

**Heyford Park  
Dorchester Living: Phase 9  
(Planning Consent 16/02446/F)**

**POL PIPELINE SUPPLEMENTARY SITE  
INVESTIGATION**

**For: Urban Regen Ltd. & Dorchester Living**

**January 2021**

**R1742b-R21-v1**

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Supplementary Site Investigation Report

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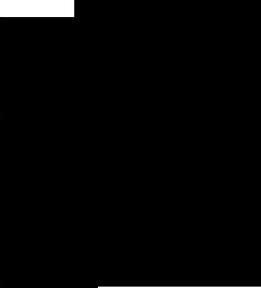
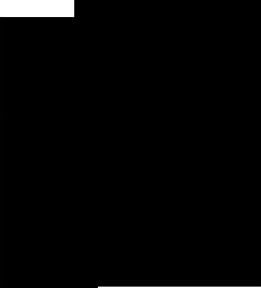
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### Signed For Smith Grant LLP

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## 1. Introduction

- 1.1. Urban Regen (URL) have been appointed by Dorchester Living (DL) to carry out demolition, site remediation and preparatory earthworks to prepare Phase 9 of the former RAF/USAF Upper Heyford Airbase for residential development with private gardens, areas of open space, landscaping, attenuation ponds and associated infrastructure.
- 1.2. The site currently comprises of the southwestern portion of the former Upper Heyford Airbase, latterly developed and used by the United States Airforce. Phase 9 is located to the south of Camp Road which bisects the NSA and served as a school with associated buildings and a baseball pitch. Site details are as follows:

**Table 1: Site details**

<b>Address</b>	Upper Heyford, Camp Road, Oxfordshire
<b>National Grid Reference</b>	450358, 225742
<b>Local Authority</b>	Cherwell District Council
<b>Site Area</b>	11.5 Ha
<b>Current Site Use</b>	Derelict school with associated buildings and baseball pitch in the northeast
<b>Proposed Use</b>	296 residential dwellings with associated works including infrastructure, landscaping and public open space
<b>Planning Consent</b>	16/02446/F

**Figure 1: Site Location**



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- 1.3. A Remediation Strategy which covers Phase 9 and other development phases was produced by Hydrock (ref. HPW-HYD-PX-REM-RP-GE-P1-S1) in April 2017, however it was decided that a revised Strategy should be produced to align remedial and verification works to that of the

approved Smith Grant LLP (SGP) Strategy which covered the neighbouring NSA (R1742-R01-v1; May 2014) for consistency. DL duly instructed SGP to produce the revised Strategy (R1742d-R03-v2) which was produced in December 2020.

- 1.4. Several contamination hotspots including an underground fuel tank associated with a former boiler house were identified by Hydrock and were included within the revised Strategy as requiring dedicated investigation and remediation which are to be completed concurrently with remediation works. However, an additional potential contamination source, a decommissioned fuel pipeline in the east of Phase 9 was identified by SGP but was not included in the Hydrock reporting.
- 1.5. The revised Strategy recommended that further investigation of the fuel pipeline was required as the previous site investigation entries did not target the fuel line with only a limited number of entries within proximity. DL instructed SGP to undertake a supplementary site investigation of the fuel pipeline prior to the commencement of preparatory earthworks to establish whether contamination is present and if so, could it be dealt with under the provisions of the revised Strategy.
- 1.6. This report has been produced to support and partially satisfy the recommendations made within the revised Strategy with regards to the former fuel pipeline which crosses the site only. The report methodology follows the framework described in the EA Land Contamination Risk Management (LCRM) 2020.
- 1.7. The report comprises descriptions of the supplementary intrusive site investigation with the collection and analysis of representative soil, risk assessments, review of remediation requirements and recommendations as to whether the remediation of any contamination can be completed under the existing revised Strategy without further amendment. This report should be read in conjunction with the following reports:
  - Vertase POL System - Clean and Make Safe, Upper Heyford, Oxfordshire: Contract Completion Report; February 2012 (ref. 1246DOR)
  - Watermans Preliminary Risk Assessment; November 2016 (ref. WIB14371-100-R-3-3-2.EB)
  - Hydrock Desk Study & Ground Investigation – Western Development Phase 9, 10, 16 and 16A; February 2017
  - Smith Grant LLP Heyford Park Phase 9 Remediation Strategy; December 2020 (ref. R1742d-R03-v2)

## 2. Background Information

### 2.1. Phase 9 Historical Development and Contaminative Land Use

2.1.1. A review of the historical development of the site is made within the Watermans Preliminary Environmental Risk Assessment (ref. WIB14371-100-R-3-3-2.EB) The site was occupied by agricultural farmland (1884-1885) with a surface watercourse (Gallos Brook) in the east until 1966 when the site formed part of RAF Upper Heyford, with some roadways shown. By 1980-1982 the site has been developed as a school with a pipeline mapped in the southeast corner within the location of the Brook. It is assumed that this refers to the culvert of the watercourse as it does not follow the route of the POL as reported previously by Vertase. Operations at the airbase closed in 1993 following which the buildings have remained in a state of disrepair.

2.1.2. Watermans report that the site was initially used as houses for families living on the airbase but once the airbase was extended, these buildings were converted into the 'Upper Heyford American High School' with playing field and boiler house.

2.1.3. The presence of a POL (Petroleum Oil Lubricant) system is referred to by Watermans but is not discussed by Hydrock. The POL system was a supply pipe present on the Upper Heyford Flying Field and consisted of above and below ground infrastructure of pipework, pumps, valves and storage tanks to transport aviation fuel around the airbase. The POL system was previously connected to the National Fuel Pipeline (NFP) which is understood to be adjacent to the southern boundary.

2.1.4. The POL system has been disconnected from the NFP, emptied, foam filled and cut in several locations by Vertase as part of the decommissioning works but remains beneath the eastern portion of the site. Vertase produced a Method Statement (ref. 1246DOR) for the decommissioning of the POL in 2011 which confirmed the route of the pipeline. During decommissioning works by Vertase in 2012, a secondary POL pipeline route was encountered also in the east of the site. The approximate routes are reproduced in Drawing D01 but both are shown to enter the site in the south before both extending north. In total, approximately 540m of pipeline extends across Phase 9.

2.1.5. Vertase have confirmed the foam filling of the pipeline as well as excavation of trial-pits with pipes cut and filled (TP34A, TP34B, TP35, TP5-1 and TP5-2). Breaking of the pipe was undertaken to allow the removal of contaminated water by vacuum tanker before foam filling. Works were undertaken as per the approved Method Statement.

### 2.2. Intrusive Investigation

2.2.1. Hydrock undertook a site investigation in February 2017 which consisted of 29 trial-pits to a maximum depth of 2.75m bgl and 4 cable percussion boreholes with groundwater/gas installations. Locations consisted of both non-targeted (to provide good spatial coverage across the site) and

targeted within the area of known fuel storage (USTs). A secondary site investigation was undertaken by SGP in 2018 which was limited to the excavation of 12 shallow trial-pits within the northeast area of the site (baseball pitch) to allow the in-situ sampling of topsoil and subsoil.

2.2.2. In total, 45 entries were excavated across the site which is roughly equivalent to an average of 1 entry per 2,565m<sup>2</sup> or an approximate 50m grid spacing across the site. An increased density of entries was achieved within the area of the former baseball pitch in the northeast of the site, although these were limited to shallow (0.5m trial-pits) to support a supplementary soil sampling assessment for soil reuse.

