

Date: 22nd August 2025
Ref: 18-488-L1-1

The Village Hotel Group – VUR
By Email

SUPPLEMENTARY GROUND INVESTIGATION LETTER REPORT VILLAGE HOTEL, READING

1. BACKGROUND AND OBJECTIVES

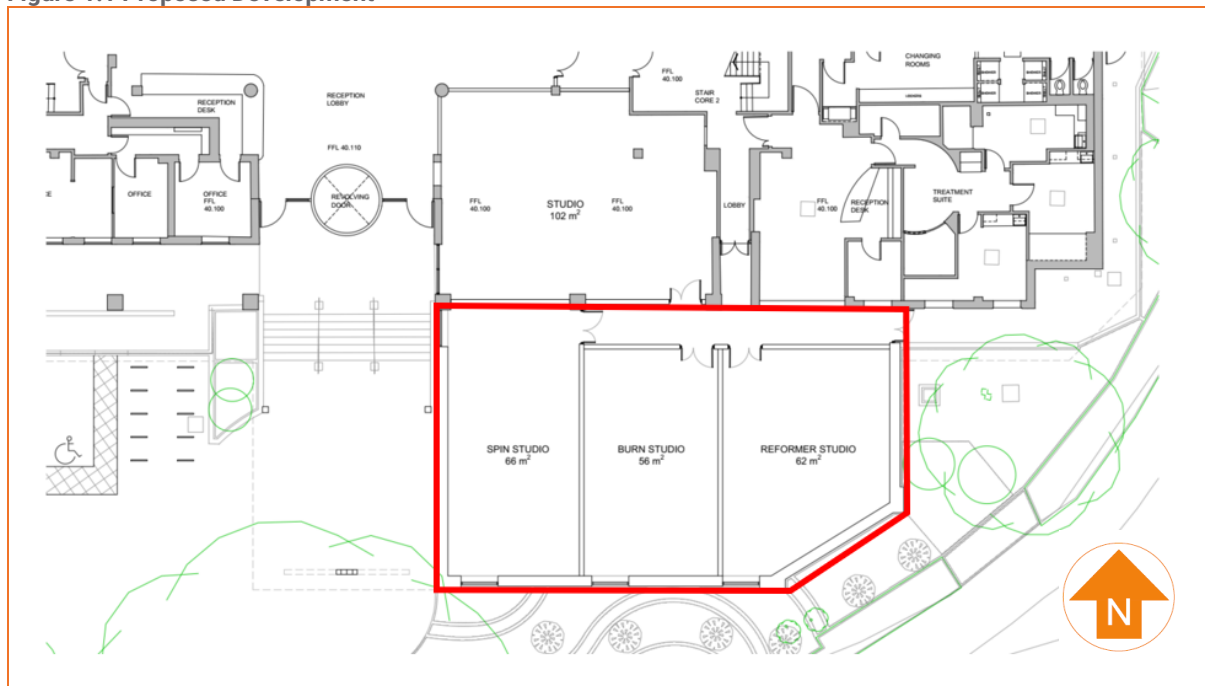
E3P has been commissioned by The Village Hotel Group – VUR Village (the Client) to undertake a supplementary phase of ground investigation work for the proposed extension to the existing hotel complex at the newly refurbished Village Hotel, Reading, RG1 8BD.

The supplementary ground investigation has been designed to characterise and assess the potential risks associated with ground gas migration from the adjacent former landfill, which occupies the western portion of the wider site (car park) and extends beyond the western site boundary.

It is understood that The Village Hotel Group – VUR Village intends to construct an extension to the south of the current hotel, which will include exercise studios. The works are to be completed as part of the redesign and refurbishment of the current structure. Drawing 18-488-002, attached to this letter, identifies the proposed development layout.

A snapshot of the proposed development layout is indicated in Figure 1.1. The area outlined in red indicates the extension to the current structure.

Figure 1.1 Proposed Development





1.1. PREVIOUS WORKS

The following phases of desk study have previously been carried out at the site:

- 🏠 **Nova Ambiente** – Phase I Environmental Report, Crowne Plaza Reading (Ref: CKB013, dated October 2024)

The above report provides a review of environmental searches and previous investigations undertaken on site, with the conclusion stating that the site is not registered as contaminated land by the local authority; however, the western sector of the site has been identified by the council as potentially contaminated due to its former use as part of the wider Richfield Avenue landfill. The site is currently classified as a low risk in its current use as a car park, and there is currently no schedule set for investigation or development in this sector.

It should be noted that the report centres on the potential contamination and ground gas risk posed in the western sector of the site, which is currently a car park. There is little mention of the eastern sector, where the hotel and further extension are situated. This sector of the site is considered to pose a low risk with no potential contamination or elevated ground gas readings being noted.

Figure 1.2 indicates the location of the former landfill in relation to the car park in the western portion of the site and the proposed extension in the eastern sector. The figure also identifies the locations of the ground gas monitoring wells installed as part of the E3P supplementary investigation.

Figure 1.2 Site Features – Landfill Location Plan



The following phases of geoenvironmental investigations and assessments have previously been carried out at the site:

- 🏠 **Earth Environmental & Geotechnical (EEGSL)** – Phase II Geotechnical Site Investigation Report, The Village Hotel Reading (Ref: R4876/25, dated June 2025)



The intrusive investigation has identified that the area of the proposed extension, in general, is underlain by Made Ground deposits proven to a maximum depth of 2.20mbgl, overlying superficial Alluvium deposits comprising very soft clay to a maximum proven depth of 3.50mbgl. Groundwater strikes were recorded between 2.00–2.50 m bgl.

The EEGSL report states that shallow foundations will not be suitable for the proposed extension, and an engineered solution will likely be required. No chemical analysis or ground gas monitoring has been undertaken as part of this phase of works.

For the avoidance of doubt, the previous desk study and intrusive ground investigation reports should be read both as a precursor to and in conjunction with this document.

1.2. GENERAL OVERVIEW

Exploratory fieldwork was completed on the 22nd July 2025. The intrusive works comprised of three window sample boreholes to facilitate the installation of ground gas monitoring wells within the footprint of the proposed extension.

2. GROUND CONDITIONS

The supplementary ground investigation generally confirms both the published geology and the geology identified during the initial phase of ground investigation works undertaken by EEGSL (Ref: R4876/25, dated June 2025). Details of the stratum encountered can be found in Table 2.1.

Table 2.1 Summary of Strata

HOLE	DEPTH TO STRATUM (m bgl)			
	MADE GROUND	Very Soft to Soft CLAY	Clayey PEAT	Sandy GRAVEL
WS101	0.00–1.80	1.80–4.30	4.30–4.60	4.60–5.08
WS102	0.00–2.90	2.90–4.50	4.50–5.00	5.00–5.17
WS103	0.00–2.18	—	—	—

MADE GROUND

Made Ground deposits were encountered within all exploratory hole locations to depths of between 1.80m and to a maximum proven depth of 2.90m bgl (WS102). The full depth of Made Ground deposits could not be proven within WS103 due to the presence of brick obstructions.

Generally, the Made Ground deposits comprise of red brick pavers overlying yellowish grey sand and gravel MOT to approximately 0.45 m bgl. Reworked black gravels and gravelly clays, with gravel comprising of brick, sandstone, chalk and clinker being noted throughout. Rare fragments of wood, timber, glass and flint have additionally been noted.

Within WS103, Made Ground brick fill has been noted between 0.80–2.18 m bgl, with whole bricks and fragments of cement being present. Between 1.30–1.40 m bgl, an isolated pocket of hydrocarbon staining and a corresponding odour has been identified.



DRIFT

Superficial deposits were encountered within WS101 and WS102 at depths between 1.80 m and 3.00 m bgl.

Superficial deposits encountered comprise of soft black gravelly CLAY with gravels of flint and light blue grey, very soft to soft CLAY. Black, slightly clayey pseudo-fibrous PEAT has been encountered within both WS101 and WS102 between 4.30–5.00 m bgl., with dense greenish brown flint gravels recorded below.

BEDROCK

The E3P site investigation has not identified any solid geology. According to BGS mapping, the site is underlain by the Seaford Chalk Formation and the Newhaven Chalk Formation.

GROUNDWATER

Groundwater strikes have been noted in WS101 and WS102 at 2.20 m bgl.

3. TIER 2 QUALITATIVE CONTAMINATED LAND RISK ASSESSMENT

E3P has undertaken a Tier 2 qualitative land risk assessment with respect to human health and ground gas to determine if any potential contaminants within the underlying soils pose an unacceptable level of risk to the identified receptors.

3.1. HUMAN HEALTH RISK ASSESSMENT

At Tier 2 stage, the long-term (chronic) human health toxicity of the soil has been assessed by comparing the on-site concentrations of organic and inorganic compounds with reference values published in LQM/CIEH S4UL (S4UL3267).

Where Tier 2 screening values are not provided by LQM, other screening values have been used, and these are referenced in Table A, in Appendix III.

