road topsoil, SGP considers that this soil is suitable for reuse in gardens / landscaping, as has been approved by the Local Authority. Further explanation and confirmation with the Local authority is attached in Appendix D.

4.3 Depth Validation

4.3.1 As specified within both the Outline Remediation Strategy (ref: R2174-R01-v2 May 2019) and Phase 1 Developer-Stage Remediation Strategy (ref; R2174-R07-v5 final), depth validation was to be undertaken in all rear gardens on a plot-by-plot basis.

4.3.2 The depth of placed soil cover has been confirmed in 47 plots covered within this report as part of Phase 1A (*Excluding plots within the compound area [Plots 22-38] and show home [Plot 145]*). The validation works successfully meet the prescribed frequency. A photographic record is provided within the soil validation certificates in Appendix E.

4.3.3 The depth entries demonstrated that the descriptions of the soils present matched those from the stockpile inspections (where applicable), and that the total depth of placed soils within the garden areas inspected met or exceeded 600mm.

4.4 MMP

4.4.1 Two donor sites for topsoil for placement within the Phase 1A garden areas were used:

- Rossendale Road Burnley – 253.4m³
- Cottam Way – 1,114.6m³

- 4.4.2 The imported soil from Cottam Way was covered under the MMP (v2 allowed for 1,500m³). Due to soil from Rossendale Road becoming available for use on short notice, it was not possible to update the MMP prior to the first load of material being imported to the Site.
- 4.4.3 The MMP included multiple other donor sites which were not used. It is also acknowledged that the MMP stated that a total of 9,648m³ of imported topsoil/subsoil would be required. It is assumed this relates to the whole development rather than Phase 1A. For clarity, due to changes in the development phasing of the Site and on-going remedial works, each development phase will be supported by a developer-remediation strategy and its own MMP.

5. Conclusions and Recommendations

Gas Protection Measures

- 5.1 The whole of Phase 1A was classified as CIRIA CS2 “Low Risk” / NHBC Amber-1 requiring basic gas protection measures to be installed. Due to the reported presence of elevated VOCs during pre-remediation works, it was specified that a VOC resistant membrane was required within Plots 39-40, 42-57 and 143-146.
- 5.2 SGP has undertaken visual inspections on a plot-by-plot basis for all plots where basic gas protection measures in accordance with CS2 were required. Specialist verification including visual and air lance testing has been completed by GeoEnginSeer within all plots where VOC measures were installed.
- 5.3 A VOC membrane was correctly installed within Plots 143-146; however, it was only subject to visual inspection rather than air lance testing. Further assessment was completed by GeoEnginSeer using tracer gas tests to demonstrate that the integrity of the membrane was appropriate. The assessment concluded that the installed measures were adequate and functional.
- 5.4 In error a proprietary gas membrane was installed within Plot 48 rather than a VOC resistant membrane. A proposed scope of works was submitted by GeoEnginSeer to Bury Council to provide a lines of evidence approach to assess the risk further. SGP produced a Plot 48 risk assessment in accordance with the approved methodology which included subfloor void and living space VOC monitoring. The report concluded that there was no risk from VOCs.

Soil Cover System

- 5.5 The soils used in the garden areas are of known provenance, have been tested at appropriate frequencies given their source and confirmed by analysis as acceptable for use in residential gardens.
- 5.6 Depth validations have been completed on a plot-by-plot basis confirming application of the required 600mm of imported cover soils within rear gardens (as well as a basal geotextile where necessary in Plots 147-151).
- 5.7 Two sources of topsoil have been used for garden cover soils including Cottam Way which was a confirmed donor site on the MMP and for which the proposed import volume was not exceeded. The second source was from Rossendale Road. Due to time constraints to import this material, it was not possible to update the MMP for this source. It is, however, important to note that Rossendale Road (a Barratt development site) is both a greenfield and well characterised site.

- 5.8 It is assumed due to the required volumes stated within the MMP that this incorrectly referred to the whole development requirements rather than just Phase 1A. The development has been somewhat complicated as it is occurring in sub-phases as preparatory works are completed and handed over to the developer. As such, going forward, a developer-stage Remediation Strategy will be produced for each sub-phase of development and this will be supported by its own MMP. This is considered an appropriate approach to avoid further confusion regarding phasing and material movement.

Outstanding Plots

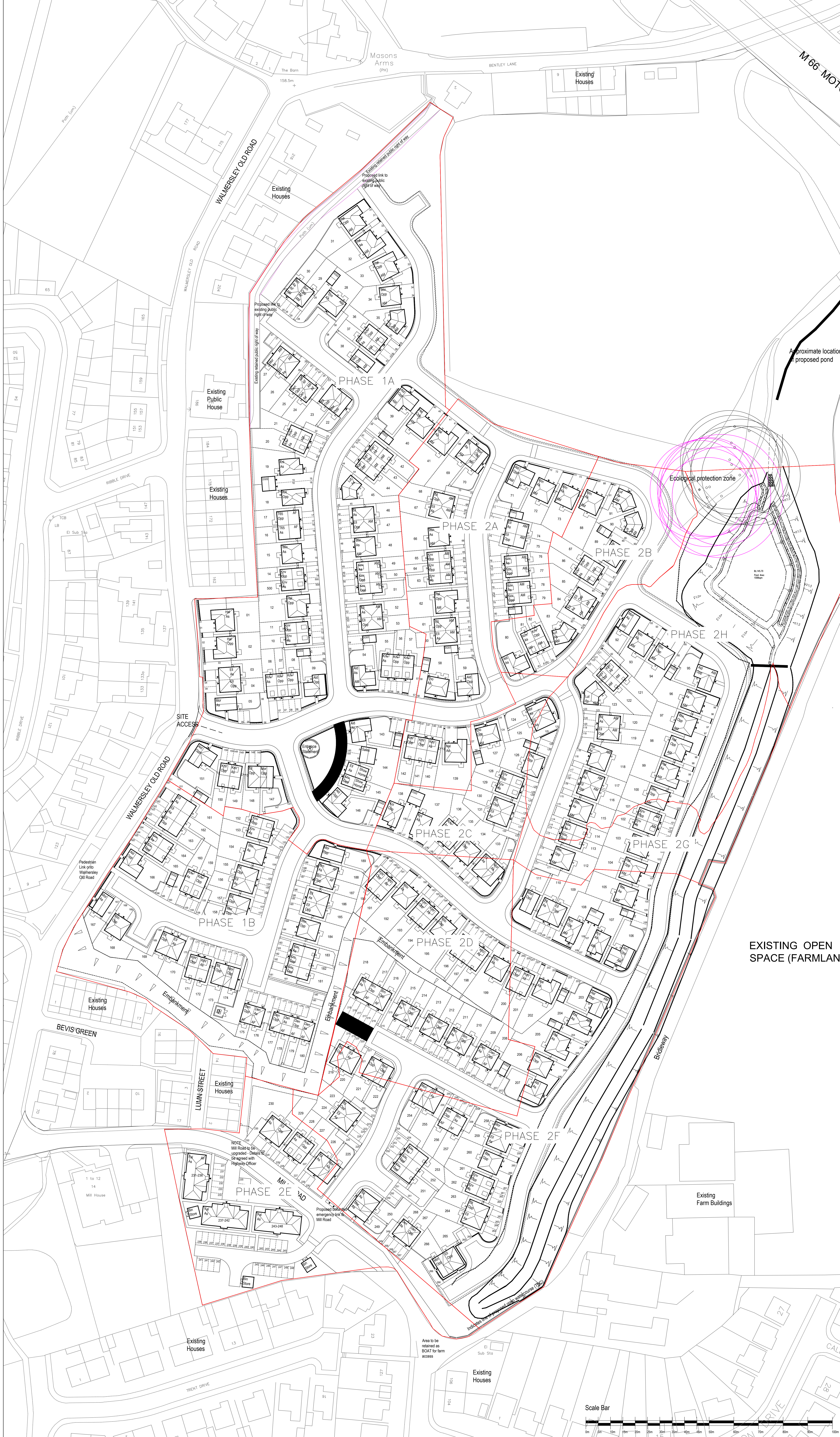
- 5.9 Several plots located within Phase 1A will not be constructed / completed for some time owing to the fact that Plot 145 is a show home (VOC membrane validated and included herein) and that Plots 22-38 are located within the current developer compound.
- 5.10 These plots have been excluded from this completion report to allow the current information to be formally submitted. It is intended that these outstanding plots will be incorporated within future reporting as and when completed.
- 5.11 Following the completion of Plots 22-38 and 145, a separate completion report will be produced and submitted.
- 5.12 Based on the available evidence, SGP conclude that the construction stage mitigation measures, comprising gas/VOC protection measures and clean garden cover system as recommended within the Phase 1A Developer-Stage Remediation Strategy (R2174-R07-v5), has been successfully implemented by Barratt Homes Manchester. No further validation or verification is proposed for Phase 1A (excluding Plots 22-38 and 145, as discussed).

Limitations

- 5.13 This report has been prepared by SGP for the sole and exclusive use of Barratt Homes Manchester. Reasonable skill, care and diligence has been exercised within the budget available, and in accordance with the technical requirements of the brief. Notwithstanding the efforts made by the professional team in undertaking the assessment and preparing this report, it is possible that other ground conditions and contamination as yet undetected may exist. Reliance on the findings of this report must therefore be limited accordingly. Such reliance must be based on the whole report and not on extracts which may lead to incomplete or incorrect conclusions when taken out of context.
- 5.14 SGP reserves the right to alter any of the foregoing information in the event of new information being disclosed or provided and in the light of changes to legislation, guidelines and responses by the statutory and regulatory authorities.

DRAWINGS

WARNING TO HOUSE-PURCHASERS
Property Misdescriptions Act 1991
Buyers are warned that this is a working drawing and is not intended to be treated as
descriptive material describing, in relation to any particular property or development,
any of the specified matters prescribed by any order made under the above Act.
The contents of this drawing may be subject to change at any time and alterations and
variations can occur during the progress of the works without revision of the drawing.
Consequently the layout, form, content and dimensions of the finished construction may
differ materially from those shown. Nor do the contents of this drawing constitute a
contract, part of any contract or warranty.



F	Remediation phases updated to suit Urban Regen. Plan.	12.01.23	BJM
E	Remediation phases updated to suit NHBC comments.	26.10.22	BJM
D	Remediation phases updated to suit Urban Regen. plan.	26.05.22	FB
C	Latest planning layout added. Approximate Vent Shaft location added.	18.11.21	RB
B	Amended to suit latest phase 1 remediation boundary & drainage design.	06.12.19	DK
A	Amended to show proposed phasing and new potential drainage outfalls.	15.03.18	DK
REV	DESCRIPTION	DATE	DRAWN

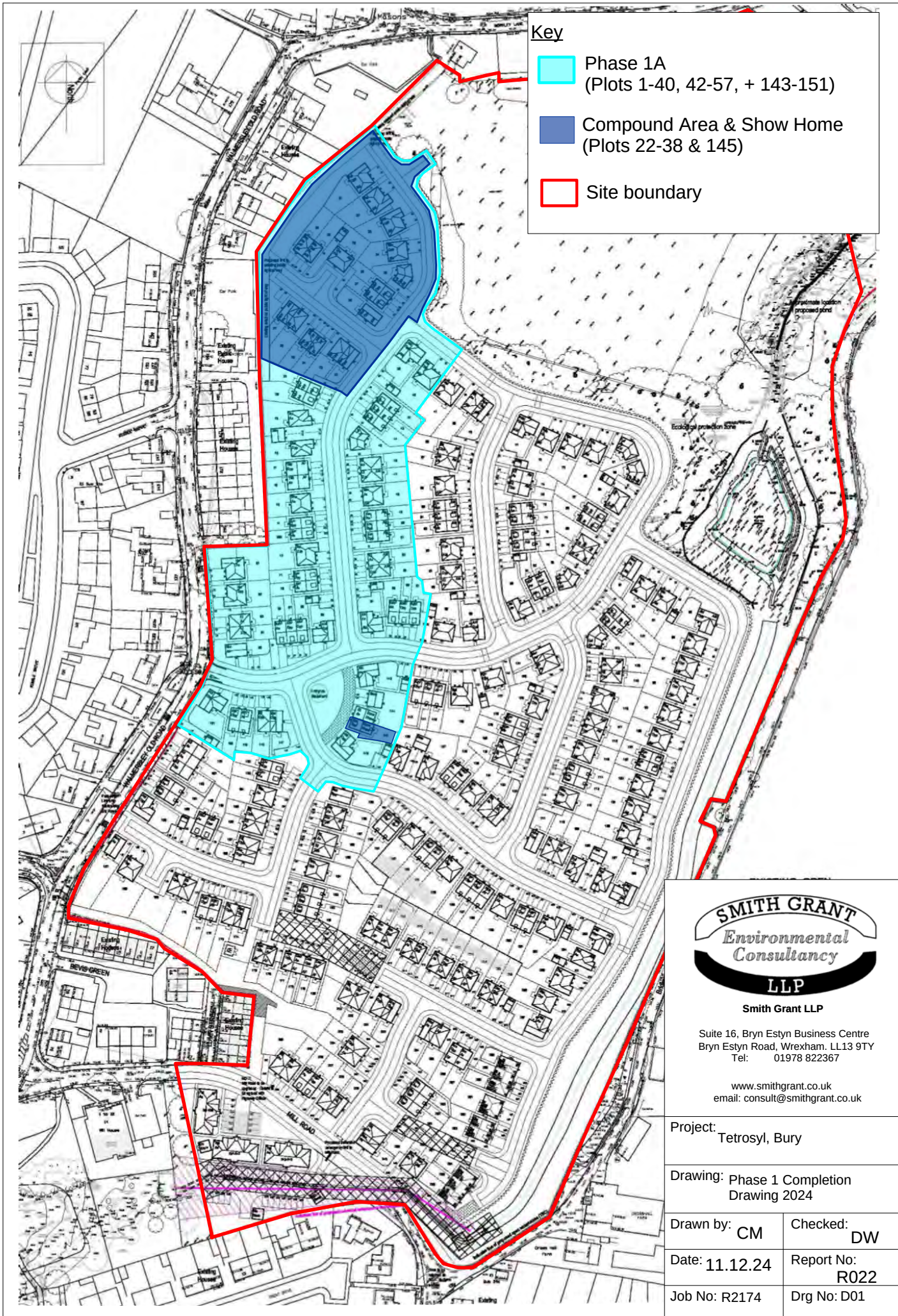


**BARRATT
HOMES**

MANCHESTER

Barratt Homes Manchester
(A division of BDW Trading Ltd)
4 Brindley Road
City Park
Manchester
M16 9HQ
Tel: 0161 872 0161
Fax: 0161 855 2820

Job:	Tetrosyl Bury
Title:	Remediation Phasing Plan
Design By:	DK
Date:	19.02.18
C.A.D. By:	DK
Scale:	1:500
Drawing Number:	456/ED/05
Rev:	F



Key

- Phase 1A
(Plots 1-40, 42-57, + 143-151)
- Compound Area & Show Home
(Plots 22-38 & 145)
- Site boundary



Smith Grant LLP

Suite 16, Bryn Estyn Business Centre
Bryn Estyn Road, Wrexham, LL13 9TY
Tel: 01978 822367

www.smithgrant.co.uk
email: consult@smithgrant.co.uk

Project: Tetrosyl, Bury

Drawing: Phase 1 Completion
Drawing 2024

Drawn by: CM	Checked: DW
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Date: 11.12.24	Report No: R022
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Job No: R2174	Drg No: D01
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APPENDIX A

SGP Gas Membrane Validation Certificates

Gas Protection Validation Record

job number	R2174	design source/ref:	BM-SD02-13-01	specification source/ref:	R2174-R07-v3	other documents attached	✕	
site name / location	Tetrosyl, Bury	building use:	residential	commercial	other (describe)			
plot number	16 & 17	building description:	no. of storeys =	2	detached	semi-detached	Terrace	apartment block
compiled by:	SM	gas protection type:	active / passive		foundation type:	suspended floor / raft / other		

Ventilated sub-floor (if present)	inspection date/time:	25.10.21	inspected by:	SM	photographed:	✓
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✓ / ✕ notes (see overleaf)

void former type	✕	1. N/A
height of void space	✕	2. >150mm, not inspected, however building control minimum is confirmed by client and on design detail
gravel type	✕	3. N/A (void clear)
pipe size and spacing	✕	4. N/A
external wall airbricks	✓	5. Plots 16 & 17: 4 airbricks along the front, 6 to the rear, 5 on each side (total 20); all clear and free from obstructions.
internal sleeper walls	✕	6. not inspected
external vent trenches / ducts	✕	7. N/A

Gas barrier	inspection date/time:	25.10.21	inspected by:	SM	photographed:	✓
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membrane type	✓	8. Radbar Amber 1 Gas Membrane
extent of coverage	✓	9. Full coverage, membranes checked throughout.
slab/membrane condition	✓	10. Membrane in good condition, standing water present; no rips or tears.
laps and joints	✓	11. Laps all > 150mm and sealed using both double and single sided tape.
damp-proof course	✓	12. Visqueen Zedex CPT High Performance DPC (600mm) taped to gas membrane using double and single-sided tape and spans to external wall; gas membrane also underlies DPC to external wall providing 100% coverage to building footprint.
service entries and seals	✓	13. 6 service entries on each plot. All service entries sealed with a preformed 'tophat', proprietary double/single sided tape, and tightened jubilee clip.

Gas Protection Validation Record

Guide notes:

1	void former type	proprietary type - manufacturer and specification, in accordance with design?, installed properly without damage?
2	height of void space	height of proprietary former or constructed ventilation space below suspended floor - note any debris on void / obstructions to air flow, note formation surface soil type (e.g. crushed concrete/brick), any evidence of flooding
3	gravel type	gravel type, if used (limestone / granite etc.) and any specification (e.g. 6F2), typical particle dimensions (mm), apparent fines content (low/high), compaction (loose/dense), waterlogging / contamination by clay, organic matter, other debris
4	pipe size and spacing	diameter in mm; material type (e.g. PVC); slotted or perforated; positioning and spacing / separation and jointing as on design drawing - if not sketch arrangement - do pipes connect with external (telescopic / swan-neck) vents?
5	external wall airbricks	check numbers, size and positions as design drawing (if not shown, make sketch; check for blockage, e.g. by mortar, or soil / pavings etc.
6	internal sleeper walls	check for ventilation holes - e.g. honeycomb brickwork or pipe crossings - note size, spacing and location - in accordance with design?
7	external vent trenches / ducts	check whether located and constructed in accordance with design drawings; if open-topped gravel, note gravel type and presence of fines / contamination; if pipe or other vents - check positions and construction for functionality and absence of blockages - vents may be built over
8	membrane type	note manufacturer and product specification, including batch / roll numbers if present - in accordance with specification? check stock storage arrangements - protected from dirt and damage?
9	extent of coverage	if membrane is incomplete, further inspection will be required - note areas completed / incomplete - is membrane fully visible or have internal walls been constructed over membrane / screed placed?
10	slab/membrane condition	record presence of debris / rough surfaces, in particular sharp projections, below or above membrane; record locations of all punctures or repairs, note arrangements to protect membrane surface from traffic / tools and equipment / materials, and temporary weighting down of membrane, e.g. use of boards - record evidence of footprints / tracks on membrane surface, creases or water/wind damage
11	laps and joints	check the all joints are lapped and sealed in accordance with manufacturer's requirements / specification, particularly where creases/folds are present (usually minimum 150mm laps with double-sided tape between sheets, and single-sided tape on top surface; note size of sheets and frequency of edge seals
12	damp-proof course	record DPC manufacturer and product code - usually integrated with the membrane; measure the DPC projection from external wall in mm; check laps and seals between membrane and DPC - note any potential stress points and tension between the two; check for damage to DPC
13	service entries and seals	note number, position and diameter of service entries - check top hat seal arrangements in accordance with design / specification (laps and seals between top hat and floor membrane, pipe upstand is usually a minimum 150mm) check, with jubilee clips to secure top hat seal to pipe - note presence of clips and tightness of connections

Gas Protection Validation Record

This plot has PASSED inspection.

An additional inspection visit IS NOT required for this plot.

SGP Staff:	S D Miller BSc MSc AMIEnvSc	Signed:		24.06.2022
SGP Member:	D Wayland BSc MSc AssocCIWM MCIWEM C.WEM	Signed:		24.06.22

Gas Protection Validation Record



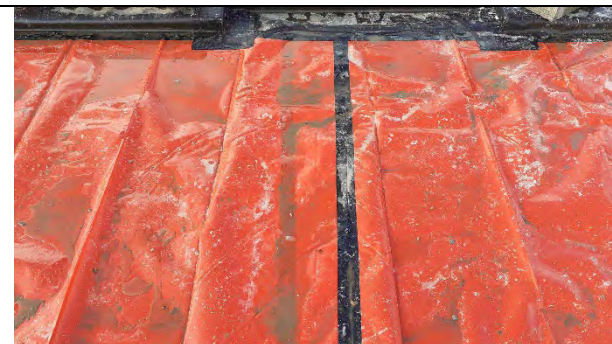
Plot 16: Membrane fully exposed and in good condition.



Plot 16: Airbricks installed were clear and free from any obstructions.



Plot 16: Service entries sealed with top hat, double and single sided tape and a jubilee clip



Plot 16: Overlap in membrane sheets >150mm and sealed with double and single sided tape



Plot 16: Good detail on cornering using proprietary detailing strip to reduce stress points; DPC taped to gas membrane extending to external wall.



Plot 17: Membrane fully exposed and in good condition.

Gas Protection Validation Record

		
Plot 17: Airbricks installed were clear and free from any obstructions.	Plot 17: Service entry sealed with top hat, double and single sided tape and a jubilee clip	Plot 17: Good detail on cornering using proprietary detailing strip to reduce stress points; DPC taped to gas membrane extending to external wall.
	NO PHOTOGRAPH	NO PHOTOGRAPH
Plot 17: Overlap in membrane sheets >150mm and sealed with double and single sided tape		

Gas Protection Validation Record

job number	R2174	design source/ref:	BM-SD02-13-01	specification source/ref:	R2174-R07-v3	other documents attached	✕
site name / location	Tetrosyl, Bury	building use:	residential	commercial	other (describe)		
plot number	18 & 20-21	building description:	no. of storeys =	2	detached	semi-detached	Terrace apartment block
compiled by:	DW	gas protection type:	active / passive	foundation type:	suspended floor	raft / other	

Ventilated sub-floor (if present)	inspection date/time:	18.11.21	inspected by:	DW	photographed:	✓
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void former type	✕	1. N/A
height of void space	✕	2. >150mm, not inspected, however building control minimum is confirmed by client and on design detail
gravel type	✕	3. N/A (void clear)
pipe size and spacing	✕	4. N/A
external wall airbricks	✓	5. Plot 18: 3 airbricks along the front, 2 to the rear, 5 on each side (total 15); all clear and free from obstructions. Plots 20-21: 2 airbricks to the front, 2 to the rear and 5 on each side of each plot (total 14; all clear and free from obstructions).
internal sleeper walls	✕	6. not inspected
external vent trenches / ducts	✕	7. N/A

Gas barrier	inspection date/time:	18.11.21	inspected by:	SM	photographed:	✓
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membrane type	✓	8. Radbar Amber 1 Gas Membrane
extent of coverage	✓	9. Full coverage, membranes checked throughout.
slab/membrane condition	✓	10. Membrane in good condition, standing water present; no rips or tears.
laps and joints	✓	11. Laps all > 150mm and sealed using both double and single sided tape.
damp-proof course	✓	12. Visqueen Zedex CPT High Performance DPC (600mm) taped to gas membrane using double and single-sided tape and spans to external wall; gas membrane also underlies DPC to external wall providing 100% coverage to building footprint.
service entries and seals	✓	13. 6 service entries in Plots 18 & 20 and 4 entries in Plot 21. All service entries sealed with a preformed 'tophat', proprietary double/single sided tape, and tightened jubilee clip.

Gas Protection Validation Record

Guide notes:

1	void former type	proprietary type - manufacturer and specification, in accordance with design?, installed properly without damage?
2	height of void space	height of proprietary former or constructed ventilation space below suspended floor - note any debris on void / obstructions to air flow, note formation surface soil type (e.g. crushed concrete/brick), any evidence of flooding
3	gravel type	gravel type, if used (limestone / granite etc.) and any specification (e.g. 6F2), typical particle dimensions (mm), apparent fines content (low/high), compaction (loose/dense), waterlogging / contamination by clay, organic matter, other debris
4	pipe size and spacing	diameter in mm; material type (e.g. PVC); slotted or perforated; positioning and spacing / separation and jointing as on design drawing - if not sketch arrangement - do pipes connect with external (telescopic / swan-neck) vents?
5	external wall airbricks	check numbers, size and positions as design drawing (if not shown, make sketch; check for blockage, e.g. by mortar, or soil / pavings etc.
6	internal sleeper walls	check for ventilation holes - e.g. honeycomb brickwork or pipe crossings - note size, spacing and location - in accordance with design?
7	external vent trenches / ducts	check whether located and constructed in accordance with design drawings; if open-topped gravel, note gravel type and presence of fines / contamination; if pipe or other vents - check positions and construction for functionality and absence of blockages - vents may be built over
8	membrane type	note manufacturer and product specification, including batch / roll numbers if present - in accordance with specification? check stock storage arrangements - protected from dirt and damage?
9	extent of coverage	if membrane is incomplete, further inspection will be required - note areas completed / incomplete - is membrane fully visible or have internal walls been constructed over membrane / screed placed?
10	slab/membrane condition	record presence of debris / rough surfaces, in particular sharp projections, below or above membrane; record locations of all punctures or repairs, note arrangements to protect membrane surface from traffic / tools and equipment / materials, and temporary weighting down of membrane, e.g. use of boards - record evidence of footprints / tracks on membrane surface, creases or water/wind damage
11	laps and joints	check the all joints are lapped and sealed in accordance with manufacturer's requirements / specification, particularly where creases/folds are present (usually minimum 150mm laps with double-sided tape between sheets, and single-sided tape on top surface; note size of sheets and frequency of edge seals
12	damp-proof course	record DPC manufacturer and product code - usually integrated with the membrane; measure the DPC projection from external wall in mm; check laps and seals between membrane and DPC - note any potential stress points and tension between the two; check for damage to DPC
13	service entries and seals	note number, position and diameter of service entries - check top hat seal arrangements in accordance with design / specification (laps and seals between top hat and floor membrane, pipe upstand is usually a minimum 150mm) check, with jubilee clips to secure top hat seal to pipe - note presence of clips and tightness of connections

Gas Protection Validation Record

This plot has PASSED inspection.

An additional inspection visit IS NOT required for this plot.

SGP Staff:	S D Miller BSc MSc AMIEnvSc	Signed:		24.06.22
SGP Member:	D Wayland BSc MSc AssocCIWM MCIWEM C.WEM	Signed:		24.06.22

Gas Protection Validation Record



Plot 18: Membrane extends across plot footprint with all areas available for inspection. Standing water indicative of watertight seal achieved



Plot 18: Good detail on cornering using proprietary detailing strip to reduce stress points; DPC taped to gas membrane extending to external wall



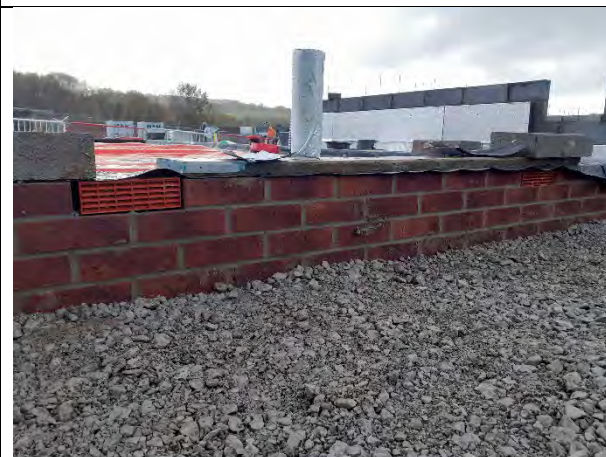
Plot 18: Service entry sealed with top hat, double and single sided tape and a jubilee clip



Plot 18: Good corner detailing with no stress points. DPC taped to membrane across cavity wall



Plot 18: Service entry sealed with top hat, double and single sided tape and a jubilee clip



Plot 18: Airbricks installed were clear and free from any obstructions.

Gas Protection Validation Record



Plot 20: Membrane in good condition. Final taping of tap-hats taking place during inspection. Works complete during inspection



Plot 20: Good detail on cornering using proprietary detailing strip to reduce stress points; DPC taped to gas membrane extending to external wall.



Plot 20: Service entry sealed with top hat, double and single sided tape and a jubilee clip



Plot 20: No holes, rips, tears or puncture markers observed



Plot 20: Airbricks installed were clear and free from any obstructions.

No Photo

Gas Protection Validation Record



Plot 21: Membrane extends across plot footprint with all areas available for inspection. Standing water indicative of watertight seal achieved



Plot 21: Good detail on cornering using proprietary detailing strip to reduce stress points; DPC taped to gas membrane extending to external wall



Plot 21: Service entry sealed with top hat, double and single sided tape and a jubilee clip



Plot 21: Good corner detailing with no stress points. DPC taped to membrane across cavity wall



Plot 21: Service entry sealed with top hat, double and single sided tape and a jubilee clip



Plot 21: Airbricks installed were clear and free from any obstructions.

Gas Protection Validation Record

job number	R2174	design source/ref:	BM-SD02-13-01	specification source/ref:	R2174-R07-v3	other documents attached	✕	
site name / location	Tetrosyl, Bury	building use:	residential	commercial	other (describe)			
plot number	19	building description:	no. of storeys =	2	detached	semi-detached	Terrace	apartment block
compiled by:	MJ	gas protection type:	active / passive		foundation type:	suspended floor / raft / other		

Ventilated sub-floor (if present)	inspection date/time:	17.01.22	inspected by:	MJ	photographed:	✓
	✓ / ✕	notes (see overleaf)				

void former type	✕	1. N/A
height of void space	✕	2. >150mm, not inspected, however building control minimum is confirmed by client and on design detail
gravel type	✕	3. N/A (void clear)
pipe size and spacing	✕	4. N/A
external wall airbricks	✓	5. Plots 9: 5 airbricks along the front, 2 to the rear, 7 on each side (total 21); all clear and free from obstructions.
internal sleeper walls	✕	6. not inspected
external vent trenches / ducts	✕	7. N/A

Gas barrier	inspection date/time:	17.01.22	inspected by:	MJ	photographed:	✓
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membrane type	✓	8. Radbar Amber 1 Gas Membrane
extent of coverage	✓	9. Full coverage, membranes checked throughout.
slab/membrane condition	✓	10. Membrane in good condition, standing water present; no rips or tears.
laps and joints	✓	11. Laps all > 150mm and sealed using both double and single sided tape.
damp-proof course	✓	12. Visqueen Zedex CPT High Performance DPC (600mm) taped to gas membrane using double and single-sided tape and spans to external wall; gas membrane also underlies DPC to external wall providing 100% coverage to building footprint.
service entries and seals	✓	13. 6 service entries. All service entries sealed with a preformed 'tophat', proprietary double/single sided tape, and tightened jubilee clip.

Gas Protection Validation Record

Guide notes:

1	void former type	proprietary type - manufacturer and specification, in accordance with design?, installed properly without damage?
2	height of void space	height of proprietary former or constructed ventilation space below suspended floor - note any debris on void / obstructions to air flow, note formation surface soil type (e.g. crushed concrete/brick), any evidence of flooding
3	gravel type	gravel type, if used (limestone / granite etc.) and any specification (e.g. 6F2), typical particle dimensions (mm), apparent fines content (low/high), compaction (loose/dense), waterlogging / contamination by clay, organic matter, other debris
4	pipe size and spacing	diameter in mm; material type (e.g. PVC); slotted or perforated; positioning and spacing / separation and jointing as on design drawing - if not sketch arrangement - do pipes connect with external (telescopic / swan-neck) vents?
5	external wall airbricks	check numbers, size and positions as design drawing (if not shown, make sketch; check for blockage, e.g. by mortar, or soil / pavings etc.
6	internal sleeper walls	check for ventilation holes - e.g. honeycomb brickwork or pipe crossings - note size, spacing and location - in accordance with design?
7	external vent trenches / ducts	check whether located and constructed in accordance with design drawings; if open-topped gravel, note gravel type and presence of fines / contamination; if pipe or other vents - check positions and construction for functionality and absence of blockages - vents may be built over
8	membrane type	note manufacturer and product specification, including batch / roll numbers if present - in accordance with specification? check stock storage arrangements - protected from dirt and damage?
9	extent of coverage	if membrane is incomplete, further inspection will be required - note areas completed / incomplete - is membrane fully visible or have internal walls been constructed over membrane / screed placed?
10	slab/membrane condition	record presence of debris / rough surfaces, in particular sharp projections, below or above membrane; record locations of all punctures or repairs, note arrangements to protect membrane surface from traffic / tools and equipment / materials, and temporary weighting down of membrane, e.g. use of boards - record evidence of footprints / tracks on membrane surface, creases or water/wind damage
11	laps and joints	check the all joints are lapped and sealed in accordance with manufacturer's requirements / specification, particularly where creases/folds are present (usually minimum 150mm laps with double-sided tape between sheets, and single-sided tape on top surface; note size of sheets and frequency of edge seals
12	damp-proof course	record DPC manufacturer and product code - usually integrated with the membrane; measure the DPC projection from external wall in mm; check laps and seals between membrane and DPC - note any potential stress points and tension between the two; check for damage to DPC
13	service entries and seals	note number, position and diameter of service entries - check top hat seal arrangements in accordance with design / specification (laps and seals between top hat and floor membrane, pipe upstand is usually a minimum 150mm) check, with jubilee clips to secure top hat seal to pipe - note presence of clips and tightness of connections

Gas Protection Validation Record

This plot has PASSED inspection.

An additional inspection visit IS NOT required for this plot.

SGP Staff:	S D Miller BSc MSc AMIEnvSc	Signed:		24.06.22
SGP Member:	D Wayland BSc MSc AssocCIWM MCIWEM C.WEM	Signed:		24.06.22

Gas Protection Validation Record



Plot 19: Membrane fully exposed and in good condition.



Plot 19: Airbricks installed were clear and free from any obstructions.



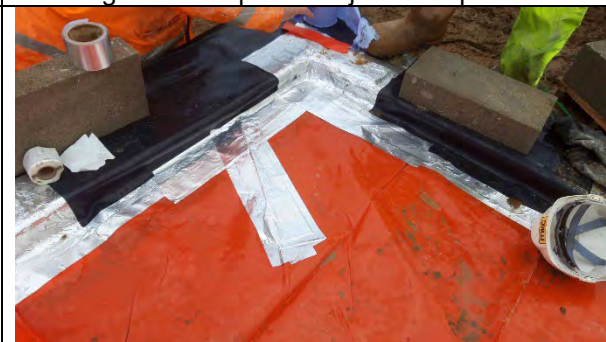
Plot 19: Service entries sealed with top hat, double and single sided tape and a jubilee clip



Plot 19: Overlap in membrane sheets >150mm and sealed with double and single sided tape



Plot 19: Good detail on cornering using proprietary detailing strip to reduce stress points; DPC taped to gas membrane extending to external wall.



Plot 19: Gap in membrane repaired with double and single sided tape.

Gas Protection Validation Record

job number	R2174	design source/ref:	BM-SD02-13-01	specification source/ref:	R2174-R07-v3	other documents attached	✖	
site name / location	Tetrosyl, Bury	building use:	residential	commercial	other (describe)			
plot number	9	building description:	no. of storeys =	2	detached	semi-detached	Terrace	apartment block
compiled by:	JR	gas protection type:	active / passive		foundation type:	suspended floor / raft / other		

Ventilated sub-floor (if present)	inspection date/time:	13.08.21	inspected by:	JR	photographed:	✓
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✓ / x notes (see overleaf)

void former type	x	1. N/A
height of void space	x	2. >150mm, not inspected, however building control minimum is confirmed by client and on design detail
gravel type	x	3. N/A (void clear)
pipe size and spacing	x	4. N/A
external wall airbricks	✓	5. Plot 9: 2 airbricks along the front, 2 to the rear, 2 on the left side and 4 on the right side (total 10); all clear and free from obstructions.
internal sleeper walls	x	6. not inspected
external vent trenches / ducts	x	7. N/A

Gas barrier	inspection date/time:	13.08.21	inspected by:	JR	photographed:	✓
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membrane type	✓	8. Radbar Amber 1 Gas Membrane
extent of coverage	✓	9. Full coverage, membrane checked throughout.
slab/membrane condition	✓	10. Membrane in good condition with minimal track marks; no tears or puncture marks noted.
laps and joints	✓	11. Laps all > 150mm and sealed using both double and single sided tape.
damp-proof course	✓	12. Visqueen Zedex CPT High Performance DPC (600mm) taped to gas membrane using double and single-sided tape and spans to external wall; gas membrane also underlies DPC to external wall providing 100% coverage to building footprint.
service entries and seals	✓	13. 5 service entries on plot 9. All service entries sealed with proprietary double/single sided tape and tightened jubilee clip.

Gas Protection Validation Record

Guide notes:

1	void former type	proprietary type - manufacturer and specification, in accordance with design?, installed properly without damage?
2	height of void space	height of proprietary former or constructed ventilation space below suspended floor - note any debris on void / obstructions to air flow, note formation surface soil type (e.g. crushed concrete/brick), any evidence of flooding
3	gravel type	gravel type, if used (limestone / granite etc.) and any specification (e.g. 6F2), typical particle dimensions (mm), apparent fines content (low/high), compaction (loose/dense), waterlogging / contamination by clay, organic matter, other debris
4	pipe size and spacing	diameter in mm; material type (e.g. PVC); slotted or perforated; positioning and spacing / separation and jointing as on design drawing - if not sketch arrangement - do pipes connect with external (telescopic / swan-neck) vents?
5	external wall airbricks	check numbers, size and positions as design drawing (if not shown, make sketch; check for blockage, e.g. by mortar, or soil / pavings etc.
6	internal sleeper walls	check for ventilation holes - e.g. honeycomb brickwork or pipe crossings - note size, spacing and location - in accordance with design?
7	external vent trenches / ducts	check whether located and constructed in accordance with design drawings; if open-topped gravel, note gravel type and presence of fines / contamination; if pipe or other vents - check positions and construction for functionality and absence of blockages - vents may be built over
8	membrane type	note manufacturer and product specification, including batch / roll numbers if present - in accordance with specification? check stock storage arrangements - protected from dirt and damage?
9	extent of coverage	if membrane is incomplete, further inspection will be required - note areas completed / incomplete - is membrane fully visible or have internal walls been constructed over membrane / screed placed?
10	slab/membrane condition	record presence of debris / rough surfaces, in particular sharp projections, below or above membrane; record locations of all punctures or repairs, note arrangements to protect membrane surface from traffic / tools and equipment / materials, and temporary weighting down of membrane, e.g. use of boards - record evidence of footprints / tracks on membrane surface, creases or water/wind damage
11	laps and joints	check the all joints are lapped and sealed in accordance with manufacturer's requirements / specification, particularly where creases/folds are present (usually minimum 150mm laps with double-sided tape between sheets, and single-sided tape on top surface; note size of sheets and frequency of edge seals
12	damp-proof course	record DPC manufacturer and product code - usually integrated with the membrane; measure the DPC projection from external wall in mm; check laps and seals between membrane and DPC - note any potential stress points and tension between the two; check for damage to DPC
13	service entries and seals	note number, position and diameter of service entries - check top hat seal arrangements in accordance with design / specification (laps and seals between top hat and floor membrane, pipe upstand is usually a minimum 150mm) check, with jubilee clips to secure top hat seal to pipe - note presence of clips and tightness of connections

Gas Protection Validation Record

This plot has PASSED inspection.

An additional inspection visit IS NOT required for this plot.

SGP Staff:	S D Miller BSc MCIWEM	Signed:		24.06.22
SGP Member:	D Wayland BSc MSc AssocCIWM MCIWEM C.WEM	Signed:		24.06.22

Gas Protection Validation Record



Plot 9: Membrane fully exposed and in good condition.



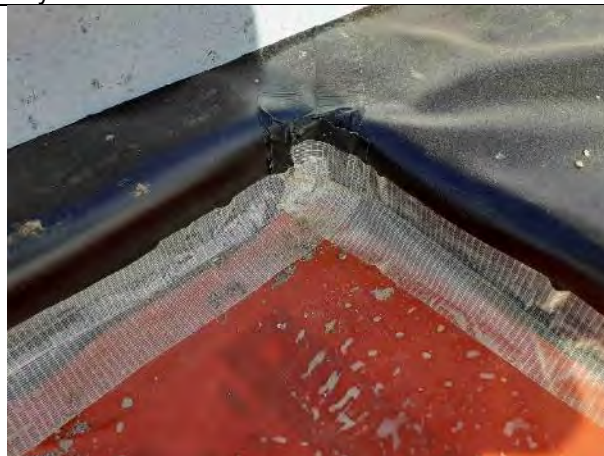
Plot 9: Airbricks installed were clear and free from any obstructions.



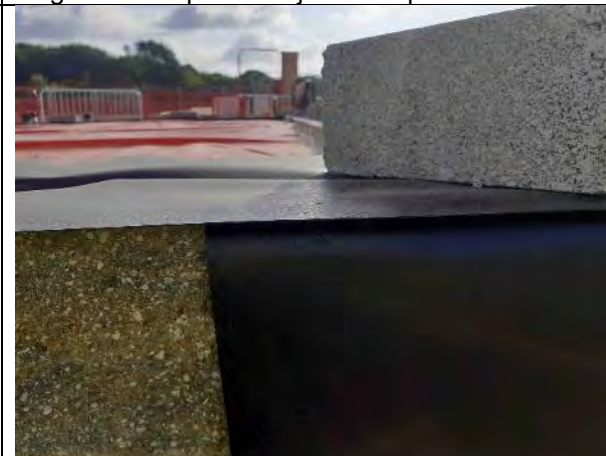
Plot 9: Service entry sealed with top hat, double and single sided tape and a jubilee clip



Plot 9: Overlap in membrane sheets >150mm and sealed with double and single sided tape



Plot 9: Good detail on cornering using proprietary detailing strip to reduce stress points.



Plot 9: Membrane extends across outer wall

Gas Protection Validation Record

job number	R2174	design source/ref:	BM-SD02-13-01	specification source/ref:	R2174-R07-v3	other documents attached	✖	
site name / location	Tetrosyl, Bury	building use:	residential	commercial	other (describe)			
plot number	12	building description:	no. of storeys =	2	detached	semi-detached	Terrace	apartment block
compiled by:	MJ	gas protection type:	active / passive		foundation type:	suspended floor / raft / other		

Ventilated sub-floor (if present)	inspection date/time:	16.09.21	inspected by:	MJ	photographed:	✓
✓ / ✗ notes (see overleaf)						

void former type	✗	1. N/A
height of void space	✗	2. >150mm, not inspected, however building control minimum is confirmed by client and on design detail
gravel type	✗	3. N/A (void clear)
pipe size and spacing	✗	4. N/A
external wall airbricks	✓	5. Plot 12: 2 airbricks along the front, 5 to the rear, 2 on the left side and 6 on the right side (total 15); all clear and free from obstructions.
internal sleeper walls	✗	6. not inspected
external vent trenches / ducts	✗	7. N/A

Gas barrier	inspection date/time:	16.09.21	inspected by:	MJ	photographed:	✓
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membrane type	✓	8. Radbar Amber 1 Gas Membrane
extent of coverage	✓	9. Full coverage, membranes checked throughout.
slab/membrane condition	✓	10. Membrane in good condition with minimal track marks; no tears or puncture marks noted.
laps and joints	✓	11. Laps all > 150mm and sealed using both double and single sided tape.
damp-proof course	✓	12. Visqueen Zedex CPT High Performance DPC (600mm) taped to gas membrane using double and single-sided tape and spans to external wall; gas membrane also underlies DPC to external wall providing 100% coverage to building footprint.
service entries and seals	✓	13. 6 service entries on plot 12. All service entries sealed with a preformed 'tophat', proprietary double/single sided tape, and tightened jubilee clip.

Gas Protection Validation Record

Guide notes:

1	void former type	proprietary type - manufacturer and specification, in accordance with design?, installed properly without damage?
2	height of void space	height of proprietary former or constructed ventilation space below suspended floor - note any debris on void / obstructions to air flow, note formation surface soil type (e.g. crushed concrete/brick), any evidence of flooding
3	gravel type	gravel type, if used (limestone / granite etc.) and any specification (e.g. 6F2), typical particle dimensions (mm), apparent fines content (low/high), compaction (loose/dense), waterlogging / contamination by clay, organic matter, other debris
4	pipe size and spacing	diameter in mm; material type (e.g. PVC); slotted or perforated; positioning and spacing / separation and jointing as on design drawing - if not sketch arrangement - do pipes connect with external (telescopic / swan-neck) vents?
5	external wall airbricks	check numbers, size and positions as design drawing (if not shown, make sketch; check for blockage, e.g. by mortar, or soil / pavings etc.
6	internal sleeper walls	check for ventilation holes - e.g. honeycomb brickwork or pipe crossings - note size, spacing and location - in accordance with design?
7	external vent trenches / ducts	check whether located and constructed in accordance with design drawings; if open-topped gravel, note gravel type and presence of fines / contamination; if pipe or other vents - check positions and construction for functionality and absence of blockages - vents may be built over
8	membrane type	note manufacturer and product specification, including batch / roll numbers if present - in accordance with specification? check stock storage arrangements - protected from dirt and damage?
9	extent of coverage	if membrane is incomplete, further inspection will be required - note areas completed / incomplete - is membrane fully visible or have internal walls been constructed over membrane / screed placed?
10	slab/membrane condition	record presence of debris / rough surfaces, in particular sharp projections, below or above membrane; record locations of all punctures or repairs, note arrangements to protect membrane surface from traffic / tools and equipment / materials, and temporary weighting down of membrane, e.g. use of boards - record evidence of footprints / tracks on membrane surface, creases or water/wind damage
11	laps and joints	check the all joints are lapped and sealed in accordance with manufacturer's requirements / specification, particularly where creases/folds are present (usually minimum 150mm laps with double-sided tape between sheets, and single-sided tape on top surface; note size of sheets and frequency of edge seals
12	damp-proof course	record DPC manufacturer and product code - usually integrated with the membrane; measure the DPC projection from external wall in mm; check laps and seals between membrane and DPC - note any potential stress points and tension between the two; check for damage to DPC
13	service entries and seals	note number, position and diameter of service entries - check top hat seal arrangements in accordance with design / specification (laps and seals between top hat and floor membrane, pipe upstand is usually a minimum 150mm) check, with jubilee clips to secure top hat seal to pipe - note presence of clips and tightness of connections

Gas Protection Validation Record

This plot has PASSED inspection.

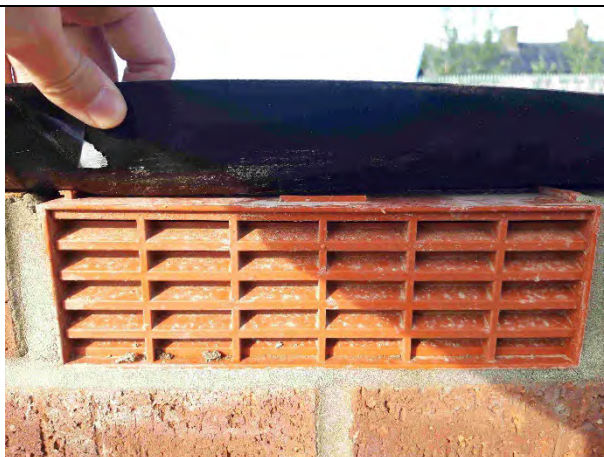
An additional inspection visit IS NOT required for this plot.

SGP Staff:	S D Miller BSc MCIWEM	Signed:		24.06.22
SGP Member:	D Wayland BSc MSc AssocCIWM MCIWEM C.WEM	Signed:		24.06.22

Gas Protection Validation Record



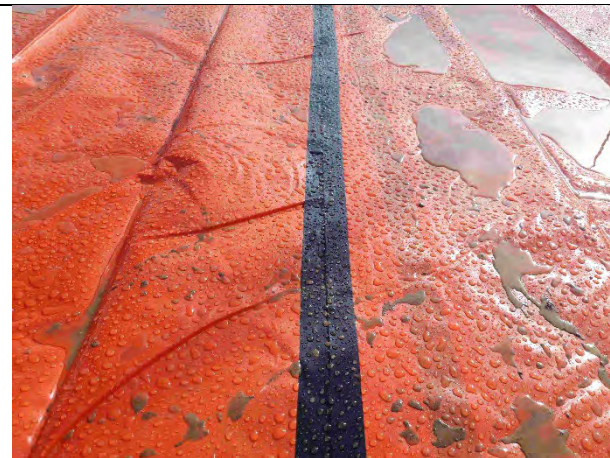
Plot 12: Membrane fully exposed and in good condition.



Plot 12: Airbricks installed were clear and free from any obstructions.



Plot 12: Service entry sealed with top hat, double and single sided tape and a jubilee clip



Plot 12: Overlap in membrane sheets >150mm and sealed with double and single sided tape



Plot 12: Good detail on cornering using proprietary detailing strip to reduce stress points.



Plot 12: Membrane extends across outer wall

Gas Protection Validation Record

job number	R2174	design source/ref:	BM-SD02-13-01	specification source/ref:	R2174-R07-v3	other documents attached	*	
site name / location	Tetrosyl, Bury	building use:	residential	commercial	other (describe)			
plot number	15	building description:	no. of storeys =	2	detached	semi-detached	Terrace	apartment block
compiled by:	MJ	gas protection type:	active / passive		foundation type:	suspended floor		/raft/other

Ventilated sub-floor (if present)	inspection date/time:	06.10.21	inspected by:	MJ	photographed:	✓
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✓ / ✗ notes (see overleaf)

void former type	✗	1. N/A
height of void space	✗	2. >150mm, not inspected, however building control minimum is confirmed by client and on design detail
gravel type	✗	3. N/A (void clear)
pipe size and spacing	✗	4. N/A
external wall airbricks	✓	5. Plot 15: 2 airbricks along the front, 2 to the rear, 2 on the left side and 4 on the right side (total 10); all clear and free from obstructions.
internal sleeper walls	✗	6. not inspected
external vent trenches / ducts	✗	7. N/A

Gas barrier	inspection date/time:	06.10.21	inspected by:	MJ	photographed:	✓
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membrane type	✓	8. Radbar Amber 1 Gas Membrane
extent of coverage	✓	9. Full coverage, membranes checked throughout.
slab/membrane condition	✓	10. Membrane in good condition with minimal track marks; 2 repaired punctures were noted.
laps and joints	✓	11. Laps all > 150mm and sealed using both double and single sided tape.
damp-proof course	✓	12. Visqueen Zedex CPT High Performance DPC (600mm) taped to gas membrane using double and single-sided tape and spans to external wall; gas membrane also underlies DPC to external wall providing 100% coverage to building footprint.
service entries and seals	✓	13. 6 service entries on plot 15. All service entries sealed with a preformed 'tophat', proprietary double/single sided tape, and tightened jubilee clip.

Gas Protection Validation Record

Guide notes:

1	void former type	proprietary type - manufacturer and specification, in accordance with design?, installed properly without damage?
2	height of void space	height of proprietary former or constructed ventilation space below suspended floor - note any debris on void / obstructions to air flow, note formation surface soil type (e.g. crushed concrete/brick), any evidence of flooding
3	gravel type	gravel type, if used (limestone / granite etc.) and any specification (e.g. 6F2), typical particle dimensions (mm), apparent fines content (low/high), compaction (loose/dense), waterlogging / contamination by clay, organic matter, other debris
4	pipe size and spacing	diameter in mm; material type (e.g. PVC); slotted or perforated; positioning and spacing / separation and jointing as on design drawing - if not sketch arrangement - do pipes connect with external (telescopic / swan-neck) vents?
5	external wall airbricks	check numbers, size and positions as design drawing (if not shown, make sketch; check for blockage, e.g. by mortar, or soil / pavings etc.
6	internal sleeper walls	check for ventilation holes - e.g. honeycomb brickwork or pipe crossings - note size, spacing and location - in accordance with design?
7	external vent trenches / ducts	check whether located and constructed in accordance with design drawings; if open-topped gravel, note gravel type and presence of fines / contamination; if pipe or other vents - check positions and construction for functionality and absence of blockages - vents may be built over
8	membrane type	note manufacturer and product specification, including batch / roll numbers if present - in accordance with specification? check stock storage arrangements - protected from dirt and damage?
9	extent of coverage	if membrane is incomplete, further inspection will be required - note areas completed / incomplete - is membrane fully visible or have internal walls been constructed over membrane / screed placed?
10	slab/membrane condition	record presence of debris / rough surfaces, in particular sharp projections, below or above membrane; record locations of all punctures or repairs, note arrangements to protect membrane surface from traffic / tools and equipment / materials, and temporary weighting down of membrane, e.g. use of boards - record evidence of footprints / tracks on membrane surface, creases or water/wind damage
11	laps and joints	check the all joints are lapped and sealed in accordance with manufacturer's requirements / specification, particularly where creases/folds are present (usually minimum 150mm laps with double-sided tape between sheets, and single-sided tape on top surface; note size of sheets and frequency of edge seals
12	damp-proof course	record DPC manufacturer and product code - usually integrated with the membrane; measure the DPC projection from external wall in mm; check laps and seals between membrane and DPC - note any potential stress points and tension between the two; check for damage to DPC
13	service entries and seals	note number, position and diameter of service entries - check top hat seal arrangements in accordance with design / specification (laps and seals between top hat and floor membrane, pipe upstand is usually a minimum 150mm) check, with jubilee clips to secure top hat seal to pipe - note presence of clips and tightness of connections

Gas Protection Validation Record

This plot has PASSED inspection.

An additional inspection visit IS NOT required for this plot.

SGP Staff:	M K Jones BSc MSc AMIEnvSc	Signed:		24.06.22
SGP Member:	D Wayland BSc MSc AssocCIWM MCIWEM C.WEM	Signed:		24.06.22

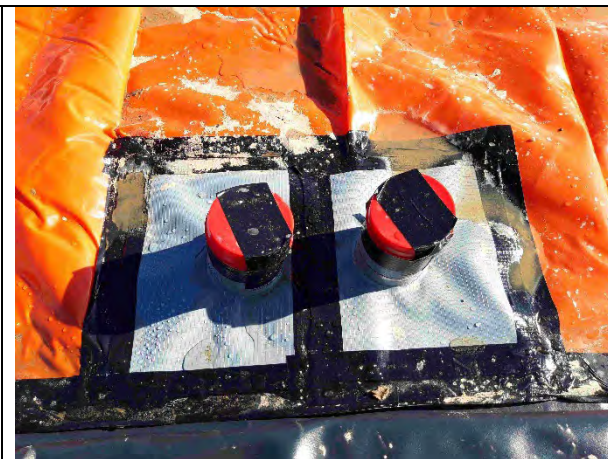
Gas Protection Validation Record



Plot 15: Membrane fully exposed and in good condition.



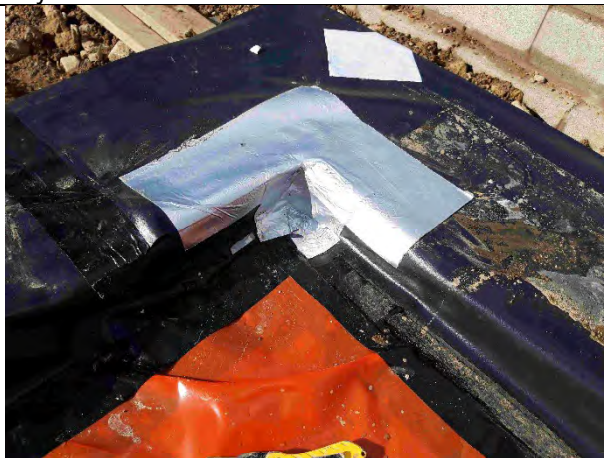
Plot 15: Airbricks installed were clear and free from any obstructions.



Plot 15: Service entry sealed with top hat, double and single sided tape and a jubilee clip



Plot 15: Overlap in membrane sheets >150mm and sealed with double and single sided tape



Plot 15: Good detail on cornering using proprietary detailing strip to reduce stress points.



Plot 15: Patch repaired with double sided tape and single sided tape

Gas Protection Validation Record

job number	R2174	design source/ref:	BM-SD02-13-01	specification source/ref:	R2174-R07-v3	other documents attached	✕	
site name / location	Tetrosyl, Bury	building use:	residential	commercial	other (describe)			
plot number	1 + 5	building description:	no. of storeys =	2	detached	semi-detached	Terrace	apartment block
compiled by:	MJ	gas protection type:	active / passive		foundation type:	suspended floor / raft / other		

Ventilated sub-floor (if present)		inspection date/time:	18.06.21	inspected by:	MJ	photographed:	✓
void former type	✕	1. N/A					
height of void space	✕	2. >150mm, not inspected, however building control minimum is confirmed by client and on design detail					
gravel type	✕	3. N/A (void clear)					
pipe size and spacing	✕	4. N/A					
external wall airbricks	✓	5. Plot 1: 3 airbricks along the front, 5 to the rear, 2 on the left side and 7 on the right side (total 17); Plot 5: 5 airbricks along the front, 5 to the rear, and 3 on the left side (total 13); all clear and free from obstructions.					
internal sleeper walls	✕	6. not inspected					
external vent trenches / ducts	✕	7. N/A					
Gas barrier		inspection date/time:	18.06.21	inspected by:	MJ	photographed:	✓
membrane type	✓	8. Radbar Amber 1 Gas Membrane					
extent of coverage	✓	9. Full coverage, membranes checked throughout.					
slab/membrane condition	✓	10. Membrane in good condition with minimal track marks; no tears or puncture marks noted.					
laps and joints	✓	11. Laps all > 150mm and sealed using both double and single sided tape.					
damp-proof course	✓	12. Membrane observed to span internal and external walls providing 100% coverage to building footprint. Installers confirmed subsequent installation of Visqueen Zedex CPT High Performance DPC (600mm) around perimeter of dwellings spanning internal and external walls using double and single-sided tape to attach to underlying gas membrane.					
service entries and seals	✓	13. 5/6 service entries on plots 1 and 5. All service entries sealed with proprietary double/single sided tape and tightened jubilee clip.					

Gas Protection Validation Record

Guide notes:

1	void former type	proprietary type - manufacturer and specification, in accordance with design?, installed properly without damage?
2	height of void space	height of proprietary former or constructed ventilation space below suspended floor - note any debris on void / obstructions to air flow, note formation surface soil type (e.g. crushed concrete/brick), any evidence of flooding
3	gravel type	gravel type, if used (limestone / granite etc.) and any specification (e.g. 6F2), typical particle dimensions (mm), apparent fines content (low/high), compaction (loose/dense), waterlogging / contamination by clay, organic matter, other debris
4	pipe size and spacing	diameter in mm; material type (e.g. PVC); slotted or perforated; positioning and spacing / separation and jointing as on design drawing - if not sketch arrangement - do pipes connect with external (telescopic / swan-neck) vents?
5	external wall airbricks	check numbers, size and positions as design drawing (if not shown, make sketch; check for blockage, e.g. by mortar, or soil / pavings etc.
6	internal sleeper walls	check for ventilation holes - e.g. honeycomb brickwork or pipe crossings - note size, spacing and location - in accordance with design?
7	external vent trenches / ducts	check whether located and constructed in accordance with design drawings; if open-topped gravel, note gravel type and presence of fines / contamination; if pipe or other vents - check positions and construction for functionality and absence of blockages - vents may be built over
8	membrane type	note manufacturer and product specification, including batch / roll numbers if present - in accordance with specification? check stock storage arrangements - protected from dirt and damage?
9	extent of coverage	if membrane is incomplete, further inspection will be required - note areas completed / incomplete - is membrane fully visible or have internal walls been constructed over membrane / screed placed?
10	slab/membrane condition	record presence of debris / rough surfaces, in particular sharp projections, below or above membrane; record locations of all punctures or repairs, note arrangements to protect membrane surface from traffic / tools and equipment / materials, and temporary weighting down of membrane, e.g. use of boards - record evidence of footprints / tracks on membrane surface, creases or water/wind damage
11	laps and joints	check the all joints are lapped and sealed in accordance with manufacturer's requirements / specification, particularly where creases/folds are present (usually minimum 150mm laps with double-sided tape between sheets, and single-sided tape on top surface; note size of sheets and frequency of edge seals
12	damp-proof course	record DPC manufacturer and product code - usually integrated with the membrane; measure the DPC projection from external wall in mm; check laps and seals between membrane and DPC - note any potential stress points and tension between the two; check for damage to DPC
13	service entries and seals	note number, position and diameter of service entries - check top hat seal arrangements in accordance with design / specification (laps and seals between top hat and floor membrane, pipe upstand is usually a minimum 150mm) check, with jubilee clips to secure top hat seal to pipe - note presence of clips and tightness of connections

Gas Protection Validation Record

This plot has PASSED inspection.

An additional inspection visit IS NOT required for this plot.

SGP Staff:	S D Miller BSc MCIWEM	Signed:		24.06.22
SGP Member:	D Wayland BSc MSc AssocCIWM MCIWEM C.WEM	Signed:		24.06.22

Gas Protection Validation Record



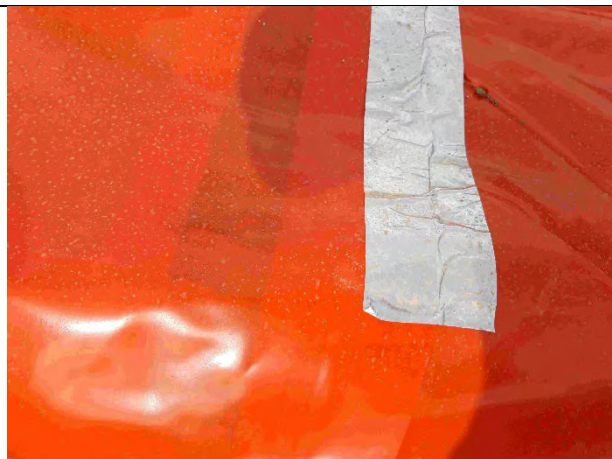
Plot 1: Membrane fully exposed and in good condition.



Plot 1: Airbricks installed were clear and free from any obstructions.



Plot 1: Service entry sealed with top hat, double and single sided tape and a jubilee clip



Plot 1: Overlap in membrane sheets >150mm and sealed with double and single sided tape.



Plot 1: Good detail on cornering using proprietary detailing strip to reduce stress points.



Plot 5: Membrane extends across outer wall

Gas Protection Validation Record



Plot 5: Membrane fully exposed and in good condition.



Plot 5: Airbricks installed were clear and free from any obstructions.



Plot 5: Service entry sealed with top hat, double and single sided tape and a jubilee clip.



Plot 5: Overlap in membrane sheets >150mm and sealed with double and single sided tape.



Plot 5: Good detail on cornering using proprietary detailing strip to reduce stress points.



Plot 5: Membrane extends across outer wall

Gas Protection Validation Record

job number	R2174	design source/ref:	BM-SD02-13-01	specification source/ref:	R2174-R07-v3	other documents attached	✕
site name / location	Tetrosyl, Bury	building use:	residential	commercial	other (describe)		
plot number	1, 2, 3 & 4	building description:	no. of storeys =	2	detached	semi-detached	Terrace apartment block
compiled by:	BJT	gas protection type:	active / passive	foundation type:	suspended floor	raft / other	

Ventilated sub-floor (if present)	inspection date/time:	05.07.2021	inspected by:	BJT	photographed:	✓
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void former type	✘	1. N/A					
height of void space	✘	2. >150mm, not inspected, however building control minimum is confirmed by client and on design detail					
gravel type	✘	3. N/A (void clear)					
pipe size and spacing	✘	4. N/A					
external wall airbricks	✓	5. Plot 2 & 3: 2 airbricks along the front, 3 to the rear, 2 Plot 4: 5 airbricks along the front, 5 to the rear: all clear and free from obstructions.					
internal sleeper walls	✘	6. not inspected					
external vent trenches / ducts	✘	7. N/A					
Gas barrier		inspection date/time:	05.07.2021	inspected by:	BJT	photographed:	✓

membrane type	✓	8. Radbar Amber 1 Gas Membrane
extent of coverage	✓	9. Full coverage, membranes checked throughout.
slab/membrane condition	✓	10. Membrane in good condition with minimal track marks; no tears or puncture marks noted. Two holes in Plot 4 had been patched with sheets of membrane jointed with double and single sided tape
laps and joints	✓	11. Laps all > 150mm and sealed using both double and single sided tape (single sided mix of proprietary silver tape and wide electrical type tape - effectively taping down of lapped joint with proprietary double sided butyl tape visible through membrane providing deal..
damp-proof course	✓	12. Visqueen Zedex CPT High Performance DPC (600mm) taped to gas membrane using double and single-sided tape and spans to external wall; gas membrane also underlies DPC to external wall providing 100% coverage to building footprint.
service entries and seals	✓	13. 6 service entries on plot 2 , 5 each on Plots 3 & 4 and 5. All service entries sealed with proprietary double/single sided tape and tightened jubilee clip forming effective seal against service pipes.

Gas Protection Validation Record

Guide notes:

1	void former type	proprietary type - manufacturer and specification, in accordance with design?, installed properly without damage?
2	height of void space	height of proprietary former or constructed ventilation space below suspended floor - note any debris on void / obstructions to air flow, note formation surface soil type (e.g. crushed concrete/brick), any evidence of flooding
3	gravel type	gravel type, if used (limestone / granite etc.) and any specification (e.g. 6F2), typical particle dimensions (mm), apparent fines content (low/high), compaction (loose/dense), waterlogging / contamination by clay, organic matter, other debris
4	pipe size and spacing	diameter in mm; material type (e.g. PVC); slotted or perforated; positioning and spacing / separation and jointing as on design drawing - if not sketch arrangement - do pipes connect with external (telescopic / swan-neck) vents?
5	external wall airbricks	check numbers, size and positions as design drawing (if not shown, make sketch; check for blockage, e.g. by mortar, or soil / pavings etc.
6	internal sleeper walls	check for ventilation holes - e.g. honeycomb brickwork or pipe crossings - note size, spacing and location - in accordance with design?
7	external vent trenches / ducts	check whether located and constructed in accordance with design drawings; if open-topped gravel, note gravel type and presence of fines / contamination; if pipe or other vents - check positions and construction for functionality and absence of blockages - vents may be built over
8	membrane type	note manufacturer and product specification, including batch / roll numbers if present - in accordance with specification? check stock storage arrangements - protected from dirt and damage?
9	extent of coverage	if membrane is incomplete, further inspection will be required - note areas completed / incomplete - is membrane fully visible or have internal walls been constructed over membrane / screed placed?
10	slab/membrane condition	record presence of debris / rough surfaces, in particular sharp projections, below or above membrane; record locations of all punctures or repairs, note arrangements to protect membrane surface from traffic / tools and equipment / materials, and temporary weighting down of membrane, e.g. use of boards - record evidence of footprints / tracks on membrane surface, creases or water/wind damage
11	laps and joints	check the all joints are lapped and sealed in accordance with manufacturer's requirements / specification, particularly where creases/folds are present (usually minimum 150mm laps with double-sided tape between sheets, and single-sided tape on top surface; note size of sheets and frequency of edge seals
12	damp-proof course	record DPC manufacturer and product code - usually integrated with the membrane; measure the DPC projection from external wall in mm; check laps and seals between membrane and DPC - note any potential stress points and tension between the two; check for damage to DPC
13	service entries and seals	note number, position and diameter of service entries - check top hat seal arrangements in accordance with design / specification (laps and seals between top hat and floor membrane, pipe upstand is usually a minimum 150mm) check, with jubilee clips to secure top hat seal to pipe - note presence of clips and tightness of connections

Gas Protection Validation Record

This plot has PASSED inspection.

An additional inspection visit IS NOT required for this plot.

SGP Staff:	S D Miller BSc MCIWEM	Signed:		24.06.22
SGP Member:	D Wayland BSc MSc AssocCIWM MCIWEM C.WEM	Signed:		24.06.22

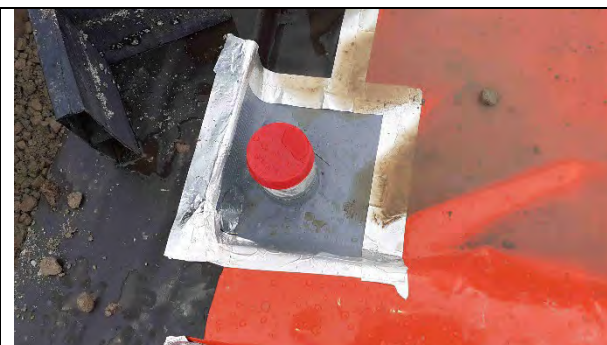
Gas Protection Validation Record



Plot 2: Membrane fully exposed and in good condition.



Plot 2: Airbricks installed were clear and free from any obstructions. Membrane extends across outer wall



Plot 2: Service entry sealed with top hat, double and single sided tape and a jubilee clip



Plot 2: Overlap in membrane sheets to Gas resistant DPC >150mm and sealed with double and single sided tape.



Plot 2: Good detail on cornering using proprietary detailing strip to reduce stress points.



Good detail on cornering in integral; garage using proprietary detailing strip to reduce stress points.

Gas Protection Validation Record



Plot 3: Membrane fully exposed except across cavity wall, despite some traffic marks and standing water is generally in good condition. Airbricks visible to front elevation



Plot 3: corner detail from folding DPC, some standing water no holes visible in joints



Plot 3 Service entry sealed with top hat, double and single sided tape and a jubilee clip.



Plot 4: Proprietary double sided buytul tape and pre-formed "top Hat" service entries used throughout



Plot 3: membrane joints with combination double sided tape minimum 150mm lap to single sided tape



Plot 3 & 4 membrane runs under DPC spanning Cavity wall – this section is a single sheet with no joint to DPC

Gas Protection Validation Record



Plot 4: Membrane fully exposed except across cavity wall, despite some traffic marks and standing water is generally in good condition. Airbricks visible to front elevation



Plot 4: 2 patches to repair tears combination of membrane patch and double and single sided tape used.



Plot 4: corner detail from folding DPC, some standing water no holes visible in joints

Gas Protection Validation Record

job number	R2174	design source/ref:	BM-SD02-13-01	specification source/ref:	R2174-R07-v3	other documents attached	✖	
site name / location	Tetrosyl, Bury	building use:	residential	commercial	other (describe)			
plot number	6, 7 and 8	building description:	no. of storeys =	2	detached	semi-detached	Terrace	apartment block
compiled by:	CS	gas protection type:	active / passive		foundation type:	suspended floor / raft / other		

Ventilated sub-floor (if present)	inspection date/time:	19.07.2021	inspected by:	CS	photographed:	✓
✓ / ✗	notes (see overleaf)					

void former type	✘	1. N/A					
height of void space	✘	2. >150mm, not inspected, however building control minimum is confirmed by client and on design detail					
gravel type	✘	3. N/A (void clear)					
pipe size and spacing	✘	4. N/A					
external wall airbricks	✓	5. Plot 6: 2 airbricks along the front, 1 to the rear, 3 to the side. Plot 7: 1 airbrick along the front, 2 to the rear: Plot 8. 3 airbricks along the front, 3 airbricks to the rear, 3 airbricks to the side. All clear and free from obstructions.					
internal sleeper walls	✘	6. not inspected					
external vent trenches / ducts	✘	7. N/A					
Gas barrier		inspection date/time:	19.07.2021	inspected by:	CS	photographed:	✓

membrane type	✓	8. Radbar Amber 1 Gas Membrane
extent of coverage	✓	9. Full coverage, membranes checked throughout.
slab/membrane condition	✓	10. Membrane in good condition with minimal track marks; no tears or puncture marks noted.
laps and joints	✓	11. Laps all > 150mm and sealed using both double and single sided tape.
damp-proof course	✓	12. Visqueen Zedex CPT High Performance DPC (600mm) taped to gas membrane using double and single-sided tape and spans to external wall; gas membrane also underlies DPC to external wall providing 100% coverage to building footprint.
service entries and seals	✓	13. 4 service entries on plot 6, 7 entries on plot 7, 7 entries on plot 8. All service entries sealed with proprietary double/single sided tape and tightened jubilee clip forming effective seal against service pipes.

Gas Protection Validation Record

Guide notes:

1	void former type	proprietary type - manufacturer and specification, in accordance with design?, installed properly without damage?
2	height of void space	height of proprietary former or constructed ventilation space below suspended floor - note any debris on void / obstructions to air flow, note formation surface soil type (e.g. crushed concrete/brick), any evidence of flooding
3	gravel type	gravel type, if used (limestone / granite etc.) and any specification (e.g. 6F2), typical particle dimensions (mm), apparent fines content (low/high), compaction (loose/dense), waterlogging / contamination by clay, organic matter, other debris
4	pipe size and spacing	diameter in mm; material type (e.g. PVC); slotted or perforated; positioning and spacing / separation and jointing as on design drawing - if not sketch arrangement - do pipes connect with external (telescopic / swan-neck) vents?
5	external wall airbricks	check numbers, size and positions as design drawing (if not shown, make sketch; check for blockage, e.g. by mortar, or soil / pavings etc.
6	internal sleeper walls	check for ventilation holes - e.g. honeycomb brickwork or pipe crossings - note size, spacing and location - in accordance with design?
7	external vent trenches / ducts	check whether located and constructed in accordance with design drawings; if open-topped gravel, note gravel type and presence of fines / contamination; if pipe or other vents - check positions and construction for functionality and absence of blockages - vents may be built over
8	membrane type	note manufacturer and product specification, including batch / roll numbers if present - in accordance with specification? check stock storage arrangements - protected from dirt and damage?
9	extent of coverage	if membrane is incomplete, further inspection will be required - note areas completed / incomplete - is membrane fully visible or have internal walls been constructed over membrane / screed placed?
10	slab/membrane condition	record presence of debris / rough surfaces, in particular sharp projections, below or above membrane; record locations of all punctures or repairs, note arrangements to protect membrane surface from traffic / tools and equipment / materials, and temporary weighting down of membrane, e.g. use of boards - record evidence of footprints / tracks on membrane surface, creases or water/wind damage
11	laps and joints	check the all joints are lapped and sealed in accordance with manufacturer's requirements / specification, particularly where creases/folds are present (usually minimum 150mm laps with double-sided tape between sheets, and single-sided tape on top surface; note size of sheets and frequency of edge seals
12	damp-proof course	record DPC manufacturer and product code - usually integrated with the membrane; measure the DPC projection from external wall in mm; check laps and seals between membrane and DPC - note any potential stress points and tension between the two; check for damage to DPC
13	service entries and seals	note number, position and diameter of service entries - check top hat seal arrangements in accordance with design / specification (laps and seals between top hat and floor membrane, pipe upstand is usually a minimum 150mm) check, with jubilee clips to secure top hat seal to pipe - note presence of clips and tightness of connections

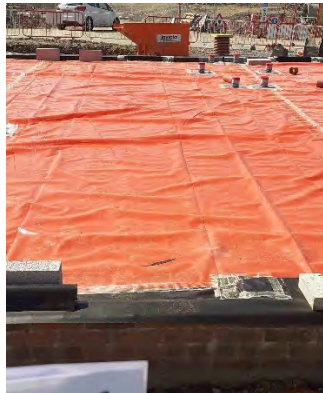
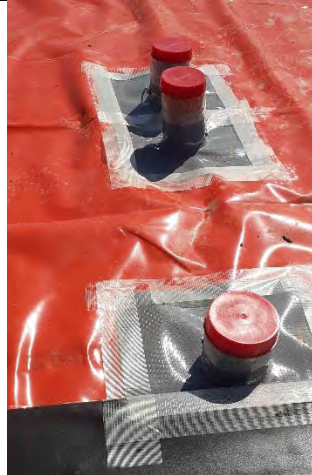
Gas Protection Validation Record

This plot has PASSED inspection.

An additional inspection visit IS NOT required for this plot.

SGP Staff:	S D Miller BSc MCIWEM	Signed:		24.06.22
SGP Member:	D Wayland BSc MSc AssocCIWM MCIWEM C.WEM	Signed:		24.06.22

Gas Protection Validation Record

 Plots 6, 7 and 8 – general view.	   General views plot 6, plot 7 plot 8
 Plot 6: Membrane fully exposed and in good condition.	 Plot 6: Airbricks installed were clear and free from any obstructions. Membrane extends across outer wall  Plot 6: Service entry sealed with top hat, double and single sided tape and a jubilee clip.