2.2.3. Whilst Hydrock did not intentionally target the POL system which crosses the site in the east, six entries (BH03-BH04, TP104-TP106, TP14 and TP132) were located within proximity of one of the pipelines. Trial-pits extended down to bedrock and boreholes to a depth of 8m bgl, no contamination indicators were reported.

2.2.4. Borehole logs obtained from the British Geological Society and referenced within Hydrock's Groundsure Report identify two clusters of site investigation entries within the area of the POL system on the site. One is associated with an investigation in 1987 and second in 1989 both works completed prior to the decommissioning of the POL system. Whilst a plan is not available to confirm the entry locations and so reliance on the information should be used with some caution, their location would suggest they were in the general eastern area where the pipelines are present. A review of the logs confirms no visual or olfactory contamination indicators reported which further suggests the absence of any significantly impacted soils associated with the pipeline.

2.2.5. Although no contamination indicators were encountered and ground conditions were consistent with those reported across the Phase 9 area, the revised SGP Strategy acknowledged that the entries were not specifically excavated to target the pipeline and that a dedicated investigation with entries above the pipeline should be undertaken to assess whether any contamination indicators are present.

### 3. Supplementary Investigation Methodology

#### 3.1. Objectives and Rationale

3.1.1. A supplementary/dedicated site investigation was recommended within the SGP Remediation Strategy to specifically target the decommissioned POL fuel pipeline to support the information reported by Hydrock and to establish if any contamination is present, and if so determine whether it can be dealt with under the Strategy or whether revision is required.

3.1.2. The proposed scope of works for the supplementary investigation were determined as follows:

- Target entries immediately on or adjacent to the pipeline through excavation of approximately 11 entries to achieve an approximate spacing of 1 entry per 50m length of pipeline;
- Logging of ground conditions and recording any visual / olfactory contamination indicators;
- Screening arisings with a photo-ionisation detector (PID) to detect the presence of volatile organic compounds (VOCs);
- Collection of representative soil samples from around the pipeline (1 per entry) and submission for fractionated hydrocarbon analysis (TPHCWG) to confirm visual / screening observations;
- Collection of representative samples from contaminated strata and submission for TPHCWG to allow further risk assessment

3.1.3. The investigation was undertaken in accordance with appropriate guidance (BS10175 + A2 and CLR11).

#### 3.2. Fieldwork

3.2.1. The POL supplementary site investigation commenced on 14.12.20 and was completed on 15.12.20 under the supervision of SGP Partner D Wayland. Locations of the supplementary site investigation in relation to the fuel pipeline are shown on Drawing D01.

3.2.2. Works involved:

- Identification and location of pipeline using a Cable Avoidance Tool;
- Excavation of 11 trial-pits (TP1-TP11) using a tracked 48t excavator to a maximum depth of 3.5m bgl.
- screening of all arisings with a PID for volatiles, inspection and logging of ground conditions.
- collection of 11 shallow samples and submission of chemical analysis for fractionated hydrocarbons (TPHCWG).



3.2.3. There were no significant constraints to the supplementary site investigation with exception of a stockpile which covered part of the pipeline route and so could therefore not be investigated, however this is not considered to have impacted the assessment.

3.2.4. Representative soil samples collected during the intrusive works were placed immediately into appropriate containers and stored / transported in a chilled cool box before delivery to the laboratory within 48 hours of collection.

### 3.3. Chemical Analysis

3.3.1. Chemical analysis of soils and waters was carried out by Element (formerly Exova-Jones Environmental Laboratories), Queensferry, respectively working where possible to MCERTS and / or ISO 17025 accreditation. Chain of custody documentation was completed and is retained by SGP.

3.3.2. Soil samples were taken from the following horizons and submitted for analysis as follows:

**Table 2: Summary of Soil Chemical Analysis**

strata	description	sample ref	depth (m bgl)	analytical suite	Observations
made ground	Reworked natural light brown to grey CLAY with rounded to angular gravel of limestone	TP1-S1	1.5-1.7	TPHCWG	2x pipes @ 1.5m bgl ( <u>slight HC odour, 6.3 ppm</u> ).
		TP2-S1	1.6-2.0	TPHCWG	1x pipe @ 1.6m bgl (no odour, <0.1ppm).
		TP3-S1	2.2-2.4	TPHCWG	1x pipe @ 2.2m bgl (no odour, <0.1ppm)
		TP5-S1	1.15-1.3	TPHCWG	1x pipe @ 1.1m bgl (no odour, <0.1ppm)
		TP8-S1	2.2-2.5	TPHCWG	1x pipe @ 2.2m bgl (no odour, <0.1ppm)
	Reworked natural coarse limestone GRAVEL in a brown to grey sandy clay soil	TP4-S1	1.3-1.6	TPHCWG	1x pipe @ 1.3m bgl ( <u>moderate fuel odour, 36 ppm</u> )
		TP6-S1	1.4-1.7	TPHCWG	2x pipes @ 1.4m bgl (no odour, <0.1 ppm)
		TP7-S1	1.3-1.7	TPHCWG	2x pipes @ 1.2m bgl (no odour, <0.1 ppm)
		TP9-S1	2.3-2.6	TPHCWG	1x pipe @ 2.3m bgl (no odour,

strata	description	sample ref	depth (m bgl)	analytical suite	Observations
					<0.1 ppm)
Natural	Light brown silty CLAY	TP10-S1	1.5-.8	TPHCWG	1x pipe @ 1.5m bgl (no odour, <0.1 ppm)
		TP4-S2		TPHCWG	(strong HC odour, black, 900 ppm)

3.3.3. Soil samples were collected from horizons at and directly below the fuel pipeline where the impact of any fuel loss is considered most likely.

## 4. Supplementary Investigation Observations

### 4.1. Physical Observation

- 4.1.1. The logs and descriptions for the trial-pits confirm the general sequence of stratigraphy as reported in the Hydrock investigation within this part of the site. Copies of SGP trial-pit logs are provided in Appendix A and are supplemented with photos of the observed strata and arisings.

#### *Topsoil*

- 4.1.2. Topsoil material was present within all entries excluding TP11 and consisted of a dark brown clay with rootlets to depths ranging between 0.25m (TP3) to a maximum depth of 0.45m (TP9).

#### *Made Ground*

- 4.1.3. Differentiation between natural and made ground strata was difficult given the absence of anthropogenic inclusions within approximately half of the entries, however given the identification of the fuel pipeline within all entries (except TP11), it is considered that all ground above the pipeline is reworked natural material.
- 4.1.4. The made ground consisted of two types, a reworked light brown to grey sandy clay and a reworked gravel of angular limestone in a sandy clay soil. One or both types of reworked natural strata were encountered at or above the pipeline depth within all entries.
- 4.1.5. Anthropogenic inclusions were limited to rare cobbles of brick and concrete in TP3 (0.25-2.1m bgl), TP8 (0.4-1.4m bgl), TP9 (0.45-1.3m bgl), TP10 (0.4-1.5m bgl) and TP11 (1.1-2.2m bgl).
- 4.1.6. The depth of made ground is difficult to confirm and is assumed to be limited to the depth of the pipeline within all locations with exception to TP11 where a large boulder of concrete with rebar was present at 2.2m bgl before a light brown sandy clay was recorded. No pipeline was encountered in this location which may suggest that some previous preparatory works have taken place within this area.