The Tier 2 screening values for commercial end use have been utilised for this assessment due to the proposed development being a commercial end use. To remain conservative at an early stage, the screening values based on a 1% SOM have been utilised for this assessment. The results of the comparison are tabulated in Appendix III.

A review of chemical soil analysis indicates that elevated non-volatile PAHs concentrations within Made Ground deposits in WS103, when compared to the commercial end targets. Furthermore, volatile PAHs, TPHs and S/VOCs have been recorded above the laboratory LOD.

It is considered that as part of enabling works phase, prior to construction, Made Ground obstructions will be removed from within the footprint of the proposed extension. As part of these works the removal of the impacted material identified within WS103 at should be considered. As the site will be covered by hardstanding, and it is anticipated that any landscaped areas will have a suitably designed cover system, the risk is considered low.



3.2. GROUND GAS RISK ASSESSMENT

3.2.1. RATIONALE AND POTENTIAL SOURCES

Hazardous ground gas qualitative risk assessment is based on a conceptual site model (CSM) similar to that used for soil contamination sources (i.e., source pathway receptor pollutant linkages).

The risk can be assessed based on knowledge of the ground conditions and CSM, and a measure of hazardous gas concentrations and gas flow at the site within monitoring standpipes.

Reading Borough Council has requested a programme of ground gas monitoring to be undertaken in connection with the proposed extension works. The purpose of this monitoring is to assess the potential risk associated with ground gas migration from a former landfill located to the west of the site.

Three monitoring wells have been installed within the footprint of the proposed extension, with response zones constructed to target both the Made Ground and the underlying natural strata.

3.2.2. MONITORING FREQUENCY

The CIRIA C665 guidance on gas risk assessment includes recommendations for periods and frequencies for monitoring visits. These recommendations take into account the nature of the proposed development and the likely generation potential of the source.

The proposed development consists of an extension to the existing hotel, which is classified as a Type C development (low sensitivity) in accordance with BS8485:2015+A1:2019. The generation potential of the identified gas sources, including consideration of the likelihood of future increases, is considered to be low.

The extension is categorised as a Type C development on the basis that its use will be limited to fitness classes and, therefore, does not constitute a semi-permanently or permanently occupied space. The proposed ground floor layout is shown in Figure 1.1.

In line with the intended hotel use and the assessed ground gas generation potential, the monitoring programme requires four visits over a one-month period, including at least two sets of readings undertaken during low or falling atmospheric pressure conditions.

The monitoring of the ground gas has been completed in accordance with published standards and guidelines. The risk assessment methodology, along with the monitoring methodology, can be found in detail within APPENDIX IV.

3.2.3. MONITORING METHODOLOGY

Concentrations of methane (CH₄), carbon dioxide (CO₂) and oxygen (O₂) were measured using a calibrated infrared gas analyser (GFM435) with gas flow rates measured using an integrated flow meter.

Gas measurements were recorded for a minimum of 300 seconds (5 minutes) at each location, increasing to 600 seconds if elevated concentrations were identified, at which points the maximum concentration of CH₄ and CO₂, together with the lowest concentration of O₂, were recorded.

The results of the ground gas monitoring are presented in Table 3.1.



In addition to the raw data, results for each individual standpipe have been assessed with reference to guidance provided in BS8485:2015+A1:2019. Based on the initial peak measured flow rates and hazardous gas concentrations, individual hazardous gas flow rates (Q_{hg}) have been derived for each monitoring point, from which an individual Characteristic Situation (CS) can be determined.

3.2.4. SUMMARY OF MONITORING RESULTS

Table 3.1 presents the supplementary ground gas and groundwater monitoring results.



Table 3.1 Summary of Ground Gas Monitoring Results

WELL	STRATA	DATE	CH ₄ PEAK (%V/V)	CH ₄ STEADY (%V/V)	CH ₄ Q _{hg} (l/hr)	CO ₂ PEAK (%V/V)	CO ₂ STEADY (%V/V)	CO ₂ Q _{hg} (l/hr)	O ₂ (%V/V)	ATMOS (mb)	ATMOS. DYNAMIC	PEAK FLOW (l/hr)	STEADY FLOW (l/hr)	RESPONSE ZONE (m bgl)	DEPTH TO BASE (m bgl)	DEPTH TO WATER (m bgl)
WS101	Made Ground	29/07/2025	0.1	0.1	0.0001	0.4	0.4	0.0004	19.6	1013	Steady	0.1	0.1	0.50–1.80	1.79	Dry
		03/08/2025	0.1	0.1	0.0001	13.4	13.4	0.0134	2.80	1016	Rising	0.1	0.1		1.79	Dry
		12/08/2025	0.1	0.1	0.0001	14.6	14.4	0.0146	1.30	1007	Falling	0.1	0.1		1.79	Dry
		18/08/2025	0.1	0.1	0.0001	14.6	14.5	0.0146	1.90	1014	Falling	0.1	0.1		1.79	Dry
WS102	Natural	29/07/2025	0.1	0.1	0.0001	2.1	2.1	0.0021	16.7	1013	Steady	0.1	0.1	3.00–5.00	4.86	2.67
		03/08/2025	0.1	0.1	0.0001	4.2	4.2	0.0042	13.8	1016	Rising	0.1	0.1		4.86	2.66
		12/08/2025	0.1	0.1	0.0001	4.4	4.3	0.0044	14.5	1007	Falling	0.1	0.1		4.86	2.66
		18/08/2025	0.1	0.1	0.0001	4.3	4.3	0.0043	15.4	1014	Falling	0.1	0.1		4.86	2.70
WS103	Made Ground	29/07/2025	0.1	0.1	0.0001	0.4	0.4	0.0004	19.2	1012	Steady	0.1	0.1	0.50–2.00	1.88	Dry
		03/08/2025	0.1	0.1	0.0001	1.0	1.0	0.0010	16.6	1015	Rising	0.1	0.1		1.88	Dry
		12/08/2025	0.1	0.1	0.0001	2.1	2.1	0.0021	14.6	1007	Falling	0.1	0.1		1.87	Dry
		18/08/2025	0.1	0.1	0.0001	2.1	2.1	0.0021	15.9	1014	Falling	0.1	0.1		1.87	Dry

Notes

CIRIA Characteristic Situation

Q_{hg}

CS1

<0.07

Typical Max CO₂ <5 % Typical Max CH₄ <1 %

Values in BOLD exceed CS1 Thresholds

CS2

<0.7

Flow rate not to exceed 70 l/hr otherwise consider increase to CS3

Values in BLUE denote water above level of response zone (flooded)

CS3

<3.5

CS4

<15

Quantitative Risk Assessment required to evaluate scope of protective measures



GROUNDWATER

WS101 and WS103, both installed within Made Ground deposits, remained dry throughout the monitoring period. In contrast, WS102, located within natural strata, recorded a groundwater level between 2.66–2.70 m bgl. This is considered representative of the natural water table, consistent with water strikes observed during previous phases of intrusive ground investigation.

As the groundwater level in WS102 is above the well's response zone, the installation is regarded as flooded. Consequently, data from WS102 will not be used in the assessment.

BAROMETRIC PRESSURE

Visits 1 and 2 were undertaken during relatively high/steady and rising pressures, with pressures recorded between 1013 to 1016 mbar.

Visits 3 and 4 were undertaken during high /falling pressure events, with pressures ranging from 1007 to 1014 mbar.

Due to the time of year (peak summer), no monitoring has been undertaken within low-pressure events.

GAS FLOW

Throughout the monitoring period, steady flow rates were recorded to be 0.0 l/hr (limit detection of the analyser), with no instances of elevated peak flow rates being noted.

GAS CONCENTRATION

The maximum methane value recorded within the monitoring wells was 0.1% v/v (limit of detection of the analyser).

Carbon dioxide concentrations were recorded at concentrations ranging from 0.10% v/v to 14.6% v/v (WS101).