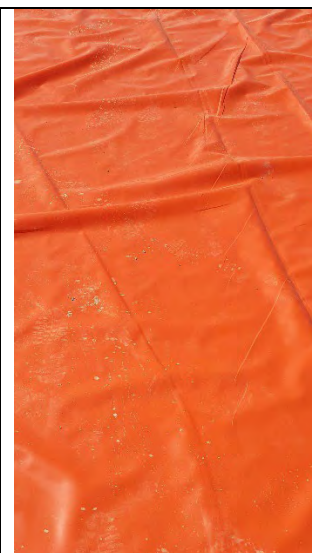
Gas Protection Validation Record



Plot 6: Detail on cornering using proprietary detailing strip to reduce stress points.

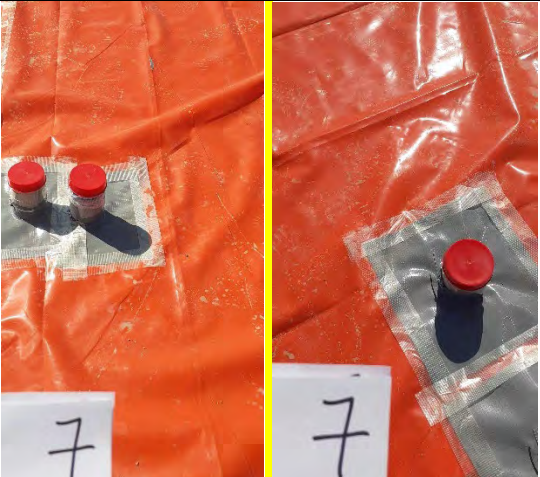
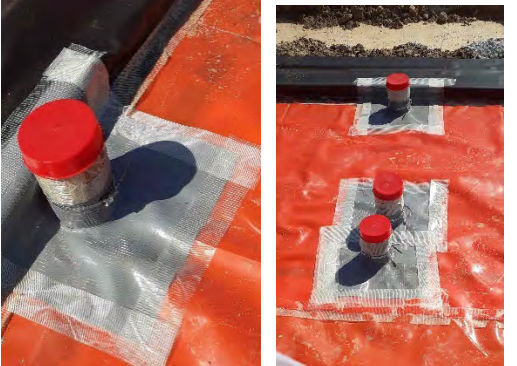


Plot 7: Airbricks installed were clear and free from any obstructions.



Plot 7: Membrane fully exposed and in good condition.

Gas Protection Validation Record

 Plot 7: Service entry sealed with top hat, double and single sided tape and a jubilee clip.	 Plot 7: corner detail from folding DPC, no holes visible in joints.	 Plot 8: Membrane fully exposed and in good condition.
 Plot 8: Service entry sealed with top hat, double and single sided tape and a jubilee clip.	 Plot 8: Airbricks installed were clear and free from any obstructions.	 Plot 8: corner detail from folding DPC, no holes visible in joints.

Gas Protection Validation Record

job number	R2174	design source/ref:	BM-SD02-13-01	specification source/ref:	R2174-R07-v3	other documents attached	✖	
site name / location	Tetrosyl, Bury	building use:	residential	commercial	other (describe)			
plot number	10-11	building description:	no. of storeys =	2	detached	semi-detached	Terrace	apartment block
compiled by:	JR	gas protection type:	active / passive		foundation type:	suspended floor / raft / other		

Ventilated sub-floor (if present)	inspection date/time:	26.08.21	inspected by:	JR	photographed:	✓
✓ / ✗	notes (see overleaf)					

void former type	✗	1. N/A
height of void space	✗	2. >150mm, not inspected, however building control minimum is confirmed by client and on design detail
gravel type	✗	3. N/A (void clear)
pipe size and spacing	✗	4. N/A
external wall airbricks	✓	5. Plot 10: 2 airbricks along the front, 2 to the rear, 6 on the left side (Total 10); Plot 11: 2 airbricks along the front, 2 to the rear, 6 on the right side (Total 10); all clear and free from obstructions.
internal sleeper walls	✗	6. not inspected
external vent trenches / ducts	✗	7. N/A

Gas barrier	inspection date/time:	26.08.21	inspected by:	JR	photographed:	✓
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membrane type	✓	8. Radbar Amber 1 Gas Membrane
extent of coverage	✓	9. Full coverage, membranes checked throughout.
slab/membrane condition	✓	10. Membrane in good condition with minimal track marks; no tears or puncture marks noted.
laps and joints	✓	11. Laps all > 150mm and sealed using both double and single sided tape.
damp-proof course	✓	12. Visqueen Zedex CPT High Performance DPC (600mm) taped to gas membrane using double and single-sided tape and spans to external wall; gas membrane also underlies DPC to external wall providing 100% coverage to building footprint.
service entries and seals	✓	13. 5 service entries on Plot 10. 5 service entries on Plot 11 All service entries sealed with proprietary double/single sided tape and tightened jubilee clip.

Gas Protection Validation Record

Guide notes:

1	void former type	proprietary type - manufacturer and specification, in accordance with design?, installed properly without damage?
2	height of void space	height of proprietary former or constructed ventilation space below suspended floor - note any debris on void / obstructions to air flow, note formation surface soil type (e.g. crushed concrete/brick), any evidence of flooding
3	gravel type	gravel type, if used (limestone / granite etc.) and any specification (e.g. 6F2), typical particle dimensions (mm), apparent fines content (low/high), compaction (loose/dense), waterlogging / contamination by clay, organic matter, other debris
4	pipe size and spacing	diameter in mm; material type (e.g. PVC); slotted or perforated; positioning and spacing / separation and jointing as on design drawing - if not sketch arrangement - do pipes connect with external (telescopic / swan-neck) vents?
5	external wall airbricks	check numbers, size and positions as design drawing (if not shown, make sketch; check for blockage, e.g. by mortar, or soil / pavings etc.
6	internal sleeper walls	check for ventilation holes - e.g. honeycomb brickwork or pipe crossings - note size, spacing and location - in accordance with design?
7	external vent trenches / ducts	check whether located and constructed in accordance with design drawings; if open-topped gravel, note gravel type and presence of fines / contamination; if pipe or other vents - check positions and construction for functionality and absence of blockages - vents may be built over
8	membrane type	note manufacturer and product specification, including batch / roll numbers if present - in accordance with specification? check stock storage arrangements - protected from dirt and damage?
9	extent of coverage	if membrane is incomplete, further inspection will be required - note areas completed / incomplete - is membrane fully visible or have internal walls been constructed over membrane / screed placed?
10	slab/membrane condition	record presence of debris / rough surfaces, in particular sharp projections, below or above membrane; record locations of all punctures or repairs, note arrangements to protect membrane surface from traffic / tools and equipment / materials, and temporary weighting down of membrane, e.g. use of boards - record evidence of footprints / tracks on membrane surface, creases or water/wind damage
11	laps and joints	check the all joints are lapped and sealed in accordance with manufacturer's requirements / specification, particularly where creases/folds are present (usually minimum 150mm laps with double-sided tape between sheets, and single-sided tape on top surface; note size of sheets and frequency of edge seals
12	damp-proof course	record DPC manufacturer and product code - usually integrated with the membrane; measure the DPC projection from external wall in mm; check laps and seals between membrane and DPC - note any potential stress points and tension between the two; check for damage to DPC
13	service entries and seals	note number, position and diameter of service entries - check top hat seal arrangements in accordance with design / specification (laps and seals between top hat and floor membrane, pipe upstand is usually a minimum 150mm) check, with jubilee clips to secure top hat seal to pipe - note presence of clips and tightness of connections

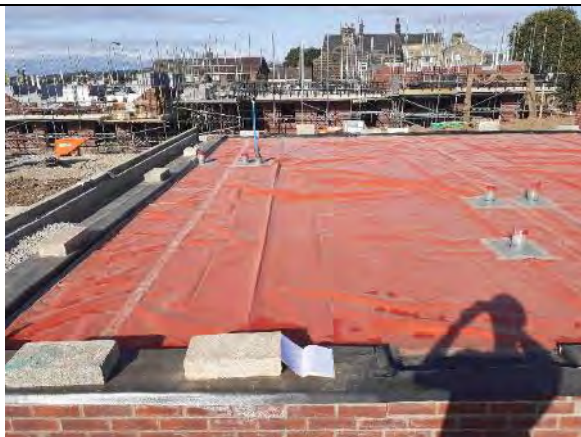
Gas Protection Validation Record

This plot has PASSED inspection.

An additional inspection visit IS NOT required for this plot.

SGP Staff:	S D Miller BSc MCIWEM	Signed:		24.06.22
SGP Member:	D Wayland BSc MSc AssocCIWM MCIWEM C.WEM	Signed:		24.06.22

Gas Protection Validation Record



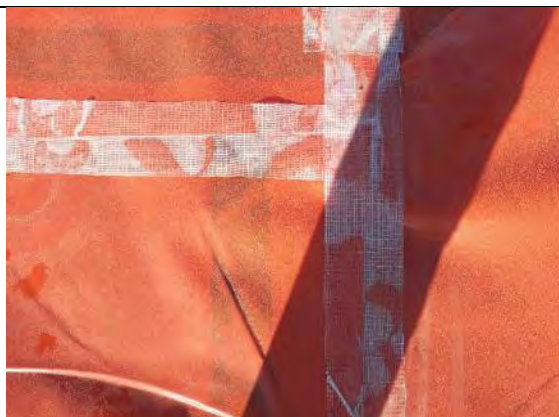
Plot 10: Membrane fully exposed and in good condition.



Plot 10: Airbricks installed were clear and free from any obstructions.



Plot 10: Service entry sealed with top hat, double and single sided tape and a jubilee clip



Plot 10: Overlap in membrane sheets >150mm and sealed with double and single sided tape



Plot 10: Good detail on cornering using proprietary detailing strip to reduce stress points.



Plot 10: DPC taped to membrane and extends across outer cavity wall

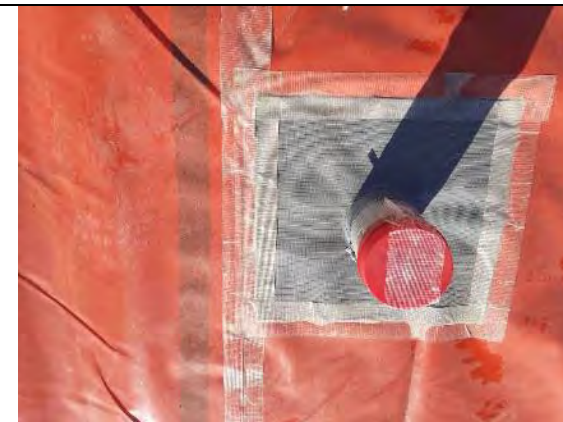
Gas Protection Validation Record



Plot 11: Membrane fully exposed and in good condition.



Plot 11: Airbricks installed were clear and free from any obstructions.



Plot 11: Service entry sealed with top hat, double and single sided tape and a jubilee clip



Plot 11: Overlap in membrane sheets >150mm and sealed with double and single sided tape. Service entry neatly sealed and tightened with jubilee clip.



Plot 11: Good detail on cornering using proprietary detailing strip to reduce stress points.



Plot 11: DPC taped to membrane and extends across outer cavity wall



G:\Jobs\R2174\Plots 143-146

Gas Protection Validation Record

job number	R2174	design source/ref:	BM-SD02-13-01	specification source/ref:	R2174-R07-v3	other documents attached	x
site name / location	Tetrosyl, Bury	building use:	residential	commercial	other (describe)		
plot number	143-146	building description:	no. of storeys =	2	detached	semi-detached	Terrace apartment block
compiled by:	JR	gas protection type:	active / passive	foundation type:	suspended floor	raft other	

Ventilated sub-floor (if present)	inspection date/time:	08.08.2021	inspected by:	JR	photographed:	✓
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✓ / x notes (see overleaf)

void former type	x	1. N/A
height of void space	x	2. >150mm, not inspected, however building control minimum is confirmed by client and on design detail
gravel type	x	3. N/A (void clear)
pipe size and spacing	x	4. N/A
external wall airbricks	✓	5. Plot 143 - 146: Plot 143; 3 airbricks along the front, 4 to the rear, 4 to the left side and 3 on the right side. Plot 144: 2 airbricks along the front, 2 to the rear and 3 on the left side. Plot 145: 2 airbricks along the front, 2 to the rear, 3 on the right side. Plot 146: 3 airbricks along the front, 3 to the rear, 4 to the left side and 4 on the right side: all clear and free from obstructions.
internal sleeper walls	x	6. not inspected
external vent trenches / ducts	x	7. N/A

Gas barrier	inspection date/time:	08.08.2021	inspected by:	JR	photographed:	✓
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membrane type	✓	8. Alderprufe HC Geomembrane
extent of coverage	✓	9. Full coverage, membranes checked throughout.
slab/membrane condition	✓	10. Membrane in good condition with minimal track marks. A single puncture mark was identified in Plot 146 was repaired with sheets of membrane jointed with double and single sided tape
laps and joints	✓	11. Laps all > 150mm and sealed using both double and single sided tape (single sided mix of proprietary silver tape and wide electrical type tape- effectively taping down lapped joint with proprietary double sided butyl tape visible through membrane.
damp-proof course	✓	12. Membrane spans internal and external wall providing 100% coverage to building footprint.



G:\Jobs\R2174\Plots 143-146

Gas Protection Validation Record

service entries and seals	✓	13. 6 service entries on Plot 143, 5 on Plot 144 on Plot 145 and 5 on Plot 146. All service entries sealed with proprietary double/single sided tape and tightened jubilee clip forming effective seal against service pipes.
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Guide notes:

1	void former type	proprietary type - manufacturer and specification, in accordance with design?, installed properly without damage?
2	height of void space	height of proprietary former or constructed ventilation space below suspended floor - note any debris on void / obstructions to air flow, note formation surface soil type (e.g. crushed concrete/brick), any evidence of flooding
3	gravel type	gravel type, if used (limestone / granite etc.) and any specification (e.g. 6F2), typical particle dimensions (mm), apparent fines content (low/high), compaction (loose/dense), waterlogging / contamination by clay, organic matter, other debris
4	pipe size and spacing	diameter in mm; material type (e.g. PVC); slotted or perforated; positioning and spacing / separation and jointing as on design drawing - if not sketch arrangement - do pipes connect with external (telescopic / swan-neck) vents?
5	external wall airbricks	check numbers, size and positions as design drawing (if not shown, make sketch; check for blockage, e.g. by mortar, or soil / pavings etc.
6	internal sleeper walls	check for ventilation holes - e.g. honeycomb brickwork or pipe crossings - note size, spacing and location - in accordance with design?
7	external vent trenches / ducts	check whether located and constructed in accordance with design drawings; if open-topped gravel, note gravel type and presence of fines / contamination; if pipe or other vents - check positions and construction for functionality and absence of blockages - vents may be built over
8	membrane type	note manufacturer and product specification, including batch / roll numbers if present - in accordance with specification? check stock storage arrangements - protected from dirt and damage?
9	extent of coverage	if membrane is incomplete, further inspection will be required - note areas completed / incomplete - is membrane fully visible or have internal walls been constructed over membrane / screed placed?
10	slab/membrane condition	record presence of debris / rough surfaces, in particular sharp projections, below or above membrane; record locations of all punctures or repairs, note arrangements to protect membrane surface from traffic / tools and equipment / materials, and temporary weighting down of membrane, e.g. use of boards - record evidence of footprints / tracks on membrane surface, creases or water/wind damage
11	laps and joints	check the all joints are lapped and sealed in accordance with manufacturer's requirements / specification, particularly where creases/folds are present (usually minimum 150mm laps with double-sided tape between sheets, and single-sided tape on top surface; note size of sheets and frequency of edge seals



G:\Jobs\R2174\Plots 143-146

Gas Protection Validation Record

12	damp-proof course	record DPC manufacturer and product code - usually integrated with the membrane; measure the DPC projection from external wall in mm; check laps and seals between membrane and DPC - note any potential stress points and tension between the two; check for damage to DPC
13	service entries and seals	note number, position and diameter of service entries - check top hat seal arrangements in accordance with design / specification (laps and seals between top hat and floor membrane, pipe upstand is usually a minimum 150mm) check, with jubilee clips to secure top hat seal to pipe - note presence of clips and tightness of connections

This plot has PASSED inspection.

An additional inspection visit IS NOT required for this plot.

SGP Staff:	J D Roberts	Signed:		23.08.21
SGP Member:	D Wayland BSc MSc AssocCIWM MCIWEM C.WEM	Signed:		23.08.21

Gas Protection Validation Record



Plot 143: Membrane fully exposed and in good condition.



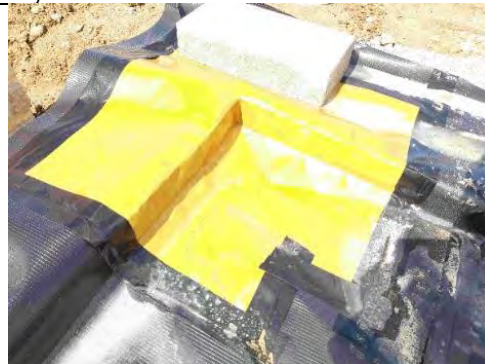
Plot 143: Airbricks installed were clear and free from any obstructions.



Plot 143: Service entry sealed with top hat, double and single sided tape and a jubilee clip



Plot 143: Overlap in membrane sheets to Gas resistant DPC >150mm and sealed with double and single sided tape.



Plot 143: Good detail on cornering using proprietary detailing strip to reduce stress points.



Plot 144: Membrane fully exposed and in good condition.

Commented [d1]: Not relevant to photo

Gas Protection Validation Record



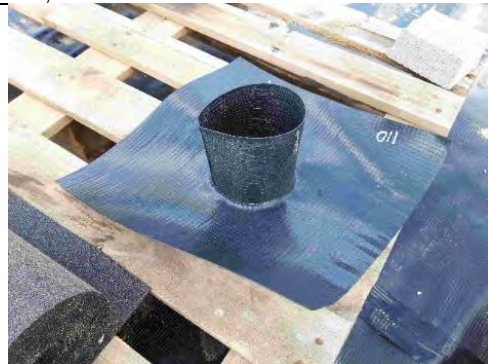
Plot 144: Membrane fully exposed except across cavity wall, Airbricks visible to front elevation



Plot 144: Corner detail, some standing water no holes visible in joints



Plot 144: Service entry sealed with top hat, double and single sided tape and a jubilee clip.



Plot 144: Proprietary double sided buytul tape and pre-formed "top Hat" service entries used throughout



Plot 144: Airbricks installed were clear and free from any obstructions. Membrane extends across outer wall



Plot 144-145: membrane runs under DPC spanning Cavity wall – this section is a single sheet with no joint to DPC

Commented [d2]: Plot correction

Gas Protection Validation Record



Plot 145: Membrane fully exposed except across cavity wall, Airbricks visible to front elevation



Plot 145: Corner detail, no holes visible in joints



Plot 145: Airbricks installed were clear and free from any obstructions.



Plot 145: Service entry sealed with top hat, double and single sided tape and a jubilee clip.



Plot 145: Overlap in membrane sheets to Gas resistant DPC >150mm and sealed with double and single sided tape.



Plot 146: Membrane fully exposed and in good condition.

Gas Protection Validation Record



Plot 146: Service entry sealed with top hat, double and single sided tape and a jubilee clip.



Plot 146: Overlap in membrane sheets to gas resistant DPC >150mm



Plot 146: Airbricks installed were clear and free from any obstructions.



Plot 146: Single sided tape used to repair minor gaps in the geomembrane.



Plot 146: Corner detail, no holes visible in joints

No Photo

Gas Protection Validation Record

job number	R2174	design source/ref:	BM-SD02-13-01	specification source/ref:	R2174-R07-v3	other documents attached	✗
site name / location	Tetrosyl, Bury	building use:	residential	commercial	other (describe)		
plot number	147-151	building description:	no. of storeys =	2	Detached (plot 151)	semi-detached (Plots 147-150)	Terrace apartment block
compiled by:	MJ	gas protection type:	active / passive	foundation type:	suspended floor	/raft/other	

Ventilated sub-floor (if present)	inspection date/time:	28.04.23	inspected by:	MJ	photographed:	✓
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✓ / ✗ notes (see overleaf)

void former type	✗	1. N/A
height of void space	✗	2. >150mm, not inspected, however building control minimum is confirmed by client and on design detail
gravel type	✗	3. N/A (void clear)
pipe size and spacing	✗	4. N/A
external wall airbricks	✓	5. Plot 147: 2 airbricks along the front, 4 on the gable end (Total 6); Plot 148: 3 airbricks along the front, 4 on the gable end (Total 7); Plot 149+150: 2 along the front, 1 on the back and 5 on each gable end (Total 8 each); Plot 151: 5 on front, 4 on back and 3 on each gable end (Total 12); all clear and free from obstructions.
internal sleeper walls	✗	6. not inspected
external vent trenches / ducts	✗	7. N/A

Gas barrier	inspection date/time:	28.04.23	inspected by:	MJ	photographed:	✓
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membrane type	✓	8. Visqueen Gas Barrier Membrane installed by specialist installer PRS Manchester.
extent of coverage	✓	9. Full coverage, membranes checked throughout.
slab/membrane condition	✓	10. Membrane in good condition with minimal track marks; no tears or puncture marks noted.
laps and joints	✓	11. Laps all > 150mm and sealed using a heat gun.
damp-proof course	✓	12. No DPC was installed at the time of the visit, but gas membrane extended across external wall providing 100% coverage to building footprint.

Gas Protection Validation Record

service entries and seals	✓	13. 5 service entries on Plot 147. 6 service entries on Plots 148-151. All service entries sealed with proprietary detailing strip.
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Guide notes:

1	void former type	proprietary type - manufacturer and specification, in accordance with design?, installed properly without damage?
2	height of void space	height of proprietary former or constructed ventilation space below suspended floor - note any debris on void / obstructions to air flow, note formation surface soil type (e.g. crushed concrete/brick), any evidence of flooding
3	gravel type	gravel type, if used (limestone / granite etc.) and any specification (e.g. 6F2), typical particle dimensions (mm), apparent fines content (low/high), compaction (loose/dense), waterlogging / contamination by clay, organic matter, other debris
4	pipe size and spacing	diameter in mm; material type (e.g. PVC); slotted or perforated; positioning and spacing / separation and jointing as on design drawing - if not sketch arrangement - do pipes connect with external (telescopic / swan-neck) vents?
5	external wall airbricks	check numbers, size and positions as design drawing (if not shown, make sketch; check for blockage, e.g. by mortar, or soil / pavings etc.
6	internal sleeper walls	check for ventilation holes - e.g. honeycomb brickwork or pipe crossings - note size, spacing and location - in accordance with design?
7	external vent trenches / ducts	check whether located and constructed in accordance with design drawings; if open-topped gravel, note gravel type and presence of fines / contamination; if pipe or other vents - check positions and construction for functionality and absence of blockages - vents may be built over
8	membrane type	note manufacturer and product specification, including batch / roll numbers if present - in accordance with specification? check stock storage arrangements - protected from dirt and damage?
9	extent of coverage	if membrane is incomplete, further inspection will be required - note areas completed / incomplete - is membrane fully visible or have internal walls been constructed over membrane / screed placed?
10	slab/membrane condition	record presence of debris / rough surfaces, in particular sharp projections, below or above membrane; record locations of all punctures or repairs, note arrangements to protect membrane surface from traffic / tools and equipment / materials, and temporary weighting down of membrane, e.g. use of boards - record evidence of footprints / tracks on membrane surface, creases or water/wind damage
11	laps and joints	check the all joints are lapped and sealed in accordance with manufacturer's requirements / specification, particularly where creases/folds are present (usually minimum 150mm laps with double-sided tape between sheets, and single-sided tape on top surface; note size of sheets and frequency of edge seals
12	damp-proof course	record DPC manufacturer and product code - usually integrated with the membrane; measure the DPC projection from external wall in mm; check laps and seals between membrane and DPC - note any potential stress points and tension between the two; check for damage to DPC
13	service entries and seals	note number, position and diameter of service entries - check top hat seal arrangements in accordance with design / specification (laps and seals between top hat and floor membrane, pipe upstand is usually a minimum 150mm) check, with jubilee clips to secure top hat seal to pipe - note presence of clips and tightness of connections



G:\Jobs\R2174\Plot 147-151

Gas Protection Validation Record

This plot has PASSED inspection.

An additional inspection visit IS NOT required for this plot.

SGP Staff:	M Jones BSc MSc AMIEEnvSc	Signed:		28.04.23
SGP Member:	D Wayland BSc MSc AssocCIWM MCIWEM C.WEM	Signed:		28.04.23

Gas Protection Validation Record



Plot 147: Membrane fully exposed and in good condition.



Plot 147: Airbricks installed were clear and free from any obstructions.



Plot 147: Service entry sealed using proprietary detailing strip



Plot 147: Overlap in membrane sheets >150mm and sealed with heat gun



Plot 147: Good detail on cornering using proprietary detailing strip to reduce stress points.



Plot 147: Membrane extends across outer cavity wall

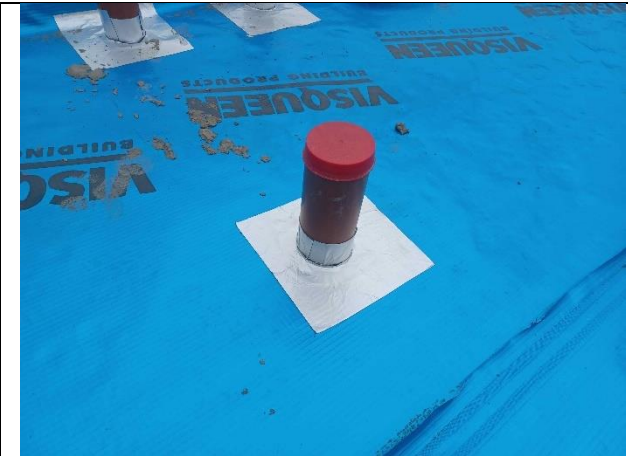
Gas Protection Validation Record



Plot 148: Membrane fully exposed and in good condition.



Plot 148: Airbricks installed were clear and free from any obstructions.



Plot 148: Service entry sealed using proprietary detailing strip



Plot 148: Overlap in membrane sheets >150mm and sealed with heat gun.



Plot 148: Good detail on cornering using proprietary detailing strip to reduce stress points.



Plot 148: Membrane spans neatly under internal dividing wall between plots

Gas Protection Validation Record



Plot 149: Membrane fully exposed and in good condition.



Plot 149: Airbricks installed were clear and free from any obstructions.



Plot 149: Membrane extends across outer cavity wall



Plot 149: Service entry sealed using proprietary detailing strip



Plot 149: Good detail on cornering using proprietary detailing strip to reduce stress points.



Plot 149: Membrane spans neatly under internal dividing wall between plots

Gas Protection Validation Record



Plot 150: Membrane fully exposed and in good condition.



Plot 150: Airbricks installed were clear and free from any obstructions.



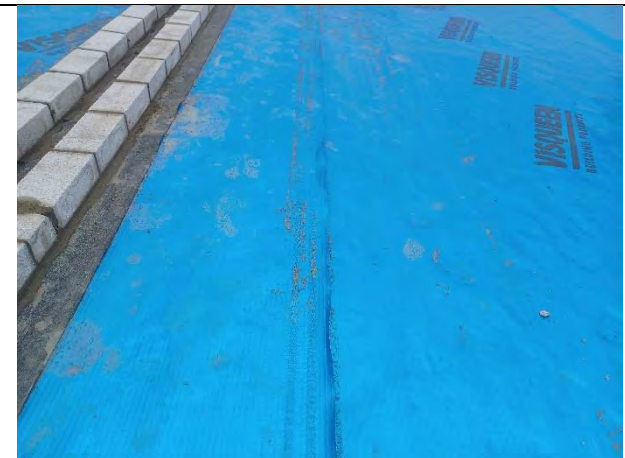
Plot 150: Membrane extends across outer cavity wall



Plot 150: Service entry sealed using proprietary detailing strip



Plot 150: Good detail on cornering using proprietary detailing strip to reduce stress points.



Plot 150: Membrane sheets well sealed using heat sealer.

Gas Protection Validation Record



Plot 151: Membrane fully exposed and in good condition.



Plot 151: Airbricks installed were clear and free from any obstructions.



Plot 151: Membrane extends across outer cavity wall



Plot 151: Service entry sealed with top hat, and adhesive membrane patches



Plot 151: Good detail on cornering using proprietary detailing strip to reduce stress points.



Plot 151: Overlap in membrane sheets >150mm and sealed with heat gun.

Gas Protection Validation Record

job number	R2174	design source/ref:	BM-SD02-13-01	specification source/ref:	R2174-R07-v3	other documents attached	✕
site name / location	Tetrosyl, Bury	building use:	residential	commercial	other (describe)		
plot number	500 + 14	building description:	no. of storeys =	2	detached	semi-detached	Terrace apartment block
compiled by:	JR	gas protection type:	active / passive	foundation type:	suspended floor	raft / other	

Ventilated sub-floor (if present)	inspection date/time:	28.09.21	inspected by:	JR	photographed:	✓
✓ / ✕ notes (see overleaf)						

void former type	✕	1. N/A
height of void space	✕	2. >150mm, not inspected, however building control minimum is confirmed by client and on design detail
gravel type	✕	3. N/A (void clear)
pipe size and spacing	✕	4. N/A
external wall airbricks	✓	5. Plot 500: 1 airbrick along the front, 2 to the rear, 6 on the left side (Total 9); Plot 14: 1 airbricks along the front, 2 to the rear, 6 on the right side (Total 9); all clear and free from obstructions.
internal sleeper walls	✕	6. not inspected
external vent trenches / ducts	✕	7. N/A

Gas barrier	inspection date/time:	28.09.21	inspected by:	JR	photographed:	✓
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membrane type	✓	8. Radbar Amber 1 Gas Membrane
extent of coverage	✓	9. Full coverage, membrane checked throughout.
slab/membrane condition	✓	10. Membrane in good condition with minimal track marks; no tears or puncture marks noted.
laps and joints	✓	11. Laps all > 150mm and sealed using both double and single sided tape.
damp-proof course	✓	12. Visqueen Zedex CPT High Performance DPC (600mm) taped to gas membrane using double and single-sided tape and spans to external wall; gas membrane also underlies DPC to external wall providing 100% coverage to building footprint.
service entries and seals	✓	13. 5 service entries on Plot 500. 5 service entries on Plot 14. All service entries sealed with proprietary double/single sided tape and tightened jubilee clip.

Gas Protection Validation Record

Guide notes:

1	void former type	proprietary type - manufacturer and specification, in accordance with design?, installed properly without damage?
2	height of void space	height of proprietary former or constructed ventilation space below suspended floor - note any debris on void / obstructions to air flow, note formation surface soil type (e.g. crushed concrete/brick), any evidence of flooding
3	gravel type	gravel type, if used (limestone / granite etc.) and any specification (e.g. 6F2), typical particle dimensions (mm), apparent fines content (low/high), compaction (loose/dense), waterlogging / contamination by clay, organic matter, other debris
4	pipe size and spacing	diameter in mm; material type (e.g. PVC); slotted or perforated; positioning and spacing / separation and jointing as on design drawing - if not sketch arrangement - do pipes connect with external (telescopic / swan-neck) vents?
5	external wall airbricks	check numbers, size and positions as design drawing (if not shown, make sketch; check for blockage, e.g. by mortar, or soil / pavings etc.
6	internal sleeper walls	check for ventilation holes - e.g. honeycomb brickwork or pipe crossings - note size, spacing and location - in accordance with design?
7	external vent trenches / ducts	check whether located and constructed in accordance with design drawings; if open-topped gravel, note gravel type and presence of fines / contamination; if pipe or other vents - check positions and construction for functionality and absence of blockages - vents may be built over
8	membrane type	note manufacturer and product specification, including batch / roll numbers if present - in accordance with specification? check stock storage arrangements - protected from dirt and damage?
9	extent of coverage	if membrane is incomplete, further inspection will be required - note areas completed / incomplete - is membrane fully visible or have internal walls been constructed over membrane / screed placed?
10	slab/membrane condition	record presence of debris / rough surfaces, in particular sharp projections, below or above membrane; record locations of all punctures or repairs, note arrangements to protect membrane surface from traffic / tools and equipment / materials, and temporary weighting down of membrane, e.g. use of boards - record evidence of footprints / tracks on membrane surface, creases or water/wind damage
11	laps and joints	check the all joints are lapped and sealed in accordance with manufacturer's requirements / specification, particularly where creases/folds are present (usually minimum 150mm laps with double-sided tape between sheets, and single-sided tape on top surface; note size of sheets and frequency of edge seals
12	damp-proof course	record DPC manufacturer and product code - usually integrated with the membrane; measure the DPC projection from external wall in mm; check laps and seals between membrane and DPC - note any potential stress points and tension between the two; check for damage to DPC
13	service entries and seals	note number, position and diameter of service entries - check top hat seal arrangements in accordance with design / specification (laps and seals between top hat and floor membrane, pipe upstand is usually a minimum 150mm) check, with jubilee clips to secure top hat seal to pipe - note presence of clips and tightness of connections

Gas Protection Validation Record

This plot has PASSED inspection.

An additional inspection visit IS NOT required for this plot.

SGP Staff:	S D Miller BSc MCIWEM	Signed:		24.06.22
SGP Member:	D Wayland BSc MSc AssocCIWM MCIWEM C.WEM	Signed:		24.06.22

Gas Protection Validation Record

 Plot 500: Membrane fully exposed and in good condition.	 Plot 500: Airbricks installed were clear and free from any obstructions.	 Plot 500: Service entry sealed with top hat, double and single sided tape and a jubilee clip, whilst JR present.
 Plot 500: Overlap in membrane sheets >150mm and sealed with double and single sided tape	 Plot 500: Good detail on cornering using proprietary detailing strip to reduce stress points. Standing water indicative of water tight seal	 Plot 500: DPC taped to membrane and extends across outer cavity wall

Gas Protection Validation Record



Plot 14: Membrane fully exposed and in good condition. Groundstaff sealing top hats whilst JR present, due to wet conditions.



Plot 14: Airbricks installed were clear and free from any obstructions.



Plot 14: Service entry sealed with top hat, double and single sided tape and a jubilee clip under presence of JR,



Plot 14: Overlap in membrane sheets >150mm and sealed with double and single sided tape. Service entry neatly sealed and tightened with jubilee clip.



Plot 14: Good detail on cornering using proprietary detailing strip to reduce stress points.



Plot 14: DPC taped to membrane and extends across outer cavity wall

Our Ref: HBC1221/LRTG2
24th January 2022

Dan Wayland
Smith Grant LLP
Highfield,
2 Station Road,
Ruabon,
Wrexham LL14 6DL

CO2 AND CH4 TRACE GAS MEMBRANE INTEGRITY TESTING AT: PLOTS 143,144,145 &146, WALMERSLEY ROAD, BURY.

Ben Crowther (GeoEnginSeer Ltd) has been commissioned by Smith Grant Partnership LLP to complete membrane integrity confirmation, by means of a pressurised carbon dioxide (4%) and methane (2.5%) testing of the sealed sub floor void space.

Context: The site has been identified as being potentially affected by adverse ground gasses. As a result, a precautionary measure to install a Alderprufe HC Geomembrane Gas Barrier Membrane and Gas Resistant Self-Adhesive Detailing Tape; as proprietary gas resistant barrier system, The materials are designed and rated to resist standard ground gasses such as Carbon Dioxide and Radon.

The system was installed by experienced ground workers with no related professional qualifications. The membrane is laid on a solid brushed clean, beam and block foundation above a minimum 150mm ventilated void.

The installation was completed and covered prior to verification of the installation.

As a result, a post verification tracer gas test was selected from a range of options to prove through several lines of evidence that the installed gas resistance was intact and functioning efficiently. A site visit was conducted on 7th January 2022 between 11:00-13:00hrs to conduct the test.

4% Carbon dioxide and 2.5% Methane were used for the tracer gas' and detected using a GMI Instruments portable gas analyser and detection device. Calibration certificates for the instrument are available.

The tests were conducted using the following methodology:

- Establish good barometric pressure situation to conduct test: Slow drop overnight 6th – 7th of January 2021, barometric pressure dropped from 1010hpa to 1006hpa.
- Gas sweep survey of all available plots to establish baseline conditions and to identify possible gas ingress entry points and any existing gas regime active in the property.
- Sub floor void flow test to establish the connectivity between the windward and leeward air bricks.
- Introduction of tracer gas under positive pressure, using a windward air brick as the delivery point. All other exit points from the void were adequately sealed.
- Gas sweep survey of all plots following the introduction of tracer gas to test for any ingress into the property.

The initial gas sweep surveys conducted before the introduction of tracer gas recorded no carbon dioxide, VOC and methane concentrations consistent above its limit of detection. Each room was swept for any gas with the gas detection instrument as well as the trickle vents on the outside of the building and the subfloor void vents prior to the introduction of the tracer gasses.

Readings from the anemometer showed a wind speed of 2.2 m/s prevailing from a South-Westerly direction, therefore the South-West side of the building was selected for the entry point for the tracer gas, with plot 146 selected as the first to be tested. Air brick vents were sealed with tape, excluding the entry and exit vents located on the south-west and north-east sides respectively. Airflow within the sub-floor void was measured with the anemometer, which measured 2m/s, indicative of good airflow. The 4% carbon dioxide was then injected through the air brick vents on the South-West side of the development. The GMI Instruments portable gas analyser was positioned at the exit air brick vent. Readings of 0.32 ppm carbon dioxide were recorded at the exit vent, whilst no changes in carbon dioxide levels were monitored within the property. This suggests that both the sub-floor void and the membrane are functioning as intended.

Due to shortages within the compressed carbon dioxide supply line, 2.5% methane was used as the tracer gas for the remaining three properties, following the same methodology. For properties 143 to 145, readings taken at the exit vents did not identify significant changes in methane concentrations. However, there were only very minor, fleeting Lower

Explosive Limit (LEL – the GMI measurement range) changes in methane concentration identified within the three aforementioned properties. The reason for this is likely the low density of CH₄ when compared with ambient air, therefore it is likely that the majority of the injected 2.5% methane trace gas was suspended within the sub-floor void. Due to no changes in the readings within any of the properties following the injection of trace gasses, it can be said with confidence that the ground-gas protection measures implemented at this site are adequate and functional.

RESULTS OF THE POST CONSTRUCTION CH₄ TRACER GAS TEST: PASS

If you have any questions regarding the above, please do not hesitate to contact me.

Yours sincerely



Ben Crowther B.Sc, M.Sc, PGCE, FGS, CIEH, PCA QT SGPV

For and on behalf of GeoEnginSeer Ltd.

geoenginseer@gmail.com 07817 108921

Appendix A1:

Site plan



Figure 1 site layout



Figure 2 plots 143 to 146

Appendix A2: Site Photographs



Figure 3 trace gas injection into sub-floor void.

Appendix A3

Trace Gas readings.



Figure 4 trace gas reading taken outside of plot 146 with a long sample tube

APPENDIX B

GeoEnginSeer Ltd Integrity Test Records

www.GeoEnginSeerLtd.com

Barratt Bury Photograph 1: Plan of the Site.



Barratt Bury Photograph 2: VISQUEEN GAS BARRIER Membrane:



ON BEHALF OF SMITH GRANT PARTNERSHIP LLP

job number	R2174	design source/ref:	BM-SD02-13-01	specification source/ref:	R2174-R07-v3	documents attached	✕	
site name / location	Waldmer's Wood, Bury	building use:	residential	commercial	other (describe)			
plot number	48	building description:	no. of storeys =	2	Detached	semi-detached	terrace	apartment block
compiled by:	Ben Crowther (BC)	gas protection type:	active / passive		foundation type:	block and beam / raft / other		

Ventilated sub-floor (if present)	inspection date/time:	6.10.2021 (airbricks only) Plots 42,43,44 and future plots show >150mm	inspected by:	BC	photographed:	✓
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	✓ / ✕	notes (see overleaf)
void former type	✕	1. N/A
height of void space	✕	2. >150mm, not inspected, however building control minimum is confirmed by client and on design detail and anemometer used in conjunction with leaf blower to prove continuity of air flow under the building. No reduction in air flow of the sub floor void was respected.
gravel type	✕	3. N/A (void clear)
pipe size and spacing	✕	4. N/A

external wall airbricks	✓	5. Plots: All : 5 airbricks provided in total to sidewall of dwelling: all clear and free from blockages. Sleeper voids noted in plots with beam and block coverings
internal sleeper walls	✗	6. N/A
external vent trenches / ducts	✗	7. N/A

Gas barrier	inspection date/time:	6.10.21	inspected by:	BC	photographed:	✓
membrane type	✓	8. Visqueen Gas Barrier				
extent of coverage	✓	9. 100% of building footprint.				
slab/membrane condition	✓	10. Good condition, minimal traffic marks and no stress points observed during inspection.				
laps and joints	✓	11. Laps >150mm with taped seam seals.				
damp-proof course	✓	12. Membrane extends beyond external walls; no DPC installed at time of inspection.				
service entries and seals	✓	13. 5 service entries per plot sealed to membrane using adhesive membrane patches; good seals achieved throughout.				
Integrity testing	✓	14. Integrity testing was undertaken on site by Ben Crowther, Geoengineer, with and air lance on 6 th October 2021				

Guide notes:

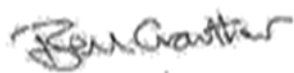
1	void former type	proprietary type - manufacturer and specification, in accordance with design? Installed properly without damage?
2	height of void space	height of proprietary former or constructed ventilation space below suspended floor - note any debris on void / obstructions to air flow, note formation surface soil type (e.g. crushed concrete/brick), any evidence of flooding
3	gravel type	gravel type, if used (limestone / granite etc.) and any specification (e.g. 6F2), typical particle dimensions (mm), apparent fines content (low/high), compaction (loose/dense), waterlogging / contamination by clay, organic matter, other debris
4	pipe size and spacing	diameter in mm; material type (e.g. PVC); slotted or perforated; positioning and spacing / separation and jointing as on design drawing - if not sketch arrangement - do pipes connect with external (telescopic / swan-neck) vents?
5	external wall airbricks	check numbers, size and positions as design drawing (if not shown, make sketch; check for blockage, e.g. by mortar, or soil / pavings etc.
6	internal sleeper walls	check for ventilation holes - e.g. honeycombe brickwork or pipe crossings - note size, spacing and location - in accordance with design?
7	external vent trenches / ducts	check whether located and constructed in accordance with design drawings; if open-topped gravel, note gravel type and presence of fines / contamination; if pipe or other vents - check positions and construction for functionality and absence of blockages - vents may be built over
8	membrane type	note manufacturer and product specification, including batch / roll numbers if present - in accordance with specification? check stock storage arrangements - protected from dirt and damage?
9	extent of coverage	if membrane is incomplete, further inspection will be required - note areas completed / incomplete - is membrane fully visible or have internal walls been constructed over membrane / screed placed?
10	slab/membrane condition	record presence of debris / rough surfaces, in particular sharp projections, below or above membrane; record locations of all punctures or repairs, note arrangements to protect membrane surface from traffic / tools and equipment / materials, and temporary weighting down of membrane, e.g. use of boards - record evidence of footprints / tracks on membrane surface, creases or water/wind damage

11	laps and joints	check the all joints are lapped and sealed in accordance with manufacturer's requirements / specification, particularly where creases/folds are present (usually minimum 150mm laps with double-sided tape between sheets, and single-sided tape on top surface; note size of sheets and frequency of edge seals
12	damp-proof course	record DPC manufacturer and product code - usually integrated with the membrane; measure the DPC projection from external wall in mm; check laps and seals between membrane and DPC - note any potential stress points and tension between the two; check for damage to DPC
13	service entries and seals	note number, position and diameter of service entries - check top hat seal arrangements in accordance with design / specification (laps and seals between top hat and floor membrane, pipe upstand is usually a minimum 150mm) check, with jubilee clips to secure top hat seal to pipe - note presence of clips and tightness of connections
14	Integrity testing	Has integrity testing been undertaken on this plot? If yes, who undertook the testing (company name) and what type of test did they use (air lancing/other test)? Append a copy of the testing certificate to this report.

Visual inspection has been completed by specialist sub-contractor Ben Crowther of GeoEnginSeer Ltd on behalf of Smith Gant LLP with the inspection completed concurrently with integrity testing.

These buildings have **PASSED** inspection.

An additional inspection IS NOT required for these plots.



Inspection by: Ben Crowther

Signed: 6th October 2021

Barratt Bury Photograph 1: Conduit sealing, NB Sealing later with approved material between the inner of the conduit and outer of the service pipe.



Barratt Bury Photograph 2: General area view:



Barratt Bury Photograph 3: Example Penetration detail:



Barratt Bury: Photograph 4: Example Corner detail:



ON BEHALF OF SMITH GRANT PARTNERSHIP LLP

job number	R2174	design source/ref:	BM-SD02-13-01	specification source/ref:	R2174-R07-v3	documents attached	✕
site name / location	Waldmer's Wood, Bury	building use:	residential	commercial	other (describe)		
plot number	52 & 53	building description:	no. of storeys =	2	Detached	semi-detached	terrace apartment block
compiled by:	Ben Crowther (BC)	gas protection type:	active / passive	foundation type:	block and beam	/raft/other	

Ventilated sub-floor (if present)	inspection date/time:	10.09.2021 (airbricks only) Plots and >150mm	inspected by:	BC	photographed:	✓
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✓ / ✕		notes (see overleaf)
void former type	✕	1. N/A
height of void space	✕	2. >150mm, not inspected, however building control minimum is confirmed by client and on design detail and anemometer used in conjunction with leaf blower to prove continuity of air flow under the building. No reduction in air flow of the sub floor void was respected.
gravel type	✕	3. N/A (void clear)
pipe size and spacing	✕	4. N/A
external wall airbricks	✓	5. Plots: All : 5 airbricks provided in total to sidewall of dwelling: all clear and free from blockages. Sleeper voids noted in plots with beam and block coverings

internal sleeper walls	✘	6. N/A
external vent trenches / ducts	✘	7. N/A

Gas barrier	inspection date/time:	10.09.21	inspected by:	BC	photographed:	✓
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membrane type	✓	8. Alderprufe HC Geomembrane
extent of coverage	✓	9. 100% of building footprint.
slab/membrane condition	✓	10. Good condition, minimal traffic marks and no stress points observed during inspection.
laps and joints	✓	11. Laps >150mm with taped seam seals.
damp-proof course	✓	12. Membrane extends beyond external walls; no DPC installed at time of inspection.
service entries and seals	✓	13. 5 service entries per plot sealed to membrane using adhesive membrane patches; good seals achieved throughout.
Integrity testing	✓	14. Integrity testing was undertaken on site by Ben Crowther, Geoengineer, with and air lance on 10 th September 2021.

Guide notes:

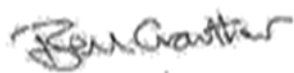
1	void former type	proprietary type - manufacturer and specification, in accordance with design? Installed properly without damage?
2	height of void space	height of proprietary former or constructed ventilation space below suspended floor - note any debris on void / obstructions to air flow, note formation surface soil type (e.g. crushed concrete/brick), any evidence of flooding
3	gravel type	gravel type, if used (limestone / granite etc.) and any specification (e.g. 6F2), typical particle dimensions (mm), apparent fines content (low/high), compaction (loose/dense), waterlogging / contamination by clay, organic matter, other debris
4	pipe size and spacing	diameter in mm; material type (e.g. PVC); slotted or perforated; positioning and spacing / separation and jointing as on design drawing - if not sketch arrangement - do pipes connect with external (telescopic / swan-neck) vents?
5	external wall airbricks	check numbers, size and positions as design drawing (if not shown, make sketch; check for blockage, e.g. by mortar, or soil / pavings etc.
6	internal sleeper walls	check for ventilation holes - e.g. honeycombe brickwork or pipe crossings - note size, spacing and location - in accordance with design?
7	external vent trenches / ducts	check whether located and constructed in accordance with design drawings; if open-topped gravel, note gravel type and presence of fines / contamination; if pipe or other vents - check positions and construction for functionality and absence of blockages - vents may be built over
8	membrane type	note manufacturer and product specification, including batch / roll numbers if present - in accordance with specification? check stock storage arrangements - protected from dirt and damage?
9	extent of coverage	if membrane is incomplete, further inspection will be required - note areas completed / incomplete - is membrane fully visible or have internal walls been constructed over membrane / screed placed?
10	slab/membrane condition	record presence of debris / rough surfaces, in particular sharp projections, below or above membrane; record locations of all punctures or repairs, note arrangements to protect membrane surface from traffic / tools and equipment / materials, and temporary weighting down of membrane, e.g. use of boards - record evidence of footprints / tracks on membrane surface, creases or water/wind damage

11	laps and joints	check the all joints are lapped and sealed in accordance with manufacturer's requirements / specification, particularly where creases/folds are present (usually minimum 150mm laps with double-sided tape between sheets, and single-sided tape on top surface; note size of sheets and frequency of edge seals
12	damp-proof course	record DPC manufacturer and product code - usually integrated with the membrane; measure the DPC projection from external wall in mm; check laps and seals between membrane and DPC - note any potential stress points and tension between the two; check for damage to DPC
13	service entries and seals	note number, position and diameter of service entries - check top hat seal arrangements in accordance with design / specification (laps and seals between top hat and floor membrane, pipe upstand is usually a minimum 150mm) check, with jubilee clips to secure top hat seal to pipe - note presence of clips and tightness of connections
14	Integrity testing	Has integrity testing been undertaken on this plot? If yes, who undertook the testing (company name) and what type of test did they use (air lancing/other test)? Append a copy of the testing certificate to this report.

Visual inspection has been completed by specialist sub-contractor Ben Crowther of Geoengineer Ltd on behalf of Smith Gant LLP with the inspection completed concurrently with integrity testing.

These buildings have **PASSED** inspection.

An additional inspection IS NOT required for these plots.



Inspection by: Ben Crowther

Signed: 14.09.2021

Barratt Bury Photograph 1: Plan of the Site.



Barratt Bury Photograph 2: Air Lance Pressure Evidence:



Photo 3: Barratts Bury: Corner and Penetration detailing:



Photo 4: Barratts Bury Subfloor void photographs of future plots:



ON BEHALF OF SMITH GRANT PARTNERSHIP LLP

job number	R2174	design source/ref:	BM-SD02-13-01	specification source/ref:	R2174-R07-v3	documents attached	✕	
site name / location	Waldmer's Wood, Bury	building use:	residential	commercial	other (describe)			
plot number	42,43,44	building description:	no. of storeys =	2	Detached	semi-detached	terrace	apartment block
compiled by:	Ben Crowther (BC)	gas protection type:	active / passive		foundation type:	block and beam / raft / other		

Ventilated sub-floor (if present)	inspection date/time:	12.1.2022 (airbricks only) Plots 42,43,44 and future plots show >150mm	inspected by:	BC	photographed:	✓
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	✓ / ✕	notes (see overleaf)
void former type	✕	1. N/A
height of void space	✕	2. >150mm, not inspected, however building control minimum is confirmed by client and on design detail and anemometer used in conjunction with leaf blower to prove continuity of air flow under the building. No reduction in air flow of the sub floor void was respected.
gravel type	✕	3. N/A (void clear)
pipe size and spacing	✕	4. N/A

external wall airbricks	✓	5. Plots: All : 5 airbricks provided in total to sidewall of dwelling: all clear and free from blockages. Sleeper voids noted in plots with beam and block coverings
internal sleeper walls	✗	6. N/A
external vent trenches / ducts	✗	7. N/A

Gas barrier	inspection date/time:	12.1.2022	inspected by:	BC	photographed:	✓
membrane type	✓	8. Visqueen HC Blok				
extent of coverage	✓	9. 100% of building footprint.				
slab/membrane condition	✓	10. Good condition, minimal traffic marks and no stress points observed during inspection.				
laps and joints	✓	11. Laps >150mm with taped seam seals.				
damp-proof course	✓	12. Membrane extends beyond external walls; no DPC installed at time of inspection.				
service entries and seals	✓	13. 5 service entries per plot sealed to membrane using adhesive membrane patches; good seals achieved throughout.				
Integrity testing	✓	14. Integrity testing was undertaken on site by Ben Crowther, Geoengineer, with and air lance on 12 th January 2022.				

Guide notes:

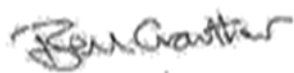
1	void former type	proprietary type - manufacturer and specification, in accordance with design? Installed properly without damage?
2	height of void space	height of proprietary former or constructed ventilation space below suspended floor - note any debris on void / obstructions to air flow, note formation surface soil type (e.g. crushed concrete/brick), any evidence of flooding
3	gravel type	gravel type, if used (limestone / granite etc.) and any specification (e.g. 6F2), typical particle dimensions (mm), apparent fines content (low/high), compaction (loose/dense), waterlogging / contamination by clay, organic matter, other debris
4	pipe size and spacing	diameter in mm; material type (e.g. PVC); slotted or perforated; positioning and spacing / separation and jointing as on design drawing - if not sketch arrangement - do pipes connect with external (telescopic / swan-neck) vents?
5	external wall airbricks	check numbers, size and positions as design drawing (if not shown, make sketch; check for blockage, e.g. by mortar, or soil / pavings etc.
6	internal sleeper walls	check for ventilation holes - e.g. honeycombe brickwork or pipe crossings - note size, spacing and location - in accordance with design?
7	external vent trenches / ducts	check whether located and constructed in accordance with design drawings; if open-topped gravel, note gravel type and presence of fines / contamination; if pipe or other vents - check positions and construction for functionality and absence of blockages - vents may be built over
8	membrane type	note manufacturer and product specification, including batch / roll numbers if present - in accordance with specification? check stock storage arrangements - protected from dirt and damage?
9	extent of coverage	if membrane is incomplete, further inspection will be required - note areas completed / incomplete - is membrane fully visible or have internal walls been constructed over membrane / screed placed?
10	slab/membrane condition	record presence of debris / rough surfaces, in particular sharp projections, below or above membrane; record locations of all punctures or repairs, note arrangements to protect membrane surface from traffic / tools and equipment / materials, and temporary weighting down of membrane, e.g. use of boards - record evidence of footprints / tracks on membrane surface, creases or water/wind damage

11	laps and joints	check the all joints are lapped and sealed in accordance with manufacturer's requirements / specification, particularly where creases/folds are present (usually minimum 150mm laps with double-sided tape between sheets, and single-sided tape on top surface; note size of sheets and frequency of edge seals
12	damp-proof course	record DPC manufacturer and product code - usually integrated with the membrane; measure the DPC projection from external wall in mm; check laps and seals between membrane and DPC - note any potential stress points and tension between the two; check for damage to DPC
13	service entries and seals	note number, position and diameter of service entries - check top hat seal arrangements in accordance with design / specification (laps and seals between top hat and floor membrane, pipe upstand is usually a minimum 150mm) check, with jubilee clips to secure top hat seal to pipe - note presence of clips and tightness of connections
14	Integrity testing	Has integrity testing been undertaken on this plot? If yes, who undertook the testing (company name) and what type of test did they use (air lancing/other test)? Append a copy of the testing certificate to this report.

Visual inspection has been completed by specialist sub-contractor Ben Crowther of GeoEnginSeer Ltd on behalf of Smith Gant LLP with the inspection completed concurrently with integrity testing.

These buildings have **PASSED** inspection.

An additional inspection IS NOT required for these plots.



Inspection by: Ben Crowther

Signed: 12.1.2022

GeoEnginSeer Ltd: Air Lance Integrity Testing Certification

**Project: Barratt Homes; Waldmers Wood, Walmersley Gardens
Bury BL9 6SB HBC1221
Building Type: Low Rise Residential Properties,
Plot 49-51**

Date: 18th September 2021

Inspection and Integrity Details:

On the 18th September 2021 from 10:00 to 11:30 the installation of ALDERPRUFE HC HYDROCARBON BARRIER Proprietary Membrane on plot 49-51 was inspected and found to be in an excellent condition. 100% Air-Lancing of the plot was conducted.

The Air Lance integrity test of the laid membrane taped on site was conducted. Several repairs to the plots was required, these was repairs were observed being carried out and retested.

Where the following conclusion indicates a pass the follow on construction activities may proceed to suitable protection measures of the membrane being applied in accordance with manufacturer's recommendations.

CONCLUSION OF INTEGRITY AIR LANCE TEST: PASS

If you have any questions regarding the above, please do not hesitate to contact me.

Yours sincerely



Ben Crowther B.Sc, M.Sc, PGCE, FGS, CIEH, PCA-QT, DoWCoP(MMP) SGVP

For and on behalf of geoenginseer.

geoenginseer@gmail.com 07817 108921

Barratt Bury Photograph 1: The plots as laid and being repaired.



Barratt Bury Photograph 2: Picture of the sleeper wall voids:



Barratt Bury Photograph 3: Example beam and block construction:



ON BEHALF OF SMITH GRANT PARTNERSHIP LLP

job number	R2174	design source/ref:	BM-SD02-13-01	specification source/ref:	R2174-R07-V3	documents attached	✗
site name / location	Waldmersly Woods. Bury	building use:	residential	commercial	other (describe)		
plot number	49-51	building description:	no. of storeys =	2	Detached	semi-detached	terrace apartment block
compiled by:	Ben Crowther (BC)	gas protection type:	active / passive	foundation type:	block and beam	/raft/other	

Ventilated sub-floor (if present)	inspection date/time:	18.09.2021 (airbricks only) Plots and >150mm	inspected by:	BC	photographed:	✓
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	✓ / ✗	notes (see overleaf)
void former type	✗	1. N/A
height of void space	✗	2. >150mm, not inspected, however building control minimum is confirmed by client and on design detail and anemometer used in conjunction with leaf blower to prove continuity of air flow under the building. No reduction in air flow of the sub floor void was respected.
gravel type	✗	3. N/A (void clear)
pipe size and spacing	✗	4. N/A
external wall airbricks	✓	5. Plots: All : 5 airbricks provided in total to sidewall of dwelling: all clear and free from blockages. Sleeper voids noted in plots with beam and block coverings

internal sleeper walls	✘	6. N/A
external vent trenches / ducts	✘	7. N/A

Gas barrier	inspection date/time:	18.09.21	inspected by:	BC	photographed:	✓
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membrane type	✓	8. Alderprufe HC Geomembrane
extent of coverage	✓	9. 100% of building footprint.
slab/membrane condition	✓	10. Good condition, minimal traffic marks and no stress points observed during inspection.
laps and joints	✓	11. Laps >150mm with taped seals.
damp-proof course	✓	12. Membrane extends beyond external walls; no DPC installed at time of inspection.
service entries and seals	✓	13. 5 service entries per plot sealed to membrane using adhesive membrane patches; good seals achieved throughout.
Integrity testing	✓	14. Integrity testing was undertaken on site by Ben Crowther, Geoengineer, with and air lance on 18 th September 2021.

Guide notes:

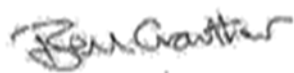
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2	height of void space	height of proprietary former or constructed ventilation space below suspended floor - note any debris on void / obstructions to air flow, note formation surface soil type (e.g. crushed concrete/brick), any evidence of flooding
3	gravel type	gravel type, if used (limestone / granite etc.) and any specification (e.g. 6F2), typical particle dimensions (mm), apparent fines content (low/high), compaction (loose/dense), waterlogging / contamination by clay, organic matter, other debris
4	pipe size and spacing	diameter in mm; material type (e.g. PVC); slotted or perforated; positioning and spacing / separation and jointing as on design drawing - if not sketch arrangement - do pipes connect with external (telescopic / swan-neck) vents?
5	external wall airbricks	check numbers, size and positions as design drawing (if not shown, make sketch; check for blockage, e.g. by mortar, or soil / pavings etc.
6	internal sleeper walls	check for ventilation holes - e.g. honeycombe brickwork or pipe crossings - note size, spacing and location - in accordance with design?
7	external vent trenches / ducts	check whether located and constructed in accordance with design drawings; if open-topped gravel, note gravel type and presence of fines / contamination; if pipe or other vents - check positions and construction for functionality and absence of blockages - vents may be built over
8	membrane type	note manufacturer and product specification, including batch / roll numbers if present - in accordance with specification? check stock storage arrangements - protected from dirt and damage?
9	extent of coverage	if membrane is incomplete, further inspection will be required - note areas completed / incomplete - is membrane fully visible or have internal walls been constructed over membrane / screed placed?
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11	laps and joints	check the all joints are lapped and sealed in accordance with manufacturer's requirements / specification, particularly where creases/folds are present (usually minimum 150mm laps with double-sided tape between sheets, and single-sided tape on top surface; note size of sheets and frequency of edge seals
12	damp-proof course	record DPC manufacturer and product code - usually integrated with the membrane; measure the DPC projection from external wall in mm; check laps and seals between membrane and DPC - note any potential stress points and tension between the two; check for damage to DPC
13	service entries and seals	note number, position and diameter of service entries - check top hat seal arrangements in accordance with design / specification (laps and seals between top hat and floor membrane, pipe upstand is usually a minimum 150mm) check, with jubilee clips to secure top hat seal to pipe - note presence of clips and tightness of connections
14	Integrity testing	Has integrity testing been undertaken on this plot? If yes, who undertook the testing (company name) and what type of test did they use (air lancing/other test)? Append a copy of the testing certificate to this report.

Visual inspection has been completed by specialist sub-contractor Ben Crowther of Geoengineer Ltd on behalf of Smith Gant LLP with the inspection completed concurrently with integrity testing.

These buildings have **PASSED** inspection.

An additional inspection IS NOT required for these plots.



Inspection by: Ben Crowther

Signed: 18.09.2021

GeoEnginSeer Ltd: Air Lance Integrity Testing Certification

**Project: Barratt Homes; Waldmer's Wood, Walmersley Gardens
Bury BL9 6SB HBC1221
Building Type: Low Rise Residential Properties,
Plot 45-47**

Date: 25th October 2021

Inspection and Integrity Details:

On the 25th October 2021 from 10:00 to 11:30 the installation of Visqueen HC Blok Proprietary Membrane on plot 45 to 47 was inspected and found to be in an excellent condition. 100% Air-Lancing of the plot was conducted.

The Air Lance integrity test of the laid membrane taped on site was conducted. No minor repairs to the plots were required, this is an excellent installation.

Where the following conclusion indicates a pass the follow on construction activities may proceed to suitable protection measures of the membrane being applied in accordance with manufacturer's recommendations.

CONCLUSION OF INTEGRITY AIR LANCE TEST: PASS

If you have any questions regarding the above, please do not hesitate to contact me.

Yours sincerely



Ben Crowther B.Sc, M.Sc, PGCE, FGS, CIEH, PCA-QT, DoWCoP(MMP) SGVP

For and on behalf of geoenginseer.

geoenginseer@gmail.com 07817 108921

Barratt Bury Photograph 1: Plan of the Site.



Barratt Bury Photograph 2: General area view:



Barratt Bury Photograph 3: Showing line of edge air bricks, flow tested on the day.



ON BEHALF OF SMITH GRANT PARTNERSHIP LLP

job number	R2174	design source/ref:	BM-SD02-13-01	specification source/ref:	R2174-R07-v3	documents attached	✕	
site name / location	Waldmer's Wood, Bury	building use:	residential	commercial	other (describe)			
plot number	45 to 47	building description:	no. of storeys =	2	Detached	semi-detached	terrace	apartment block
compiled by:	Ben Crowther (BC)	gas protection type:	active / passive		foundation type:	block and beam / raft / other		

Ventilated sub-floor (if present)	inspection date/time:	25.10.2021 (airbricks only) Plots and >150mm	inspected by:	BC	photographed:	✓
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✓ / ✕		notes (see overleaf)
void former type	✕	1. N/A
height of void space	✕	2. >150mm, not inspected, however building control minimum is confirmed by client and on design detail and anemometer used in conjunction with leaf blower to prove continuity of air flow under the building. No reduction in air flow of the sub floor void was respected.
gravel type	✕	3. N/A (void clear)
pipe size and spacing	✕	4. N/A

external wall airbricks	✓	5. Plots: All : 3/4 airbricks provided in total to sidewall of dwelling: all clear and free from blockages. Sleeper voids noted in plots with beam and block coverings. Different edge lengths give differing placements of snokles.
internal sleeper walls	✗	6. N/A
external vent trenches / ducts	✗	7. N/A

Gas barrier	inspection date/time:	25.10.21	inspected by:	BC	photographed:	✓
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membrane type	✓	8. Visqueen HC Blok
extent of coverage	✓	9. 100% of building footprint.
slab/membrane condition	✓	10. Good condition, minimal traffic marks and no stress points observed during inspection.
laps and joints	✓	11. Laps >150mm with tapedseam seals.
damp-proof course	✓	12. Membrane extends beyond external walls; no DPC installed at time of inspection.
service entries and seals	✓	13. 5 service entries per plot sealed to membrane using adhesive membrane patches; good seals achieved throughout.
Integrity testing	✓	14. Integrity testing was undertaken on site by Ben Crowther, Geoengineer, with and air lance on 25 th October 2021.

Guide notes:

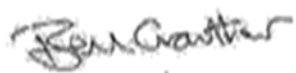
1	void former type	proprietary type - manufacturer and specification, in accordance with design? Installed properly without damage?
2	height of void space	height of proprietary former or constructed ventilation space below suspended floor - note any debris on void / obstructions to air flow, note formation surface soil type (e.g. crushed concrete/brick), any evidence of flooding
3	gravel type	gravel type, if used (limestone / granite etc.) and any specification (e.g. 6F2), typical particle dimensions (mm), apparent fines content (low/high), compaction (loose/dense), waterlogging / contamination by clay, organic matter, other debris
4	pipe size and spacing	diameter in mm; material type (e.g. PVC); slotted or perforated; positioning and spacing / separation and jointing as on design drawing - if not sketch arrangement - do pipes connect with external (telescopic / swan-neck) vents?
5	external wall airbricks	check numbers, size and positions as design drawing (if not shown, make sketch; check for blockage, e.g. by mortar, or soil / pavings etc.
6	internal sleeper walls	check for ventilation holes - e.g. honeycombe brickwork or pipe crossings - note size, spacing and location - in accordance with design?
7	external vent trenches / ducts	check whether located and constructed in accordance with design drawings; if open-topped gravel, note gravel type and presence of fines / contamination; if pipe or other vents - check positions and construction for functionality and absence of blockages - vents may be built over
8	membrane type	note manufacturer and product specification, including batch / roll numbers if present - in accordance with specification? check stock storage arrangements - protected from dirt and damage?
9	extent of coverage	if membrane is incomplete, further inspection will be required - note areas completed / incomplete - is membrane fully visible or have internal walls been constructed over membrane / screed placed?

10	slab/membrane condition	record presence of debris / rough surfaces, in particular sharp projections, below or above membrane; record locations of all punctures or repairs, note arrangements to protect membrane surface from traffic / tools and equipment / materials, and temporary weighting down of membrane, e.g. use of boards - record evidence of footprints / tracks on membrane surface, creases or water/wind damage
11	laps and joints	check the all joints are lapped and sealed in accordance with manufacturer's requirements / specification, particularly where creases/folds are present (usually minimum 150mm laps with double-sided tape between sheets, and single-sided tape on top surface; note size of sheets and frequency of edge seals
12	damp-proof course	record DPC manufacturer and product code - usually integrated with the membrane; measure the DPC projection from external wall in mm; check laps and seals between membrane and DPC - note any potential stress points and tension between the two; check for damage to DPC
13	service entries and seals	note number, position and diameter of service entries - check top hat seal arrangements in accordance with design / specification (laps and seals between top hat and floor membrane, pipe upstand is usually a minimum 150mm) check, with jubilee clips to secure top hat seal to pipe - note presence of clips and tightness of connections
14	Integrity testing	Has integrity testing been undertaken on this plot? If yes, who undertook the testing (company name) and what type of test did they use (air lancing/other test)? Append a copy of the testing certificate to this report.

Visual inspection has been completed by specialist sub-contractor Ben Crowther of Geoengineer Ltd on behalf of Smith Gant LLP with the inspection completed concurrently with integrity testing.

These buildings have **PASSED** inspection.

An additional inspection IS NOT required for these plots.



Inspection by: Ben Crowther

Signed: 25.10.2021



GeoEnginSeer Ltd: Air Lance Integrity Testing Certification

**Project: Barratt Homes; Waldmer's Wood, Walmersley Gardens
Bury BL9 6SB HBC1221
Building Type: Low Rise Residential Properties,
Plot 55-57**

Date: 29th April 2022

Inspection and Integrity Details:

On the 29th April 2022 from 11:00 to 12:30 the installation of VISQUEEN HC BLOC Proprietary Membrane on plot 55-57 were inspected and found to be in an excellent condition. 100% Air-Lancing of the plot was conducted.

The Air Lance integrity test of the laid membrane taped on site was conducted. Some damage due to wind was noted and approximately 2no. repairs to the plots were required, these were then retested.

Where the following conclusion indicates a pass the follow on construction activities may proceed to suitable protection measures of the membrane being applied in accordance with manufacturer's recommendations.

CONCLUSION OF INTEGRITY AIR LANCE TEST: PASS

If you have any questions regarding the above, please do not hesitate to contact me.

Yours sincerely



Ben Crowther B.Sc, M.Sc, PGCE, FGS, CIEH, PCA-QT, SGPV

For and on behalf of GeoEnginSeer Ltd.

geoenginseer@gmail.com 07817 108 921

www.GeoEnginSeerLtd.com

Barratt Bury Photograph 1: Plan of the Site.



VISQUEEN HC BLOC Membrane



Pipe Penetrations - before repair

Airflow brick example



ON BEHALF OF SMITH GRANT PARTNERSHIP LLP

job number	R2174	design source/ref:	BM-SD02-13-01	specification source/ref:	R2174-R07-v3	documents attached	✕	
site name / location	Waldmer's Wood, Bury	building use:	residential	commercial	other (describe)			
plot number	55-57	building description:	no. of storeys =	2	Detached	semi-detached	terrace	apartment block
compiled by:	Ben Crowther (BC)	gas protection type:	active / passive		foundation type:	block and beam / raft / other		

Ventilated sub-floor (if present)	inspection date/time:	29.4.2022 (airbricks only)	inspected by:	BC	photographed:	✓
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	✓ / ✕	notes (see overleaf)
void former type	✕	1. N/A
height of void space	✕	2. >150mm, not inspected, however building control minimum is confirmed by client and on design detail and anemometer used in conjunction with leaf blower to prove continuity of air flow under the building. No reduction in air flow of the sub floor void was respected.
gravel type	✕	3. N/A (void clear)
pipe size and spacing	✕	4. N/A
external wall airbricks	✓	5. Plots: All : 5 airbricks provided in total to sidewall of dwelling: all clear and free from blockages. Sleeper voids noted in plots with beam and block coverings

internal sleeper walls	✘	6. N/A
external vent trenches / ducts	✘	7. N/A

Gas barrier	inspection date/time:	29.4.22	inspected by:	BC	photographed:	✓
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membrane type	✓	8. Visqueen HC Bloc
extent of coverage	✓	9. 100% of building footprint.
slab/membrane condition	✓	10. Good condition, minimal traffic marks and no stress points observed during inspection.
laps and joints	✓	11. Laps >150mm with taped seals.
damp-proof course	✓	12. Membrane extends beyond external walls; no DPC installed at time of inspection.
service entries and seals	✓	13. 5 service entries per plot sealed to membrane using adhesive membrane patches; good seals achieved throughout.
Integrity testing	✓	14. Integrity testing was undertaken on site by Ben Crowther, GeoEnginSeerLtd, with and air lance on 29 th April 2022.

Guide notes:

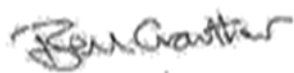
1	void former type	proprietary type - manufacturer and specification, in accordance with design? Installed properly without damage?
2	height of void space	height of proprietary former or constructed ventilation space below suspended floor - note any debris on void / obstructions to air flow, note formation surface soil type (e.g. crushed concrete/brick), any evidence of flooding
3	gravel type	gravel type, if used (limestone / granite etc.) and any specification (e.g. 6F2), typical particle dimensions (mm), apparent fines content (low/high), compaction (loose/dense), waterlogging / contamination by clay, organic matter, other debris
4	pipe size and spacing	diameter in mm; material type (e.g. PVC); slotted or perforated; positioning and spacing / separation and jointing as on design drawing - if not sketch arrangement - do pipes connect with external (telescopic / swan-neck) vents?
5	external wall airbricks	check numbers, size and positions as design drawing (if not shown, make sketch; check for blockage, e.g. by mortar, or soil / pavings etc.
6	internal sleeper walls	check for ventilation holes - e.g. honeycomb brickwork or pipe crossings - note size, spacing and location - in accordance with design?
7	external vent trenches / ducts	check whether located and constructed in accordance with design drawings; if open-topped gravel, note gravel type and presence of fines / contamination, if pipe or other vents - check positions and construction for functionality and absence of blockages - vents may be built over
8	membrane type	note manufacturer and product specification, including batch / roll numbers if present - in accordance with specification? check stock storage arrangements - protected from dirt and damage?
9	extent of coverage	if membrane is incomplete, further inspection will be required - note areas completed / incomplete - is membrane fully visible or have internal walls been constructed over membrane / screed placed?
10	slab/membrane condition	record presence of debris / rough surfaces, in particular sharp projections, below or above membrane; record locations of all punctures or repairs, note arrangements to protect membrane surface from traffic / tools and equipment / materials, and temporary weighting down of membrane, e.g. use of boards - record evidence of footprints / tracks on membrane surface, creases or water/wind damage

11	laps and joints	check the all joints are lapped and sealed in accordance with manufacturer's requirements / specification, particularly where creases/folds are present (usually minimum 150mm laps with double-sided tape between sheets, and single-sided tape on top surface; note size of sheets and frequency of edge seals
12	damp-proof course	record DPC manufacturer and product code - usually integrated with the membrane; measure the DPC projection from external wall in mm; check laps and seals between membrane and DPC - note any potential stress points and tension between the two; check for damage to DPC
13	service entries and seals	note number, position and diameter of service entries - check top hat seal arrangements in accordance with design / specification (laps and seals between top hat and floor membrane, pipe upstand is usually a minimum 150mm) check, with jubilee clips to secure top hat seal to pipe - note presence of clips and tightness of connections
14	Integrity testing	Has integrity testing been undertaken on this plot? If yes, who undertook the testing (company name) and what type of test did they use (air lancing/other test)? Append a copy of the testing certificate to this report.

Visual inspection has been completed by specialist sub-contractor Ben Crowther of GeoEnginSeer Ltd on behalf of Smith Gant LLP with the inspection completed concurrently with integrity testing.

These buildings have **PASSED** inspection.

An additional inspection IS NOT required for these plots.



Inspection by: Ben Crowther

Signed: 29.4.2022

GeoEnginSeer Ltd: Air Lance Integrity Testing Certification

**Project: Barratt Homes; Waldmer's Wood, Walmersley Gardens
Bury BL9 6SB HBC1221**

**Building Type: Low Rise Residential Detached Properties,
Plot 39,40,41(three foot prints)**

Date: 31st January 2022

Inspection and Integrity Details:

On the 31st January 2022 from 13:00 to 14:20 the installation of VISQUEEN HC BLOC Proprietary Membrane on plot 39 - 41 (Detached) was inspected and found to be in an excellent condition. 100% Air-Lancing of the plot was conducted.

The Air Lance integrity test of the laid membrane, taped on site, was conducted. Some damage due to wind was noted and approximately 20 repairs to the plots were required.

Where the following conclusion indicates a pass the follow on construction activities may proceed to suitable protection measures of the membrane being applied in accordance with manufacturer's recommendations.

CONCLUSION OF INTEGRITY AIR LANCE TEST: PASS

If you have any questions regarding the above, please do not hesitate to contact me.

Yours sincerely



Ben Crowther B.Sc, M.Sc, PGCE, FGS, CIEH, PCA-QT, SGPV

For and on behalf of GeoEnginSeer Ltd.

geoenginseer@gmail.com 07817 108 921

www.GeoEnginSeerLtd.com

Barratt Bury Photograph 1: Plan of the Site.