#### *Natural*

- 4.1.7. Natural strata of a grey gravelly clay to a coarse limestone gravel (similar to the reworked natural material detailed above) was encountered within entries which extended below the fuel pipeline.
- 4.1.8. Bedrock of limestone (Great Oolite Group) was encountered within two entries only, TP4 at 2.5m bgl and TP7 (1.7m bgl. Trial-pit TP11 was extended to 3.5m bgl but did not encounter bedrock.

#### *Fuel Pipeline*

- 4.1.9. The fuel pipeline was identified within all entries and was located using a Cable Avoidance Tool (CAT) in radio mode.

- 4.1.10. Typically, one pipeline, consisting of a bitumen bound pipe was encountered within the entries, however several entries confirmed the presence of a second cast iron pipe running parallel to the bitumen pipe. It is assumed that both relate to the fuel pipeline although no reference is made by Vertase on multiple pipelines.
- 4.1.11. Entries where two pipelines were observed were limited to TP1 (1.5m bgl), TP5 (1.1m bgl), TP6 (1.4m bgl).
- 4.1.12. Pipes were surrounded by either a bedding sand and/or pea gravel and it was observed within TP5 (1.1m bgl) and TP10 (1.5m bgl) that a plastic marker tape was present above the pipeline. Given the presence of marker tape in only limited locations, this may suggest its more recent placement, possibly during repair work.
- 4.1.13. The pipes, where encountered appeared to be in a good condition with no cracks or breakages. A photographic record showing the pipeline within each entry is provided in Appendix A with the corresponding trial-pit logs.

**Figure 2: Photographs of single and double pipes encountered**



- 4.1.14. No evidence of the fuel pipeline was identified within TP11, which was excavated in line with TP10 where the pipe was located. The Vertase reporting suggests the pipeline extended in a north to south direction within this part of the site down to the southern boundary. It was observed that the made ground was particularly deep (2.5m bgl) in this location with cobbles of concrete and rebar which may suggest previous ground disturbance / preparatory works and could have also included the removal of the pipe.
- 4.1.15. The above evidence of stratigraphy is taken from discrete locations. Given the broadly similar ground conditions between many of the entries, it appears reasonable to infer that similar conditions may extend between these locations across the majority of the site, although caution should always be exercised as the nature of the ground does vary between some entries.

#### 4.2. Contamination Indicators

4.2.1. Contamination was limited to visual and or olfactory hydrocarbon indicators within TP1 and TP4 only. No odours, visual indicators or elevated readings on the PID above detection limits (<0.1ppm) were reported within the remaining entries.

##### *TP1*

4.2.2. A slight hydrocarbon odour was reported within the soils surrounding the pipeline at approximately 1.5m bgl. Soil arisings were screened with a PID with a maximum of 6.3 ppm recorded at 1.5m bgl.

4.2.3. During the excavation of TP1 a relict manhole chamber was encountered and damaged, this resulted in the rapid ingress of perched water from the chamber into the excavation. No sheen or floating product was observed on the water. The vertical extend of the contamination could not be confirmed within this location due to ingress of water from the chamber flooding the excavation.

##### *TP4*

4.2.4. TP4 was excavated approximately 25m to the west of TP1 and encountered the pipeline at 1.3m bgl. Strong fuel odours were observed within the soils immediately below the pipeline with a maximum of 990 ppm recorded on the PID at 1.8m bgl. Black stained gravel was present from 1.8m to 2.3m bgl above the bedrock at 2.5m bgl.

4.2.5. Following the presence of significant contamination indicators, TP4 was extended into a trench in a southerly direction to delineate the extent of impacted soils. The trench was extended by approximately 30m and whilst stained gravels were limited to the initial area of excavation, elevated PID readings and the presence of a grey clayey gravel layer with moderate hydrocarbon odours remained.

4.2.6. Soil samples were collected from the stratum which exhibited the greatest / strongest contamination indicators; TP1 (1.5-1.7m bgl) and TP4 (1.3-1.6m bgl and 1.9m bgl) with samples submitted for TPHCWG analysis. A sample of the black stained gravel from TP4 was also submitted for whole oil fingerprint analysis, however as the sample was limited to stained gravel rather than product the analysis could not be completed.

4.2.7. No contamination indicators were reported within TP5, TP6 and TP2; whilst the greatest indicators were reported within TP4 and appeared to generally reduce at TP1. These observations have allowed the approximate delineation of the fuel impacted hotspot which is presented in Drawing D02. Approximations suggest an impacted area of 1,690m<sup>2</sup> and assuming a nominal thickness of 0.9m of impacted soils would correspond to circa 1,520m<sup>3</sup> of fuel impacted soils.

#### 4.3. Groundwater Conditions

4.3.1. No groundwater was encountered during the supplementary site investigation.

## 5. Supplementary Investigation Results

### 5.1. Results of Soil Chemical Analysis

5.1.1. Copies of laboratory test certificates are presented in Appendix B (lab ref. 20/17917).

5.1.2. Eleven samples were submitted to accredited laboratory Element Laboratories, in Deeside for full TPHCWG banding and BTEX analysis. The results of the testing (lab ref. 20-17917) is provided in Appendix B with the results summarised in the table below and compared to the assessment criteria produced by Watermans (Table B2 – distance to southern/south-eastern boundary <250m) as adopted under the revised Phase 9 Remediation Strategy.

**Table 3 Summary of Soil Results**

Contaminant	Samples	Range of Concentrations (mg/kg unless stated)	Table B2	
			Screening criteria* (mg/kg unless stated)	Exceedances Concentration & location
Aliphatic C5-C6	11	<0.1	-	-
Aliphatic C6-C8	11	0.1-80.8	-	-
Aliphatic C8-C10	11	<0.1-204.4	80	2: TP4-S1 (1.3-1.6m) & TP4-S2 (1.9m)
Aliphatic C10-C12	11	<0.2-456.2	1000	None
Aliphatic C12-C16	11	<4-901	1000	None
Aliphatic C16-C21	11	<7-46	1000	None
Aliphatic C21-C35	11	<7	1000	None
Aromatic C6-C7	11	<0.1	-	-
Aromatic C7-C8	11	<0.1	-	-
Aromatic C8-C10	11	<0.1-9.3	-	-
Aromatic C10-C12	11	<0.2-39.6	7	1: TP4-S2 (1.9m)
Aromatic C12-C16	11	<4-280	120	1: TP4-S2 (1.9m)
Aromatic C16-C21	11	<7-54	440	None
Aromatic C21-C35	11	<7-54	1000	None
Benzene	11	<0.005	0.08 (Table B1)	None
Toluene	11	<0.005	120 (Table B1)	None
Ethyl benzene	11	<0.005-1.02	65 (Table B1)	None
m/p-Xylene	11	<0.005-2.33	42 (Table B1)	None
o-xylene	11	<0.005-6.05	44 (Table B1)	None

5.1.3. Exceedances of the assessment criteria were limited to two samples collected within TP4 which was identified as the main hotspot area. Exceedances of the aliphatic C8-C10 hydrocarbons were reported within both samples collected from TP4 (1.3-1.6m and 1.9m bgl) with a maximum concentration of 204.4 mg/kg compared to the criteria of 80 mg/kg. Elevated aromatic C10-C12 (39.6 mg/kg) and C12-16 ( 280 mg/kg) were also recorded within TP4-S2.