TERNARY PLOT FOR GROUND GAS

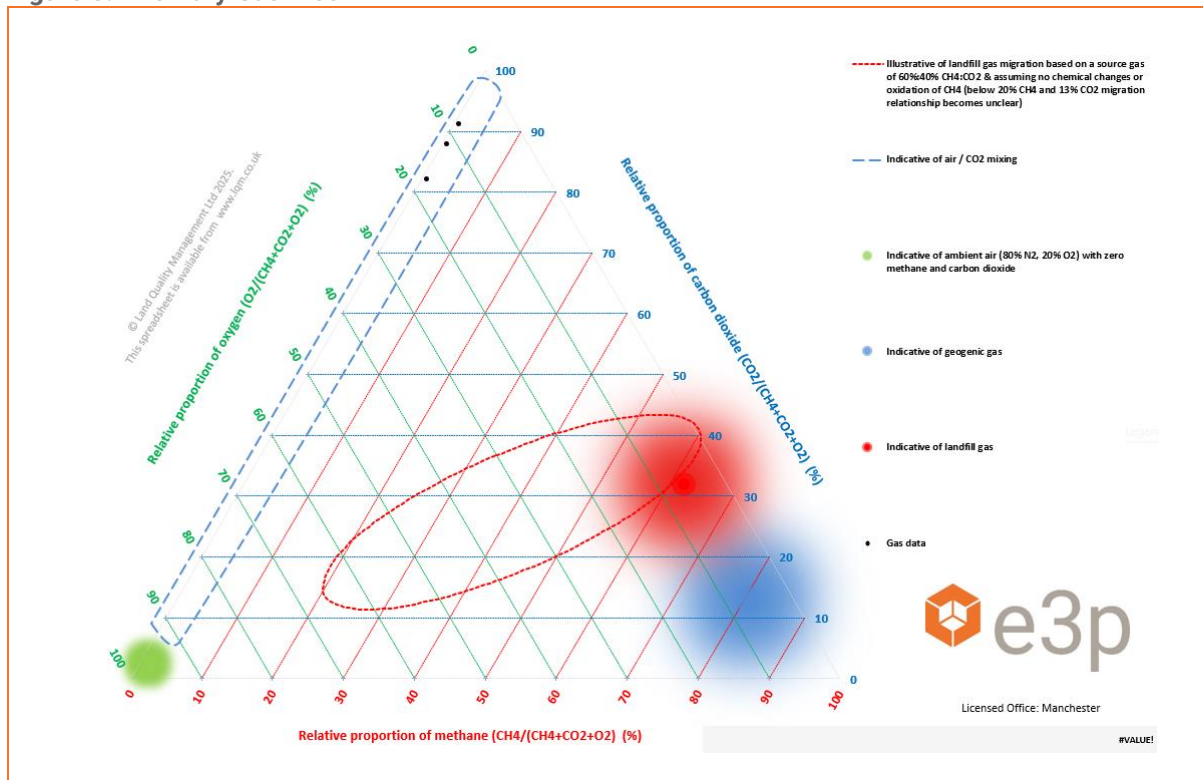
A ternary gas plot is a triangular plot of three variable which equal 100%. They allow the composition of gas to be identified and can help to identify the potential source of gas. As carbon dioxide is present in natural soils, this can lead to uncertainty about whether it is necessary to increase the gas regime. On this basis, a ternary plot has been used as an assessment tool for the gas monitoring data to identify if there is a true risk.

Figure 3.1 (overleaf) shows the ternary gas plot for the gas monitoring data.

The ternary gas plot indicates that the elevated carbon dioxide readings identified in WS101 plots within the zone denoted to reflect 'indicative of air and carbon dioxide mixing'. The fluctuations of carbon dioxide monitored are observed to be part of the natural ground gas regime of the site and are not from a protrusible or manmade source. This implies that the carbon dioxide concentrations recorded above 5% are seen to be natural fluctuations and do not pose a risk to the proposed development.



Figure 3.1 Ternary Gas Plot



RADON RISK

The UKHSA UK Radon Map Online Viewer indicates that the majority of the site lies within Radon Potential Class 3, where 3–5% of structures are said to be above the Radon Action Level. Using this data, basic radon protection measures will be required to be incorporated into the future extension.

To allow a site specific radon ground gas assessment, E3P has ordered a BGS GeoReport – Radon Report (Ref: BGS_344332/62332). This report characterises the site as a single entity; thus, the data is of greater clarity and is site-specific. On the contrary, the UKHSA UK Radon Map Online Viewer averages the radon potential across the UK using a 1km grid system.

The key findings from the BGS GeoReport report are summarised below:

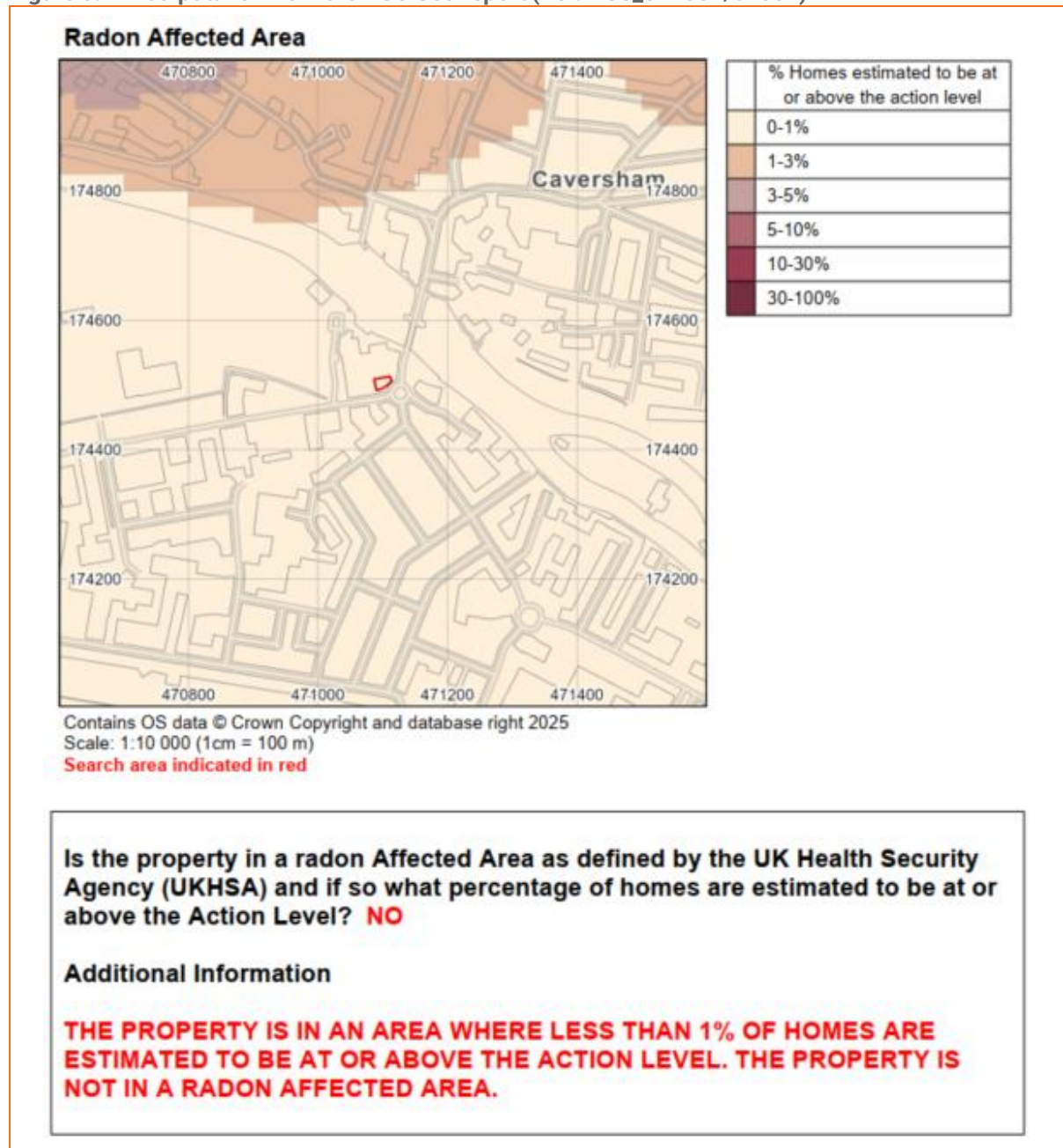
- Confirm the site is situated in Radon Class 1, where >1% of structures are said to be above the Radon Action Level.
- Confirms that no radon protection measures will be required as part of the future extension.

Figure 3.2 (overleaf) presents an excerpt from the detailed BGS GeoReport that indicates the whole site to be situated in an area where >1% of structures are said to be above the Radon Action Level and no radon-specific protection measures are required.

The BGS GeoReport can be attached in APPENDIX V.



Figure 3.2 Excerpt taken from the BGS GeoReport (Ref: BGS_344332/62332)



3.2.5. GROUND GAS CONCLUSION

The characteristic situation for all monitoring wells is classified as **CS1**, as the risk from potential ground gas is considered to be low. Although marginally elevated carbon dioxide concentrations were recorded, statistical assessment of the gas signature indicates that these fluctuations are consistent with the natural ground gas regime. In addition, the absence of measurable flow suggests that no active or sustained gas generation is occurring. It should be noted, however, that monitoring was undertaken during peak summer and did not coincide with low-pressure events.

Detailed BGS Radon Reporting confirms that radon protection measures are not required to be incorporated into the future extension.



4. CONCLUSION

E3P was appointed by The Village Hotel Group – VUR Village (the Client) to carry out an additional phase of intrusive ground investigation to assess the potential risks associated with ground gas migration from a former landfill site located to the west of the development area.

As part of the works, three monitoring wells were installed within the footprint of the proposed extension, which were monitored on four occasions over a one-month period. The results indicate a low risk from ground gas, with only minor variations in carbon dioxide concentrations observed at WS101, consistent with natural ground gas conditions. It should be noted that monitoring was undertaken during peak summer and did not coincide with any low-pressure events.

The assessment found no evidence to suggest that the adjacent landfill presents an increased risk to the proposed extension, with no elevated gas concentrations or significant flow rates recorded. On this basis, it is considered that specific ground gas protection measures are not required for the development.