Barratt Bury Photograph 2: Air Lance Pressure Evidence: 31.1.22



Photo 3: Barratts Bury: Corner and Penetration detailing: 31.1.22



Photo 4: Barratts Bury example seam failure repair location: 31.1.22



Example wind damage to penetration noted in the morning visit: 31.1.22



ON BEHALF OF SMITH GRANT PARTNERSHIP LLP

job number	R2174	design source/ref:	BM-SD02-13-01	specification source/ref:	R2174-R07-v3	documents attached	✕	
site name / location	Waldmer’s Wood, Bury	building use:	residential	commercial	other (describe)			
plot number	39,40,41	building description:	no. of storeys =	2	Detached	semi-detached	terrace	apartment block
compiled by:	Ben Crowther (BC)	gas protection type:	active / passive		foundation type:	block and beam / raft / other		

Ventilated sub-floor (if present)	inspection date/time:	31.1.2022 (airbricks only)	inspected by:	BC	photographed:	✓
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	✓ / ✕	notes (see overleaf)
void former type	✕	1. N/A
height of void space	✕	2. >150mm, not inspected, however building control minimum is confirmed by client and on design detail and anemometer used in conjunction with leaf blower to prove continuity of air flow under the building. No reduction in air flow of the sub floor void was respected.
gravel type	✕	3. N/A (void clear)
pipe size and spacing	✕	4. N/A
external wall airbricks	✓	5. Plots: All : 5 airbricks provided in total to sidewall of dwelling: all clear and free from blockages. Sleeper voids noted in plots with beam and block coverings

internal sleeper walls	✗	6. N/A
external vent trenches / ducts	✗	7. N/A

Gas barrier	inspection date/time:	31.1.22	inspected by:	BC	photographed:	✓
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membrane type	✓	8. VISQUEEN HC BLOC
extent of coverage	✓	9. 100% of building footprint.
slab/membrane condition	✓	10. Good condition, minimal traffic marks and no stress points observed during inspection.
laps and joints	✓	11. Laps >150mm with taped seam seals.
damp-proof course	✓	12. Membrane extends beyond external walls; no DPC installed at time of inspection.
service entries and seals	✓	13. 5 service entries per plot sealed to membrane using adhesive membrane patches; good seals achieved throughout.
Integrity testing	✓	14. Integrity testing was undertaken on site by Ben Crowther, Geoengineer, with and air lance on 31 st January 2022.

Guide notes:

1	void former type	proprietary type - manufacturer and specification, in accordance with design? Installed properly without damage?
2	height of void space	height of proprietary former or constructed ventilation space below suspended floor - note any debris on void / obstructions to air flow, note formation surface soil type (e.g. crushed concrete/brick), any evidence of flooding
3	gravel type	gravel type, if used (limestone / granite etc.) and any specification (e.g. 6F2), typical particle dimensions (mm), apparent fines content (low/high), compaction (loose/dense), waterlogging / contamination by clay, organic matter, other debris
4	pipe size and spacing	diameter in mm; material type (e.g. PVC); slotted or perforated; positioning and spacing / separation and jointing as on design drawing - if not sketch arrangement - do pipes connect with external (telescopic / swan-neck) vents?
5	external wall airbricks	check numbers, size and positions as design drawing (if not shown, make sketch; check for blockage, e.g. by mortar, or soil / pavings etc.
6	internal sleeper walls	check for ventilation holes - e.g. honeycomb brickwork or pipe crossings - note size, spacing and location - in accordance with design?
7	external vent trenches / ducts	check whether located and constructed in accordance with design drawings; if open-topped gravel, note gravel type and presence of fines / contamination, if pipe or other vents - check positions and construction for functionality and absence of blockages - vents may be built over
8	membrane type	note manufacturer and product specification, including batch / roll numbers if present - in accordance with specification? check stock storage arrangements - protected from dirt and damage?
9	extent of coverage	if membrane is incomplete, further inspection will be required - note areas completed / incomplete - is membrane fully visible or have internal walls been constructed over membrane / screed placed?
10	slab/membrane condition	record presence of debris / rough surfaces, in particular sharp projections, below or above membrane; record locations of all punctures or repairs, note arrangements to protect membrane surface from traffic / tools and equipment / materials, and temporary weighting down of membrane, e.g. use of boards - record evidence of footprints / tracks on membrane surface, creases or water/wind damage
11	laps and joints	check the all joints are lapped and sealed in accordance with manufacturer's requirements / specification, particularly where creases/folds are present (usually minimum 150mm laps with double-sided tape between sheets, and single-sided tape on top surface; note size of sheets and frequency of edge seals

12	damp-proof course	record DPC manufacturer and product code - usually integrated with the membrane; measure the DPC projection from external wall in mm; check laps and seals between membrane and DPC - note any potential stress points and tension between the two; check for damage to DPC
13	service entries and seals	note number, position and diameter of service entries - check top hat seal arrangements in accordance with design / specification (laps and seals between top hat and floor membrane, pipe upstand is usually a minimum 150mm) check, with jubilee clips to secure top hat seal to pipe - note presence of clips and tightness of connections
14	Integrity testing	Has integrity testing been undertaken on this plot? If yes, who undertook the testing (company name) and what type of test did they use (air lancing/other test)? Append a copy of the testing certificate to this report.

Visual inspection has been completed by specialist sub-contractor Ben Crowther of GeoEnginSeer Ltd on behalf of Smith Gant LLP with the inspection completed concurrently with integrity testing.

These buildings have **PASSED** inspection.

An additional inspection IS NOT required for these plots.



Inspection by: Ben Crowther

Signed: 31.1.2022

GeoEnginSeer Ltd: Air Lance Integrity Testing Certification

Project: Barratt Homes; Waldmer's Wood, Bury BL9 6SB HBC1221
Building Type: Detached Low Rise Residential Property,
Plot 54

Date: 31st August 2021

Inspection and Integrity Details:

On the 31st August 2021 from 10:00 to 11:30 the installation of ALDERPRUFE HC GEOMEMBRANE Proprietary Membrane on plot 54 was inspected and found to be in an excellent condition. 100% Air-Lancing of the plot was conducted.

The Air Lance integrity test of the laid membrane on site was conducted. Seams were taped and covered with silver foil tape (see photograph 2). Several repairs to the plots was required, these was repairs were observed being carried out and then retested.

Where the following conclusion indicates a pass the follow on construction activities may proceed to suitable protection measures of the membrane being applied in accordance with manufacturer's recommendations.

CONCLUSION OF INTEGRITY AIR LANCE TEST: PASS

If you have any questions regarding the above, please do not hesitate to contact me.

Yours sincerely



Ben Crowther B.Sc, M.Sc, PGCE, FGS, CIEH, PCA-QT, DoWCoP(MMP) SGVP

For and on behalf of geoenginseer.

geoenginseer@gmail.com 07817 108921

Barratt Bury Photograph 1: Repair made to seam.



Barratt Bury Photograph 2: General area view (taped seams with silver foil tape):



Barratt Bury Photograph 3: Example Penetration detail:



Barratt Bury: Site visit evidence:



Geoenginseer
Uncivil Engineering

Geological Services,
Gas Sampling, Verification,
Restricted Access Sampling

07817 108 921

geoenginseer@gmail.com

B14

ON BEHALF OF SMITH GRANT PARTNERSHIP LLP

job number	R2572	design source/ref:	BM-SD02-13-01 to BM-SD02-13-14	specification source/ref:	R2572-R03-V2	documents attached	✗	
site name / location	Waldmer's Wood, Bury	building use:	residential	commercial	other (describe)			
plot number	54	building description:	no. of storeys =	2	Detached	semi-detached	terrace	apartment block
compiled by:	Ben Crowther (BC)	gas protection type:	active / passive		foundation type:	block and beam /raft/other		

Ventilated sub-floor (if present)	inspection date/time:	31.08.2021 (airbricks only) Plots and >150mm	inspected by:	BC	photographed:	✓
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✓ / ✗		notes (see overleaf)
void former type	✗	1. N/A
height of void space	✗	2. >150mm, not inspected, however building control minimum is confirmed by client and on design detail and anemometer used in conjunction with leaf blower to prove continuity of air flow under the building. No reduction in air flow of the sub floor void was respected.
gravel type	✗	3. N/A (void clear)
pipe size and spacing	✗	4. N/A

external wall airbricks	✓	5. Plots: All : 5 airbricks provided in total to sidewall of dwelling: all clear and free from blockages. Sleeper voids noted in plots with beam and block coverings
internal sleeper walls	✗	6. N/A
external vent trenches / ducts	✗	7. N/A

Gas barrier	inspection date/time:	31.08.21	inspected by:	BC	photographed:	✓
membrane type	✓	8. Alderprufe HC Geomembrane				
extent of coverage	✓	9. 100% of building footprint.				
slab/membrane condition	✓	10. Good condition, minimal traffic marks and no stress points observed during inspection.				
laps and joints	✓	11. Laps >150mm with taped seam seals.				
damp-proof course	✓	12. Membrane extends beyond external walls; no DPC installed at time of inspection.				
service entries and seals	✓	13. 5 service entries per plot sealed to membrane using adhesive membrane patches; good seals achieved throughout.				
Integrity testing	✓	14. Integrity testing was undertaken on site by Ben Crowther, Geoengineer, with and air lance on 31 st August 2021.				

Guide notes:

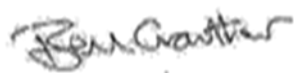
1	void former type	proprietary type - manufacturer and specification, in accordance with design? Installed properly without damage?
2	height of void space	height of proprietary former or constructed ventilation space below suspended floor - note any debris on void / obstructions to air flow, note formation surface soil type (e.g. crushed concrete/brick), any evidence of flooding
3	gravel type	gravel type, if used (limestone / granite etc.) and any specification (e.g. 6F2), typical particle dimensions (mm), apparent fines content (low/high), compaction (loose/dense), waterlogging / contamination by clay, organic matter, other debris
4	pipe size and spacing	diameter in mm; material type (e.g. PVC); slotted or perforated; positioning and spacing / separation and jointing as on design drawing - if not sketch arrangement - do pipes connect with external (telescopic / swan-neck) vents?
5	external wall airbricks	check numbers, size and positions as design drawing (if not shown, make sketch; check for blockage, e.g. by mortar, or soil / pavings etc.
6	internal sleeper walls	check for ventilation holes - e.g. honeycombe brickwork or pipe crossings - note size, spacing and location - in accordance with design?
7	external vent trenches / ducts	check whether located and constructed in accordance with design drawings; if open-topped gravel, note gravel type and presence of fines / contamination; if pipe or other vents - check positions and construction for functionality and absence of blockages - vents may be built over
8	membrane type	note manufacturer and product specification, including batch / roll numbers if present - in accordance with specification? check stock storage arrangements - protected from dirt and damage?
9	extent of coverage	if membrane is incomplete, further inspection will be required - note areas completed / incomplete - is membrane fully visible or have internal walls been constructed over membrane / screed placed?
10	slab/membrane condition	record presence of debris / rough surfaces, in particular sharp projections, below or above membrane; record locations of all punctures or repairs, note arrangements to protect membrane surface from traffic / tools and equipment / materials, and temporary weighting down of membrane, e.g. use of boards - record evidence of footprints / tracks on membrane surface, creases or water/wind damage

11	laps and joints	check the all joints are lapped and sealed in accordance with manufacturer's requirements / specification, particularly where creases/folds are present (usually minimum 150mm laps with double-sided tape between sheets, and single-sided tape on top surface; note size of sheets and frequency of edge seals
12	damp-proof course	record DPC manufacturer and product code - usually integrated with the membrane; measure the DPC projection from external wall in mm; check laps and seals between membrane and DPC - note any potential stress points and tension between the two; check for damage to DPC
13	service entries and seals	note number, position and diameter of service entries - check top hat seal arrangements in accordance with design / specification (laps and seals between top hat and floor membrane, pipe upstand is usually a minimum 150mm) check, with jubilee clips to secure top hat seal to pipe - note presence of clips and tightness of connections
14	Integrity testing	Has integrity testing been undertaken on this plot? If yes, who undertook the testing (company name) and what type of test did they use (air lancing/other test)? Append a copy of the testing certificate to this report.

Visual inspection has been completed by specialist sub-contractor Ben Crowther of Geoengineer Ltd on behalf of Smith Gant LLP with the inspection completed concurrently with integrity testing.

These buildings have **PASSED** inspection.

An additional inspection IS NOT required for these plots.



Inspection by: Ben Crowther

Signed: 31st August 2021

APPENDIX C

GeoEnginSeer Trace Gas Report: Plots 143-146

Our Ref: HBC1221/LRTG2
24th January 2022

Dan Wayland
Smith Grant LLP
Highfield,
2 Station Road,
Ruabon,
Wrexham LL14 6DL

CO2 AND CH4 TRACE GAS MEMBRANE INTEGRITY TESTING AT: PLOTS 143,144,145 &146, WALMERSLEY ROAD, BURY.

Ben Crowther (GeoEnginSeer Ltd) has been commissioned by Smith Grant Partnership LLP to complete membrane integrity confirmation, by means of a pressurised carbon dioxide (4%) and methane (2.5%) testing of the sealed sub floor void space.

Context: The site has been identified as being potentially affected by adverse ground gasses. As a result, a precautionary measure to install a Alderprufe HC Geomembrane Gas Barrier Membrane and Gas Resistant Self-Adhesive Detailing Tape; as proprietary gas resistant barrier system, The materials are designed and rated to resist standard ground gasses such as Carbon Dioxide and Radon.

The system was installed by experienced ground workers with no related professional qualifications. The membrane is laid on a solid brushed clean, beam and block foundation above a minimum 150mm ventilated void.

The installation was completed and covered prior to verification of the installation.

As a result, a post verification tracer gas test was selected from a range of options to prove through several lines of evidence that the installed gas resistance was intact and functioning efficiently. A site visit was conducted on 7th January 2022 between 11:00-13:00hrs to conduct the test.

4% Carbon dioxide and 2.5% Methane were used for the tracer gas' and detected using a GMI Instruments portable gas analyser and detection device. Calibration certificates for the instrument are available.

The tests were conducted using the following methodology:

- Establish good barometric pressure situation to conduct test: Slow drop overnight 6th – 7th of January 2021, barometric pressure dropped from 1010hpa to 1006hpa.
- Gas sweep survey of all available plots to establish baseline conditions and to identify possible gas ingress entry points and any existing gas regime active in the property.
- Sub floor void flow test to establish the connectivity between the windward and leeward air bricks.
- Introduction of tracer gas under positive pressure, using a windward air brick as the delivery point. All other exit points from the void were adequately sealed.
- Gas sweep survey of all plots following the introduction of tracer gas to test for any ingress into the property.

The initial gas sweep surveys conducted before the introduction of tracer gas recorded no carbon dioxide, VOC and methane concentrations consistent above its limit of detection. Each room was swept for any gas with the gas detection instrument as well as the trickle vents on the outside of the building and the subfloor void vents prior to the introduction of the tracer gasses.

Readings from the anemometer showed a wind speed of 2.2 m/s prevailing from a South-Westerly direction, therefore the South-West side of the building was selected for the entry point for the tracer gas, with plot 146 selected as the first to be tested. Air brick vents were sealed with tape, excluding the entry and exit vents located on the south-west and north-east sides respectively. Airflow within the sub-floor void was measured with the anemometer, which measured 2m/s, indicative of good airflow. The 4% carbon dioxide was then injected through the air brick vents on the South-West side of the development. The GMI Instruments portable gas analyser was positioned at the exit air brick vent. Readings of 0.32 ppm carbon dioxide were recorded at the exit vent, whilst no changes in carbon dioxide levels were monitored within the property. This suggests that both the sub-floor void and the membrane are functioning as intended.

Due to shortages within the compressed carbon dioxide supply line, 2.5% methane was used as the tracer gas for the remaining three properties, following the same methodology. For properties 143 to 145, readings taken at the exit vents did not identify significant changes in methane concentrations. However, there were only very minor, fleeting Lower

Explosive Limit (LEL – the GMI measurement range) changes in methane concentration identified within the three aforementioned properties. The reason for this is likely the low density of CH₄ when compared with ambient air, therefore it is likely that the majority of the injected 2.5% methane trace gas was suspended within the sub-floor void. Due to no changes in the readings within any of the properties following the injection of trace gasses, it can be said with confidence that the ground-gas protection measures implemented at this site are adequate and functional.

RESULTS OF THE POST CONSTRUCTION CH₄ TRACER GAS TEST: PASS

If you have any questions regarding the above, please do not hesitate to contact me.

Yours sincerely



Ben Crowther B.Sc, M.Sc, PGCE, FGS, CIEH, PCA QT SGPV

For and on behalf of GeoEnginSeer Ltd.

geoenginseer@gmail.com 07817 108921

Appendix A1:

Site plan



Figure 1 site layout



Figure 2 plots 143 to 146

Appendix A2: Site Photographs



Figure 3 trace gas injection into sub-floor void.

Appendix A3

Trace Gas readings.



Figure 4 trace gas reading taken outside of plot 146 with a long sample tube

APPENDIX D

Plot 48 Vapour Risk Assessment

**Bevis Green Works (Tetrosyl)
Mill Road, Bury, BL9 6RE**

Vapour Risk Assessment (Plot 48)

For: Barratt Homes Ltd.

May 2023

Report Ref: R2174-R13-v1

DOCUMENT CONTROL SHEET

Report Title: Bevis Green Works (Tetrosyl),
Vapour Risk Assessment Report (Plot 48)

Client: Barratt Homes Manchester

Report Reference Number: R2174-R13

Report Status: Final

Version: v1

Report Date: 31st May 2023

Signed For Smith Grant LLP

	Name	Position	Signature	Date
Author	D Wayland BSc MSc AssocMCIWM MCIWEM C.WEM	Partner		31.05.23
Reviewer	S D Miller BSc MCIWEM	Senior Consultant		31.05.23

Document Revision Record:

Version	Report Status	Date	
v1	Final	31.05.23	Issue to client and Local Authority

This report has been prepared by Smith Grant LLP for the sole and exclusive use of Barratt Homes Manchester. All reasonable skill, care and diligence has been exercised within the terms of the contract with the client. We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above. This report may be relied upon or transferred to any other parties only with the express written authorisation of Smith Grant LLP, such consent not to be unreasonably withheld or delayed. If any Third Party comes into possession of this report, they rely on it at their own risk and the authors owe them no duty or care of skill.

Smith Grant LLP reserves the right to alter any of the foregoing information in the event of new information being disclosed or provided and in the light of changes to legislation, guidelines and responses by the statutory and regulatory authorities.

Contents

- 1 Introduction
- 2 Methodology
- 3 Results
- 4 Conclusions

Appendices

- | | |
|---|----------------------------------|
| A | Plot 48 Gas Membrane Certificate |
| B | Photographic Record |
| C | Laboratory Analysis Certificate |

1. Introduction

- 1.1. Remediation works to prepare Phase 1 of the former Bevis Green Works, Bury have been undertaken by Urban Regen Ltd. (URL) on behalf of Barratt Homes Manchester (BM). Remedial works were completed in accordance with the approved Outline Remediation Strategy (ref. R2174-R01-v2) and were detailed within the Phase 1 Earthworks Completion Report (ref. R2174c-R04-v2).
- 1.2. Upon completion of the preparatory works, a Phase 1 Developer-Stage Remediation Strategy (R2174-R07-v5) was produced to finalise the remedial measures to be implemented by the developer. These measures included a phase wide requirement for the application of a 600mm clean soil cover system within all private gardens and the installation of gas protection measures.
- 1.3. Two types of gas protection measures were required within Phase 1 with Plots 39-57 & 143-146 required to have a hydrocarbon VOC resistant membrane whilst the rest of the plots were to have basic protection measures based on CIRIA CS2 / NHBC-Amber 1 conditions.
- 1.4. The requirement for an upgraded VOC membrane within selected plots was based on the recommendation made within the Phase 1 Supplementary Site Investigation Report (ref. R2174-R02-v1) which was produced to allow additional characterisation of the phase and to confirm that the Outline Remedial Strategy remained applicable. Elevated hydrocarbon vapours were reported within a hotspot area (HS12 – Former AST) within monitoring well WS311 and so the recommendation was made. Remedial works to remove impacted soils within this location were subsequently completed, however post-remediation vapour monitoring was not undertaken and so the requirement for VOC measures within the selected plots remained.
- 1.5. It was also acknowledged by the Contaminated Land Officer that there is potential for the migration of VOCs from the adjacent Phase 2 area which may only be remediated after Phase 1 was constructed and so the requirement for VOC membranes within plots in the east of Phase 1 remained valid.
- 1.6. The Phase 1 Developer-Stage Strategy detailed that a suitable membrane resistant to the ingress of VOCs will be installed within Plots 39-57 & 143-146 and that these will be subject to a high-level of verification which will include a visual inspection of each plot and air lance testing, this is compliant with CIRIA C735¹.
- 1.7. BM commissioned the supply and installation of the VOC membranes within the selected plots to PRS Manchester, specialists in the installation of gas protection measures. Smith Grant LLP

¹ CIRIA (C735) Good Practice on the testing and verification of protection systems for buildings against hazardous ground gases.

(SGP) were appointed by BM to carry out the validation works which was then sub-contracted to GeoEngineer, specialists in the verification of gas protection measures.

- 1.8. Following the submission of verification certificates to the CLO, it was identified that basic gas protection measures compliant to CIRIA CS2 had been installed (and validated) in Plot 48 rather than a specific VOC resistant membrane. A copy of the validation report produced is provided in Appendix A.
- 1.9. It was therefore determined that further information and risk assessment was required to confirm that the installed protection measures are sufficient to mitigate against the risk of VOC ingress.

2. Description of Works

- 2.1. Prior to the commencement of additional works, SGP produced a proposed Scope of Works and Methodology for the assessment (ref. R2174-L20221026) and a multiple lines of evidence approach was recommended utilising in-situ vapour monitoring. The proposal was duly presented by GeoEnginSeer to Bury Council (BC) on 13.10.22 with a response received on 18.10.22 generally confirming approval of the scope but advising that actual data from Plot 48 would be preferable.
- 2.2. The following scope was therefore adopted and implemented:
- 2.3. Monitoring of target VOC concentrations within the sub-floor void of Plot 68 (Phase 2)
- 2.3.1. As foundations within the neighbouring Phase 2A area (located adjacent to Plot 48) were under construction, it was proposed to install a vapour monitoring probe within the sub-floor void of Plot 68. The purpose of this was to assess VOC concentrations within the sub-floor void of a plot located closer to the remaining VOC source within Phase 2B. If concentrations of VOCs were found to be below the assessment criteria in a plot located closer to the source, it is therefore reasonable to assume that VOC concentrations would also be below the assessment criteria within the void space of Plot 48.
- 2.3.2. The monitoring of VOCs within the sub-floor void followed the methodology outlined in CL:AIRE TB16² where possible. A slit trench approximately 0.5m deep was excavated down the side of the plot (rear of Plot 68) and a 25mm core drilled through the brickwork below ground level to allow access into the sub-floor void. A diffusion tube supplied by Element laboratories (see Section 2.6) was secured by cable tie to a steel rod and inserted into the void space. The hole around the brickwork was then sealed with hydrated bentonite to provide an air-tight seal. The probe was then left in-situ for a period of 3 weeks before collection.
- 2.4. Monitoring of target VOC concentrations within the sub-floor void of Plot 48
- 2.4.1. To support and allow a comparison of the sub-floor void concentrations within Plot 68, monitoring of VOC concentrations within Plot 48 was also completed. As the plot was finished and occupied it was not possible to adopt the same method of probe installation and so an alternative method was adopted.
- 2.4.2. The front cover of an airbrick along the gable end of the property was partially removed and a diffusion tube secured to a copper wire was inserted through the airbrick and down the telescopic vent. It is acknowledged that there are limitations to this method, as outlined within CL:AIRE TB16, in that the angle of the venting typically limits any monitoring device from entering into the void

² CL:AIRE Technical Bulletin 16 – Complete Continuous Monitoring in Underfloor Voids

space. Whilst the limitations of this approach are noted, it does provide useful data for comparison to support the other monitoring methods.

2.5. Monitoring of target VOC concentrations within Plot 48

2.5.1. BM had notified the resident of the proposed works and it was determined that a diffusion tube should also be installed within Plot 48. To allow for a conservative yet appropriate assessment, the diffusion tube was installed within a downstairs closet underneath the stairs, this can readily be expected where the greatest number of VOCs may accumulate as it is the smallest space with limited ventilation.

2.5.2. Whilst monitoring within Plot 48 will provide the most robust assessment, the limitations of monitoring within an occupied plot are also acknowledged, particularly where resident activities could result in cross-contamination such as through smoking indoors or use of paints and solvents. During deployment, GeoEnginSeer confirmed that the occupant was not a smoker and there was no intention to use paints or solvents during the monitoring period.

Figure 1. Monitoring Location Plan



Blue Star = Environmental / Background
Purple Cross = Indoor (Plot 48)
Purple Arrow = Subfloor Void Monitoring Locations

2.6. VOC Sampling

2.6.1. It was determined through review of previous vapour monitoring reporting that monitoring should be completed for target VOCs where previous exceedances had been reported, these were determined as benzene, toluene, ethylbenzene, xylenes (BTEX), aliphatic and aromatic <C12 hydrocarbons and trichloroethene (TCE).

2.6.2. There are typically two methods of VOC sampling: grab-samples which utilise bottlevacacs of silocans which collect a sample at that given moment in time, or diffusion samples which collect samples over a designated time. The latter method was proposed as this allows sample collection over diurnal changes and is more likely to record concentrations over pressure and temperature changes when VOC generation may be greatest.

2.6.3. Diffusion tubes (tenax) were provided by Element Laboratories, Deeside. These were deployed by GeoEnginSeer on 19.01.23 and were left in-situ for 3 weeks before collection on 10.02.23. Analysis was scheduled for a VOC target list which included the key VOCs as listed in Section 2.6.1. In total 5 diffusion tubes were deployed, 3 as part of the VOC assessment, 1 to determine the environmental background concentrations and 1 travel blank. These are summarised in the table below and are cross-referenced to GeoEnginSeer's labelling.

Table 2.1 Summary of diffusion tube locations

Location	Diffusion Tube Label
Sub-Floor Void of Plot 68	Plot 68 SFV
Sub-Flood Void (via Airbrick) of Plot 48	Bury Plot 45*
Indoor Plot 48	Internal House
Environmental Blank	Atmospheric Sample (Fence Line)
Travel Blank	Control

**Incorrectly labelled on laboratory chain of custody as should be Plot 48*

2.6.4. The Environmental Sample (Atmospheric Sample – Fence Line) was located on the northern boundary of the site and was secured to the site fencing. This was to obtain background concentrations for the site. A travel blank (Control) was also utilised, this is a diffusion tube which remains unopened and remains with the sampler to identify any potential cross-contamination. GeoEnginSeer confirmed that the control tube was left within the vehicle during the monitoring period, however a leak from a portable fuel can within the vehicle occurred resulting in cross-contamination of the blank, as evident from the presence of VOCs. As such the concentrations from the travel blank have been discounted from this assessment and are not discussed further.

2.6.5. Representative photographs taken by GeoEnginSeer during the deployment of the diffusion tubes are presented in Appendix B.

3. Analysis Results

- 3.1. The methodology for deriving assessment screening criteria for health impacts from VOCs at the receptor is set out in Appendix 9 of the VOC handbook³. Tolerable Daily Soil Intake values or Index Doses (for non-carcinogens and carcinogens respectively) are multiplied by the body weight (13.3 kg) and divided by the inhalation rate (8.8 m³/day) of a child receptor as defined in the most recent published UK guidance (DEFRA C4SL). Most of the substances under consideration have toxicological inhalation data published in the “LQM/CIEH S4ULs for Human Health Risk Assessment” (S4UL) - *Copyright Land Quality Management Limited reproduced with Permission* or CL:AIRE “Soil Generic Assessment Criteria for Human Health Risk Assessment”.
- 3.2. The assessment criteria are inherently conservative as they assume long-term, constant exposure of residents over 24 hr periods, 365 days a year and a continuous source which does not diminish over time. However, for the most vulnerable receptors, infants and small children, significant amounts of time spent within dwellings may be anticipated. The exception is benzene for which an air quality standard is available (5 µg/m³).
- 3.3. The methodology in the derivation of inhalation criteria values is consistent with those implemented as part of previous vapour risk assessments on the site.
- 3.4. The full laboratory analysis certificate (lab ref. 23-2091) is included within Appendix C. The range of results from the diffusion of the contaminants detected are provided in the following table with comparison to the derived screening criteria. Only VOCs where concentrations are above analytical detection limits have been listed.

Table 3.1 Summary of VOC results

Contaminant	Inhalation Health Critical Value (µg/kg.bw.day ⁻¹)	Assessment Criteria (µg/m ³)	Concentration Range (µg/m ³)	Exceedances
Benzene	1.4 (S4UL)	5	0.86-1.73	None
Toluene	1400 (S4UL)	2,115.91	1.28-11.03	None
Ethylbenzene	74.3 (S4UL)	112.29	1.02	None
m/p-xylene	60 (S4UL)	90.68	0.75-4.11	None
o-xylene	60 (S4UL)	90.68	1.59	None
1,2,4-Trimethylbenzene	2 (CL:AIRE GAC)	3.02	0.39-1.37	None
Hexane [#] (Aliphatic C6)	5000 (S4UL)	7556.82	5.50	None
4-Isopropyltoluene	-	-	0.39-1.37	-
Styrene	240	362.73	6.27	

³ CIRIA C682: The VOCs Handbook: Investigating, assessing and managing risks from inhalation of VOCs at land affected by contamination 2009

Contaminant	Inhalation Health Critical Value ($\mu\text{g/kg.bw.day}^{-1}$)	Assessment Criteria ($\mu\text{g/m}^3$)	Concentration Range ($\mu\text{g/m}^3$)	Exceedances
Naphthalene	0.86 (S4UL)	1.30	0.33	None
Aliphatic C6-C8	5000 (S4UL)	7556.82	17.05-17.44	None
Aliphatic C8-C10	290 (S4UL)	438.30	26.86	None
Aliphatic C10-C12	290 (S4UL)	438.30	55.99	None
Aliphatic C12-C16	290 (S4UL)	438.30	225.86	None
Aromatic C5-C7	As per benzene			
Aromatic C7-C8	As per toluene			
Aromatic C8-C10	60 (S4UL)	90.68	2.12-26.70	None
Aromatic C10-C12	60 (S4UL)	90.68	13.51	None

3.5. Concentrations of VOCs reported above detection limit were below the derived inhalation criteria in all instances.

4. Conclusions

- 4.1. Indoor vapour monitoring within Plot 48 has demonstrated that VOCs are not migrating into the dwelling and that there is no risk to human health in this regard.
- 4.2. No elevated VOCs were reported within the telescopic vent of Plot 48 which would suggest the efficiency of the dilution and dispersion which occurs within the void-space. This is further demonstrated in the results of the subfloor void of Plot 68 where no elevated concentrations were reported.
- 4.3. It is also important to acknowledge the type of membrane which has been installed within Plot 48 and its high-level of installation and verification. A Visqueen proprietary membrane (Visqueen Gas Barrier) was installed which includes an aluminium core, the aluminium being impermeable to VOCs. Industry testing of proprietary products emerged in VOC product have demonstrated that delamination can occur, however in this instance there is no free product, and the membrane is installed above a ventilated void space. A comparative proprietary product (JUTA GP1) states that where the product is not in direct contact with the ground, and where a clear void of >150mm is provided, then the GP1 product may be suitable for use as a VOC barrier.
- 4.4. The membrane was installed by qualified professionals and the membrane was verified by an independent specialist who also conducted air lance testing and noted no failures.
- 4.5. In the totality of the evidence provided, it is demonstrated that there is no risk of ingress of VOCs into Plot 48.
- 4.6. SGP reserves the right to alter any of the foregoing information in the event of new information being disclosed or provided and in the light of changes to legislation, guidelines and responses by the statutory and regulatory authorities.
- 4.7. This report has been prepared by Smith Grant LLP, for the sole and exclusive use of Barratt Homes Manchester, the benefit of this report may not be assigned to any third party without the prior agreement in writing of Smith Grant LLP. Reasonable skill, care and diligence has been exercised within the timescale and budget available, and in accordance with the technical requirements of the brief. Notwithstanding the efforts made by the professional team in undertaking the assessment and preparing this report, it is possible that other ground conditions and contamination as yet undetected may exist. Reliance on the findings of this report must therefore be limited accordingly. Such reliance must be based on the whole report and not on extracts which may lead to incomplete or incorrect conclusions when taken out of context.

APPENDIX A

Plot 48 Gas Membrane Certificate

www.GeoEnginSeerLtd.com

Barratt Bury Photograph 1: Plan of the Site.



Barratt Bury Photograph 2: VISQUEEN GAS BARRIER Membrane:



ON BEHALF OF SMITH GRANT PARTNERSHIP LLP

job number	R2174	design source/ref:	BM-SD02-13-01	specification source/ref:	R2174-R07-v3	documents attached	✕	
site name / location	Waldmer's Wood, Bury	building use:	residential	commercial	other (describe)			
plot number	48	building description:	no. of storeys =	2	Detached	semi-detached	terrace	apartment block
compiled by:	Ben Crowther (BC)	gas protection type:	active / passive		foundation type:	block and beam / raft / other		

Ventilated sub-floor (if present)	inspection date/time:	6.10.2021 (airbricks only) Plots 42,43,44 and future plots show >150mm	inspected by:	BC	photographed:	✓
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	✓ / ✕	notes (see overleaf)
void former type	✕	1. N/A
height of void space	✕	2. >150mm, not inspected, however building control minimum is confirmed by client and on design detail and anemometer used in conjunction with leaf blower to prove continuity of air flow under the building. No reduction in air flow of the sub floor void was respected.
gravel type	✕	3. N/A (void clear)
pipe size and spacing	✕	4. N/A

external wall airbricks	✓	5. Plots: All : 5 airbricks provided in total to sidewall of dwelling: all clear and free from blockages. Sleeper voids noted in plots with beam and block coverings
internal sleeper walls	✗	6. N/A
external vent trenches / ducts	✗	7. N/A

Gas barrier	inspection date/time:	6.10.21	inspected by:	BC	photographed:	✓
membrane type	✓	8. Visqueen Gas Barrier				
extent of coverage	✓	9. 100% of building footprint.				
slab/membrane condition	✓	10. Good condition, minimal traffic marks and no stress points observed during inspection.				
laps and joints	✓	11. Laps >150mm with taped seam seals.				
damp-proof course	✓	12. Membrane extends beyond external walls; no DPC installed at time of inspection.				
service entries and seals	✓	13. 5 service entries per plot sealed to membrane using adhesive membrane patches; good seals achieved throughout.				
Integrity testing	✓	14. Integrity testing was undertaken on site by Ben Crowther, Geoengineer, with and air lance on 6 th October 2021				

Guide notes:

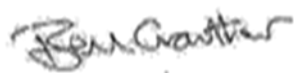
1	void former type	proprietary type - manufacturer and specification, in accordance with design? Installed properly without damage?
2	height of void space	height of proprietary former or constructed ventilation space below suspended floor - note any debris on void / obstructions to air flow, note formation surface soil type (e.g. crushed concrete/brick), any evidence of flooding
3	gravel type	gravel type, if used (limestone / granite etc.) and any specification (e.g. 6F2), typical particle dimensions (mm), apparent fines content (low/high), compaction (loose/dense), waterlogging / contamination by clay, organic matter, other debris
4	pipe size and spacing	diameter in mm; material type (e.g. PVC); slotted or perforated; positioning and spacing / separation and jointing as on design drawing - if not sketch arrangement - do pipes connect with external (telescopic / swan-neck) vents?
5	external wall airbricks	check numbers, size and positions as design drawing (if not shown, make sketch; check for blockage, e.g. by mortar, or soil / pavings etc.
6	internal sleeper walls	check for ventilation holes - e.g. honeycombe brickwork or pipe crossings - note size, spacing and location - in accordance with design?
7	external vent trenches / ducts	check whether located and constructed in accordance with design drawings; if open-topped gravel, note gravel type and presence of fines / contamination; if pipe or other vents - check positions and construction for functionality and absence of blockages - vents may be built over
8	membrane type	note manufacturer and product specification, including batch / roll numbers if present - in accordance with specification? check stock storage arrangements - protected from dirt and damage?
9	extent of coverage	if membrane is incomplete, further inspection will be required - note areas completed / incomplete - is membrane fully visible or have internal walls been constructed over membrane / screed placed?
10	slab/membrane condition	record presence of debris / rough surfaces, in particular sharp projections, below or above membrane; record locations of all punctures or repairs, note arrangements to protect membrane surface from traffic / tools and equipment / materials, and temporary weighting down of membrane, e.g. use of boards - record evidence of footprints / tracks on membrane surface, creases or water/wind damage

11	laps and joints	check the all joints are lapped and sealed in accordance with manufacturer's requirements / specification, particularly where creases/folds are present (usually minimum 150mm laps with double-sided tape between sheets, and single-sided tape on top surface; note size of sheets and frequency of edge seals
12	damp-proof course	record DPC manufacturer and product code - usually integrated with the membrane; measure the DPC projection from external wall in mm; check laps and seals between membrane and DPC - note any potential stress points and tension between the two; check for damage to DPC
13	service entries and seals	note number, position and diameter of service entries - check top hat seal arrangements in accordance with design / specification (laps and seals between top hat and floor membrane, pipe upstand is usually a minimum 150mm) check, with jubilee clips to secure top hat seal to pipe - note presence of clips and tightness of connections
14	Integrity testing	Has integrity testing been undertaken on this plot? If yes, who undertook the testing (company name) and what type of test did they use (air lancing/other test)? Append a copy of the testing certificate to this report.

Visual inspection has been completed by specialist sub-contractor Ben Crowther of GeoEnginSeer Ltd on behalf of Smith Gant LLP with the inspection completed concurrently with integrity testing.

These buildings have **PASSED** inspection.

An additional inspection IS NOT required for these plots.



Inspection by: Ben Crowther

Signed: 6th October 2021

APPENDIX B

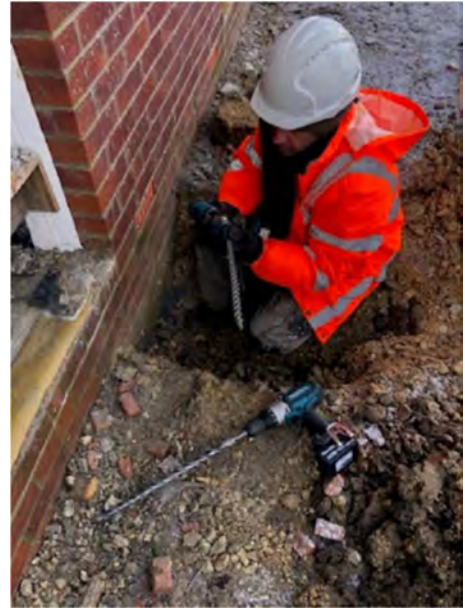
Site Photographs

1.



Plot 48 sub-floor void monitoring.

2.



Excavation of slit trench adjacent to Plot 68 and drilling through brickwork into void

3.



Installation of diffusion tube attached to metal rod into void space. Rope secured for recovery

4.



Monitoring location temporarily backfilled to avoid destruction during site works

APPENDIX C

Laboratory Analysis Certificates

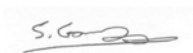
GeoEngineer Ltd
738 Burnley Road
Todmorden
OL14 8LF



Attention : Ben Crowther
Date : 21st February 2023
Your reference :
Our reference : 23/2091
Location : Bury
Date samples received : 10th February 2023
Status : Final Report
Issue : 1

5 samples were received for analysis on 10th February 2023 of which 5 were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

Authorised By:



Simon Gomery BSc
Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: GeoEngineer Ltd

Reference:

Location: Bury

Contact: Ben Crowther

Date of Receipt: 10/02/23

Date Analysed: 17/02/23

Uptake Rate Key

	Rate from Markes Application Note 001 based on nearest exposure time to actual
	Rate based on 8 hour exposure time from Markes Application Note 001
	No uptake rate available for this compound - Approximate rate used

Sample ID: Plot 68 SFV

Volume Sampled by Client -

EMT Job No: 23/2091

EMT Sample No: 1

Matrix: Tenax Tube

Method: VOCs by Thermal Desorption (GC-MS)

Volume Sampled by Client: Passive Sample

Sample Start Time 19/01/2023 10:15 Date:Hours:Mins

Sample Stop Time 10/02/2023 11:45 Date:Hours:Mins

Sample Duration 31,770 Total Minutes

Tube Serial number: 771375

Q* - Qualifiers

SV Indicates surrogate recovery outside performance criteria

>> Indicates value exceeds calibration range

Key

MDL Method Detection Limit

ISO 17025 (UKAS) accredited

(NB - accreditation only applies to ng/tube concentrations)

CAS No	Compound	Q*	Passive Uptake Rate* ng/ppm/min	RESULT ng/tube	Concentration in Air ppb	MDL ng/tube	MDL ppb	Concentration ug/m ³	MDL ug/m ³
60-29-7	Diethyl ether [#]		2	<5	<0.08	<5	<0.08		
156-60-5	trans-1,2-dichloroethene		2	<90	<1.42	<90	<1.42		
1634-04-4	MTBE		2	<90	<1.42	<90	<1.42		
110-54-3	Hexane [#]		2	<10	<0.16	<10	<0.16		
126-98-7	Methyl acrylonitrile		2	<90	<1.42	<90	<1.42		
156-59-2	cis-1,2-dichloroethene		2	<90	<1.42	<90	<1.42		
594-20-7	2,2-Dichloropropane		2	<90	<1.42	<90	<1.42		
67-66-3	Chloroform		2	<90	<1.42	<90	<1.42		
109-99-9	Tetrahydrofuran		2	<90	<1.42	<90	<1.42		
71-55-6	1,1,1-Trichloroethane		2	<90	<1.42	<90	<1.42		
109-69-3	1-Chlorobutane [#]		2	<5	<0.08	<5	<0.08		
71-43-2	Benzene [#]		0.7	7	0.31	<5	<0.22	1.01	<0.72
563-58-6	1,1-Dichloropropene [#]		2	<5	<0.08	<5	<0.08		
56-23-5	Carbon Tetrachloride		2	<90	<1.42	<90	<1.42		
107-14-2	Chloroacetonitrile [#]		2	<90	<1.42	<90	<1.42		
79-01-6	Trichloroethene [#] (TCE)		2	<5	<0.08	<5	<0.08		
74-95-3	Dibromomethane [#]		2	<5	<0.08	<5	<0.08		
80-62-6	Methyl methacrylate [#]		2	<5	<0.08	<5	<0.08		
75-27-4	Bromodichloromethane [#]		2	<5	<0.08	<5	<0.08		
10061-01-5	cis-1,3-dichloropropene [#]		2	<5	<0.08	<5	<0.08		
108-88-3	Toluene [#]		1.03	11	0.34	<5	<0.15	1.28	<0.58
10061-02-6	trans-1,3-dichloropropene [#]		2	<5	<0.08	<5	<0.08		
79-00-5	1,1,2-Trichloroethane [#]		2	<5	<0.08	<5	<0.08		
142-28-9	1,3-Dichloropropane [#]		2	<5	<0.08	<5	<0.08		
97-63-2	Ethyl methacrylate [#]		2	<5	<0.08	<5	<0.08		
124-48-1	Dibromochloromethane [#]		2	<5	<0.08	<5	<0.08		
106-93-4	1,2-Dibromoethane [#]		2	<10	<0.16	<10	<0.16		
127-18-4	Tetrachloroethene [#] (PCE)		2.8	<5	<0.06	<5	<0.06		
108-90-7	Chlorobenzene [#]		2	<5	<0.08	<5	<0.08		

*Taken from Application Note 001: Uptake rates for tube-type axial diffusive samplers, Markes International, March 2015. Where more than 1 uptake rate is published the uptake rate closest to the sample duration has been chosen.

ns=Not Specified

Element Materials Technology

Client Name: GeoEngineer Ltd
Reference:
Location: Bury
Contact: Ben Crowther

Date of Receipt: 10/02/23

Date Analysed: 17/02/23

Uptake Rate Key

	Rate from Markes Application Note 001 based on nearest exposure time to actual
	Rate based on 8 hour exposure time from Markes Application Note 001
	No uptake rate available for this compound - Approximate rate used

Sample ID: Plot 68 SFV
Volume Sampled by Client: -
EMT Job No: 23/2091
EMT Sample No: 1
Matrix: Tenax Tube
Method: VOCs by Thermal Desorption (GC-MS)

Volume Sampled by Client: Passive Sample

Sample Start Time: 19/01/2023 10:15 Date:Hours:Mins
Sample Stop Time: 10/02/2023 11:45 Date:Hours:Mins
Sample Duration: 31,770 Total Minutes

Tube Serial number: 771375

Q* - Qualifiers

SV Indicates surrogate recovery outside performance criteria
>> Indicates value exceeds calibration range

Key

MDL Method Detection Limit
ISO 17025 (UKAS) accredited
(NB - accreditation only applies to ng/tube concentrations)

CAS No	Compound	Q*	Passive Uptake Rate*	RESULT	Concentration in Air	MDL ng/tube	MDL ppb	Concentration ug/m ³	MDL ug/m ³
			ng/ppm/min		ppb				
630-20-6	1,1,1,2-tetrachloroethane [#]		2	<5	<0.08	<5	<0.08		
100-41-4	Ethylbenzene [#]		2	<5	<0.08	<5	<0.08		
179601-23-1	M/Pxylene [#]		1.46	11	0.24	<5	<0.11	1.03	<0.47
75-25-2	Bromoform [#]		2	<5	<0.08	<5	<0.08		
100-42-5	Styrene [#]		2.4	<5	<0.07	<5	<0.07		
95-47-6	o-Xylene [#]		1.46	<5	<0.11	<5	<0.11		
79-34-5	1,1,2,2-Tetrachloroethane [#]		2	<5	<0.08	<5	<0.08		
96-18-4	1,2,3-Trichloropropane [#]		2	<5	<0.08	<5	<0.08		
98-82-8	Isopropylbenzene [#]		2.5	<5	<0.06	<5	<0.06		
110-57-6	trans-1,4-dichloro-2-butene [#]		2	<10	<0.16	<10	<0.16		
108-86-1	Bromobenzene [#]		3.31	<5	<0.05	<5	<0.05		
95-49-8	2-Chlorotoluene [#]		2	<5	<0.08	<5	<0.08		
103-65-1	Propyl benzene [#]		2.37	<5	<0.07	<5	<0.07		
106-43-4	4-Chlorotoluene [#]		2	<5	<0.08	<5	<0.08		
108-67-8	1,3,5-Trimethylbenzene [#]		2.37	<5	<0.07	<5	<0.07		
98-06-6	tert-Butyl benzene [#]		2	<5	<0.08	<5	<0.08		
95-63-6	1,2,4-Trimethylbenzene [#]		2.37	<5	<0.07	<5	<0.07		
541-73-1	1,3-Dichlorobenzene [#]		2	<5	<0.08	<5	<0.08		
135-98-8	sec-Butylbenzene [#]		2	<5	<0.08	<5	<0.08		
106-46-7	1,4-Dichlorobenzene [#]		3.23	<5	<0.05	<5	<0.05		
99-87-6	4-Isopropyltoluene [#]		2	<5	<0.08	<5	<0.08		
95-50-1	1,2-Dichlorobenzene [#]		3.23	<5	<0.05	<5	<0.05		
104-51-8	n-butyl benzene [#]		2	<5	<0.08	<5	<0.08		
67-72-1	Hexachloroethane [#]		2	<5	<0.08	<5	<0.08		
96-12-8	1,2-dibromo-3-chloropropane [#]		2	<10	<0.16	<10	<0.16		
98-95-3	Nitrobenzene [#]		2	<10	<0.16	<10	<0.16		
120-82-1	1,2,4-Trichlorobenzene [#]		2	<5	<0.08	<5	<0.08		
91-20-3	Naphthalene [#]		2.55	<5	<0.06	<5	<0.06		
87-61-6	1,2,3-Trichlorobenzene [#]		2	<5	<0.08	<5	<0.08		
87-68-3	Hexachlorobutadiene [#]		3.5	<5	<0.04	<5	<0.04		

*Taken from Application Note 001: Uptake rates for tube-type axial diffusive samplers, Markes International, March 2015. Where more than 1 uptake rate is published the uptake rate closest to the sample duration has been chosen.

ns=Not Specified

Element Materials Technology

Client Name: GeoEngineer Ltd

Reference:

Location: Bury

Contact: Ben Crowther

Date of Receipt: 10/02/23

Date Analysed: 17/02/23

Uptake Rate Key

	Rate from Markes Application Note 001 based on nearest exposure time to actual
	Rate based on 8 hour exposure time from Markes Application Note 001
	No uptake rate available for this compound - Approximate rate used

Sample ID: Bury Plot 45
 Volume Sampled by Client: -
 EMT Job No: 23/2091
 EMT Sample No: 2
 Matrix: Tenax Tube
 Method: VOCs by Thermal Desorption (GC-MS)
 Tube Serial number: 776585

Volume Sampled by Client: Passive Sample
 Sample Start Time: 19/01/2023 10:20
 Sample Stop Time: 10/02/2023 11:50
 Sample Duration: 31,770
 Date: Hours: Mins
 Date: Hours: Mins
 Total Minutes

Q* - Qualifiers

SV Indicates surrogate recovery outside performance criteria
 >> Indicates value exceeds calibration range

Key

MDL Method Detection Limit
 # ISO 17025 (UKAS) accredited
 (NB - accreditation only applies to ng/tube concentrations)

CAS No	Compound	Q*	Passive Uptake Rate* ng/ppm/min	RESULT ng/tube	Concentration in Air ppb	MDL ng/tube	MDL ppb	Concentration ug/m ³	MDL ug/m ³
60-29-7	Diethyl ether [#]		2	<5	<0.08	<5	<0.08		
156-60-5	trans-1,2-dichloroethene		2	<90	<1.42	<90	<1.42		
1634-04-4	MTBE		2	<90	<1.42	<90	<1.42		
110-54-3	Hexane [#]		2	<10	<0.16	<10	<0.16		
126-98-7	Methyl acrylonitrile		2	<90	<1.42	<90	<1.42		
156-59-2	cis-1,2-dichloroethene		2	<90	<1.42	<90	<1.42		
594-20-7	2,2-Dichloropropane		2	<90	<1.42	<90	<1.42		
67-66-3	Chloroform		2	<90	<1.42	<90	<1.42		
109-99-9	Tetrahydrofuran		2	<90	<1.42	<90	<1.42		
71-55-6	1,1,1-Trichloroethane		2	<90	<1.42	<90	<1.42		
109-69-3	1-Chlorobutane [#]		2	<5	<0.08	<5	<0.08		
71-43-2	Benzene [#]		0.7	<5	<0.22	<5	<0.22		
563-58-6	1,1-Dichloropropene [#]		2	<5	<0.08	<5	<0.08		
56-23-5	Carbon Tetrachloride		2	<90	<1.42	<90	<1.42		
107-14-2	Chloroacetonitrile [#]		2	<90	<1.42	<90	<1.42		
79-01-6	Trichloroethene [#] (TCE)		2	<5	<0.08	<5	<0.08		
74-95-3	Dibromomethane [#]		2	<5	<0.08	<5	<0.08		
80-62-6	Methyl methacrylate [#]		2	<5	<0.08	<5	<0.08		
75-27-4	Bromodichloromethane [#]		2	<5	<0.08	<5	<0.08		
10061-01-5	cis-1,3-dichloropropene [#]		2	<5	<0.08	<5	<0.08		
108-88-3	Toluene [#]		1.03	13	0.40	<5	<0.15	1.51	<0.58
10061-02-6	trans-1,3-dichloropropene [#]		2	<5	<0.08	<5	<0.08		
79-00-5	1,1,2-Trichloroethane [#]		2	<5	<0.08	<5	<0.08		
142-28-9	1,3-Dichloropropane [#]		2	<5	<0.08	<5	<0.08		
97-63-2	Ethyl methacrylate [#]		2	<5	<0.08	<5	<0.08		
124-48-1	Dibromochloromethane [#]		2	<5	<0.08	<5	<0.08		
106-93-4	1,2-Dibromoethane [#]		2	<10	<0.16	<10	<0.16		
127-18-4	Tetrachloroethene [#] (PCE)		2.8	<5	<0.06	<5	<0.06		
108-90-7	Chlorobenzene [#]		2	<5	<0.08	<5	<0.08		

*Taken from Application Note 001: Uptake rates for tube-type axial diffusive samplers, Markes International, March 2015. Where more than 1 uptake rate is published the uptake rate closest to the sample duration has been chosen.

ns=Not Specified

Client Name:	GeoEngineer Ltd
Reference:	
Location:	Bury
Contact:	Ben Crowther
Sample ID:	Bury Plot 45
EMT Job No:	23/2091
EMT Sample No:	2
Matrix:	Tenax Tube
Tube Serial number:	776585
Method:	VOCs by Thermal Desorption (GC-MS)

	Rate from Markes Application Note 001 based on nearest exposure time to actual
	Rate based on 8 hour exposure time from Markes Application Note 001
	No uptake rate available for this compound - Approximate rate used

Volume Sampled by Client: Passive Sample		
Sample Start Time	19/01/2023 10:20	Date:Hours:mins
Sample Stop Time	10/02/2023 11:50	Date:Hours:mins
Sample Duration	31,770	Total Minutes

SV Indicates surrogate recovery outside performance criteria
>> Indicates value exceeds calibration range

MDL	Method Detection Limit
#	ISO 17025 (UKAS) accredited

[illegible]

ns= Not Specified

Element Materials Technology

Client Name: GeoEngineer Ltd

Reference:

Location: Bury

Contact: Ben Crowther

Date of Receipt: 10/02/23

Date Analysed: 17/02/23

Uptake Rate Key

	Rate from Markes Application Note 001 based on nearest exposure time to actual
	Rate based on 8 hour exposure time from Markes Application Note 001
	No uptake rate available for this compound - Approximate rate used

Sample ID: Internal House

Volume Sampled by Client -

EMT Job No: 23/2091

EMT Sample No: 3

Matrix: Tenax Tube

Method: VOCs by Thermal Desorption (GC-MS)

Volume Sampled by Client: Passive Sample

Sample Start Time 19/01/2023 10:25 Date:Hours:Mins

Sample Stop Time 10/02/2023 11:55 Date:Hours:Mins

Sample Duration 31,770 Total Minutes

Tube Serial number: 776586

Q* - Qualifiers

SV Indicates surrogate recovery outside performance criteria

>> Indicates value exceeds calibration range

Key

MDL Method Detection Limit

ISO 17025 (UKAS) accredited

(NB - accreditation only applies to ng/tube concentrations)

CAS No	Compound	Q*	Passive Uptake Rate* ng/ppm/min	RESULT ng/tube	Concentration in Air ppb	MDL ng/tube	MDL ppb	Concentration ug/m ³	MDL ug/m ³
60-29-7	Diethyl ether [#]		2	<5	<0.08	<5	<0.08		
156-60-5	trans-1,2-dichloroethene		2	<90	<1.42	<90	<1.42		
1634-04-4	MTBE		2	<90	<1.42	<90	<1.42		
110-54-3	Hexane [#]		2	99	1.56	<10	<0.16	5.50	<0.56
126-98-7	Methyl acrylonitrile		2	<90	<1.42	<90	<1.42		
156-59-2	cis-1,2-dichloroethene		2	<90	<1.42	<90	<1.42		
594-20-7	2,2-Dichloropropane		2	<90	<1.42	<90	<1.42		
67-66-3	Chloroform		2	<90	<1.42	<90	<1.42		
109-99-9	Tetrahydrofuran		2	<90	<1.42	<90	<1.42		
71-55-6	1,1,1-Trichloroethane		2	<90	<1.42	<90	<1.42		
109-69-3	1-Chlorobutane [#]		2	<5	<0.08	<5	<0.08		
71-43-2	Benzene [#]		0.7	12	0.54	<5	<0.22	1.73	<0.72
563-58-6	1,1-Dichloropropene [#]		2	<5	<0.08	<5	<0.08		
56-23-5	Carbon Tetrachloride		2	<90	<1.42	<90	<1.42		
107-14-2	Chloroacetonitrile [#]		2	<90	<1.42	<90	<1.42		
79-01-6	Trichloroethene [#] (TCE)		2	<5	<0.08	<5	<0.08		
74-95-3	Dibromomethane [#]		2	<5	<0.08	<5	<0.08		
80-62-6	Methyl methacrylate [#]		2	<5	<0.08	<5	<0.08		
75-27-4	Bromodichloromethane [#]		2	<5	<0.08	<5	<0.08		
10061-01-5	cis-1,3-dichloropropene [#]		2	<5	<0.08	<5	<0.08		
108-88-3	Toluene [#]		1.03	95	2.90	<5	<0.15	11.03	<0.58
10061-02-6	trans-1,3-dichloropropene [#]		2	<5	<0.08	<5	<0.08		
79-00-5	1,1,2-Trichloroethane [#]		2	<5	<0.08	<5	<0.08		
142-28-9	1,3-Dichloropropane [#]		2	<5	<0.08	<5	<0.08		
97-63-2	Ethyl methacrylate [#]		2	<5	<0.08	<5	<0.08		
124-48-1	Dibromochloromethane [#]		2	<5	<0.08	<5	<0.08		
106-93-4	1,2-Dibromoethane [#]		2	<10	<0.16	<10	<0.16		
127-18-4	Tetrachloroethene [#] (PCE)		2.8	<5	<0.06	<5	<0.06		
108-90-7	Chlorobenzene [#]		2	<5	<0.08	<5	<0.08		

*Taken from Application Note 001: Uptake rates for tube-type axial diffusive samplers, Markes International, March 2015. Where more than 1 uptake rate is published the uptake rate closest to the sample duration has been chosen.

ns=Not Specified

Client Name:	GeoEngineer Ltd
Reference:	
Location:	Bury
Contact:	Ben Crowther
Sample ID:	Internal House
Volume Sampled by Client	-
EMT Job No:	23/2091
EMT Sample No:	3
Matrix:	Tenax Tube
Method:	VOCs by Thermal Desorption (GC-MS)
Tube Serial number:	776586

Date of Receipt: 10/02/23

Date Analysed: 17/02/23

Uptake Rate Key

Rate from Markes Application Note 001 based on nearest exposure time to actual
Rate based on 8 hour exposure time from Markes Application Note 001
No uptake rate available for this compound - Approximate rate used

Volume Sampled by Client: Passive Sample

Sample Start Time 19/01/2023 10:25 Date:Hours:Mins

Sample Stop Time 10/02/2023 11:55 Date:Hours:Mins

Sample Duration	31,770	Total Minutes
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Q* - Qualifiers

SV Indicates surrogate recovery outside performance criteria

>> Indicates value exceeds calibration range

Key

MDL Method Detection Limit

ISO 17025 (UKAS) accredited
(NB - accreditation only applies to ng/tube concentrations)

[illegible]

*Taken from Application Note 001: Uptake rates for tube-type axial diffusive samplers, Markes International, March 2015. Where more than 1 uptake rate is published the uptake rate closest to the sample duration has been chosen.

ns=Not Specified

Element Materials Technology

Client Name: GeoEngineer Ltd

Reference:

Location: Bury

Contact: Ben Crowther

Date of Receipt: 10/02/23

Date Analysed: 17/02/23

Uptake Rate Key

	Rate from Markes Application Note 001 based on nearest exposure time to actual
	Rate based on 8 hour exposure time from Markes Application Note 001
	No uptake rate available for this compound - Approximate rate used

Sample ID: Control

Volume Sampled by Client -

EMT Job No: 23/2091

EMT Sample No: 4

Matrix: Tenax Tube

Method: VOCs by Thermal Desorption (GC-MS)

Volume Sampled by Client: Passive Sample

Sample Start Time 19/01/2023 10:15 Date:Hours:Mins

Sample Stop Time 10/02/2023 12:00 Date:Hours:Mins

Sample Duration 31,785 Total Minutes

Tube Serial number: 246821

Q* - Qualifiers

SV Indicates surrogate recovery outside performance criteria

>> Indicates value exceeds calibration range

Key

MDL Method Detection Limit

ISO 17025 (UKAS) accredited

(NB - accreditation only applies to ng/tube concentrations)

CAS No	Compound	Q*	Passive Uptake Rate* ng/ppm/min	RESULT ng/tube	Concentration in Air ppb	MDL ng/tube	MDL ppb	Concentration ug/m ³	MDL ug/m ³
60-29-7	Diethyl ether [#]		2	<5	<0.08	<5	<0.08		
156-60-5	trans-1,2-dichloroethene		2	<90	<1.42	<90	<1.42		
1634-04-4	MTBE		2	<90	<1.42	<90	<1.42		
110-54-3	Hexane [#]		2	707	11.12	<10	<0.16	39.26	<0.56
126-98-7	Methyl acrylonitrile		2	<90	<1.42	<90	<1.42		
156-59-2	cis-1,2-dichloroethene		2	<90	<1.42	<90	<1.42		
594-20-7	2,2-Dichloropropane		2	<90	<1.42	<90	<1.42		
67-66-3	Chloroform		2	<90	<1.42	<90	<1.42		
109-99-9	Tetrahydrofuran		2	<90	<1.42	<90	<1.42		
71-55-6	1,1,1-Trichloroethane		2	<90	<1.42	<90	<1.42		
109-69-3	1-Chlorobutane [#]		2	<5	<0.08	<5	<0.08		
71-43-2	Benzene [#]		0.7	571	25.66	<5	<0.22	82.12	<0.72
563-58-6	1,1-Dichloropropene [#]		2	<5	<0.08	<5	<0.08		
56-23-5	Carbon Tetrachloride		2	<90	<1.42	<90	<1.42		
107-14-2	Chloroacetonitrile [#]		2	<90	<1.42	<90	<1.42		
79-01-6	Trichloroethene [#] (TCE)		2	<5	<0.08	<5	<0.08		
74-95-3	Dibromomethane [#]		2	<5	<0.08	<5	<0.08		
80-62-6	Methyl methacrylate [#]		2	<5	<0.08	<5	<0.08		
75-27-4	Bromodichloromethane [#]		2	<5	<0.08	<5	<0.08		
10061-01-5	cis-1,3-dichloropropene [#]		2	<5	<0.08	<5	<0.08		
108-88-3	Toluene [#]	>>	1.03	4887	149.27	<5	<0.15	567.24	<0.58
10061-02-6	trans-1,3-dichloropropene [#]		2	<5	<0.08	<5	<0.08		
79-00-5	1,1,2-Trichloroethane [#]		2	<5	<0.08	<5	<0.08		
142-28-9	1,3-Dichloropropane [#]		2	<5	<0.08	<5	<0.08		
97-63-2	Ethyl methacrylate [#]		2	<5	<0.08	<5	<0.08		
124-48-1	Dibromochloromethane [#]		2	<5	<0.08	<5	<0.08		
106-93-4	1,2-Dibromoethane [#]		2	<10	<0.16	<10	<0.16		
127-18-4	Tetrachloroethene [#] (PCE)		2.8	<5	<0.06	<5	<0.06		
108-90-7	Chlorobenzene [#]		2	<5	<0.08	<5	<0.08		

*Taken from Application Note 001: Uptake rates for tube-type axial diffusive samplers, Markes International, March 2015. Where more than 1 uptake rate is published the uptake rate closest to the sample duration has been chosen.

ns=Not Specified

Element Materials Technology

Client Name: GeoEngineer Ltd
Reference:

Location: Bury

Contact: Ben Crowther

Date of Receipt: 10/02/23

Date Analysed: 17/02/23

Uptake Rate Key

	Rate from Markes Application Note 001 based on nearest exposure time to actual
	Rate based on 8 hour exposure time from Markes Application Note 001
	No uptake rate available for this compound - Approximate rate used

Sample ID: Control
Volume Sampled by Client: -
EMT Job No: 23/2091
EMT Sample No: 4
Matrix: Tenax Tube
Method: VOCs by Thermal Desorption (GC-MS)

Volume Sampled by Client: Passive Sample

Sample Start Time 19/01/2023 10:15 Date:Hours:Mins
Sample Stop Time 10/02/2023 12:00 Date:Hours:Mins
Sample Duration 31,785 Total Minutes

Tube Serial number: 246821

Q* - Qualifiers

SV Indicates surrogate recovery outside performance criteria
>> Indicates value exceeds calibration range

Key

MDL Method Detection Limit
ISO 17025 (UKAS) accredited
(NB - accreditation only applies to ng/tube concentrations)

CAS No	Compound	Q*	Passive Uptake Rate* ng/ppm/min	RESULT ng/tube	Concentration in Air ppb	MDL ng/tube	MDL ppb	Concentration ug/m ³	MDL ug/m ³
630-20-6	1,1,1,2-tetrachloroethane [#]		2	<5	<0.08	<5	<0.08		
100-41-4	Ethylbenzene [#]	>>	2	1975	31.07	<5	<0.08	134.52	<0.34
179601-23-1	M/Pxylene [#]	>>	1.46	6628	142.83	<5	<0.11	618.44	<0.47
75-25-2	Bromoform [#]		2	<5	<0.08	<5	<0.08		
100-42-5	Styrene [#]		2.4	18	0.24	<5	<0.07	1.01	<0.28
95-47-6	o-Xylene [#]	>>	1.46	3194	68.83	<5	<0.11	298.02	<0.47
79-34-5	1,1,2,2-Tetrachloroethane [#]		2	<5	<0.08	<5	<0.08		
96-18-4	1,2,3-Trichloropropane [#]		2	<5	<0.08	<5	<0.08		
98-82-8	Isopropylbenzene [#]		2.5	311	3.91	<5	<0.06	19.57	<0.31
110-57-6	trans-1,4-dichloro-2-butene [#]		2	<10	<0.16	<10	<0.16		
108-86-1	Bromobenzene [#]		3.31	<5	<0.05	<5	<0.05		
95-49-8	2-Chlorotoluene [#]		2	<5	<0.08	<5	<0.08		
103-65-1	Propyl benzene [#]	>>	2.37	1059	14.06	<5	<0.07	70.29	<0.33
106-43-4	4-Chlorotoluene [#]		2	<5	<0.08	<5	<0.08		
108-67-8	1,3,5-Trimethylbenzene [#]	>>	2.37	1611	21.39	<5	<0.07	104.79	<0.33
98-06-6	tert-Butyl benzene [#]		2	<5	<0.08	<5	<0.08		
95-63-6	1,2,4-Trimethylbenzene [#]	>>	2.37	5177	68.72	<5	<0.07	336.75	<0.33
541-73-1	1,3-Dichlorobenzene [#]		2	<5	<0.08	<5	<0.08		
135-98-8	sec-Butylbenzene [#]		2	61	0.96	<5	<0.08	5.35	<0.44
106-46-7	1,4-Dichlorobenzene [#]		3.23	<5	<0.05	<5	<0.05		
99-87-6	4-Isopropyltoluene [#]		2	<5	<0.08	<5	<0.08		
95-50-1	1,2-Dichlorobenzene [#]		3.23	<5	<0.05	<5	<0.05		
104-51-8	n-butyl benzene [#]		2	148	2.33	<5	<0.08	12.99	<0.44
67-72-1	Hexachloroethane [#]		2	<5	<0.08	<5	<0.08		
96-12-8	1,2-dibromo-3-chloropropane [#]		2	<10	<0.16	<10	<0.16		
98-95-3	Nitrobenzene [#]		2	<10	<0.16	<10	<0.16		
120-82-1	1,2,4-Trichlorobenzene [#]		2	<5	<0.08	<5	<0.08		
91-20-3	Naphthalene [#]		2.55	103	1.27	<5	<0.06	6.75	<0.33
87-61-6	1,2,3-Trichlorobenzene [#]		2	<5	<0.08	<5	<0.08		
87-68-3	Hexachlorobutadiene [#]		3.5	<5	<0.04	<5	<0.04		

*Taken from Application Note 001: Uptake rates for tube-type axial diffusive samplers, Markes International, March 2015. Where more than 1 uptake rate is published the uptake rate closest to the sample duration has been chosen.

ns=Not Specified

Element Materials Technology

Reference:

Date of Receipt: 10/02/23

Date Analysed: 17/02/23

Volume Sampled by Client: Passive Sample

Sample Start Time 19/01/2023 10:15

Date:Hours:Mins

Sample Stop Time	10/02/2023 12:00
-------------------------	------------------

Date:Hours:Mins

Sample Duration	31,785
-----------------	--------

Total Minutes

31,133

	Rate from Markes Application Note 001 based on nearest exposure time to actual
	Rate based on 8 hour exposure time from Markes Application Note 001
	No uptake rate available for this compound - Approximate rate used

SV Indicates surrogate recovery outside performance criteria
>> Indicates value exceeds calibration range

MDL	Method Detection Limit
#	ISO 17025 (UKAS) accredited

[illegible]

ns= Not Specified

Element Materials Technology

Client Name: GeoEngineer Ltd

Reference:

Location: Bury

Contact: Ben Crowther

Date of Receipt: 10/02/23

Date Analysed: 17/02/23

Uptake Rate Key

	Rate from Markes Application Note 001 based on nearest exposure time to actual
	Rate based on 8 hour exposure time from Markes Application Note 001
	No uptake rate available for this compound - Approximate rate used

Sample ID: Atmospheric Sample (Fence Line)

Volume Sampled by Client

EMT Job No: 23/2091

EMT Sample No: 5

Matrix: Tenax Tube

Method: VOCs by Thermal Desorption (GC-MS)

Volume Sampled by Client: Passive Sample

Sample Start Time 19/01/2023 10:30 Date:Hours:Mins

Sample Stop Time 10/02/2023 12:00 Date:Hours:Mins

Sample Duration 31,770 Total Minutes

Tube Serial number: 435928

Q* - Qualifiers

SV Indicates surrogate recovery outside performance criteria

>> Indicates value exceeds calibration range

Key

MDL Method Detection Limit

ISO 17025 (UKAS) accredited

(NB - accreditation only applies to ng/tube concentrations)

CAS No	Compound	Q*	Passive Uptake Rate* ng/ppm/min	RESULT ng/tube	Concentration in Air ppb	MDL ng/tube	MDL ppb	Concentration ug/m ³	MDL ug/m ³
60-29-7	Diethyl ether [#]		2	<5	<0.08	<5	<0.08		
156-60-5	trans-1,2-dichloroethene		2	<90	<1.42	<90	<1.42		
1634-04-4	MTBE		2	<90	<1.42	<90	<1.42		
110-54-3	Hexane [#]		2	<10	<0.16	<10	<0.16		
126-98-7	Methyl acrylonitrile		2	<90	<1.42	<90	<1.42		
156-59-2	cis-1,2-dichloroethene		2	<90	<1.42	<90	<1.42		
594-20-7	2,2-Dichloropropane		2	<90	<1.42	<90	<1.42		
67-66-3	Chloroform		2	<90	<1.42	<90	<1.42		
109-99-9	Tetrahydrofuran		2	<90	<1.42	<90	<1.42		
71-55-6	1,1,1-Trichloroethane		2	<90	<1.42	<90	<1.42		
109-69-3	1-Chlorobutane [#]		2	<5	<0.08	<5	<0.08		
71-43-2	Benzene [#]		0.7	6	0.27	<5	<0.22	0.86	<0.72
563-58-6	1,1-Dichloropropene [#]		2	<5	<0.08	<5	<0.08		
56-23-5	Carbon Tetrachloride		2	<90	<1.42	<90	<1.42		
107-14-2	Chloroacetonitrile [#]		2	<90	<1.42	<90	<1.42		
79-01-6	Trichloroethene [#] (TCE)		2	<5	<0.08	<5	<0.08		
74-95-3	Dibromomethane [#]		2	<5	<0.08	<5	<0.08		
80-62-6	Methyl methacrylate [#]		2	<5	<0.08	<5	<0.08		
75-27-4	Bromodichloromethane [#]		2	<5	<0.08	<5	<0.08		
10061-01-5	cis-1,3-dichloropropene [#]		2	<5	<0.08	<5	<0.08		
108-88-3	Toluene [#]		1.03	18	0.55	<5	<0.15	2.09	<0.58
10061-02-6	trans-1,3-dichloropropene [#]		2	<5	<0.08	<5	<0.08		
79-00-5	1,1,2-Trichloroethane [#]		2	<5	<0.08	<5	<0.08		
142-28-9	1,3-Dichloropropane [#]		2	<5	<0.08	<5	<0.08		
97-63-2	Ethyl methacrylate [#]		2	<5	<0.08	<5	<0.08		
124-48-1	Dibromochloromethane [#]		2	<5	<0.08	<5	<0.08		
106-93-4	1,2-Dibromoethane [#]		2	<10	<0.16	<10	<0.16		
127-18-4	Tetrachloroethene [#] (PCE)		2.8	<5	<0.06	<5	<0.06		
108-90-7	Chlorobenzene [#]		2	<5	<0.08	<5	<0.08		

*Taken from Application Note 001: Uptake rates for tube-type axial diffusive samplers, Markes International, March 2015. Where more than 1 uptake rate is published the uptake rate closest to the sample duration has been chosen.

ns=Not Specified

Element Materials Technology

Reference:

Date of Receipt: 10/02/23

Date Analysed: 17/02/23

Volume Sampled by Client: Passive Sample

Sample Start Time 19/01/2023 10:30

Sample Stop Time 10/02/2023 12:00

Sample Duration	31.770
-----------------	--------

Date:Hours:Mins

Date: Hours: Mins:

Total Minutes

Rate from Markes Application Note 001 based on nearest exposure time to actual
Rate based on 8 hour exposure time from Markes Application Note 001
No uptake rate available for this compound - Approximate rate used

Rate from Markes Application Note 001
based on nearest exposure time to actual

Rate based on 8 hour exposure time from
Markes Application Note 001

No uptake rate available for this compound -
Approximate rate used

SV	Indicates surrogate recovery outside performance criteria
>>	Indicates value exceeds calibration range

SV Indicates surrogate recovery outside performance criteria

>> Indicates value exceeds calibration range

MDL	Method Detection Limit
#	ISO 17025 (UKAS) accredited

MDL Method Detection Limit

ISO 17025 (UKAS) accredited

[illegible]

*Taken from Application Note 001: Uptake rates for tube-type axial diffusive samplers, Markes International, March 2015. Where more than 1 uptake rate is published the uptake rate closest to the sample duration has been chosen.

ns= Not Specified

Client Name: GeoEnginseer Ltd

Reference: Bury

Location:

Contact: Ben Crowther

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 23/2091

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher, this result is not accredited.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

EMT Job No: 23/2091

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM197	VOCs by GCMS-TD			N			

APPENDIX E

Soil Depth Validation Certificates

Topsoil Validation Record

Job number	R2174	Depth ref:	R2174-R07-v4 Final			Quality ref:		R2174-R07-v4 Final			Other documents attached		✓	
Date	24.06.22	Area use:	garden			landscaped			stockpile			other		
Site name / location	Waldmers Wood, Bury	Size area (m):	4 x 7	Approx. Area (m²):	28	Approx. Depth Top (m):	0.6	Approx. Volume Top (m³):	17	Approx. Depth Sub (m):	n/a	Approx. Volume Sub (m³):	n/a	
Plot/ location:	Plot 19													
Compiled by:	MJ / SM	Number depth entries required			1 (1 per plot); 1 entry provided.			Number samples required:			3 TS (1 per 100m³ TS, minimum 3 samples per source); 9 TS provided (full suite) with an additional 5 samples analysed for PAHs only.			

Quality Validation		Inspection date/time:	10.11.21, 22.02.22	Inspected by:	SM, CS	Photographed:	✓
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Source Topsoil	1.	✓	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.
Description Topsoil	2.	✓	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.
Sample Topsoil	3.	✓	5 samples collected from onsite stockpile for full contamination suite and 5 additional samples collected and analysed for PAHs only (EMT Lab ref: 21/17783); 4 additional samples collected from onsite stockpile on 22.02.22 (Eurofins Lab ref: 22-07010-1).
Source Subsoil	4.	x	Not used
Description Subsoil	5.	x	n/a
Sample Subsoil	6.	x	n/a

Topsoil Validation Record



Topsoil Results Summary – Cottam 15 import (Lab ref: 21/17783, 22-07010-1)

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Asbestos Fibres	NAD	NAD	Yes
Arsenic	37	7-15	Yes
Cadmium	11	<0.1-1.3	Yes
Chromium (total)	910	19-70.5	Yes
Chromium VI	6	<0.5	Yes
Copper	2,400	19-33	Yes
Lead	200	30-68	Yes
Mercury	40	<0.1-0.2	Yes
Nickel	180	16-51	Yes
Zinc	3,700	38-170	Yes
Naphthalene	2.3	<0.04-0.06	Yes
Acenaphthene	210	<0.03	Yes
Acenaphthylene	170	<0.05-0.11	Yes
Fluorene	170	<0.04-0.08	Yes
Phenanthrene	95	<0.03-1.7	Yes
Anthracene	2,400	<0.04-0.51	Yes
Fluoranthene	280	<0.03-2	Yes
Pyrene	620	<0.03-2.1	Yes
Benzo(a)anthracene	7.2	<0.06-1.5	Yes
Chrysene	15	<0.02-1.9	Yes
Benzo(b)fluoranthene	2.6	<0.05-1.5	Yes
Benzo(k)fluoranthene	77	<0.05-0.45	Yes
Benzo(a)pyrene	2.2	<0.04-1	Yes
Indeno(123cd) pyrene	27	<0.04-0.83	Yes

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Dibenzo(ah) anthracene	0.24	<0.04-0.22	Yes
Benzo(ghi) perylene	320	<0.04-0.67	Yes
Aliphatic C5-C6	42	<0.1	Yes
Aliphatic C6-C8	100	<0.1	Yes
Aliphatic C8-C10	27	<0.1	Yes
Aliphatic C10-C12	130	<0.2	Yes
Aliphatic C12-C16	1,100	<1	Yes
Aliphatic C16-C21	65,000	<1	Yes
Aliphatic C21-C35	65,000	<1	Yes
Aromatic C6-C7	70	<0.1	Yes
Aromatic C7-C8	130	<0.1	Yes
Aromatic C8-C10	34	<0.1	Yes
Aromatic C10-C12	74	<0.2	Yes
Aromatic C12-C16	140	<1	Yes
Aromatic C16-C21	260	<1	Yes
Aromatic C21-C35	1,100	<1	Yes
Benzene	0.08	<0.001	Yes
Toluene	130	<0.001	Yes
Ethyl-benzene	47	<0.001	Yes
m/p-xylene	56	<0.001	Yes
o-xylene	60	<0.001	Yes

Topsoil Validation Record

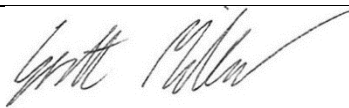
Depth Validation	Inspection date/time:	08.06.22	Inspected by:	MJ	Photographed:	✓
Plot 19	Required Depth (mm)	600	Measured Depth (mm)	600	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.6m	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.6m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						

Topsoil Validation Record



Soil PASSED testing for quality and depth.

