

GROUND GAS ADDENDUM

Site:	Grey Mare Lane – Site 1
References:	16-908-R3-1
Date:	20 June 2025
Client:	Great Places Housing Group





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QUALITY ASSURANCE

Report references

16-908-R3-1

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This report has been prepared for the sole benefit, use, and information of the client. The liability of Environmental Engineering Partnership Limited T/A E3P with respect to the information contained in the report will not extend to any third party.

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DRAWING LIST

16-908-001 - Site Location Plan
16-908-002 - Proposed Development Plan



1. INTRODUCTION

1.1. BACKGROUND

E3P has previously completed a ground investigation on the site located off Grey Mare Lane, Beswick, Manchester, M11 3TF. The findings of the ground investigation are presented within the E3P report entitled Phase II Geoenvironmental Site Assessment (Report reference 16-908-R2-1, dated June 2024).

During the investigation E3P installed three ground gas monitoring wells, which were to be monitored over a period of three months after installation. The data collected from the gas monitoring wells are summarised in this report and this comprises the completed ground gas assessment.

1.2. PROPOSED DEVELOPMENT

E3P understands that Great Places Housing Group are involved with the proposed redevelopment, consisting of 3-6 storey residential block comprising a total of 82no. apartments with associated communal areas, cycle store, landscaping, and parking courtyard. Drawing Ref: 16-908-R3-1 (APPENDIX IV) identifies the proposed development layout.

A snapshot of the proposed development layout is indicated in Figure 1.1.

Figure 1.1 Snapshot of Proposed Development





1.3. OBJECTIVES AND SCOPE

The objectives of the ground gas addendum report are to provide a detailed assessment of ground gas risk based on all available data from the E3P ground investigation works.

1.4. LIMITATIONS

The limitations of this report are presented in APPENDIX I.

1.5. CONFIDENTIALITY

E3P has prepared this report solely for the use of the client and those parties with whom a warranty agreement has been executed or with whom an assignment has been agreed. Should any third party wish to use or rely upon the report's contents, written approval must be sought from E3P; a charge may be levied against such consent.



2. GROUND GAS RISK ASSESSMENT

2.1. PRELIMINARY MINE GAS ASSESSMENT

If coal mining is present below the site, this may be a potential source of ground gas that could pose a risk to site end users. A preliminary mine gas assessment is provided in Table 2.1.

Table 2.1 Preliminary Mine Gas Assessment

SCENARIO	DISCUSSION	RATING
Are There Known Coal Seams Beneath the Site?	Yes – four known coal seams dip below the site.	Moderate
Are There Coal Seams Within 150m of the Top of the Bedrock?	Yes – the coal seams beneath the site are known to be as shallow as 114 m bgl.	Moderate
Are There Any Known Workings Below the Site?	Yes – there are known workings at 114 m bgl.	Moderate
Are the Underlying Drift Deposits Impermeable?	Yes – the site is underlain by circa 16 m of clay.	Low
Are There Any Mine Entrances Within the Site Boundary or Within 50m of the Site?	Yes – there is one mine shaft located in close proximity to site, situated 25 m northeast.	Moderate/High
Are There Any Faults Below the Site or In Close Proximity?	No	Low
Is There Any Records of Mine Gas Emission on Or Within 50m of the Site	No	Low
Is There Any Record of Historical Mine Stabilisation Works?	No	Low
Evidence of Rising Groundwater in Flooded Mine Workings?	Not known	Moderate
Overall Mine Gas Risk		Moderate

Conclusion

Source

The site is underlain by known coal workings at 114 m bgl, which presents a potential source of ground gas.

Pathway

The site is underlain by 16m of permeable clay; therefore, the likelihood of mine gas migration through the clay to the ground surface is low. However, there is a known mine shaft in proximity to the site, which could create a preferential pathway for mine gasses to reach the ground surface.