I trust this information is satisfactory to your requirements, and should I be able to be of any further assistance, please do not hesitate to contact me.

Yours sincerely,

Written by
Matt Jackson
Project Manager

Approved by
Alex Smith
Associate Director

For and on behalf of E3P Ltd

Enclosed:

-  Appendix I – Drawings
 - 18-488-002 – Proposed Development Plan
 - 18-488-004 – Site Features Plan
 - 18-488-006 – Exploratory Hole Location Plan
-  Appendix II – Laboratory Chemical Testing Results
-  Appendix III – Tier 2 Chemical Assessment (Commercial End Use)
-  Appendix IV – Ground Gas Risk Assessment Methodology
-  Appendix V – BGS Radon Report

APPENDIX I: DRAWINGS





Notes:						Client: VUR		Job No: 18-488	Date: 22.08.2025	 Environmental Engineering Partnership Ltd Taylor Road, Trafford Park Urmston, Manchester, M41 7JQ Tel: 0161 707 9612 E-mail: info@e3p.co.uk Website: www.e3p.co.uk
								Drawing No: 002	Scale: NTS @ A3	
						Job Title: Village Hotel, Reading		Drawing Title: Proposed Development Plan		The client must not amend any drawing, design or other intellectual property produced by E3P Ltd without permission in writing from E3P Ltd in advance of any amendments being made. In the event that such written permission is not obtained in advance of the amendments being made, E3P Ltd shall not be liable for any damage and/or losses occurring as a result of the amended drawing, design or intellectual property.
P1	REVA	22.08.2025	CB	MJ	MJ					
Phase	Issue	Date	Drawn	Checked	PM					

Village Hotel, Reading

Landfill Location Plan

Legend

- 1) Site Redline Boundary
- 2) Approximate Extension Footprint
- 3) Window Sample / Monitoring Well Locations
- 4) Approximate Landfill Boundary



Notes:

Client:

Job No:

Date:

VUR

18-488

22.08.2025

Drawing No:

Scale:

004

NTS @ A3



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P1	REVA	22.08.2025	CB	MJ	MJ
Phase	Issue	Date	Drawn	Checked	PM

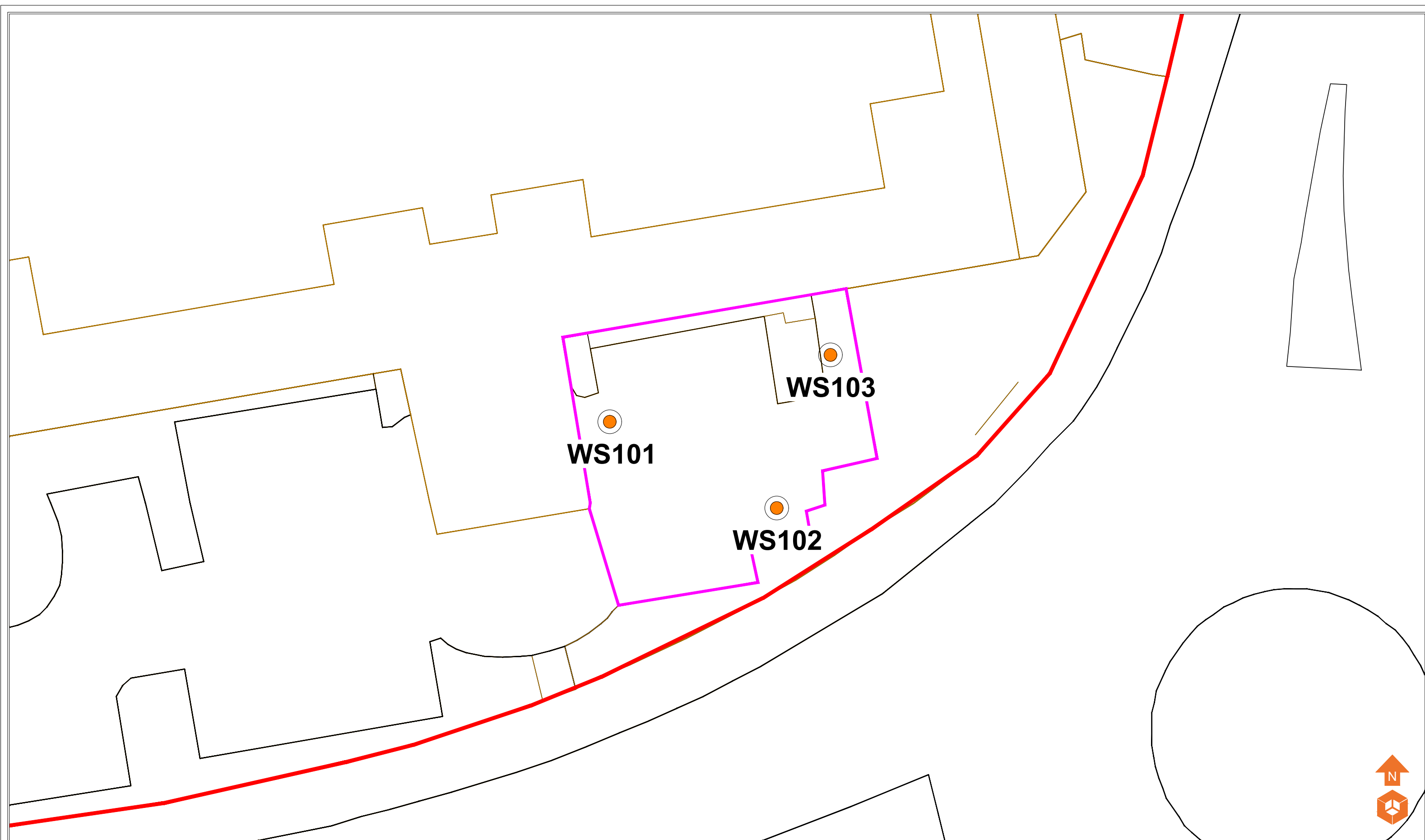
Job Title:

Village Hotel, Reading

Drawing Title:

Site Feature Plan

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Location Symbols

-  Proposed Window Sample Probehole Location
-  Site Red Line Boundary
-  Approximate Building Extension Footprint

Notes:

P1	REVA	22.08.2025	CB	MJ	MJ
Phase	Issue	Date	Drawn	Checked	PM

Client:

VUR

Job Title:

Village Hotel, Reading

Job No:

18-488

Drawing No:

006

Date:

22.08.2025

Scale:

NTS @ A3



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APPENDIX II: LABORATORY CHEMICAL TESTING RESULTS





Final Report

Report No.: 25-24794-1

Initial Date of Issue: 18-Aug-2025

Re-Issue Details:

Client E3P

Client Address: Unit 3 Wharfside Complex
Lifford Lane
Lifford
Birmingham
B30 3DZ

Contact(s): mjackson@e3p.co.uk
happleton-gregg@e3p.co.uk

Project Village Hotel, Reading

Quotation No.: Q24-35882 **Date Received:** 28-Jul-2025

Order No.: 011818 **Date Instructed:** 28-Jul-2025

No. of Samples: 3

Turnaround (Wkdays): 5 **Results Due:** 01-Aug-2025

Date Approved: 18-Aug-2025

Approved By:

Details: David Smith, Technical Director

For details about application of accreditation to specific matrix types, please refer to the Table at the back of this report