5.1.4. No exceedances were reported within any of the other entries which is consistent with the absence of visual or olfactory contamination indicators. Whilst a slight hydrocarbon odour and low PID readings (6.3 ppm) were recorded within TP1, the chemical testing does not report any exceedances possibly suggesting the periphery of impacted soils where only low concentrations remain.

## 6. Conclusions and Recommendations

### 6.1. Conclusions

- 6.1.1. A supplementary site investigation has been completed along the route of the decommissioned POL fuel pipeline which crosses the eastern portion of Phase 9. Investigation entries were completed at an approximate frequency of 1 entry per 50m length with representative soil samples collected from each entry to confirm the presence/absence of fuel contamination to support visual and olfactory observations.
- 6.1.2. The fuel pipeline was successfully located using a Cable Avoidance Tool (CAT) with the extent of the pipework consistent with that reported by Vertase with exception to the area of TP11 in the south where the pipe could not be located. It was observed within this location that the made ground was deeper than encountered elsewhere with deep concrete boulders which may suggest previous ground disturbance works which could have included the removal of a section of pipe.
- 6.1.3. Contamination indicators were limited to TP1 (slight hydrocarbon odour) and TP4 (strong hydrocarbon odour with staining of gravel). These observations were confirmed with the screening of soils with a PID with a maximum of 990ppm reported in TP4. Given the strong contamination indicators within TP4, the trial-pit was extended to a 30m trench to delineate the north-south extent of the contamination, elevated PID readings (162 ppm) were recorded within the extent of the trench.
- 6.1.4. Representative soil samples were collected from soils at and directly below the pipeline and where contamination indicators were observed (TP1 and TP4 only) and compared to the screening criteria adopted for hydrocarbon hotspots within the revised Remediation Strategy. Exceedances were limited to samples collected from TP4 only, with exceedances of the aliphatic C8-C10 and aromatic C10-C12 and C12-C16 hydrocarbons.
- 6.1.5. No exceedances were reported elsewhere which is consistent with the investigation observations, similarly no exceedances were reported within TP1 where only limited indicators were reported, possibly suggested the lateral extent of impacted soils. An approximate delineation of impacted soils was provided which suggests that the contamination associated with TP4 may extend over an area of ~1,690m<sup>2</sup> and may relate to approximately 1,520m<sup>3</sup> of impacted material.
- 6.1.6. It is concluded that the investigation of the POL pipeline has been completed and has identified a previously unencountered contamination hotspot within the north of the site. The revised Remediation Strategy includes provisions for the remediation of hydrocarbon hotspots and includes adopted verification criteria to verify the remediation of such hotspot areas. It is considered that there is no requirement to revise the Strategy.



6.1.7. The nature and extent of the contamination is consistent with contamination hotspots encountered across the wider New Settlement Area (NSA) which have been successfully remediated and validated.

## 6.2. Recommendations

6.2.1. It is recommended that this contamination hotspot is remediated at an early stage of the remedial works within Phase 9 in accordance with the revised Remediation Strategy and that a copy of this reported is submitted to the Local Authority.

6.2.2. As per the Strategy, the entire length of the pipeline should also be removed, and a watching brief maintained by site operatives who should remain vigilant on any further localised hotspot areas across the pipeline route.

6.2.3. Following the completion of the removal and verification of impacted strata, post-remediation vapour monitoring may be necessary to establish whether vapour protection measures will be required in future dwellings. A decision as to whether such additional monitoring and assessment will be required will be dependent on the successful removal of impacted soils, any limitations on the extents of removal (i.e., if bedrock is impacted or contamination extends north beyond Camp Road and cannot therefore be removed) and any remaining exceedances from the validation sampling.

6.2.4. The Remediation Strategy does not extend to include specific details on post-remediation vapour monitoring and any such works should be proposed and agreed in advance with the Local Authority.

## 6.3. Limitations

### *Stratigraphy*

6.3.1. The evidence of stratigraphy is taken from trial pit locations, and from information provided by other parties. Whilst it is usually reasonable to infer that similar conditions may extend between these locations; caution should be exercised.

### *Contamination*

6.3.2. The site investigation involved sampling at discrete locations, and it should be recognised that further areas or types of contamination may exist between investigation positions. The analyses performed are drawn from a typical suite of tests used to screen potentially contaminated land and specified to fall within the available budget. It is always possible that other substances may be present that have not been included within the standard range of tests. Asbestos quantification testing is currently underway and the above assessment and recommended remedial actions may be revised pending review of the result.

*Groundwater and surface water*

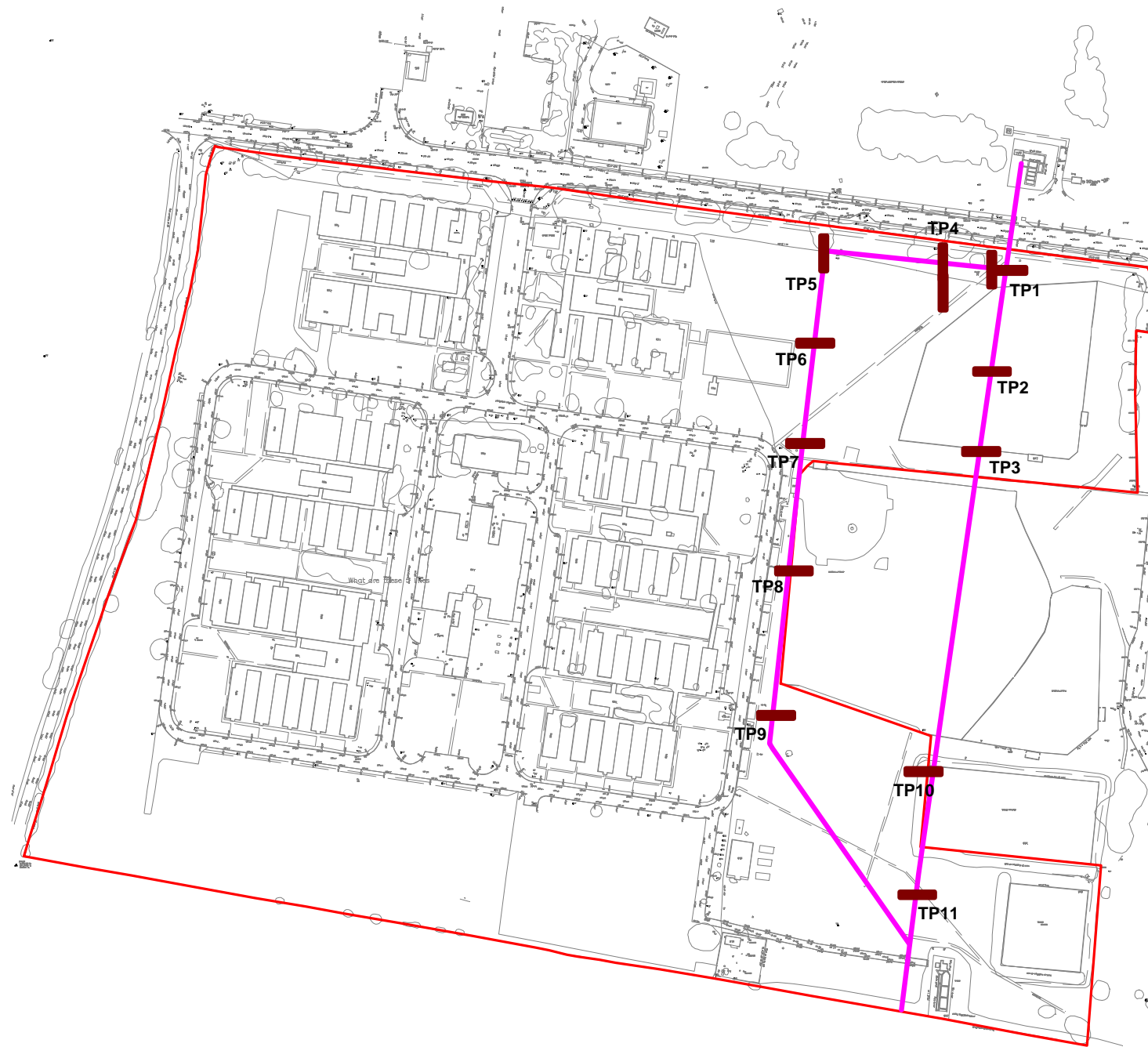
6.3.3. Any comments made on ground water conditions are based on observations or tests made at the time that the work was carried out. It should be noted that groundwater levels and concentrations of substances may vary per seasonal or weather-related effects, sometimes in an unpredictable fashion.