An additional inspection visit IS NOT required.

SGP Staff:	M Jones BSc MSc AMIEnvSc	Signed:		24.06.22
SGP Member:	D Wayland BSc MSC AssocMCIWM MCIWEM C.WEM	Signed:		24.06.22

Guide notes:

1.	Source Topsoil	As much information as possible: Date Delivered, volume/weight delivery, supplier, certification, source address (yard), original source address (site).
2.	Description Topsoil	Full Description: Grading (Particle Size: clay, silt, sand, gravel), organic content, colour, odour, minerals, stone, glass, slate, ash, clinker, coal, coke, tarmac, plastic, other?
3.	Sample Topsoil	Date sampled, date submitted, sample reference, laboratory, laboratory job number
4.	Source Subsoil	As much information as possible: Date Delivered, volume/weight delivery, supplier, certification, source address (yard), original source address (site).
5.	Description Subsoil	Full Description: Grading (Particle Size: clay, silt, sand, gravel), organic content, colour, odour, minerals, stone, glass, slate, ash, clinker, coal, coke, tarmac, plastic, other?
6.	Sample Subsoil	Date sampled, date submitted, sample reference, laboratory, laboratory job number

Smith Grant LLP
Station House
Station Road
Ruabon
Wrexham
LL14 6DL



Attention : Dan Wayland
Date : 15th November, 2021
Your reference : R2174
Our reference : Test Report 21/17783 Batch 1
Location : Tetrosyl BM
Date samples received : 11th November, 2021
Status : Final Report
Issue : 2

Ten samples were received for analysis on 11th November, 2021 of which ten were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:



Bruce Leslie
Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Smith Grant LLP
Reference: R2127
Location: Tetrosyl BM
Contact: Dan Wayland
EMT Job No: 21/17783

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1	2-3	4	5-6	7	8-9	10	11-12	13	14-15	Please see attached notes for all abbreviations and acronyms		
Sample ID	Cottam - TS1	Cottam - TS2	Cottam - TS3	Cottam - TS4	Cottam - TS5	Cottam - TS6	Cottam - TS7	Cottam - TS8	Cottam - TS9	Cottam - TS10			
Depth													
COC No / misc													
Containers	J	V J	J	V J	J	V J	J	V J	J	V J			
Sample Date	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021			
Sample Type	Clayey Loam	Clayey Loam	Clay	Clay	Clay	Clayey Loam	Clay	Clay	Clay	Clay			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	LOD/LOR	Units	Method No.
Arsenic ^{#M}	-	11.8	-	12.5	-	11.9	-	14.1	-	9.8	<0.5	mg/kg	TM30/PM15
Cadmium ^{#M}	-	0.1	-	0.1	-	0.1	-	<0.1	-	0.1	<0.1	mg/kg	TM30/PM15
Chromium ^{#M}	-	68.5	-	70.5	-	63.4	-	68.4	-	64.7	<0.5	mg/kg	TM30/PM15
Copper ^{#M}	-	32	-	33	-	28	-	30	-	27	<1	mg/kg	TM30/PM15
Lead ^{#M}	-	63	-	68	-	55	-	60	-	50	<5	mg/kg	TM30/PM15
Mercury ^{#M}	-	0.2	-	<0.1	-	0.1	-	0.1	-	0.2	<0.1	mg/kg	TM30/PM15
Nickel ^{#M}	-	23.4	-	23.6	-	21.0	-	24.0	-	22.3	<0.7	mg/kg	TM30/PM15
Selenium ^{#M}	-	<1	-	<1	-	1	-	1	-	<1	<1	mg/kg	TM30/PM15
Zinc ^{#M}	-	67	-	68	-	62	-	65	-	60	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene ^{#M}	<0.04	0.06	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene ^{#M}	<0.05	0.11	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene ^{#M}	<0.04	0.08	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene ^{#M}	0.11	1.03	<0.03	0.11	<0.03	0.10	0.07	0.06	0.22	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene [#]	<0.04	0.19	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.06	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene ^{#M}	0.18	1.15	<0.03	0.19	<0.03	0.13	0.10	0.10	0.28	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene [#]	0.15	0.93	<0.03	0.16	<0.03	0.11	0.10	0.09	0.22	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene [#]	0.11	0.46	<0.06	0.11	<0.06	<0.06	0.08	0.09	0.14	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene ^{#M}	0.10	0.50	<0.02	0.09	<0.02	0.06	0.06	0.06	0.11	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(k)fluoranthene ^{#M}	0.11	0.65	<0.07	0.12	<0.07	<0.07	<0.07	<0.07	0.12	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene [#]	0.06	0.33	<0.04	0.05	<0.04	<0.04	<0.04	<0.04	0.07	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene ^{#M}	<0.04	0.25	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene [#]	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene [#]	<0.04	0.21	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 16 Total	0.8	6.0	<0.6	0.8	<0.6	<0.6	<0.6	<0.6	1.2	<0.6	<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.08	0.47	<0.05	0.09	<0.05	<0.05	<0.05	<0.05	0.09	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.03	0.18	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	98	97	98	102	98	96	97	99	92	71	<0	%	TM4/PM8
TPH CWG													
Aliphatics													
>C5-C6 ^{#M}	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 ^{#M}	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 ^{#M}	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 ^{#M}	-	<4	-	<4	-	<4	-	<4	-	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 ^{#M}	-	<7	-	<7	-	<7	-	<7	-	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 ^{#M}	-	<7	-	<7	-	<7	-	<7	-	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35	-	<19	-	<19	-	<19	-	<19	-	<19	<19	mg/kg	TM5/PM8/PM16/PM12/PM15

Element Materials Technology

Client Name: Smith Grant LLP
Reference: R2127
Location: Tetrosyl BM
Contact: Dan Wayland
EMT Job No: 21/17783

Report : Solid

Solids: V=60g VOC jar. J=250g glass jar. T=plastic tub

[illegible]

Client Name: Smith Grant LLP
Reference: R2127
Location: Tetrosyl BM
Contact: Dan Wayland

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
21/17783	1	Cottam - TS2		3	11/11/2021	General Description (Bulk Analysis)	soil/stones
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD
21/17783	1	Cottam - TS4		6	11/11/2021	General Description (Bulk Analysis)	soil/stones
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD
21/17783	1	Cottam - TS6		9	11/11/2021	General Description (Bulk Analysis)	soil/stones
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD
21/17783	1	Cottam - TS8		12	11/11/2021	General Description (Bulk Analysis)	Brown soil with vegetation
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD
21/17783	1	Cottam - TS10		15	11/11/2021	General Description (Bulk Analysis)	Brown soil with vegetation
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD

Client Name: Smith Grant LLP

Reference: R2127

Location: Tetrosyl BM

Contact: Dan Wayland

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/17783

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Please include all sections of this report if it is reproduced

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

EMT Job No: 21/17783

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes	Yes	AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes
PM13	A visual examination of the solid sample is carried out to ascertain sample make up, colour and any other inclusions. This is not a geotechnical description.	PM0	No preparation is required.			AR	No
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO ₂ generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes

EMT Job No: 21/17783

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEPA Method 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes	Yes	AD	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes	Yes	AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 First edition (2006)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No
NONE	No Method Code	NONE	No Method Code			AD	Yes



2183

Final Report

Report No.: 22-07010-1
Initial Date of Issue: 01-Mar-2022
Client Smith Grant LLP
Client Address: Station House, Station Road
Ruabon
Wrexham
LL14 6DL
Contact(s): Cezary Salwa
Megan Jones

Project R2174 TETROSYL BM

Quotation No.: **Date Received:** 24-Feb-2022

Order No.: **Date Instructed:** 24-Feb-2022

No. of Samples: 4

Turnaround (Wkdays): 5 **Results Due:** 02-Mar-2022

Date Approved: 01-Mar-2022

Approved By:



Details: Stuart Henderson, Technical
Manager

Results - Soil

Project: R2174 TETROSYL BM

Client: Smith Grant LLP	Chemtest Job No.:				22-07010	22-07010	22-07010	22-07010
Quotation No.:	Chemtest Sample ID.:				1378913	1378914	1378915	1378916
Order No.:	Client Sample Ref.:				ES1	ES2	ES3	ES4
	Sample Location:				Cottam	Cottam	Cottam	Cottam
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Date Sampled:				22-Feb-2022	22-Feb-2022	22-Feb-2022	22-Feb-2022
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD				
ACM Type	U	2192		N/A	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	20	21	22	20
pH	U	2010		4.0	7.9	7.8	7.6	7.9
Arsenic	U	2450	mg/kg	1.0	7.0	8.0	15	7.6
Cadmium	U	2450	mg/kg	0.10	0.15	0.16	1.3	0.13
Chromium	U	2450	mg/kg	1.0	19	23	38	20
Copper	U	2450	mg/kg	0.50	21	22	29	19
Mercury	U	2450	mg/kg	0.10	0.18	0.12	0.14	0.16
Nickel	U	2450	mg/kg	0.50	18	51	43	16
Lead	U	2450	mg/kg	0.50	43	30	45	49
Selenium	U	2450	mg/kg	0.20	< 0.20	< 0.20	1.1	0.22
Zinc	U	2450	mg/kg	0.50	61	59	170	38
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	5.0	2.9	4.7	3.8
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10	< 10	< 10
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: R2174 TETROSYL BM

Client: Smith Grant LLP	Chemtest Job No.:				22-07010	22-07010	22-07010	22-07010
Quotation No.:	Chemtest Sample ID.:				1378913	1378914	1378915	1378916
Order No.:	Client Sample Ref.:				ES1	ES2	ES3	ES4
	Sample Location:				Cottam	Cottam	Cottam	Cottam
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Date Sampled:				22-Feb-2022	22-Feb-2022	22-Feb-2022	22-Feb-2022
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD				
Phenanthrene	U	2700	mg/kg	0.10	1.7	0.86	0.93	0.85
Anthracene	U	2700	mg/kg	0.10	0.51	0.26	0.19	0.18
Fluoranthene	U	2700	mg/kg	0.10	2.0	1.4	1.2	1.4
Pyrene	U	2700	mg/kg	0.10	2.1	1.7	1.4	1.5
Benzo[a]anthracene	U	2700	mg/kg	0.10	1.4	1.0	1.5	0.94
Chrysene	U	2700	mg/kg	0.10	1.9	0.85	1.9	1.4
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	1.5	1.2	1.1	1.2
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	0.45	0.32	0.23	0.27
Benzo[a]pyrene	U	2700	mg/kg	0.10	1.0	0.80	0.53	0.66
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	0.83	0.62	0.43	0.69
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	0.22	0.15	< 0.10	0.17
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	0.67	0.39	0.31	0.26
Total Of 16 PAH's	U	2700	mg/kg	2.0	14	9.6	9.7	9.5
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com



Topsoil Validation Record

Job number	R2174	Depth ref:	R2174-R07-v4 Final		Quality ref:		R2174-R07-v4 Final			Other documents attached		✓		
Date	23.11.23	Area use:	Garden			landscaped			stockpile			other		
Site name / location	Waldmers Wood, Bury	Size area (m):	6 x 4	Approx. Area (m²):	24	Approx. Depth Top (m):	0.6	Approx. Volume Top (m³):	14.4	Approx. Depth Sub (m):	n/a	Approx. Volume Sub (m³):	n/a	
Plot/ location:	Plot 147													
Compiled by:	MJ	Number depth entries required			1 (1 per plot); 1 entry provided.		Number samples required:			3 TS (1 per 250m³ TS, minimum 3 samples per source); 6 TS samples provided.				

Quality Validation		Inspection date/time:	15.06.23 & 09.08.23	Inspected by:	CM	Photographed:	✓
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Source Topsoil	1.	✓	Barratt Homes development site off Rossendale Road, Burnley (well characterised Greenfield site): stockpile 'T2'.
Description Topsoil	2.	✓	Blackish brown slightly gravelly sandy clayey topsoil with grass roots.
Sample Topsoil	3.	✓	3 samples collected from stockpile at source site (Eurofins Lab ref: 23-20765; samples: T2-S1 to S3) and a further 3 samples collected from stockpile at destination site (Eurofins Lab ref: 23-50455-1).
Source Subsoil	4.	x	Not used
Description Subsoil	5.	x	n/a
Sample Subsoil	6.	x	n/a

Topsoil Validation Record



Topsoil Results Summary – Rossendale Road

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Asbestos Fibres	NAD	NAD	Yes
Arsenic	37	1.8-20	Yes
Cadmium	11	<0.1-1.2	Yes
Chromium (total)	910	5.0-54	Yes
Chromium VI	6	<1.2	Yes
Copper	2,400	8.1-76	Yes
Lead	200	16-190	Yes
Mercury	40	<0.05-0.40	Yes
Nickel	180	2.8-15	Yes
Zinc	3,700	17-210	Yes
Naphthalene	2.3	0.57-2.9	Yes*
Acenaphthene	210	0.92-3.8	Yes
Acenaphthylene	170	0.11-2.0	Yes
Fluorene	170	0.68-3.4	Yes
Phenanthrene	95	5.9-21	Yes
Anthracene	2,400	1.5-7.0	Yes
Fluoranthene	280	8.2-26	Yes
Pyrene	620	8.2-26	Yes
Benzo(a)anthracene	7.2	3.8-14	Yes*
Chrysene	15	5.7-13	Yes
Benzo(b)fluoranthene	2.6	4.5-13	Yes*
Benzo(k)fluoranthene	77	2.8-4.8	Yes
Benzo(a)pyrene	2.2	4.1-10	Yes*
Indeno(123cd) pyrene	27	2.7-6.8	Yes

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Dibenzo(ah) anthracene	0.24	0.89-1.9	Yes*
Benzo(ghi) perylene	320	2.3-6.1	Yes
Aliphatic C5-C6	42	<0.1	Yes
Aliphatic C6-C8	100	<0.1	Yes
Aliphatic C8-C10	27	<0.1	Yes
Aliphatic C10-C12	130	<1	Yes
Aliphatic C12-C16	1,100	<2	Yes
Aliphatic C16-C21	65,000	<8	Yes
Aliphatic C21-C35	65,000	<1-20	Yes
Aromatic C6-C7	70	<1	Yes
Aromatic C7-C8	130	<1	Yes
Aromatic C8-C10	34	<1	Yes
Aromatic C10-C12	74	<1-1.5	Yes
Aromatic C12-C16	140	<1-7.8	Yes
Aromatic C16-C21	260	25-130	Yes
Aromatic C21-C35	1,100	49-250	Yes
Benzene	0.08	<0.005	Yes
Toluene	130	<0.005	Yes
Ethyl-benzene	47	<0.005	Yes
m/p-xylene	56	<0.005	Yes
o-xylene	60	<0.005	Yes
*See Summary section			



Topsoil Validation Record

Depth Validation	Inspection date/time:	23.11.23	Inspected by:	MJ	Photographed:	✓
Plot 147	Required Depth (mm)	600	Measured Depth (mm)	600	PASS	
Source Topsoil	Barratt Homes development site off Rossendale Road, Burnley (well characterised Greenfield site): stockpile 'T2'.					
Source Subsoil	n/a					
Soil profile/description	0.0-0.6m	Blackish brown slightly gravelly sandy clayey topsoil with grass roots.				
	0.6m	Base – Black woven geotextile				
Photograph (location)		Photograph (depth profile)		Photograph (soil type & geotextile)		
						

Topsoil Validation Record

**Summary**

Exceedances of the adopted residential soils screening criteria have been detected for a number of PAHs: Naphthalene (3 no.), Benz(a)anthracene (5 no.), Benzo(b)fluoranthene (6 no.), Benzo(a)pyrene (6 no.) and Dibenzo(ah)anthracene (6 no.). However, as summarised in the 'Rossendale Road, Burnley: Stockpile Validation & Assessment' letter (ref: R2688-L01, dated 27th June 2023 – attached), these exceedances have been attributed to the inclusion of coal within the soils considering the undeveloped nature of the source site, the absence of any other identifiable sources, as well as the descriptions of coal gravel within the soils. The overall risk to human health from PAHs within fragments of coal is associated with the bioavailability of the PAHs which is considered to be limited due to the sequestration of PAHs within a carbon or vitrified matrix; the soils were therefore considered suitable for reuse as topsoil in garden areas which was agreed by the Bury Council's Environmental Protection Officer in letter 'CL584.120623.1' (6th July 2023). The supplementary onsite testing confirmed concentrations of the exceeding determinants to be below, or within the range of, the testing results from the source site therefore the conclusions of the assessment letter remain unchanged.

An additional inspection visit IS NOT required.

SGP Staff:	M Jones BSc MSc AMIEnvSc	Signed:		23.11.23
SGP Member:	D Wayland BSc MSC AssocMCIWM MCIWEM C.WEM	Signed:		24.11.23

Guide notes:

1.	Source Topsoil	As much information as possible: Date Delivered, volume/weight delivery, supplier, certification, source address (yard), original source address (site).
2.	Description Topsoil	Full Description: Grading (Particle Size: clay, silt, sand, gravel), organic content, colour, odour, minerals, stone, glass, slate, ash, clinker, coal, coke, tarmac, plastic, other?
3.	Sample Topsoil	Date sampled, date submitted, sample reference, laboratory, laboratory job number
4.	Source Subsoil	As much information as possible: Date Delivered, volume/weight delivery, supplier, certification, source address (yard), original source address (site).
5.	Description Subsoil	Full Description: Grading (Particle Size: clay, silt, sand, gravel), organic content, colour, odour, minerals, stone, glass, slate, ash, clinker, coal, coke, tarmac, plastic, other?
6.	Sample Subsoil	Date sampled, date submitted, sample reference, laboratory, laboratory job number



Caitlin McHugh
Smith Grant LLP
Bryn Estyn
Business Centre
Bryn Estyn Road
Wrexham
LL13 9TY

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

e: caitlin.mchugh@smithgrant.co.uk

Analytical Report Number : 23-50455

Project / Site name:	Tetrosyl, Bury	Samples received on:	11/08/2023
Your job number:	R2174	Samples instructed on/ Analysis started on:	11/08/2023
Your order number:		Analysis completed by:	21/08/2023
Report Issue Number:	1	Report issued on:	21/08/2023
Samples Analysed:	3 soil samples		

Signed: _____

Joanna Wawrzeczko
Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 23-50455
Project / Site name: Tetrosyl, Bury

Lab Sample Number				2778430	2778431	2778432
Sample Reference				TS-S1	TS-S2	TS-S3
Sample Number				RR Bury	RR Bury	RR Bury
Depth (m)				None Supplied	None Supplied	None Supplied
Date Sampled				09/08/2023	09/08/2023	09/08/2023
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status			
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	37	39	35
Total mass of sample received	kg	0.001	NONE	0.8	0.8	0.8

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	DSA	DSA	DSA

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	6.6	6.6	6.8
Organic Matter	%	0.1	MCERTS	-	13	-
Organic Matter (automated)	%	0.1	MCERTS	12	-	11

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.91	0.57	1.2
Acenaphthylene	mg/kg	0.05	MCERTS	0.11	0.14	0.2
Acenaphthene	mg/kg	0.05	MCERTS	2.2	2	2
Fluorene	mg/kg	0.05	MCERTS	1.6	1.4	1.5
Phenanthrene	mg/kg	0.05	MCERTS	14	13	13
Anthracene	mg/kg	0.05	MCERTS	3.1	3.1	3.1
Fluoranthene	mg/kg	0.05	MCERTS	17	17	17
Pyrene	mg/kg	0.05	MCERTS	15	16	15
Benzo(a)anthracene	mg/kg	0.05	MCERTS	7.3	7.4	7.7
Chrysene	mg/kg	0.05	MCERTS	7.3	8.1	7.6
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	8.3	7.9	9.2
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	2.8	4.1	3.1
Benzo(a)pyrene	mg/kg	0.05	MCERTS	6.7	7.2	7.7
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	3.5	3.7	4.1
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.89	0.94	1
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	3.8	4	4.4

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	95.4	96.8	98.9
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	14	14	14
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.8	0.9	0.8
Chromium (hexavalent)	mg/kg	1.2	NONE	< 1.2	< 1.2	< 1.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	28	31	29
Copper (aqua regia extractable)	mg/kg	1	MCERTS	40	45	48
Lead (aqua regia extractable)	mg/kg	1	MCERTS	99	120	100
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	0.4	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	14	14	15
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	100	110	100

Monoaromatics & Oxygenates

Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
p & m-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
o-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0

Analytical Report Number: 23-50455
Project / Site name: Tetrosyl, Bury

Lab Sample Number	2778430	2778431	2778432
Sample Reference	TS-S1	TS-S2	TS-S3
Sample Number	RR Bury	RR Bury	RR Bury
Depth (m)	None Supplied	None Supplied	None Supplied
Date Sampled	09/08/2023	09/08/2023	09/08/2023
Time Taken	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 _{HS 1D AL}	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10
TPH-CWG - Aliphatic >EC6 - EC8 _{HS 1D AL}	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10
TPH-CWG - Aliphatic >EC8 - EC10 _{HS 1D AL}	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10
TPH-CWG - Aliphatic >EC10 - EC12 _{EH CU 1D AL}	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 _{EH CU 1D AL}	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 _{EH CU 1D AL}	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 _{EH CU 1D AL}	mg/kg	8	MCERTS	10	20	18
TPH-CWG - Aliphatic (EC5 - EC35) _{EH CU+HS 1D AL}	mg/kg	10	NONE	11	22	19

TPH-CWG - Aromatic >EC5 - EC7 _{HS 1D AR}	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10
TPH-CWG - Aromatic >EC7 - EC8 _{HS 1D AR}	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10
TPH-CWG - Aromatic >EC8 - EC10 _{HS 1D AR}	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10
TPH-CWG - Aromatic >EC10 - EC12 _{EH CU 1D AR}	mg/kg	1	MCERTS	< 1.0	1.5	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 _{EH CU 1D AR}	mg/kg	2	MCERTS	5.4	7.8	4.6
TPH-CWG - Aromatic >EC16 - EC21 _{EH CU 1D AR}	mg/kg	10	MCERTS	26	43	30
TPH-CWG - Aromatic >EC21 - EC35 _{EH CU 1D AR}	mg/kg	10	MCERTS	49	77	62
TPH-CWG - Aromatic (EC5 - EC35) _{EH CU+HS 1D AR}	mg/kg	10	NONE	81	130	96

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected



Analytical Report Number : 23-50455
Project / Site name: Tetrosyl, Bury

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2778430	TS-S1	RR Bury	None Supplied	Brown loam and clay with gravel and vegetation.
2778431	TS-S2	RR Bury	None Supplied	Brown loam and clay with gravel and vegetation.
2778432	TS-S3	RR Bury	None Supplied	Brown loam and clay with gravel and vegetation.

Analytical Report Number : 23-50455
Project / Site name: Tetrosyl, Bury

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Organic matter in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L023-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073B-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS

Analytical Report Number : 23-50455
Project / Site name: Tetrosyl, Bury

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	NONE

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Smith Grant LLP
Station House
Station Road
Ruabon
Wrexham
LL14 6DL



Attention : Meg Jones
Date : 24th January, 2023
Your reference : R2174
Our reference : Test Report 23/799 Batch 1
Location : Terosyl
Date samples received : 19th January, 2023
Status : Final Report
Issue : 1

Three samples were received for analysis on 19th January, 2023 of which three were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:



Bruce Leslie
Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Smith Grant LLP
Reference: R2174
Location: Terosyl
Contact: Meg Jones
EMT Job No: 23/799

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3	4-6	7-9								Please see attached notes for all abbreviations and acronyms		
Sample ID	TSimp-1-170123	TSimp-2-170123	TSimp-3-170123										
Depth													
COC No / misc													
Containers	V J T	V J T	V J T										
Sample Date	17/01/2023	17/01/2023	17/01/2023										
Sample Type	Clay	Clay	Clay										
Batch Number	1	1	1										
Date of Receipt	19/01/2023	19/01/2023	19/01/2023								LOD/LOR	Units	Method No.
Arsenic ^{#M}	18.6	18.4	18.7								<0.5	mg/kg	TM30/PM15
Cadmium ^{#M}	0.4	0.3	0.3								<0.1	mg/kg	TM30/PM15
Chromium ^{#M}	148.1	125.1	109.1								<0.5	mg/kg	TM30/PM15
Copper ^{#M}	65	53	58								<1	mg/kg	TM30/PM15
Lead ^{#M}	125	106	114								<5	mg/kg	TM30/PM15
Mercury ^{#M}	0.4	0.5	0.3								<0.1	mg/kg	TM30/PM15
Nickel ^{#M}	23.4	23.6	19.7								<0.7	mg/kg	TM30/PM15
Selenium ^{#M}	2	2	2								<1	mg/kg	TM30/PM15
Zinc ^{#M}	111	112	93								<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene ^{#M}	0.06	0.08	<0.04								<0.04	mg/kg	TM4/PM8
Acenaphthylene	0.10	0.09	<0.03								<0.03	mg/kg	TM4/PM8
Acenaphthene ^{#M}	0.16	0.20	0.18								<0.05	mg/kg	TM4/PM8
Fluorene ^{#M}	0.13	0.16	0.14								<0.04	mg/kg	TM4/PM8
Phenanthrene ^{#M}	1.36	1.46	1.51								<0.03	mg/kg	TM4/PM8
Anthracene [#]	0.34	0.38	0.33								<0.04	mg/kg	TM4/PM8
Fluoranthene ^{#M}	2.00	2.17	1.95								<0.03	mg/kg	TM4/PM8
Pyrene [#]	1.69	1.81	1.59								<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene [#]	0.89	1.05	0.86								<0.06	mg/kg	TM4/PM8
Chrysene ^{#M}	1.04	1.13	0.94								<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene ^{#M}	1.72	1.82	1.44								<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene [#]	0.89	0.94	0.79								<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene ^{#M}	0.77	0.82	0.62								<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene [#]	0.16	0.17	0.11								<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene [#]	0.59	0.60	0.47								<0.04	mg/kg	TM4/PM8
PAH 16 Total	11.9	12.9	10.9								<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	1.24	1.31	1.04								<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.48	0.51	0.40								<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	98	94	96								<0	%	TM4/PM8
TPH CWG													
Aliphatics													
>C5-C6 ^{#M}	<0.1 ^{SV}	<0.1 ^{SV}	<0.1 ^{SV}								<0.1	mg/kg	TM36/PM12
>C6-C8 ^{#M}	<0.1 ^{SV}	<0.1 ^{SV}	<0.1 ^{SV}								<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1 ^{SV}	<0.1 ^{SV}	<0.1 ^{SV}								<0.1	mg/kg	TM36/PM12
>C10-C12 ^{#M}	<0.2	<0.2	<0.2								<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 ^{#M}	<4	<4	<4								<4	mg/kg	TM5/PM8/PM16
>C16-C21 ^{#M}	<7	<7	<7								<7	mg/kg	TM5/PM8/PM16
>C21-C35 ^{#M}	<7	<7	<7								<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35	<19	<19	<19								<19	mg/kg	TM5/PM8/PM16/PM12/PM15

Element Materials Technology

Client Name: Smith Grant LLP
Reference: R2174
Location: Terosyl
Contact: Meg Jones
EMT Job No: 23/799

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3	4-6	7-9								Please see attached notes for all abbreviations and acronyms		
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Sample Type	Clay	Clay	Clay										
Batch Number	1	1	1										
Date of Receipt	19/01/2023	19/01/2023	19/01/2023								LOD/LOR	Units	Method No.
TPH CWG													
Aromatics													
>C5-EC7 #	<0.1 ^{SV}	<0.1 ^{SV}	<0.1 ^{SV}								<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1 ^{SV}	<0.1 ^{SV}	<0.1 ^{SV}								<0.1	mg/kg	TM36/PM12
>EC8-EC10 #M	<0.1 ^{SV}	<0.1 ^{SV}	<0.1 ^{SV}								<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	<0.2	<0.2	<0.2								<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 #	<4	<4	<4								<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	40	38	<7								<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 #	313	285	145								<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-35 #	353	323	145								<19	mg/kg	TM5/PM8/PM16
Total aliphatics and aromatics(C5-35)	353	323	145								<38	mg/kg	TM5/PM8/PM16
MTBE #	<5 ^{SV}	<5 ^{SV}	<5 ^{SV}								<5	ug/kg	TM36/PM12
Benzene #	<5 ^{SV}	<5 ^{SV}	<5 ^{SV}								<5	ug/kg	TM36/PM12
Toluene #	128 ^{SV}	126 ^{SV}	32 ^{SV}								<5	ug/kg	TM36/PM12
Ethylbenzene #	10 ^{SV}	9 ^{SV}	<5 ^{SV}								<5	ug/kg	TM36/PM12
m/p-Xylene #	<5 ^{SV}	<5 ^{SV}	8 ^{SV}								<5	ug/kg	TM36/PM12
o-Xylene #	<5 ^{SV}	<5 ^{SV}	<5 ^{SV}								<5	ug/kg	TM36/PM12
Natural Moisture Content	59.7	57.2	51.2								<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3								<0.3	mg/kg	TM38/PM20
Chromium III	148.1	125.1	109.1								<0.5	mg/kg	NONE/NONE
Organic Matter	15.4	12.1	13.6								<0.2	%	TM21/PM24
pH #M	6.99	6.80	7.12								<0.01	pH units	TM73/PM11
Sample Type	Clay	Clay	Clay									None	PM13/PM0
Sample Colour	Dark Brown	Dark Brown	Dark Brown									None	PM13/PM0
Other Items	stones, roots	stones	stones									None	PM13/PM0

Note:

The LOQ of the Asbestos Quantification is 0.001% dry fibre of dry mass of sample.

Where trace asbestos is reported the amount of asbestos will be <0.1%.

[illegible]

Client Name: Smith Grant LLP

Reference: R2174

Location: Terosyl

Contact: Meg Jones

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 23/799

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

EMT Job No: 23/799

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes	Yes	AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes
PM13	A visual examination of the solid sample is carried out to ascertain sample make up, colour and any other inclusions. This is not a geotechnical description.	PM0	No preparation is required.			AR	No
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO ₂ generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Preparation of Soil and Marine Sediment Samples for Total Organic Carbon.			AD	Yes

EMT Job No: 23/799

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEPA Method 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes	Yes	AD	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes	Yes	AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 Second edition (2021)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No
NONE	No Method Code	NONE	No Method Code			AD	Yes

Our Ref: R2688-L01

27th June 2023

Barratt Homes Manchester
4 Brindley Road
City Park
Manchester
M16 9HQ

Dear Brad

Rossendale Road, Burnley: Stockpile Validation & Assessment

Barratt Homes Manchester (BHM) are carrying out preparatory earthworks at the Brun Lea, Rossendale Road site, Burnley to prepare for residential development. Preparatory works have included the recovery of circa 1,275m³ of topsoil which has been divided into several stockpiles on site. These are as follows:

- T1 (200m³)
- T2 (350m³)
- T3 (125m³)
- T6 (600m³)

BHM propose to export the above topsoil stockpiles to their Waldmers Wood development in Bury under an MMP for direct transfer to allow reuse as garden soils. To assess the suitability of the soils for this intended use prior to export, BHM have instructed Smith Grant LLP (SGP) to carry out validation testing.

SGP Consultant C McHugh attended site on 15.06.23 and collected 3 samples from each stockpile and submitted samples for chemical analysis in accordance with the Remediation Strategy for the receiving site. The testing undertaken achieves a minimum sampling frequency of 1 per 200m³ per stockpile or 1 per 106m³ for the full volume of soil.

Samples were couriered to Eurofins Chemtest Laboratories, Newmarket within 24 hours of collections. Samples were placed in appropriate containers as provided by the laboratory and stored in a chilled cool box. Chemical analysis was scheduled for a generic suite of urban contaminants (asbestos, metals, hydrocarbons and PAHs), the results of which have been compared against generic soil assessment criteria for use in residential gardens with plant uptake (LQM/CIEH Suitable 4 Use Levels (S4ULs) and Category 4 Screening Levels (C4SL) for lead and benzo(a)pyrene). Due to the high SOM content of the samples (average of 6.9%) soil screening criteria based on 6% have been adopted.

Stockpile Assessment

The results of each stockpile are presented in the sub-sections below and are compared to the adopted screening criteria. Where exceedances are present, additional risk assessment is provided. A copy of the laboratory test certificate (ref. 23-20766-0) is provided in Appendix A.



Stockpile TS1

Three samples (TS1-S1, TS1-S2 and TS1-S3) were collected from the stockpile. The results are summarised in the table below:

Table 1. Summary of Stockpile T1 (200m³ – Samples T1-S1, T1-S2, T1-S3) Results

Determinant	Range of Concentrations (mg/kg, unless specified)	Screening Criteria (mg/g, unless specified)	Exceedances
Asbestos (%)	NAD	NAD	None
Arsenic	10-15	LQM/CIEH S4UL 37	None
Cadmium	0.17-0.26	LQM/CIEH S4UL 11	None
Chromium	17-27	LQM/CIEH S4UL 910	None
Copper	31-47	LQM/CIEH S4UL 2400	None
Lead	64-110	LQM/CIEH S4UL 450	None
Mercury	0.17-0.31	LQM/CIEH S4UL 40	None
Nickel	13-21	LQM/CIEH S4UL 130	None
Zinc	58-86	LQM/CIEH S4UL 3700	None
Naphthalene	<0.10-2.2	LQM/CIEH S4UL 13	None
Acenaphthylene	<0.10-2.2	LQM/CIEH S4UL 920	None
Acenaphthene	<0.10-0.95	LQM/CIEH S4UL 1100	None
Fluorene	<0.10-2.5	LQM/CIEH S4UL 440	None
Phenanthrene	5.7-9.8	LQM/CIEH S4UL 440	None
Fluoranthene	6.8-8.9	LQM/CIEH S4UL 890	None
Anthracene	3.9-1.5	LQM/CIEH S4UL 11,000	None
Pyrene	7.2-9.1	LQM/CIEH S4UL 2000	None
Benzo(a)anthracene	<0.10-12	LQM/CIEH S4UL 13	(1): T1-S1
Chrysene	<0.10-9.3	LQM/CIEH S4UL 27	None
Benzo(b)fluoranthene	<0.10-13	LQM/CIEH S4UL 3.7	(2): T1-S2 & T1-S3
Benzo(k)fluoranthene	<0.10-5.9	LQM/CIEH S4UL 100	None
Benzo(a)pyrene	<0.10-4.2	C4SL 5	None
Indeno(123cd) pyrene	<0.10	S4UL 41	None
Dibenzo(ah)anthracene	<0.10	LQM/CIEH S4UL 0.3	None
Benzo(ghi)perylene	<0.10	LQM/CIEH S4UL 350	None
aliphatic >C5-C7	<1.0	LQM/CIEH S4UL 42	None
aliphatic >C7-C8	<1.0	LQM/CIEH S4UL 100	None
aliphatic >C8-C10	<1.0	LQM/CIEH S4UL 27	None
aliphatic >C10-C12	<1.0	LQM/CIEH S4UL 130	None
aliphatic >C12-C16	<1.0	LQM/CIEH S4UL 1100	None
aliphatic >C16-C21	<1.0	LQM/CIEH S4UL 5000	None
aliphatic >C21-C35	<1.0	LQM/CIEH S4UL 5000	None
aromatic >C5-C7	<1.0	LQM/CIEH S4UL 70	None
aromatic >C7-C8	<1.0	LQM/CIEH S4UL 130	None
aromatic >C8-C10	<1.0	LQM/CIEH S4UL 34	None
aromatic >C10-C12	<1.0	LQM/CIEH S4UL 74	None
aromatic >C12-C16	<1.0-3.0	LQM/CIEH S4UL 140	None
aromatic >C16-C21	<1.0-34	LQM/CIEH S4UL 260	None



Determinant	Range of Concentrations (mg/kg, unless specified)	Screening Criteria (mg/g, unless specified)	Exceedances
aromatic >C21-C35	<1.0-180	LQM/CIEH S4UL 1100	None
Benzene	<1.0	LQM/CIEH S4UL 0.087	None
Toluene	<1.0	LQM/CIEH S4UL 130	None
Ethylbenzene	<1.0	LQM/CIEH S4UL 47	None
Xylenes	<1.0	LQM/CIEH S4UL 59	None

A single minor benzo(a)anthracene exceedance was recorded with a concentration of 12 mg/kg (sample: T1-S2), slightly above the assessment criteria of 13 mg/kg. Two Benzo(b)fluoranthene exceedances were recorded with a concentration of 13 mg/kg (sample: T1-S2) and 5.6 mg/kg (sample: T1-S3) both slightly above the assessment criteria of 3.7 mg/kg.

To assess the potential source of the PAHs a ratio-cross plot has been undertaken, a copy of the plot is presented in Appendix B. All three results indicate a possible coal-tar signature although it is noted that the results are close to the boundary in which a coal signature may be considered.

Stockpile TS2

Three samples (TS2-S1, TS2-S2 and TS2-S3) were collected from the stockpile. The results are summarised in the table below:

Table 2. Summary of Stockpile T2 (350m³ – Samples T2-S1, T2-S2, T2-S3) Results

Determinant	Range of Concentrations (mg/kg, unless specified)	Screening Criteria (mg/g, unless specified)	Exceedances
Asbestos (%)	NAD	NAD	None
Arsenic	1.8-20	LQM/CIEH S4UL 37	None
Cadmium	<0.10-1.2	LQM/CIEH S4UL 11	None
Chromium	5-54	LQM/CIEH S4UL 910	None
Copper	8.1-76	LQM/CIEH S4UL 2400	None
Lead	16-190	LQM/CIEH S4UL 450	None
Mercury	<0.05-0.37	LQM/CIEH S4UL 40	None
Nickel	2.8-28	LQM/CIEH S4UL 130	None
Zinc	17-210	LQM/CIEH S4UL 3700	None
Naphthalene	2.4-2.9	LQM/CIEH S4UL 13	None
Acenaphthylene	0.47-2.0	LQM/CIEH S4UL 920	None
Acenaphthene	0.92-3.8	LQM/CIEH S4UL 1100	None
Fluorene	0.68-3.4	LQM/CIEH S4UL 440	None
Phenanthrene	5.9-21	LQM/CIEH S4UL 440	None
Fluoranthene	8.2-26	LQM/CIEH S4UL 890	None
Anthracene	1.5-7.0	LQM/CIEH S4UL 11,000	None
Pyrene	8.2-26	LQM/CIEH S4UL 2000	None
Benzo(a)anthracene	3.8-14	LQM/CIEH S4UL 13	(1): T2-S1



Determinant	Range of Concentrations (mg/kg, unless specified)	Screening Criteria (mg/g, unless specified)	Exceedances
Chrysene	5.7-13	LQM/CIEH S4UL 27	None
Benzo(b)fluoranthene	4.5-13	LQM/CIEH S4UL 3.7	(3): T2-S1, T2-S2, T2-S3
Benzo(k)fluoranthene	2.3-4.8	LQM/CIEH S4UL 100	None
Benzo(a)pyrene	4.1-10	C4SL's 5	(2): T2-S1 & T2-S3
Indeno(123cd) pyrene	2.7-6.8	S4UL 41	None
Dibenzo(ah)anthracene	1.3-1.9	LQM/CIEH S4UL 0.3	(3): T2-S1, T2-S2, T2-S3
Benzo(ghi)perylene	2.3-6.1	LQM/CIEH S4UL 350	None
aliphatic >C5-C7	<1.0	LQM/CIEH S4UL 42	None
aliphatic >C7-C8	<1.0	LQM/CIEH S4UL 100	None
aliphatic >C8-C10	<1.0	LQM/CIEH S4UL 27	None
aliphatic >C10-C12	<1.0	LQM/CIEH S4UL 130	None
aliphatic >C12-C16	<1.0	LQM/CIEH S4UL 1100	None
aliphatic >C16-C21	<1.0	LQM/CIEH S4UL 5000	None
aliphatic >C21-C35	<1.0	LQM/CIEH S4UL 5000	None
aromatic >C5-C7	<1.0	LQM/CIEH S4UL 70	None
aromatic >C7-C8	<1.0	LQM/CIEH S4UL 130	None
aromatic >C8-C10	<1.0	LQM/CIEH S4UL 34	None
aromatic >C10-C12	<1.0	LQM/CIEH S4UL 74	None
aromatic >C12-C16	<1.0	LQM/CIEH S4UL 140	None
aromatic >C16-C21	25-130	LQM/CIEH S4UL 260	None
aromatic >C21-C35	84-250	LQM/CIEH S4UL 1100	None
Benzene	<1.0	LQM/CIEH S4UL 0.087	None
Toluene	<1.0	LQM/CIEH S4UL 130	None
Ethylbenzene	<1.0	LQM/CIEH S4UL 47	None
Xylenes	<1.0	LQM/CIEH S4UL 59	None

A single benzo(a)anthracene exceedance was recorded with a concentration of 14 mg/kg (sample: T2-S1), slightly above the assessment criteria of 13 mg/kg.

Three benzo(b)fluoranthene exceedances were recorded with a concentration of 13 mg/kg (sample: T2-S1), 4.5 mg/kg (sample T2-S2) and 9.9 mg/kg (sample T2-S3), all above the assessment criteria of 3.7 mg/kg.

Two benzo(a)pyrene exceedances were recorded with a concentration of 10 mg/kg (sample: T2-S1) and 7.8 mg/kg (sample: T2-S3), above the assessment criteria of 5 (C4SL).

Three dibenzo(ah)anthracene exceedances were recorded with a concentration of 1.9 mg/kg (sample T2-S1), 1.3 mg/kg, and 1.7 mg/kg (sample: T2-S3), all above the assessment criteria of 0.3 mg/kg.

To assess the potential source of the PAHs a ratio-cross plot has been undertaken, a copy of the plot is presented in Appendix B. All three results indicate a possible coal/coal-tar signature coal-tar signature.



Stockpile TS3

Three samples (TS3-S1, TS3-S2 and TS3-S3) were collected from the stockpile. The results are summarised in the table below:

Table 3. Summary of Stockpile T3 (125m³ – Samples T3-S1, T3-S2, T3-S3) Results

Determinant	Range of Concentrations (mg/kg, unless specified)	Screening Criteria (mg/g, unless specified)	Exceedances
Asbestos (%)	NAD	NAD	None
Arsenic	8.1-9.7	LQM/CIEH S4UL 37	None
Cadmium	0.29-0.38	LQM/CIEH S4UL 11	None
Chromium	23-30	LQM/CIEH S4UL 910	None
Copper	26-36	LQM/CIEH S4UL 2400	None
Lead	63-76	LQM/CIEH S4UL 450	None
Mercury	0.13-0.17	LQM/CIEH S4UL 40	None
Nickel	13-18	LQM/CIEH S4UL 130	None
Zinc	73-93	LQM/CIEH S4UL 3700	None
Naphthalene	1.7-2.7	LQM/CIEH S4UL 13	None
Acenaphthylene	0.27-1.2	LQM/CIEH S4UL 920	None
Acenaphthene	1.1-2.3	LQM/CIEH S4UL 1100	None
Fluorene	1.1-1.9	LQM/CIEH S4UL 440	None
Phenanthrene	7.4-14	LQM/CIEH S4UL 440	None
Fluoranthene	10-18	LQM/CIEH S4UL 890	None
Anthracene	1.9-3.3	LQM/CIEH S4UL 11,000	None
Pyrene	10-18	LQM/CIEH S4UL 2000	None
Benzo(a)anthracene	7.1-11	LQM/CIEH S4UL 13	None
Chrysene	9.4-6.1	LQM/CIEH S4UL 27	None
Benzo(b)fluoranthene	6.4-11	LQM/CIEH S4UL 3.7	(3): T3-S1, T3-S2, T3-S3
Benzo(k)fluoranthene	2.2-4.0	LQM/CIEH S4UL 100	None
Benzo(a)pyrene	4.5-7.8	C4SL 5	(1): T3-S2
Indeno(123cd) pyrene	<0.10-5.7	S4UL 41	None
Dibenzo(ah)anthracene	<0.10-1.3	LQM/CIEH S4UL 0.3	(2): T3-S2, T3-S3
Benzo(ghi)perylene	<0.10-8.3	LQM/CIEH S4UL 350	None
aliphatic >C5-C7	<1.0	LQM/CIEH S4UL 42	None
aliphatic >C7-C8	<1.0	LQM/CIEH S4UL 100	None
aliphatic >C8-C10	<1.0	LQM/CIEH S4UL 27	None
aliphatic >C10-C12	<1.0	LQM/CIEH S4UL 130	None
aliphatic >C12-C16	<1.0	LQM/CIEH S4UL 1100	None
aliphatic >C16-C21	<1.0	LQM/CIEH S4UL 5000	None
aliphatic >C21-C35	<1.0	LQM/CIEH S4UL 5000	None
aromatic >C5-C7	<1.0	LQM/CIEH S4UL 70	None
aromatic >C7-C8	<1.0	LQM/CIEH S4UL 130	None
aromatic >C8-C10	<1.0	LQM/CIEH S4UL 34	None
aromatic >C10-C12	<1.0	LQM/CIEH S4UL 74	None
aromatic >C12-C16	<1.0	LQM/CIEH S4UL 140	None



Determinant	Range of Concentrations (mg/kg, unless specified)	Screening Criteria (mg/g, unless specified)	Exceedances
aromatic >C16-C21	<1.0	LQM/CIEH S4UL 260	None
aromatic >C21-C35	<1.0	LQM/CIEH S4UL 1100	None
Benzene	<1.0	LQM/CIEH S4UL 0.087	None
Toluene	<1.0	LQM/CIEH S4UL 130	None
Ethylbenzene	<1.0	LQM/CIEH S4UL 47	None
Xylenes	<1.0	LQM/CIEH S4UL 59	None

A single benzo(a)pyrene exceedance was recorded with a concentration of 7.8 mg/kg (sample: T3-S2), slightly above the assessment criteria (C4SL's) of 5 mg/kg.

Three benzo(b)fluoranthene exceedances were recorded with a concentration of 6.6 mg/kg (sample: T3-S1), 11 mg/kg (sample T3-S2) and 6.4 mg/kg (sample T3-S3), all above the assessment criteria of 3.7 mg/kg.

Two dibenzo(ah)anthracene exceedances were recorded with a concentration of 1.3 mg/kg (sample: T3-S2) and 0.84 mg/kg (sample: T3-S3), above the assessment criteria 0.3 mg/kg.

To assess the potential source of the PAHs a ratio-cross plot has been undertaken, a copy of the plot is presented in Appendix B. All three results indicate a possible coal/coal-tar signature coal-tar signature.

Stockpile TS6

Three samples (TS6-S1, TS6-S2 and TS6-S3) were collected from the stockpile. The results are summarised in the table below:

Table 4. Summary of Stockpile T6 (600m³ – Samples T6-S1, T6-S2, T6-S3) Results

Determinant	Range of Concentrations (mg/kg, unless specified)	Screening Criteria (mg/g, unless specified)	Exceedances
Asbestos (%)	NAD	NAD	None
Arsenic	1.9-9.4	LQM/CIEH S4UL 37	None
Cadmium	<0.10-0.33	LQM/CIEH S4UL 11	None
Chromium	5.6-26	LQM/CIEH S4UL 910	None
Copper	6.1-29	LQM/CIEH S4UL 2400	None
Lead	14-100	LQM/CIEH S4UL 450	None
Mercury	<0.05-0.14	LQM/CIEH S4UL 40	None
Nickel	4.2-27	LQM/CIEH S4UL 130	None
Zinc	17-82	LQM/CIEH S4UL 3700	None
Naphthalene	2.8-6.6	LQM/CIEH S4UL 13	None
Acenaphthylene	0.35-0.84	LQM/CIEH S4UL 920	None
Acenaphthene	3.7-8.4	LQM/CIEH S4UL 1100	None
Fluorene	2.2-5.4	LQM/CIEH S4UL 440	None
Phenanthrene	17-34	LQM/CIEH S4UL 440	None
Fluoranthene	20-35	LQM/CIEH S4UL 890	None



Determinant	Range of Concentrations (mg/kg, unless specified)	Screening Criteria (mg/g, unless specified)	Exceedances
Anthracene	3.6-8.7	LQM/CIEH S4UL 11,000	None
Pyrene	20-34	LQM/CIEH S4UL 2000	None
Benzo(a)anthracene	10-16	LQM/CIEH S4UL 13	(1): T6-S2
Chrysene	12-20	LQM/CIEH S4UL 27	None
Benzo(b)fluoranthene	9.8-17	LQM/CIEH S4UL 3.7	(3): T6-S1, T6-S2, T6-S3
Benzo(k)fluoranthene	4.8-7.6	LQM/CIEH S4UL 100	None
Benzo(a)pyrene	8.2-15	C4SL 5	(3): T6-S1, T6-S2, T6-S3
Indeno(123cd) pyrene	7.9-12	S4UL 41	None
Dibenzo(ah)anthracene	2.0-3.2	LQM/CIEH S4UL 0.3	(3): T6-S1, T6-S2, T6-S3
Benzo(ghi)perylene	4.4-7.7	LQM/CIEH S4UL 350	None
aliphatic >C5-C7	<1.0	LQM/CIEH S4UL 42	None
aliphatic >C7-C8	<1.0	LQM/CIEH S4UL 100	None
aliphatic >C8-C10	<1.0	LQM/CIEH S4UL 27	None
aliphatic >C10-C12	<1.0	LQM/CIEH S4UL 130	None
aliphatic >C12-C16	<1.0	LQM/CIEH S4UL 1100	None
aliphatic >C16-C21	<1.0	LQM/CIEH S4UL 5000	None
aliphatic >C21-C35	<1.0-97	LQM/CIEH S4UL 5000	None
aromatic >C5-C7	<1.0	LQM/CIEH S4UL 70	None
aromatic >C7-C8	<1.0	LQM/CIEH S4UL 130	None
aromatic >C8-C10	<1.0	LQM/CIEH S4UL 34	None
aromatic >C10-C12	<1.0	LQM/CIEH S4UL 74	None
aromatic >C12-C16	<1.0	LQM/CIEH S4UL 140	None
aromatic >C16-C21	4.3-13	LQM/CIEH S4UL 260	None
aromatic >C21-C35	58-120	LQM/CIEH S4UL 1100	None
Benzene	<1.0	LQM/CIEH S4UL 0.087	None
Toluene	<1.0	LQM/CIEH S4UL 130	None
Ethylbenzene	<1.0	LQM/CIEH S4UL 47	None
Xylenes	<1.0	LQM/CIEH S4UL 59	None

A single benzo(a)anthracene exceedance was recorded with a concentration of 16 mg/kg (sample: T6-S2), slightly above the assessment criteria 13 mg/kg.

Three benzo(b)fluoranthene exceedances were recorded with a concentration of 9.8 mg/kg (sample: T6-S1), 17 mg/kg (sample T6-S2) and 11 mg/kg (sample T6-S3), all above the assessment criteria of 3.7 mg/kg.

Three dibenzo(ah)anthracene exceedances were recorded with a concentration of 2.0 mg/kg (sample: T6-S1) and 3.1mg/kg (sample: T6-S2), and 3.2 mg/kg (sample: T6-S3) above the assessment criteria 0.3 mg/kg.

A single benzo(a)pyrene exceedance was recorded with concentrations of 8.2 mg/kg (sample T6-S1), 15 kg/mg (sample T6-S2), and 9.6 kg/mg (sample: T6-S3) above the assessment criteria of 5 (C4SL).

To assess the potential source of the PAHs a ratio-cross plot has been undertaken, a copy of the plot is presented in Appendix B. Two results indicate a possible coal/coal-tar signature coal-tar signature whilst present a coal signature.



Conclusions

SGP has carried out sampling of four stockpiles of site-generated topsoil which have produced generally similar concentrations. Elevated PAHs have been reported within each stockpile and have been limited to benzo(a)pyrene, dibenzo(ah)anthracene, benzo(b)fluoranthene and dibenzo(ah)anthracene when compared to residential land use with plant uptake criteria based on 6% SOM.

SGP has previously produced a Phase 1 and 2 Geo-Environmental Ground Investigation (ref. R2688-R01-v4) which confirmed through a detailed historical review that the site has remained undeveloped throughout its history. The report included a Coal Authority and Coal Mining Risk Assessment Report which confirmed there was the potential for shallow mineworkings to be present. A mining investigation was completed and identified the presence of three shafts (Shaft A, B and C) as well as the presence of grey shale with coal within 8 of the 14 mining entries extending from the surface.

As part of the SGP works trial-pitting was carried out across the site. No made ground deposits were encountered within the shallow geology typically consisting of gravelly sandy clayey topsoil overlying a gravelly clay with partings of sand and fine to medium coal. Samples of the shallow soil were also collected during this initial investigation and also reported exceedances of the same PAHs.

PAH ratio analysis has been undertaken to assess the probable source of the elevated PAHs; most ratios suggested a coal to coal tar signature with the exception of Stockpile TS1 where a coal tar signature was produced although it is acknowledged this was a marginal indicator which was close to the boundary of a coal signature.

Based on the review of information within R2688-R01-v1 there is no identifiable sources of coal tar present on the site. No made ground was present and no industrial works (other than coal mining) have taken place on the site. The presence of coal tars is therefore unlikely to have been present. It is considered that it is most likely attributed to inclusions of coal as is more clearly shown within the other corresponding ratio plots. This is more consistent with the history of the site and the recorded ground conditions where fine inclusions of coal have been recorded.

The overall risk to human health from PAHs within fragments of coal is with the bioavailability of the PAHs limited due to the sequestration of PAHs within a carbon or vitrified matrix. It is therefore considered that the topsoil within stockpiles TS1, TS2, TS3 and TS6 would be suitable for reuse as garden soils, however this will require approval by the Local Authority Contaminated Land Officer where the soil is proposed to be exported to.

Recommendations

No further testing is recommended; however, this assessment should be provided to the Local Authority Contaminated Land Officer at the proposed receiving site (Bury Council) to confirm whether they accept the assessment and conclusions made within this report. If approved, the Material Management Plan (MMP) for the receiving site should be updated to include Rossendale Road, Burnley as a donor site.

Yours sincerely
for: Smith Grant LLP

Caitlin McHugh BSc GradIEMA
Graduate Consultant



Attached

Laboratory Certificate: 23-20765
PAH ratio cross plot analysis



APPENDIX A

Laboratory Certificate



2183

Final Report

Report No.: 23-20765-1**Initial Date of Issue:** 23-Jun-2023**Re-Issue Details:****Client** Smith Grant LLP**Client Address:** Bryn Estyn Business Centre
Bryn Estyn Road
Wrexham
LL13 9TY**Contact(s):** Caitlin McHugh
Megan Jones**Project** R2688 Brun Lea, Rossendale, Burnley**Quotation No.:** **Date Received:** 19-Jun-2023**Order No.:** **Date Instructed:** 19-Jun-2023**No. of Samples:** 12**Turnaround (Wkdays):** 5 **Results Due:** 23-Jun-2023**Date Approved:** 23-Jun-2023**Approved By:****Details:** Stuart Henderson, Technical
Manager

Results - Soil

Project: R2688 Brun Lea, Rossendale, Burnley

Client: Smith Grant LLP	Chemtest Job No.:				23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765
Quotation No.:	Chemtest Sample ID.:				1660264	1660265	1660266	1660267	1660268	1660269	1660270	1660271	1660272
Order No.:	Client Sample Ref.:				T1	T1	T1	T2	T2	T2	T3	T3	T3
	Client Sample ID.:				S1	S2	S3	S1	S2	S3	S1	S2	S3
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Date Sampled:				15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD									
ACM Type	U	2192		N/A	-	-	-	-	-	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	2.8	7.2	4.5	2.4	3.0	1.3	5.6	6.0	11
pH	U	2010		4.0	7.4	7.3	7.4	7.2	7.6	6.5	6.3	6.1	6.1
Arsenic	U	2455	mg/kg	0.5	10	16	15	20	12	1.8	9.7	9.3	8.1
Cadmium	U	2455	mg/kg	0.10	0.17	0.26	0.23	1.2	0.45	< 0.10	0.38	0.38	0.29
Chromium	U	2455	mg/kg	0.5	17	26	27	54	36	5.0	30	28	23
Copper	U	2455	mg/kg	0.50	31	47	43	76	39	8.1	36	34	26
Mercury	U	2455	mg/kg	0.05	0.17	0.31	0.25	0.37	0.19	< 0.05	0.17	0.13	0.13
Nickel	U	2455	mg/kg	0.50	13	21	21	28	22	2.8	18	18	13
Lead	U	2455	mg/kg	0.50	64	110	92	190	84	16	76	72	63
Selenium	U	2455	mg/kg	0.25	0.66	0.99	0.93	2.0	1.2	< 0.25	0.86	0.83	0.62
Zinc	U	2455	mg/kg	0.50	58	86	79	210	110	17	93	91	73
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	5.8	16	9.6	8.7	6.7	1.8	4.7	9.9	6.8
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	N	2680	mg/kg	1.0	< 1.0	5.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	N	2680	mg/kg	1.0	< 1.0	3.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	N	2680	mg/kg	1.0	5.7	34	< 1.0	30	130	25	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	N	2680	mg/kg	1.0	4.7	180	< 1.0	94	250	84	< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	10	220	< 5.0	120	380	110	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	10	220	< 10	120	380	110	< 10	< 10	< 10
Naphthalene	U	2700	mg/kg	0.10	< 0.10	2.2	1.1	2.4	2.9	2.7	2.7	1.7	1.7
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	2.2	1.1	2.0	0.71	0.47	0.27	1.2	0.76
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	2.6	0.95	3.8	0.92	2.5	1.7	2.3	1.1
Fluorene	U	2700	mg/kg	0.10	< 0.10	2.5	0.80	3.4	0.68	1.9	1.3	1.9	1.1

Results - Soil

Project: R2688 Brun Lea, Rossendale, Burnley

Client: Smith Grant LLP	Chemtest Job No.:				23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765
Quotation No.:	Chemtest Sample ID.:				1660264	1660265	1660266	1660267	1660268	1660269	1660270	1660271	1660272
Order No.:	Client Sample Ref.:				T1	T1	T1	T2	T2	T2	T3	T3	T3
	Client Sample ID.:				S1	S2	S3	S1	S2	S3	S1	S2	S3
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Date Sampled:				15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD									
Phenanthrene	U	2700	mg/kg	0.10	9.8	9.7	5.7	21	5.9	15	10	14	7.4
Anthracene	U	2700	mg/kg	0.10	3.9	2.8	1.5	7.0	1.5	3.8	2.3	3.3	1.9
Fluoranthene	U	2700	mg/kg	0.10	6.8	8.9	6.8	26	8.2	19	12	18	10
Pyrene	U	2700	mg/kg	0.10	7.2	9.1	7.3	26	8.2	19	12	18	10
Benzo[a]anthracene	U	2700	mg/kg	0.10	< 0.10	12	6.5	14	3.8	8.9	7.1	11	7.4
Chrysene	U	2700	mg/kg	0.10	< 0.10	9.3	4.4	13	5.7	13	9.4	9.3	6.1
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10	13	5.6	13	4.5	9.9	6.6	11	6.4
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10	5.9	1.8	4.8	2.3	4.6	3.9	4.0	2.2
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10	4.2	3.8	10	4.1	7.8	4.9	7.8	4.5
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	6.8	2.7	5.6	< 0.10	5.7	4.0
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	1.9	1.3	1.7	< 0.10	1.3	0.84
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	6.1	2.3	4.4	< 0.10	5.1	8.3
Total Of 16 PAH's	U	2700	mg/kg	2.0	28	84	47	160	56	120	74	120	74
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Results - Soil

Project: R2688 Brun Lea, Rossendale, Burnley

Client: Smith Grant LLP	Chemtest Job No.:				23-20765	23-20765	23-20765
Quotation No.:	Chemtest Sample ID.:				1660273	1660274	1660275
Order No.:	Client Sample Ref.:				T6	T6	T6
	Client Sample ID.:				S1	S2	S3
	Sample Type:				SOIL	SOIL	SOIL
	Date Sampled:				15-Jun-2023	15-Jun-2023	15-Jun-2023
	Asbestos Lab:				DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD			
ACM Type	U	2192		N/A	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	8.5	1.8	12
pH	U	2010		4.0	6.3	6.5	7.6
Arsenic	U	2455	mg/kg	0.5	9.4	1.9	8.3
Cadmium	U	2455	mg/kg	0.10	0.33	< 0.10	0.20
Chromium	U	2455	mg/kg	0.5	26	5.6	15
Copper	U	2455	mg/kg	0.50	29	6.1	37
Mercury	U	2455	mg/kg	0.05	0.14	< 0.05	< 0.05
Nickel	U	2455	mg/kg	0.50	13	4.2	27
Lead	U	2455	mg/kg	0.50	79	14	100
Selenium	U	2455	mg/kg	0.25	0.84	< 0.25	0.70
Zinc	U	2455	mg/kg	0.50	82	17	72
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	2.3	4.0	6.5
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	N	2680	mg/kg	1.0	< 1.0	97	18
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	97	18
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	N	2680	mg/kg	1.0	13	4.3	11
Aromatic TPH >C21-C35	N	2680	mg/kg	1.0	58	89	120
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	71	94	130
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	71	190	140
Naphthalene	U	2700	mg/kg	0.10	2.8	4.3	6.6
Acenaphthylene	U	2700	mg/kg	0.10	0.35	0.59	0.84
Acenaphthene	U	2700	mg/kg	0.10	3.7	8.4	3.7
Fluorene	U	2700	mg/kg	0.10	2.2	5.4	3.0

Results - Soil

Project: R2688 Brun Lea, Rossendale, Burnley

Client: Smith Grant LLP	Chemtest Job No.:				23-20765	23-20765	23-20765
Quotation No.:	Chemtest Sample ID.:				1660273	1660274	1660275
Order No.:	Client Sample Ref.:				T6	T6	T6
	Client Sample ID.:				S1	S2	S3
	Sample Type:				SOIL	SOIL	SOIL
	Date Sampled:				15-Jun-2023	15-Jun-2023	15-Jun-2023
	Asbestos Lab:				DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD			
Phenanthrene	U	2700	mg/kg	0.10	17	34	19
Anthracene	U	2700	mg/kg	0.10	3.6	8.7	5.5
Fluoranthene	U	2700	mg/kg	0.10	20	35	22
Pyrene	U	2700	mg/kg	0.10	20	34	22
Benzo[a]anthracene	U	2700	mg/kg	0.10	9.1	16	10
Chrysene	U	2700	mg/kg	0.10	12	20	14
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	9.8	17	11
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	4.8	7.6	5.8
Benzo[a]pyrene	U	2700	mg/kg	0.10	8.2	15	9.6
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	7.9	12	9.8
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	2.0	3.1	3.2
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	4.4	7.7	5.3
Total Of 16 PAH's	U	2700	mg/kg	2.0	130	230	150
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com



APPENDIX B

PAH Ratio Cross Plot Analysis

Job name	Rossendale Road
Job no.	r2688
Date:	28.06.23
Author:	CM
Laboratory:	Chemest
Lab. Reference:	23-20765



PAH concentrations

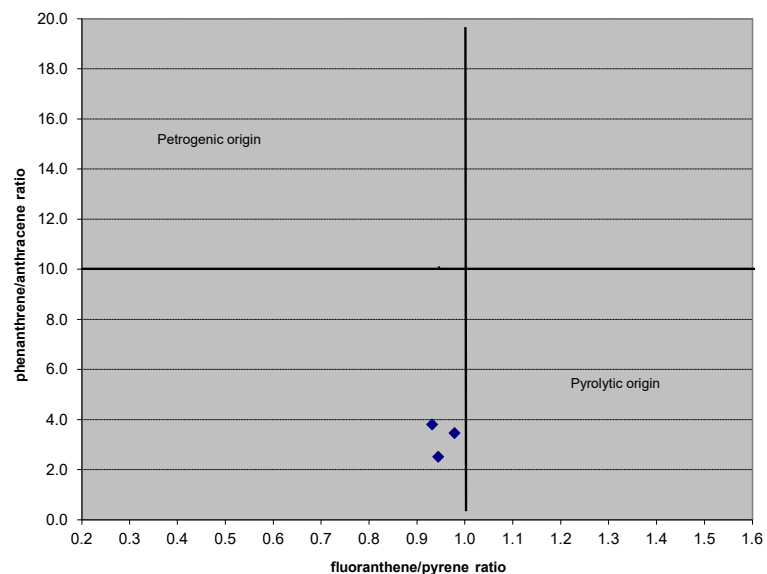
sample identity	T1-S1	T1-S2	T1-S3																
phenanthrene	9.8	9.7	5.7																
anthracene	3.9	2.8	1.5																
fluoranthene	6.8	8.9	6.8																
pyrene	7.2	9.1	7.3																
benz(a)anthracene	0.1	12	6.5																
chrysene	0.1	9.3	4.4																

PAH units	mg/kg
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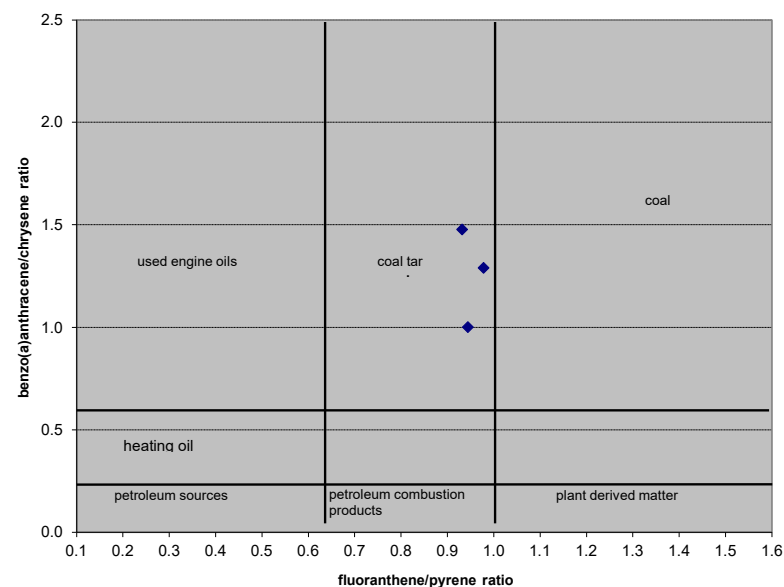
PAH ratios

phe/ant	2.513	3.464	3.800																
flu/pyr	0.944	0.978	0.932																
baa/chr	1.000	1.290	1.477																

PAH source diagnosis



PAH source diagnosis



Job name	Rossendale Road
Job no.	R2688
Date:	28.06.23
Author:	CM
Laboratory:	Chemtest
Lab. Reference:	23-20765



PAH concentrations

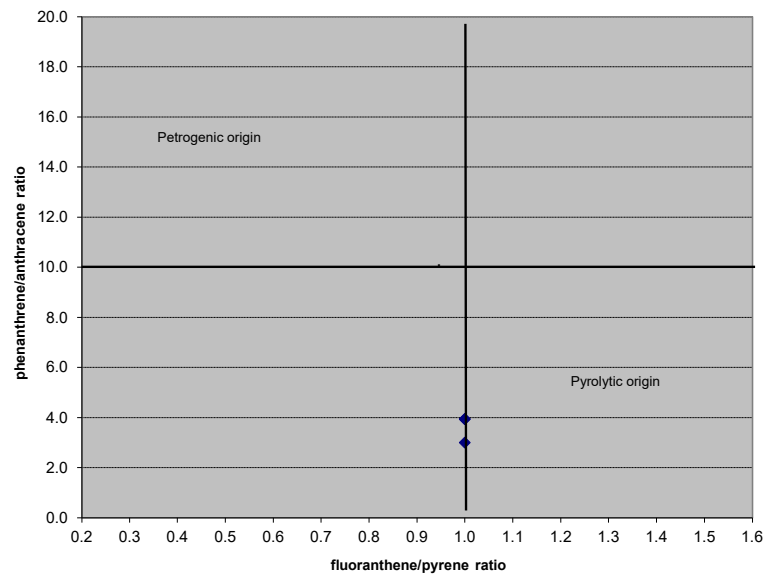
sample identity	T2-S1	T2-S2	T2-S3																
phenanthrene	21	5.9	15																
anthracene	7	1.5	3.8																
fluoranthene	26	8.2	19																
pyrene	26	8.2	19																
benz(a)anthracene	14	3.8	8.9																
chrysene	13	5.7	13																

PAH units	mg/kg
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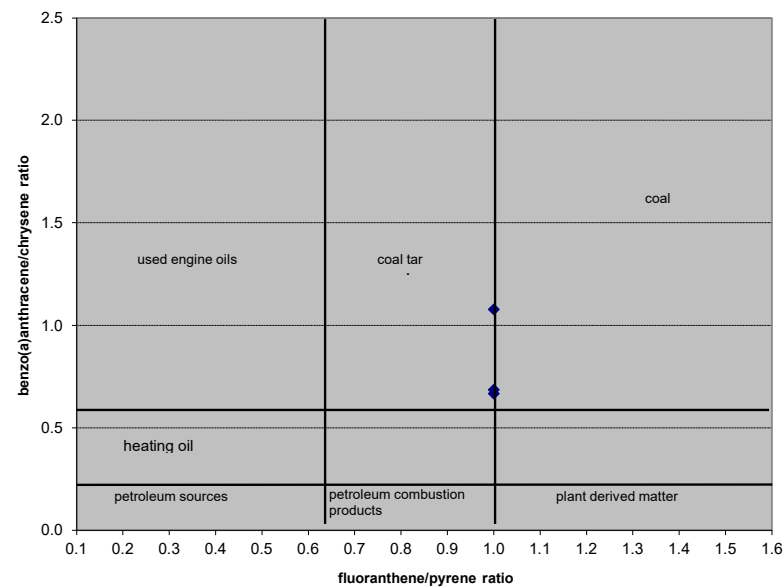
PAH ratios

phe/ant	3.000	3.933	3.947																
flu/pyr	1.000	1.000	1.000																
baa/chr	1.077	0.667	0.685																

PAH source diagnosis



PAH source diagnosis



Job name	Rossendale Road
Job no.	R2688
Date:	28.06.23
Author:	CM
Laboratory:	Chemtest
Lab. Reference:	23-70265



PAH concentrations

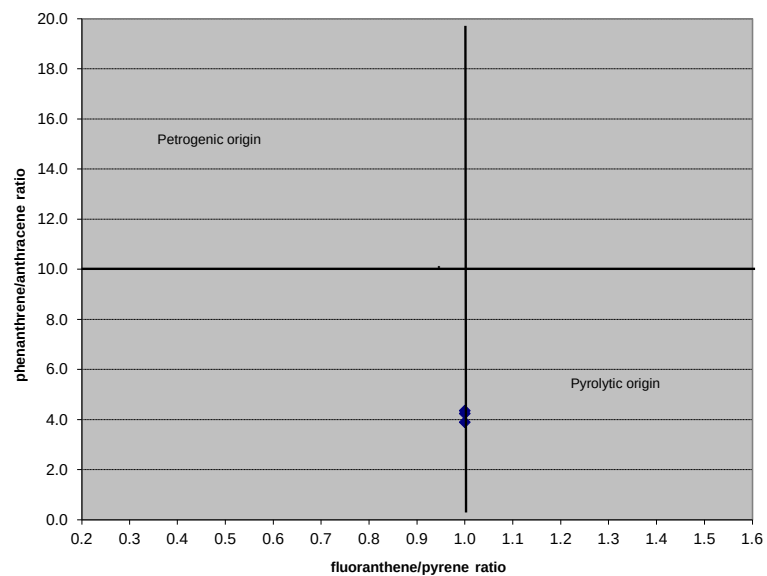
sample identity	T3-S1	T3-S2	T3-S3																
phenanthrene	10	14	7.4																
anthracene	2.3	3.3	1.9																
fluoranthene	12	18	10																
pyrene	12	18	10																
benz(a)anthracene	7.1	11	7.4																
chrysene	9.4	9.3	6.1																

PAH units	mg/kg
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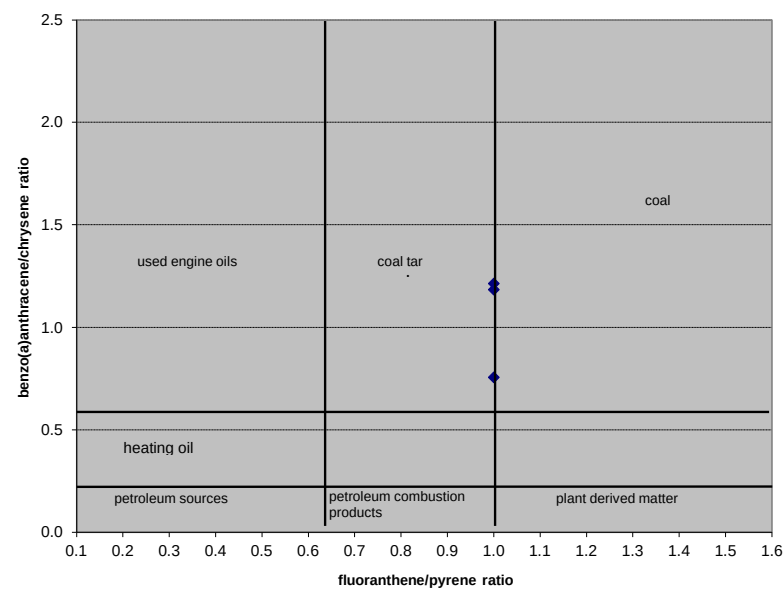
PAH ratios

phe/ant	4.348	4.242	3.895																
flu/pyr	1.000	1.000	1.000																
baa/chr	0.755	1.183	1.213																

PAH source diagnosis



PAH source diagnosis



Job name	Rossendale Road
Job no.	R2688
Date:	28.06.23
Author:	CM
Laboratory:	Chemtest
Lab. Reference:	23-20765



PAH concentrations

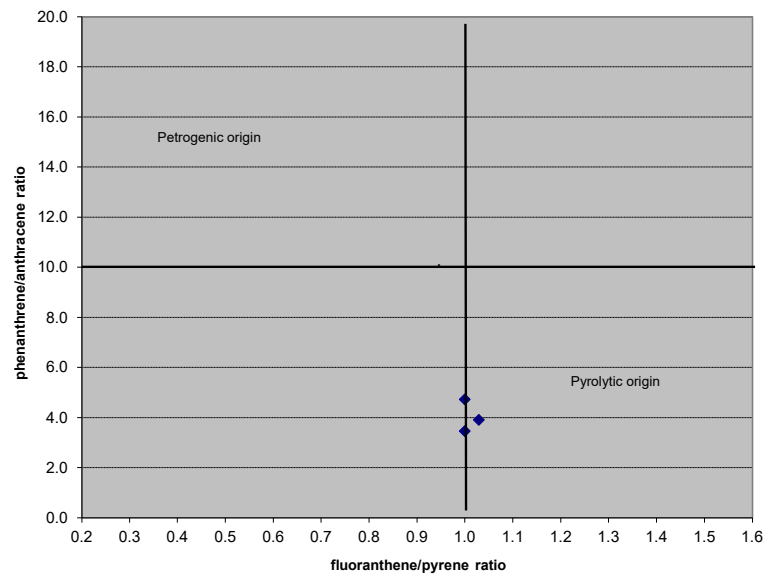
sample identity	T6-S1	T6-S2	T6-S3																
phenanthrene	17	34	19																
anthracene	3.6	8.7	5.5																
fluoranthene	20	35	22																
pyrene	20	34	22																
benz(a)anthracene	9.1	16	10																
chrysene	12	20	14																

PAH units	mg/kg
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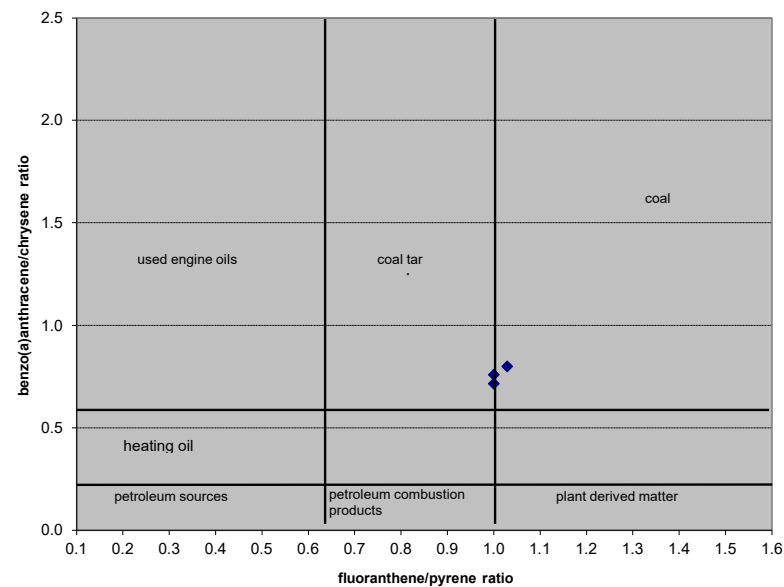
PAH ratios

phe/ant	4.722	3.908	3.455																
flu/pyr	1.000	1.029	1.000																
baa/chr	0.758	0.800	0.714																

PAH source diagnosis



PAH source diagnosis





2183

Final Report

Report No.: 23-20765-1

Initial Date of Issue: 23-Jun-2023

Re-Issue Details:

Client Smith Grant LLP

Client Address: Bryn Estyn Business Centre
Bryn Estyn Road
Wrexham
LL13 9TY

Contact(s): Caitlin McHugh
Megan Jones

Project R2688 Brun Lea, Rossendale, Burnley

Quotation No.: **Date Received:** 19-Jun-2023

Order No.: **Date Instructed:** 19-Jun-2023

No. of Samples: 12

Turnaround (Wkdays): 5 **Results Due:** 23-Jun-2023

Date Approved: 23-Jun-2023

Approved By:



Details: Stuart Henderson, Technical
Manager

Results - Soil

Project: R2688 Brun Lea, Rossendale, Burnley

Client: Smith Grant LLP	Chemtest Job No.:				23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765
Quotation No.:	Chemtest Sample ID.:				1660264	1660265	1660266	1660267	1660268	1660269	1660270	1660271	1660272
Order No.:	Client Sample Ref.:				T1	T1	T1	T2	T2	T2	T3	T3	T3
	Client Sample ID.:				S1	S2	S3	S1	S2	S3	S1	S2	S3
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Date Sampled:				15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD									
ACM Type	U	2192		N/A	-	-	-	-	-	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	2.8	7.2	4.5	2.4	3.0	1.3	5.6	6.0	11
pH	U	2010		4.0	7.4	7.3	7.4	7.2	7.6	6.5	6.3	6.1	6.1
Arsenic	U	2455	mg/kg	0.5	10	16	15	20	12	1.8	9.7	9.3	8.1
Cadmium	U	2455	mg/kg	0.10	0.17	0.26	0.23	1.2	0.45	< 0.10	0.38	0.38	0.29
Chromium	U	2455	mg/kg	0.5	17	26	27	54	36	5.0	30	28	23
Copper	U	2455	mg/kg	0.50	31	47	43	76	39	8.1	36	34	26
Mercury	U	2455	mg/kg	0.05	0.17	0.31	0.25	0.37	0.19	< 0.05	0.17	0.13	0.13
Nickel	U	2455	mg/kg	0.50	13	21	21	28	22	2.8	18	18	13
Lead	U	2455	mg/kg	0.50	64	110	92	190	84	16	76	72	63
Selenium	U	2455	mg/kg	0.25	0.66	0.99	0.93	2.0	1.2	< 0.25	0.86	0.83	0.62
Zinc	U	2455	mg/kg	0.50	58	86	79	210	110	17	93	91	73
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	5.8	16	9.6	8.7	6.7	1.8	4.7	9.9	6.8
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	N	2680	mg/kg	1.0	< 1.0	5.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	N	2680	mg/kg	1.0	< 1.0	3.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	N	2680	mg/kg	1.0	5.7	34	< 1.0	30	130	25	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	N	2680	mg/kg	1.0	4.7	180	< 1.0	94	250	84	< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	10	220	< 5.0	120	380	110	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	10	220	< 10	120	380	110	< 10	< 10	< 10
Naphthalene	U	2700	mg/kg	0.10	< 0.10	2.2	1.1	2.4	2.9	2.7	2.7	1.7	1.7
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	2.2	1.1	2.0	0.71	0.47	0.27	1.2	0.76
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	2.6	0.95	3.8	0.92	2.5	1.7	2.3	1.1
Fluorene	U	2700	mg/kg	0.10	< 0.10	2.5	0.80	3.4	0.68	1.9	1.3	1.9	1.1

Results - Soil

Project: R2688 Brun Lea, Rossendale, Burnley

Client: Smith Grant LLP	Chemtest Job No.:				23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765
Quotation No.:	Chemtest Sample ID.:				1660264	1660265	1660266	1660267	1660268	1660269	1660270	1660271	1660272
Order No.:	Client Sample Ref.:				T1	T1	T1	T2	T2	T2	T3	T3	T3
	Client Sample ID.:				S1	S2	S3	S1	S2	S3	S1	S2	S3
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Date Sampled:				15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD									
Phenanthrene	U	2700	mg/kg	0.10	9.8	9.7	5.7	21	5.9	15	10	14	7.4
Anthracene	U	2700	mg/kg	0.10	3.9	2.8	1.5	7.0	1.5	3.8	2.3	3.3	1.9
Fluoranthene	U	2700	mg/kg	0.10	6.8	8.9	6.8	26	8.2	19	12	18	10
Pyrene	U	2700	mg/kg	0.10	7.2	9.1	7.3	26	8.2	19	12	18	10
Benzo[a]anthracene	U	2700	mg/kg	0.10	< 0.10	12	6.5	14	3.8	8.9	7.1	11	7.4
Chrysene	U	2700	mg/kg	0.10	< 0.10	9.3	4.4	13	5.7	13	9.4	9.3	6.1
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10	13	5.6	13	4.5	9.9	6.6	11	6.4
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10	5.9	1.8	4.8	2.3	4.6	3.9	4.0	2.2
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10	4.2	3.8	10	4.1	7.8	4.9	7.8	4.5
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	6.8	2.7	5.6	< 0.10	5.7	4.0
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	1.9	1.3	1.7	< 0.10	1.3	0.84
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	6.1	2.3	4.4	< 0.10	5.1	8.3
Total Of 16 PAH's	U	2700	mg/kg	2.0	28	84	47	160	56	120	74	120	74
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Results - Soil

Project: R2688 Brun Lea, Rossendale, Burnley

Client: Smith Grant LLP	Chemtest Job No.:				23-20765	23-20765	23-20765
Quotation No.:	Chemtest Sample ID.:				1660273	1660274	1660275
Order No.:	Client Sample Ref.:				T6	T6	T6
	Client Sample ID.:				S1	S2	S3
	Sample Type:				SOIL	SOIL	SOIL
	Date Sampled:				15-Jun-2023	15-Jun-2023	15-Jun-2023
	Asbestos Lab:				DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD			
ACM Type	U	2192		N/A	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	8.5	1.8	12
pH	U	2010		4.0	6.3	6.5	7.6
Arsenic	U	2455	mg/kg	0.5	9.4	1.9	8.3
Cadmium	U	2455	mg/kg	0.10	0.33	< 0.10	0.20
Chromium	U	2455	mg/kg	0.5	26	5.6	15
Copper	U	2455	mg/kg	0.50	29	6.1	37
Mercury	U	2455	mg/kg	0.05	0.14	< 0.05	< 0.05
Nickel	U	2455	mg/kg	0.50	13	4.2	27
Lead	U	2455	mg/kg	0.50	79	14	100
Selenium	U	2455	mg/kg	0.25	0.84	< 0.25	0.70
Zinc	U	2455	mg/kg	0.50	82	17	72
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	2.3	4.0	6.5
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	N	2680	mg/kg	1.0	< 1.0	97	18
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	97	18
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	N	2680	mg/kg	1.0	13	4.3	11
Aromatic TPH >C21-C35	N	2680	mg/kg	1.0	58	89	120
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	71	94	130
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	71	190	140
Naphthalene	U	2700	mg/kg	0.10	2.8	4.3	6.6
Acenaphthylene	U	2700	mg/kg	0.10	0.35	0.59	0.84
Acenaphthene	U	2700	mg/kg	0.10	3.7	8.4	3.7
Fluorene	U	2700	mg/kg	0.10	2.2	5.4	3.0

Results - Soil

Project: R2688 Brun Lea, Rossendale, Burnley

Client: Smith Grant LLP	Chemtest Job No.:				23-20765	23-20765	23-20765
Quotation No.:	Chemtest Sample ID.:				1660273	1660274	1660275
Order No.:	Client Sample Ref.:				T6	T6	T6
	Client Sample ID.:				S1	S2	S3
	Sample Type:				SOIL	SOIL	SOIL
	Date Sampled:				15-Jun-2023	15-Jun-2023	15-Jun-2023
	Asbestos Lab:				DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD			
Phenanthrene	U	2700	mg/kg	0.10	17	34	19
Anthracene	U	2700	mg/kg	0.10	3.6	8.7	5.5
Fluoranthene	U	2700	mg/kg	0.10	20	35	22
Pyrene	U	2700	mg/kg	0.10	20	34	22
Benzo[a]anthracene	U	2700	mg/kg	0.10	9.1	16	10
Chrysene	U	2700	mg/kg	0.10	12	20	14
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	9.8	17	11
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	4.8	7.6	5.8
Benzo[a]pyrene	U	2700	mg/kg	0.10	8.2	15	9.6
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	7.9	12	9.8
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	2.0	3.1	3.2
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	4.4	7.7	5.3
Total Of 16 PAH's	U	2700	mg/kg	2.0	130	230	150
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com

Topsoil Validation Record

Job number	R2174	Depth ref:	R2174-R07-v4 Final			Quality ref:		R2174-R07-v4 Final			Other documents attached		✓	
Date	24.11.2021	Area use:	garden			landscaped			stockpile			other		
Site name / location	Waldmers Wood, Bury	Size area (m):	8 x 20 (Plots 1-2)	Approx. Area (m²):	160	Approx. Depth Top (m):	0.6	Approx. Volume Top (m³):	96	Approx. Depth Sub (m):	n/a	Approx. Volume Sub (m³):	n/a	
Plot/ location:	Plots 1-2 & 8		7 x 5 (Plot 8)		35		0.65		23		n/a		n/a	
Compiled by:	SM		Number depth entries required			3 (1 per 1 plot); 3 entries provided.		Number samples required:		3 TS (1 per 100m³ TS, minimum 3 samples per source); 5 TS provided (full suite) with an additional 5 samples analysed for PAHs only.				