Results - Soil

Project: Village Hotel, Reading

Client: E3P		Chemtest Job No.:				25-24794	25-24794	25-24794
Quotation No.: Q24-35882		Chemtest Sample ID.:				2006790	2006791	2006792
		Client Sample ID.:				WS101	WS102	WS103
		Sample Type:				SOIL	SOIL	SOIL
		Top Depth (m):				0.50	1.20	1.40
		Date Sampled:				22-Jul-2025	22-Jul-2025	22-Jul-2025
		Time Sampled:				0:00	0:00	0:00
		Asbestos Lab:				DURHAM	DURHAM	DURHAM
Determinand	HWOL Code	Accred.	SOP	Units	LOD			
ACM Type		N	2192		N/A	-	-	-
Asbestos Identification		U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture		N	2030	%	0.020	7.4	14	11
Soil Colour		N	2030		N/A	Brown	Brown	Brown
Other Material		N	2030		N/A	Stones, Roots and brick	Stones	Stones and brick
Soil Texture		N	2030		N/A	Loam	Clay	Sand
pH at 20C		M	2010		4.0	9.4	8.5	11.2
Sulphate (2:1 Water Soluble) as SO4		M	2120	g/l	0.010	0.47	0.032	0.052
Total Sulphur		U	2175	%	0.010	0.050	0.030	0.12
Cyanide (Total)		M	2300	mg/kg	0.50	1.0	3.1	< 0.50
Sulphide (Easily Liberatable)		N	2325	mg/kg	0.50	3.0	4.0	3.0
Sulphate (Total)		U	2430	%	0.010	0.26	0.047	0.15
Arsenic		M	2455	mg/kg	0.5	15	14	5.5
Cadmium		M	2455	mg/kg	0.10	0.26	0.12	0.11
Chromium		M	2455	mg/kg	0.5	26	17	7.0
Copper		M	2455	mg/kg	0.50	34	82	160
Mercury		M	2455	mg/kg	0.05	0.39	0.49	< 0.05
Nickel		M	2455	mg/kg	0.50	25	19	6.4
Lead		M	2455	mg/kg	0.50	160	150	29
Selenium		M	2455	mg/kg	0.25	0.59	0.42	0.30
Zinc		M	2455	mg/kg	0.50	140	100	80
Chromium (Hexavalent)		N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Organic Matter		M	2625	%	0.40	3.1	1.7	22
Total Organic Carbon		M	2625	%	0.20	1.8	1.0	13
TPH >C6-C8	EH_1D_Total	N	2670	mg/kg	1.0	< 1.0	< 1.0	27
TPH >C8-C10	EH_1D_Total	N	2670	mg/kg	1.0	17	< 1.0	90
TPH >C10-C12	EH_1D_Total	N	2670	mg/kg	1.0	17	< 1.0	940
TPH >C12-C16	EH_1D_Total	N	2670	mg/kg	1.0	45	1.5	860
TPH >C16-C21	EH_1D_Total	N	2670	mg/kg	1.0	59	9.0	5900
TPH >C21-C25	EH_1D_Total	N	2670	mg/kg	1.0	65	8.2	3700
TPH >C25-C35	EH_1D_Total	N	2670	mg/kg	1.0	760	21	6400
TPH >C35-C40	EH_1D_Total	N	2670	mg/kg	1.0	730	8.6	800
Total TPH >C6-C40	EH_1D_Total	U	2670	mg/kg	10	1700	48	19000
Dichlorodifluoromethane		N	2760	µg/kg	1.0			< 1.0
Chloromethane		M	2760	µg/kg	1.0			< 1.0
Vinyl Chloride		M	2760	µg/kg	1.0			< 1.0

Results - Soil

Project: Village Hotel, Reading

Client: E3P		Chemtest Job No.:				25-24794	25-24794	25-24794
Quotation No.: Q24-35882		Chemtest Sample ID.:				2006790	2006791	2006792
		Client Sample ID.:				WS101	WS102	WS103
		Sample Type:				SOIL	SOIL	SOIL
		Top Depth (m):				0.50	1.20	1.40
		Date Sampled:				22-Jul-2025	22-Jul-2025	22-Jul-2025
		Time Sampled:				0:00	0:00	0:00
		Asbestos Lab:				DURHAM	DURHAM	DURHAM
Determinand	HWOL Code	Accred.	SOP	Units	LOD			
Bromomethane		M	2760	µg/kg	20			< 20
Chloroethane		U	2760	µg/kg	2.0			< 2.0
Trichlorofluoromethane		N	2760	µg/kg	1.0			< 1.0
1,1-Dichloroethene		M	2760	µg/kg	1.0			< 1.0
Trans 1,2-Dichloroethene		M	2760	µg/kg	1.0			< 1.0
1,1-Dichloroethane		M	2760	µg/kg	1.0			< 1.0
cis 1,2-Dichloroethene		M	2760	µg/kg	1.0			< 1.0
Bromochloromethane		U	2760	µg/kg	5.0			< 5.0
Trichloromethane		M	2760	µg/kg	1.0			< 1.0
1,1,1-Trichloroethane		M	2760	µg/kg	1.0			< 1.0
Tetrachloromethane		M	2760	µg/kg	1.0			< 1.0
1,1-Dichloropropene		U	2760	µg/kg	1.0			< 1.0
Benzene		M	2760	µg/kg	1.0			< 1.0
1,2-Dichloroethane		M	2760	µg/kg	2.0			< 2.0
Trichloroethene		N	2760	µg/kg	1.0			< 1.0
1,2-Dichloropropane		M	2760	µg/kg	1.0			< 1.0
Dibromomethane		M	2760	µg/kg	1.0			< 1.0
Bromodichloromethane		M	2760	µg/kg	5.0			< 5.0
cis-1,3-Dichloropropene		N	2760	µg/kg	10			< 10
Toluene		M	2760	µg/kg	1.0			2.0
Trans-1,3-Dichloropropene		N	2760	µg/kg	10			< 10
1,1,2-Trichloroethane		M	2760	µg/kg	10			< 10
Tetrachloroethene		M	2760	µg/kg	1.0			< 1.0
1,3-Dichloropropane		U	2760	µg/kg	2.0			< 2.0
Dibromochloromethane		U	2760	µg/kg	10			< 10
1,2-Dibromoethane		M	2760	µg/kg	5.0			< 5.0
Chlorobenzene		M	2760	µg/kg	1.0			< 1.0
1,1,1,2-Tetrachloroethane		M	2760	µg/kg	2.0			< 2.0
Ethylbenzene		M	2760	µg/kg	1.0			1.4
m & p-Xylene		M	2760	µg/kg	1.0			3.8
o-Xylene		M	2760	µg/kg	1.0			2.8
Styrene		M	2760	µg/kg	1.0			< 1.0
Tribromomethane		U	2760	µg/kg	1.0			< 1.0
Isopropylbenzene		M	2760	µg/kg	1.0			< 1.0
Bromobenzene		M	2760	µg/kg	1.0			< 1.0
1,2,3-Trichloropropane		N	2760	µg/kg	50			< 50
N-Propylbenzene		U	2760	µg/kg	1.0			< 1.0
2-Chlorotoluene		M	2760	µg/kg	1.0			< 1.0

Results - Soil

Project: Village Hotel, Reading

Client: E3P		Chemtest Job No.:				25-24794	25-24794	25-24794
Quotation No.: Q24-35882		Chemtest Sample ID.:				2006790	2006791	2006792
		Client Sample ID.:				WS101	WS102	WS103
		Sample Type:				SOIL	SOIL	SOIL
		Top Depth (m):				0.50	1.20	1.40
		Date Sampled:				22-Jul-2025	22-Jul-2025	22-Jul-2025
		Time Sampled:				0:00	0:00	0:00
		Asbestos Lab:				DURHAM	DURHAM	DURHAM
Determinand	HWOL Code	Accred.	SOP	Units	LOD			
1,3,5-Trimethylbenzene		M	2760	µg/kg	1.0			1.5
4-Chlorotoluene		U	2760	µg/kg	1.0			< 1.0
Tert-Butylbenzene		U	2760	µg/kg	1.0			< 1.0
1,2,4-Trimethylbenzene		M	2760	µg/kg	1.0			3.3
Sec-Butylbenzene		U	2760	µg/kg	1.0			< 1.0
1,3-Dichlorobenzene		M	2760	µg/kg	1.0			< 1.0
4-Isopropyltoluene		U	2760	µg/kg	1.0			< 1.0
1,4-Dichlorobenzene		M	2760	µg/kg	1.0			< 1.0
N-Butylbenzene		U	2760	µg/kg	1.0			< 1.0
1,2-Dichlorobenzene		M	2760	µg/kg	1.0			< 1.0
1,2-Dibromo-3-Chloropropane		N	2760	µg/kg	50			< 50
1,2,4-Trichlorobenzene		M	2760	µg/kg	1.0			< 1.0
Hexachlorobutadiene		N	2760	µg/kg	1.0			< 1.0
1,2,3-Trichlorobenzene		U	2760	µg/kg	2.0			< 2.0
Methyl Tert-Butyl Ether		M	2760	µg/kg	1.0			< 1.0
N-Nitrosodimethylamine		M	2790	mg/kg	0.50			< 0.50
Phenol		M	2790	mg/kg	0.50			2.1
2-Chlorophenol		N	2790	mg/kg	0.50			< 0.50
Bis-(2-Chloroethyl)Ether		M	2790	mg/kg	0.50			< 0.50
1,3-Dichlorobenzene		M	2790	mg/kg	0.50			< 0.50
1,4-Dichlorobenzene		N	2790	mg/kg	0.50			< 0.50
1,2-Dichlorobenzene		M	2790	mg/kg	0.50			< 0.50
2-Methylphenol		M	2790	mg/kg	0.50			1.8
Bis(2-Chloroisopropyl)Ether		N	2790	mg/kg	0.50			< 0.50
Hexachloroethane		N	2790	mg/kg	0.50			< 0.50
N-Nitrosodi-n-propylamine		M	2790	mg/kg	0.50			< 0.50
4-Methylphenol		M	2790	mg/kg	0.50			1.7
Nitrobenzene		N	2790	mg/kg	0.50			< 0.50
Isophorone		M	2790	mg/kg	0.50			< 0.50
2-Nitrophenol		N	2790	mg/kg	0.50			< 0.50
2,4-Dimethylphenol		N	2790	mg/kg	0.50			1.5
Bis(2-Chloroethoxy)Methane		M	2790	mg/kg	0.50			< 0.50
2,4-Dichlorophenol		N	2790	mg/kg	0.50			< 0.50
1,2,4-Trichlorobenzene		M	2790	mg/kg	0.50			< 0.50
Naphthalene		M	2790	mg/kg	0.50			160
4-Chloroaniline		N	2790	mg/kg	0.50			< 0.50
Hexachlorobutadiene		M	2790	mg/kg	0.50			< 0.50
4-Chloro-3-Methylphenol		N	2790	mg/kg	0.50			< 0.50