*General*

6.3.4. This report has been prepared by SGP for the sole and exclusive use of Urban Regen Ltd. and Dorchester Living. 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.

6.3.5. 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**



- Approx Line of POL pipeline
- Pipeline Trench / Extended TP

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email: consult@smithgrant.co.uk

Project:  
Heyford Park: Phase 9

Drawing:  
POL Pipeline  
Investigation Entries

Drawn: DW	Checked: BJT
--------------	-----------------

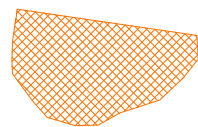
Date: 17.12.20	Scale: 1:2,500 @ A3
-------------------	------------------------

Job No: R1742d	Drg No: D02
-------------------	----------------



— Approx Line of POL pipeline

— Pipeline Trench / Extended TP



Possible extent of contamination

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email: consult@smithgrant.co.uk

Project:  
Heyford Park: Phase 9

Drawing:  
POL Contamination  
Extent (Approximate)


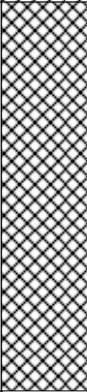

Drawn: DW      Checked: BJT


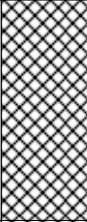
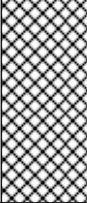

Date: 17.12.20      Scale: 1:2,500 @ A3

Job No: R1742d      Drg No: D02

## **APPENDIX A**


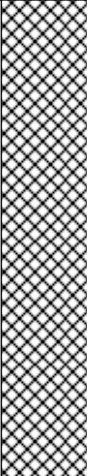

### **Trial-Pit Logs & Photographic Record**

SHEET: <b>1 of 1</b>	LOCATION: <b>See Plan</b>	PROJECT: <b>Heyford Park - Ph9</b>	ENGINEER: <b>DW</b>	JOB NO. <b>R1742d</b>	TRIAL PIT NO. <b>TP1</b>
		EXCAVATED BY: <b>Tracked 360Excavator</b>	CLIENT: <b>Dorchester Homes</b>	DATE: <b>14-15 Dec 2020</b>	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
	TP1-S1	TPHCWG	0	TOPSOIL: Dark brown clay with rootlets	
			0.3	MADE GROUND: Reworked natural of light brown to grey CLAY with slight hydrocarbon odour (2x pipes at 1.5m bgl)	
1.7				Base at 1.8m bgl due to rapid ingress of groundwater	
 <p>Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk</p>		<b>GROUND WATER:</b> Rapid ingress from ruptured manhole chamber			
		<b>REMARKS:</b> Sidewalls stable; no sheens or staining. Slight hydrocarbon odour at 1.5m bgl Max 6.3ppm at 1.5m bgl; 2x pipes at 1.5m bgl			
		SCALE: <b>1:250</b>	LOGGED BY: <b>DW</b>	FIGURE NO. <b>1</b>	
<small>D: small disturbed sample B: bulk disturbed sample PP: pocket penetrometer</small>					

SHEET: <b>1 of 1</b>	LOCATION: <b>See Plan</b>	PROJECT: <b>Heyford Park - Ph9</b>	ENGINEER: <b>DW</b>	JOB NO. <b>R1742d</b>	TRIAL PIT NO. <b>TP2</b>
		EXCAVATED BY: <b>Tracked 360Excavator</b>	CLIENT: <b>Dorchester Homes</b>	DATE: <b>14-15 Dec 2020</b>	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
2	TP2-S1	TPHCWG	0	TOPSOIL: Dark brown clay with rootlets	
			0.35	MADE GROUND: Reworked natural of coarse GRAVEL of angular limestone in a sandy clay soil	
			1.2	MADE GROUND: Reworked natural of dark brown firm CLAY with occasional rounded gravel (pipe at 1.6m bgl surrounded by bedding sand)	
				Base at 2m bgl	
 <p>Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk</p>		<b>GROUND WATER:</b> No groundwater observed			
		<b>REMARKS:</b> Sidewalls stable; no sheens, staining or odours PID <0.1 ppm; 1x pipe at 1.6m bgl			
		SCALE: <b>1:250</b>	LOGGED BY: <b>DW</b>	FIGURE NO. <b>1</b>	

D: small disturbed sample  
B: bulk disturbed sample  
PP: pocket penetrometer



SHEET: <b>1 of 1</b>	LOCATION: <b>See Plan</b>	PROJECT: <b>Heyford Park - Ph9</b>	ENGINEER: <b>DW</b>	JOB NO. <b>R1742d</b>	TRIAL PIT NO. <b>TP3</b>
		EXCAVATED BY: <b>Tracked 360Excavator</b>	CLIENT: <b>Dorchester Homes</b>	DATE: <b>14-15 Dec 2020</b>	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
	TP3-S1	TPHCWG	0	TOPSOIL: Dark brown clay with rootlets	
			0.25	MADE GROUND: Coarse GRAVEL of angular limestone in a sandy clay soil with rare cobbles of red brick and concrete	
2.4			2.1	MADE GROUND: Reworked natural of dark brown firm CLAY with occasional rounded gravel (pipe at 2.2m bgl surrounded by bedding sand)	
				Base at 2.4m bgl	




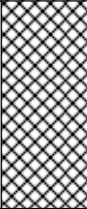
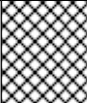

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**GROUND WATER:**  
 No groundwater observed