Recommendations

Further consideration and/or assessment is required to assess the potential for mine gas to migrate up mine shafts to the ground surface.



2.2. RATIONALE

Hazardous ground gas qualitative risk assessment is based on a conceptual site model (CSM) similar to that used for soil and groundwater 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.

2.3. SOURCES AND PATHWAYS OF GROUND GAS

Table 2.2 summarises the potential sources and pathways of ground gas within the context of the recorded site setting and proposed development.

Table 2.2 Identified Potential Sources of Ground Gas

SOURCE

Made Ground

Made Ground was encountered within all exploratory hole locations to a maximum proven depth of 1.30 m bgl (WS104), however, typically Made Ground deposits were encountered at depths less than 0.80 m bgl.

The Made Ground deposits underlying concrete and asphalt generally comprised sandy gravel and gravelly clay with fragments of brick, concrete, timber, plastic, slag and clinker.

As the Made Ground is shallow, the potential for ground gas generation is limited.

Superficial Strata

The superficial deposits generally comprised CLAY with gravel of sandstone, mudstone and coal.

No potential sources of hazardous ground gas were identified in the superficial deposits.

Bedrock Strata

The bedrock geology was encountered between 15.10 m and 16.10m bgl to a termination depth of 30.00 m bgl.

The solid geology comprises grey to dark grey MUDSTONE interbedded with occasional beds of brownish grey sandstone. In RB103, in the western sector, the MUDSTONE is underlain by grey SANDSTONE with occasional bands of grey mudstone.

The site is located in a development high risk area. There are no mine entries located on site, however one is situated 25 m northeast of the site. The mine entry is known to be in association with the Bradford Colliery which is situated approximately 20m northeast of the site. Known workings have been recorded 114 m bgl under the site.

No evidence of viable coal seams was encountered during the investigation, with no voids, broken ground or loss of flush recorded that would typically be indicative of shallow workings.

The mine shaft located 25 m northeast does not have any recorded remedial action completed, therefore potentially providing preferential pathway for the migration of mine gas from underlying worked coal seams.

Landfill Sites

There are no active or historical landfills within 250 m of the site.

Other Gases

5-10% of homes are estimated to be at or above the radon Action Level. Basic radon protection measures are required.



Elevated total mercury identified at TP103 presents a potential volatilisation to indoor air risk. Therefore, during a process of cut/fill enabling works, a hotspot removal should be undertaken where these soils may be chemically validated to assess chemical suitability for retention on site in an area of no future sensitivity.

2.4. MONITORING FREQUENCY

The CIRIA C665 guidance on gas risk assessment includes recommendations for periods 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 comprises private residential properties, which would be classified as a Type A development (high sensitivity) in accordance with BS8485:2015+A1:2019. However, it is considered that the likely generation potential of the identified gas sources (taking into account the likelihood of future increases in gas generation) would be best classified as low.

Therefore, within the context of the proposed residential end-use and ground gas generation potential, the gas assessment requires six visits over three months, with at least two sets of readings at low or falling atmospheric pressure.

2.5. 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.
- 🔦 CL:AIRE Publication “Good Practice for Risk Assessment for Coal Mine Gas Emissions” (October 2021)

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 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 2.3.

Table 2.3 Site Characterisation by GSV (BS8485:2015+A1:2019)

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

- 1) The CS is equivalent to the characteristic GSC in CIRIA C665.
- 2) 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.
- 3) 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.
- 4) 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.

2.6. 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 point 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 2.4.

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.

2.7. SUMMARY OF MONITORING RESULTS

Table 2.4 presents the ground gas and groundwater monitoring results to date.