Results - Soil

Project: Village Hotel, Reading

Client: E3P		Chemtest Job No.:				25-24794	25-24794	25-24794
Quotation No.: Q24-35882		Chemtest Sample ID.:				2006790	2006791	2006792
		Client Sample ID.:				WS101	WS102	WS103
		Sample Type:				SOIL	SOIL	SOIL
		Top Depth (m):				0.50	1.20	1.40
		Date Sampled:				22-Jul-2025	22-Jul-2025	22-Jul-2025
		Time Sampled:				0:00	0:00	0:00
		Asbestos Lab:				DURHAM	DURHAM	DURHAM
Determinand	HWOL Code	Accred.	SOP	Units	LOD			
2-Methylnaphthalene		M	2790	mg/kg	0.50			22
4-Nitrophenol		N	2790	mg/kg	0.50			< 0.50
2,4,6-Trichlorophenol		N	2790	mg/kg	0.50			< 0.50
2,4,5-Trichlorophenol		N	2790	mg/kg	0.50			< 0.50
2-Chloronaphthalene		M	2790	mg/kg	0.50			< 0.50
2-Nitroaniline		N	2790	mg/kg	0.50			< 0.50
Acenaphthylene		M	2790	mg/kg	0.50			1.3
Dimethylphthalate		M	2790	mg/kg	0.50			< 0.50
2,6-Dinitrotoluene		N	2790	mg/kg	0.50			< 0.50
Acenaphthene		M	2790	mg/kg	0.50			24
3-Nitroaniline		N	2790	mg/kg	0.50			< 0.50
Dibenzofuran		M	2790	mg/kg	0.50			24
4-Chlorophenylphenylether		M	2790	mg/kg	0.50			< 0.50
2,4-Dinitrotoluene		N	2790	mg/kg	0.50			< 0.50
Fluorene		M	2790	mg/kg	0.50			22
Diethyl Phthalate		M	2790	mg/kg	0.50			< 0.50
4-Nitroaniline		N	2790	mg/kg	0.50			< 0.50
Azobenzene		M	2790	mg/kg	0.50			< 0.50
4-Bromophenylphenyl Ether		M	2790	mg/kg	0.50			< 0.50
Hexachlorobenzene		M	2790	mg/kg	0.50			< 0.50
Phenanthrene		M	2790	mg/kg	0.50			210
Anthracene		M	2790	mg/kg	0.50			38
Carbazole		M	2790	mg/kg	0.50			25
Di-N-Butyl Phthalate		N	2790	mg/kg	0.50			< 0.50
Fluoranthene		M	2790	mg/kg	0.50			220
Pyrene		M	2790	mg/kg	0.50			180
Butylbenzyl Phthalate		N	2790	mg/kg	0.50			< 0.50
Benzo[a]anthracene		M	2790	mg/kg	0.50			98
Chrysene		M	2790	mg/kg	0.50			100
Bis(2-Ethylhexyl)Phthalate		N	2790	mg/kg	0.50			< 0.50
Di-N-Octyl Phthalate		N	2790	mg/kg	0.50			< 0.50
Benzo[b]fluoranthene		M	2790	mg/kg	0.50			110
Benzo[k]fluoranthene		M	2790	mg/kg	0.50			37
Benzo[a]pyrene		M	2790	mg/kg	0.50			87
Indeno(1,2,3-c,d)Pyrene		N	2790	mg/kg	0.50			41
Dibenz(a,h)Anthracene		N	2790	mg/kg	0.50			15
Benzo[g,h,i]perylene		M	2790	mg/kg	0.50			47
Naphthalene		M	2800	mg/kg	0.10	0.33	0.99	73

Results - Soil

Project: Village Hotel, Reading

Client: E3P		Chemtest Job No.:				25-24794	25-24794	25-24794
Quotation No.: Q24-35882		Chemtest Sample ID.:				2006790	2006791	2006792
		Client Sample ID.:				WS101	WS102	WS103
		Sample Type:				SOIL	SOIL	SOIL
		Top Depth (m):				0.50	1.20	1.40
		Date Sampled:				22-Jul-2025	22-Jul-2025	22-Jul-2025
		Time Sampled:				0:00	0:00	0:00
		Asbestos Lab:				DURHAM	DURHAM	DURHAM
Determinand	HWOL Code	Accred.	SOP	Units	LOD			
Acenaphthylene		N	2800	mg/kg	0.10	0.20	< 0.10	0.77
Acenaphthene		M	2800	mg/kg	0.10	0.32	< 0.10	11
Fluorene		M	2800	mg/kg	0.10	0.53	< 0.10	10
Phenanthrene		M	2800	mg/kg	0.10	5.0	0.86	79
Anthracene		M	2800	mg/kg	0.10	1.3	0.28	17
Fluoranthene		M	2800	mg/kg	0.10	9.8	2.7	92
Pyrene		M	2800	mg/kg	0.10	8.2	2.4	74
Benzo[a]anthracene		M	2800	mg/kg	0.10	5.2	1.4	44
Chrysene		M	2800	mg/kg	0.10	5.1	1.4	45
Benzo[b]fluoranthene		M	2800	mg/kg	0.10	7.8	2.1	53
Benzo[k]fluoranthene		M	2800	mg/kg	0.10	2.7	0.74	19
Benzo[a]pyrene		M	2800	mg/kg	0.10	7.0	1.9	44
Indeno(1,2,3-c,d)Pyrene		M	2800	mg/kg	0.10	4.6	1.1	25
Dibenz(a,h)Anthracene		N	2800	mg/kg	0.10	0.78	0.28	5.6
Benzo[g,h,i]perylene		M	2800	mg/kg	0.10	3.3	0.98	23
Total Of 16 PAH's		N	2800	mg/kg	2.0	62	17	620
Total Phenols		M	2920	mg/kg	0.10	< 0.10	0.39	15

Test Methods

SOP	Title	Parameters included	Method summary	Water Accred.
2010	pH Value of Soils	pH at 20°C	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 <30°C.	
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES	
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.	
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry	
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.	
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N-dimethyl-p-phenylenediamine.	
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.	
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-diphenylcarbazine.	
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.	
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID	
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.	
2790	Semi-Volatile Organic Compounds (SVOCs) in Soils by GC-MS	Semi-volatile organic compounds(cf. USEPA Method 8270)	Acetone/Hexane extraction / GC-MS	
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	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-MS	
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.	

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

Text example All items indicated in italic font represent customer-supplied information that may not be independently verified by the laboratory
This report shall not be reproduced except in full, and only with the prior approval of the laboratory.
Any comments or interpretations are outside the scope of UKAS accreditation.
The Laboratory is not accredited for any sampling activities and reported results relate to the samples 'as received' at the laboratory.
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 EPH, VPH, TPH, BTEX, VOCs, SVOCs, PCBs, Phenols.
For all other tests the samples were dried at $\leq 30^{\circ}\text{C}$ 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.

NEW_ASB Eurofins Chemtest Limited, 11 Depot Road, Newmarket, CB8 0AL
DURHAM Eurofins Chemtest Limited, Unit A North Wing, Prospect Business Park, Crookhall Lane, Consett, Co Durham, DH8 7PW

Sample Deviation Codes

As a result of any of the below deviations applying, the test results may be unreliable

- 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 - The required amount of sample for analysis was not received
- H - Appropriate cooling measures were not taken for sample transportation

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.