Quality Validation		Inspection date/time:	10.11.21	Inspected by:	SM	Photographed:	✓
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Source Topsoil	1.	✓	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.
Description Topsoil	2.	✓	Greyish-brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.
Sample Topsoil	3.	✓	5 samples collected from onsite stockpile for full contamination suite and 5 additional samples collected and analysed for PAHs only (EMT Lab ref: 21/17783).
Source Subsoil	4.	x	Not used
Description Subsoil	5.	x	n/a
Sample Subsoil	6.	x	n/a

Topsoil Validation Record



Topsoil Results Summary

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Asbestos Fibres	NAD	NAD	Yes
Arsenic	37	9.8-14.1	Yes
Cadmium	11	<0.1-0.1	Yes
Chromium (total)	910	64.7-70.5	Yes
Chromium VI	6	<0.3	Yes
Copper	2,400	27-33	Yes
Lead	200	50-68	Yes
Mercury	40	<0.1-0.2	Yes
Nickel	180	21-24	Yes
Zinc	3,700	60-68	Yes
Naphthalene	2.3	<0.04-0.06	Yes
Acenaphthene	210	<0.03	Yes
Acenaphthylene	170	<0.05-0.11	Yes
Fluorene	170	<0.04-0.08	Yes
Phenanthrene	95	<0.03-1.03	Yes
Anthracene	2,400	<0.04-0.19	Yes
Fluoranthene	280	<0.03-1.15	Yes
Pyrene	620	<0.03-0.93	Yes
Benzo(a)anthracene	7.2	<0.06-0.46	Yes
Chrysene	15	<0.02-0.50	Yes
Benzo(b)fluoranthene	2.6	<0.05-0.47	Yes
Benzo(k)fluoranthene	77	<0.02-0.18	Yes
Benzo(a)pyrene	2.2	<0.04-0.33	Yes
Indeno(123cd) pyrene	27	<0.04-0.25	Yes

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Dibenzo(ah) anthracene	0.24	<0.04	Yes
Benzo(ghi) perylene	320	<0.04-0.21	Yes
Aliphatic C5-C6	42	<0.1	Yes
Aliphatic C6-C8	100	<0.1	Yes
Aliphatic C8-C10	27	<0.1	Yes
Aliphatic C10-C12	130	<0.2	Yes
Aliphatic C12-C16	1,100	<4	Yes
Aliphatic C16-C21	65,000	<7	Yes
Aliphatic C21-C35	65,000	<7	Yes
Aromatic C6-C7	70	<0.1	Yes
Aromatic C7-C8	130	<0.1	Yes
Aromatic C8-C10	34	<0.1	Yes
Aromatic C10-C12	74	<0.2	Yes
Aromatic C12-C16	140	<4	Yes
Aromatic C16-C21	260	<7	Yes
Aromatic C21-C35	1,100	<7	Yes
Benzene	0.08	<0.005	Yes
Toluene	130	<0.005	Yes
Ethyl-benzene	47	<0.005	Yes
m/p-xylene	56	<0.005	Yes
o-xylene	60	<0.005	Yes

Topsoil Validation Record

Depth Validation	Inspection date/time:	24.11.2021	Inspected by:	SM	Photographed:	✓
Plot 1	Required Depth (mm)	600	Measured Depth (mm)	600	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.60m	Greyish-brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.60m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						

Topsoil Validation Record

Depth Validation	Inspection date/time:	24.11.2021	Inspected by:	SM	Photographed:	✓
Plot 2	Required Depth (mm)	600	Measured Depth (mm)	600	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.60m	Greyish-brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.60m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						

Topsoil Validation Record

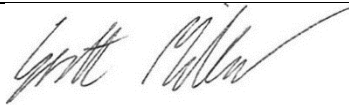
Depth Validation	Inspection date/time:	24.11.2021	Inspected by:	SM	Photographed:	✓
Plot 8	Required Depth (mm)	600	Measured Depth (mm)	650	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.65m	Greyish-brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.65m	Base in same material (following completion of remediation works natural soils confirmed at formation level in area therefore underlying geotextile not required)				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						

Topsoil Validation Record



Soil PASSED testing for quality and depth.

An additional inspection visit IS NOT required.

SGP Staff:	Scott Miller BSc MCIWEM	Signed:		25.11.21
SGP Member:	K Hawkins BSc MSc MIES CEnv	Signed:		25.11.21

Guide notes:

1.	Source Topsoil	As much information as possible: Date Delivered, volume/weight delivery, supplier, certification, source address (yard), original source address (site).
2.	Description Topsoil	Full Description: Grading (Particle Size: clay, silt, sand, gravel), organic content, colour, odour, minerals, stone, glass, slate, ash, clinker, coal, coke, tarmac, plastic, other?
3.	Sample Topsoil	Date sampled, date submitted, sample reference, laboratory, laboratory job number
4.	Source Subsoil	As much information as possible: Date Delivered, volume/weight delivery, supplier, certification, source address (yard), original source address (site).
5.	Description Subsoil	Full Description: Grading (Particle Size: clay, silt, sand, gravel), organic content, colour, odour, minerals, stone, glass, slate, ash, clinker, coal, coke, tarmac, plastic, other?
6.	Sample Subsoil	Date sampled, date submitted, sample reference, laboratory, laboratory job number

Smith Grant LLP

Station House

Station Road

Ruabon

Wrexham

LL14 6DL



Attention : Dan Wayland

Date : 15th November, 2021

Your reference : R2174

Our reference : Test Report 21/17783 Batch 1

Location : Tetrosyl BM

Date samples received : 11th November, 2021

Status : Final Report

Issue : 2

Ten samples were received for analysis on 11th November, 2021 of which ten were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

A handwritten signature in black ink, appearing to read 'B. Leslie'.

Bruce Leslie

Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Smith Grant LLP
Reference: R2127
Location: Tetrosyl BM
Contact: Dan Wayland
EMT Job No: 21/17783

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1	2-3	4	5-6	7	8-9	10	11-12	13	14-15	Please see attached notes for all abbreviations and acronyms		
Sample ID	Cottam - TS1	Cottam - TS2	Cottam - TS3	Cottam - TS4	Cottam - TS5	Cottam - TS6	Cottam - TS7	Cottam - TS8	Cottam - TS9	Cottam - TS10			
Depth													
COC No / misc													
Containers	J	V J	J	V J	J	V J	J	V J	J	V J			
Sample Date	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021			
Sample Type	Clayey Loam	Clayey Loam	Clay	Clay	Clay	Clayey Loam	Clay	Clay	Clay	Clay			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	LOD/LOR	Units	Method No.
Arsenic ^{#M}	-	11.8	-	12.5	-	11.9	-	14.1	-	9.8	<0.5	mg/kg	TM30/PM15
Cadmium ^{#M}	-	0.1	-	0.1	-	0.1	-	<0.1	-	0.1	<0.1	mg/kg	TM30/PM15
Chromium ^{#M}	-	68.5	-	70.5	-	63.4	-	68.4	-	64.7	<0.5	mg/kg	TM30/PM15
Copper ^{#M}	-	32	-	33	-	28	-	30	-	27	<1	mg/kg	TM30/PM15
Lead ^{#M}	-	63	-	68	-	55	-	60	-	50	<5	mg/kg	TM30/PM15
Mercury ^{#M}	-	0.2	-	<0.1	-	0.1	-	0.1	-	0.2	<0.1	mg/kg	TM30/PM15
Nickel ^{#M}	-	23.4	-	23.6	-	21.0	-	24.0	-	22.3	<0.7	mg/kg	TM30/PM15
Selenium ^{#M}	-	<1	-	<1	-	1	-	1	-	<1	<1	mg/kg	TM30/PM15
Zinc ^{#M}	-	67	-	68	-	62	-	65	-	60	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene ^{#M}	<0.04	0.06	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene ^{#M}	<0.05	0.11	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene ^{#M}	<0.04	0.08	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene ^{#M}	0.11	1.03	<0.03	0.11	<0.03	0.10	0.07	0.06	0.22	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene [#]	<0.04	0.19	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.06	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene ^{#M}	0.18	1.15	<0.03	0.19	<0.03	0.13	0.10	0.10	0.28	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene [#]	0.15	0.93	<0.03	0.16	<0.03	0.11	0.10	0.09	0.22	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene [#]	0.11	0.46	<0.06	0.11	<0.06	<0.06	0.08	0.09	0.14	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene ^{#M}	0.10	0.50	<0.02	0.09	<0.02	0.06	0.06	0.06	0.11	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(k)fluoranthene ^{#M}	0.11	0.65	<0.07	0.12	<0.07	<0.07	<0.07	<0.07	0.12	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene [#]	0.06	0.33	<0.04	0.05	<0.04	<0.04	<0.04	<0.04	0.07	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene ^{#M}	<0.04	0.25	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene [#]	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene [#]	<0.04	0.21	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 16 Total	0.8	6.0	<0.6	0.8	<0.6	<0.6	<0.6	<0.6	1.2	<0.6	<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.08	0.47	<0.05	0.09	<0.05	<0.05	<0.05	<0.05	0.09	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.03	0.18	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	98	97	98	102	98	96	97	99	92	71	<0	%	TM4/PM8
TPH CWG													
Aliphatics													
>C5-C6 ^{#M}	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 ^{#M}	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 ^{#M}	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 ^{#M}	-	<4	-	<4	-	<4	-	<4	-	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 ^{#M}	-	<7	-	<7	-	<7	-	<7	-	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 ^{#M}	-	<7	-	<7	-	<7	-	<7	-	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35	-	<19	-	<19	-	<19	-	<19	-	<19	<19	mg/kg	TM5/PM8/PM16/PM12/PM15

Element Materials Technology

Client Name: Smith Grant LLP
Reference: R2127
Location: Tetrosyl BM
Contact: Dan Wayland
EMT Job No: 21/17783

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

[illegible]

Client Name: Smith Grant LLP
Reference: R2127
Location: Tetrosyl BM
Contact: Dan Wayland

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
21/17783	1	Cottam - TS2		3	11/11/2021	General Description (Bulk Analysis)	soil/stones
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD
21/17783	1	Cottam - TS4		6	11/11/2021	General Description (Bulk Analysis)	soil/stones
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD
21/17783	1	Cottam - TS6		9	11/11/2021	General Description (Bulk Analysis)	soil/stones
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD
21/17783	1	Cottam - TS8		12	11/11/2021	General Description (Bulk Analysis)	Brown soil with vegetation
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD
21/17783	1	Cottam - TS10		15	11/11/2021	General Description (Bulk Analysis)	Brown soil with vegetation
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD

Client Name: Smith Grant LLP

Reference: R2127

Location: Tetrosyl BM

Contact: Dan Wayland

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/17783

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Please include all sections of this report if it is reproduced

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

EMT Job No: 21/17783

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes	Yes	AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes
PM13	A visual examination of the solid sample is carried out to ascertain sample make up, colour and any other inclusions. This is not a geotechnical description.	PM0	No preparation is required.			AR	No
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO ₂ generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes

EMT Job No: 21/17783

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEPA Method 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes	Yes	AD	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes	Yes	AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 First edition (2006)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No
NONE	No Method Code	NONE	No Method Code			AD	Yes



Topsoil Validation Record

Job number	R2174	Depth ref:	R2174-R07-v4 Final		Quality ref:		R2174-R07-v4 Final		Other documents attached		✓		
Date	06.12.21	Area use:	garden		landscaped		stockpile		other				
Site name / location	Waldmers Wood, Bury	Size area (m):	5 x 15	Approx. Area (m²):	75	Approx. Depth Top (m):	0.6	Approx. Volume Top (m³):	45	Approx. Depth Sub (m):	n/a	Approx. Volume Sub (m³):	n/a
Plot/ location:	Plots 3-5												
Compiled by:	MJ		Number depth entries required		3 (1 per plot); 3 entries provided.		Number samples required:		3 TS (1 per 100m³ TS, minimum 3 samples per source); 5 TS provided (full suite) with an additional 5 samples analysed for PAHs only.				

Quality Validation		Inspection date/time:	11.11.21	Inspected by:	DW	Photographed:	✓
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Source Topsoil	1.	✓	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.
Description Topsoil	2.	✓	Greyish-brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.
Sample Topsoil	3.	✓	5 samples collected from onsite stockpile for full contamination suite and 5 additional samples collected and analysed for PAHs only (EMT Lab ref: 21/17783).
Source Subsoil	4.	x	Not used
Description Subsoil	5.	x	n/a
Sample Subsoil	6.	x	n/a

Topsoil Validation Record



Topsoil Results Summary

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Asbestos Fibres	NAD	NAD	Yes
Arsenic	37	9.8-14.1	Yes
Cadmium	11	<0.1-0.1	Yes
Chromium (total)	910	64.7-70.5	Yes
Chromium VI	6	<0.3	Yes
Copper	2,400	27-33	Yes
Lead	200	50-68	Yes
Mercury	40	<0.1-0.2	Yes
Nickel	180	21-24	Yes
Zinc	3,700	60-68	Yes
Naphthalene	2.3	<0.04-0.06	Yes
Acenaphthene	210	<0.03	Yes
Acenaphthylene	170	<0.05-0.11	Yes
Fluorene	170	<0.04-0.08	Yes
Phenanthrene	95	<0.03-1.03	Yes
Anthracene	2,400	<0.04-0.19	Yes
Fluoranthene	280	<0.03-1.15	Yes
Pyrene	620	<0.03-0.93	Yes
Benzo(a)anthracene	7.2	<0.06-0.46	Yes
Chrysene	15	<0.02-0.50	Yes
Benzo(b)fluoranthene	2.6	<0.05-0.47	Yes
Benzo(k)fluoranthene	77	<0.02-0.18	Yes
Benzo(a)pyrene	2.2	<0.04-0.33	Yes
Indeno(123cd) pyrene	27	<0.04-0.25	Yes

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Dibenzo(ah) anthracene	0.24	<0.04	Yes
Benzo(ghi) perylene	320	<0.04-0.21	Yes
Aliphatic C5-C6	42	<0.1	Yes
Aliphatic C6-C8	100	<0.1	Yes
Aliphatic C8-C10	27	<0.1	Yes
Aliphatic C10-C12	130	<0.2	Yes
Aliphatic C12-C16	1,100	<4	Yes
Aliphatic C16-C21	65,000	<7	Yes
Aliphatic C21-C35	65,000	<7	Yes
Aromatic C6-C7	70	<0.1	Yes
Aromatic C7-C8	130	<0.1	Yes
Aromatic C8-C10	34	<0.1	Yes
Aromatic C10-C12	74	<0.2	Yes
Aromatic C12-C16	140	<4	Yes
Aromatic C16-C21	260	<7	Yes
Aromatic C21-C35	1,100	<7	Yes
Benzene	0.08	<0.005	Yes
Toluene	130	<0.005	Yes
Ethyl-benzene	47	<0.005	Yes
m/p-xylene	56	<0.005	Yes
o-xylene	60	<0.005	Yes



Topsoil Validation Record

Depth Validation	Inspection date/time:	06.12.21	Inspected by:	MJ	Photographed:	✓
Plot 3	Required Depth (mm)	600	Measured Depth (mm)	600	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.60m	Greyish-brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.60m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						

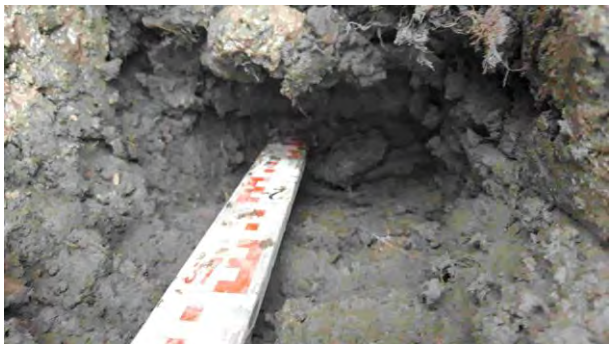


Topsoil Validation Record

Depth Validation	Inspection date/time:	06.12.21	Inspected by:	MJ	Photographed:	✓
Plot 4	Required Depth (mm)	600	Measured Depth (mm)	600	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.60m	Greyish-brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.60m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						



Topsoil Validation Record

Depth Validation	Inspection date/time:	06.12.2021	Inspected by:	MJ	Photographed:	✓
Plot 5	Required Depth (mm)	600	Measured Depth (mm)	600	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.65m	Greyish-brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.65m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						

Topsoil Validation Record



Soil PASSED testing for quality and depth.

An additional inspection visit IS NOT required.

SGP Staff:	M K Jones BSc MSc AMIEnvSc	Signed:		06.12.21
SGP Member:	D Wayland BSc MSC AssocMCIWM MCIWEM C.WEM	Signed:		07.12.21

Guide notes:

1.	Source Topsoil	As much information as possible: Date Delivered, volume/weight delivery, supplier, certification, source address (yard), original source address (site).
2.	Description Topsoil	Full Description: Grading (Particle Size: clay, silt, sand, gravel), organic content, colour, odour, minerals, stone, glass, slate, ash, clinker, coal, coke, tarmac, plastic, other?
3.	Sample Topsoil	Date sampled, date submitted, sample reference, laboratory, laboratory job number
4.	Source Subsoil	As much information as possible: Date Delivered, volume/weight delivery, supplier, certification, source address (yard), original source address (site).
5.	Description Subsoil	Full Description: Grading (Particle Size: clay, silt, sand, gravel), organic content, colour, odour, minerals, stone, glass, slate, ash, clinker, coal, coke, tarmac, plastic, other?
6.	Sample Subsoil	Date sampled, date submitted, sample reference, laboratory, laboratory job number

Smith Grant LLP

Station House

Station Road

Ruabon

Wrexham

LL14 6DL



Attention : Dan Wayland

Date : 15th November, 2021

Your reference : R2174

Our reference : Test Report 21/17783 Batch 1

Location : Tetrosyl BM

Date samples received : 11th November, 2021

Status : Final Report

Issue : 2

Ten samples were received for analysis on 11th November, 2021 of which ten were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:**Bruce Leslie**

Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Smith Grant LLP
Reference: R2127
Location: Tetrosyl BM
Contact: Dan Wayland
EMT Job No: 21/17783

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1	2-3	4	5-6	7	8-9	10	11-12	13	14-15	Please see attached notes for all abbreviations and acronyms		
Sample ID	Cottam - TS1	Cottam - TS2	Cottam - TS3	Cottam - TS4	Cottam - TS5	Cottam - TS6	Cottam - TS7	Cottam - TS8	Cottam - TS9	Cottam - TS10			
Depth													
COC No / misc													
Containers	J	V J	J	V J	J	V J	J	V J	J	V J			
Sample Date	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021			
Sample Type	Clayey Loam	Clayey Loam	Clay	Clay	Clay	Clayey Loam	Clay	Clay	Clay	Clay			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	LOD/LOR	Units	Method No.
Arsenic ^{#M}	-	11.8	-	12.5	-	11.9	-	14.1	-	9.8	<0.5	mg/kg	TM30/PM15
Cadmium ^{#M}	-	0.1	-	0.1	-	0.1	-	<0.1	-	0.1	<0.1	mg/kg	TM30/PM15
Chromium ^{#M}	-	68.5	-	70.5	-	63.4	-	68.4	-	64.7	<0.5	mg/kg	TM30/PM15
Copper ^{#M}	-	32	-	33	-	28	-	30	-	27	<1	mg/kg	TM30/PM15
Lead ^{#M}	-	63	-	68	-	55	-	60	-	50	<5	mg/kg	TM30/PM15
Mercury ^{#M}	-	0.2	-	<0.1	-	0.1	-	0.1	-	0.2	<0.1	mg/kg	TM30/PM15
Nickel ^{#M}	-	23.4	-	23.6	-	21.0	-	24.0	-	22.3	<0.7	mg/kg	TM30/PM15
Selenium ^{#M}	-	<1	-	<1	-	1	-	1	-	<1	<1	mg/kg	TM30/PM15
Zinc ^{#M}	-	67	-	68	-	62	-	65	-	60	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene ^{#M}	<0.04	0.06	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene ^{#M}	<0.05	0.11	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene ^{#M}	<0.04	0.08	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene ^{#M}	0.11	1.03	<0.03	0.11	<0.03	0.10	0.07	0.06	0.22	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene [#]	<0.04	0.19	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.06	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene ^{#M}	0.18	1.15	<0.03	0.19	<0.03	0.13	0.10	0.10	0.28	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene [#]	0.15	0.93	<0.03	0.16	<0.03	0.11	0.10	0.09	0.22	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene [#]	0.11	0.46	<0.06	0.11	<0.06	<0.06	0.08	0.09	0.14	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene ^{#M}	0.10	0.50	<0.02	0.09	<0.02	0.06	0.06	0.06	0.11	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(k)fluoranthene ^{#M}	0.11	0.65	<0.07	0.12	<0.07	<0.07	<0.07	<0.07	0.12	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene [#]	0.06	0.33	<0.04	0.05	<0.04	<0.04	<0.04	<0.04	0.07	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene ^{#M}	<0.04	0.25	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene [#]	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene [#]	<0.04	0.21	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 16 Total	0.8	6.0	<0.6	0.8	<0.6	<0.6	<0.6	<0.6	1.2	<0.6	<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.08	0.47	<0.05	0.09	<0.05	<0.05	<0.05	<0.05	0.09	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.03	0.18	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	98	97	98	102	98	96	97	99	92	71	<0	%	TM4/PM8
TPH CWG													
Aliphatics													
>C5-C6 ^{#M}	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 ^{#M}	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 ^{#M}	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 ^{#M}	-	<4	-	<4	-	<4	-	<4	-	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 ^{#M}	-	<7	-	<7	-	<7	-	<7	-	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 ^{#M}	-	<7	-	<7	-	<7	-	<7	-	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35	-	<19	-	<19	-	<19	-	<19	-	<19	<19	mg/kg	TM5/PM8/PM16/PM12/PM15

Element Materials Technology

Client Name: Smith Grant LLP
Reference: R2127
Location: Tetrosyl BM
Contact: Dan Wayland
EMT Job No: 21/17783

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

[illegible]

Client Name: Smith Grant LLP
Reference: R2127
Location: Tetrosyl BM
Contact: Dan Wayland

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
21/17783	1	Cottam - TS2		3	11/11/2021	General Description (Bulk Analysis)	soil/stones
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD
21/17783	1	Cottam - TS4		6	11/11/2021	General Description (Bulk Analysis)	soil/stones
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD
21/17783	1	Cottam - TS6		9	11/11/2021	General Description (Bulk Analysis)	soil/stones
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD
21/17783	1	Cottam - TS8		12	11/11/2021	General Description (Bulk Analysis)	Brown soil with vegetation
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD
21/17783	1	Cottam - TS10		15	11/11/2021	General Description (Bulk Analysis)	Brown soil with vegetation
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD

Client Name: Smith Grant LLP

Reference: R2127

Location: Tetrosyl BM

Contact: Dan Wayland

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/17783

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Please include all sections of this report if it is reproduced

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

EMT Job No: 21/17783

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes	Yes	AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes
PM13	A visual examination of the solid sample is carried out to ascertain sample make up, colour and any other inclusions. This is not a geotechnical description.	PM0	No preparation is required.			AR	No
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO ₂ generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes

EMT Job No: 21/17783

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEPA Method 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes	Yes	AD	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes	Yes	AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 First edition (2006)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No
NONE	No Method Code	NONE	No Method Code			AD	Yes



Topsoil Validation Record

Job number	R2174	Depth ref:	R2174-R07-v4 Final		Quality ref:		R2174-R07-v4 Final			Other documents attached		✓	
Date	17.01.22	Area use:	garden			landscaped			stockpile		other		
Site name / location	Waldmers Wood, Bury	Size area (m):	15 x 15	Approx. Area (m²):	225	Approx. Depth Top (m):	0.6	Approx. Volume Top (m³):	135	Approx. Depth Sub (m):	n/a	Approx. Volume Sub (m³):	n/a
Plot/ location:	Plots 6-8 + 10-12												
Compiled by:	MJ		Number depth entries required			6 (1 per plot); 6 entries provided.		Number samples required:		3 TS (1 per 100m³ TS, minimum 3 samples per source); 5 TS provided (full suite) with an additional 5 samples analysed for PAHs only.			

Quality Validation		Inspection date/time:	11.11.21	Inspected by:	DW	Photographed:	✓
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Source Topsoil	1.	✓	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.
Description Topsoil	2.	✓	Greyish-brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.
Sample Topsoil	3.	✓	5 samples collected from onsite stockpile for full contamination suite and 5 additional samples collected and analysed for PAHs only (EMT Lab ref: 21/17783).
Source Subsoil	4.	x	Not used
Description Subsoil	5.	x	n/a
Sample Subsoil	6.	x	n/a

Topsoil Validation Record



Topsoil Results Summary

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Asbestos Fibres	NAD	NAD	Yes
Arsenic	37	9.8-14.1	Yes
Cadmium	11	<0.1-0.1	Yes
Chromium (total)	910	64.7-70.5	Yes
Chromium VI	6	<0.3	Yes
Copper	2,400	27-33	Yes
Lead	200	50-68	Yes
Mercury	40	<0.1-0.2	Yes
Nickel	180	21-24	Yes
Zinc	3,700	60-68	Yes
Naphthalene	2.3	<0.04-0.06	Yes
Acenaphthene	210	<0.03	Yes
Acenaphthylene	170	<0.05-0.11	Yes
Fluorene	170	<0.04-0.08	Yes
Phenanthrene	95	<0.03-1.03	Yes
Anthracene	2,400	<0.04-0.19	Yes
Fluoranthene	280	<0.03-1.15	Yes
Pyrene	620	<0.03-0.93	Yes
Benzo(a)anthracene	7.2	<0.06-0.46	Yes
Chrysene	15	<0.02-0.50	Yes
Benzo(b)fluoranthene	2.6	<0.05-0.47	Yes
Benzo(k)fluoranthene	77	<0.02-0.18	Yes
Benzo(a)pyrene	2.2	<0.04-0.33	Yes
Indeno(123cd) pyrene	27	<0.04-0.25	Yes

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Dibenzo(ah) anthracene	0.24	<0.04	Yes
Benzo(ghi) perylene	320	<0.04-0.21	Yes
Aliphatic C5-C6	42	<0.1	Yes
Aliphatic C6-C8	100	<0.1	Yes
Aliphatic C8-C10	27	<0.1	Yes
Aliphatic C10-C12	130	<0.2	Yes
Aliphatic C12-C16	1,100	<4	Yes
Aliphatic C16-C21	65,000	<7	Yes
Aliphatic C21-C35	65,000	<7	Yes
Aromatic C6-C7	70	<0.1	Yes
Aromatic C7-C8	130	<0.1	Yes
Aromatic C8-C10	34	<0.1	Yes
Aromatic C10-C12	74	<0.2	Yes
Aromatic C12-C16	140	<4	Yes
Aromatic C16-C21	260	<7	Yes
Aromatic C21-C35	1,100	<7	Yes
Benzene	0.08	<0.005	Yes
Toluene	130	<0.005	Yes
Ethyl-benzene	47	<0.005	Yes
m/p-xylene	56	<0.005	Yes
o-xylene	60	<0.005	Yes



Topsoil Validation Record

Depth Validation	Inspection date/time:	17.01.22	Inspected by:	MJ	Photographed:	✓
Plot 6	Required Depth (mm)	600	Measured Depth (mm)	600	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.60m	Greyish-brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.60m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						



Topsoil Validation Record

Depth Validation	Inspection date/time:	17.01.22	Inspected by:	MJ	Photographed:	✓
Plot 7	Required Depth (mm)	600	Measured Depth (mm)	600	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.60m	Greyish-brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.60m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						

Topsoil Validation Record



Depth Validation	Inspection date/time:	17.01.22	Inspected by:	MJ	Photographed:	✓
Plot 8	Required Depth (mm)	600	Measured Depth (mm)	600	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.6m	Greyish-brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.6m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						



Topsoil Validation Record

Depth Validation	Inspection date/time:	17.01.22	Inspected by:	MJ	Photographed:	✓
Plot 10	Required Depth (mm)	600	Measured Depth (mm)	600	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.6m	Greyish-brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.6m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						

Topsoil Validation Record



Depth Validation	Inspection date/time:	17.01.22	Inspected by:	MJ	Photographed:	✓
Plot 11	Required Depth (mm)	600	Measured Depth (mm)	600	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.6m	Greyish-brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.6m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						

Topsoil Validation Record



Depth Validation	Inspection date/time:	17.01.22	Inspected by:	MJ	Photographed:	✓
Plot 12	Required Depth (mm)	600	Measured Depth (mm)	600	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.6m	Greyish-brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.6m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						

Topsoil Validation Record



Soil PASSED testing for quality and depth.

An additional inspection visit IS NOT required.

SGP Staff:	M K Jones BSc MSc AMIEnvSc	Signed:		19.01.22
SGP Member:	D Wayland BSc MSC AssocMCIWM MCIWEM C.WEM	Signed:		20.01.22

Guide notes:

1.	Source Topsoil	As much information as possible: Date Delivered, volume/weight delivery, supplier, certification, source address (yard), original source address (site).
2.	Description Topsoil	Full Description: Grading (Particle Size: clay, silt, sand, gravel), organic content, colour, odour, minerals, stone, glass, slate, ash, clinker, coal, coke, tarmac, plastic, other?
3.	Sample Topsoil	Date sampled, date submitted, sample reference, laboratory, laboratory job number
4.	Source Subsoil	As much information as possible: Date Delivered, volume/weight delivery, supplier, certification, source address (yard), original source address (site).
5.	Description Subsoil	Full Description: Grading (Particle Size: clay, silt, sand, gravel), organic content, colour, odour, minerals, stone, glass, slate, ash, clinker, coal, coke, tarmac, plastic, other?
6.	Sample Subsoil	Date sampled, date submitted, sample reference, laboratory, laboratory job number

Topsoil Validation Record

Job number	R2174	Depth ref:	R2174-R07-v4 Final			Quality ref:			R2174-R07-v4 Final			Other documents attached		✓	
Date	24.06.22	Area use:	garden			landscaped			stockpile			other			
Site name / location	Waldmers Wood, Bury	Size area (m):	Plot 9: 6x10	Approx. Area (m²):	60	Approx. Depth Top (m):	0.65	Approx. Volume Top (m³):	40	Approx. Depth Sub (m):	n/a	Approx. Volume Sub (m³):	n/a		
Plot/ location:	Plots 9 & 144		Plot 144 7x14		98		0.65		65						
Compiled by:	CS / SM	Number depth entries required			2 (1 per plot); 2 entries provided.			Number samples required:			3 TS (1 per 100m³ TS, minimum 3 samples per source); 4 TS provided.				

Quality Validation		Inspection date/time:	22.02.22	Inspected by:	CS	Photographed:	✓
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Source Topsoil	1.	✓	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.
Description Topsoil	2.	✓	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.
Sample Topsoil	3.	✓	4 samples collected from onsite stockpile for full contamination suite (Eurofins Lab ref: 22-07010-1).
Source Subsoil	4.	x	Not used
Description Subsoil	5.	x	n/a
Sample Subsoil	6.	x	n/a

Topsoil Validation Record



Topsoil Results Summary (Lab ref: 22-07010-1)

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Asbestos Fibres	NAD	NAD	Yes
Arsenic	37	7-15	Yes
Cadmium	11	0.13-1.3	Yes
Chromium (total)	910	19-38	Yes
Chromium VI	6	<0.5	Yes
Copper	2,400	19-29	Yes
Lead	200	30-49	Yes
Mercury	40	0.12-0.18	Yes
Nickel	180	16-51	Yes
Zinc	3,700	38-170	Yes
Naphthalene	2.3	<0.1	Yes
Acenaphthene	210	<0.1	Yes
Acenaphthylene	170	<0.1	Yes
Fluorene	170	<0.1	Yes
Phenanthrene	95	0.85-1.7	Yes
Anthracene	2,400	0.18-0.51	Yes
Fluoranthene	280	1.2-2	Yes
Pyrene	620	1.4-2.1	Yes
Benzo(a)anthracene	7.2	0.94-1.5	Yes
Chrysene	15	0.85-1.9	Yes
Benzo(b)fluoranthene	2.6	1.1-1.5	Yes
Benzo(k)fluoranthene	77	0.23-0.45	Yes
Benzo(a)pyrene	2.2	0.53-1	Yes
Indeno(123cd) pyrene	27	0.43-0.83	Yes

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Dibenzo(ah) anthracene	0.24	<0.1-0.22	Yes
Benzo(ghi) perylene	320	0.26-0.67	Yes
Aliphatic C5-C6	42	<1	Yes
Aliphatic C6-C8	100	<1	Yes
Aliphatic C8-C10	27	<1	Yes
Aliphatic C10-C12	130	<1	Yes
Aliphatic C12-C16	1,100	<1	Yes
Aliphatic C16-C21	65,000	<1	Yes
Aliphatic C21-C35	65,000	<1	Yes
Aromatic C6-C7	70	<1	Yes
Aromatic C7-C8	130	<1	Yes
Aromatic C8-C10	34	<1	Yes
Aromatic C10-C12	74	<1	Yes
Aromatic C12-C16	140	<1	Yes
Aromatic C16-C21	260	<1	Yes
Aromatic C21-C35	1,100	<1	Yes
Benzene	0.08	<0.001	Yes
Toluene	130	<0.001	Yes
Ethyl-benzene	47	<0.001	Yes
m/p-xylene	56	<0.001	Yes
o-xylene	60	<0.001	Yes

Topsoil Validation Record

Depth Validation	Inspection date/time:	22.02.22	Inspected by:	CS	Photographed:	✓
Plot 9	Required Depth (mm)	600	Measured Depth (mm)	650	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.65m	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.65m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						

Topsoil Validation Record

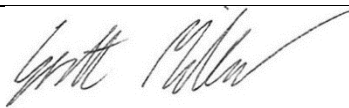
Depth Validation	Inspection date/time:	22.02.22	Inspected by:	CS	Photographed:	✓
Plot 144	Required Depth (mm)	600	Measured Depth (mm)	650	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.65m	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.65m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						

Topsoil Validation Record



Soil PASSED testing for quality and depth.

An additional inspection visit IS NOT required.

SGP Staff:	C Salwa BSc MSc FGS	Signed:		24.06.22
SGP Member:	D Wayland BSc MSC AssocMCIWM MCIWEM C.WEM	Signed:		24.06.22

Guide notes:

1.	Source Topsoil	As much information as possible: Date Delivered, volume/weight delivery, supplier, certification, source address (yard), original source address (site).
2.	Description Topsoil	Full Description: Grading (Particle Size: clay, silt, sand, gravel), organic content, colour, odour, minerals, stone, glass, slate, ash, clinker, coal, coke, tarmac, plastic, other?
3.	Sample Topsoil	Date sampled, date submitted, sample reference, laboratory, laboratory job number
4.	Source Subsoil	As much information as possible: Date Delivered, volume/weight delivery, supplier, certification, source address (yard), original source address (site).
5.	Description Subsoil	Full Description: Grading (Particle Size: clay, silt, sand, gravel), organic content, colour, odour, minerals, stone, glass, slate, ash, clinker, coal, coke, tarmac, plastic, other?
6.	Sample Subsoil	Date sampled, date submitted, sample reference, laboratory, laboratory job number



2183

Final Report

Report No.: 22-07010-1
Initial Date of Issue: 01-Mar-2022
Client Smith Grant LLP
Client Address: Station House, Station Road
Ruabon
Wrexham
LL14 6DL
Contact(s): Cezary Salwa
Megan Jones
Project R2174 TETROSYL BM

Quotation No.:	Date Received:	24-Feb-2022
Order No.:	Date Instructed:	24-Feb-2022
No. of Samples: 4		
Turnaround (Wkdays): 5	Results Due:	02-Mar-2022
Date Approved: 01-Mar-2022		

Approved By:



Details: Stuart Henderson, Technical
Manager

Results - Soil

Project: R2174 TETROSYL BM

Client: Smith Grant LLP	Chemtest Job No.:				22-07010	22-07010	22-07010	22-07010
Quotation No.:	Chemtest Sample ID.:				1378913	1378914	1378915	1378916
Order No.:	Client Sample Ref.:				ES1	ES2	ES3	ES4
	Sample Location:				Cottam	Cottam	Cottam	Cottam
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Date Sampled:				22-Feb-2022	22-Feb-2022	22-Feb-2022	22-Feb-2022
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD				
ACM Type	U	2192		N/A	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	20	21	22	20
pH	U	2010		4.0	7.9	7.8	7.6	7.9
Arsenic	U	2450	mg/kg	1.0	7.0	8.0	15	7.6
Cadmium	U	2450	mg/kg	0.10	0.15	0.16	1.3	0.13
Chromium	U	2450	mg/kg	1.0	19	23	38	20
Copper	U	2450	mg/kg	0.50	21	22	29	19
Mercury	U	2450	mg/kg	0.10	0.18	0.12	0.14	0.16
Nickel	U	2450	mg/kg	0.50	18	51	43	16
Lead	U	2450	mg/kg	0.50	43	30	45	49
Selenium	U	2450	mg/kg	0.20	< 0.20	< 0.20	1.1	0.22
Zinc	U	2450	mg/kg	0.50	61	59	170	38
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	5.0	2.9	4.7	3.8
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10	< 10	< 10
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: R2174 TETROSYL BM

Client: Smith Grant LLP	Chemtest Job No.:				22-07010	22-07010	22-07010	22-07010
Quotation No.:	Chemtest Sample ID.:				1378913	1378914	1378915	1378916
Order No.:	Client Sample Ref.:				ES1	ES2	ES3	ES4
	Sample Location:				Cottam	Cottam	Cottam	Cottam
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Date Sampled:				22-Feb-2022	22-Feb-2022	22-Feb-2022	22-Feb-2022
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD				
Phenanthrene	U	2700	mg/kg	0.10	1.7	0.86	0.93	0.85
Anthracene	U	2700	mg/kg	0.10	0.51	0.26	0.19	0.18
Fluoranthene	U	2700	mg/kg	0.10	2.0	1.4	1.2	1.4
Pyrene	U	2700	mg/kg	0.10	2.1	1.7	1.4	1.5
Benzo[a]anthracene	U	2700	mg/kg	0.10	1.4	1.0	1.5	0.94
Chrysene	U	2700	mg/kg	0.10	1.9	0.85	1.9	1.4
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	1.5	1.2	1.1	1.2
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	0.45	0.32	0.23	0.27
Benzo[a]pyrene	U	2700	mg/kg	0.10	1.0	0.80	0.53	0.66
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	0.83	0.62	0.43	0.69
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	0.22	0.15	< 0.10	0.17
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	0.67	0.39	0.31	0.26
Total Of 16 PAH's	U	2700	mg/kg	2.0	14	9.6	9.7	9.5
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com

Topsoil Validation Record

Job number	R2174	Depth ref:	R2174-R07-v4 Final		Quality ref:		R2174-R07-v4 Final			Other documents attached		✓		
Date	24.06.22	Area use:	garden			landscaped			stockpile			other		
Site name / location	Waldmers Wood, Bury	Size area (m):	irregular	Approx. Area (m²):	640	Approx. Depth Top (m):	0.62	Approx. Volume Top (m³):	397	Approx. Depth Sub (m):	n/a	Approx. Volume Sub (m³):	n/a	
Plot/ location:	Plots 500, 14-17 & 52-53													
Compiled by:	CS / SM		Number depth entries required			7 (at 1 per plot); 4 entries provided.		Number samples required:		3 TS (1 per 100m³ TS, minimum 3 samples per source); 4 TS provided (full suite)				

Quality Validation		Inspection date/time:	22.02.22	Inspected by:	CS	Photographed:	✓
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Source Topsoil	1.	✓	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.
Description Topsoil	2.	✓	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.
Sample Topsoil	3.	✓	4 samples collected from onsite stockpile for full contamination suite (Eurofins Lab ref: 22-07010-1).
Source Subsoil	4.	x	Not used
Description Subsoil	5.	x	n/a
Sample Subsoil	6.	x	n/a

Topsoil Validation Record



Topsoil Results Summary (Lab ref: 22-07010-1)

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Asbestos Fibres	NAD	NAD	Yes
Arsenic	37	7-15	Yes
Cadmium	11	0.13-1.3	Yes
Chromium (total)	910	19-38	Yes
Chromium VI	6	<0.5	Yes
Copper	2,400	19-29	Yes
Lead	200	30-49	Yes
Mercury	40	0.12-0.18	Yes
Nickel	180	16-51	Yes
Zinc	3,700	38-170	Yes
Naphthalene	2.3	<0.1	Yes
Acenaphthene	210	<0.1	Yes
Acenaphthylene	170	<0.1	Yes
Fluorene	170	<0.1	Yes
Phenanthrene	95	0.85-1.7	Yes
Anthracene	2,400	0.18-0.51	Yes
Fluoranthene	280	1.2-2	Yes
Pyrene	620	1.4-2.1	Yes
Benzo(a)anthracene	7.2	0.94-1.5	Yes
Chrysene	15	0.85-1.9	Yes
Benzo(b)fluoranthene	2.6	1.1-1.5	Yes
Benzo(k)fluoranthene	77	0.23-0.45	Yes
Benzo(a)pyrene	2.2	0.53-1	Yes
Indeno(123cd) pyrene	27	0.43-0.83	Yes

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Dibenzo(ah) anthracene	0.24	<0.1-0.22	Yes
Benzo(ghi) perylene	320	0.26-0.67	Yes
Aliphatic C5-C6	42	<1	Yes
Aliphatic C6-C8	100	<1	Yes
Aliphatic C8-C10	27	<1	Yes
Aliphatic C10-C12	130	<1	Yes
Aliphatic C12-C16	1,100	<1	Yes
Aliphatic C16-C21	65,000	<1	Yes
Aliphatic C21-C35	65,000	<1	Yes
Aromatic C6-C7	70	<1	Yes
Aromatic C7-C8	130	<1	Yes
Aromatic C8-C10	34	<1	Yes
Aromatic C10-C12	74	<1	Yes
Aromatic C12-C16	140	<1	Yes
Aromatic C16-C21	260	<1	Yes
Aromatic C21-C35	1,100	<1	Yes
Benzene	0.08	<0.001	Yes
Toluene	130	<0.001	Yes
Ethyl-benzene	47	<0.001	Yes
m/p-xylene	56	<0.001	Yes
o-xylene	60	<0.001	Yes

Topsoil Validation Record

Depth Validation	Inspection date/time:	01.03.22	Inspected by:	CS	Photographed:	✓
Plot 14	Required Depth (mm)	600	Measured Depth (mm)	640	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.62m	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.62-0.64m	Base yellowish brown clayey sand				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						

Topsoil Validation Record

Depth Validation	Inspection date/time:	01.03.22	Inspected by:	CS	Photographed:	✓
Plot 16	Required Depth (mm)	600	Measured Depth (mm)	700	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.64m	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.64-0.7m	Base yellowish brown clayey sand				
Photograph (location) – rear gardens of Plots 500, 14 & 15 visible in background 		Photograph (depth profile) 		Photograph (soil type) 		

Topsoil Validation Record

Depth Validation	Inspection date/time:	08.06.22	Inspected by:	MJ	Photographed:	✓
Plot 17	Required Depth (mm)	600	Measured Depth (mm)	600	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.6m	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.6m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						

Topsoil Validation Record

Depth Validation	Inspection date/time:	01.03.22	Inspected by:	CS	Photographed:	✓
Plot 53	Required Depth (mm)	600	Measured Depth (mm)	600	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.60m	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.60m	Base yellowish brown clayey sand				
Photograph (location) – taken from Plot 52, the rear garden of which is visible in foreground 		Photograph (depth profile) 		Photograph (soil type) 		

Topsoil Validation Record

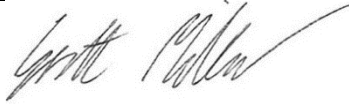


Soil PASSED testing for quality.

Soil depth inspections were carried out for 4 out of the 7 plots listed in this certificate within which a minimum of 600mm of clean, tested soils were confirmed in each location. Whereas this does not meet the frequency of 1 depth test per plot as specified within the Remediation Strategy for the site, given that the groundworkers have consistently placed the full 600mm soil cover system in the plots verified to date (including the plots adjacent to those which have not been depth tested) the frequency achieved is considered satisfactory in demonstrating that the correct soil cover system has been placed. This does, however, require agreement from the Local Authority.

Additionally, the plots which have not been depth tested can be seen in the location photographs for Plots 16 and 53 above which demonstrates that topsoil has been placed at the same level as adjacent plots where a 600mm soil cover system has been confirmed. The completed depth inspections in Plots 14, 16 and 53 also confirmed that bedrock / weathered bedrock (clayey sand) was present beneath the soil cover system (i.e. there was no residual made ground) and it is reasonable to infer that this would be the case with the neighbouring plots. A photograph is also provided below showing the approximate locations of Plots 500, 14, 15, 52 and 53 following completion of the Phase 1 remediation works which demonstrates the presence of sandstone / weathered sandstone at the remediation formation surface. Whilst there is a slight deviation of the Strategy for the verification of these plots, the totality of the evidence provides a high confidence that the prescribed cover system has been adopted.

An additional inspection visit IS NOT therefore considered to be required by SGP.

SGP Staff:	S D Miller BSc MSc MCIWEM	Signed:		24.06.22
SGP Member:	D Wayland BSc MSC AssocMCIWM MCIWEM C.WEM	Signed:		24.06.22

Topsoil Validation Record





2183

Final Report

Report No.: 22-07010-1
Initial Date of Issue: 01-Mar-2022
Client Smith Grant LLP
Client Address: Station House, Station Road
Ruabon
Wrexham
LL14 6DL
Contact(s): Cezary Salwa
Megan Jones

Project R2174 TETROSYL BM

Quotation No.: **Date Received:** 24-Feb-2022

Order No.: **Date Instructed:** 24-Feb-2022

No. of Samples: 4

Turnaround (Wkdays): 5 **Results Due:** 02-Mar-2022

Date Approved: 01-Mar-2022

Approved By:



Details: Stuart Henderson, Technical
Manager

Results - Soil

Project: R2174 TETROSYL BM

Client: Smith Grant LLP	Chemtest Job No.:				22-07010	22-07010	22-07010	22-07010
Quotation No.:	Chemtest Sample ID.:				1378913	1378914	1378915	1378916
Order No.:	Client Sample Ref.:				ES1	ES2	ES3	ES4
	Sample Location:				Cottam	Cottam	Cottam	Cottam
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Date Sampled:				22-Feb-2022	22-Feb-2022	22-Feb-2022	22-Feb-2022
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD				
ACM Type	U	2192		N/A	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	20	21	22	20
pH	U	2010		4.0	7.9	7.8	7.6	7.9
Arsenic	U	2450	mg/kg	1.0	7.0	8.0	15	7.6
Cadmium	U	2450	mg/kg	0.10	0.15	0.16	1.3	0.13
Chromium	U	2450	mg/kg	1.0	19	23	38	20
Copper	U	2450	mg/kg	0.50	21	22	29	19
Mercury	U	2450	mg/kg	0.10	0.18	0.12	0.14	0.16
Nickel	U	2450	mg/kg	0.50	18	51	43	16
Lead	U	2450	mg/kg	0.50	43	30	45	49
Selenium	U	2450	mg/kg	0.20	< 0.20	< 0.20	1.1	0.22
Zinc	U	2450	mg/kg	0.50	61	59	170	38
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	5.0	2.9	4.7	3.8
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10	< 10	< 10
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: R2174 TETROSYL BM

Client: Smith Grant LLP	Chemtest Job No.:				22-07010	22-07010	22-07010	22-07010
Quotation No.:	Chemtest Sample ID.:				1378913	1378914	1378915	1378916
Order No.:	Client Sample Ref.:				ES1	ES2	ES3	ES4
	Sample Location:				Cottam	Cottam	Cottam	Cottam
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Date Sampled:				22-Feb-2022	22-Feb-2022	22-Feb-2022	22-Feb-2022
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD				
Phenanthrene	U	2700	mg/kg	0.10	1.7	0.86	0.93	0.85
Anthracene	U	2700	mg/kg	0.10	0.51	0.26	0.19	0.18
Fluoranthene	U	2700	mg/kg	0.10	2.0	1.4	1.2	1.4
Pyrene	U	2700	mg/kg	0.10	2.1	1.7	1.4	1.5
Benzo[a]anthracene	U	2700	mg/kg	0.10	1.4	1.0	1.5	0.94
Chrysene	U	2700	mg/kg	0.10	1.9	0.85	1.9	1.4
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	1.5	1.2	1.1	1.2
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	0.45	0.32	0.23	0.27
Benzo[a]pyrene	U	2700	mg/kg	0.10	1.0	0.80	0.53	0.66
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	0.83	0.62	0.43	0.69
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	0.22	0.15	< 0.10	0.17
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	0.67	0.39	0.31	0.26
Total Of 16 PAH's	U	2700	mg/kg	2.0	14	9.6	9.7	9.5
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com

Topsoil Validation Record

Job number	R2174	Depth ref:	R2174-R07-v4 Final			Quality ref:		R2174-R07-v4 Final			Other documents attached		✓	
Date	23.05.22	Area use:	garden			landscaped			stockpile			other		
Site name / location	Waldmers Wood, Bury	Size area (m):	10 x 7.5 (Plot 18) Irregular (Plot 45)	Approx. Area (m²):	75 50	Approx. Depth Top (m):	0.65 0.65	Approx. Volume Top (m³):	49 32.5	Approx. Depth Sub (m):	n/a	Approx. Volume Sub (m³):	n/a	
Plot/ location:	Plots 18 & 45													
Compiled by:	SM	Number depth entries required			2 (1 per plot); 2 entries provided.			Number samples required:			3 TS (1 per 100m³ TS, minimum 3 samples per source); 9 TS provided (full suite) with an additional 5 samples analysed for PAHs only.			

Quality Validation		Inspection date/time:	10.11.21, 22.02.22	Inspected by:	SM, CS	Photographed:	✓
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Source Topsoil	1.	✓	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.
Description Topsoil	2.	✓	Greyish brown, slightly gravelly, sandy clay topsoil with frequent roots.
Sample Topsoil	3.	✓	5 samples collected from onsite stockpile for full contamination suite and 5 additional samples collected and analysed for PAHs only (EMT Lab ref: 21/17783); 4 additional samples collected from onsite stockpile on 22.02.22 (Eurofins Lab ref: 22-07010-1).
Source Subsoil	4.	x	Not used
Description Subsoil	5.	x	n/a
Sample Subsoil	6.	x	n/a

Topsoil Validation Record



Topsoil Results Summary – Cottam 15 import (Lab ref: 21/17783, 22-07010-1)

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Asbestos Fibres	NAD	NAD	Yes
Arsenic	37	7-15	Yes
Cadmium	11	<0.1-1.3	Yes
Chromium (total)	910	19-70.5	Yes
Chromium VI	6	<0.5	Yes
Copper	2,400	19-33	Yes
Lead	200	30-68	Yes
Mercury	40	<0.1-0.2	Yes
Nickel	180	16-51	Yes
Zinc	3,700	38-170	Yes
Naphthalene	2.3	<0.04-0.06	Yes
Acenaphthene	210	<0.03	Yes
Acenaphthylene	170	<0.05-0.11	Yes
Fluorene	170	<0.04-0.08	Yes
Phenanthrene	95	<0.03-1.7	Yes
Anthracene	2,400	<0.04-0.51	Yes
Fluoranthene	280	<0.03-2	Yes
Pyrene	620	<0.03-2.1	Yes
Benzo(a)anthracene	7.2	<0.06-1.5	Yes
Chrysene	15	<0.02-1.9	Yes
Benzo(b)fluoranthene	2.6	<0.05-1.5	Yes
Benzo(k)fluoranthene	77	<0.05-0.45	Yes
Benzo(a)pyrene	2.2	<0.04-1	Yes
Indeno(123cd) pyrene	27	<0.04-0.83	Yes

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Dibenzo(ah) anthracene	0.24	<0.04-0.22	Yes
Benzo(ghi) perylene	320	<0.04-0.67	Yes
Aliphatic C5-C6	42	<0.1	Yes
Aliphatic C6-C8	100	<0.1	Yes
Aliphatic C8-C10	27	<0.1	Yes
Aliphatic C10-C12	130	<0.2	Yes
Aliphatic C12-C16	1,100	<1	Yes
Aliphatic C16-C21	65,000	<1	Yes
Aliphatic C21-C35	65,000	<1	Yes
Aromatic C6-C7	70	<0.1	Yes
Aromatic C7-C8	130	<0.1	Yes
Aromatic C8-C10	34	<0.1	Yes
Aromatic C10-C12	74	<0.2	Yes
Aromatic C12-C16	140	<1	Yes
Aromatic C16-C21	260	<1	Yes
Aromatic C21-C35	1,100	<1	Yes
Benzene	0.08	<0.001	Yes
Toluene	130	<0.001	Yes
Ethyl-benzene	47	<0.001	Yes
m/p-xylene	56	<0.001	Yes
o-xylene	60	<0.001	Yes

Topsoil Validation Record

Depth Validation	Inspection date/time:	20.05.22	Inspected by:	SM	Photographed:	✓
Plot 18	Required Depth (mm)	600	Measured Depth (mm)	650	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.65m	Greyish brown, slightly gravelly, sandy clay topsoil with frequent roots.				
	0.65m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						

Topsoil Validation Record

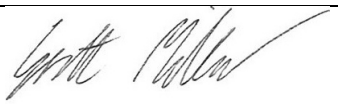
Depth Validation	Inspection date/time:	20.05.22	Inspected by:	SM	Photographed:	✓
Plot 45	Required Depth (mm)	600	Measured Depth (mm)	650	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.65m	Greyish brown, slightly gravelly, sandy clay topsoil with frequent roots.				
	0.65m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						

Topsoil Validation Record



Soil PASSED testing for quality and depth.

An additional inspection visit IS NOT required.

SGP Staff:	S D Miller BSc MCIWEM	Signed:		23.05.2022
SGP Member:	D Wayland BSc MSC AssocMCIWM MCIWEM C.WEM	Signed:		23.05.2022

Guide notes:

1.	Source Topsoil	As much information as possible: Date Delivered, volume/weight delivery, supplier, certification, source address (yard), original source address (site).
2.	Description Topsoil	Full Description: Grading (Particle Size: clay, silt, sand, gravel), organic content, colour, odour, minerals, stone, glass, slate, ash, clinker, coal, coke, tarmac, plastic, other?
3.	Sample Topsoil	Date sampled, date submitted, sample reference, laboratory, laboratory job number
4.	Source Subsoil	As much information as possible: Date Delivered, volume/weight delivery, supplier, certification, source address (yard), original source address (site).
5.	Description Subsoil	Full Description: Grading (Particle Size: clay, silt, sand, gravel), organic content, colour, odour, minerals, stone, glass, slate, ash, clinker, coal, coke, tarmac, plastic, other?
6.	Sample Subsoil	Date sampled, date submitted, sample reference, laboratory, laboratory job number

Smith Grant LLP

Station House

Station Road

Ruabon

Wrexham

LL14 6DL



Attention : Dan Wayland

Date : 15th November, 2021

Your reference : R2174

Our reference : Test Report 21/17783 Batch 1

Location : Tetrosyl BM

Date samples received : 11th November, 2021

Status : Final Report

Issue : 2

Ten samples were received for analysis on 11th November, 2021 of which ten were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

A handwritten signature in black ink, appearing to read 'B. Leslie'.

Bruce Leslie

Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Smith Grant LLP
Reference: R2127
Location: Tetrosyl BM
Contact: Dan Wayland
EMT Job No: 21/17783

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1	2-3	4	5-6	7	8-9	10	11-12	13	14-15	Please see attached notes for all abbreviations and acronyms		
Sample ID	Cottam - TS1	Cottam - TS2	Cottam - TS3	Cottam - TS4	Cottam - TS5	Cottam - TS6	Cottam - TS7	Cottam - TS8	Cottam - TS9	Cottam - TS10			
Depth													
COC No / misc													
Containers	J	V J	J	V J	J	V J	J	V J	J	V J			
Sample Date	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021			
Sample Type	Clayey Loam	Clayey Loam	Clay	Clay	Clay	Clayey Loam	Clay	Clay	Clay	Clay			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	LOD/LOR	Units	Method No.
Arsenic ^{#M}	-	11.8	-	12.5	-	11.9	-	14.1	-	9.8	<0.5	mg/kg	TM30/PM15
Cadmium ^{#M}	-	0.1	-	0.1	-	0.1	-	<0.1	-	0.1	<0.1	mg/kg	TM30/PM15
Chromium ^{#M}	-	68.5	-	70.5	-	63.4	-	68.4	-	64.7	<0.5	mg/kg	TM30/PM15
Copper ^{#M}	-	32	-	33	-	28	-	30	-	27	<1	mg/kg	TM30/PM15
Lead ^{#M}	-	63	-	68	-	55	-	60	-	50	<5	mg/kg	TM30/PM15
Mercury ^{#M}	-	0.2	-	<0.1	-	0.1	-	0.1	-	0.2	<0.1	mg/kg	TM30/PM15
Nickel ^{#M}	-	23.4	-	23.6	-	21.0	-	24.0	-	22.3	<0.7	mg/kg	TM30/PM15
Selenium ^{#M}	-	<1	-	<1	-	1	-	1	-	<1	<1	mg/kg	TM30/PM15
Zinc ^{#M}	-	67	-	68	-	62	-	65	-	60	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene ^{#M}	<0.04	0.06	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene ^{#M}	<0.05	0.11	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene ^{#M}	<0.04	0.08	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene ^{#M}	0.11	1.03	<0.03	0.11	<0.03	0.10	0.07	0.06	0.22	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene [#]	<0.04	0.19	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.06	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene ^{#M}	0.18	1.15	<0.03	0.19	<0.03	0.13	0.10	0.10	0.28	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene [#]	0.15	0.93	<0.03	0.16	<0.03	0.11	0.10	0.09	0.22	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene [#]	0.11	0.46	<0.06	0.11	<0.06	<0.06	0.08	0.09	0.14	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene ^{#M}	0.10	0.50	<0.02	0.09	<0.02	0.06	0.06	0.06	0.11	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(k)fluoranthene ^{#M}	0.11	0.65	<0.07	0.12	<0.07	<0.07	<0.07	<0.07	0.12	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene [#]	0.06	0.33	<0.04	0.05	<0.04	<0.04	<0.04	<0.04	0.07	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene ^{#M}	<0.04	0.25	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene [#]	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene [#]	<0.04	0.21	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 16 Total	0.8	6.0	<0.6	0.8	<0.6	<0.6	<0.6	<0.6	1.2	<0.6	<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.08	0.47	<0.05	0.09	<0.05	<0.05	<0.05	<0.05	0.09	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.03	0.18	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	98	97	98	102	98	96	97	99	92	71	<0	%	TM4/PM8
TPH CWG													
Aliphatics													
>C5-C6 ^{#M}	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 ^{#M}	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 ^{#M}	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 ^{#M}	-	<4	-	<4	-	<4	-	<4	-	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 ^{#M}	-	<7	-	<7	-	<7	-	<7	-	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 ^{#M}	-	<7	-	<7	-	<7	-	<7	-	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35	-	<19	-	<19	-	<19	-	<19	-	<19	<19	mg/kg	TM5/PM8/PM16/PM12/PM15

Element Materials Technology

Client Name: Smith Grant LLP
Reference: R2127
Location: Tetrosyl BM
Contact: Dan Wayland
EMT Job No: 21/17783

Report : Solid

Solids: V=60g VOC jar. J=250g glass jar. T=plastic tub

[illegible]

Client Name: Smith Grant LLP
Reference: R2127
Location: Tetrosyl BM
Contact: Dan Wayland

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
21/17783	1	Cottam - TS2		3	11/11/2021	General Description (Bulk Analysis)	soil/stones
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD
21/17783	1	Cottam - TS4		6	11/11/2021	General Description (Bulk Analysis)	soil/stones
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD
21/17783	1	Cottam - TS6		9	11/11/2021	General Description (Bulk Analysis)	soil/stones
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD
21/17783	1	Cottam - TS8		12	11/11/2021	General Description (Bulk Analysis)	Brown soil with vegetation
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD
21/17783	1	Cottam - TS10		15	11/11/2021	General Description (Bulk Analysis)	Brown soil with vegetation
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD

Client Name: Smith Grant LLP

Reference: R2127

Location: Tetrosyl BM

Contact: Dan Wayland

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/17783

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Please include all sections of this report if it is reproduced

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

EMT Job No: 21/17783

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes	Yes	AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes
PM13	A visual examination of the solid sample is carried out to ascertain sample make up, colour and any other inclusions. This is not a geotechnical description.	PM0	No preparation is required.			AR	No
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO ₂ generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes

EMT Job No: 21/17783

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEPA Method 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes	Yes	AD	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes	Yes	AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 First edition (2006)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No
NONE	No Method Code	NONE	No Method Code			AD	Yes



2183

Final Report

Report No.: 22-07010-1
Initial Date of Issue: 01-Mar-2022
Client Smith Grant LLP
Client Address: Station House, Station Road
Ruabon
Wrexham
LL14 6DL
Contact(s): Cezary Salwa
Megan Jones
Project R2174 TETROSYL BM

Quotation No.:	Date Received:	24-Feb-2022
Order No.:	Date Instructed:	24-Feb-2022
No. of Samples: 4		
Turnaround (Wkdays): 5	Results Due:	02-Mar-2022
Date Approved: 01-Mar-2022		

Approved By:



Details: Stuart Henderson, Technical
Manager

Results - Soil

Project: R2174 TETROSYL BM

Client: Smith Grant LLP	Chemtest Job No.:				22-07010	22-07010	22-07010	22-07010
Quotation No.:	Chemtest Sample ID.:				1378913	1378914	1378915	1378916
Order No.:	Client Sample Ref.:				ES1	ES2	ES3	ES4
	Sample Location:				Cottam	Cottam	Cottam	Cottam
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Date Sampled:				22-Feb-2022	22-Feb-2022	22-Feb-2022	22-Feb-2022
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD				
ACM Type	U	2192		N/A	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	20	21	22	20
pH	U	2010		4.0	7.9	7.8	7.6	7.9
Arsenic	U	2450	mg/kg	1.0	7.0	8.0	15	7.6
Cadmium	U	2450	mg/kg	0.10	0.15	0.16	1.3	0.13
Chromium	U	2450	mg/kg	1.0	19	23	38	20
Copper	U	2450	mg/kg	0.50	21	22	29	19
Mercury	U	2450	mg/kg	0.10	0.18	0.12	0.14	0.16
Nickel	U	2450	mg/kg	0.50	18	51	43	16
Lead	U	2450	mg/kg	0.50	43	30	45	49
Selenium	U	2450	mg/kg	0.20	< 0.20	< 0.20	1.1	0.22
Zinc	U	2450	mg/kg	0.50	61	59	170	38
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	5.0	2.9	4.7	3.8
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10	< 10	< 10
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: R2174 TETROSYL BM

Client: Smith Grant LLP	Chemtest Job No.:				22-07010	22-07010	22-07010	22-07010
Quotation No.:	Chemtest Sample ID.:				1378913	1378914	1378915	1378916
Order No.:	Client Sample Ref.:				ES1	ES2	ES3	ES4
	Sample Location:				Cottam	Cottam	Cottam	Cottam
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Date Sampled:				22-Feb-2022	22-Feb-2022	22-Feb-2022	22-Feb-2022
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD				
Phenanthrene	U	2700	mg/kg	0.10	1.7	0.86	0.93	0.85
Anthracene	U	2700	mg/kg	0.10	0.51	0.26	0.19	0.18
Fluoranthene	U	2700	mg/kg	0.10	2.0	1.4	1.2	1.4
Pyrene	U	2700	mg/kg	0.10	2.1	1.7	1.4	1.5
Benzo[a]anthracene	U	2700	mg/kg	0.10	1.4	1.0	1.5	0.94
Chrysene	U	2700	mg/kg	0.10	1.9	0.85	1.9	1.4
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	1.5	1.2	1.1	1.2
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	0.45	0.32	0.23	0.27
Benzo[a]pyrene	U	2700	mg/kg	0.10	1.0	0.80	0.53	0.66
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	0.83	0.62	0.43	0.69
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	0.22	0.15	< 0.10	0.17
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	0.67	0.39	0.31	0.26
Total Of 16 PAH's	U	2700	mg/kg	2.0	14	9.6	9.7	9.5
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com



Topsoil Validation Record

Job number	R2174		Depth ref:	R2174-R07-v4 Final		Quality ref:		R2174-R07-v4 Final		Other documents attached		✓		
Date	08.07.22		Area use:	Garden			landscaped		stockpile		other			
Site name / location	Waldmers Wood, Bury		Size area (m):	20-21: 18x10	Approx. Area (m²):	180	Approx. Depth Top (m):	0.6	Approx. Volume Top (m³):	108	Approx. Depth Sub (m):	n/a	Approx. Volume Sub (m³):	n/a
Plot/ location:	Plots 20-21+42-44			42-44: 15x8										
Compiled by:	MJ		Number depth entries required			5 (1 per plot); 5 entries provided.		Number samples required:		3 TS (1 per 100m³ TS, minimum 3 samples per source); 9 TS provided (full suite) with an additional 5 samples analysed for PAHs only.				