**REMARKS:**  
 Sidewalls stable; no sheens, staining or odours  
 PID <0.1 ppm; 1x pipe at 1.6m bgl

D: small disturbed sample  
 B: bulk disturbed sample  
 PP: pocket penetrometer

SCALE: **1:250**      LOGGED BY: **DW**      FIGURE NO. **1**

SHEET: <b>1 of 1</b>	LOCATION: <b>See Plan</b>	PROJECT: <b>Heyford Park - Ph9</b>	ENGINEER: <b>DW</b>	JOB NO. <b>R1742d</b>	TRIAL PIT NO. <b>TP4</b>
		EXCAVATED BY: <b>Tracked 360Excavator</b>	CLIENT: <b>Dorchester Homes</b>	DATE: <b>14-15 Dec 2020</b>	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
			0	TOPSOIL: Dark brown clay with rootlets	
			0.4	MADE GROUND: Reworked natural strata of a light brown sandy CLAY	
1.6	TP4-S1	TPHCWG	1.2	MADE GROUND: Reworked natural of coarse GRAVEL of limestone in a brown to grey sandy clay soil (1x pipe at 1.3m bgl)	
1.9	TP4-S2	Whole Oil Fingerprint	1.6	Light grey gravelly CLAY with strong fuel odour (900 ppm) with black staining between 1.8m to 2.3m bgl on gravel	
				Refusal at 2.5m bgl (bedrock)	



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**GROUND WATER:**

No groundwater observed

**REMARKS:**

Sidewalls stable; Light grey / silvery sand with strong fuel odour at 1.6-2.5m bgl. Black staining at 1.9-2.3m bgl  
PID 990ppm at 1.8m; 1x pipe at 1.3m bgl

D: small disturbed sample  
B: bulk disturbed sample  
PP: pocket penetrometer

SCALE:


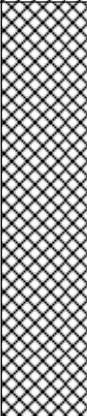
**1:250**

LOGGED BY:

**DW**

FIGURE NO.

**1**

SHEET: <b>1 of 1</b>	LOCATION: <b>See Plan</b>	PROJECT: <b>Heyford Park - Ph9</b>	ENGINEER: <b>DW</b>	JOB NO. <b>R1742d</b>	TRIAL PIT NO. <b>TP5</b>
		EXCAVATED BY: <b>Tracked 360Excavator</b>	CLIENT: <b>Dorchester Homes</b>	DATE: <b>14-15 Dec 2020</b>	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
	TP5-S1	TPHCWG	0	TOPSOIL: Dark brown clay with rootlets	
			0.3	MADE GROUND: Dark brown sandy CLAY (1x pipe at 1.1m bgl with bedding gravel and blue marker tape)	
1.3				Base at 1.9m bgl	



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email: consult@smithgrant.co.uk

**GROUND WATER:**

No groundwater observed

**REMARKS:**

Sidewalls stable; no sheens, staining or odours  
PID <0.1 ppm; 2x pipes at 1.1m bgl

D: small disturbed sample  
B: bulk disturbed sample  
PP: pocket penetrometer

SCALE:


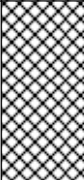
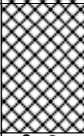
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LOGGED BY:


**DW**

FIGURE NO.


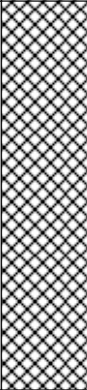

**1**

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Heyford Park - Ph9	ENGINEER: DW	JOB NO. R1742d	TRIAL PIT NO.
		EXCAVATED BY: Tracked 360Excavator	CLIENT: Dorchester Homes	DATE: 14-15 Dec 2020	TP6
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
1.7	TP6-S1	TPHCWG	0	TOPSOIL: Dark brown clay with rootlets	
			0.4	MADE GROUND: Reworked natural sandy cLAY with occasional gravel of angular limestone	
			1.1	MADE GROUND: Reworked natural coarse limestone gravel in a light brown CLAY (2x pipes at 1.4m bgl with bedding sand and gravel)	
			1.6	Coarse GRAVEL of limestone Base at 1.7m bgl	0 ○ △


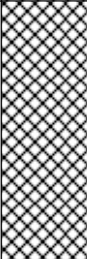
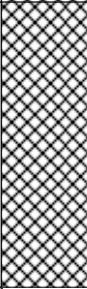

  

 <p>Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk</p>	<b>GROUND WATER:</b> No groundwater observed	
	<b>REMARKS:</b> Sidewalls stable; no sheens, staining or odours PID <0.1 ppm; 2x pipes at 1.4m bgl	
	SCALE: <b>1:250</b>	LOGGED BY: <b>DW</b>


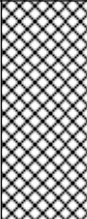
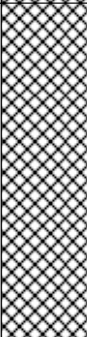
D: small disturbed sample  
B: bulk disturbed sample  
PP: pocket penetrometer

SHEET: <b>1 of 1</b>	LOCATION: <b>See Plan</b>	PROJECT: <b>Heyford Park - Ph9</b>	ENGINEER: <b>DW</b>	JOB NO. <b>R1742d</b>	TRIAL PIT NO. <b>TP7</b>
		EXCAVATED BY: <b>Tracked 360Excavator</b>	CLIENT: <b>Dorchester Homes</b>	DATE: <b>14-15 Dec 2020</b>	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
	TP7-S1	TPHCWG	0	TOPSOIL: Dark brown clay with rootlets	
			0.2	MADE GROUND: Reworked natural coarse gravel of angular limestone in a sandy CLAY (1x pipe at 1.2m bgl in bedding sand)	
1.6				Refusal at 1.7m bgl (bedrock)	
 <p>Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk</p>		<b>GROUND WATER:</b> No groundwater observed			
		<b>REMARKS:</b> Sidewalls stable; no sheens, staining or odours PID <0.1 ppm; 1x pipe at 1.2m bgl			
		SCALE: <b>1:250</b>	LOGGED BY: <b>DW</b>	FIGURE NO. <b>1</b>	

D: small disturbed sample  
B: bulk disturbed sample  
PP: pocket penetrometer

SHEET: <b>1 of 1</b>	LOCATION: <b>See Plan</b>	PROJECT: <b>Heyford Park - Ph9</b>	ENGINEER: <b>DW</b>	JOB NO. <b>R1742d</b>	TRIAL PIT NO. <b>TP8</b>
		EXCAVATED BY: <b>Tracked 360Excavator</b>	CLIENT: <b>Dorchester Homes</b>	DATE: <b>14-15 Dec 2020</b>	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
	TP8-S1	TPHCWG	0	TOPSOIL: Dark brown clay with rootlets	
			0.4	MADE GROUND: Coarse gravel of angular limestone in a sandy CLAY with rare fragments of brick	
			1.4	MADE GROUND: Reworked natural of coarse gravel of angular limestone in a sandy CLAY (1x pipe at 2.2m bgl in bedding sand)	
2.5				Base at 2.5m bgl	
 <p>Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk</p>		<b>GROUND WATER:</b> No groundwater observed			
		<b>REMARKS:</b> Sidewalls stable; no sheens, staining or odours PID <0.1 ppm; 1x pipe at 2.2m bgl			
		SCALE: <b>1:250</b>	LOGGED BY: <b>DW</b>	FIGURE NO. <b>1</b>	