Report Information

Water Sample Category Key for Accreditation

DW - Drinking Water
GW - Ground Water
LE - Land Leachate
NA - Not Applicable
PL - Prepared Leachate
PW - Processed Water
RE - Recreational Water
SA - Saline Water
SW - Surface Water
TE - Treated Effluent
TS - Treated Sewage
UL - Unspecified Liquid

Clean Up Codes

NC - No Clean Up
MC - Mathematical Clean Up
FC - Florisil Clean Up

HWOL Acronym System

HS - Headspace analysis
EH - Extractable hydrocarbons – i.e. everything extracted by the solvent
CU - Clean-up – e.g. by Florisil, silica gel
1D - GC – Single coil gas chromatography
Total - Aliphatics & Aromatics
AL - Aliphatics only
AR - Aromatic only
2D - GC-GC – Double coil gas chromatography
#1 - EH_2D_Total but with humics mathematically subtracted
#2 - EH_2D_Total but with fatty acids mathematically subtracted
+ - Operator to indicate cumulative e.g. EH+EH_Total or EH_CU+HS_Total

Asbestos Tests LOD = LOQ

Limit of Detection = Limit of Quantification for asbestos results only

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

APPENDIX III: TIER 2 CHEMICAL ASSESSMENT (COMMERCIAL END USE)





Table A Summary of Inorganic and Hydrocarbon Toxicity Assessment for a Commercial End Use

DETERMINANT	UNIT	GAC	N	MC	LOC. OF EX	PL	ASSESSMENT
Arsenic	mg/kg	640	6	15	—	1	No Further Action
Cadmium	mg/kg	190	6	0.26	—	1	No Further Action
Chromium (VI)	mg/kg	33	6	<0.50	—	1	No Further Action
Lead	mg/kg	2300	6	160	—	1	No Further Action
Mercury	mg/kg	58	6	0.49	—	2	No Further Action
Nickel	mg/kg	980	6	25	—	1	No Further Action
Selenium	mg/kg	12000	6	0.59	—	1	No Further Action
Copper	mg/kg	68000	6	160	—	1	No Further Action
Zinc	mg/kg	730000	6	140	—	1	No Further Action
Cyanide – Total	mg/kg	791	6	3.10	—	1	No Further Action
Phenols – Total	mg/kg	440	6	15	—	1	No Further Action
Asbestos	Fibres	NFD	2	NFD	—	3	No Further Action
Naphthalene	mg/kg	190	6	160	—	4	No Further Action
Acenaphthylene	mg/kg	83000	6	1.3	—	2	No Further Action
Acenaphthene	mg/kg	84000	6	24	—	1	No Further Action
Fluorene	mg/kg	63000	6	22	—	1	No Further Action
Phenanthrene	mg/kg	22000	6	210	—	2	No Further Action
Anthracene	mg/kg	520000	6	38	—	2	No Further Action
Fluoranthene	mg/kg	23000	6	220	—	2	No Further Action
Pyrene	mg/kg	54000	6	180	—	2	No Further Action
Benzo(a) Anthracene	mg/kg	170	6	98	—	2	No Further Action
Chrysene	mg/kg	350	6	100	—	2	No Further Action
Benzo(b) Fluoranthene	mg/kg	44	6	110	WS103 – 1.40m	2	No Further Action
Benzo(k) Fluoranthene	mg/kg	1200	6	37	—	2	No Further Action
Benzo(a) Pyrene	mg/kg	35	6	87	WS103 – 1.40m	2	No Further Action
Indeno (123-cd) Pyrene	mg/kg	500	6	41	—	2	No Further Action
Dibenzo (a,h) Anthracene	mg/kg	3.5	6	15	WS103 – 1.40m	2	No Further Action
Benzo(ghi) Perylene	mg/kg	3900	6	47	—	2	No Further Action
TPH C6-C8 (aliphatic)*	mg/kg	2000	6	27	—	4	No Further Action
TPH C8-C10 (aliphatic)*	mg/kg	9700	6	90	—	4	No Further Action
TPH C10-C12 (aromatic)*	mg/kg	36000	6	940	—	4	No Further Action
TPH C12-C16 (aromatic)*	mg/kg	28000	6	860	—	4	No Further Action
TPH C16-C21 (aromatic)*	mg/kg	28000	6	5900	—	1	No Further Action

Notes

PL1 = soil ingestion, PL2 = dermal contact and ingestion, PL3 = dust inhalation; PL4 = Vapour/Gas inhalation
Abbreviations: GAC = general assessment criteria, N = number of samples, MC = maximum concentration; Loc of Ex = location of exceedance; PL = Contaminant pathway of that contaminant.

*The Tier 2 GAC for the hydrocarbon fraction is derived from the CIEH assessment for petroleum hydrocarbons Criteria Working Group (CWG) for both aliphatic and aromatic compounds. E3P has utilised the Tier 2 values for aliphatic compounds for the volatile and semi volatile fractions (C5-C12) and the Tier 2 values for aromatic compound for the non-volatile fractions (C12-C35). The comparison of a total (aliphatic/aromatic) compounds to an individual fraction is considered to be a conservative approach and satisfactory for the protection of human health.

APPENDIX IV: GROUND GAS RISK ASSESSMENT METHODOLOGY





GROUND GAS RISK ASSESSMENT METHODOLOGY

The potential impact on the development from ground gases has been assessed with reference to standards and guidelines published in:

- ✳ CIRIA Report 665 – Assessing risks posed by hazardous ground gases to buildings (2007)
- ✳ BS8485:2015+A1:2019 – Code of Practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings

BS8485 provides guidance on the level of gas protection requirements based upon the characteristic situation (CS) and the proposed development based on building type.

Therefore, in accordance with BS8485, based on the measured flow rates and hazardous gas concentrations, individual hazardous gas flow rates (Q_{hg}) shall be derived for each monitoring point, from which the site characteristic hazardous gas flow rate (Q_{hgs}), and then the Characteristic Situation (CS) can be determined.

The following equation should be utilised:

$$Q_{hg} = q \left(\frac{C_{hg}}{100} \right)$$

Where:

q is the measured flow rate (in litres per hour) of combined gases from the monitoring standpipe
 C_{hg} is the measured hazardous gas concentration (in percentage volume/volume).

The subsequent derived gas screening value (GSV) should be the maximum Q_{hg} (flow rate x concentration as a percentage volume) for all the monitoring events.

A 'worst case check' may be carried out using the maximum recorded flow in any hole with the maximum concentration in any hole to present the plausible worst-case conditions. Adoption of the worst case Q_{hg} requires thorough justification and reference to the CSM.

The final derived GSV can then be used to characterise the site as summarised in Table B.

Table B Site Characterisation by GSV (BS8485:2015)

CS	HAZARD POTENTIAL	GSV (L/HR) FOR METHANE AND CARBON DIOXIDE	ADDITIONAL FACTORS
CS1	Very Low	< 0.07	Typically <1% methane concentration and <5% carbon dioxide concentration (otherwise consider an increase to CS2)
CS2	Low	< 0.70	Typical measured flow rate <70 l/h (otherwise consider an increase to CS3)
CS3	Moderate	< 3.5	N/A
CS4	Moderate to High	< 15	N/A
CS5	High	< 70	N/A
CS6	Very High	> 70	N/A
Notes <i>The CS is equivalent to the characteristic GSV in CIRIA C665.</i> <i>The worst-case ground gas regime identified on the site, either methane or carbon dioxide, at the worst-case temporal conditions that the site may be expected to encounter should be considered.</i> <i>Gas Screening Value is the Borehole Gas Volume Flow Rate, in litres per hour, multiplied by the concentration in the air stream of the particular gas being considered.</i> <i>The Gas Screening Value thresholds should not generally be exceeded without the completion of a detailed ground gas risk assessment taking into account site-specific conditions.</i>			

It should be noted that in the first instance, this assessment has been carried out in accordance with BS8485:2015+A1(2019).