Quality Validation		Inspection date/time:	10.11.21, 22.02.22	Inspected by:	SM, CS	Photographed:	✓
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Source Topsoil	1.	✓	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.
Description Topsoil	2.	✓	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.
Sample Topsoil	3.	✓	5 samples collected from onsite stockpile for full contamination suite and 5 additional samples collected and analysed for PAHs only (EMT Lab ref: 21/17783); 4 additional samples collected from onsite stockpile on 22.02.22 (Eurofins Lab ref: 22-07010-1).
Source Subsoil	4.	x	Not used
Description Subsoil	5.	x	n/a
Sample Subsoil	6.	x	n/a

Topsoil Validation Record



Topsoil Results Summary – Cottam 15 import (Lab ref: 21/17783, 22-07010-1)

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Asbestos Fibres	NAD	NAD	Yes
Arsenic	37	7-15	Yes
Cadmium	11	<0.1-1.3	Yes
Chromium (total)	910	19-70.5	Yes
Chromium VI	6	<0.5	Yes
Copper	2,400	19-33	Yes
Lead	200	30-68	Yes
Mercury	40	<0.1-0.2	Yes
Nickel	180	16-51	Yes
Zinc	3,700	38-170	Yes
Naphthalene	2.3	<0.04-0.06	Yes
Acenaphthene	210	<0.03	Yes
Acenaphthylene	170	<0.05-0.11	Yes
Fluorene	170	<0.04-0.08	Yes
Phenanthrene	95	<0.03-1.7	Yes
Anthracene	2,400	<0.04-0.51	Yes
Fluoranthene	280	<0.03-2	Yes
Pyrene	620	<0.03-2.1	Yes
Benzo(a)anthracene	7.2	<0.06-1.5	Yes
Chrysene	15	<0.02-1.9	Yes
Benzo(b)fluoranthene	2.6	<0.05-1.5	Yes
Benzo(k)fluoranthene	77	<0.05-0.45	Yes
Benzo(a)pyrene	2.2	<0.04-1	Yes
Indeno(123cd) pyrene	27	<0.04-0.83	Yes

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Dibenzo(ah) anthracene	0.24	<0.04-0.22	Yes
Benzo(ghi) perylene	320	<0.04-0.67	Yes
Aliphatic C5-C6	42	<0.1	Yes
Aliphatic C6-C8	100	<0.1	Yes
Aliphatic C8-C10	27	<0.1	Yes
Aliphatic C10-C12	130	<0.2	Yes
Aliphatic C12-C16	1,100	<1	Yes
Aliphatic C16-C21	65,000	<1	Yes
Aliphatic C21-C35	65,000	<1	Yes
Aromatic C6-C7	70	<0.1	Yes
Aromatic C7-C8	130	<0.1	Yes
Aromatic C8-C10	34	<0.1	Yes
Aromatic C10-C12	74	<0.2	Yes
Aromatic C12-C16	140	<1	Yes
Aromatic C16-C21	260	<1	Yes
Aromatic C21-C35	1,100	<1	Yes
Benzene	0.08	<0.001	Yes
Toluene	130	<0.001	Yes
Ethyl-benzene	47	<0.001	Yes
m/p-xylene	56	<0.001	Yes
o-xylene	60	<0.001	Yes



Topsoil Validation Record

Depth Validation	Inspection date/time:	06.07.22	Inspected by:	MJ	Photographed:	✓
Plot 20	Required Depth (mm)	600	Measured Depth (mm)	600	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.6m	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.6m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						



Topsoil Validation Record

Depth Validation	Inspection date/time:	06.07.22	Inspected by:	MJ	Photographed:	✓
Plot 21	Required Depth (mm)	600	Measured Depth (mm)	600	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.6m	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.6m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						

Topsoil Validation Record



Depth Validation	Inspection date/time:	06.07.22	Inspected by:	MJ	Photographed:	✓
Plot 42	Required Depth (mm)	600	Measured Depth (mm)	675	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.675m	Depth of void verified with stockpile of garden soil awaiting placement at the end of the garden. Soil was a greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.675m					
		Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						



Topsoil Validation Record

Depth Validation	Inspection date/time:	06.07.22	Inspected by:	MJ	Photographed:	✓
Plot 43	Required Depth (mm)	600	Measured Depth (mm)	800	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.8m	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.8m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						

Topsoil Validation Record



Depth Validation	Inspection date/time:	06.07.22	Inspected by:	MJ	Photographed:	✓
Plot 44	Required Depth (mm)	600	Measured Depth (mm)	850	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.85m	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.85m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		

Topsoil Validation Record



Soil PASSED testing for quality and depth.

An additional inspection visit IS NOT required.

SGP Staff:	M Jones BSc MSc AMIEnvSc	Signed:		08.07.22
SGP Member:	D Wayland BSc MSC AssocMCIWM MCIWEM C.WEM	Signed:		11.07.22

Guide notes:

1.	Source Topsoil	As much information as possible: Date Delivered, volume/weight delivery, supplier, certification, source address (yard), original source address (site).
2.	Description Topsoil	Full Description: Grading (Particle Size: clay, silt, sand, gravel), organic content, colour, odour, minerals, stone, glass, slate, ash, clinker, coal, coke, tarmac, plastic, other?
3.	Sample Topsoil	Date sampled, date submitted, sample reference, laboratory, laboratory job number
4.	Source Subsoil	As much information as possible: Date Delivered, volume/weight delivery, supplier, certification, source address (yard), original source address (site).
5.	Description Subsoil	Full Description: Grading (Particle Size: clay, silt, sand, gravel), organic content, colour, odour, minerals, stone, glass, slate, ash, clinker, coal, coke, tarmac, plastic, other?
6.	Sample Subsoil	Date sampled, date submitted, sample reference, laboratory, laboratory job number

Smith Grant LLP
Station House
Station Road
Ruabon
Wrexham
LL14 6DL



Attention : Dan Wayland
Date : 15th November, 2021
Your reference : R2174
Our reference : Test Report 21/17783 Batch 1
Location : Tetrosyl BM
Date samples received : 11th November, 2021
Status : Final Report
Issue : 2

Ten samples were received for analysis on 11th November, 2021 of which ten were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:



Bruce Leslie
Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Smith Grant LLP
Reference: R2127
Location: Tetrosyl BM
Contact: Dan Wayland
EMT Job No: 21/17783

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1	2-3	4	5-6	7	8-9	10	11-12	13	14-15	Please see attached notes for all abbreviations and acronyms		
Sample ID	Cottam - TS1	Cottam - TS2	Cottam - TS3	Cottam - TS4	Cottam - TS5	Cottam - TS6	Cottam - TS7	Cottam - TS8	Cottam - TS9	Cottam - TS10			
Depth													
COC No / misc													
Containers	J	V J	J	V J	J	V J	J	V J	J	V J			
Sample Date	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021			
Sample Type	Clayey Loam	Clayey Loam	Clay	Clay	Clay	Clayey Loam	Clay	Clay	Clay	Clay			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	LOD/LOR	Units	Method No.
Arsenic ^{#M}	-	11.8	-	12.5	-	11.9	-	14.1	-	9.8	<0.5	mg/kg	TM30/PM15
Cadmium ^{#M}	-	0.1	-	0.1	-	0.1	-	<0.1	-	0.1	<0.1	mg/kg	TM30/PM15
Chromium ^{#M}	-	68.5	-	70.5	-	63.4	-	68.4	-	64.7	<0.5	mg/kg	TM30/PM15
Copper ^{#M}	-	32	-	33	-	28	-	30	-	27	<1	mg/kg	TM30/PM15
Lead ^{#M}	-	63	-	68	-	55	-	60	-	50	<5	mg/kg	TM30/PM15
Mercury ^{#M}	-	0.2	-	<0.1	-	0.1	-	0.1	-	0.2	<0.1	mg/kg	TM30/PM15
Nickel ^{#M}	-	23.4	-	23.6	-	21.0	-	24.0	-	22.3	<0.7	mg/kg	TM30/PM15
Selenium ^{#M}	-	<1	-	<1	-	1	-	1	-	<1	<1	mg/kg	TM30/PM15
Zinc ^{#M}	-	67	-	68	-	62	-	65	-	60	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene ^{#M}	<0.04	0.06	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene ^{#M}	<0.05	0.11	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene ^{#M}	<0.04	0.08	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene ^{#M}	0.11	1.03	<0.03	0.11	<0.03	0.10	0.07	0.06	0.22	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene [#]	<0.04	0.19	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.06	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene ^{#M}	0.18	1.15	<0.03	0.19	<0.03	0.13	0.10	0.10	0.28	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene [#]	0.15	0.93	<0.03	0.16	<0.03	0.11	0.10	0.09	0.22	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene [#]	0.11	0.46	<0.06	0.11	<0.06	<0.06	0.08	0.09	0.14	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene ^{#M}	0.10	0.50	<0.02	0.09	<0.02	0.06	0.06	0.06	0.11	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(k)fluoranthene ^{#M}	0.11	0.65	<0.07	0.12	<0.07	<0.07	<0.07	<0.07	0.12	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene [#]	0.06	0.33	<0.04	0.05	<0.04	<0.04	<0.04	<0.04	0.07	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene ^{#M}	<0.04	0.25	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene [#]	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene [#]	<0.04	0.21	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 16 Total	0.8	6.0	<0.6	0.8	<0.6	<0.6	<0.6	<0.6	1.2	<0.6	<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.08	0.47	<0.05	0.09	<0.05	<0.05	<0.05	<0.05	0.09	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.03	0.18	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	98	97	98	102	98	96	97	99	92	71	<0	%	TM4/PM8
TPH CWG													
Aliphatics													
>C5-C6 ^{#M}	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 ^{#M}	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 ^{#M}	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 ^{#M}	-	<4	-	<4	-	<4	-	<4	-	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 ^{#M}	-	<7	-	<7	-	<7	-	<7	-	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 ^{#M}	-	<7	-	<7	-	<7	-	<7	-	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35	-	<19	-	<19	-	<19	-	<19	-	<19	<19	mg/kg	TM5/PM8/PM16/PM12/PM15

Element Materials Technology

Client Name: Smith Grant LLP
Reference: R2127
Location: Tetrosyl BM
Contact: Dan Wayland
EMT Job No: 21/17783

Report : Solid

Solids: V=60g VOC jar. J=250g glass jar. T=plastic tub

[illegible]

Client Name: Smith Grant LLP
Reference: R2127
Location: Tetrosyl BM
Contact: Dan Wayland

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

[illegible]

Client Name: Smith Grant LLP

Reference: R2127

Location: Tetrosyl BM

Contact: Dan Wayland

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/17783

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Please include all sections of this report if it is reproduced

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

EMT Job No: 21/17783

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes	Yes	AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes
PM13	A visual examination of the solid sample is carried out to ascertain sample make up, colour and any other inclusions. This is not a geotechnical description.	PM0	No preparation is required.			AR	No
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes

EMT Job No: 21/17783

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEPA Method 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes	Yes	AD	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes	Yes	AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 First edition (2006)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No
NONE	No Method Code	NONE	No Method Code			AD	Yes



2183

Final Report

Report No.: 22-07010-1
Initial Date of Issue: 01-Mar-2022
Client Smith Grant LLP
Client Address: Station House, Station Road
Ruabon
Wrexham
LL14 6DL
Contact(s): Cezary Salwa
Megan Jones

Project R2174 TETROSYL BM

Quotation No.: **Date Received:** 24-Feb-2022

Order No.: **Date Instructed:** 24-Feb-2022

No. of Samples: 4

Turnaround (Wkdays): 5 **Results Due:** 02-Mar-2022

Date Approved: 01-Mar-2022

Approved By:



Details: Stuart Henderson, Technical
Manager

Results - Soil

Project: R2174 TETROSYL BM

Client: Smith Grant LLP	Chemtest Job No.:				22-07010	22-07010	22-07010	22-07010
Quotation No.:	Chemtest Sample ID.:				1378913	1378914	1378915	1378916
Order No.:	Client Sample Ref.:				ES1	ES2	ES3	ES4
	Sample Location:				Cottam	Cottam	Cottam	Cottam
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Date Sampled:				22-Feb-2022	22-Feb-2022	22-Feb-2022	22-Feb-2022
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD				
ACM Type	U	2192		N/A	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	20	21	22	20
pH	U	2010		4.0	7.9	7.8	7.6	7.9
Arsenic	U	2450	mg/kg	1.0	7.0	8.0	15	7.6
Cadmium	U	2450	mg/kg	0.10	0.15	0.16	1.3	0.13
Chromium	U	2450	mg/kg	1.0	19	23	38	20
Copper	U	2450	mg/kg	0.50	21	22	29	19
Mercury	U	2450	mg/kg	0.10	0.18	0.12	0.14	0.16
Nickel	U	2450	mg/kg	0.50	18	51	43	16
Lead	U	2450	mg/kg	0.50	43	30	45	49
Selenium	U	2450	mg/kg	0.20	< 0.20	< 0.20	1.1	0.22
Zinc	U	2450	mg/kg	0.50	61	59	170	38
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	5.0	2.9	4.7	3.8
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10	< 10	< 10
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: R2174 TETROSYL BM

Client: Smith Grant LLP	Chemtest Job No.:				22-07010	22-07010	22-07010	22-07010
Quotation No.:	Chemtest Sample ID.:				1378913	1378914	1378915	1378916
Order No.:	Client Sample Ref.:				ES1	ES2	ES3	ES4
	Sample Location:				Cottam	Cottam	Cottam	Cottam
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Date Sampled:				22-Feb-2022	22-Feb-2022	22-Feb-2022	22-Feb-2022
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD				
Phenanthrene	U	2700	mg/kg	0.10	1.7	0.86	0.93	0.85
Anthracene	U	2700	mg/kg	0.10	0.51	0.26	0.19	0.18
Fluoranthene	U	2700	mg/kg	0.10	2.0	1.4	1.2	1.4
Pyrene	U	2700	mg/kg	0.10	2.1	1.7	1.4	1.5
Benzo[a]anthracene	U	2700	mg/kg	0.10	1.4	1.0	1.5	0.94
Chrysene	U	2700	mg/kg	0.10	1.9	0.85	1.9	1.4
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	1.5	1.2	1.1	1.2
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	0.45	0.32	0.23	0.27
Benzo[a]pyrene	U	2700	mg/kg	0.10	1.0	0.80	0.53	0.66
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	0.83	0.62	0.43	0.69
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	0.22	0.15	< 0.10	0.17
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	0.67	0.39	0.31	0.26
Total Of 16 PAH's	U	2700	mg/kg	2.0	14	9.6	9.7	9.5
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com

Topsoil Validation Record

Job number	R2174	Depth ref:	R2174-R07-v5 Final	Quality ref:	R2174-R07-v5 Final	Other documents attached	✓
Date	02.08.22	Area use:	Garden	<i>landscaped</i>	<i>stockpile</i>	<i>other</i>	
Site name / location	Waldmers Wood, Bury	Size area (m):	6 x 8 (39) 8 x 8 (40) 6 x 8 (54)	Approx. Area (m ²): 48 64 48	Approx. Depth Top (m): 0.75 0.6 0.8	Approx. Volume Top (m ³): 36 38.5 38.5	Approx. Depth Sub (m): n/a n/a n/a
Plot/ location:	Plots 39, 40 & 54						
Compiled by:	SM	Number depth entries required	3 (1 per plot); 3 entries provided.		Number samples required:	3 TS (1 per 250m ³ TS, minimum 3 samples per source); 9 TS provided (full suite) with an additional 5 samples analysed for PAHs only.	

Quality Validation		Inspection date/time:	10.11.21 & 22.02.22	Inspected by:	SM & CS	Photographed:	✓
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Source Topsoil	1.	✓	Barratt Homes development site: 'Site 15' off Cottam Way, Preston – well characterised Greenfield site.
Description Topsoil	2.	✓	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.
Sample Topsoil	3.	✓	5 samples collected from onsite stockpile for full contamination suite and 5 additional samples collected and analysed for PAHs only (EMT Lab ref: 21/17783); 4 additional samples collected from onsite stockpile on 22.02.22 (Eurofins Lab ref: 22-07010-1).
Source Subsoil	4.	x	Not used
Description Subsoil	5.	x	n/a
Sample Subsoil	6.	x	n/a

Topsoil Validation Record



Topsoil Results Summary – Cottam import

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Asbestos Fibres	NAD	NAD	Yes
Arsenic	37	7-15	Yes
Cadmium	11	<0.1-1.3	Yes
Chromium (total)	910	19-70.5	Yes
Chromium VI	6	<0.5	Yes
Copper	2,400	19-33	Yes
Lead	200	30-68	Yes
Mercury	40	<0.1-0.2	Yes
Nickel	180	16-51	Yes
Zinc	3,700	38-170	Yes
Naphthalene	2.3	<0.04-0.06	Yes
Acenaphthene	210	<0.03	Yes
Acenaphthylene	170	<0.05-0.11	Yes
Fluorene	170	<0.04-0.08	Yes
Phenanthrene	95	<0.03-1.7	Yes
Anthracene	2,400	<0.04-0.51	Yes
Fluoranthene	280	<0.03-2	Yes
Pyrene	620	<0.03-2.1	Yes
Benzo(a)anthracene	7.2	<0.06-1.5	Yes
Chrysene	15	<0.02-1.9	Yes
Benzo(b)fluoranthene	2.6	<0.05-1.5	Yes
Benzo(k)fluoranthene	77	<0.05-0.45	Yes
Benzo(a)pyrene	2.2	<0.04-1	Yes
Indeno(123cd) pyrene	27	<0.04-0.83	Yes

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Dibenzo(ah) anthracene	0.24	<0.04-0.22	Yes
Benzo(ghi) perylene	320	<0.04-0.67	Yes
Aliphatic C5-C6	42	<0.1	Yes
Aliphatic C6-C8	100	<0.1	Yes
Aliphatic C8-C10	27	<0.1	Yes
Aliphatic C10-C12	130	<0.2	Yes
Aliphatic C12-C16	1,100	<1	Yes
Aliphatic C16-C21	65,000	<1	Yes
Aliphatic C21-C35	65,000	<1	Yes
Aromatic C6-C7	70	<0.1	Yes
Aromatic C7-C8	130	<0.1	Yes
Aromatic C8-C10	34	<0.1	Yes
Aromatic C10-C12	74	<0.2	Yes
Aromatic C12-C16	140	<1	Yes
Aromatic C16-C21	260	<1	Yes
Aromatic C21-C35	1,100	<1	Yes
Benzene	0.08	<0.001	Yes
Toluene	130	<0.001	Yes
Ethyl-benzene	47	<0.001	Yes
m/p-xylene	56	<0.001	Yes
o-xylene	60	<0.001	Yes

Topsoil Validation Record

Depth Validation	Inspection date/time:	02.08.22	Inspected by:	SM	Photographed:	✓
Plot 39	Required Depth (mm)	600	Measured Depth (mm)	750	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.75m	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.75m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						

Topsoil Validation Record

Depth Validation	Inspection date/time:	02.08.22	Inspected by:	SM	Photographed:	✓
Plot 40	Required Depth (mm)	600	Measured Depth (mm)	600	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.60m	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.60m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						

Topsoil Validation Record

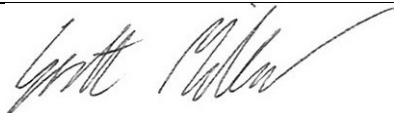
Depth Validation	Inspection date/time:	02.08.22	Inspected by:	SM	Photographed:	✓
Plot 54	Required Depth (mm)	600	Measured Depth (mm)	800	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.80m	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.80m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						

Topsoil Validation Record



Soil PASSED testing for quality and depth.

An additional inspection visit IS NOT required.

SGP Staff:	S D Miller BSc MCIWEM	Signed:		02.08.2022
SGP Member:	D Wayland BSc MSC AssocMCIWM MCIWEM C.WEM	Signed:		03.08.2022

Guide notes:

1.	Source Topsoil	As much information as possible: Date Delivered, volume/weight delivery, supplier, certification, source address (yard), original source address (site).
2.	Description Topsoil	Full Description: Grading (Particle Size: clay, silt, sand, gravel), organic content, colour, odour, minerals, stone, glass, slate, ash, clinker, coal, coke, tarmac, plastic, other?
3.	Sample Topsoil	Date sampled, date submitted, sample reference, laboratory, laboratory job number
4.	Source Subsoil	As much information as possible: Date Delivered, volume/weight delivery, supplier, certification, source address (yard), original source address (site).
5.	Description Subsoil	Full Description: Grading (Particle Size: clay, silt, sand, gravel), organic content, colour, odour, minerals, stone, glass, slate, ash, clinker, coal, coke, tarmac, plastic, other?
6.	Sample Subsoil	Date sampled, date submitted, sample reference, laboratory, laboratory job number

Smith Grant LLP
Station House
Station Road
Ruabon
Wrexham
LL14 6DL



Attention : Dan Wayland
Date : 15th November, 2021
Your reference : R2174
Our reference : Test Report 21/17783 Batch 1
Location : Tetrosyl BM
Date samples received : 11th November, 2021
Status : Final Report
Issue : 2

Ten samples were received for analysis on 11th November, 2021 of which ten were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:



Bruce Leslie
Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Smith Grant LLP
Reference: R2127
Location: Tetrosyl BM
Contact: Dan Wayland
EMT Job No: 21/17783

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1	2-3	4	5-6	7	8-9	10	11-12	13	14-15	Please see attached notes for all abbreviations and acronyms		
Sample ID	Cottam - TS1	Cottam - TS2	Cottam - TS3	Cottam - TS4	Cottam - TS5	Cottam - TS6	Cottam - TS7	Cottam - TS8	Cottam - TS9	Cottam - TS10			
Depth													
COC No / misc													
Containers	J	V J	J	V J	J	V J	J	V J	J	V J			
Sample Date	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021			
Sample Type	Clayey Loam	Clayey Loam	Clay	Clay	Clay	Clayey Loam	Clay	Clay	Clay	Clay			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	LOD/LOR	Units	Method No.
Arsenic ^{#M}	-	11.8	-	12.5	-	11.9	-	14.1	-	9.8	<0.5	mg/kg	TM30/PM15
Cadmium ^{#M}	-	0.1	-	0.1	-	0.1	-	<0.1	-	0.1	<0.1	mg/kg	TM30/PM15
Chromium ^{#M}	-	68.5	-	70.5	-	63.4	-	68.4	-	64.7	<0.5	mg/kg	TM30/PM15
Copper ^{#M}	-	32	-	33	-	28	-	30	-	27	<1	mg/kg	TM30/PM15
Lead ^{#M}	-	63	-	68	-	55	-	60	-	50	<5	mg/kg	TM30/PM15
Mercury ^{#M}	-	0.2	-	<0.1	-	0.1	-	0.1	-	0.2	<0.1	mg/kg	TM30/PM15
Nickel ^{#M}	-	23.4	-	23.6	-	21.0	-	24.0	-	22.3	<0.7	mg/kg	TM30/PM15
Selenium ^{#M}	-	<1	-	<1	-	1	-	1	-	<1	<1	mg/kg	TM30/PM15
Zinc ^{#M}	-	67	-	68	-	62	-	65	-	60	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene ^{#M}	<0.04	0.06	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene ^{#M}	<0.05	0.11	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene ^{#M}	<0.04	0.08	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene ^{#M}	0.11	1.03	<0.03	0.11	<0.03	0.10	0.07	0.06	0.22	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene [#]	<0.04	0.19	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.06	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene ^{#M}	0.18	1.15	<0.03	0.19	<0.03	0.13	0.10	0.10	0.28	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene [#]	0.15	0.93	<0.03	0.16	<0.03	0.11	0.10	0.09	0.22	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene [#]	0.11	0.46	<0.06	0.11	<0.06	<0.06	0.08	0.09	0.14	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene ^{#M}	0.10	0.50	<0.02	0.09	<0.02	0.06	0.06	0.06	0.11	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(k)fluoranthene ^{#M}	0.11	0.65	<0.07	0.12	<0.07	<0.07	<0.07	<0.07	0.12	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene [#]	0.06	0.33	<0.04	0.05	<0.04	<0.04	<0.04	<0.04	0.07	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene ^{#M}	<0.04	0.25	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene [#]	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene [#]	<0.04	0.21	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 16 Total	0.8	6.0	<0.6	0.8	<0.6	<0.6	<0.6	<0.6	1.2	<0.6	<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.08	0.47	<0.05	0.09	<0.05	<0.05	<0.05	<0.05	0.09	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.03	0.18	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	98	97	98	102	98	96	97	99	92	71	<0	%	TM4/PM8
TPH CWG													
Aliphatics													
>C5-C6 ^{#M}	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 ^{#M}	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 ^{#M}	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 ^{#M}	-	<4	-	<4	-	<4	-	<4	-	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 ^{#M}	-	<7	-	<7	-	<7	-	<7	-	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 ^{#M}	-	<7	-	<7	-	<7	-	<7	-	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35	-	<19	-	<19	-	<19	-	<19	-	<19	<19	mg/kg	TM5/PM8/PM16/PM12/PM15

Element Materials Technology

Client Name: Smith Grant LLP
Reference: R2127
Location: Tetrosyl BM
Contact: Dan Wayland
EMT Job No: 21/17783

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

[illegible]

Client Name: Smith Grant LLP
Reference: R2127
Location: Tetrosyl BM
Contact: Dan Wayland

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
21/17783	1	Cottam - TS2		3	11/11/2021	General Description (Bulk Analysis)	soil/stones
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD
21/17783	1	Cottam - TS4		6	11/11/2021	General Description (Bulk Analysis)	soil/stones
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD
21/17783	1	Cottam - TS6		9	11/11/2021	General Description (Bulk Analysis)	soil/stones
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD
21/17783	1	Cottam - TS8		12	11/11/2021	General Description (Bulk Analysis)	Brown soil with vegetation
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD
21/17783	1	Cottam - TS10		15	11/11/2021	General Description (Bulk Analysis)	Brown soil with vegetation
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD

Client Name: Smith Grant LLP

Reference: R2127

Location: Tetrosyl BM

Contact: Dan Wayland

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/17783

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

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REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

EMT Job No: 21/17783

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes	Yes	AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes
PM13	A visual examination of the solid sample is carried out to ascertain sample make up, colour and any other inclusions. This is not a geotechnical description.	PM0	No preparation is required.			AR	No
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes

EMT Job No: 21/17783

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEPA Method 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes	Yes	AD	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes	Yes	AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 First edition (2006)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No
NONE	No Method Code	NONE	No Method Code			AD	Yes



2183

Final Report

Report No.: 22-07010-1
Initial Date of Issue: 01-Mar-2022
Client Smith Grant LLP
Client Address: Station House, Station Road
Ruabon
Wrexham
LL14 6DL
Contact(s): Cezary Salwa
Megan Jones

Project R2174 TETROSYL BM

Quotation No.: **Date Received:** 24-Feb-2022

Order No.: **Date Instructed:** 24-Feb-2022

No. of Samples: 4

Turnaround (Wkdays): 5 **Results Due:** 02-Mar-2022

Date Approved: 01-Mar-2022

Approved By:



Details: Stuart Henderson, Technical
Manager

Results - Soil

Project: R2174 TETROSYL BM

Client: Smith Grant LLP	Chemtest Job No.:				22-07010	22-07010	22-07010	22-07010
Quotation No.:	Chemtest Sample ID.:				1378913	1378914	1378915	1378916
Order No.:	Client Sample Ref.:				ES1	ES2	ES3	ES4
	Sample Location:				Cottam	Cottam	Cottam	Cottam
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Date Sampled:				22-Feb-2022	22-Feb-2022	22-Feb-2022	22-Feb-2022
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD				
ACM Type	U	2192		N/A	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	20	21	22	20
pH	U	2010		4.0	7.9	7.8	7.6	7.9
Arsenic	U	2450	mg/kg	1.0	7.0	8.0	15	7.6
Cadmium	U	2450	mg/kg	0.10	0.15	0.16	1.3	0.13
Chromium	U	2450	mg/kg	1.0	19	23	38	20
Copper	U	2450	mg/kg	0.50	21	22	29	19
Mercury	U	2450	mg/kg	0.10	0.18	0.12	0.14	0.16
Nickel	U	2450	mg/kg	0.50	18	51	43	16
Lead	U	2450	mg/kg	0.50	43	30	45	49
Selenium	U	2450	mg/kg	0.20	< 0.20	< 0.20	1.1	0.22
Zinc	U	2450	mg/kg	0.50	61	59	170	38
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	5.0	2.9	4.7	3.8
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10	< 10	< 10
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: R2174 TETROSYL BM

Client: Smith Grant LLP	Chemtest Job No.:				22-07010	22-07010	22-07010	22-07010
Quotation No.:	Chemtest Sample ID.:				1378913	1378914	1378915	1378916
Order No.:	Client Sample Ref.:				ES1	ES2	ES3	ES4
	Sample Location:				Cottam	Cottam	Cottam	Cottam
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Date Sampled:				22-Feb-2022	22-Feb-2022	22-Feb-2022	22-Feb-2022
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD				
Phenanthrene	U	2700	mg/kg	0.10	1.7	0.86	0.93	0.85
Anthracene	U	2700	mg/kg	0.10	0.51	0.26	0.19	0.18
Fluoranthene	U	2700	mg/kg	0.10	2.0	1.4	1.2	1.4
Pyrene	U	2700	mg/kg	0.10	2.1	1.7	1.4	1.5
Benzo[a]anthracene	U	2700	mg/kg	0.10	1.4	1.0	1.5	0.94
Chrysene	U	2700	mg/kg	0.10	1.9	0.85	1.9	1.4
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	1.5	1.2	1.1	1.2
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	0.45	0.32	0.23	0.27
Benzo[a]pyrene	U	2700	mg/kg	0.10	1.0	0.80	0.53	0.66
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	0.83	0.62	0.43	0.69
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	0.22	0.15	< 0.10	0.17
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	0.67	0.39	0.31	0.26
Total Of 16 PAH's	U	2700	mg/kg	2.0	14	9.6	9.7	9.5
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com



Topsoil Validation Record

Job number	R2174	Depth ref:	R2174-R07-v4 Final		Quality ref:		R2174-R07-v4 Final		Other documents attached		✓		
Date	05.05.22	Area use:	garden		landscaped			stockpile		other			
Site name / location	Waldmers Wood, Bury	Size area (m):	5 x 7	Approx. Area (m²):	35	Approx. Depth Top (m):	0.6	Approx. Volume Top (m³):	21	Approx. Depth Sub (m):	n/a	Approx. Volume Sub (m³):	n/a
Plot/ location:	Plots 46-48												
Compiled by:	MJ		Number depth entries required		3 (1 per plot); 3 entries provided.		Number samples required:		3 TS (1 per 100m³ TS, minimum 3 samples per source); 9 TS provided (full suite) with an additional 5 samples analysed for PAHs only.				

Quality Validation		Inspection date/time:	10.11.21, 22.02.22	Inspected by:	SM, CS	Photographed:	✓
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Source Topsoil	1.	✓	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.
Description Topsoil	2.	✓	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.
Sample Topsoil	3.	✓	5 samples collected from onsite stockpile for full contamination suite and 5 additional samples collected and analysed for PAHs only (EMT Lab ref: 21/17783); 4 additional samples collected from onsite stockpile on 22.02.22 (Eurofins Lab ref: 22-07010-1).
Source Subsoil	4.	x	Not used
Description Subsoil	5.	x	n/a
Sample Subsoil	6.	x	n/a

Topsoil Validation Record



Topsoil Results Summary – Cottam 15 import (Lab ref: 21/17783, 22-07010-1)

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Asbestos Fibres	NAD	NAD	Yes
Arsenic	37	7-15	Yes
Cadmium	11	<0.1-1.3	Yes
Chromium (total)	910	19-70.5	Yes
Chromium VI	6	<0.5	Yes
Copper	2,400	19-33	Yes
Lead	200	30-68	Yes
Mercury	40	<0.1-0.2	Yes
Nickel	180	16-51	Yes
Zinc	3,700	38-170	Yes
Naphthalene	2.3	<0.04-0.06	Yes
Acenaphthene	210	<0.03	Yes
Acenaphthylene	170	<0.05-0.11	Yes
Fluorene	170	<0.04-0.08	Yes
Phenanthrene	95	<0.03-1.7	Yes
Anthracene	2,400	<0.04-0.51	Yes
Fluoranthene	280	<0.03-2	Yes
Pyrene	620	<0.03-2.1	Yes
Benzo(a)anthracene	7.2	<0.06-1.5	Yes
Chrysene	15	<0.02-1.9	Yes
Benzo(b)fluoranthene	2.6	<0.05-1.5	Yes
Benzo(k)fluoranthene	77	<0.05-0.45	Yes
Benzo(a)pyrene	2.2	<0.04-1	Yes
Indeno(123cd) pyrene	27	<0.04-0.83	Yes

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Dibenzo(ah) anthracene	0.24	<0.04-0.22	Yes
Benzo(ghi) perylene	320	<0.04-0.67	Yes
Aliphatic C5-C6	42	<0.1	Yes
Aliphatic C6-C8	100	<0.1	Yes
Aliphatic C8-C10	27	<0.1	Yes
Aliphatic C10-C12	130	<0.2	Yes
Aliphatic C12-C16	1,100	<1	Yes
Aliphatic C16-C21	65,000	<1	Yes
Aliphatic C21-C35	65,000	<1	Yes
Aromatic C6-C7	70	<0.1	Yes
Aromatic C7-C8	130	<0.1	Yes
Aromatic C8-C10	34	<0.1	Yes
Aromatic C10-C12	74	<0.2	Yes
Aromatic C12-C16	140	<1	Yes
Aromatic C16-C21	260	<1	Yes
Aromatic C21-C35	1,100	<1	Yes
Benzene	0.08	<0.001	Yes
Toluene	130	<0.001	Yes
Ethyl-benzene	47	<0.001	Yes
m/p-xylene	56	<0.001	Yes
o-xylene	60	<0.001	Yes

Topsoil Validation Record



Depth Validation	Inspection date/time:	04.05.22	Inspected by:	MJ	Photographed:	✓
Plot 46	Required Depth (mm)	600	Measured Depth (mm)	600	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.6m	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.6m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		

Topsoil Validation Record



Depth Validation	Inspection date/time:	04.05.22	Inspected by:	MJ	Photographed:	✓
Plot 47	Required Depth (mm)	600	Measured Depth (mm)	600	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.6m	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.6m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						



Topsoil Validation Record

Depth Validation	Inspection date/time:	04.05.22	Inspected by:	MJ	Photographed:	✓
Plot 48	Required Depth (mm)	600	Measured Depth (mm)	600	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.6m	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.6m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						

Topsoil Validation Record



Soil PASSED testing for quality and depth.

An additional inspection visit IS NOT required.

SGP Staff:	M Jones BSc MSc AMIEnvSc	Signed:		05.05.22
SGP Member:	D Wayland BSc MSC AssocMCIWM MCIWEM C.WEM	Signed:		06.05.22

Guide notes:

1.	Source Topsoil	As much information as possible: Date Delivered, volume/weight delivery, supplier, certification, source address (yard), original source address (site).
2.	Description Topsoil	Full Description: Grading (Particle Size: clay, silt, sand, gravel), organic content, colour, odour, minerals, stone, glass, slate, ash, clinker, coal, coke, tarmac, plastic, other?
3.	Sample Topsoil	Date sampled, date submitted, sample reference, laboratory, laboratory job number
4.	Source Subsoil	As much information as possible: Date Delivered, volume/weight delivery, supplier, certification, source address (yard), original source address (site).
5.	Description Subsoil	Full Description: Grading (Particle Size: clay, silt, sand, gravel), organic content, colour, odour, minerals, stone, glass, slate, ash, clinker, coal, coke, tarmac, plastic, other?
6.	Sample Subsoil	Date sampled, date submitted, sample reference, laboratory, laboratory job number



Topsoil Validation Record

Job number	R2174	Depth ref:	R2174-R07-v4 Final		Quality ref:		R2174-R07-v4 Final		Other documents attached		✓		
Date	01.04.22	Area use:	garden		landscaped		stockpile		other				
Site name / location	Waldmers Wood, Bury	Size area (m):	3 x 7 each	Approx. Area (m²):	63	Approx. Depth Top (m):	0.6	Approx. Volume Top (m³):	37.8	Approx. Depth Sub (m):	n/a	Approx. Volume Sub (m³):	n/a
Plot/ location:	Plots 49-51												
Compiled by:	MJ		Number depth entries required		3 (1 per plot); 3 entries provided.		Number samples required:		3 TS (1 per 100m³ TS, minimum 3 samples per source); 9 TS provided (full suite) with an additional 5 samples analysed for PAHs only.				

Quality Validation		Inspection date/time:	10.11.21, 22.02.22	Inspected by:	SM, CS	Photographed:	✓
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Source Topsoil	1.	✓	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.
Description Topsoil	2.	✓	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.
Sample Topsoil	3.	✓	5 samples collected from onsite stockpile for full contamination suite and 5 additional samples collected and analysed for PAHs only (EMT Lab ref: 21/17783); 4 additional samples collected from onsite stockpile on 22.02.22 (Eurofins Lab ref: 22-07010-1).
Source Subsoil	4.	x	Not used
Description Subsoil	5.	x	n/a
Sample Subsoil	6.	x	n/a

Topsoil Validation Record



Topsoil Results Summary – Cottam 15 import (Lab ref: 21/17783, 22-07010-1)

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Asbestos Fibres	NAD	NAD	Yes
Arsenic	37	7-15	Yes
Cadmium	11	<0.1-1.3	Yes
Chromium (total)	910	19-70.5	Yes
Chromium VI	6	<0.5	Yes
Copper	2,400	19-33	Yes
Lead	200	30-68	Yes
Mercury	40	<0.1-0.2	Yes
Nickel	180	16-51	Yes
Zinc	3,700	38-170	Yes
Naphthalene	2.3	<0.04-0.06	Yes
Acenaphthene	210	<0.03	Yes
Acenaphthylene	170	<0.05-0.11	Yes
Fluorene	170	<0.04-0.08	Yes
Phenanthrene	95	<0.03-1.7	Yes
Anthracene	2,400	<0.04-0.51	Yes
Fluoranthene	280	<0.03-2	Yes
Pyrene	620	<0.03-2.1	Yes
Benzo(a)anthracene	7.2	<0.06-1.5	Yes
Chrysene	15	<0.02-1.9	Yes
Benzo(b)fluoranthene	2.6	<0.05-1.5	Yes
Benzo(k)fluoranthene	77	<0.05-0.45	Yes
Benzo(a)pyrene	2.2	<0.04-1	Yes
Indeno(123cd) pyrene	27	<0.04-0.83	Yes

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Dibenzo(ah) anthracene	0.24	<0.04-0.22	Yes
Benzo(ghi) perylene	320	<0.04-0.67	Yes
Aliphatic C5-C6	42	<0.1	Yes
Aliphatic C6-C8	100	<0.1	Yes
Aliphatic C8-C10	27	<0.1	Yes
Aliphatic C10-C12	130	<0.2	Yes
Aliphatic C12-C16	1,100	<1	Yes
Aliphatic C16-C21	65,000	<1	Yes
Aliphatic C21-C35	65,000	<1	Yes
Aromatic C6-C7	70	<0.1	Yes
Aromatic C7-C8	130	<0.1	Yes
Aromatic C8-C10	34	<0.1	Yes
Aromatic C10-C12	74	<0.2	Yes
Aromatic C12-C16	140	<1	Yes
Aromatic C16-C21	260	<1	Yes
Aromatic C21-C35	1,100	<1	Yes
Benzene	0.08	<0.001	Yes
Toluene	130	<0.001	Yes
Ethyl-benzene	47	<0.001	Yes
m/p-xylene	56	<0.001	Yes
o-xylene	60	<0.001	Yes



Topsoil Validation Record

Depth Validation	Inspection date/time:	31.03.22	Inspected by:	MJ	Photographed:	✓
Plot 49	Required Depth (mm)	600	Measured Depth (mm)	600	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.6m	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.6m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						



Topsoil Validation Record

Depth Validation	Inspection date/time:	31.03.22	Inspected by:	MJ	Photographed:	✓
Plot 50	Required Depth (mm)	600	Measured Depth (mm)	600	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.6m	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.6m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						



Topsoil Validation Record

Depth Validation	Inspection date/time:	31.03.22	Inspected by:	MJ	Photographed:	✓
Plot 51	Required Depth (mm)	600	Measured Depth (mm)	600	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.6m	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.6m	Base (sandstone bedrock – underlying geotextile therefore not required).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						

Topsoil Validation Record



Soil PASSED testing for quality and depth.

An additional inspection visit IS NOT required.

SGP Staff:	M Jones BSc MSc AMIEnvSc	Signed:		01.04.22
SGP Member:	D Wayland BSc MSC AssocMCIWM MCIWEM C.WEM	Signed:		01.04.22

Guide notes:

1.	Source Topsoil	As much information as possible: Date Delivered, volume/weight delivery, supplier, certification, source address (yard), original source address (site).
2.	Description Topsoil	Full Description: Grading (Particle Size: clay, silt, sand, gravel), organic content, colour, odour, minerals, stone, glass, slate, ash, clinker, coal, coke, tarmac, plastic, other?
3.	Sample Topsoil	Date sampled, date submitted, sample reference, laboratory, laboratory job number
4.	Source Subsoil	As much information as possible: Date Delivered, volume/weight delivery, supplier, certification, source address (yard), original source address (site).
5.	Description Subsoil	Full Description: Grading (Particle Size: clay, silt, sand, gravel), organic content, colour, odour, minerals, stone, glass, slate, ash, clinker, coal, coke, tarmac, plastic, other?
6.	Sample Subsoil	Date sampled, date submitted, sample reference, laboratory, laboratory job number

Smith Grant LLP
Station House
Station Road
Ruabon
Wrexham
LL14 6DL



Attention : Dan Wayland
Date : 15th November, 2021
Your reference : R2174
Our reference : Test Report 21/17783 Batch 1
Location : Tetrosyl BM
Date samples received : 11th November, 2021
Status : Final Report
Issue : 2

Ten samples were received for analysis on 11th November, 2021 of which ten were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:



Bruce Leslie
Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Smith Grant LLP
Reference: R2127
Location: Tetrosyl BM
Contact: Dan Wayland
EMT Job No: 21/17783

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1	2-3	4	5-6	7	8-9	10	11-12	13	14-15	Please see attached notes for all abbreviations and acronyms		
Sample ID	Cottam - TS1	Cottam - TS2	Cottam - TS3	Cottam - TS4	Cottam - TS5	Cottam - TS6	Cottam - TS7	Cottam - TS8	Cottam - TS9	Cottam - TS10			
Depth													
COC No / misc													
Containers	J	V J	J	V J	J	V J	J	V J	J	V J			
Sample Date	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021			
Sample Type	Clayey Loam	Clayey Loam	Clay	Clay	Clay	Clayey Loam	Clay	Clay	Clay	Clay			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	LOD/LOR	Units	Method No.
Arsenic ^{#M}	-	11.8	-	12.5	-	11.9	-	14.1	-	9.8	<0.5	mg/kg	TM30/PM15
Cadmium ^{#M}	-	0.1	-	0.1	-	0.1	-	<0.1	-	0.1	<0.1	mg/kg	TM30/PM15
Chromium ^{#M}	-	68.5	-	70.5	-	63.4	-	68.4	-	64.7	<0.5	mg/kg	TM30/PM15
Copper ^{#M}	-	32	-	33	-	28	-	30	-	27	<1	mg/kg	TM30/PM15
Lead ^{#M}	-	63	-	68	-	55	-	60	-	50	<5	mg/kg	TM30/PM15
Mercury ^{#M}	-	0.2	-	<0.1	-	0.1	-	0.1	-	0.2	<0.1	mg/kg	TM30/PM15
Nickel ^{#M}	-	23.4	-	23.6	-	21.0	-	24.0	-	22.3	<0.7	mg/kg	TM30/PM15
Selenium ^{#M}	-	<1	-	<1	-	1	-	1	-	<1	<1	mg/kg	TM30/PM15
Zinc ^{#M}	-	67	-	68	-	62	-	65	-	60	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene ^{#M}	<0.04	0.06	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene ^{#M}	<0.05	0.11	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene ^{#M}	<0.04	0.08	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene ^{#M}	0.11	1.03	<0.03	0.11	<0.03	0.10	0.07	0.06	0.22	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene [#]	<0.04	0.19	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.06	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene ^{#M}	0.18	1.15	<0.03	0.19	<0.03	0.13	0.10	0.10	0.28	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene [#]	0.15	0.93	<0.03	0.16	<0.03	0.11	0.10	0.09	0.22	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene [#]	0.11	0.46	<0.06	0.11	<0.06	<0.06	0.08	0.09	0.14	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene ^{#M}	0.10	0.50	<0.02	0.09	<0.02	0.06	0.06	0.06	0.11	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(k)fluoranthene ^{#M}	0.11	0.65	<0.07	0.12	<0.07	<0.07	<0.07	<0.07	0.12	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene [#]	0.06	0.33	<0.04	0.05	<0.04	<0.04	<0.04	<0.04	0.07	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene ^{#M}	<0.04	0.25	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene [#]	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene [#]	<0.04	0.21	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 16 Total	0.8	6.0	<0.6	0.8	<0.6	<0.6	<0.6	<0.6	1.2	<0.6	<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.08	0.47	<0.05	0.09	<0.05	<0.05	<0.05	<0.05	0.09	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.03	0.18	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	98	97	98	102	98	96	97	99	92	71	<0	%	TM4/PM8
TPH CWG													
Aliphatics													
>C5-C6 ^{#M}	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 ^{#M}	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 ^{#M}	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 ^{#M}	-	<4	-	<4	-	<4	-	<4	-	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 ^{#M}	-	<7	-	<7	-	<7	-	<7	-	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 ^{#M}	-	<7	-	<7	-	<7	-	<7	-	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35	-	<19	-	<19	-	<19	-	<19	-	<19	<19	mg/kg	TM5/PM8/PM16/PM12/PM15

Client Name: Smith Grant LLP
Reference: R2127
Location: Tetrosyl BM
Contact: Dan Wayland
EMT Job No: 21/17783

Solids: V=60g VOC jar. J=250g glass jar. T=plastic tub

Please see attached notes for all abbreviations and acronyms

Client Name: Smith Grant LLP
Reference: R2127
Location: Tetrosyl BM
Contact: Dan Wayland

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
21/17783	1	Cottam - TS2		3	11/11/2021	General Description (Bulk Analysis)	soil/stones
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD
21/17783	1	Cottam - TS4		6	11/11/2021	General Description (Bulk Analysis)	soil/stones
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD
21/17783	1	Cottam - TS6		9	11/11/2021	General Description (Bulk Analysis)	soil/stones
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD
21/17783	1	Cottam - TS8		12	11/11/2021	General Description (Bulk Analysis)	Brown soil with vegetation
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD
21/17783	1	Cottam - TS10		15	11/11/2021	General Description (Bulk Analysis)	Brown soil with vegetation
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD

Client Name: Smith Grant LLP

Reference: R2127

Location: Tetrosyl BM

Contact: Dan Wayland

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/17783

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Please include all sections of this report if it is reproduced

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

EMT Job No: 21/17783

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes	Yes	AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes
PM13	A visual examination of the solid sample is carried out to ascertain sample make up, colour and any other inclusions. This is not a geotechnical description.	PM0	No preparation is required.			AR	No
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes

EMT Job No: 21/17783

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEPA Method 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes	Yes	AD	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes	Yes	AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 First edition (2006)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No
NONE	No Method Code	NONE	No Method Code			AD	Yes



2183

Final Report

Report No.:	22-07010-1		
Initial Date of Issue:	01-Mar-2022		
Client	Smith Grant LLP		
Client Address:	Station House, Station Road Ruabon Wrexham LL14 6DL		
Contact(s):	Cezary Salwa Megan Jones		
Project	R2174 TETROSYL BM		
Quotation No.:		Date Received:	24-Feb-2022
Order No.:		Date Instructed:	24-Feb-2022
No. of Samples:	4		
Turnaround (Wkdays):	5	Results Due:	02-Mar-2022
Date Approved:	01-Mar-2022		
Approved By:			
Details:	Stuart Henderson, Technical Manager		

Results - Soil

Project: R2174 TETROSYL BM

Client: Smith Grant LLP	Chemtest Job No.:				22-07010	22-07010	22-07010	22-07010
Quotation No.:	Chemtest Sample ID.:				1378913	1378914	1378915	1378916
Order No.:	Client Sample Ref.:				ES1	ES2	ES3	ES4
	Sample Location:				Cottam	Cottam	Cottam	Cottam
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Date Sampled:				22-Feb-2022	22-Feb-2022	22-Feb-2022	22-Feb-2022
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD				
ACM Type	U	2192		N/A	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	20	21	22	20
pH	U	2010		4.0	7.9	7.8	7.6	7.9
Arsenic	U	2450	mg/kg	1.0	7.0	8.0	15	7.6
Cadmium	U	2450	mg/kg	0.10	0.15	0.16	1.3	0.13
Chromium	U	2450	mg/kg	1.0	19	23	38	20
Copper	U	2450	mg/kg	0.50	21	22	29	19
Mercury	U	2450	mg/kg	0.10	0.18	0.12	0.14	0.16
Nickel	U	2450	mg/kg	0.50	18	51	43	16
Lead	U	2450	mg/kg	0.50	43	30	45	49
Selenium	U	2450	mg/kg	0.20	< 0.20	< 0.20	1.1	0.22
Zinc	U	2450	mg/kg	0.50	61	59	170	38
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	5.0	2.9	4.7	3.8
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10	< 10	< 10
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: R2174 TETROSYL BM

Client: Smith Grant LLP	Chemtest Job No.:				22-07010	22-07010	22-07010	22-07010
Quotation No.:	Chemtest Sample ID.:				1378913	1378914	1378915	1378916
Order No.:	Client Sample Ref.:				ES1	ES2	ES3	ES4
	Sample Location:				Cottam	Cottam	Cottam	Cottam
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Date Sampled:				22-Feb-2022	22-Feb-2022	22-Feb-2022	22-Feb-2022
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD				
Phenanthrene	U	2700	mg/kg	0.10	1.7	0.86	0.93	0.85
Anthracene	U	2700	mg/kg	0.10	0.51	0.26	0.19	0.18
Fluoranthene	U	2700	mg/kg	0.10	2.0	1.4	1.2	1.4
Pyrene	U	2700	mg/kg	0.10	2.1	1.7	1.4	1.5
Benzo[a]anthracene	U	2700	mg/kg	0.10	1.4	1.0	1.5	0.94
Chrysene	U	2700	mg/kg	0.10	1.9	0.85	1.9	1.4
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	1.5	1.2	1.1	1.2
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	0.45	0.32	0.23	0.27
Benzo[a]pyrene	U	2700	mg/kg	0.10	1.0	0.80	0.53	0.66
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	0.83	0.62	0.43	0.69
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	0.22	0.15	< 0.10	0.17
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	0.67	0.39	0.31	0.26
Total Of 16 PAH's	U	2700	mg/kg	2.0	14	9.6	9.7	9.5
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com



Topsoil Validation Record

Job number	R2174	Depth ref:	R2174-R07-v5 Final		Quality ref:		R2174-R07-v5 Final		Other documents attached		✓		
Date	03.11.22	Area use:	Garden		landscaped			stockpile		other			
Site name / location	Waldmers Wood, Bury	Size area (m):	16 x 9.6	Approx. Area (m²):	153.6	Approx. Depth Top (m):	0.6	Approx. Volume Top (m³):	92.16	Approx. Depth Sub (m):	n/a	Approx. Volume Sub (m³):	n/a
Plot/ location:	Plot 55-57												
Compiled by:	MJ		Number depth entries required		3 (1 per plot); 3 entries provided.		Number samples required:		3 TS (1 per 250m³ TS, minimum 3 samples per source); 12 TS provided (full suite) with an additional 5 samples analysed for PAHs only.				

Quality Validation		Inspection date/time:	10.11.21, 22.02.22 & 02.08.22	Inspected by:	SM & CS	Photographed:	✓
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Source Topsoil	1.	✓	Barratt Homes development site: 'Site 15' off Cottam Way, Preston – well characterised Greenfield site.
Description Topsoil	2.	✓	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.
Sample Topsoil	3.	✓	5 samples collected from onsite stockpile for full contamination suite and 5 additional samples collected and analysed for PAHs only (EMT Lab ref: 21/17783); 4 additional samples collected from onsite stockpile on 22.02.22 (Eurofins Lab ref: 22-07010-1) and a further 3 samples collected from stockpile on 02.08.22 (Eurofins Lab ref: 22-29639)
Source Subsoil	4.	x	Not used
Description Subsoil	5.	x	n/a
Sample Subsoil	6.	x	n/a

Topsoil Validation Record



Topsoil Results Summary – Cottam import

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Asbestos Fibres	NAD	NAD	Yes
Arsenic	37	4.9-15	Yes
Cadmium	11	<0.1-1.3	Yes
Chromium (total)	910	13-70.5	Yes
Chromium VI	6	<0.5	Yes
Copper	2,400	13-33	Yes
Lead	200	27-68	Yes
Mercury	40	<0.1-0.2	Yes
Nickel	180	9.2-51	Yes
Zinc	3,700	30-170	Yes
Naphthalene	2.3	<0.04-0.41	Yes
Acenaphthene	210	<0.03-0.73	Yes
Acenaphthylene	170	<0.05-0.47	Yes
Fluorene	170	<0.04-0.38	Yes
Phenanthrene	95	<0.03-3.6	Yes
Anthracene	2,400	<0.04-0.68	Yes
Fluoranthene	280	<0.03-4.3	Yes
Pyrene	620	<0.03-4.0	Yes
Benzo(a)anthracene	7.2	<0.06-2.1	Yes
Chrysene	15	<0.02-2.0	Yes
Benzo(b)fluoranthene	2.6	<0.05-2.5	Yes
Benzo(k)fluoranthene	77	<0.05-0.79	Yes
Benzo(a)pyrene	2.2	<0.04-1.0	Yes
Indeno(123cd) pyrene	27	<0.04-0.97	Yes

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Dibenzo(ah) anthracene	0.24	<0.04-0.22	Yes
Benzo(ghi) perylene	320	<0.04-1.2	Yes
Aliphatic C5-C6	42	<0.1	Yes
Aliphatic C6-C8	100	<0.1	Yes
Aliphatic C8-C10	27	<0.1	Yes
Aliphatic C10-C12	130	<0.2	Yes
Aliphatic C12-C16	1,100	<1	Yes
Aliphatic C16-C21	65,000	<1	Yes
Aliphatic C21-C35	65,000	<1	Yes
Aromatic C6-C7	70	<1	Yes
Aromatic C7-C8	130	<1	Yes
Aromatic C8-C10	34	<1	Yes
Aromatic C10-C12	74	<1	Yes
Aromatic C12-C16	140	<1	Yes
Aromatic C16-C21	260	<1	Yes
Aromatic C21-C35	1,100	<1	Yes
Benzene	0.08	<0.001	Yes
Toluene	130	<0.001	Yes
Ethyl-benzene	47	<0.001	Yes
m/p-xylene	56	<0.001	Yes
o-xylene	60	<0.001	Yes



Topsoil Validation Record

Depth Validation	Inspection date/time:	03.11.22	Inspected by:	MJ&CM	Photographed:	✓
Plot 57	Required Depth (mm)	600	Measured Depth (mm)	600	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.6m	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.6m	Base (Sandstone bedrock)..				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						

Topsoil Validation Record



Depth Validation	Inspection date/time:	03.11.22	Inspected by:	MJ&CM	Photographed:	✓
Plot 55	Required Depth (mm)	600	Measured Depth (mm)	600	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.60m	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.60m	Base (Sandstone bedrock).				

Photograph (location)



Photograph (depth profile)



Photograph (soil type)





Topsoil Validation Record

Depth Validation	Inspection date/time:	03.11.22	Inspected by:	MJ&CM	Photographed:	✓
Plot 56	Required Depth (mm)	600	Measured Depth (mm)	600	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.60m	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.60m	Base (Sandstone bedrock).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		

Topsoil Validation Record



Soil PASSED testing for quality and depth.

An additional inspection visit IS NOT required.

SGP Staff:	M Jones BSc MSc AMIEnvSc	Signed:		07.11.22
SGP Member:	D Wayland BSc MSC AssocMCIWM MCIWEM C.WEM	Signed:		07.11.22

Guide notes:

1.	Source Topsoil	As much information as possible: Date Delivered, volume/weight delivery, supplier, certification, source address (yard), original source address (site).
2.	Description Topsoil	Full Description: Grading (Particle Size: clay, silt, sand, gravel), organic content, colour, odour, minerals, stone, glass, slate, ash, clinker, coal, coke, tarmac, plastic, other?
3.	Sample Topsoil	Date sampled, date submitted, sample reference, laboratory, laboratory job number
4.	Source Subsoil	As much information as possible: Date Delivered, volume/weight delivery, supplier, certification, source address (yard), original source address (site).
5.	Description Subsoil	Full Description: Grading (Particle Size: clay, silt, sand, gravel), organic content, colour, odour, minerals, stone, glass, slate, ash, clinker, coal, coke, tarmac, plastic, other?
6.	Sample Subsoil	Date sampled, date submitted, sample reference, laboratory, laboratory job number

Topsoil Validation Record

Job number	R2174	Depth ref:	R2174-R07-v5 Final		Quality ref:		R2174-R07-v5 Final			Other documents attached		✓		
Date	17.10.22	Area use:	Garden			landscaped			stockpile			other		
Site name / location	Waldmers Wood, Bury	Size area (m):	Irregular	Approx. Area (m²):	140	Approx. Depth Top (m):	0.75	Approx. Volume Top (m³):	105	Approx. Depth Sub (m):	n/a	Approx. Volume Sub (m³):	n/a	
Plot/ location:	Plot 143 & 146													
Compiled by:	SM		Number depth entries required			2 (1 per plot); 2 entries provided.		Number samples required:		3 TS (1 per 250m³ TS, minimum 3 samples per source); 12 TS provided (full suite) with an additional 5 samples analysed for PAHs only.				

Quality Validation		Inspection date/time:	10.11.21, 22.02.22 & 02.08.22	Inspected by:	SM & CS	Photographed:	✓
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Source Topsoil	1.	✓	Barratt Homes development site: 'Site 15' off Cottam Way, Preston – well characterised Greenfield site.
Description Topsoil	2.	✓	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.
Sample Topsoil	3.	✓	5 samples collected from onsite stockpile for full contamination suite and 5 additional samples collected and analysed for PAHs only (EMT Lab ref: 21/17783); 4 additional samples collected from onsite stockpile on 22.02.22 (Eurofins Lab ref: 22-07010-1) and a further 3 samples collected from stockpile on 02.08.22.
Source Subsoil	4.	x	Not used
Description Subsoil	5.	x	n/a
Sample Subsoil	6.	x	n/a

Topsoil Validation Record



Topsoil Results Summary – Cottam import

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Asbestos Fibres	NAD	NAD	Yes
Arsenic	37	4.9-15	Yes
Cadmium	11	<0.1-1.3	Yes
Chromium (total)	910	13-70.5	Yes
Chromium VI	6	<0.5	Yes
Copper	2,400	13-33	Yes
Lead	200	27-68	Yes
Mercury	40	<0.1-0.2	Yes
Nickel	180	9.2-51	Yes
Zinc	3,700	30-170	Yes
Naphthalene	2.3	<0.04-0.41	Yes
Acenaphthene	210	<0.03-0.73	Yes
Acenaphthylene	170	<0.05-0.47	Yes
Fluorene	170	<0.04-0.38	Yes
Phenanthrene	95	<0.03-3.6	Yes
Anthracene	2,400	<0.04-0.68	Yes
Fluoranthene	280	<0.03-4.3	Yes
Pyrene	620	<0.03-4.0	Yes
Benzo(a)anthracene	7.2	<0.06-2.1	Yes
Chrysene	15	<0.02-2.0	Yes
Benzo(b)fluoranthene	2.6	<0.05-2.5	Yes
Benzo(k)fluoranthene	77	<0.05-0.79	Yes
Benzo(a)pyrene	2.2	<0.04-1.0	Yes
Indeno(123cd) pyrene	27	<0.04-0.97	Yes

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Dibenzo(ah) anthracene	0.24	<0.04-0.22	Yes
Benzo(ghi) perylene	320	<0.04-1.2	Yes
Aliphatic C5-C6	42	<0.1	Yes
Aliphatic C6-C8	100	<0.1	Yes
Aliphatic C8-C10	27	<0.1	Yes
Aliphatic C10-C12	130	<0.2	Yes
Aliphatic C12-C16	1,100	<1	Yes
Aliphatic C16-C21	65,000	<1	Yes
Aliphatic C21-C35	65,000	<1	Yes
Aromatic C6-C7	70	<1	Yes
Aromatic C7-C8	130	<1	Yes
Aromatic C8-C10	34	<1	Yes
Aromatic C10-C12	74	<1	Yes
Aromatic C12-C16	140	<1	Yes
Aromatic C16-C21	260	<1	Yes
Aromatic C21-C35	1,100	<1	Yes
Benzene	0.08	<0.001	Yes
Toluene	130	<0.001	Yes
Ethyl-benzene	47	<0.001	Yes
m/p-xylene	56	<0.001	Yes
o-xylene	60	<0.001	Yes

Topsoil Validation Record

Depth Validation	Inspection date/time:	14.10.22	Inspected by:	SM	Photographed:	✓
Plot 143	Required Depth (mm)	600	Measured Depth (mm)	750	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.75m	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.75m	Base (Sandstone bedrock).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						

Topsoil Validation Record

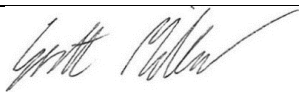
Depth Validation	Inspection date/time:	14.10.22	Inspected by:	SM	Photographed:	✓
Plot 146	Required Depth (mm)	600	Measured Depth (mm)	700	PASS	
Source Topsoil	Barratt Homes development site: 'Site 15' off Cottam Way, Preston.					
Source Subsoil	n/a					
Soil profile/description	0.00-0.70m	Greyish brown, slightly gravelly, slightly sandy clay topsoil with frequent roots.				
	0.70m	Base (Sandstone bedrock).				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						

Topsoil Validation Record



Soil PASSED testing for quality and depth.

An additional inspection visit IS NOT required.

SGP Staff:	S D Miller BSc MCIWEM	Signed:		17.10.2022
SGP Member:	D Wayland BSc MSC AssocMCIWM MCIWEM C.WEM	Signed:		17.10.2022

Guide notes:

1.	Source Topsoil	As much information as possible: Date Delivered, volume/weight delivery, supplier, certification, source address (yard), original source address (site).
2.	Description Topsoil	Full Description: Grading (Particle Size: clay, silt, sand, gravel), organic content, colour, odour, minerals, stone, glass, slate, ash, clinker, coal, coke, tarmac, plastic, other?
3.	Sample Topsoil	Date sampled, date submitted, sample reference, laboratory, laboratory job number
4.	Source Subsoil	As much information as possible: Date Delivered, volume/weight delivery, supplier, certification, source address (yard), original source address (site).
5.	Description Subsoil	Full Description: Grading (Particle Size: clay, silt, sand, gravel), organic content, colour, odour, minerals, stone, glass, slate, ash, clinker, coal, coke, tarmac, plastic, other?
6.	Sample Subsoil	Date sampled, date submitted, sample reference, laboratory, laboratory job number

Smith Grant LLP
Station House
Station Road
Ruabon
Wrexham
LL14 6DL



Attention : Dan Wayland
Date : 15th November, 2021
Your reference : R2174
Our reference : Test Report 21/17783 Batch 1
Location : Tetrosyl BM
Date samples received : 11th November, 2021
Status : Final Report
Issue : 2

Ten samples were received for analysis on 11th November, 2021 of which ten were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:



Bruce Leslie
Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Smith Grant LLP
Reference: R2127
Location: Tetrosyl BM
Contact: Dan Wayland
EMT Job No: 21/17783

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1	2-3	4	5-6	7	8-9	10	11-12	13	14-15	Please see attached notes for all abbreviations and acronyms		
Sample ID	Cottam - TS1	Cottam - TS2	Cottam - TS3	Cottam - TS4	Cottam - TS5	Cottam - TS6	Cottam - TS7	Cottam - TS8	Cottam - TS9	Cottam - TS10			
Depth													
COC No / misc													
Containers	J	V J	J	V J	J	V J	J	V J	J	V J			
Sample Date	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021	10/11/2021			
Sample Type	Clayey Loam	Clayey Loam	Clay	Clay	Clay	Clayey Loam	Clay	Clay	Clay	Clay			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021	LOD/LOR	Units	Method No.
Arsenic ^{#M}	-	11.8	-	12.5	-	11.9	-	14.1	-	9.8	<0.5	mg/kg	TM30/PM15
Cadmium ^{#M}	-	0.1	-	0.1	-	0.1	-	<0.1	-	0.1	<0.1	mg/kg	TM30/PM15
Chromium ^{#M}	-	68.5	-	70.5	-	63.4	-	68.4	-	64.7	<0.5	mg/kg	TM30/PM15
Copper ^{#M}	-	32	-	33	-	28	-	30	-	27	<1	mg/kg	TM30/PM15
Lead ^{#M}	-	63	-	68	-	55	-	60	-	50	<5	mg/kg	TM30/PM15
Mercury ^{#M}	-	0.2	-	<0.1	-	0.1	-	0.1	-	0.2	<0.1	mg/kg	TM30/PM15
Nickel ^{#M}	-	23.4	-	23.6	-	21.0	-	24.0	-	22.3	<0.7	mg/kg	TM30/PM15
Selenium ^{#M}	-	<1	-	<1	-	1	-	1	-	<1	<1	mg/kg	TM30/PM15
Zinc ^{#M}	-	67	-	68	-	62	-	65	-	60	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene ^{#M}	<0.04	0.06	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene ^{#M}	<0.05	0.11	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene ^{#M}	<0.04	0.08	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene ^{#M}	0.11	1.03	<0.03	0.11	<0.03	0.10	0.07	0.06	0.22	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene [#]	<0.04	0.19	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.06	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene ^{#M}	0.18	1.15	<0.03	0.19	<0.03	0.13	0.10	0.10	0.28	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene [#]	0.15	0.93	<0.03	0.16	<0.03	0.11	0.10	0.09	0.22	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene [#]	0.11	0.46	<0.06	0.11	<0.06	<0.06	0.08	0.09	0.14	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene ^{#M}	0.10	0.50	<0.02	0.09	<0.02	0.06	0.06	0.06	0.11	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(k)fluoranthene ^{#M}	0.11	0.65	<0.07	0.12	<0.07	<0.07	<0.07	<0.07	0.12	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene [#]	0.06	0.33	<0.04	0.05	<0.04	<0.04	<0.04	<0.04	0.07	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene ^{#M}	<0.04	0.25	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene [#]	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene [#]	<0.04	0.21	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 16 Total	0.8	6.0	<0.6	0.8	<0.6	<0.6	<0.6	<0.6	1.2	<0.6	<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.08	0.47	<0.05	0.09	<0.05	<0.05	<0.05	<0.05	0.09	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.03	0.18	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	98	97	98	102	98	96	97	99	92	71	<0	%	TM4/PM8
TPH CWG													
Aliphatics													
>C5-C6 ^{#M}	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 ^{#M}	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 ^{#M}	-	<0.2	-	<0.2	-	<0.2	-	<0.2	-	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 ^{#M}	-	<4	-	<4	-	<4	-	<4	-	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 ^{#M}	-	<7	-	<7	-	<7	-	<7	-	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 ^{#M}	-	<7	-	<7	-	<7	-	<7	-	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35	-	<19	-	<19	-	<19	-	<19	-	<19	<19	mg/kg	TM5/PM8/PM16/PM12/PM15

Element Materials Technology

Client Name: Smith Grant LLP
Reference: R2127
Location: Tetrosyl BM
Contact: Dan Wayland
EMT Job No: 21/17783

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

[illegible]

Client Name: Smith Grant LLP
Reference: R2127
Location: Tetrosyl BM
Contact: Dan Wayland

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
21/17783	1	Cottam - TS2		3	11/11/2021	General Description (Bulk Analysis)	soil/stones
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD
21/17783	1	Cottam - TS4		6	11/11/2021	General Description (Bulk Analysis)	soil/stones
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD
21/17783	1	Cottam - TS6		9	11/11/2021	General Description (Bulk Analysis)	soil/stones
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD
21/17783	1	Cottam - TS8		12	11/11/2021	General Description (Bulk Analysis)	Brown soil with vegetation
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD
21/17783	1	Cottam - TS10		15	11/11/2021	General Description (Bulk Analysis)	Brown soil with vegetation
					11/11/2021	Asbestos Fibres	NAD
					11/11/2021	Asbestos ACM	NAD
					11/11/2021	Asbestos Type	NAD
					11/11/2021	Asbestos Level Screen	NAD

Client Name: Smith Grant LLP

Reference: R2127

Location: Tetrosyl BM

Contact: Dan Wayland

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/17783

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Please include all sections of this report if it is reproduced

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

EMT Job No: 21/17783

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes	Yes	AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes
PM13	A visual examination of the solid sample is carried out to ascertain sample make up, colour and any other inclusions. This is not a geotechnical description.	PM0	No preparation is required.			AR	No
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes

EMT Job No: 21/17783

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEPA Method 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes	Yes	AD	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes	Yes	AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 First edition (2006)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No
NONE	No Method Code	NONE	No Method Code			AD	Yes



2183

Final Report

Report No.: 22-07010-1
Initial Date of Issue: 01-Mar-2022
Client Smith Grant LLP
Client Address: Station House, Station Road
Ruabon
Wrexham
LL14 6DL
Contact(s): Cezary Salwa
Megan Jones
Project R2174 TETROSYL BM

Quotation No.:	Date Received:	24-Feb-2022
Order No.:	Date Instructed:	24-Feb-2022
No. of Samples: 4		
Turnaround (Wkdays): 5	Results Due:	02-Mar-2022
Date Approved: 01-Mar-2022		

Approved By:



Details: Stuart Henderson, Technical
Manager

Results - Soil

Project: R2174 TETROSYL BM

Client: Smith Grant LLP	Chemtest Job No.:				22-07010	22-07010	22-07010	22-07010
Quotation No.:	Chemtest Sample ID.:				1378913	1378914	1378915	1378916
Order No.:	Client Sample Ref.:				ES1	ES2	ES3	ES4
	Sample Location:				Cottam	Cottam	Cottam	Cottam
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Date Sampled:				22-Feb-2022	22-Feb-2022	22-Feb-2022	22-Feb-2022
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD				
ACM Type	U	2192		N/A	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	20	21	22	20
pH	U	2010		4.0	7.9	7.8	7.6	7.9
Arsenic	U	2450	mg/kg	1.0	7.0	8.0	15	7.6
Cadmium	U	2450	mg/kg	0.10	0.15	0.16	1.3	0.13
Chromium	U	2450	mg/kg	1.0	19	23	38	20
Copper	U	2450	mg/kg	0.50	21	22	29	19
Mercury	U	2450	mg/kg	0.10	0.18	0.12	0.14	0.16
Nickel	U	2450	mg/kg	0.50	18	51	43	16
Lead	U	2450	mg/kg	0.50	43	30	45	49
Selenium	U	2450	mg/kg	0.20	< 0.20	< 0.20	1.1	0.22
Zinc	U	2450	mg/kg	0.50	61	59	170	38
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	5.0	2.9	4.7	3.8
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10	< 10	< 10
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: R2174 TETROSYL BM

Client: Smith Grant LLP	Chemtest Job No.:				22-07010	22-07010	22-07010	22-07010
Quotation No.:	Chemtest Sample ID.:				1378913	1378914	1378915	1378916
Order No.:	Client Sample Ref.:				ES1	ES2	ES3	ES4
	Sample Location:				Cottam	Cottam	Cottam	Cottam
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Date Sampled:				22-Feb-2022	22-Feb-2022	22-Feb-2022	22-Feb-2022
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD				
Phenanthrene	U	2700	mg/kg	0.10	1.7	0.86	0.93	0.85
Anthracene	U	2700	mg/kg	0.10	0.51	0.26	0.19	0.18
Fluoranthene	U	2700	mg/kg	0.10	2.0	1.4	1.2	1.4
Pyrene	U	2700	mg/kg	0.10	2.1	1.7	1.4	1.5
Benzo[a]anthracene	U	2700	mg/kg	0.10	1.4	1.0	1.5	0.94
Chrysene	U	2700	mg/kg	0.10	1.9	0.85	1.9	1.4
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	1.5	1.2	1.1	1.2
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	0.45	0.32	0.23	0.27
Benzo[a]pyrene	U	2700	mg/kg	0.10	1.0	0.80	0.53	0.66
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	0.83	0.62	0.43	0.69
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	0.22	0.15	< 0.10	0.17
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	0.67	0.39	0.31	0.26
Total Of 16 PAH's	U	2700	mg/kg	2.0	14	9.6	9.7	9.5
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com



2183

Final Report

Report No.:	22-29639-1		
Initial Date of Issue:	09-Aug-2022		
Client	Smith Grant LLP		
Client Address:	Bryn Estyn Business Centre Bryn Estyn Road Wrexham LL13 9TY		
Contact(s):	Scott Miller		
Project	R2174 Waldmers Wood, Bury		
Quotation No.:	Q15-02887	Date Received:	04-Aug-2022
Order No.:		Date Instructed:	04-Aug-2022
No. of Samples:	3		
Turnaround (Wkdays):	5	Results Due:	10-Aug-2022
Date Approved:	09-Aug-2022		
Approved By:			



Details: Stuart Henderson, Technical
Manager

Results - Soil

Project: R2174 Waldmers Wood, Bury

Client: Smith Grant LLP	Chemtest Job No.:				22-29639	22-29639	22-29639
Quotation No.: Q15-02887	Chemtest Sample ID.:				1481418	1481419	1481420
	Sample Location:				COTSP-ES1	COTSP-ES2	COTSP-ES3
	Sample Type:				SOIL	SOIL	SOIL
	Date Sampled:				02-Aug-2022	02-Aug-2022	02-Aug-2022
	Asbestos Lab:				DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD			
ACM Type	U	2192		N/A	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	20	15	16
pH	U	2010		4.0	6.9	7.5	6.9
Arsenic	U	2455	mg/kg	0.5	6.0	4.9	6.4
Cadmium	U	2455	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Chromium	U	2455	mg/kg	0.5	13	13	13
Copper	U	2455	mg/kg	0.50	15	13	16
Mercury	U	2455	mg/kg	0.05	0.14	0.10	0.12
Nickel	U	2455	mg/kg	0.50	9.2	10	9.6
Lead	U	2455	mg/kg	0.50	36	27	36
Selenium	U	2455	mg/kg	0.25	0.37	0.28	0.34
Zinc	U	2455	mg/kg	0.50	33	30	34
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	4.5	4.0	5.0
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10	< 10
Naphthalene	U	2700	mg/kg	0.10	< 0.10	0.41	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	0.47	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	0.73	< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10	0.38	< 0.10
Phenanthrene	U	2700	mg/kg	0.10	2.9	3.6	0.77

Results - Soil

Project: R2174 Waldmers Wood, Bury

Client: Smith Grant LLP	Chemtest Job No.:				22-29639	22-29639	22-29639
Quotation No.: Q15-02887	Chemtest Sample ID.:				1481418	1481419	1481420
	Sample Location:				COTSP-ES1	COTSP-ES2	COTSP-ES3
	Sample Type:				SOIL	SOIL	SOIL
	Date Sampled:				02-Aug-2022	02-Aug-2022	02-Aug-2022
	Asbestos Lab:				DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD			
Anthracene	U	2700	mg/kg	0.10	0.57	0.68	0.22
Fluoranthene	U	2700	mg/kg	0.10	4.3	4.2	1.4
Pyrene	U	2700	mg/kg	0.10	4.0	4.0	1.4
Benzo[a]anthracene	U	2700	mg/kg	0.10	2.1	1.8	< 0.10
Chrysene	U	2700	mg/kg	0.10	2.0	1.9	< 0.10
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	2.5	2.1	< 0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	0.79	0.75	< 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.10	2.0	1.7	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10	0.97	< 0.10
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10	0.11	< 0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10	1.2	< 0.10
Total Of 16 PAH's	U	2700	mg/kg	2.0	21	25	3.8
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Diben[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.