D: small disturbed sample  
B: bulk disturbed sample  
PP: pocket penetrometer

SHEET: <b>1 of 1</b>	LOCATION: <b>See Plan</b>	PROJECT: <b>Heyford Park - Ph9</b>	ENGINEER: <b>DW</b>	JOB NO. <b>R1742d</b>	TRIAL PIT NO. <b>TP9</b>
		EXCAVATED BY: <b>Tracked 360Excavator</b>	CLIENT: <b>Dorchester Homes</b>	DATE: <b>14-15 Dec 2020</b>	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
	TP9-S1	TPHCWG	0	TOPSOIL: Dark brown clay with rootlets	
			0.45	MADE GROUND: Coarse gravel of angular limestone in a sandy CLAY and occasional fragments of red brick and concrete	
			1.3	MADE GROUND: Reworked natural coarse limestone GRAVEL in a sandy clay soil (1x pipe at 2.3m bgl in light brown bedding sand)	
2.6				Base at 2.6m bgl	



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**GROUND WATER:**

No groundwater observed

**REMARKS:**

Sidewalls stable; no sheens, staining or odours  
PID <0.1 ppm; 1x pipe at 2.3m bgl

D: small disturbed sample  
B: bulk disturbed sample  
PP: pocket penetrometer

SCALE:


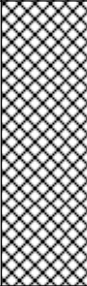


**1:250**

LOGGED BY:

**DW**

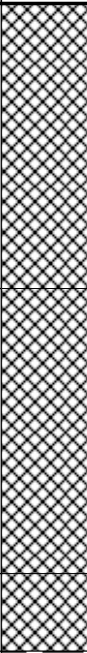

FIGURE NO.


**1**

SHEET: <b>1 of 1</b>	LOCATION: <b>See Plan</b>	PROJECT: <b>Heyford Park - Ph9</b>	ENGINEER: <b>DW</b>	JOB NO. <b>R1742d</b>	TRIAL PIT NO.
		EXCAVATED BY: <b>Tracked 360Excavator</b>	CLIENT: <b>Dorchester Homes</b>	DATE: <b>14-15 Dec 2020</b>	<b>TP10</b>
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
	TP10-S1	TPHCWG	0	TOPSOIL: Dark brown clay with rootlets	
			0.4	MADE GROUND: Dark brown gravelly CLAY with coarse angular limestone gravel and rare cobbles of brick and concrete (1x pipe at 1.5m bgl in bedding gravel with marker tape)	
1.8			1.5	Light brown silty CLAY	
				Base at 2.8m bgl	
 <p>Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk</p>		<b>GROUND WATER:</b> No groundwater observed			
		<b>REMARKS:</b> Sidewalls stable; no sheens, staining or odours PID <0.1 ppm; 1x pipe at 1.5m bgl			
		SCALE: <b>1:250</b>	LOGGED BY: <b>DW</b>	FIGURE NO. <b>1</b>	
		<small>D: small disturbed sample B: bulk disturbed sample PP: pocket penetrometer</small>			



SHEET: <b>1 of 1</b>	LOCATION: <b>See Plan</b>	PROJECT: <b>Heyford Park - Ph9</b>	ENGINEER: <b>DW</b>	JOB NO. <b>R1742d</b>	TRIAL PIT NO. <b>TP11</b>
		EXCAVATED BY: <b>Tracked 360Excavator</b>	CLIENT: <b>Dorchester Homes</b>	DATE: <b>14-15 Dec 2020</b>	

DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
			0	MADE GROUND: Reworked natural light brown gravelly CLAY with coarse gravel of limestone	
			1.1	MADE GROUND: Dark brown clay with angular GRAVEL of limestone, rare boulder of concrete and occasional cobbles of brick	
			2.2	MADE GROUND: Boulders of concrete with rebar within a gravelly clay soil (possible buried slab/foundations)	
			2.5	Light brown sandy CLAY	
				Base at 3.5m bgl	

 <p>Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk</p>	<b>GROUND WATER:</b> No groundwater observed	
	<b>REMARKS:</b> Sidewalls stable; no sheens, staining or odours PID <0.1 ppm; pipe not encountered	
	SCALE: <b>1:250</b>	LOGGED BY: <b>DW</b>

D: small disturbed sample  
B: bulk disturbed sample  
PP: pocket penetrometer



TP1



TP1



TP2



TP2



TP3



TP3



TP4



TP4



TP5



TP5



TP6



TP6



TP7



TP7



TP8



TP8



TP9



TP9



TP10



TP10



TP11



TP11

## **APPENDIX B**

### **Laboratory Test Results**

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



**Attention :** Dan Wayland  
**Date :** 29th December, 2020  
**Your reference :** R1742d  
**Our reference :** Test Report 20/17917 Batch 1  
**Location :** Heyford Phase 9  
**Date samples received :** 16th December, 2020  
**Status :** Final report  
**Issue :** 1

Twelve samples were received for analysis on 16th December, 2020 of which twelve 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: R1742d  
 Location: Heyford Phase 9  
 Contact: Dan Wayland  
 EMT Job No: 20/17917

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	15-16	17-18	19-20			
Sample ID	TP1-S1	TP2-S1	TP3-S1	TP4-S1	TP4-S2	TP5-S1	TP6-S1	TP7-S1	TP8-S1	TP9-S1			
Depth	1.50-1.70	1.60-2.00	2.20-2.40	1.30-1.60	1.90	1.15-1.30	1.40-1.70	1.30-1.70	2.20-2.50	2.30-2.60			
COC No / misc													
Containers	V J	V J	V J	V J	V J	V J	V J	V J	V J	V J			
Sample Date	<>	<>	<>	<>	<>	<>	<>	<>	<>	<>			
Sample Type	Clay	Clay	Clay	Clayey Sand	Clay	Sand	Sand	Clayey Sand	Clayey Sand	Clayey Sand			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	16/12/2020	16/12/2020	16/12/2020	16/12/2020	16/12/2020	16/12/2020	16/12/2020	16/12/2020	16/12/2020	16/12/2020	LOD/LOR	Units	Method No.
TPH CWG													
Aliphatics													
>C5-C6 <sup>#M</sup>	<0.1	<0.1	<0.1	>><0.1	>><0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 <sup>#M</sup>	2.7	<0.1	<0.1	>>13.9	>>80.8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	12.4	<0.1	<0.1	>>116.6	>>204.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 <sup>#M</sup>	32.6	<0.2	<0.2	134.6	456.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 <sup>#M</sup>	67	<4	<4	280	901	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 <sup>#M</sup>	<7	<7	<7	19	46	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 <sup>#M</sup>	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35	115	<19	<19	564	1688	<19	<19	<19	<19	<19	<19	mg/kg	TM5/PM8/PM16/PM12/PM10
Aromatics													
>C5-EC7 <sup>#</sup>	<0.1	<0.1	<0.1	>><0.1	>><0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8 <sup>#</sup>	<0.1	<0.1	<0.1	>><0.1	>><0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10 <sup>#M</sup>	0.7	<0.1	<0.1	>>6.3	>>9.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12 <sup>#</sup>	<0.2	<0.2	<0.2	12.7	39.6	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 <sup>#</sup>	14	<4	<4	86	280	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 <sup>#</sup>	<7	<7	<7	9	30	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 <sup>#</sup>	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-35 <sup>#</sup>	<19	<19	<19	114	359	<19	<19	<19	<19	<19	<19	mg/kg	TM5/PM8/PM16/PM12/PM10
Total aliphatics and aromatics(C5-35)	115	<38	<38	678	2047	<38	<38	<38	<38	<38	<38	mg/kg	TM5/PM8/PM16/PM12/PM10
MTBE <sup>#</sup>	<5	<5	<5	17 <sup>SV</sup>	836 <sup>SV</sup>	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
Benzene <sup>#</sup>	<5	<5	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
Toluene <sup>#</sup>	<5	<5	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
Ethylbenzene <sup>#</sup>	94	<5	<5	650 <sup>SV</sup>	1015 <sup>SV</sup>	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
m/p-Xylene <sup>#</sup>	163	<5	<5	1449 <sup>SV</sup>	2329 <sup>SV</sup>	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
o-Xylene <sup>#</sup>	415	<5	<5	4255 <sup>SV</sup>	6047 <sup>SV</sup>	<5	<5	<5	<5	<5	<5	ug/kg	TM36/PM12
Natural Moisture Content	18.9	24.4	27.9	10.6	14.0	23.1	17.6	13.8	16.8	11.3	<0.1	%	PM4/PM0
Sample Type	Clay	Clay	Clay	Clayey Sand	Clay	Sand	Sand	Clayey Sand	Clayey Sand	Clayey Sand		None	PM13/PM0
Sample Colour	Light Brown	Light Brown	Medium Brown	Light Brown	Medium Grey	Light Brown	Light Brown	Light Brown	Medium Brown	Light Brown		None	PM13/PM0
Other Items	chalk	sand	stones	stones	stones and oil	stones	stones	stones	stones	stones		None	PM13/PM0