APPENDIX V: BGS RADON REPORT



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Urmston
Manchester
M41 7JQ

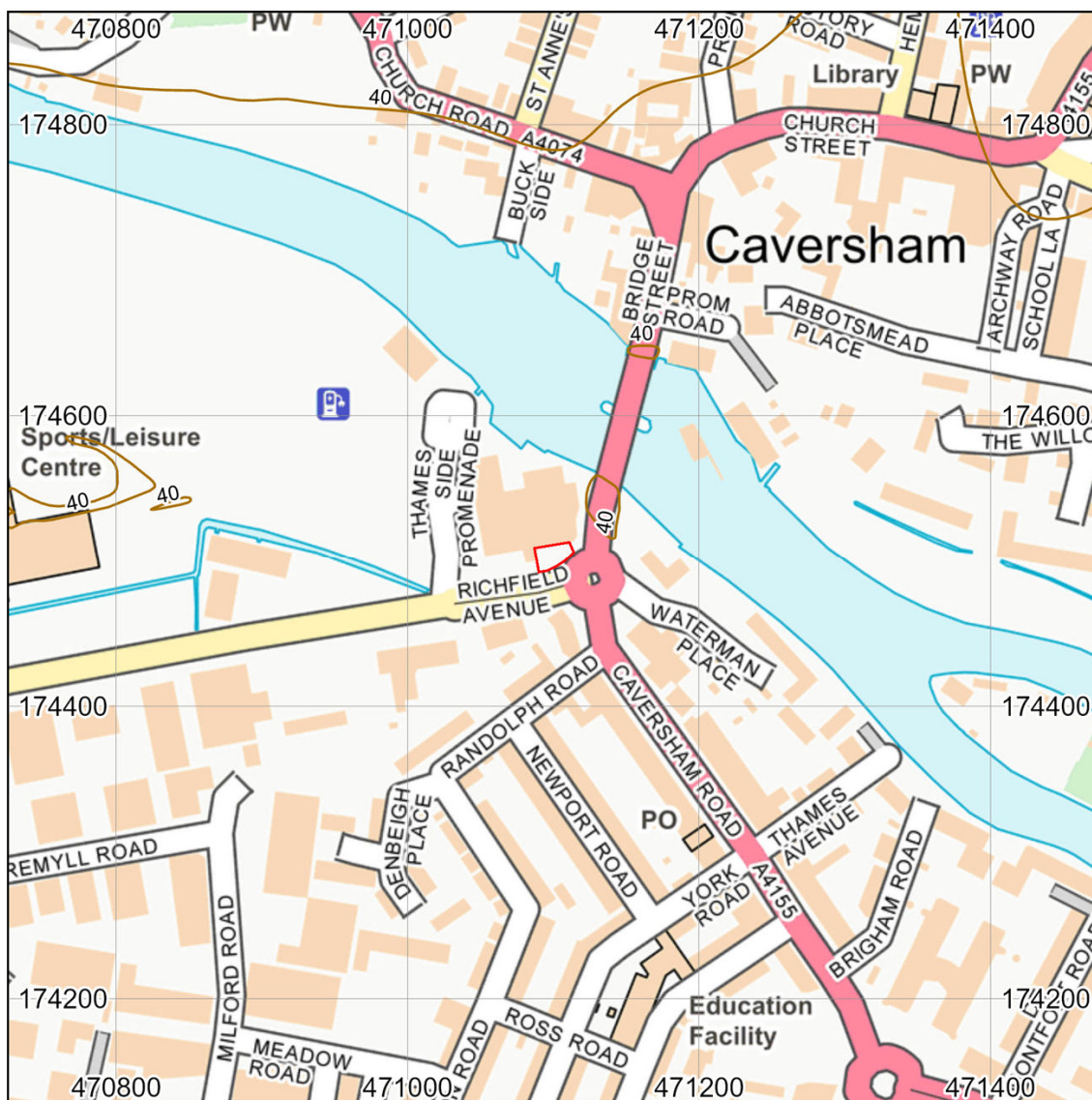
Radon Report

Advisory report on the requirement for radon protective measures in new buildings, conversions and extensions to existing buildings. The report also indicates whether a site is located within a radon Affected Area

Report Id: *BGS_344332/62332*

Client reference:

Search location



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Search location indicated in red

This report describes a site located at National Grid Reference 471100, 174502.

Note that for sites of irregular shape, this point may lie outside the site boundary.

Where the client has submitted a site plan the assessment will be based on the area given.

Radon Report: UK

When extensions are made to existing buildings in high radon areas, or new buildings are constructed in these areas, the Building Regulations for England, Wales, Scotland and Northern Ireland require that protective measures are taken against radon entering the building.

This report provides information on whether radon protective measures are required. Depending on the probability of buildings having high radon levels, the Regulations may require either:

1. No protective measures
2. Basic protective measures
3. Full protective measures

This is an advisory report on the requirement for radon protective measures in new buildings, conversions and extensions. The report also indicates whether a site is located within a radon Affected Area

Requirement for radon protective measures

The determination below follows advice in *BR211 Radon: Guidance on protective measures for new buildings (2023 edition)*, which also provides guidance on what to do if the result indicates that protective measures are required.

Is the property in an area where radon protective measures are required for new buildings or extensions to existing ones as described in publication BR211 (2023 edition) Radon: Guidance on protective measures for new buildings?

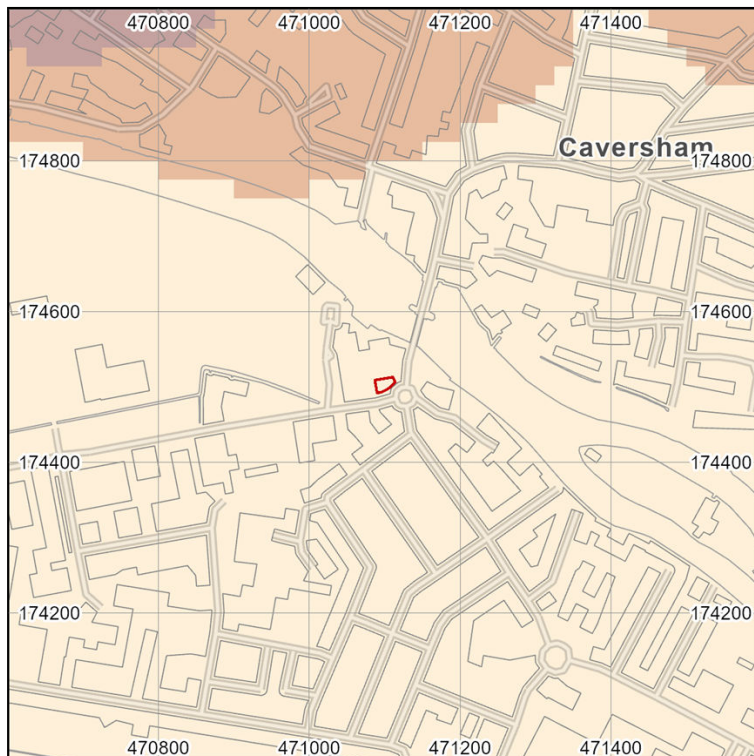
NO RADON PROTECTIVE MEASURES ARE REQUIRED FOR THE REPORT AREA.

More details of the protective measures required are available in *BR211 Radon: Guidance on protective measures for new buildings (2023 Edition)*.

Whether or not the radon level in a building is above or below the radon Action Level can only be established by having the building tested. The UKHSA provides a radon testing service which can be accessed at www.ukradon.org or by telephone (01235 822622).

If you require further information or guidance, you should contact your local authority building control officer or approved inspector.

Radon Affected Area



% Homes estimated to be at or above the action level
0-1%
1-3%
3-5%
5-10%
10-30%
30-100%

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Scale: 1:10 000 (1cm = 100 m)

Search area indicated in red

Is the property in a radon Affected Area as defined by the UK Health Security Agency (UKHSA) and if so what percentage of homes are estimated to be at or above the Action Level? **NO**

Additional Information

THE PROPERTY IS IN AN AREA WHERE LESS THAN 1% OF HOMES ARE ESTIMATED TO BE AT OR ABOVE THE ACTION LEVEL. THE PROPERTY IS NOT IN A RADON AFFECTED AREA.

The UKHSA recommends a radon 'Action Level' of 200 Becquerels per cubic metre of air (Bq m^{-3}) for the annual average of the radon gas concentration in a home. Where 1% or more of homes are estimated to be at or above the Action Level the area should be regarded as a radon Affected Area.

This report informs you whether the property is in a radon Affected Area and the percentage of homes that are estimated to be at or above the radon Action Level at this location. Being in an Affected Area does not necessarily mean there is a high radon level within the property; the only way to determine the radon level is to carry out a radon measurement.

The UKHSA advises that radon gas should be measured in all properties within radon Affected Areas and that homes with radon levels at or above the Action Level (200 Bq m⁻³) should be remediated. Householders with levels between the Target Level (100 Bq m⁻³) and Action Level should seriously consider reducing their radon level, especially if they are at greater risk, such as if they are current or ex smokers. Whether or not a home is in fact above or below the Action Level or Target Level can only be established by having the building tested. The UKHSA provides a validated radon testing service which can be accessed at www.ukradon.org.

The information in this report provides an answer to one of the standard legal enquiries on house purchase in England and Wales, known as Law Society CON29 Enquiries of the Local Authority (2016); 3.14 Radon Gas: Do records indicate that the property is in a “Radon Affected Area” as identified by the UKHSA. The data can also be used to advise house buyers and sellers in Scotland and Northern Ireland.

If you are buying a new build property in a Radon Affected Area, you should ask the builder whether radon protective measures were incorporated in the construction of the property.

If you are buying a currently occupied property in a radon Affected Area, you should ask the present owner whether radon levels have been measured in the property. If they have, ask whether the results were at or above the radon Action Level and if so, whether remedial measures were installed, radon levels were re-tested, and if the results of re-testing confirmed the effectiveness of the measures.

Further information on radon is available from the UKHSA at www.ukradon.org.

What is radon?

Radon is a naturally occurring radioactive gas, which is produced by the radioactive decay of radium which, in turn, is derived from the radioactive decay of uranium. Uranium is found in small quantities in all soils and rocks, although the amount varies from place to place. Radon released from rocks and soils is quickly diluted in the atmosphere. Concentrations in the open air are normally very low and do not present a hazard. Radon that enters enclosed spaces such as some buildings (particularly basements), caves, mines, and tunnels may reach high concentrations in some circumstances. The construction method and degree of ventilation will influence radon levels in individual buildings. A person's exposure to radon will also vary according to how particular buildings and spaces are used.

Inhalation of the radioactive decay products of radon gas increases the chance of developing lung cancer. If individuals are exposed to high concentrations for significant periods of time, there may be cause for concern. In order to limit the risk to individuals, the Government has adopted an Action Level for radon in homes of 200 becquerels per cubic metre (Bq m^{-3}). The Government advises householders that, where the radon level is at or above the Action Level, measures should be taken to reduce the concentration.

Radon in workplaces

The Ionising Radiation Regulations 2017 require employers to take action when radon is present above a defined level in the workplace. Advice may be obtained from your local Health and Safety Executive Area Office or the Environmental Health Department of your local authority. The BRE publishes a guide (BR293): **Radon in the workplace**. BRE publications may be obtained from the BRE Bookshop, Tel: 01923 664262, email: bookshop@bre.co.uk website: www.brebookshop.com

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