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SOP	Standard operating procedure
LOD	Limit of detection

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Uncertainty of measurement for the determinands tested are available upon request

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The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

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Sample Deviation Codes

- A - Date of sampling not supplied
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All water samples will be retained for 14 days from the date of receipt

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Topsoil Validation Record

Job number	R2174	Depth ref:	R2174-R07-v4 Final		Quality ref:		R2174-R07-v4 Final			Other documents attached		✓	
Date	06.09.23	Area use:	Garden		landscaped			stockpile			other		
Site name / location	Waldmers Wood, Bury	Size area (m):	Irregular	Approx. Area (m²):	330	Approx. Depth Top (m):	0.725 (Av.)	Approx. Volume Top (m³):	239	Approx. Depth Sub (m):	n/a	Approx. Volume Sub (m³):	n/a
Plot/ location:	Plots 148-151	Number depth entries required		4 (1 per plot); 4 entries provided.			Number samples required:			3 TS (1 per 250m³ TS, minimum 3 samples per source); 6 TS samples provided.			
Compiled by:	SM												

Quality Validation		Inspection date/time:	15.06.23 & 09.08.23	Inspected by:	CM	Photographed:	✓
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Source Topsoil	1.	✓	Barratt Homes development site off Rossendale Road, Burnley (well characterised Greenfield site): stockpile 'T2'.
Description Topsoil	2.	✓	Blackish brown slightly gravelly sandy clayey topsoil with grass roots.
Sample Topsoil	3.	✓	3 samples collected from stockpile at source site (Eurofins Lab ref: 23-20765; samples: T2-S1 to S3) and a further 3 samples collected from stockpile at destination site (Eurofins Lab ref: 23-50455-1).
Source Subsoil	4.	x	Not used
Description Subsoil	5.	x	n/a
Sample Subsoil	6.	x	n/a

Topsoil Validation Record



Topsoil Results Summary – Rossendale Road

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Asbestos Fibres	NAD	NAD	Yes
Arsenic	37	1.8-20	Yes
Cadmium	11	<0.1-1.2	Yes
Chromium (total)	910	5.0-54	Yes
Chromium VI	6	<1.2	Yes
Copper	2,400	8.1-76	Yes
Lead	200	16-190	Yes
Mercury	40	<0.05-0.40	Yes
Nickel	180	2.8-15	Yes
Zinc	3,700	17-210	Yes
Naphthalene	2.3	0.57-2.9	Yes*
Acenaphthene	210	0.92-3.8	Yes
Acenaphthylene	170	0.11-2.0	Yes
Fluorene	170	0.68-3.4	Yes
Phenanthrene	95	5.9-21	Yes
Anthracene	2,400	1.5-7.0	Yes
Fluoranthene	280	8.2-26	Yes
Pyrene	620	8.2-26	Yes
Benzo(a)anthracene	7.2	3.8-14	Yes*
Chrysene	15	5.7-13	Yes
Benzo(b)fluoranthene	2.6	4.5-13	Yes*
Benzo(k)fluoranthene	77	2.8-4.8	Yes
Benzo(a)pyrene	2.2	4.1-10	Yes*
Indeno(123cd) pyrene	27	2.7-6.8	Yes

Contaminant	Soil standard adopted (mg/kg)	Concentrations (mg/kg)	Compliant?
Dibenzo(ah) anthracene	0.24	0.89-1.9	Yes*
Benzo(ghi) perylene	320	2.3-6.1	Yes
Aliphatic C5-C6	42	<0.1	Yes
Aliphatic C6-C8	100	<0.1	Yes
Aliphatic C8-C10	27	<0.1	Yes
Aliphatic C10-C12	130	<1	Yes
Aliphatic C12-C16	1,100	<2	Yes
Aliphatic C16-C21	65,000	<8	Yes
Aliphatic C21-C35	65,000	<1-20	Yes
Aromatic C6-C7	70	<1	Yes
Aromatic C7-C8	130	<1	Yes
Aromatic C8-C10	34	<1	Yes
Aromatic C10-C12	74	<1-1.5	Yes
Aromatic C12-C16	140	<1-7.8	Yes
Aromatic C16-C21	260	25-130	Yes
Aromatic C21-C35	1,100	49-250	Yes
Benzene	0.08	<0.005	Yes
Toluene	130	<0.005	Yes
Ethyl-benzene	47	<0.005	Yes
m/p-xylene	56	<0.005	Yes
o-xylene	60	<0.005	Yes
*See Summary section			

Topsoil Validation Record

Depth Validation	Inspection date/time:	05.09.23	Inspected by:	SM	Photographed:	✓
Plot 148	Required Depth (mm)	600	Measured Depth (mm)	650	PASS	
Source Topsoil	Barratt Homes development site off Rossendale Road, Burnley (well characterised Greenfield site): stockpile 'T2'.					
Source Subsoil	n/a					
Soil profile/description	0.0-0.65m	Blackish brown slightly gravelly sandy clayey topsoil with grass roots.				
	0.65m	Base – Black woven geotextile				
Photograph (location)		Photograph (depth profile)		Photograph (soil type & geotextile)		
						

Topsoil Validation Record

Depth Validation	Inspection date/time:	05.09.23	Inspected by:	SM	Photographed:	✓
Plot 149	Required Depth (mm)	600	Measured Depth (mm)	>750	PASS	
Source Topsoil	Barratt Homes development site off Rossendale Road, Burnley (well characterised Greenfield site): stockpile 'T2'.					
Source Subsoil	n/a					
Soil profile/description	0.0-0.75m	Blackish brown slightly gravelly sandy clayey topsoil with grass roots.				
	0.75m	Base – Same material (geotextile confirmed in plots 148 & 151)				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						

Topsoil Validation Record

Depth Validation	Inspection date/time:	05.09.23	Inspected by:	SM	Photographed:	✓
Plot 150	Required Depth (mm)	600	Measured Depth (mm)	>900	PASS	
Source Topsoil	Barratt Homes development site off Rossendale Road, Burnley (well characterised Greenfield site): stockpile 'T2'.					
Source Subsoil	n/a					
Soil profile/description	0.0-0.9m	Blackish brown slightly gravelly sandy clayey topsoil with grass roots.				
	0.9m	Base – Same material (geotextile confirmed in plots 148 & 151)				
Photograph (location)		Photograph (depth profile)		Photograph (soil type)		
						

Topsoil Validation Record

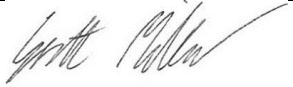
Depth Validation	Inspection date/time:	05.09.23	Inspected by:	SM	Photographed:	✓
Plot 151	Required Depth (mm)	600	Measured Depth (mm)	600	PASS	
Source Topsoil	Barratt Homes development site off Rossendale Road, Burnley (well characterised Greenfield site): stockpile 'T2'.					
Source Subsoil	n/a					
Soil profile/description	0.0-0.6m	Blackish brown slightly gravelly sandy clayey topsoil with grass roots.				
	0.6m	Base – Black woven geotextile				
Photograph (location) 		Photograph (depth profile) 		Photograph (soil type & geotextile) 		

Topsoil Validation Record

Summary

Exceedances of the adopted residential soils screening criteria have been detected for a number of PAHs: Naphthalene (3 no.), Benz(a)anthracene (5 no.), Benzo(b)fluoranthene (6 no.), Benzo(a)pyrene (6 no.) and Dibenzo(ah)anthracene (6 no.). However, as summarised in the 'Rossendale Road, Burnley: Stockpile Validation & Assessment' letter (ref: R2688-L01, dated 27th June 2023 – attached), these exceedances have been attributed to the inclusion of coal within the soils considering the undeveloped nature of the source site, the absence of any other identifiable sources, as well as the descriptions of coal gravel within the soils. The overall risk to human health from PAHs within fragments of coal is associated with the bioavailability of the PAHs which is considered to be limited due to the sequestration of PAHs within a carbon or vitrified matrix; the soils were therefore considered suitable for reuse as topsoil in garden areas which was agreed by the Bury Council's Environmental Protection Officer in letter 'CL584.120623.1' (6th July 2023). The supplementary onsite testing confirmed concentrations of the exceeding determinants to be below, or within the range of, the testing results from the source site therefore the conclusions of the assessment letter remain unchanged.

An additional inspection visit IS NOT required.

SGP Staff:	S D Miller BSc MCIWEM	Signed:		06.09.23
SGP Member:	D Wayland BSc MSC AssocMCIWM MCIWEM C.WEM	Signed:		06.09.23

Guide notes:

1.	Source Topsoil	As much information as possible: Date Delivered, volume/weight delivery, supplier, certification, source address (yard), original source address (site).
2.	Description Topsoil	Full Description: Grading (Particle Size: clay, silt, sand, gravel), organic content, colour, odour, minerals, stone, glass, slate, ash, clinker, coal, coke, tarmac, plastic, other?
3.	Sample Topsoil	Date sampled, date submitted, sample reference, laboratory, laboratory job number
4.	Source Subsoil	As much information as possible: Date Delivered, volume/weight delivery, supplier, certification, source address (yard), original source address (site).
5.	Description Subsoil	Full Description: Grading (Particle Size: clay, silt, sand, gravel), organic content, colour, odour, minerals, stone, glass, slate, ash, clinker, coal, coke, tarmac, plastic, other?
6.	Sample Subsoil	Date sampled, date submitted, sample reference, laboratory, laboratory job number



2183

Final Report

Report No.: 23-20765-1**Initial Date of Issue:** 23-Jun-2023**Re-Issue Details:****Client** Smith Grant LLP**Client Address:** Bryn Estyn Business Centre
Bryn Estyn Road
Wrexham
LL13 9TY**Contact(s):** Caitlin McHugh
Megan Jones**Project** R2688 Brun Lea, Rossendale, Burnley**Quotation No.:** **Date Received:** 19-Jun-2023**Order No.:** **Date Instructed:** 19-Jun-2023**No. of Samples:** 12**Turnaround (Wkdays):** 5 **Results Due:** 23-Jun-2023**Date Approved:** 23-Jun-2023**Approved By:****Details:** Stuart Henderson, Technical
Manager

Results - Soil

Project: R2688 Brun Lea, Rossendale, Burnley

Client: Smith Grant LLP	Chemtest Job No.:				23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765
Quotation No.:	Chemtest Sample ID.:				1660264	1660265	1660266	1660267	1660268	1660269	1660270	1660271	1660272
Order No.:	Client Sample Ref.:				T1	T1	T1	T2	T2	T2	T3	T3	T3
	Client Sample ID.:				S1	S2	S3	S1	S2	S3	S1	S2	S3
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Date Sampled:				15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD									
ACM Type	U	2192		N/A	-	-	-	-	-	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	2.8	7.2	4.5	2.4	3.0	1.3	5.6	6.0	11
pH	U	2010		4.0	7.4	7.3	7.4	7.2	7.6	6.5	6.3	6.1	6.1
Arsenic	U	2455	mg/kg	0.5	10	16	15	20	12	1.8	9.7	9.3	8.1
Cadmium	U	2455	mg/kg	0.10	0.17	0.26	0.23	1.2	0.45	< 0.10	0.38	0.38	0.29
Chromium	U	2455	mg/kg	0.5	17	26	27	54	36	5.0	30	28	23
Copper	U	2455	mg/kg	0.50	31	47	43	76	39	8.1	36	34	26
Mercury	U	2455	mg/kg	0.05	0.17	0.31	0.25	0.37	0.19	< 0.05	0.17	0.13	0.13
Nickel	U	2455	mg/kg	0.50	13	21	21	28	22	2.8	18	18	13
Lead	U	2455	mg/kg	0.50	64	110	92	190	84	16	76	72	63
Selenium	U	2455	mg/kg	0.25	0.66	0.99	0.93	2.0	1.2	< 0.25	0.86	0.83	0.62
Zinc	U	2455	mg/kg	0.50	58	86	79	210	110	17	93	91	73
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	5.8	16	9.6	8.7	6.7	1.8	4.7	9.9	6.8
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	N	2680	mg/kg	1.0	< 1.0	5.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	N	2680	mg/kg	1.0	< 1.0	3.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	N	2680	mg/kg	1.0	5.7	34	< 1.0	30	130	25	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	N	2680	mg/kg	1.0	4.7	180	< 1.0	94	250	84	< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	10	220	< 5.0	120	380	110	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	10	220	< 10	120	380	110	< 10	< 10	< 10
Naphthalene	U	2700	mg/kg	0.10	< 0.10	2.2	1.1	2.4	2.9	2.7	2.7	1.7	1.7
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	2.2	1.1	2.0	0.71	0.47	0.27	1.2	0.76
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	2.6	0.95	3.8	0.92	2.5	1.7	2.3	1.1
Fluorene	U	2700	mg/kg	0.10	< 0.10	2.5	0.80	3.4	0.68	1.9	1.3	1.9	1.1

Results - Soil

Project: R2688 Brun Lea, Rossendale, Burnley

Client: Smith Grant LLP	Chemtest Job No.:				23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765
Quotation No.:	Chemtest Sample ID.:				1660264	1660265	1660266	1660267	1660268	1660269	1660270	1660271	1660272
Order No.:	Client Sample Ref.:				T1	T1	T1	T2	T2	T2	T3	T3	T3
	Client Sample ID.:				S1	S2	S3	S1	S2	S3	S1	S2	S3
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Date Sampled:				15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD									
Phenanthrene	U	2700	mg/kg	0.10	9.8	9.7	5.7	21	5.9	15	10	14	7.4
Anthracene	U	2700	mg/kg	0.10	3.9	2.8	1.5	7.0	1.5	3.8	2.3	3.3	1.9
Fluoranthene	U	2700	mg/kg	0.10	6.8	8.9	6.8	26	8.2	19	12	18	10
Pyrene	U	2700	mg/kg	0.10	7.2	9.1	7.3	26	8.2	19	12	18	10
Benzo[a]anthracene	U	2700	mg/kg	0.10	< 0.10	12	6.5	14	3.8	8.9	7.1	11	7.4
Chrysene	U	2700	mg/kg	0.10	< 0.10	9.3	4.4	13	5.7	13	9.4	9.3	6.1
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10	13	5.6	13	4.5	9.9	6.6	11	6.4
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10	5.9	1.8	4.8	2.3	4.6	3.9	4.0	2.2
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10	4.2	3.8	10	4.1	7.8	4.9	7.8	4.5
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	6.8	2.7	5.6	< 0.10	5.7	4.0
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	1.9	1.3	1.7	< 0.10	1.3	0.84
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	6.1	2.3	4.4	< 0.10	5.1	8.3
Total Of 16 PAH's	U	2700	mg/kg	2.0	28	84	47	160	56	120	74	120	74
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Results - Soil

Project: R2688 Brun Lea, Rossendale, Burnley

Client: Smith Grant LLP	Chemtest Job No.:				23-20765	23-20765	23-20765
Quotation No.:	Chemtest Sample ID.:				1660273	1660274	1660275
Order No.:	Client Sample Ref.:				T6	T6	T6
	Client Sample ID.:				S1	S2	S3
	Sample Type:				SOIL	SOIL	SOIL
	Date Sampled:				15-Jun-2023	15-Jun-2023	15-Jun-2023
	Asbestos Lab:				DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD			
ACM Type	U	2192		N/A	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	8.5	1.8	12
pH	U	2010		4.0	6.3	6.5	7.6
Arsenic	U	2455	mg/kg	0.5	9.4	1.9	8.3
Cadmium	U	2455	mg/kg	0.10	0.33	< 0.10	0.20
Chromium	U	2455	mg/kg	0.5	26	5.6	15
Copper	U	2455	mg/kg	0.50	29	6.1	37
Mercury	U	2455	mg/kg	0.05	0.14	< 0.05	< 0.05
Nickel	U	2455	mg/kg	0.50	13	4.2	27
Lead	U	2455	mg/kg	0.50	79	14	100
Selenium	U	2455	mg/kg	0.25	0.84	< 0.25	0.70
Zinc	U	2455	mg/kg	0.50	82	17	72
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	2.3	4.0	6.5
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	N	2680	mg/kg	1.0	< 1.0	97	18
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	97	18
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	N	2680	mg/kg	1.0	13	4.3	11
Aromatic TPH >C21-C35	N	2680	mg/kg	1.0	58	89	120
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	71	94	130
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	71	190	140
Naphthalene	U	2700	mg/kg	0.10	2.8	4.3	6.6
Acenaphthylene	U	2700	mg/kg	0.10	0.35	0.59	0.84
Acenaphthene	U	2700	mg/kg	0.10	3.7	8.4	3.7
Fluorene	U	2700	mg/kg	0.10	2.2	5.4	3.0

Results - Soil

Project: R2688 Brun Lea, Rossendale, Burnley

Client: Smith Grant LLP	Chemtest Job No.:				23-20765	23-20765	23-20765
Quotation No.:	Chemtest Sample ID.:				1660273	1660274	1660275
Order No.:	Client Sample Ref.:				T6	T6	T6
	Client Sample ID.:				S1	S2	S3
	Sample Type:				SOIL	SOIL	SOIL
	Date Sampled:				15-Jun-2023	15-Jun-2023	15-Jun-2023
	Asbestos Lab:				DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD			
Phenanthrene	U	2700	mg/kg	0.10	17	34	19
Anthracene	U	2700	mg/kg	0.10	3.6	8.7	5.5
Fluoranthene	U	2700	mg/kg	0.10	20	35	22
Pyrene	U	2700	mg/kg	0.10	20	34	22
Benzo[a]anthracene	U	2700	mg/kg	0.10	9.1	16	10
Chrysene	U	2700	mg/kg	0.10	12	20	14
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	9.8	17	11
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	4.8	7.6	5.8
Benzo[a]pyrene	U	2700	mg/kg	0.10	8.2	15	9.6
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	7.9	12	9.8
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	2.0	3.1	3.2
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	4.4	7.7	5.3
Total Of 16 PAH's	U	2700	mg/kg	2.0	130	230	150
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com



Caitlin McHugh
Smith Grant LLP
Bryn Estyn
Business Centre
Bryn Estyn Road
Wrexham
LL13 9TY

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

e: caitlin.mchugh@smithgrant.co.uk

Analytical Report Number : 23-50455

Project / Site name:	Tetrosyl, Bury	Samples received on:	11/08/2023
Your job number:	R2174	Samples instructed on/ Analysis started on:	11/08/2023
Your order number:		Analysis completed by:	21/08/2023
Report Issue Number:	1	Report issued on:	21/08/2023
Samples Analysed:	3 soil samples		

Signed: _____

Joanna Wawrzeczko
Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 23-50455
Project / Site name: Tetrosyl, Bury

Lab Sample Number	2778430			2778431	2778432
Sample Reference	TS-S1			TS-S2	TS-S3
Sample Number	RR Bury			RR Bury	RR Bury
Depth (m)	None Supplied			None Supplied	None Supplied
Date Sampled	09/08/2023			09/08/2023	09/08/2023
Time Taken	None Supplied			None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	37	35
Total mass of sample received	kg	0.001	NONE	0.8	0.8

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	DSA	DSA	DSA

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	6.6	6.6	6.8
Organic Matter	%	0.1	MCERTS	-	13	-
Organic Matter (automated)	%	0.1	MCERTS	12	-	11

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.91	0.57	1.2
Acenaphthylene	mg/kg	0.05	MCERTS	0.11	0.14	0.2
Acenaphthene	mg/kg	0.05	MCERTS	2.2	2	2
Fluorene	mg/kg	0.05	MCERTS	1.6	1.4	1.5
Phenanthrene	mg/kg	0.05	MCERTS	14	13	13
Anthracene	mg/kg	0.05	MCERTS	3.1	3.1	3.1
Fluoranthene	mg/kg	0.05	MCERTS	17	17	17
Pyrene	mg/kg	0.05	MCERTS	15	16	15
Benzo(a)anthracene	mg/kg	0.05	MCERTS	7.3	7.4	7.7
Chrysene	mg/kg	0.05	MCERTS	7.3	8.1	7.6
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	8.3	7.9	9.2
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	2.8	4.1	3.1
Benzo(a)pyrene	mg/kg	0.05	MCERTS	6.7	7.2	7.7
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	3.5	3.7	4.1
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.89	0.94	1
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	3.8	4	4.4

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	95.4	96.8	98.9
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	14	14	14
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.8	0.9	0.8
Chromium (hexavalent)	mg/kg	1.2	NONE	< 1.2	< 1.2	< 1.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	28	31	29
Copper (aqua regia extractable)	mg/kg	1	MCERTS	40	45	48
Lead (aqua regia extractable)	mg/kg	1	MCERTS	99	120	100
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	0.4	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	14	14	15
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	100	110	100

Monoaromatics & Oxygenates

Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
p & m-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
o-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0

Analytical Report Number: 23-50455
Project / Site name: Tetrosyl, Bury

Lab Sample Number	2778430	2778431	2778432
Sample Reference	TS-S1	TS-S2	TS-S3
Sample Number	RR Bury	RR Bury	RR Bury
Depth (m)	None Supplied	None Supplied	None Supplied
Date Sampled	09/08/2023	09/08/2023	09/08/2023
Time Taken	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 _{HS 1D AL}	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10
TPH-CWG - Aliphatic >EC6 - EC8 _{HS 1D AL}	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10
TPH-CWG - Aliphatic >EC8 - EC10 _{HS 1D AL}	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10
TPH-CWG - Aliphatic >EC10 - EC12 _{EH CU 1D AL}	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 _{EH CU 1D AL}	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 _{EH CU 1D AL}	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 _{EH CU 1D AL}	mg/kg	8	MCERTS	10	20	18
TPH-CWG - Aliphatic (EC5 - EC35) _{EH CU+HS 1D AL}	mg/kg	10	NONE	11	22	19

TPH-CWG - Aromatic >EC5 - EC7 _{HS 1D AR}	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10
TPH-CWG - Aromatic >EC7 - EC8 _{HS 1D AR}	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10
TPH-CWG - Aromatic >EC8 - EC10 _{HS 1D AR}	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10
TPH-CWG - Aromatic >EC10 - EC12 _{EH CU 1D AR}	mg/kg	1	MCERTS	< 1.0	1.5	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 _{EH CU 1D AR}	mg/kg	2	MCERTS	5.4	7.8	4.6
TPH-CWG - Aromatic >EC16 - EC21 _{EH CU 1D AR}	mg/kg	10	MCERTS	26	43	30
TPH-CWG - Aromatic >EC21 - EC35 _{EH CU 1D AR}	mg/kg	10	MCERTS	49	77	62
TPH-CWG - Aromatic (EC5 - EC35) _{EH CU+HS 1D AR}	mg/kg	10	NONE	81	130	96

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected



Analytical Report Number : 23-50455
Project / Site name: Tetrosyl, Bury

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2778430	TS-S1	RR Bury	None Supplied	Brown loam and clay with gravel and vegetation.
2778431	TS-S2	RR Bury	None Supplied	Brown loam and clay with gravel and vegetation.
2778432	TS-S3	RR Bury	None Supplied	Brown loam and clay with gravel and vegetation.

Analytical Report Number : 23-50455
Project / Site name: Tetrosyl, Bury

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Organic matter in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L023-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073B-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS

Analytical Report Number : 23-50455
Project / Site name: Tetrosyl, Bury

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	NONE

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Our Ref: R2688-L01

27th June 2023

Barratt Homes Manchester
4 Brindley Road
City Park
Manchester
M16 9HQ

Dear Brad

Rossendale Road, Burnley: Stockpile Validation & Assessment

Barratt Homes Manchester (BHM) are carrying out preparatory earthworks at the Brun Lea, Rossendale Road site, Burnley to prepare for residential development. Preparatory works have included the recovery of circa 1,275m³ of topsoil which has been divided into several stockpiles on site. These are as follows:

- T1 (200m³)
- T2 (350m³)
- T3 (125m³)
- T6 (600m³)

BHM propose to export the above topsoil stockpiles to their Waldmers Wood development in Bury under an MMP for direct transfer to allow reuse as garden soils. To assess the suitability of the soils for this intended use prior to export, BHM have instructed Smith Grant LLP (SGP) to carry out validation testing.

SGP Consultant C McHugh attended site on 15.06.23 and collected 3 samples from each stockpile and submitted samples for chemical analysis in accordance with the Remediation Strategy for the receiving site. The testing undertaken achieves a minimum sampling frequency of 1 per 200m³ per stockpile or 1 per 106m³ for the full volume of soil.

Samples were couriered to Eurofins Chemtest Laboratories, Newmarket within 24 hours of collections. Samples were placed in appropriate containers as provided by the laboratory and stored in a chilled cool box. Chemical analysis was scheduled for a generic suite of urban contaminants (asbestos, metals, hydrocarbons and PAHs), the results of which have been compared against generic soil assessment criteria for use in residential gardens with plant uptake (LQM/CIEH Suitable 4 Use Levels (S4ULs) and Category 4 Screening Levels (C4SL) for lead and benzo(a)pyrene). Due to the high SOM content of the samples (average of 6.9%) soil screening criteria based on 6% have been adopted.

Stockpile Assessment

The results of each stockpile are presented in the sub-sections below and are compared to the adopted screening criteria. Where exceedances are present, additional risk assessment is provided. A copy of the laboratory test certificate (ref. 23-20766-0) is provided in Appendix A.



Stockpile TS1

Three samples (TS1-S1, TS1-S2 and TS1-S3) were collected from the stockpile. The results are summarised in the table below:

Table 1. Summary of Stockpile T1 (200m³ – Samples T1-S1, T1-S2, T1-S3) Results

Determinant	Range of Concentrations (mg/kg, unless specified)	Screening Criteria (mg/g, unless specified)	Exceedances
Asbestos (%)	NAD	NAD	None
Arsenic	10-15	LQM/CIEH S4UL 37	None
Cadmium	0.17-0.26	LQM/CIEH S4UL 11	None
Chromium	17-27	LQM/CIEH S4UL 910	None
Copper	31-47	LQM/CIEH S4UL 2400	None
Lead	64-110	LQM/CIEH S4UL 450	None
Mercury	0.17-0.31	LQM/CIEH S4UL 40	None
Nickel	13-21	LQM/CIEH S4UL 130	None
Zinc	58-86	LQM/CIEH S4UL 3700	None
Naphthalene	<0.10-2.2	LQM/CIEH S4UL 13	None
Acenaphthylene	<0.10-2.2	LQM/CIEH S4UL 920	None
Acenaphthene	<0.10-0.95	LQM/CIEH S4UL 1100	None
Fluorene	<0.10-2.5	LQM/CIEH S4UL 440	None
Phenanthrene	5.7-9.8	LQM/CIEH S4UL 440	None
Fluoranthene	6.8-8.9	LQM/CIEH S4UL 890	None
Anthracene	3.9-1.5	LQM/CIEH S4UL 11,000	None
Pyrene	7.2-9.1	LQM/CIEH S4UL 2000	None
Benzo(a)anthracene	<0.10-12	LQM/CIEH S4UL 13	(1): T1-S1
Chrysene	<0.10-9.3	LQM/CIEH S4UL 27	None
Benzo(b)fluoranthene	<0.10-13	LQM/CIEH S4UL 3.7	(2): T1-S2 & T1-S3
Benzo(k)fluoranthene	<0.10-5.9	LQM/CIEH S4UL 100	None
Benzo(a)pyrene	<0.10-4.2	C4SL 5	None
Indeno(123cd) pyrene	<0.10	S4UL 41	None
Dibenzo(ah)anthracene	<0.10	LQM/CIEH S4UL 0.3	None
Benzo(ghi)perylene	<0.10	LQM/CIEH S4UL 350	None
aliphatic >C5-C7	<1.0	LQM/CIEH S4UL 42	None
aliphatic >C7-C8	<1.0	LQM/CIEH S4UL 100	None
aliphatic >C8-C10	<1.0	LQM/CIEH S4UL 27	None
aliphatic >C10-C12	<1.0	LQM/CIEH S4UL 130	None
aliphatic >C12-C16	<1.0	LQM/CIEH S4UL 1100	None
aliphatic >C16-C21	<1.0	LQM/CIEH S4UL 5000	None
aliphatic >C21-C35	<1.0	LQM/CIEH S4UL 5000	None
aromatic >C5-C7	<1.0	LQM/CIEH S4UL 70	None
aromatic >C7-C8	<1.0	LQM/CIEH S4UL 130	None
aromatic >C8-C10	<1.0	LQM/CIEH S4UL 34	None
aromatic >C10-C12	<1.0	LQM/CIEH S4UL 74	None
aromatic >C12-C16	<1.0-3.0	LQM/CIEH S4UL 140	None
aromatic >C16-C21	<1.0-34	LQM/CIEH S4UL 260	None



Determinant	Range of Concentrations (mg/kg, unless specified)	Screening Criteria (mg/g, unless specified)	Exceedances
aromatic >C21-C35	<1.0-180	LQM/CIEH S4UL 1100	None
Benzene	<1.0	LQM/CIEH S4UL 0.087	None
Toluene	<1.0	LQM/CIEH S4UL 130	None
Ethylbenzene	<1.0	LQM/CIEH S4UL 47	None
Xylenes	<1.0	LQM/CIEH S4UL 59	None

A single minor benzo(a)anthracene exceedance was recorded with a concentration of 12 mg/kg (sample: T1-S2), slightly above the assessment criteria of 13 mg/kg. Two Benzo(b)fluoranthene exceedances were recorded with a concentration of 13 mg/kg (sample: T1-S2) and 5.6 mg/kg (sample: T1-S3) both slightly above the assessment criteria of 3.7 mg/kg.

To assess the potential source of the PAHs a ratio-cross plot has been undertaken, a copy of the plot is presented in Appendix B. All three results indicate a possible coal-tar signature although it is noted that the results are close to the boundary in which a coal signature may be considered.

Stockpile TS2

Three samples (TS2-S1, TS2-S2 and TS2-S3) were collected from the stockpile. The results are summarised in the table below:

Table 2. Summary of Stockpile T2 (350m³ – Samples T2-S1, T2-S2, T2-S3) Results

Determinant	Range of Concentrations (mg/kg, unless specified)	Screening Criteria (mg/g, unless specified)	Exceedances
Asbestos (%)	NAD	NAD	None
Arsenic	1.8-20	LQM/CIEH S4UL 37	None
Cadmium	<0.10-1.2	LQM/CIEH S4UL 11	None
Chromium	5-54	LQM/CIEH S4UL 910	None
Copper	8.1-76	LQM/CIEH S4UL 2400	None
Lead	16-190	LQM/CIEH S4UL 450	None
Mercury	<0.05-0.37	LQM/CIEH S4UL 40	None
Nickel	2.8-28	LQM/CIEH S4UL 130	None
Zinc	17-210	LQM/CIEH S4UL 3700	None
Naphthalene	2.4-2.9	LQM/CIEH S4UL 13	None
Acenaphthylene	0.47-2.0	LQM/CIEH S4UL 920	None
Acenaphthene	0.92-3.8	LQM/CIEH S4UL 1100	None
Fluorene	0.68-3.4	LQM/CIEH S4UL 440	None
Phenanthrene	5.9-21	LQM/CIEH S4UL 440	None
Fluoranthene	8.2-26	LQM/CIEH S4UL 890	None
Anthracene	1.5-7.0	LQM/CIEH S4UL 11,000	None
Pyrene	8.2-26	LQM/CIEH S4UL 2000	None
Benzo(a)anthracene	3.8-14	LQM/CIEH S4UL 13	(1): T2-S1



Determinant	Range of Concentrations (mg/kg, unless specified)	Screening Criteria (mg/g, unless specified)	Exceedances
Chrysene	5.7-13	LQM/CIEH S4UL 27	None
Benzo(b)fluoranthene	4.5-13	LQM/CIEH S4UL 3.7	(3): T2-S1, T2-S2, T2-S3
Benzo(k)fluoranthene	2.3-4.8	LQM/CIEH S4UL 100	None
Benzo(a)pyrene	4.1-10	C4SL's 5	(2): T2-S1 & T2-S3
Indeno(123cd) pyrene	2.7-6.8	S4UL 41	None
Dibenzo(ah)anthracene	1.3-1.9	LQM/CIEH S4UL 0.3	(3): T2-S1, T2-S2, T2-S3
Benzo(ghi)perylene	2.3-6.1	LQM/CIEH S4UL 350	None
aliphatic >C5-C7	<1.0	LQM/CIEH S4UL 42	None
aliphatic >C7-C8	<1.0	LQM/CIEH S4UL 100	None
aliphatic >C8-C10	<1.0	LQM/CIEH S4UL 27	None
aliphatic >C10-C12	<1.0	LQM/CIEH S4UL 130	None
aliphatic >C12-C16	<1.0	LQM/CIEH S4UL 1100	None
aliphatic >C16-C21	<1.0	LQM/CIEH S4UL 5000	None
aliphatic >C21-C35	<1.0	LQM/CIEH S4UL 5000	None
aromatic >C5-C7	<1.0	LQM/CIEH S4UL 70	None
aromatic >C7-C8	<1.0	LQM/CIEH S4UL 130	None
aromatic >C8-C10	<1.0	LQM/CIEH S4UL 34	None
aromatic >C10-C12	<1.0	LQM/CIEH S4UL 74	None
aromatic >C12-C16	<1.0	LQM/CIEH S4UL 140	None
aromatic >C16-C21	25-130	LQM/CIEH S4UL 260	None
aromatic >C21-C35	84-250	LQM/CIEH S4UL 1100	None
Benzene	<1.0	LQM/CIEH S4UL 0.087	None
Toluene	<1.0	LQM/CIEH S4UL 130	None
Ethylbenzene	<1.0	LQM/CIEH S4UL 47	None
Xylenes	<1.0	LQM/CIEH S4UL 59	None

A single benzo(a)anthracene exceedance was recorded with a concentration of 14 mg/kg (sample: T2-S1), slightly above the assessment criteria of 13 mg/kg.

Three benzo(b)fluoranthene exceedances were recorded with a concentration of 13 mg/kg (sample: T2-S1), 4.5 mg/kg (sample T2-S2) and 9.9 mg/kg (sample T2-S3), all above the assessment criteria of 3.7 mg/kg.

Two benzo(a)pyrene exceedances were recorded with a concentration of 10 mg/kg (sample: T2-S1) and 7.8 mg/kg (sample: T2-S3), above the assessment criteria of 5 (C4SL).

Three dibenzo(ah)anthracene exceedances were recorded with a concentration of 1.9 mg/kg (sample T2-S1), 1.3 mg/kg, and 1.7 mg/kg (sample: T2-S3), all above the assessment criteria of 0.3 mg/kg.

To assess the potential source of the PAHs a ratio-cross plot has been undertaken, a copy of the plot is presented in Appendix B. All three results indicate a possible coal/coal-tar signature coal-tar signature.



Stockpile TS3

Three samples (TS3-S1, TS3-S2 and TS3-S3) were collected from the stockpile. The results are summarised in the table below:

Table 3. Summary of Stockpile T3 (125m³ – Samples T3-S1, T3-S2, T3-S3) Results

Determinant	Range of Concentrations (mg/kg, unless specified)	Screening Criteria (mg/g, unless specified)	Exceedances
Asbestos (%)	NAD	NAD	None
Arsenic	8.1-9.7	LQM/CIEH S4UL 37	None
Cadmium	0.29-0.38	LQM/CIEH S4UL 11	None
Chromium	23-30	LQM/CIEH S4UL 910	None
Copper	26-36	LQM/CIEH S4UL 2400	None
Lead	63-76	LQM/CIEH S4UL 450	None
Mercury	0.13-0.17	LQM/CIEH S4UL 40	None
Nickel	13-18	LQM/CIEH S4UL 130	None
Zinc	73-93	LQM/CIEH S4UL 3700	None
Naphthalene	1.7-2.7	LQM/CIEH S4UL 13	None
Acenaphthylene	0.27-1.2	LQM/CIEH S4UL 920	None
Acenaphthene	1.1-2.3	LQM/CIEH S4UL 1100	None
Fluorene	1.1-1.9	LQM/CIEH S4UL 440	None
Phenanthrene	7.4-14	LQM/CIEH S4UL 440	None
Fluoranthene	10-18	LQM/CIEH S4UL 890	None
Anthracene	1.9-3.3	LQM/CIEH S4UL 11,000	None
Pyrene	10-18	LQM/CIEH S4UL 2000	None
Benzo(a)anthracene	7.1-11	LQM/CIEH S4UL 13	None
Chrysene	9.4-6.1	LQM/CIEH S4UL 27	None
Benzo(b)fluoranthene	6.4-11	LQM/CIEH S4UL 3.7	(3): T3-S1, T3-S2, T3-S3
Benzo(k)fluoranthene	2.2-4.0	LQM/CIEH S4UL 100	None
Benzo(a)pyrene	4.5-7.8	C4SL 5	(1): T3-S2
Indeno(123cd) pyrene	<0.10-5.7	S4UL 41	None
Dibenzo(ah)anthracene	<0.10-1.3	LQM/CIEH S4UL 0.3	(2): T3-S2, T3-S3
Benzo(ghi)perylene	<0.10-8.3	LQM/CIEH S4UL 350	None
aliphatic >C5-C7	<1.0	LQM/CIEH S4UL 42	None
aliphatic >C7-C8	<1.0	LQM/CIEH S4UL 100	None
aliphatic >C8-C10	<1.0	LQM/CIEH S4UL 27	None
aliphatic >C10-C12	<1.0	LQM/CIEH S4UL 130	None
aliphatic >C12-C16	<1.0	LQM/CIEH S4UL 1100	None
aliphatic >C16-C21	<1.0	LQM/CIEH S4UL 5000	None
aliphatic >C21-C35	<1.0	LQM/CIEH S4UL 5000	None
aromatic >C5-C7	<1.0	LQM/CIEH S4UL 70	None
aromatic >C7-C8	<1.0	LQM/CIEH S4UL 130	None
aromatic >C8-C10	<1.0	LQM/CIEH S4UL 34	None
aromatic >C10-C12	<1.0	LQM/CIEH S4UL 74	None
aromatic >C12-C16	<1.0	LQM/CIEH S4UL 140	None



Determinant	Range of Concentrations (mg/kg, unless specified)	Screening Criteria (mg/g, unless specified)	Exceedances
aromatic >C16-C21	<1.0	LQM/CIEH S4UL 260	None
aromatic >C21-C35	<1.0	LQM/CIEH S4UL 1100	None
Benzene	<1.0	LQM/CIEH S4UL 0.087	None
Toluene	<1.0	LQM/CIEH S4UL 130	None
Ethylbenzene	<1.0	LQM/CIEH S4UL 47	None
Xylenes	<1.0	LQM/CIEH S4UL 59	None

A single benzo(a)pyrene exceedance was recorded with a concentration of 7.8 mg/kg (sample: T3-S2), slightly above the assessment criteria (C4SL's) of 5 mg/kg.

Three benzo(b)fluoranthene exceedances were recorded with a concentration of 6.6 mg/kg (sample: T3-S1), 11 mg/kg (sample T3-S2) and 6.4 mg/kg (sample T3-S3), all above the assessment criteria of 3.7 mg/kg.

Two dibenzo(ah)anthracene exceedances were recorded with a concentration of 1.3 mg/kg (sample: T3-S2) and 0.84 mg/kg (sample: T3-S3), above the assessment criteria 0.3 mg/kg.

To assess the potential source of the PAHs a ratio-cross plot has been undertaken, a copy of the plot is presented in Appendix B. All three results indicate a possible coal/coal-tar signature coal-tar signature.

Stockpile TS6

Three samples (TS6-S1, TS6-S2 and TS6-S3) were collected from the stockpile. The results are summarised in the table below:

Table 4. Summary of Stockpile T6 (600m³ – Samples T6-S1, T6-S2, T6-S3) Results

Determinant	Range of Concentrations (mg/kg, unless specified)	Screening Criteria (mg/g, unless specified)	Exceedances
Asbestos (%)	NAD	NAD	None
Arsenic	1.9-9.4	LQM/CIEH S4UL 37	None
Cadmium	<0.10-0.33	LQM/CIEH S4UL 11	None
Chromium	5.6-26	LQM/CIEH S4UL 910	None
Copper	6.1-29	LQM/CIEH S4UL 2400	None
Lead	14-100	LQM/CIEH S4UL 450	None
Mercury	<0.05-0.14	LQM/CIEH S4UL 40	None
Nickel	4.2-27	LQM/CIEH S4UL 130	None
Zinc	17-82	LQM/CIEH S4UL 3700	None
Naphthalene	2.8-6.6	LQM/CIEH S4UL 13	None
Acenaphthylene	0.35-0.84	LQM/CIEH S4UL 920	None
Acenaphthene	3.7-8.4	LQM/CIEH S4UL 1100	None
Fluorene	2.2-5.4	LQM/CIEH S4UL 440	None
Phenanthrene	17-34	LQM/CIEH S4UL 440	None
Fluoranthene	20-35	LQM/CIEH S4UL 890	None



Determinant	Range of Concentrations (mg/kg, unless specified)	Screening Criteria (mg/g, unless specified)	Exceedances
Anthracene	3.6-8.7	LQM/CIEH S4UL 11,000	None
Pyrene	20-34	LQM/CIEH S4UL 2000	None
Benzo(a)anthracene	10-16	LQM/CIEH S4UL 13	(1): T6-S2
Chrysene	12-20	LQM/CIEH S4UL 27	None
Benzo(b)fluoranthene	9.8-17	LQM/CIEH S4UL 3.7	(3): T6-S1, T6-S2, T6-S3
Benzo(k)fluoranthene	4.8-7.6	LQM/CIEH S4UL 100	None
Benzo(a)pyrene	8.2-15	C4SL 5	(3): T6-S1, T6-S2, T6-S3
Indeno(123cd) pyrene	7.9-12	S4UL 41	None
Dibenzo(ah)anthracene	2.0-3.2	LQM/CIEH S4UL 0.3	(3): T6-S1, T6-S2, T6-S3
Benzo(ghi)perylene	4.4-7.7	LQM/CIEH S4UL 350	None
aliphatic >C5-C7	<1.0	LQM/CIEH S4UL 42	None
aliphatic >C7-C8	<1.0	LQM/CIEH S4UL 100	None
aliphatic >C8-C10	<1.0	LQM/CIEH S4UL 27	None
aliphatic >C10-C12	<1.0	LQM/CIEH S4UL 130	None
aliphatic >C12-C16	<1.0	LQM/CIEH S4UL 1100	None
aliphatic >C16-C21	<1.0	LQM/CIEH S4UL 5000	None
aliphatic >C21-C35	<1.0-97	LQM/CIEH S4UL 5000	None
aromatic >C5-C7	<1.0	LQM/CIEH S4UL 70	None
aromatic >C7-C8	<1.0	LQM/CIEH S4UL 130	None
aromatic >C8-C10	<1.0	LQM/CIEH S4UL 34	None
aromatic >C10-C12	<1.0	LQM/CIEH S4UL 74	None
aromatic >C12-C16	<1.0	LQM/CIEH S4UL 140	None
aromatic >C16-C21	4.3-13	LQM/CIEH S4UL 260	None
aromatic >C21-C35	58-120	LQM/CIEH S4UL 1100	None
Benzene	<1.0	LQM/CIEH S4UL 0.087	None
Toluene	<1.0	LQM/CIEH S4UL 130	None
Ethylbenzene	<1.0	LQM/CIEH S4UL 47	None
Xylenes	<1.0	LQM/CIEH S4UL 59	None

A single benzo(a)anthracene exceedance was recorded with a concentration of 16 mg/kg (sample: T6-S2), slightly above the assessment criteria 13 mg/kg.

Three benzo(b)fluoranthene exceedances were recorded with a concentration of 9.8 mg/kg (sample: T6-S1), 17 mg/kg (sample T6-S2) and 11 mg/kg (sample T6-S3), all above the assessment criteria of 3.7 mg/kg.

Three dibenzo(ah)anthracene exceedances were recorded with a concentration of 2.0 mg/kg (sample: T6-S1) and 3.1mg/kg (sample: T6-S2), and 3.2 mg/kg (sample: T6-S3) above the assessment criteria 0.3 mg/kg.

A single benzo(a)pyrene exceedance was recorded with concentrations of 8.2 mg/kg (sample T6-S1), 15 kg/mg (sample T6-S2), and 9.6 kg/mg (sample: T6-S3) above the assessment criteria of 5 (C4SL).

To assess the potential source of the PAHs a ratio-cross plot has been undertaken, a copy of the plot is presented in Appendix B. Two results indicate a possible coal/coal-tar signature coal-tar signature whilst present a coal signature.



Conclusions

SGP has carried out sampling of four stockpiles of site-generated topsoil which have produced generally similar concentrations. Elevated PAHs have been reported within each stockpile and have been limited to benzo(a)pyrene, dibenzo(ah)anthracene, benzo(b)fluoranthene and dibenzo(ah)anthracene when compared to residential land use with plant uptake criteria based on 6% SOM.

SGP has previously produced a Phase 1 and 2 Geo-Environmental Ground Investigation (ref. R2688-R01-v4) which confirmed through a detailed historical review that the site has remained undeveloped throughout its history. The report included a Coal Authority and Coal Mining Risk Assessment Report which confirmed there was the potential for shallow mineworkings to be present. A mining investigation was completed and identified the presence of three shafts (Shaft A, B and C) as well as the presence of grey shale with coal within 8 of the 14 mining entries extending from the surface.

As part of the SGP works trial-pitting was carried out across the site. No made ground deposits were encountered within the shallow geology typically consisting of gravelly sandy clayey topsoil overlying a gravelly clay with partings of sand and fine to medium coal. Samples of the shallow soil were also collected during this initial investigation and also reported exceedances of the same PAHs.

PAH ratio analysis has been undertaken to assess the probable source of the elevated PAHs; most ratios suggested a coal to coal tar signature with the exception of Stockpile TS1 where a coal tar signature was produced although it is acknowledged this was a marginal indicator which was close to the boundary of a coal signature.

Based on the review of information within R2688-R01-v1 there is no identifiable sources of coal tar present on the site. No made ground was present and no industrial works (other than coal mining) have taken place on the site. The presence of coal tars is therefore unlikely to have been present. It is considered that it is most likely attributed to inclusions of coal as is more clearly shown within the other corresponding ratio plots. This is more consistent with the history of the site and the recorded ground conditions where fine inclusions of coal have been recorded.

The overall risk to human health from PAHs within fragments of coal is with the bioavailability of the PAHs limited due to the sequestration of PAHs within a carbon or vitrified matrix. It is therefore considered that the topsoil within stockpiles TS1, TS2, TS3 and TS6 would be suitable for reuse as garden soils, however this will require approval by the Local Authority Contaminated Land Officer where the soil is proposed to be exported to.

Recommendations

No further testing is recommended; however, this assessment should be provided to the Local Authority Contaminated Land Officer at the proposed receiving site (Bury Council) to confirm whether they accept the assessment and conclusions made within this report. If approved, the Material Management Plan (MMP) for the receiving site should be updated to include Rossendale Road, Burnley as a donor site.

Yours sincerely
for: Smith Grant LLP

Caitlin McHugh BSc GradIEMA
Graduate Consultant



Attached

Laboratory Certificate: 23-20765
PAH ratio cross plot analysis



APPENDIX A

Laboratory Certificate



2183

Final Report

Report No.: 23-20765-1**Initial Date of Issue:** 23-Jun-2023**Re-Issue Details:****Client** Smith Grant LLP**Client Address:** Bryn Estyn Business Centre
Bryn Estyn Road
Wrexham
LL13 9TY**Contact(s):** Caitlin McHugh
Megan Jones**Project** R2688 Brun Lea, Rossendale, Burnley**Quotation No.:** **Date Received:** 19-Jun-2023**Order No.:** **Date Instructed:** 19-Jun-2023**No. of Samples:** 12**Turnaround (Wkdays):** 5 **Results Due:** 23-Jun-2023**Date Approved:** 23-Jun-2023**Approved By:****Details:** Stuart Henderson, Technical
Manager

Results - Soil

Project: R2688 Brun Lea, Rossendale, Burnley

Client: Smith Grant LLP	Chemtest Job No.:				23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765
Quotation No.:	Chemtest Sample ID.:				1660264	1660265	1660266	1660267	1660268	1660269	1660270	1660271	1660272
Order No.:	Client Sample Ref.:				T1	T1	T1	T2	T2	T2	T3	T3	T3
	Client Sample ID.:				S1	S2	S3	S1	S2	S3	S1	S2	S3
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Date Sampled:				15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD									
ACM Type	U	2192		N/A	-	-	-	-	-	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	2.8	7.2	4.5	2.4	3.0	1.3	5.6	6.0	11
pH	U	2010		4.0	7.4	7.3	7.4	7.2	7.6	6.5	6.3	6.1	6.1
Arsenic	U	2455	mg/kg	0.5	10	16	15	20	12	1.8	9.7	9.3	8.1
Cadmium	U	2455	mg/kg	0.10	0.17	0.26	0.23	1.2	0.45	< 0.10	0.38	0.38	0.29
Chromium	U	2455	mg/kg	0.5	17	26	27	54	36	5.0	30	28	23
Copper	U	2455	mg/kg	0.50	31	47	43	76	39	8.1	36	34	26
Mercury	U	2455	mg/kg	0.05	0.17	0.31	0.25	0.37	0.19	< 0.05	0.17	0.13	0.13
Nickel	U	2455	mg/kg	0.50	13	21	21	28	22	2.8	18	18	13
Lead	U	2455	mg/kg	0.50	64	110	92	190	84	16	76	72	63
Selenium	U	2455	mg/kg	0.25	0.66	0.99	0.93	2.0	1.2	< 0.25	0.86	0.83	0.62
Zinc	U	2455	mg/kg	0.50	58	86	79	210	110	17	93	91	73
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	5.8	16	9.6	8.7	6.7	1.8	4.7	9.9	6.8
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	N	2680	mg/kg	1.0	< 1.0	5.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	N	2680	mg/kg	1.0	< 1.0	3.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	N	2680	mg/kg	1.0	5.7	34	< 1.0	30	130	25	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	N	2680	mg/kg	1.0	4.7	180	< 1.0	94	250	84	< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	10	220	< 5.0	120	380	110	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	10	220	< 10	120	380	110	< 10	< 10	< 10
Naphthalene	U	2700	mg/kg	0.10	< 0.10	2.2	1.1	2.4	2.9	2.7	2.7	1.7	1.7
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	2.2	1.1	2.0	0.71	0.47	0.27	1.2	0.76
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	2.6	0.95	3.8	0.92	2.5	1.7	2.3	1.1
Fluorene	U	2700	mg/kg	0.10	< 0.10	2.5	0.80	3.4	0.68	1.9	1.3	1.9	1.1

Results - Soil

Project: R2688 Brun Lea, Rossendale, Burnley

Client: Smith Grant LLP	Chemtest Job No.:				23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765
Quotation No.:	Chemtest Sample ID.:				1660264	1660265	1660266	1660267	1660268	1660269	1660270	1660271	1660272
Order No.:	Client Sample Ref.:				T1	T1	T1	T2	T2	T2	T3	T3	T3
	Client Sample ID.:				S1	S2	S3	S1	S2	S3	S1	S2	S3
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Date Sampled:				15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD									
Phenanthrene	U	2700	mg/kg	0.10	9.8	9.7	5.7	21	5.9	15	10	14	7.4
Anthracene	U	2700	mg/kg	0.10	3.9	2.8	1.5	7.0	1.5	3.8	2.3	3.3	1.9
Fluoranthene	U	2700	mg/kg	0.10	6.8	8.9	6.8	26	8.2	19	12	18	10
Pyrene	U	2700	mg/kg	0.10	7.2	9.1	7.3	26	8.2	19	12	18	10
Benzo[a]anthracene	U	2700	mg/kg	0.10	< 0.10	12	6.5	14	3.8	8.9	7.1	11	7.4
Chrysene	U	2700	mg/kg	0.10	< 0.10	9.3	4.4	13	5.7	13	9.4	9.3	6.1
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10	13	5.6	13	4.5	9.9	6.6	11	6.4
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10	5.9	1.8	4.8	2.3	4.6	3.9	4.0	2.2
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10	4.2	3.8	10	4.1	7.8	4.9	7.8	4.5
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	6.8	2.7	5.6	< 0.10	5.7	4.0
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	1.9	1.3	1.7	< 0.10	1.3	0.84
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	6.1	2.3	4.4	< 0.10	5.1	8.3
Total Of 16 PAH's	U	2700	mg/kg	2.0	28	84	47	160	56	120	74	120	74
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Results - Soil

Project: R2688 Brun Lea, Rossendale, Burnley

Client: Smith Grant LLP	Chemtest Job No.:				23-20765	23-20765	23-20765
Quotation No.:	Chemtest Sample ID.:				1660273	1660274	1660275
Order No.:	Client Sample Ref.:				T6	T6	T6
	Client Sample ID.:				S1	S2	S3
	Sample Type:				SOIL	SOIL	SOIL
	Date Sampled:				15-Jun-2023	15-Jun-2023	15-Jun-2023
	Asbestos Lab:				DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD			
ACM Type	U	2192		N/A	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	8.5	1.8	12
pH	U	2010		4.0	6.3	6.5	7.6
Arsenic	U	2455	mg/kg	0.5	9.4	1.9	8.3
Cadmium	U	2455	mg/kg	0.10	0.33	< 0.10	0.20
Chromium	U	2455	mg/kg	0.5	26	5.6	15
Copper	U	2455	mg/kg	0.50	29	6.1	37
Mercury	U	2455	mg/kg	0.05	0.14	< 0.05	< 0.05
Nickel	U	2455	mg/kg	0.50	13	4.2	27
Lead	U	2455	mg/kg	0.50	79	14	100
Selenium	U	2455	mg/kg	0.25	0.84	< 0.25	0.70
Zinc	U	2455	mg/kg	0.50	82	17	72
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	2.3	4.0	6.5
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	N	2680	mg/kg	1.0	< 1.0	97	18
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	97	18
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	N	2680	mg/kg	1.0	13	4.3	11
Aromatic TPH >C21-C35	N	2680	mg/kg	1.0	58	89	120
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	71	94	130
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	71	190	140
Naphthalene	U	2700	mg/kg	0.10	2.8	4.3	6.6
Acenaphthylene	U	2700	mg/kg	0.10	0.35	0.59	0.84
Acenaphthene	U	2700	mg/kg	0.10	3.7	8.4	3.7
Fluorene	U	2700	mg/kg	0.10	2.2	5.4	3.0

Results - Soil

Project: R2688 Brun Lea, Rossendale, Burnley

Client: Smith Grant LLP	Chemtest Job No.:				23-20765	23-20765	23-20765
Quotation No.:	Chemtest Sample ID.:				1660273	1660274	1660275
Order No.:	Client Sample Ref.:				T6	T6	T6
	Client Sample ID.:				S1	S2	S3
	Sample Type:				SOIL	SOIL	SOIL
	Date Sampled:				15-Jun-2023	15-Jun-2023	15-Jun-2023
	Asbestos Lab:				DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD			
Phenanthrene	U	2700	mg/kg	0.10	17	34	19
Anthracene	U	2700	mg/kg	0.10	3.6	8.7	5.5
Fluoranthene	U	2700	mg/kg	0.10	20	35	22
Pyrene	U	2700	mg/kg	0.10	20	34	22
Benzo[a]anthracene	U	2700	mg/kg	0.10	9.1	16	10
Chrysene	U	2700	mg/kg	0.10	12	20	14
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	9.8	17	11
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	4.8	7.6	5.8
Benzo[a]pyrene	U	2700	mg/kg	0.10	8.2	15	9.6
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	7.9	12	9.8
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	2.0	3.1	3.2
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	4.4	7.7	5.3
Total Of 16 PAH's	U	2700	mg/kg	2.0	130	230	150
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com



APPENDIX B

PAH Ratio Cross Plot Analysis

Job name	Rossendale Road
Job no.	r2688
Date:	28.06.23
Author:	CM
Laboratory:	Chemest
Lab. Reference:	23-20765



PAH concentrations

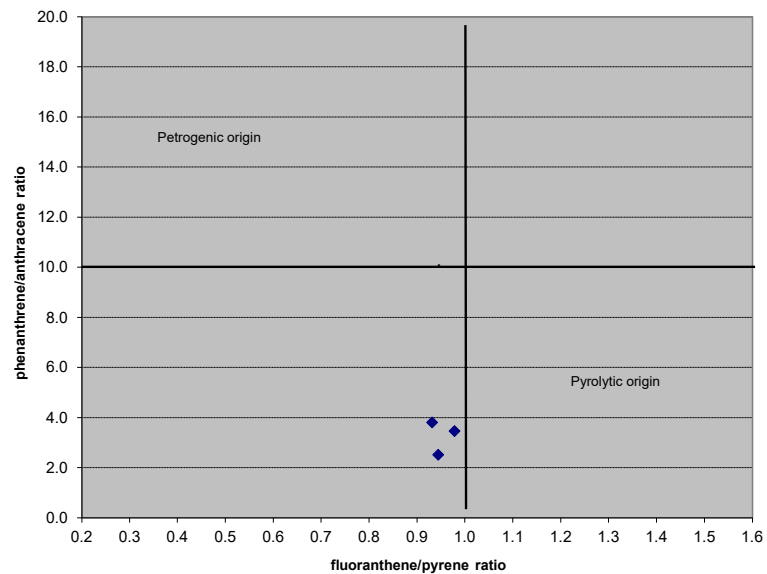
sample identity	T1-S1	T1-S2	T1-S3																
phenanthrene	9.8	9.7	5.7																
anthracene	3.9	2.8	1.5																
fluoranthene	6.8	8.9	6.8																
pyrene	7.2	9.1	7.3																
benz(a)anthracene	0.1	12	6.5																
chrysene	0.1	9.3	4.4																

PAH units	mg/kg
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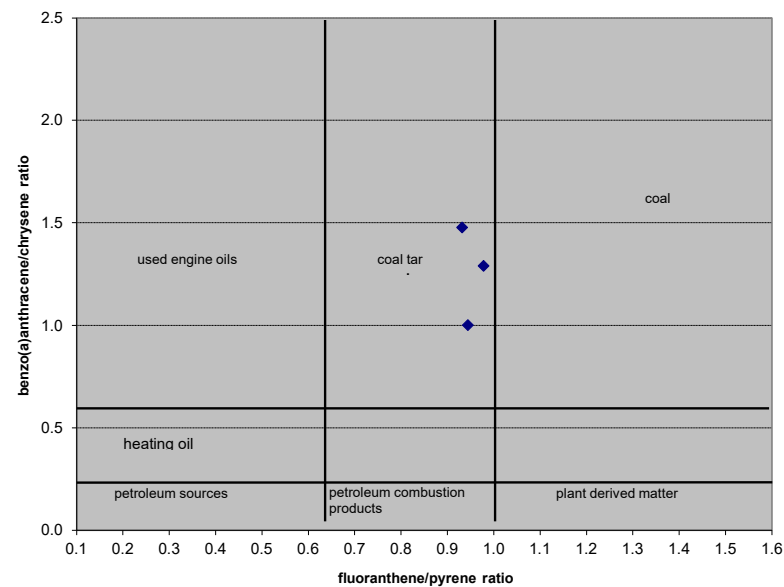
PAH ratios

phe/ant	2.513	3.464	3.800																
flu/pyr	0.944	0.978	0.932																
baa/chr	1.000	1.290	1.477																

PAH source diagnosis



PAH source diagnosis



Job name	Rossendale Road
Job no.	R2688
Date:	28.06.23
Author:	CM
Laboratory:	Chemtest
Lab. Reference:	23-20765



PAH concentrations

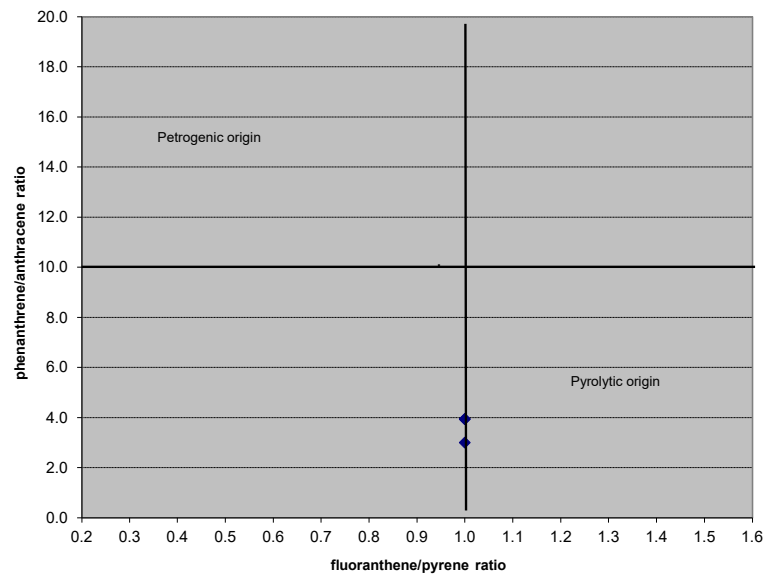
sample identity	T2-S1	T2-S2	T2-S3																
phenanthrene	21	5.9	15																
anthracene	7	1.5	3.8																
fluoranthene	26	8.2	19																
pyrene	26	8.2	19																
benz(a)anthracene	14	3.8	8.9																
chrysene	13	5.7	13																

PAH units	mg/kg
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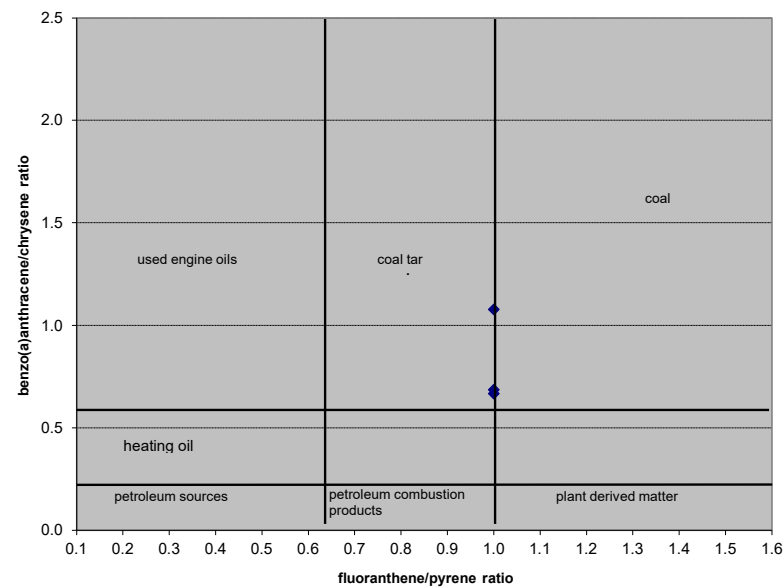
PAH ratios

phe/ant	3.000	3.933	3.947																
flu/pyr	1.000	1.000	1.000																
baa/chr	1.077	0.667	0.685																

PAH source diagnosis



PAH source diagnosis



Job name	Rossendale Road
Job no.	R2688
Date:	28.06.23
Author:	CM
Laboratory:	Chemtest
Lab. Reference:	23-70265



PAH concentrations

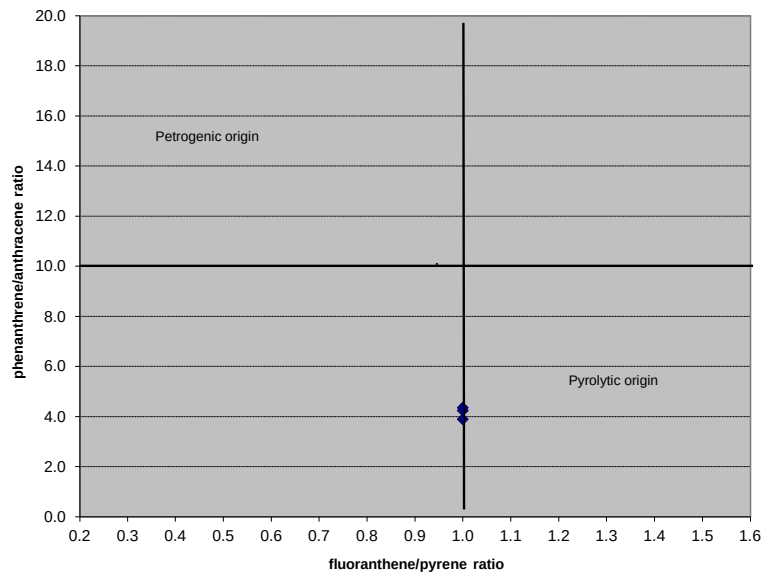
sample identity	T3-S1	T3-S2	T3-S3																
phenanthrene	10	14	7.4																
anthracene	2.3	3.3	1.9																
fluoranthene	12	18	10																
pyrene	12	18	10																
benz(a)anthracene	7.1	11	7.4																
chrysene	9.4	9.3	6.1																

PAH units	mg/kg
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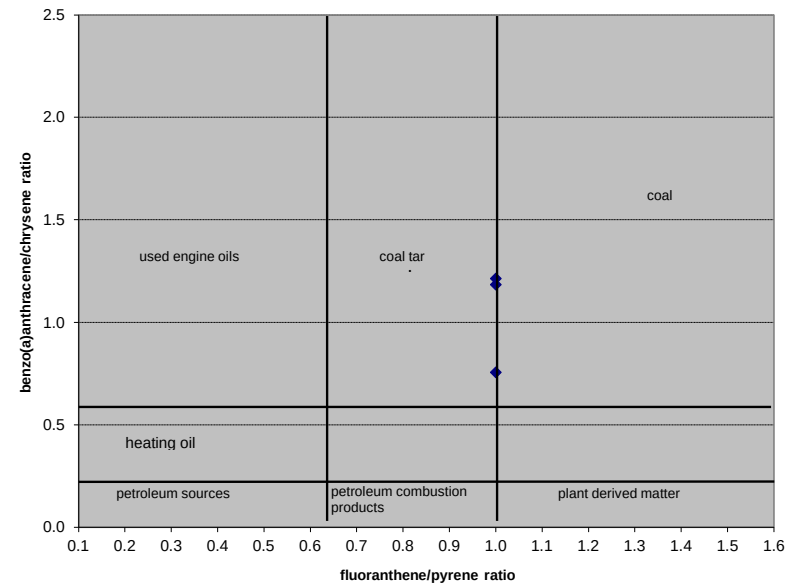
PAH ratios

phe/ant	4.348	4.242	3.895																
flu/pyr	1.000	1.000	1.000																
baa/chr	0.755	1.183	1.213																

PAH source diagnosis



PAH source diagnosis



Job name	Rossendale Road
Job no.	R2688
Date:	28.06.23
Author:	CM
Laboratory:	Chemtest
Lab. Reference:	23-20765



PAH concentrations

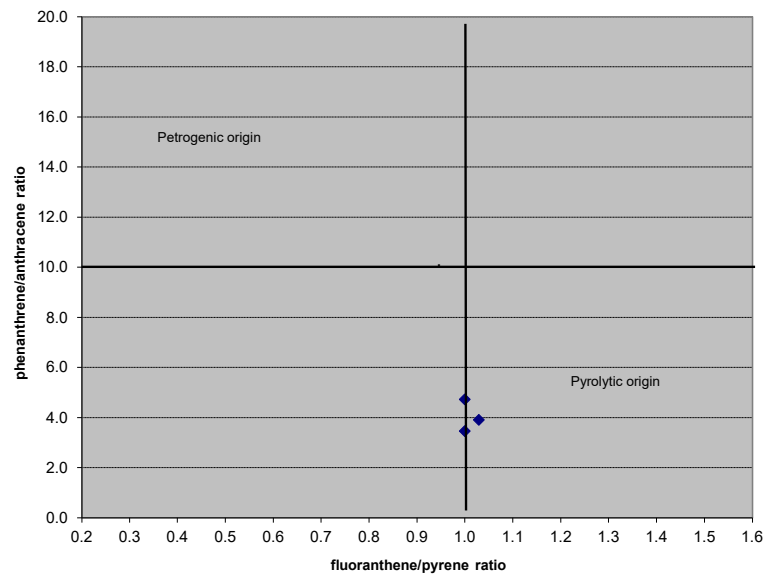
sample identity	T6-S1	T6-S2	T6-S3																
phenanthrene	17	34	19																
anthracene	3.6	8.7	5.5																
fluoranthene	20	35	22																
pyrene	20	34	22																
benz(a)anthracene	9.1	16	10																
chrysene	12	20	14																

PAH units	mg/kg
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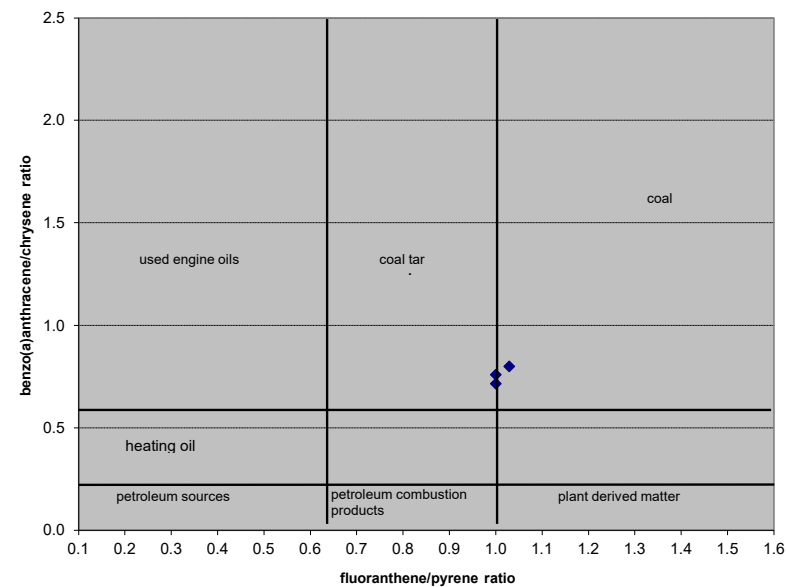
PAH ratios

phe/ant	4.722	3.908	3.455																
flu/pyr	1.000	1.029	1.000																
baa/chr	0.758	0.800	0.714																

PAH source diagnosis



PAH source diagnosis



APPENDIX F

Topsoil Validation Letter and Certificate (Rossendale Road)

Our Ref: R2688-L01

27th June 2023

Barratt Homes Manchester
4 Brindley Road
City Park
Manchester
M16 9HQ

Dear Brad

Rossendale Road, Burnley: Stockpile Validation & Assessment

Barratt Homes Manchester (BHM) are carrying out preparatory earthworks at the Brun Lea, Rossendale Road site, Burnley to prepare for residential development. Preparatory works have included the recovery of circa 1,275m³ of topsoil which has been divided into several stockpiles on site. These are as follows:

- T1 (200m³)
- T2 (350m³)
- T3 (125m³)
- T6 (600m³)

BHM propose to export the above topsoil stockpiles to their Waldmers Wood development in Bury under an MMP for direct transfer to allow reuse as garden soils. To assess the suitability of the soils for this intended use prior to export, BHM have instructed Smith Grant LLP (SGP) to carry out validation testing.

SGP Consultant C McHugh attended site on 15.06.23 and collected 3 samples from each stockpile and submitted samples for chemical analysis in accordance with the Remediation Strategy for the receiving site. The testing undertaken achieves a minimum sampling frequency of 1 per 200m³ per stockpile or 1 per 106m³ for the full volume of soil.

Samples were couriered to Eurofins Chemtest Laboratories, Newmarket within 24 hours of collections. Samples were placed in appropriate containers as provided by the laboratory and stored in a chilled cool box. Chemical analysis was scheduled for a generic suite of urban contaminants (asbestos, metals, hydrocarbons and PAHs), the results of which have been compared against generic soil assessment criteria for use in residential gardens with plant uptake (LQM/CIEH Suitable 4 Use Levels (S4ULs) and Category 4 Screening Levels (C4SL) for lead and benzo(a)pyrene). Due to the high SOM content of the samples (average of 6.9%) soil screening criteria based on 6% have been adopted.

Stockpile Assessment

The results of each stockpile are presented in the sub-sections below and are compared to the adopted screening criteria. Where exceedances are present, additional risk assessment is provided. A copy of the laboratory test certificate (ref. 23-20766-0) is provided in Appendix A.



Stockpile TS1

Three samples (TS1-S1, TS1-S2 and TS1-S3) were collected from the stockpile. The results are summarised in the table below:

Table 1. Summary of Stockpile T1 (200m³ – Samples T1-S1, T1-S2, T1-S3) Results

Determinant	Range of Concentrations (mg/kg, unless specified)	Screening Criteria (mg/g, unless specified)	Exceedances
Asbestos (%)	NAD	NAD	None
Arsenic	10-15	LQM/CIEH S4UL 37	None
Cadmium	0.17-0.26	LQM/CIEH S4UL 11	None
Chromium	17-27	LQM/CIEH S4UL 910	None
Copper	31-47	LQM/CIEH S4UL 2400	None
Lead	64-110	LQM/CIEH S4UL 450	None
Mercury	0.17-0.31	LQM/CIEH S4UL 40	None
Nickel	13-21	LQM/CIEH S4UL 130	None
Zinc	58-86	LQM/CIEH S4UL 3700	None
Naphthalene	<0.10-2.2	LQM/CIEH S4UL 13	None
Acenaphthylene	<0.10-2.2	LQM/CIEH S4UL 920	None
Acenaphthene	<0.10-0.95	LQM/CIEH S4UL 1100	None
Fluorene	<0.10-2.5	LQM/CIEH S4UL 440	None
Phenanthrene	5.7-9.8	LQM/CIEH S4UL 440	None
Fluoranthene	6.8-8.9	LQM/CIEH S4UL 890	None
Anthracene	3.9-1.5	LQM/CIEH S4UL 11,000	None
Pyrene	7.2-9.1	LQM/CIEH S4UL 2000	None
Benzo(a)anthracene	<0.10-12	LQM/CIEH S4UL 13	(1): T1-S1
Chrysene	<0.10-9.3	LQM/CIEH S4UL 27	None
Benzo(b)fluoranthene	<0.10-13	LQM/CIEH S4UL 3.7	(2): T1-S2 & T1-S3
Benzo(k)fluoranthene	<0.10-5.9	LQM/CIEH S4UL 100	None
Benzo(a)pyrene	<0.10-4.2	C4SL 5	None
Indeno(123cd) pyrene	<0.10	S4UL 41	None
Dibenzo(ah)anthracene	<0.10	LQM/CIEH S4UL 0.3	None
Benzo(ghi)perylene	<0.10	LQM/CIEH S4UL 350	None
aliphatic >C5-C7	<1.0	LQM/CIEH S4UL 42	None
aliphatic >C7-C8	<1.0	LQM/CIEH S4UL 100	None
aliphatic >C8-C10	<1.0	LQM/CIEH S4UL 27	None
aliphatic >C10-C12	<1.0	LQM/CIEH S4UL 130	None
aliphatic >C12-C16	<1.0	LQM/CIEH S4UL 1100	None
aliphatic >C16-C21	<1.0	LQM/CIEH S4UL 5000	None
aliphatic >C21-C35	<1.0	LQM/CIEH S4UL 5000	None
aromatic >C5-C7	<1.0	LQM/CIEH S4UL 70	None
aromatic >C7-C8	<1.0	LQM/CIEH S4UL 130	None
aromatic >C8-C10	<1.0	LQM/CIEH S4UL 34	None
aromatic >C10-C12	<1.0	LQM/CIEH S4UL 74	None
aromatic >C12-C16	<1.0-3.0	LQM/CIEH S4UL 140	None
aromatic >C16-C21	<1.0-34	LQM/CIEH S4UL 260	None



Determinant	Range of Concentrations (mg/kg, unless specified)	Screening Criteria (mg/g, unless specified)	Exceedances
aromatic >C21-C35	<1.0-180	LQM/CIEH S4UL 1100	None
Benzene	<1.0	LQM/CIEH S4UL 0.087	None
Toluene	<1.0	LQM/CIEH S4UL 130	None
Ethylbenzene	<1.0	LQM/CIEH S4UL 47	None
Xylenes	<1.0	LQM/CIEH S4UL 59	None

A single minor benzo(a)anthracene exceedance was recorded with a concentration of 12 mg/kg (sample: T1-S2), slightly above the assessment criteria of 13 mg/kg. Two Benzo(b)fluoranthene exceedances were recorded with a concentration of 13 mg/kg (sample: T1-S2) and 5.6 mg/kg (sample: T1-S3) both slightly above the assessment criteria of 3.7 mg/kg.

To assess the potential source of the PAHs a ratio-cross plot has been undertaken, a copy of the plot is presented in Appendix B. All three results indicate a possible coal-tar signature although it is noted that the results are close to the boundary in which a coal signature may be considered.