Table 2.4 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	Natural CLAY	07/03/2024	0.10	0.10	0.0001	0.90	0.80	0.0009	16.4	1014	Falling	0.10	0.10	1.00-2.70	2.62	1.71
		25/03/2024	0.10	0.10	0.0259	2.40	2.40	0.6216	12.8	990	Falling	25.9	0.10		2.69	1.89
		11/04/2024	0.10	0.10	0.0001	3.50	3.50	0.0035	10.9	1016	Steady	0.10	0.10		2.69	1.50
		25/04/2024	0.10	0.10	0.0001	4.20	4.30	0.0043	10.9	996	Falling	0.10	0.10		2.67	1.21
		17/05/2024	0.10	0.10	0.0001	2.50	2.50	0.0025	14.8	1001	Steady	0.10	0.10		2.67	1.17
		06/06/2024	0.10	0.10	0.0001	2.20	2.20	0.0022	15.0	1010	Rising	0.10	0.10		2.67	1.12
WS104	Made Ground	07/03/2024	0.10	0.10	0.0001	4.30	4.30	0.0043	12.8	1014	Falling	0.10	0.10	0.50-1.00	1.01	Dry
		25/03/2024	0.10	0.10	0.0001	4.70	4.60	0.0047	13.6	990	Falling	0.10	0.10		1.04	Dry
		11/04/2024	0.10	0.10	0.0001	5.00	5.00	0.0050	12.9	1015	Steady	0.10	0.10		1.04	Dry
		25/04/2024	0.10	0.10	0.0001	5.30	5.30	0.0053	12.2	995	Falling	0.10	0.10		1.04	Dry
		17/05/2024	0.10	0.10	0.0001	3.90	4.00	0.0040	18.0	1001	Steady	0.10	0.10		1.04	Dry
		06/06/2024	0.10	0.10	0.0001	3.80	3.80	0.0038	17.2	1007	Rising	0.10	0.10		1.04	Dry
WS106	Natural CLAY	07/03/2024	0.10	0.10	0.0001	0.20	0.10	0.0002	20.4	1015	Falling	0.10	0.10	1.00-3.00	2.86	2.35
		25/03/2024	0.10	0.10	0.0001	0.40	0.40	0.0004	20.0	990	Falling	0.10	0.10		2.88	1.17
		11/04/2024	0.10	0.10	0.0001	0.20	0.50	0.0005	19.9	1016	Steady	0.10	0.10		2.89	1.49
		25/04/2024	0.10	0.10	0.0001	0.20	0.90	0.0009	19.7	995	Falling	0.10	0.10		2.89	1.24
		17/05/2024	0.10	0.10	0.0001	2.10	1.80	0.0021	19.2	1001	Steady	0.10	0.10		2.89	1.36
		6/06/2024	0.10	0.10	0.0001	3.20	3.20	0.0032	17.9	1007	Rising	0.10	0.10		2.89	1.52



Notes

CIRIA Characteristic Situation	Q_{hg}		
CS1	<0.07	Typical Max CO ₂ <5 % Typical Max CH ₄ <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	



2.8. GROUNDWATER

The water level within several of the monitoring wells was recorded to be above the top of the response zone or within 0.50 m of the top of the response zone (flooded) on a number of occasions, as summarised in Table 2.5, thus rendering some of the monitoring data unreliable.

Table 2.5 **Flooded Monitoring Well Data**

WELL	VISIT 1	VISIT 2	VISIT 3	VISIT 4	VISIT 5	VISIT 6
WS101	-	-	-	Y	Y	Y
WS104	-	-	-	-	-	-
WS106	-	Y	Y	Y	Y	-

Due to the predominantly low permeability cohesive superficial stratum, it is likely that water levels are representative of surface water collecting within the standpipes and not a true representation of groundwater.

2.9. BAROMETRIC PRESSURE

The monitoring visits were undertaken during periods of steady, falling and rising pressure, with pressure recorded to be between 990 – 1016 mb.

It is therefore considered that the visits have been undertaken over representative conditions.

2.10. GAS FLOW

Throughout the monitoring period, flow rates were generally recorded to be 0.1 l/hr (limit detection of the analyser).