Please see attached notes for all abbreviations and acronyms



Element Materials Technology

**Client Name:** Smith Grant LLP  
**Reference:** R1742d  
**Location:** Heyford Phase 9  
**Contact:** Dan Wayland  
**EMT Job No:** 20/17917

**Report : Solid**

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

<b>EMT Sample No.</b>	21-22																			
<b>Sample ID</b>	TP10-S1																			
<b>Depth</b>	1.50-1.80																			
<b>COC No / misc</b>																				
<b>Containers</b>	V J																			
<b>Sample Date</b>	<>																			
<b>Sample Type</b>	Clay																			
<b>Batch Number</b>	1																			
<b>Date of Receipt</b>	16/12/2020																			
TPH CWG																				
<b>Aliphatics</b>																				
>C5-C6 #M	<0.1									<0.1	mg/kg	TM36/PM12								
>C6-C8 #M	<0.1									<0.1	mg/kg	TM36/PM12								
>C8-C10	<0.1									<0.1	mg/kg	TM36/PM12								
>C10-C12 #M	<0.2									<0.2	mg/kg	TM5/PM8/PM16								
>C12-C16 #M	<4									<4	mg/kg	TM5/PM8/PM16								
>C16-C21 #M	<7									<7	mg/kg	TM5/PM8/PM16								
>C21-C35 #M	<7									<7	mg/kg	TM5/PM8/PM16								
Total aliphatics C5-35	<19									<19	mg/kg	TM5/PM8/PM16/PM12/PM10								
<b>Aromatics</b>																				
>C5-EC7 #	<0.1									<0.1	mg/kg	TM36/PM12								
>EC7-EC8 #	<0.1									<0.1	mg/kg	TM36/PM12								
>EC8-EC10 #M	<0.1									<0.1	mg/kg	TM36/PM12								
>EC10-EC12 #	<0.2									<0.2	mg/kg	TM5/PM8/PM16								
>EC12-EC16 #	<4									<4	mg/kg	TM5/PM8/PM16								
>EC16-EC21 #	<7									<7	mg/kg	TM5/PM8/PM16								
>EC21-EC35 #	54									<7	mg/kg	TM5/PM8/PM16								
Total aromatics C5-35 #	54									<19	mg/kg	TM5/PM8/PM16/PM12/PM10								
Total aliphatics and aromatics(C5-35)	54									<38	mg/kg	TM5/PM8/PM16/PM12/PM10								
MTBE #	<5									<5	ug/kg	TM36/PM12								
Benzene #	<5									<5	ug/kg	TM36/PM12								
Toluene #	<5									<5	ug/kg	TM36/PM12								
Ethylbenzene #	<5									<5	ug/kg	TM36/PM12								
m/p-Xylene #	<5									<5	ug/kg	TM36/PM12								
o-Xylene #	<5									<5	ug/kg	TM36/PM12								
Natural Moisture Content	14.8									<0.1	%	PM4/PM0								
Sample Type	Clay										None	PM13/PM0								
Sample Colour	Light Brown										None	PM13/PM0								
Other Items	stones and roots										None	PM13/PM0								

Please see attached notes for all abbreviations and acronyms

# Element Materials Technology

**Client Name:** Smith Grant LLP  
**Reference:** R1742d  
**Location:** Heyford Phase 9  
**Contact:** Dan Wayland  
**EMT Job No:** 20/17917

**Report :** Product

**Liquids/products:** V=40ml vial, G=glass bottle, P=plastic bottle  
 H=H<sub>2</sub>SO<sub>4</sub>, Z=ZnAc, N=NaOH, HN=HNO<sub>3</sub>

<b>EMT Sample No.</b>	23													Please see attached notes for all abbreviations and acronyms
<b>Sample ID</b>	TP4-S2													
<b>Depth</b>	1.90													
<b>COC No / misc</b>														
<b>Containers</b>	J													
<b>Sample Date</b>	<>													
<b>Sample Type</b>	Product													
<b>Batch Number</b>	1													
<b>Date of Receipt</b>	16/12/2020													LOD/LOR
Whole Oil Trace #	NDP													Units
														Method No.
														None
														TM1/PM0



# Element Materials Technology

## Notification of Deviating Samples

**Client Name:** Smith Grant LLP  
**Reference:** R1742d  
**Location:** Heyford Phase 9  
**Contact:** Dan Wayland

**Matrix : Solid**

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
20/17917	1	TP1-S1	1.50-1.70	1-2	All analyses	No sampling date given
20/17917	1	TP2-S1	1.60-2.00	3-4	All analyses	No sampling date given
20/17917	1	TP3-S1	2.20-2.40	5-6	All analyses	No sampling date given
20/17917	1	TP4-S1	1.30-1.60	7-8	All analyses	No sampling date given
20/17917	1	TP4-S2	1.90	9-10	All analyses	No sampling date given
20/17917	1	TP5-S1	1.15-1.30	11-12	All analyses	No sampling date given
20/17917	1	TP6-S1	1.40-1.70	13-14	All analyses	No sampling date given
20/17917	1	TP7-S1	1.30-1.70	15-16	All analyses	No sampling date given
20/17917	1	TP8-S1	2.20-2.50	17-18	All analyses	No sampling date given
20/17917	1	TP9-S1	2.30-2.60	19-20	All analyses	No sampling date given
20/17917	1	TP10-S1	1.50-1.80	21-22	All analyses	No sampling date given

**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.: 20/17917

## 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

All solid results are expressed on a dry weight basis unless stated otherwise.

**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: 20/17917

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
TM1	Modified USEPA 8015B v2:1996 method for the determination of carbon banding in oil and product samples by GC-FID.	PM0	No preparation is required.			AR	
TM1	Modified USEPA 8015B v2:1996 method for the determination of carbon banding in oil and product samples by GC-FID.	PM0	No preparation is required.	Yes		AR	
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	
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
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

EMT Job No: 20/17917

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
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