Stockpile TS2

Three samples (TS2-S1, TS2-S2 and TS2-S3) were collected from the stockpile. The results are summarised in the table below:

Table 2. Summary of Stockpile T2 (350m³ – Samples T2-S1, T2-S2, T2-S3) Results

Determinant	Range of Concentrations (mg/kg, unless specified)	Screening Criteria (mg/g, unless specified)	Exceedances
Asbestos (%)	NAD	NAD	None
Arsenic	1.8-20	LQM/CIEH S4UL 37	None
Cadmium	<0.10-1.2	LQM/CIEH S4UL 11	None
Chromium	5-54	LQM/CIEH S4UL 910	None
Copper	8.1-76	LQM/CIEH S4UL 2400	None
Lead	16-190	LQM/CIEH S4UL 450	None
Mercury	<0.05-0.37	LQM/CIEH S4UL 40	None
Nickel	2.8-28	LQM/CIEH S4UL 130	None
Zinc	17-210	LQM/CIEH S4UL 3700	None
Naphthalene	2.4-2.9	LQM/CIEH S4UL 13	None
Acenaphthylene	0.47-2.0	LQM/CIEH S4UL 920	None
Acenaphthene	0.92-3.8	LQM/CIEH S4UL 1100	None
Fluorene	0.68-3.4	LQM/CIEH S4UL 440	None
Phenanthrene	5.9-21	LQM/CIEH S4UL 440	None
Fluoranthene	8.2-26	LQM/CIEH S4UL 890	None
Anthracene	1.5-7.0	LQM/CIEH S4UL 11,000	None
Pyrene	8.2-26	LQM/CIEH S4UL 2000	None
Benzo(a)anthracene	3.8-14	LQM/CIEH S4UL 13	(1): T2-S1



Determinant	Range of Concentrations (mg/kg, unless specified)	Screening Criteria (mg/g, unless specified)	Exceedances
Chrysene	5.7-13	LQM/CIEH S4UL 27	None
Benzo(b)fluoranthene	4.5-13	LQM/CIEH S4UL 3.7	(3): T2-S1, T2-S2, T2-S3
Benzo(k)fluoranthene	2.3-4.8	LQM/CIEH S4UL 100	None
Benzo(a)pyrene	4.1-10	C4SL's 5	(2): T2-S1 & T2-S3
Indeno(123cd) pyrene	2.7-6.8	S4UL 41	None
Dibenzo(ah)anthracene	1.3-1.9	LQM/CIEH S4UL 0.3	(3): T2-S1, T2-S2, T2-S3
Benzo(ghi)perylene	2.3-6.1	LQM/CIEH S4UL 350	None
aliphatic >C5-C7	<1.0	LQM/CIEH S4UL 42	None
aliphatic >C7-C8	<1.0	LQM/CIEH S4UL 100	None
aliphatic >C8-C10	<1.0	LQM/CIEH S4UL 27	None
aliphatic >C10-C12	<1.0	LQM/CIEH S4UL 130	None
aliphatic >C12-C16	<1.0	LQM/CIEH S4UL 1100	None
aliphatic >C16-C21	<1.0	LQM/CIEH S4UL 5000	None
aliphatic >C21-C35	<1.0	LQM/CIEH S4UL 5000	None
aromatic >C5-C7	<1.0	LQM/CIEH S4UL 70	None
aromatic >C7-C8	<1.0	LQM/CIEH S4UL 130	None
aromatic >C8-C10	<1.0	LQM/CIEH S4UL 34	None
aromatic >C10-C12	<1.0	LQM/CIEH S4UL 74	None
aromatic >C12-C16	<1.0	LQM/CIEH S4UL 140	None
aromatic >C16-C21	25-130	LQM/CIEH S4UL 260	None
aromatic >C21-C35	84-250	LQM/CIEH S4UL 1100	None
Benzene	<1.0	LQM/CIEH S4UL 0.087	None
Toluene	<1.0	LQM/CIEH S4UL 130	None
Ethylbenzene	<1.0	LQM/CIEH S4UL 47	None
Xylenes	<1.0	LQM/CIEH S4UL 59	None

A single benzo(a)anthracene exceedance was recorded with a concentration of 14 mg/kg (sample: T2-S1), slightly above the assessment criteria of 13 mg/kg.

Three benzo(b)fluoranthene exceedances were recorded with a concentration of 13 mg/kg (sample: T2-S1), 4.5 mg/kg (sample T2-S2) and 9.9 mg/kg (sample T2-S3), all above the assessment criteria of 3.7 mg/kg.

Two benzo(a)pyrene exceedances were recorded with a concentration of 10 mg/kg (sample: T2-S1) and 7.8 mg/kg (sample: T2-S3), above the assessment criteria of 5 (C4SL).

Three dibenzo(ah)anthracene exceedances were recorded with a concentration of 1.9 mg/kg (sample T2-S1), 1.3 mg/kg, and 1.7 mg/kg (sample: T2-S3), all above the assessment criteria of 0.3 mg/kg.

To assess the potential source of the PAHs a ratio-cross plot has been undertaken, a copy of the plot is presented in Appendix B. All three results indicate a possible coal/coal-tar signature coal-tar signature.



Stockpile TS3

Three samples (TS3-S1, TS3-S2 and TS3-S3) were collected from the stockpile. The results are summarised in the table below:

Table 3. Summary of Stockpile T3 (125m³ – Samples T3-S1, T3-S2, T3-S3) Results

Determinant	Range of Concentrations (mg/kg, unless specified)	Screening Criteria (mg/g, unless specified)	Exceedances
Asbestos (%)	NAD	NAD	None
Arsenic	8.1-9.7	LQM/CIEH S4UL 37	None
Cadmium	0.29-0.38	LQM/CIEH S4UL 11	None
Chromium	23-30	LQM/CIEH S4UL 910	None
Copper	26-36	LQM/CIEH S4UL 2400	None
Lead	63-76	LQM/CIEH S4UL 450	None
Mercury	0.13-0.17	LQM/CIEH S4UL 40	None
Nickel	13-18	LQM/CIEH S4UL 130	None
Zinc	73-93	LQM/CIEH S4UL 3700	None
Naphthalene	1.7-2.7	LQM/CIEH S4UL 13	None
Acenaphthylene	0.27-1.2	LQM/CIEH S4UL 920	None
Acenaphthene	1.1-2.3	LQM/CIEH S4UL 1100	None
Fluorene	1.1-1.9	LQM/CIEH S4UL 440	None
Phenanthrene	7.4-14	LQM/CIEH S4UL 440	None
Fluoranthene	10-18	LQM/CIEH S4UL 890	None
Anthracene	1.9-3.3	LQM/CIEH S4UL 11,000	None
Pyrene	10-18	LQM/CIEH S4UL 2000	None
Benzo(a)anthracene	7.1-11	LQM/CIEH S4UL 13	None
Chrysene	9.4-6.1	LQM/CIEH S4UL 27	None
Benzo(b)fluoranthene	6.4-11	LQM/CIEH S4UL 3.7	(3): T3-S1, T3-S2, T3-S3
Benzo(k)fluoranthene	2.2-4.0	LQM/CIEH S4UL 100	None
Benzo(a)pyrene	4.5-7.8	C4SL 5	(1): T3-S2
Indeno(123cd) pyrene	<0.10-5.7	S4UL 41	None
Dibenzo(ah)anthracene	<0.10-1.3	LQM/CIEH S4UL 0.3	(2): T3-S2, T3-S3
Benzo(ghi)perylene	<0.10-8.3	LQM/CIEH S4UL 350	None
aliphatic >C5-C7	<1.0	LQM/CIEH S4UL 42	None
aliphatic >C7-C8	<1.0	LQM/CIEH S4UL 100	None
aliphatic >C8-C10	<1.0	LQM/CIEH S4UL 27	None
aliphatic >C10-C12	<1.0	LQM/CIEH S4UL 130	None
aliphatic >C12-C16	<1.0	LQM/CIEH S4UL 1100	None
aliphatic >C16-C21	<1.0	LQM/CIEH S4UL 5000	None
aliphatic >C21-C35	<1.0	LQM/CIEH S4UL 5000	None
aromatic >C5-C7	<1.0	LQM/CIEH S4UL 70	None
aromatic >C7-C8	<1.0	LQM/CIEH S4UL 130	None
aromatic >C8-C10	<1.0	LQM/CIEH S4UL 34	None
aromatic >C10-C12	<1.0	LQM/CIEH S4UL 74	None
aromatic >C12-C16	<1.0	LQM/CIEH S4UL 140	None



Determinant	Range of Concentrations (mg/kg, unless specified)	Screening Criteria (mg/g, unless specified)	Exceedances
aromatic >C16-C21	<1.0	LQM/CIEH S4UL 260	None
aromatic >C21-C35	<1.0	LQM/CIEH S4UL 1100	None
Benzene	<1.0	LQM/CIEH S4UL 0.087	None
Toluene	<1.0	LQM/CIEH S4UL 130	None
Ethylbenzene	<1.0	LQM/CIEH S4UL 47	None
Xylenes	<1.0	LQM/CIEH S4UL 59	None

A single benzo(a)pyrene exceedance was recorded with a concentration of 7.8 mg/kg (sample: T3-S2), slightly above the assessment criteria (C4SL's) of 5 mg/kg.

Three benzo(b)fluoranthene exceedances were recorded with a concentration of 6.6 mg/kg (sample: T3-S1), 11 mg/kg (sample T3-S2) and 6.4 mg/kg (sample T3-S3), all above the assessment criteria of 3.7 mg/kg.

Two dibenzo(ah)anthracene exceedances were recorded with a concentration of 1.3 mg/kg (sample: T3-S2) and 0.84 mg/kg (sample: T3-S3), above the assessment criteria 0.3 mg/kg.

To assess the potential source of the PAHs a ratio-cross plot has been undertaken, a copy of the plot is presented in Appendix B. All three results indicate a possible coal/coal-tar signature coal-tar signature.

Stockpile TS6

Three samples (TS6-S1, TS6-S2 and TS6-S3) were collected from the stockpile. The results are summarised in the table below:

Table 4. Summary of Stockpile T6 (600m³ – Samples T6-S1, T6-S2, T6-S3) Results

Determinant	Range of Concentrations (mg/kg, unless specified)	Screening Criteria (mg/g, unless specified)	Exceedances
Asbestos (%)	NAD	NAD	None
Arsenic	1.9-9.4	LQM/CIEH S4UL 37	None
Cadmium	<0.10-0.33	LQM/CIEH S4UL 11	None
Chromium	5.6-26	LQM/CIEH S4UL 910	None
Copper	6.1-29	LQM/CIEH S4UL 2400	None
Lead	14-100	LQM/CIEH S4UL 450	None
Mercury	<0.05-0.14	LQM/CIEH S4UL 40	None
Nickel	4.2-27	LQM/CIEH S4UL 130	None
Zinc	17-82	LQM/CIEH S4UL 3700	None
Naphthalene	2.8-6.6	LQM/CIEH S4UL 13	None
Acenaphthylene	0.35-0.84	LQM/CIEH S4UL 920	None
Acenaphthene	3.7-8.4	LQM/CIEH S4UL 1100	None
Fluorene	2.2-5.4	LQM/CIEH S4UL 440	None
Phenanthrene	17-34	LQM/CIEH S4UL 440	None
Fluoranthene	20-35	LQM/CIEH S4UL 890	None



Determinant	Range of Concentrations (mg/kg, unless specified)	Screening Criteria (mg/g, unless specified)	Exceedances
Anthracene	3.6-8.7	LQM/CIEH S4UL 11,000	None
Pyrene	20-34	LQM/CIEH S4UL 2000	None
Benzo(a)anthracene	10-16	LQM/CIEH S4UL 13	(1): T6-S2
Chrysene	12-20	LQM/CIEH S4UL 27	None
Benzo(b)fluoranthene	9.8-17	LQM/CIEH S4UL 3.7	(3): T6-S1, T6-S2, T6-S3
Benzo(k)fluoranthene	4.8-7.6	LQM/CIEH S4UL 100	None
Benzo(a)pyrene	8.2-15	C4SL 5	(3): T6-S1, T6-S2, T6-S3
Indeno(123cd) pyrene	7.9-12	S4UL 41	None
Dibenzo(ah)anthracene	2.0-3.2	LQM/CIEH S4UL 0.3	(3): T6-S1, T6-S2, T6-S3
Benzo(ghi)perylene	4.4-7.7	LQM/CIEH S4UL 350	None
aliphatic >C5-C7	<1.0	LQM/CIEH S4UL 42	None
aliphatic >C7-C8	<1.0	LQM/CIEH S4UL 100	None
aliphatic >C8-C10	<1.0	LQM/CIEH S4UL 27	None
aliphatic >C10-C12	<1.0	LQM/CIEH S4UL 130	None
aliphatic >C12-C16	<1.0	LQM/CIEH S4UL 1100	None
aliphatic >C16-C21	<1.0	LQM/CIEH S4UL 5000	None
aliphatic >C21-C35	<1.0-97	LQM/CIEH S4UL 5000	None
aromatic >C5-C7	<1.0	LQM/CIEH S4UL 70	None
aromatic >C7-C8	<1.0	LQM/CIEH S4UL 130	None
aromatic >C8-C10	<1.0	LQM/CIEH S4UL 34	None
aromatic >C10-C12	<1.0	LQM/CIEH S4UL 74	None
aromatic >C12-C16	<1.0	LQM/CIEH S4UL 140	None
aromatic >C16-C21	4.3-13	LQM/CIEH S4UL 260	None
aromatic >C21-C35	58-120	LQM/CIEH S4UL 1100	None
Benzene	<1.0	LQM/CIEH S4UL 0.087	None
Toluene	<1.0	LQM/CIEH S4UL 130	None
Ethylbenzene	<1.0	LQM/CIEH S4UL 47	None
Xylenes	<1.0	LQM/CIEH S4UL 59	None

A single benzo(a)anthracene exceedance was recorded with a concentration of 16 mg/kg (sample: T6-S2), slightly above the assessment criteria 13 mg/kg.

Three benzo(b)fluoranthene exceedances were recorded with a concentration of 9.8 mg/kg (sample: T6-S1), 17 mg/kg (sample T6-S2) and 11 mg/kg (sample T6-S3), all above the assessment criteria of 3.7 mg/kg.

Three dibenzo(ah)anthracene exceedances were recorded with a concentration of 2.0 mg/kg (sample: T6-S1) and 3.1mg/kg (sample: T6-S2), and 3.2 mg/kg (sample: T6-S3) above the assessment criteria 0.3 mg/kg.

A single benzo(a)pyrene exceedance was recorded with concentrations of 8.2 mg/kg (sample T6-S1), 15 kg/mg (sample T6-S2), and 9.6 kg/mg (sample: T6-S3) above the assessment criteria of 5 (C4SL).

To assess the potential source of the PAHs a ratio-cross plot has been undertaken, a copy of the plot is presented in Appendix B. Two results indicate a possible coal/coal-tar signature coal-tar signature whilst present a coal signature.



Conclusions

SGP has carried out sampling of four stockpiles of site-generated topsoil which have produced generally similar concentrations. Elevated PAHs have been reported within each stockpile and have been limited to benzo(a)pyrene, dibenzo(ah)anthracene, benzo(b)fluoranthene and dibenzo(ah)anthracene when compared to residential land use with plant uptake criteria based on 6% SOM.

SGP has previously produced a Phase 1 and 2 Geo-Environmental Ground Investigation (ref. R2688-R01-v4) which confirmed through a detailed historical review that the site has remained undeveloped throughout its history. The report included a Coal Authority and Coal Mining Risk Assessment Report which confirmed there was the potential for shallow mineworkings to be present. A mining investigation was completed and identified the presence of three shafts (Shaft A, B and C) as well as the presence of grey shale with coal within 8 of the 14 mining entries extending from the surface.

As part of the SGP works trial-pitting was carried out across the site. No made ground deposits were encountered within the shallow geology typically consisting of gravelly sandy clayey topsoil overlying a gravelly clay with partings of sand and fine to medium coal. Samples of the shallow soil were also collected during this initial investigation and also reported exceedances of the same PAHs.

PAH ratio analysis has been undertaken to assess the probable source of the elevated PAHs; most ratios suggested a coal to coal tar signature with the exception of Stockpile TS1 where a coal tar signature was produced although it is acknowledged this was a marginal indicator which was close to the boundary of a coal signature.

Based on the review of information within R2688-R01-v1 there is no identifiable sources of coal tar present on the site. No made ground was present and no industrial works (other than coal mining) have taken place on the site. The presence of coal tars is therefore unlikely to have been present. It is considered that it is most likely attributed to inclusions of coal as is more clearly shown within the other corresponding ratio plots. This is more consistent with the history of the site and the recorded ground conditions where fine inclusions of coal have been recorded.

The overall risk to human health from PAHs within fragments of coal is with the bioavailability of the PAHs limited due to the sequestration of PAHs within a carbon or vitrified matrix. It is therefore considered that the topsoil within stockpiles TS1, TS2, TS3 and TS6 would be suitable for reuse as garden soils, however this will require approval by the Local Authority Contaminated Land Officer where the soil is proposed to be exported to.

Recommendations

No further testing is recommended; however, this assessment should be provided to the Local Authority Contaminated Land Officer at the proposed receiving site (Bury Council) to confirm whether they accept the assessment and conclusions made within this report. If approved, the Material Management Plan (MMP) for the receiving site should be updated to include Rossendale Road, Burnley as a donor site.

Yours sincerely
for: Smith Grant LLP

Caitlin McHugh BSc GradIEMA
Graduate Consultant



Attached

Laboratory Certificate: 23-20765
PAH ratio cross plot analysis



APPENDIX A

Laboratory Certificate



2183

Final Report

Report No.: 23-20765-1**Initial Date of Issue:** 23-Jun-2023**Re-Issue Details:****Client** Smith Grant LLP**Client Address:** Bryn Estyn Business Centre
Bryn Estyn Road
Wrexham
LL13 9TY**Contact(s):** Caitlin McHugh
Megan Jones**Project** R2688 Brun Lea, Rossendale, Burnley**Quotation No.:** **Date Received:** 19-Jun-2023**Order No.:** **Date Instructed:** 19-Jun-2023**No. of Samples:** 12**Turnaround (Wkdays):** 5 **Results Due:** 23-Jun-2023**Date Approved:** 23-Jun-2023**Approved By:****Details:** Stuart Henderson, Technical
Manager

Results - Soil

Project: R2688 Brun Lea, Rossendale, Burnley

Client: Smith Grant LLP	Chemtest Job No.:				23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765
Quotation No.:	Chemtest Sample ID.:				1660264	1660265	1660266	1660267	1660268	1660269	1660270	1660271	1660272
Order No.:	Client Sample Ref.:				T1	T1	T1	T2	T2	T2	T3	T3	T3
	Client Sample ID.:				S1	S2	S3	S1	S2	S3	S1	S2	S3
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Date Sampled:				15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD									
ACM Type	U	2192		N/A	-	-	-	-	-	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	2.8	7.2	4.5	2.4	3.0	1.3	5.6	6.0	11
pH	U	2010		4.0	7.4	7.3	7.4	7.2	7.6	6.5	6.3	6.1	6.1
Arsenic	U	2455	mg/kg	0.5	10	16	15	20	12	1.8	9.7	9.3	8.1
Cadmium	U	2455	mg/kg	0.10	0.17	0.26	0.23	1.2	0.45	< 0.10	0.38	0.38	0.29
Chromium	U	2455	mg/kg	0.5	17	26	27	54	36	5.0	30	28	23
Copper	U	2455	mg/kg	0.50	31	47	43	76	39	8.1	36	34	26
Mercury	U	2455	mg/kg	0.05	0.17	0.31	0.25	0.37	0.19	< 0.05	0.17	0.13	0.13
Nickel	U	2455	mg/kg	0.50	13	21	21	28	22	2.8	18	18	13
Lead	U	2455	mg/kg	0.50	64	110	92	190	84	16	76	72	63
Selenium	U	2455	mg/kg	0.25	0.66	0.99	0.93	2.0	1.2	< 0.25	0.86	0.83	0.62
Zinc	U	2455	mg/kg	0.50	58	86	79	210	110	17	93	91	73
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	5.8	16	9.6	8.7	6.7	1.8	4.7	9.9	6.8
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	N	2680	mg/kg	1.0	< 1.0	5.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	N	2680	mg/kg	1.0	< 1.0	3.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	N	2680	mg/kg	1.0	5.7	34	< 1.0	30	130	25	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	N	2680	mg/kg	1.0	4.7	180	< 1.0	94	250	84	< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	10	220	< 5.0	120	380	110	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	10	220	< 10	120	380	110	< 10	< 10	< 10
Naphthalene	U	2700	mg/kg	0.10	< 0.10	2.2	1.1	2.4	2.9	2.7	2.7	1.7	1.7
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	2.2	1.1	2.0	0.71	0.47	0.27	1.2	0.76
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	2.6	0.95	3.8	0.92	2.5	1.7	2.3	1.1
Fluorene	U	2700	mg/kg	0.10	< 0.10	2.5	0.80	3.4	0.68	1.9	1.3	1.9	1.1

Results - Soil

Project: R2688 Brun Lea, Rossendale, Burnley

Client: Smith Grant LLP	Chemtest Job No.:				23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765	23-20765
Quotation No.:	Chemtest Sample ID.:				1660264	1660265	1660266	1660267	1660268	1660269	1660270	1660271	1660272
Order No.:	Client Sample Ref.:				T1	T1	T1	T2	T2	T2	T3	T3	T3
	Client Sample ID.:				S1	S2	S3	S1	S2	S3	S1	S2	S3
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Date Sampled:				15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023	15-Jun-2023
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD									
Phenanthrene	U	2700	mg/kg	0.10	9.8	9.7	5.7	21	5.9	15	10	14	7.4
Anthracene	U	2700	mg/kg	0.10	3.9	2.8	1.5	7.0	1.5	3.8	2.3	3.3	1.9
Fluoranthene	U	2700	mg/kg	0.10	6.8	8.9	6.8	26	8.2	19	12	18	10
Pyrene	U	2700	mg/kg	0.10	7.2	9.1	7.3	26	8.2	19	12	18	10
Benzo[a]anthracene	U	2700	mg/kg	0.10	< 0.10	12	6.5	14	3.8	8.9	7.1	11	7.4
Chrysene	U	2700	mg/kg	0.10	< 0.10	9.3	4.4	13	5.7	13	9.4	9.3	6.1
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10	13	5.6	13	4.5	9.9	6.6	11	6.4
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10	5.9	1.8	4.8	2.3	4.6	3.9	4.0	2.2
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10	4.2	3.8	10	4.1	7.8	4.9	7.8	4.5
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	6.8	2.7	5.6	< 0.10	5.7	4.0
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	1.9	1.3	1.7	< 0.10	1.3	0.84
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	6.1	2.3	4.4	< 0.10	5.1	8.3
Total Of 16 PAH's	U	2700	mg/kg	2.0	28	84	47	160	56	120	74	120	74
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Results - Soil

Project: R2688 Brun Lea, Rossendale, Burnley

Client: Smith Grant LLP	Chemtest Job No.:				23-20765	23-20765	23-20765
Quotation No.:	Chemtest Sample ID.:				1660273	1660274	1660275
Order No.:	Client Sample Ref.:				T6	T6	T6
	Client Sample ID.:				S1	S2	S3
	Sample Type:				SOIL	SOIL	SOIL
	Date Sampled:				15-Jun-2023	15-Jun-2023	15-Jun-2023
	Asbestos Lab:				DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD			
ACM Type	U	2192		N/A	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	8.5	1.8	12
pH	U	2010		4.0	6.3	6.5	7.6
Arsenic	U	2455	mg/kg	0.5	9.4	1.9	8.3
Cadmium	U	2455	mg/kg	0.10	0.33	< 0.10	0.20
Chromium	U	2455	mg/kg	0.5	26	5.6	15
Copper	U	2455	mg/kg	0.50	29	6.1	37
Mercury	U	2455	mg/kg	0.05	0.14	< 0.05	< 0.05
Nickel	U	2455	mg/kg	0.50	13	4.2	27
Lead	U	2455	mg/kg	0.50	79	14	100
Selenium	U	2455	mg/kg	0.25	0.84	< 0.25	0.70
Zinc	U	2455	mg/kg	0.50	82	17	72
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	2.3	4.0	6.5
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	N	2680	mg/kg	1.0	< 1.0	97	18
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	97	18
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	N	2680	mg/kg	1.0	13	4.3	11
Aromatic TPH >C21-C35	N	2680	mg/kg	1.0	58	89	120
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	71	94	130
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	71	190	140
Naphthalene	U	2700	mg/kg	0.10	2.8	4.3	6.6
Acenaphthylene	U	2700	mg/kg	0.10	0.35	0.59	0.84
Acenaphthene	U	2700	mg/kg	0.10	3.7	8.4	3.7
Fluorene	U	2700	mg/kg	0.10	2.2	5.4	3.0

Results - Soil

Project: R2688 Brun Lea, Rossendale, Burnley

Client: Smith Grant LLP	Chemtest Job No.:				23-20765	23-20765	23-20765
Quotation No.:	Chemtest Sample ID.:				1660273	1660274	1660275
Order No.:	Client Sample Ref.:				T6	T6	T6
	Client Sample ID.:				S1	S2	S3
	Sample Type:				SOIL	SOIL	SOIL
	Date Sampled:				15-Jun-2023	15-Jun-2023	15-Jun-2023
	Asbestos Lab:				DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD			
Phenanthrene	U	2700	mg/kg	0.10	17	34	19
Anthracene	U	2700	mg/kg	0.10	3.6	8.7	5.5
Fluoranthene	U	2700	mg/kg	0.10	20	35	22
Pyrene	U	2700	mg/kg	0.10	20	34	22
Benzo[a]anthracene	U	2700	mg/kg	0.10	9.1	16	10
Chrysene	U	2700	mg/kg	0.10	12	20	14
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	9.8	17	11
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	4.8	7.6	5.8
Benzo[a]pyrene	U	2700	mg/kg	0.10	8.2	15	9.6
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	7.9	12	9.8
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	2.0	3.1	3.2
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	4.4	7.7	5.3
Total Of 16 PAH's	U	2700	mg/kg	2.0	130	230	150
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com



APPENDIX B

PAH Ratio Cross Plot Analysis

Job name	Rossendale Road
Job no.	r2688
Date:	28.06.23
Author:	CM
Laboratory:	Chemest
Lab. Reference:	23-20765



PAH concentrations

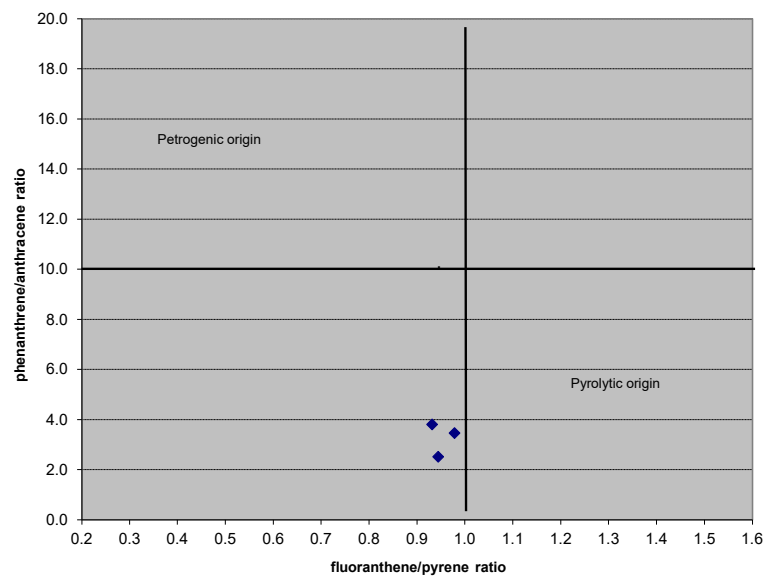
sample identity	T1-S1	T1-S2	T1-S3																
phenanthrene	9.8	9.7	5.7																
anthracene	3.9	2.8	1.5																
fluoranthene	6.8	8.9	6.8																
pyrene	7.2	9.1	7.3																
benz(a)anthracene	0.1	12	6.5																
chrysene	0.1	9.3	4.4																

PAH units	mg/kg
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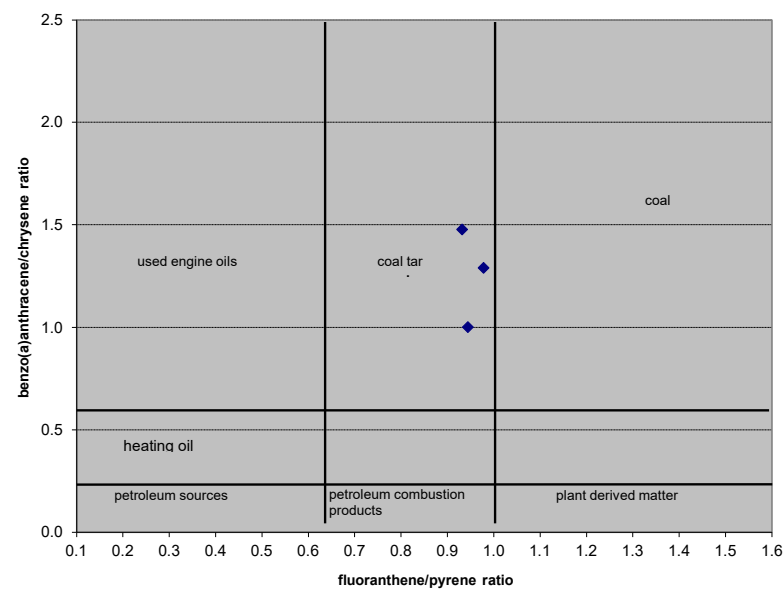
PAH ratios

phe/ant	2.513	3.464	3.800																
flu/pyr	0.944	0.978	0.932																
baa/chr	1.000	1.290	1.477																

PAH source diagnosis



PAH source diagnosis



Job name	Rossendale Road
Job no.	R2688
Date:	28.06.23
Author:	CM
Laboratory:	Chemtest
Lab. Reference:	23-20765



PAH concentrations

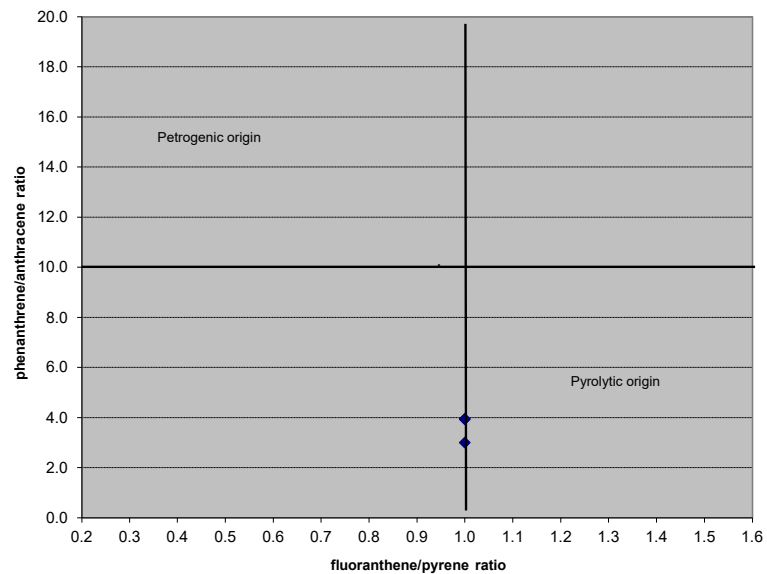
sample identity	T2-S1	T2-S2	T2-S3																
phenanthrene	21	5.9	15																
anthracene	7	1.5	3.8																
fluoranthene	26	8.2	19																
pyrene	26	8.2	19																
benz(a)anthracene	14	3.8	8.9																
chrysene	13	5.7	13																

PAH units	mg/kg
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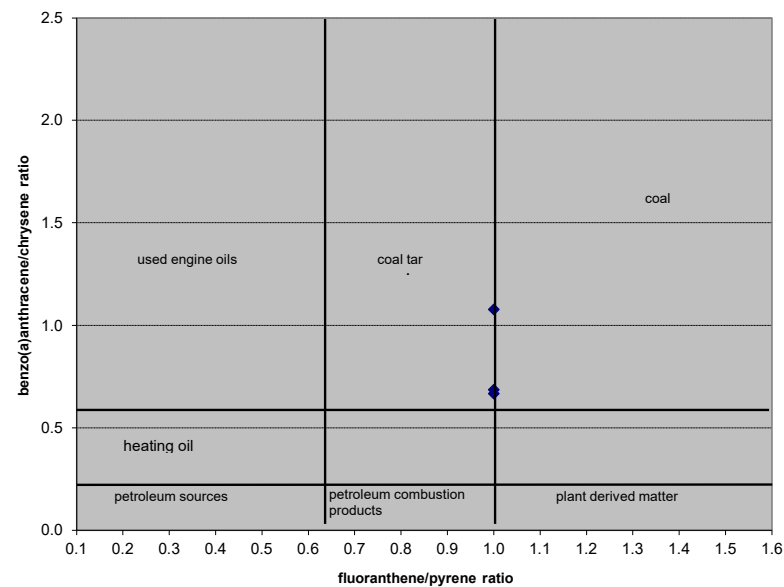
PAH ratios

phe/ant	3.000	3.933	3.947																
flu/pyr	1.000	1.000	1.000																
baa/chr	1.077	0.667	0.685																

PAH source diagnosis



PAH source diagnosis



Job name	Rossendale Road
Job no.	R2688
Date:	28.06.23
Author:	CM
Laboratory:	Chemtest
Lab. Reference:	23-70265



PAH concentrations

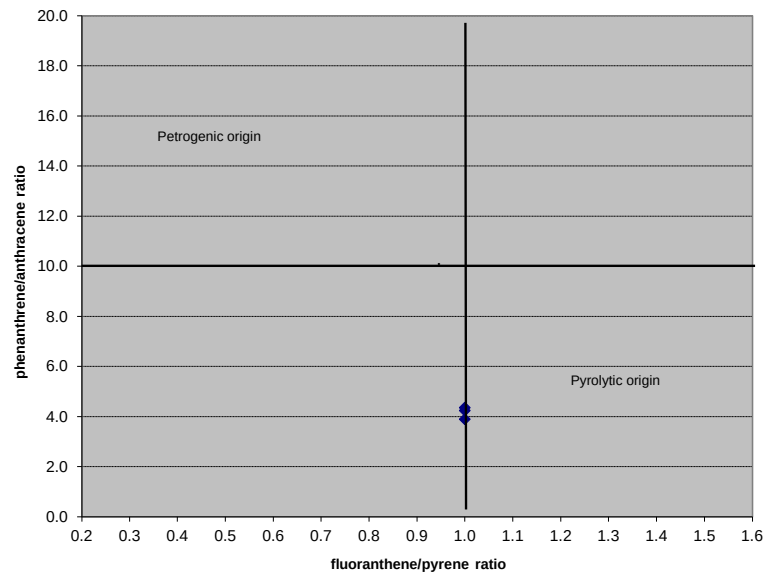
sample identity	T3-S1	T3-S2	T3-S3																
phenanthrene	10	14	7.4																
anthracene	2.3	3.3	1.9																
fluoranthene	12	18	10																
pyrene	12	18	10																
benz(a)anthracene	7.1	11	7.4																
chrysene	9.4	9.3	6.1																

PAH units	mg/kg
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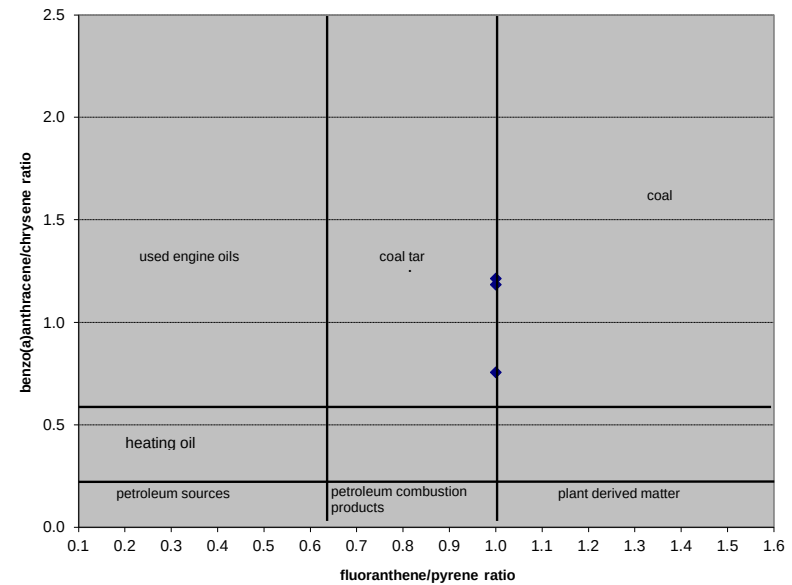
PAH ratios

phe/ant	4.348	4.242	3.895																
flu/pyr	1.000	1.000	1.000																
baa/chr	0.755	1.183	1.213																

PAH source diagnosis



PAH source diagnosis



Job name	Rossendale Road
Job no.	R2688
Date:	28.06.23
Author:	CM
Laboratory:	Chemtest
Lab. Reference:	23-20765



PAH concentrations

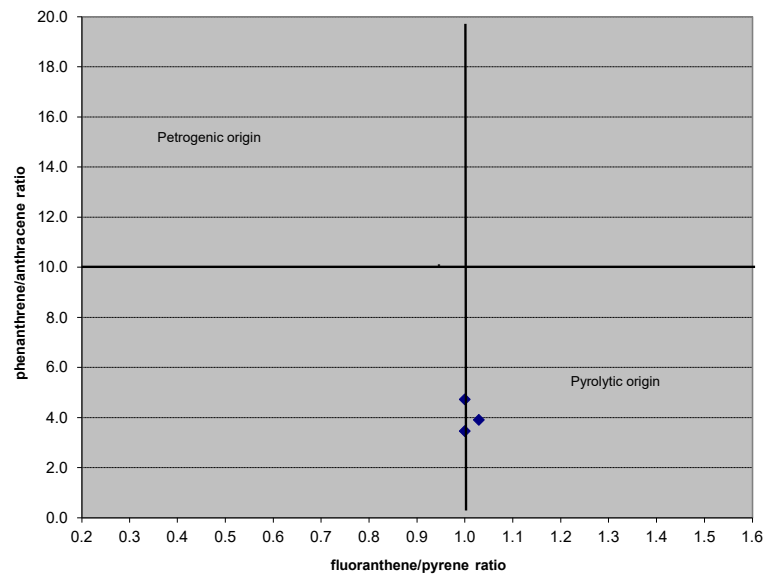
sample identity	T6-S1	T6-S2	T6-S3																
phenanthrene	17	34	19																
anthracene	3.6	8.7	5.5																
fluoranthene	20	35	22																
pyrene	20	34	22																
benz(a)anthracene	9.1	16	10																
chrysene	12	20	14																

PAH units	mg/kg
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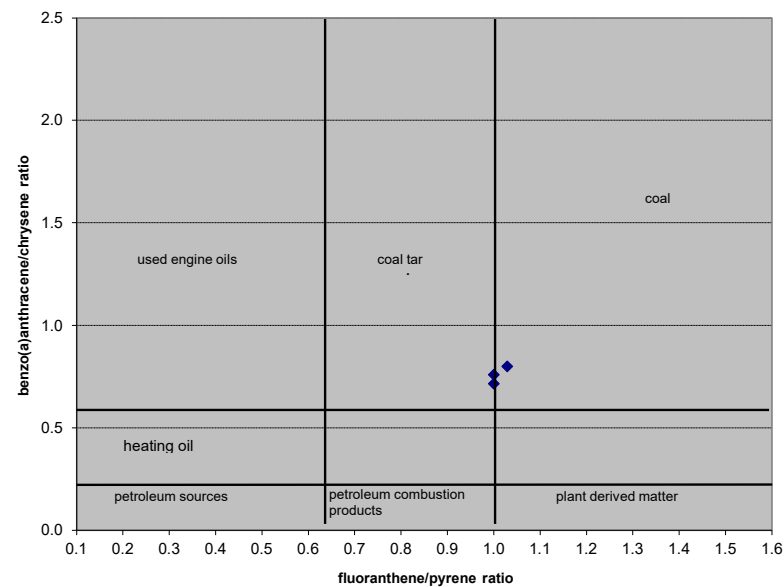
PAH ratios

phe/ant	4.722	3.908	3.455																
flu/pyr	1.000	1.029	1.000																
baa/chr	0.758	0.800	0.714																

PAH source diagnosis



PAH source diagnosis



APPENDIX G

MMP & Declaration

Materials Management Plan (MMP) Form – December 2022

This form should be completed once the lines of evidence have been marshalled in relation to suitability for use, certainty of use and quantity required.

The answers to the questions posed within this form, together with the supporting information will constitute the MMP and must be provided to the Qualified Person.

A Qualified Person may comment on draft versions of this MMP but will not complete the Declaration until all the relevant documents, demonstrating lines of evidence have been provided for each site.

The person / organisation who will pay the Declaration fee should confirm that they have read and understand the Terms and Conditions relating to the payment of the Declaration fee to CL:AIRE. These can be found on the CL:AIRE website.

The person / organisation agreeing to pay the Declaration Fee - Name, organisation and contact details inc. email address -	Rick Browne Engineering Manager Barratt Homes Manchester (A trading name of BDW Trading Ltd) 4 Brindley Road Manchester M16 9HQ Tel 0161 872 0161 rick.browne@barratthomes.co.uk C/O: Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL14 6DL Tel: 01978 822367 Fax: 01978 824718 Mobile: 07960 293834 Email: megan.jones@smithgrant.co.uk
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✓ **I confirm I have read and understood the Terms & Conditions.**

Each question must be answered. If the question is not applicable please state this and provide a brief explanation.

1. Specify the scenario to which this MMP relates, as described in the Definition of Waste: Development Industry Code of Practice (DoW CoP) (1, 2, 3 or 4):

- ✗ 1. Reuse on the Site of Origin
- ✓ 2. Direct Transfer of clean naturally occurring soil / mineral materials
- ✗ 3. Cluster Project
- ✗ 4. Combination of any of the above

In the case of a combination of reuse scenarios, please describe it below (e.g. (i) Reuse on Site of Origin and Direct Transfer of clean naturally occurring unpolluted soils, (ii) Reuse on the Site of Origin with Direct Transfer of clean naturally occurring soil to x number of development sites etc:

(NB: A Declaration is required for reuse on the Site of Origin and for any 2-site arrangement i.e., there is no facility for a combination Declaration)

2. Organisation and name of person preparing this MMP *All information contained in this document and its appendices has been provided and confirmed as accurate by the person / organisation agreeing to pay the Declaration Fee named above. Smith Grant LLP and the individual preparing this MMP accept no responsibility for any inaccuracies on the basis of incorrect factual information provided to it and accept no liability for the actions of any party carried out outside of the provisions of the MMP.	Meg Jones BSc MSc AMIEnvSc Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL14 6DL Tel: 01978 822367 Fax: 01978 824718 Mobile: 07960 293834 Email: megan.jones@amithgrant.co.uk
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Document Control

Date issued	26.08.21
Summary of revision V1.1	03.11.21: Addition of donor site - Cottam Way, Preston
Summary of revision V2.0	15.12.22: Addition of donor site – Rossendale Road, Burnley (changes highlighted in yellow)

Insert additional lines to the table above for any subsequent revisions.

Note - revisions to the MMP do not trigger an additional Declaration by a Qualified Person unless an additional site is added to the project.

Revisions to the MMP must be recorded and summarised in the Document Control box above.

Site Details

3. Site / Project name(s)	Bevis Green Works, Mill Road, Bury BL9 6RE
Reuse / receiving site name:	Bevis Green Works, Mill Road, Bury BL9 6RE
Donor site name (if Direct Transfer)	Donor Site 1: Hattersley Phase 6, Dawlish Close, Hattersley
	Donor Site 2: Leyland Test Track, Leyland
	Donor Site 3: Heathfield Nook, Buxton
	Donor Site 4: Chipping Lane, Longridge, Preston
	Donor Site 5: Cottam Way, Preston
	Donor Site 6: Rossendale Road, Burnley

Landowners

4a. Name of Landowner(s) (full address and contact details) – where excavated materials are to be reused	Barratt Homes Manchester (A trading name of BDW Trading Ltd) 4 Brindley Road Manchester M16 9HQ Tel: 0161 8720161 email: steve.p.garth@barratthomes.co.uk
4b. Name of Landowner(s) (full address and contact details) – where excavated materials are arising from	Barratt Homes Manchester (A trading name of BDW Trading Ltd) 4 Brindley Road Manchester M16 9HQ Tel: 0161 8720161 email: steve.p.garth@barratthomes.co.uk

Summary and objectives

5a. Provide a brief description of the planned project and how excavated materials are to be reused.	Following site preparatory earthworks, an application of topsoil and subsoil is required for gardens and soft landscaped Public Open Space areas. No recoverable topsoil or subsoil is present on the site of origin. Therefore, topsoil and subsoil material will be sourced from import from one or more of 6 external donor sites under <i>Direct Transfer</i> .
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General Plans and Schematics

6. Attach a location plan for the site(s) and a plan of the site(s) which identifies where different materials are to be excavated from, stockpile locations (if applicable), where materials are to be treated (if applicable) and where materials are to be reused.	<u>Plan Document Reference(s):</u> App A1 - Location Plan – 00071215 – Plan showing the location of the site with the surrounding environs. App A2 - Topographical Survey Plan – 00214357 – Topographical survey of the site showing original levels. App A3 - Site layout - 00235234- Planning Layout showing proposed garden and soft landscaped areas where soils to be placed App A4 - Engineering layout – 00214355 - Plan showing proposed drainage areas App A5 - Phasing Plan – 00235571 - Site plan showing order of works to be undertaken App A6 – BH.AB.63 Rossendale Road, Burnley - As Built Survey - Stockpile location drawing at Rossendale Road.
7. Attach a schematic of proposed materials movement. Where there is only one source area and one placement area briefly describe it. For all other projects, a schematic is required.	<u>Plan Document Reference(s):</u> Material will be removed from temporary stockpiles directly into the various gardens and landscaped areas indicated on the development layout (App A3).

Parties Involved and Consultation – if more than one party please provide additional details for them and identify the location that they will be working e.g., where a site is zoned

8a. Main earthworks contractor(s) (full address and contact details) – Where excavated materials are to be reused	Site of Origin & Receiving Site: Urban Regen Limited Langley Road, Pendlebury, Salford, M6 6FG Tel: 01204 595 933	
8b. Main earthworks contractor(s) (full address and contact details) - Where excavated materials are arising from	<u>Donor Site 1 Dawlish Close, Hattersley:</u> Urban Regen Limited Langley Road, Pendlebury, Salford, M6 6FG Tel: 01204 595 933	<u>Donor Site 2 Leyland Test Track:</u> Urban Regen Limited Langley Road, Pendlebury, Salford, M6 6FG Tel: 01204 595 933
	<u>Donor Site 3 Heathfield Nook, Buxton:</u> Bridgebank Civil Engineering Ltd Unit 3 Sherwood Oaks Close Sherwood Oaks Business Park Mansfield Notts NG18 4TB Tel: 01623 277266	<u>Donor Site 4 Chipping Lane, Longridge, Preston</u> MAE groundworks & Construction Ltd 3 Brynhall Close, Radcliffe, Manchester, M26 4NG
	<u>Donor site 5 Cottam Way, Preston:</u> X & P McGuigan Civil Engineering Ltd The Old Pump House, Railway Road, Brinscall, Chorley, PR6 8UA	<u>Donor site 6 Rossendale Road, Burnley:</u> X & P McGuigan Civil Engineering Ltd The Old Pump House, Railway Road, Brinscall, Chorley, PR6 8UA

9. Treatment contractor(s) (full address and contact details) – for treatment on site of origin, or at a Hub site within a fixed STF / Cluster Project	NA: No treatment required
10. Where wastes and materials are to be transported between sites, provide details of the transport contractor(s) (full address, contact details and waste carrier's registration details (if applicable))	Clive Hurt Sandham House Redrose Drive Lancashire Enterprise Business Park Leyland Lancashire PR26 6TJ Waste Carrier Licence Number CBDU77821
11. Provide Local Authority contact details (full address and named contacts) where excavated materials are to be reused	Rebecca Jones Environmental Protection Officer Environmental Health Town Hall Knowsley Street Bury BL9 0SW Tel: 0161 253 6392 Email: rebecca.jones@bury.gov.uk
12a. For the site where materials are to be reused and for Hub Site locations provide	Sylvia Whittingham Planning Advisor

Environment Agency contact details (full address and named contacts):	The Environment Agency Richard Fairclough House Knutsford Road Latchford, Warrington Cheshire WA4 1HT Office Tel: 02030251059 Email: sylvia.whittingham@environment-agency.gov.uk
For all Cluster Projects: 12b. Attach any relevant documentation from the EA relating to the excavation and reuse of the materials to demonstrate no objection to the proposals (see 3.37 of DoW CoP) If the EA has not been consulted please explain why (see paragraph 3.39 of the DoW CoP).	NA: Not a cluster project

Lines of Evidence

There is no one single factor that can be used to decide that a substance or object is waste, or when it is, at what point it ceases to be waste; as complete a picture as possible has to be created.

The following sections require completion to ensure the correct decision is made.

If a requested item is not relevant it is important to clearly state why this is so (e.g. no planning permission required because permitted development status exists).

Suitable for use criteria

13. Please describe or provide copies of the required specification(s) for the materials to be reused on each site.	Document Reference(s) Site of origin: <u>App C1 – Phase 1 Developer-Stage Remediation Strategy - R2174-R07-v3 Final</u> 5.2.1. <i>Verification testing of all soils (subsoil and topsoil) for use within the cover system will be subject to chemical testing to ensure suitability for use. Sampling should be undertaken by an independent consultant. The frequency of testing will be dependent on the provenance of the soil and will be completed as follows:</i> - <i>Site won subsoil (if natural soils recovered from wider development): 1 sample per 50m³;</i> - <i>imported topsoil / subsoil (well-characterised Greenfield source): 1 sample per 250m³;</i> - <i>imported topsoil / subsoil (unknown / well-characterised Brownfield source with evidence that extraction of suitable soils for transfer is feasible): 1 sample per 100m³;</i> - <i>minimum of 3 samples to be collected from each source;</i> Table 5.1 shows the Garden Cover System Compliance Criteria required for topsoil and subsoil testing. Document Reference(s) Donor Sites: <u>Donor Site 1: App C2 – Hattersley Phase 6, Dawlish Close, Hattersley – R2686D2-L20210511 SGP-URL Topsoil Assessment</u> <i>“Exceedances have been reported within the site’s topsoil a single PAH in one out of 15 samples however, based on the results from the additional assessment, the conclusions made in the original site risk assessment appear to be valid. The presence of occasional exceedances of a GAC, provided these are not indicative of contamination hotspots or wider elevated concentrations should not preclude the reuse of the soils.</i>
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	<i>It is concluded based on the completed assessment that the site's topsoil is suitable for reuse within private gardens."</i> <u>Donor Site 2: App C3 – Leyland Test Track Topsoil Validation – R2910B-L01</u> <i>"It is concluded following sampling and further assessment that the stockpiled topsoil is suitable for reuse as garden soils and that the single lead exceedance is a localised incidence (outlier) which is not representative of the larger volume of soil. As a minor exceedance has been reported, Local Authority approval of the assessment and the recommendations made for reuse should be received. Similarly, if the topsoil is proposed for export and re-use on other development sites, the same clarification should be sought from the receiving Local Authority."</i> <u>Donor Site 3: App C4 – Heathfield Nook, Buxton Phase 2 Ground Investigations Site A</u> <i>"5.2.1. The topsoil across this site is considered uncontaminated with respect to human health, and suitable for reuse in gardens."</i> <u>Donor Site 4: App C5 - Chipping Lane, Longridge, Preston –</u> <i>"8.10.2.1. As no source of significant chemical contamination has been identified on site, we are of the opinion that the site represents a very low risk of causing harm to the health of identified current users of the site."</i> <u>Donor site 5: App C6a - Cottam Way, Preston RS -30238-2 Site Investigation AFU Enabling Works Strategy -</u> <i>"8.4.3. The existing topsoil and any 'reworked' topsoil materials have been assessed to be uncontaminated are considered suitable for re-use within garden and landscaped areas within the proposed development and should be progressively carefully stripped and stockpiled at pre-agreed locations within the site."</i>
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	Donor site 6: Rossendale Road, Burnley App C7a - SGP Ph2 SI - R2688-R01-v3 <i>10.1.2. No made ground has been identified and all of the soil samples analysed were from naturally occurring topsoil. Despite this the soils exhibited consistently slightly elevated concentrations of arsenic, and occasionally more moderately elevated concentrations of PAHs when compared to the most stringent criteria for private residential gardens.</i> SGP's investigation, undertaken in 2019, mistakenly reported arsenic exceedances within 3 topsoil samples which was identified by ALM during the supplementary investigation. However, the PAH exceedances were reported correctly. App C7b - ALM Supp SI - Report 30267-1_Site Investigation_AFU_Supplementary Site Investigation_- <i>10.3.2. The PAH contamination noted within the natural topsoil materials that extensively cover the site has been determined to be derived from a natural source. As such, these materials would be deemed suitable for reuse during any redevelopment without the need for any treatment or modification.</i> App A6 shows the volumes of the subsoil and topsoil stockpiles on the donor site. The first shipment of topsoil will be stockpile 9 (approximately 230m³). This was sampled by ALM in November 2022 (App C7c – samples 'TOPSOIL 1' and 'TOPSOIL 2') and reported no exceedances when compared to residential garden criteria. This will be sampled again upon arrival to the site of origin.
Where contamination is suspected or known to be present	Document Reference(s) Site of origin:

14a. Please provide copies of or relevant extracts from the risk assessment(s) that has been used to determine the specification for use on the site. This must relate to the place where materials are to be used. This must be in terms of (i) human health (ii) controlled waters and (iii) any other relevant receptors. If a risk assessment is not relevant for a particular receptor given the site setting please explain why below:	<u>App C1 – Phase 1 Developer-Stage Remediation Strategy - R2174-R07-v3 Final</u> <u>5.1. Depth of Garden and Landscaping Soils</u> <i>5.1.1. The site levels have been regraded to allow for placement of inert cover systems during the construction phase of development.</i> <i>5.1.2. Unless robust evidence can be provided that only clean, naturally occurring soil and rock are present at formation, the cover system to be placed by the developer within all private gardens / landscaping areas in Phase 1 will comprise 600mm clean soil cover within garden areas typically comprising 450mm of subsoil and 150mm of imported topsoil (all garden & landscaped areas)</i> <i>5.1.3. Alternatively, an inspection at formation for every garden could be carried out and records, including photographs, provided to demonstrate the absence of made ground, sampling of formation for a suite of contaminants including the hydrocarbons and indicator compounds formerly present in the Phase 1 area must also be undertaken to demonstrate the absence of contamination of the natural materials.</i> <u>5.2. Import / Site-Won & Formation Sampling Requirements</u> <i>5.2.1. Verification testing of all soils (subsoil and topsoil) for use within the cover system will be subject to chemical testing to ensure suitability for use. Sampling should be undertaken by an independent consultant. The frequency of testing will be dependent on the provenance of the soil and will be completed as follows:</i> <i>o site won subsoil (if natural soils recovered from wider development): 1 sample per 50m³;</i> <i>o imported topsoil / subsoil (well-characterised Greenfield source): 1 sample per 250m³;</i>
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	- o imported topsoil / subsoil (unknown / well-characterised Brownfield source with evidence that extraction of suitable soils for transfer is feasible): 1 sample per 100m³; - o minimum of 3 samples to be collected from each source; - o Where formation testing is being undertaken to support visual inspection of materials and evidence that no cover system is required a frequency of 1 sample per 3 garden areas or 1 sample per 625m² (equivalent to a 25m grid) for larger areas is sufficient. 5.2.2. The quality criteria for garden cover soils are as that detailed in the ORS which has been reproduced in the table below with soils testing undertaken at an MCERTS or UKAS accredited environmental laboratory.
14b. Please attach any relevant documentation from the LA relating to the excavation and reuse of the materials to demonstrate no objection (see 3.37 of the CoP)	Document Reference(s) <u>App F1 - 20210722 CL584.220721.1 Ph 1 Agreement (LA)</u> The following excerpt of correspondence from the LA implies receipt and approval of the Phase 1 Developer-Stage Remediation Strategy for the Former Tetrosyl Works, Bevis Green (Reference: R2174-R07-v4 Final, July 2021). <i>"This Section is satisfied with the Remediation Strategy for the Build Phase of the Phase 1 Area".</i>
14c. Please attach any relevant documentation from the EA relating to the excavation and reuse of the materials to demonstrate no objection (see 3.37 and Table 2 of the CoP)	Document reference(s): <u>App F2 - EA Response to SGP report scope (20201114)</u> <i>"The outline remediation strategy appears to be reasonable in its proposals for how the works will be carried out. A detailed remedial strategy and method statements will be required prior to commencement of the remedial works to ensure that controlled waters are adequately protected by the proposed remedial measures."</i> <u>App F3 EA Response to planning application dated 2 April 2019 (ref - SO201911914501-L01)</u>

	<i>"Thank you for referring the above application to the Environment Agency. We have no objection in principle to the proposed development..."</i> <i>"Prior to each phase of development approved by this planning permission no development shall commence until a remediation strategy to deal with the risks associated with contamination of the site in respect of the development hereby permitted, has been submitted to, and approved in writing by, the local planning Authority." - See section 14b.</i>
14d. Please attach any relevant documentation from any other regulators (if relevant) relating to the excavation and reuse of the materials to demonstrate no objection (see 3.37 of the CoP)	Document Reference(s): NA No other regulatory bodies relevant to scheme
<i>Where contamination is not suspected</i>	Document Reference(s): NA
15a. Please attach copies or relevant extracts from the Desk Top Study that demonstrates that there is no suspicion of contamination.	
15b. Please attach copies of or relevant extracts from the site investigation/testing reports that adequately characterise the clean materials to be used (if appropriate).	Document Reference(s): NA
15c. Please attach copies of any other relevant information (if available) confirming that land contamination is not an issue.	Document Reference(s): NA

NB: It is your responsibility to assess the nature of the material to be used and that it fits within the limitations of the scenario under which it is to be used

Certainty of use

Various lines of evidence are required to demonstrate that the materials are certain to be used. This includes:

- o The production of this MMP
- o An appropriate planning permission (or conditions that link with the reuse of the said materials)
- o An agreed Remediation Strategy(ies)
- o An agreed Design Statement(s)
- o Details of the contractual arrangements

Please identify in the following sections what lines of evidence relate to the site(s) **where the materials are to be used**.

16a. Planning Permission(s) relating to the site where materials are to be reused Please provide a copy of the relevant planning permission	Document Reference(s): <u>App B2 - 2019 Planning permission - 00235578</u> - Condition 4: <i>No development, other than site clearance, demolition, or works relating to site investigation remediation or ground works, shall commence unless and until:</i> • <i>A contaminated land Preliminary Risk Assessment report to assess the actual/potential contamination and/or ground gas/landfill gas risks at the site shall be submitted to, and approved in writing by, the Local Planning Authority;</i> • <i>Where actual/potential contamination and/or ground gas/landfill gas risks have been identified, detailed site investigation and suitable risk assessment shall be submitted to, and approved in writing by the Local Planning Authority;</i> • <i>Where remediation/protection measures is/are required, a detailed Remediation Strategy shall be submitted to, and approved in writing by, the Local Planning Authority.</i> Reason. <i>The scheme does not provide full details of the actual contamination and subsequent remediation, which is required to secure the satisfactory development of the site in terms of human health, controlled waters, ground gas and the wider</i>
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	<i>environment and pursuant to National Planning Policy Framework Section 15 Conserving and enhancing the natural environment.</i> - Condition 5: <i>Following the provisions of Condition 4 of this planning permission, where remediation is required, the approved Remediation Strategy must be carried out to the satisfaction of the Local Planning Authority within agreed timescales; and A Site Verification Report detailing the actions taken and conclusions at each stage of the remediation works, including substantiating evidence, shall be submitted to and approved in writing by the Local Planning Authority prior to the development being brought into use.</i> Reason. <i>To secure the satisfactory development of the site in terms of human health, controlled waters and the wider environment and pursuant to National Planning Policy Framework Section 15 - Conserving and enhancing the natural environment.</i>
16b. Explain how the reuse of the excavated materials fits within the planning permission(s) for each site.	App E1 – Tetrosyl Garden Topsoil App E2 - Cut and fill drawing - 456-ED-06_Remediation_TEN_Cut and Fill_A Approximately 4,824 m³ of topsoil and 4,824 m³ of subsoil is required which will be imported from one or more of the 5 candidate donor sites provided by BH. Approximately 1,500m³ of topsoil will be imported from Donor Site 1 (Hattersley Phase 6) (No topsoil has been imported to site of origin from this donor site yet) Approximately 1,000m³ of topsoil will be imported from Donor Site 2 (Leyland Test Track) (No topsoil has been imported to site of origin from this donor site yet) Approximately 1,000m³ of topsoil will be imported from Donor Site 3 (Buxton) (No topsoil has been imported to site of origin from this donor site yet)

	Approximately 1,000m³ of topsoil will be imported from Donor Site 4 (Chipping Lane) (No topsoil has been imported to site of origin from this donor site yet) Approximately 2,000m³ of topsoil was imported from Donor Site 5 (Cottam Way) (Donor site has now been exhausted). Donor site 5 has been exhausted of its usable soils. Therefore, more soil is required to be imported from Donor site 6 (Rossendale Road, Bury). App A6 shows the volumes of the subsoil and topsoil stockpiles on the donor site. The first shipment of topsoil will be stockpile 9 (approximately 230m³). Following further testing at the donor site, a total of approximately 1,500m³ will be imported for use within the site of origin development.
16c. If planning permission is not required for any one site please explain why below e.g., permitted development, clean-up of a chemical spill, surrender of an Environmental Permit, re-contouring within the existing permission.	NA: Site has Planning Consent

Where contamination is suspected or is known to be present 17. Please provide a copy of any Remediation Strategy(ies) that have been agreed with relevant regulators.	Document Reference(s): App C1 – Phase 1 Developer-Stage Remediation Strategy - R2174-R07-v3 Final
Where contamination is not suspected	Document Reference(s): NA

18. Please provide a copy of any Design Statement(s) that have been agreed (e.g., with the planning authority or in the case of permitted developments the client).	
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Quantity of Use

19. Please provide a breakdown of the excavated materials for each site and how much will be placed at each site or sub area of each site. Where this is not specific to a single readily identifiable source refer to an annotated plan, schematic or attach a tabulated summary.	Document Reference(s): App E1 – Tetrosyl Garden Topsoil 4,824 m³ topsoil required (600mm in all gardens and 450mm in POS) 4,824 m³ subsoil required (supplementary 300mm required for basal element of the 600mm full cover system in contaminated areas) Total Materials required under MMP = 9,648m³
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20a. How has consolidation/compaction been considered in the above mass balance calculations?	Calculations for bulking on excavation are provided in Appendix E. In the garden / POS areas, the soils are being placed to a depth of 600mm and will not be subject to compaction, consolidation is considered likely to approximately equate to levels in the stockpiles so no net change in volume is anticipated: if more or less bulking than anticipated occurs the contingency arrangements in S.21 provide detail on how the resultant surplus/deficit will be managed. The backfill to be placed into the utilities / services trenches will require a degree of compaction, as the total void space has been calculated in, and this controls the volume of material which can be accepted, and this is the volume of recovered materials specified in the MMP, the
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	predicted volume represents the maximum volume of materials that can be accommodated and therefore recovered, even at the most effective compaction that can be achieved. Calculations for arisings (from which the required subsoil will be sourced include swell (on excavation) and shrinkage (on compaction) – See bank and compacted cut of sewer arisings in Appendix E.
20b. How has loss due to treatment being considered in the above mass balance calculations (if applicable)?	No treatment required
20c. How has the addition of treatment materials been considered in the above mass balance calculations (if applicable)?	No treatment required
Note - An exact figure is not required but one that is reasonable in the circumstances and can be justified if challenged.	

Contingency arrangements

Explain what is to happen in the following situations and **identify the appropriate clauses** in the contract(s) (Such clauses must be provided to the Qualified Person, preferably as a summary document): or

21a. What is to happen to, and who is to pay for out of specification materials?	Removed from site as waste to licensed tip. Barratt Homes to be responsible for any additional costs due to out of specification materials. No contractual arrangements are required.
21b. What is to happen to, and who is to pay for any excess materials?	Where naturally occurring soil material is suitable for re-use, it will be made available for use on other developments or sold to other developers for re-use on their developments using a direct transfer MMP for the receiving site. Where this is not possible, the excess will be removed from

	site as waste to licensed tip. Barratt Homes to be responsible for any additional costs due to excess materials. No contractual arrangements are required.
21c. What happens if the project programme slips in relation to excavated materials or materials under -going treatment?	No treatment required, material may remain in stockpile until required for individual plot areas and be used over entire construction programme. No Changes to the MMP/process are required where the programme slips. Where the site involves the re-use of site won soil, existing soils remain in stockpile and will be re-used when appropriate. Where the site involves the importation of soils, Barratt will only import soil as necessary and when required and stockpile in the plots where it is to be used under an amended MMP. Barratt Homes to be responsible for any additional costs due to programme slippage. No contractual arrangements are required.
21d. Other identified risk scenarios for the project (relating to excavated materials)?	Not anticipated: Materials will either be re-used for their intended purpose as garden soils / trench backfill or will be removed from site, either as waste or under a direct transfer MMP associated with a different receiving site.

The Tracking System

Where contamination is suspected or known to be present, state the procedures put in place to:

22a. For all sites, please describe the tracking system to be employed to monitor materials movements.	Materials are to be placed in specific, fenced-off stockpile areas, and moved directly from here to the garden and landscaped areas requiring soil cover system or to the trench requiring backfill. Soils placed as part of the soil cover system will be inspected and verified by an independent consultant while in stockpile and Barratt will maintain a record of which stockpile is placed in which gardens as part of their tracking system. This will include a detailed soil description which will be compared to the descriptions made of the source material and sample analysis at an appropriate frequency. A record of soil delivery orders, hauliers' tickets and acceptance records will be maintained to cover the transfer of the materials between the donor and receiving site. Imported materials will
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	be transferred from the nominated temporary stockpiles directly to the open utility / service trenches for placement and compaction. An as-built record of the routing of all service and utility plans will be maintained. The tracking system adopted for the site cover soils element of the MMP will then be implemented as described above with the surplus removed as waste under the provisions of 21b above.
Where contamination is suspected or known to be present, state the procedures put in place to: 22b. Prevent contaminants not suitable for the treatment process being accepted	No treatment required
Where contamination is suspected or known to be present, state the procedures put in place to: 22c. Prevent cross contamination of materials not in need of treatment, wastes awaiting treatment and treated materials	Soils materials are to be placed in specific, fenced-off stockpile areas, within a separate fenced off area and moved directly from here to the garden areas requiring growing medium. No other site arisings are to be stored in the soil stockpile area & garden areas are to be subject to a final reduced level dig to the depth of the approved growing medium thickness to preclude inclusion of other arisings. Backfill to utility trenches to comprise solely of imported materials in Site A, similarly the open trenched will be backfilled directly from the stockpile of imported material quarantined for this purpose.
Where contamination is suspected or known to be present, state the procedures put in place to: 22d. Demonstrate that materials that do not require treatment and successfully treated materials reach their specific destination	Soils testing will be requested by BM to be undertaken by an independent consultant to the prescribed frequencies and analysis suite as set out in the Enabling earthworks plans: This will generally be in stockpiles as described above. Soils placed as part of a growing medium to garden / landscaped areas will be inspected and verified by an independent consultant. This will include a detailed soil description which will be compared to the descriptions made of the source material, the validation certificate will form a permanent record of the movement and include details of the specific source of material used in each garden or landscaped area.
Where contamination is suspected or known to be present, state the procedures put in place to:	Waste testing will be requested by BM to be undertaken by an independent consultant to the appropriate frequencies and analysis suites in stockpiles in accordance with WM3. This will generally be in stockpiles as described above.

22e. Ensure that waste for off-site disposal or treatment is properly characterised and goes to the correct facility	
23. Please attach a copy of the tracking forms / control sheets that are to be used to monitor materials movements. To include transfer of loads on site into stockpiles prior to treatment (if applicable), stockpiled after treatment (if applicable), stockpiled awaiting use (as appropriate) and final placement.	Control sheets are relevant to stockpiles awaiting use and final placement: Document reference(s) App E3/App E4 are examples of the forms used by BM to request independent testing of materials for re-use on the site or export as waste or direct transfer under a different MMP (App E3), to request soils be removed as waste or direct transfer under a different MMP (App E4) . There are only two materials movements planned – From the topsoil stockpiles to the garden areas and from the temporary import stockpiles to the utility corridor route. Barratt will maintain records of all transfer documentation (Hauliers tickets).
<i>For Hub Sites within Cluster Projects & where materials need treatment before reuse</i> 24. Please attach a copy of the Environmental Permit covering the treatment process. Alternatively, if the treatment is covered by a Mobile Plant Permit and associated Deployment Form, attach a copy of the EA agreement to the Deployment Form.	NA Not cluster project.

Records

25. Where, and in what form, are records to be kept? Note – records e.g., transfer notes, delivery tickets, Desk Top Study, Site Investigation, Risk Assessment(s), Verification Report(s) need to be kept for at least 2 years after the completion of the works and production of the Verification Report	Copies of all the relevant information including the control sheets confirming testing and materials movement requests are to be held by Barratt for a minimum of two years, as will be all waste documentation associated with the site. The consultant carrying out the independent materials testing, and verification reporting will retain copies of all reports, drawings, and analysis results for a minimum of 6 years.
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Verification Plan

26. Provide or explain the Verification Plan which sets out how you will record the placement of materials and prove that excavated materials have been reused in the correct location and in the correct quantities within the development works (see 3.4 of the DoW CoP).	Document Ref(s): App C1 – Phase 1 Developer-Stage Remediation Strategy - R2174-R07-v3 Final App C1 outlines the verification requirements for the site. Smith Grant LLP on behalf of Barratt Manchester will produce the verification report for the use of imported topsoil and subsoil, incorporating: a) Summary of objectives and methods used b) Details of inspections during the works c) Results of supplementary SI, risk assessments, strategy revisions d) Schedule of wastes removed e) Verification test data
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	f) Conclusions re the adequacy of the completed works to manage risks from soil contamination & details of further mitigation required g) Material Tracking Records h) Other environmental records The contact at Smith Grant LLP for queries regarding the verification report is: Meg Jones – Tel: 01978 822367 / 07960 293834; Email: megan.jones@smithgrant.co.uk These results will be compiled into a verification report for the whole site on completion of the works , the timing of this report is dependent on factors such as sales, but it is anticipated the report will be issued December 2024.
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Definition of Waste Code of Practice Declaration Receipt

This Declaration has been submitted to the Environment Agency under the Definition of Waste Code of Practice (DoW CoP).

You are reminded that if materials are not used in accordance with the Materials Management Plan or risk assessment, or if it is discovered that materials were not suitable for use, were used in excessive quantity or in such a manner as to harm human health or pollute the environment, the Environment Agency may conclude that those materials were discarded and were waste.

You are also reminded that a Verification Report must be prepared on completion of the work as set out in the Remediation Strategy / Design Statement covering the site. This Verification Report must be provided to the Environment Agency upon request.

This receipt relates to the following Declaration -

1. References	
Your Reference for this Declaration	Tetrosyl Rev 2
Related declaration references	CL:AIRE Def. of Waste Code of Practice Declaration - 01/09/2021 12:13:38 CL:AIRE Def. of Waste Code of Practice Declaration - 25/11/2021 14:46:01
3. Site of Origin	N/A
4. Direct Transfer	Checked
5. Cluster Project (including use of a fixed Soil Treatment Facility as a Hub site)	N/A
2. Proposed Volumes	
Proposed Volumes in m ³	1500
Additional comments on Proposed Volumes	
4. Direct Transfer	
4a. Route A: Direct use of clean naturally occurring soils with elevated levels of naturally occurring substances on another development site.	N/A
4b. Route B: Direct use of clean naturally occurring soils on another development site.	Checked



4c. Donor Sites	
Donor Site #1	
Site Address	Rossendale Road, Burnley BB11 5HP
Company	Barratt Homes Manchester
Developer company address	4 Brindley Road Manchester M16 9HQ
Name	Steve Garth
Email	steve.p.garth@barratthomes.co.uk
Telephone	0161 8720161
4d. Receiver Sites	
Receiver Site #1	
Site Address	Bevis Green Works, Mill Road, Bury BL9 6RE
Company	Barratt Homes Manchester
Developer company address	4 Brindley Road Manchester M16 9HQ
Name	Steve Garth
Email	steve.p.garth@barratthomes.co.uk
Telephone	0161 8720161
6. Local Authorities / Regulators	
6a. Local Authorities	
Local Authority #1	
Receiver Site Local Authority	Bury Metropolitan Borough Council
Local Authority Address	Town Hall Knowsley Street Bury BL9 0SW
Lead Contact Name	Rebecca Jones
Lead Contact Role	Environmental Protection Officer
Lead Contact Address (if different from above)	
Lead Contact Email	rebecca.jones@bury.gov.uk
Lead Contact Telephone	0161 253 6392
Receiver Site Agency	Warrington



Agency Address	Richard Fairclough House Knutsford Road Latchford, Warrington Cheshire WA4 1HT
Contact Telephone	02030251059
Contact Email	sylvia.whittingham@environmentagency. gov.uk

7. Lines of Evidence	
Reference for the Materials Management Plan	R2174 MMP Tetrosyl Phase 1 V2.0, Smith Grant LLP, Dated 15/12/22
Reference for the Risk Assessment	Receiver Site: APP C1 - Phase 1 Developer Stage Remediation Strategy, R2174-R07-V3 Final, Smith Grant LLP, dated March 2021 Donor Site: App C7a - SGP Ph2 SI - R2688-R01-v3 10.1.2.
Reference for either Remediation Strategy or Design Statement	APP C1 - Phase 1 Developer Stage Remediation Strategy, R2174-R07-V3 Final, Smith Grant LLP, dated March 2021.
Reference for the Verification Plan	The Verification Plan is included within Section 26 of the MMP and i confirm it meets the requirements of the EA and the DoWCoP.
Company	Smith Grant LLP
Address	Bryn Estyn Business Centre, Bryn Estyn Road, Wrexham, LL13 9TY
Name	Megan Jones
Email	megan.jones@smithgrant.co.uk
Telephone	01978 822367
Expected production date for the Verification Report.	2024-12-31 00:00:00



7gi. Location plans	App A1 - Location Plan – 00071215 – Plan showing the location of the site with the surrounding environs. App A2 - Topographical Survey Plan – 00214357 – Topographical survey of the site showing original levels. App A3 - Site layout - 00235234- Planning Layout showing proposed garden and soft landscaped areas where soils to be placed App A4 - Engineering layout – 00214355 - Plan showing proposed drainage areas App A5 - Phasing Plan – 00235571 - Site plan showing order of works to be undertaken
7gii. Schematics	APP E1 - Tetrosyl Garden Topsoil Calculations App E2 - Cut and fill drawing - 456-ED-06_Remediation_TEN_Cut and Fill_A
7giii. Desk Top Study	Summarised within Section 3 of the SGP Remediation Strategy document.
7giv. Mass balance calculations	Included within Section 20 of the MMP document and considered satisfactory
7gv. Contingency arrangements	Included within Section 21 of the MMP document and considered satisfactory
7gvi. Tracking system	App E3 - Direct Transfer Request Form APP E4 - Soil Test Request Form Methodology for tracking is included within Section 22 of the MMP document.
a) The Local Authority	Checked
b) Environment Agency	Checked
c) Natural Resources Wales	N/A
d) Other relevant environmental regulatory bodies	N/A
Reference the correspondence with the Local Authority	App F1 - 20210722 CL584.220721.1 Ph 1 Agreement (LA)



Reference the correspondence with the Environment Agency	App F2 - EA Response to SGP report scope (20201114) App F3 EA Response to planning application dated 2 April 2019 (ref - SO201911914501-L01) Although these emails are from the planning team they comment on contaminated land issues and specifically state acceptance of DoWCoP usage on this site.
I have reviewed the planning consent including planning conditions	Checked
Planning Reference (State either the reference or Not Applicable.)	00235578
a) The Local Authority	Checked
b) Environment Agency	N/A
c) Natural Resources Wales	N/A
d) Other relevant environmental regulatory bodies	N/A
Please list correspondence reviewed above	App B2 - 2019 Planning permission - 00235578
Planning consent not required	N/A
8. QP Declaration	
8a. QP Name	Dan Mason
8b. QP Number	QP249
8c. I satisfy the Qualified Person requirements set out in Appendix 6 of the Definition of Waste: Development Industry Code of Practice to complete this Declaration.	Checked
8d. I have reviewed the Materials Management Plan for the above project.	Checked
8e. I have reviewed the Risk Assessment.	Checked
8f. I have reviewed the Remediation Strategy/Design Statement covering the above site.	Checked
8g. I have requested correspondence / documentation relating to the development and how that relates to the use of materials.	Checked



8h. The risk assessment assesses human health and environmental risks in relation to the proposed uses of all the materials in the MMP. The risk assessment concludes that the objectives of preventing harm to human health and pollution of the environment will be met if materials are used in the proposed manner	Checked
8i. The Local Authority, the Environment Agency / Natural Resources Wales and other relevant environmental regulatory bodies have not objected to the proposed development / land remediation on the basis that the use of any material is likely to cause harm to human health or pollution of the environment. [This confirmation should be given regardless of whether planning consent is required for the activity. Also see paragraph 3.37 of the CoP.].	Checked
8j. The EA/NRW have not objected to the reuse of materials on the grounds that it a.) constitutes a waste management operation or b.) has had a previous application for an environmental permit for waste recovery refused (on the grounds that the project represents waste disposal).	Checked
8k. The project does not involve land-spreading / agricultural re-profiling.	Checked
8l. The project has not yet commenced; this is not a retrospective application of the DoW CoP.	Checked