A single elevated peak flow rate of 25.9 l/hr was recorded in WS101 during the second monitoring visit. This is likely to be associated with high groundwater levels causing compression in the monitoring well.

2.11. GAS CONCENTRATIONS

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 0.1 % v/v to 5.3 % v/v (WS104).

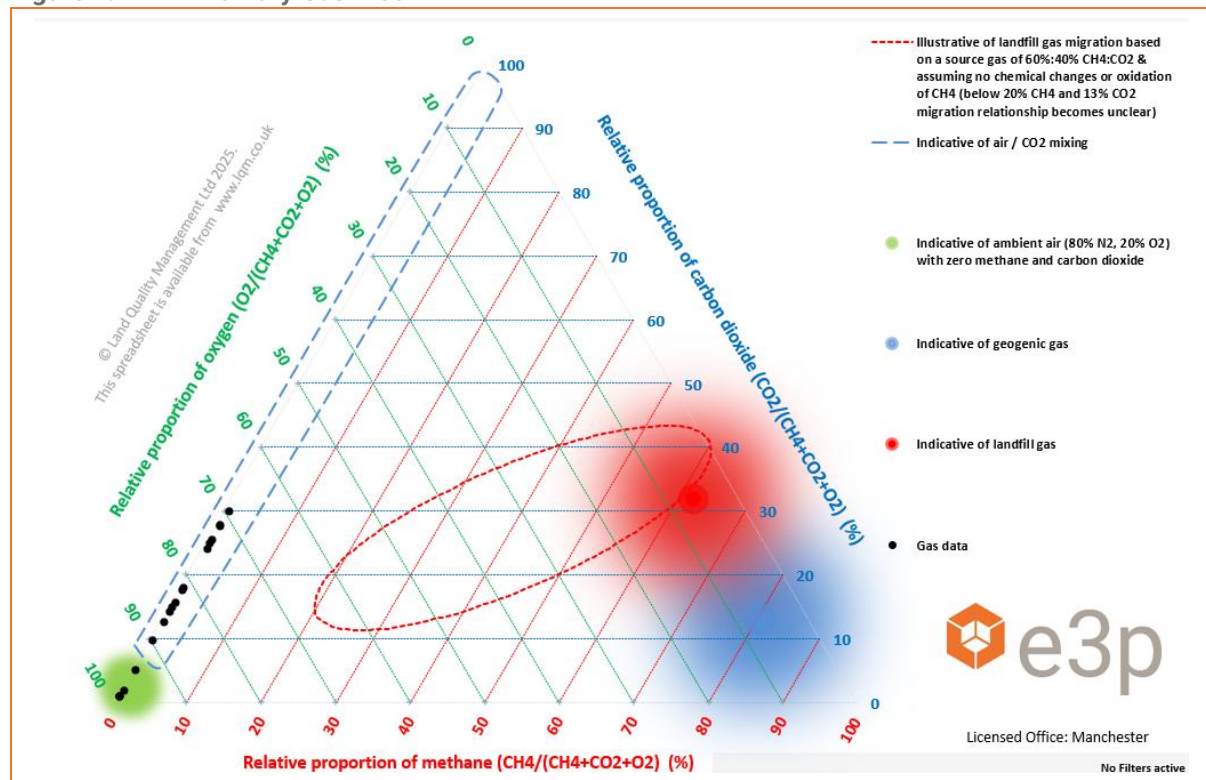
2.12. TERNARY PLOT

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 (such as Glacial Till), 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 2.1 shows the ternary gas plot for the gas monitoring data.



Figure 2.1 Ternary Gas Plot



The ternary gas plot suggests that the data is indicative of ambient air and air/CO₂ mixing, therefore there is considered to be a low risk.

3. RADON RISK

The site is in an area where between 5% and 10% of homes are above the Radon Action Level, therefore basic radon protection measures will need to be incorporated into any proposed new dwellings.

All sites registered from 1st December 2022 onwards will have been assessed against the updated radon maps by NHBC and will be required to have radon protection measures installed in accordance with the updated mapping.

Figure 3.1 indicates that based on the 5%-10% area observed, the site falls under a Radon Potential Class of 4 within the User Guide for the HPA-BGS Joint Radon Potential Dataset for Great Britain (Ref: IR/11/044, dated 2011).

A Radon potential class of 4 indicates that basic Radon Measures are required in all new dwellings, as shown in Figure 3.1.



Figure 3.1 Radon Affected Area Potential Class

Radon Potential Class*	Is the property in a Radon Affected Area?	Additional information
1	No	The property is in a Lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level). The property is not in a radon affected area.
2	Yes	The property is in an Intermediate probability radon area (1 to 3% of homes are estimated to be at or above the Action Level). The property is in a radon affected area.
3	Yes	The property is an Intermediate probability radon area (3 to 5% of homes are estimated to be at or above the Action Level). The property is in a radon affected area.
4	Yes	The property is in an Intermediate probability radon area (5 to 10% of homes are estimated to be at or above the Action Level). The property is in a radon affected area.
5	Yes	The property is in a Higher probability radon area (10 to 30% of homes are estimated to be at or above the Action Level). The property is in a radon affected area.
6	Yes	The property is in a Higher probability radon area (more than 30% of homes are estimated to be at or above the Action Level). The property is in a radon affected area.

*The Radon Potential Class number should not be included in answers.

Source: User Guide for the HPA-BGS Joint Radon Potential Dataset for Great Britain (Ref: IR/11/044, dated 2011)

Figure 3.2 Radon Affected Area Measures Required

Radon Potential Class*	What level of radon protective measures are required for new buildings in England and Wales?	What level of radon protective measures are required for new dwellings in Scotland?
1	None**	None**
2	None	Stage 1
3	Basic	Stage 1
4	Basic	Stage 1
5	Full	Stage 2
6	Full	Stage 2

*The Radon Potential Class number should not be included in answers.

** in 2008 HPA recommended that building regulations be amended to ensure that all new buildings, extensions etc. include basic radon protective measures. At the time of writing, relevant UK authorities were considering this advice.

*in 2008 HPA recommended that building regulations be amended to ensure that all new buildings, extensions etc include basic radon protective measures. At the time of writing, relevant UK authorities were considering this advice. Basic radon protection measures are required to be installed as Section 5.1 of BRE211_2015: Radon Guidance on protective measures for new buildings.



Section 5.1 of BRE211_2015 states:

*"For basic protection measures, the damp-proof course (DPC) to a cavity wall should be in the form of a cavity tray to prevent radon from entering the building through the cavity. Sealing of joints in the barrier and sealing around service penetrations are also required. It is important that attention is paid to detailing and workmanship in jointing of the barrier.
If good standards of design and workmanship are applied to the provision of a 1200 gauge damp-proof barrier to the floor sealed to a DPC/cavity tray through the walls, adequate protection from radon will be provided along with the general function of excluding moisture."*

For all new dwellings constructed after 1st September 2023, in line with changes to the British Board of Agreement (BBA) building standards, plots requiring basic radon measures will require a specialized Radon Membrane, with a minimum thickness of 0.4mm thick (1600 gauge) suitably installed and validated.

4. CONCLUSION

The determined Characteristic Situation for each standpipe is presented in Table 4.1. The data from flooded monitoring wells has been excluded from the below assessment.

Table 4.1 Gas Profile and Location

WELL	MAX FLOW (l/hr)	MAX CH4 (%V/V)	MAX CH4 Qhg (l/hr)	MAX CO2 (%V/V)	MAX CO2 Qhg (l/hr)	CHARACTERISTIC SITUATION
WS101	25.9	0.1	0.0259	3.5	0.6216	CS2
WS104	0.1	0.1	0.0001	5.3	0.0053	CS1
WS106	0.1	0.1	0.0001	3.2	0.0032	CS1

In the vicinity of WS104, carbon dioxide has been identified marginally above the 5% v/v threshold, however the GSV is noted to be within a CS1 classification. It is likely that the high groundwater levels are causing compression in the wells.

With regards to WS101, if the Qhg for CO₂ is calculated using the steady flow rate rather than the peak flow rate, this would be calculated as 0.0024 l/hr. This is likely to be more representative given the single elevated peak flow rate observed during the monitoring.

Houses located within 50 metres of an abandoned mine shaft may be at risk from the ingress of hazardous mine gases such as methane and carbon dioxide. These gases can migrate from unflooded or partially flooded mine workings through preferential pathways, particularly where permeability in the overlying ground is increased by geological features or development-related disturbance.

Mine shafts can act as point sources of gas, and where shallow workings, fractured strata, or man-made penetrations exist, gas may travel laterally and accumulate beneath buildings. The risk is highest within 20–50 metres of a shaft, where dispersion and dilution are limited.

Monitoring is often insufficient to intercept these migration routes. Borehole gas monitoring is constrained by the number, location, and spacing of installations, and may fail to detect narrow or localised preferential pathways. Gas emissions can also be driven by changes in barometric pressure, rising groundwater, and temperature variations, further complicating the reliability of short-term monitoring results.



As a result, a precautionary approach is warranted, particularly where gas migration cannot be ruled out and the consequences of accumulation could include explosion or asphyxiation. Installation of gas protection measures in accordance with BS 8485:2015 + A1:2019 for Characteristic Situation 2 (CS2) is considered reasonable in such circumstances.

It is recommended that the full ground gas assessment and recommended protection measures (if applicable) are agreed with the local authority prior to their adoption on site. Furthermore, all protection measures adopted should be validated by a suitably qualified engineer.

As the radon risk is classified within Radon Class 4, the proposed development will require a specialised Radon Membrane, with minimum thickness of 0.40mm thick (1600 gauge) suitably installed and validated.

END OF REPORT

Appendix I: Limitations





GENERAL

This report and any associated works (together comprising the "Services") were compiled and carried out by E3P for the client (as present in Section 1) under the E3P "Terms of Business" or with those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed and outlined in the body of the report.

Unless explicitly agreed otherwise, in writing, this report has been prepared under E3P Standard Terms and Business as included within our proposal to the Client.

Project-specific appointment documents may be agreed upon at our discretion and a charge may be levied for both the time to review and finalise appointment documents and also for associated changes to the appointment terms. E3P reserves the right to amend the fee should any changes to the appointment terms create an increased risk to E3P.

The report needs to be considered in light of the proposal and associated limitations of scope. The report needs to be read in full and isolated sections cannot be used without full reference to other elements of the report and any previous works referenced within the report.

INTRUSIVE INVESTIGATION REPORTS

Coverage: The following report titles (or combination) may cover this category of work: Geoenvironmental Site Investigation; Geotechnical Assessment; GIR (Ground Investigation Reports); Preliminary Environmental and Geotechnical Risk Assessment; Preliminary Summary; Coal Mining Risk Assessment, Ground Gas Addendum; and Geotechnical Risk Register.

The investigation has been undertaken to provide information concerning either:

- The type and degree of contamination present at the site in order to allow a generic quantitative risk assessment to be undertaken; or
- Information on the soil properties present at the site to allow for geotechnical development constraints to be considered.

The scope of the investigation was selected on the basis of the specific development and land use scenario proposed by the Client and may be inappropriate to another form of development or scheme. If the development layout was not known at the time of the investigation the report findings may need revisiting once the development layout is confirmed.

Unless otherwise specified in the scope of works, any site drawing(s) provided in this report is (are) not meant to be an accurate base plan but is (are) used to present the general relative locations of features on, and surrounding, the site. Features (intrusive and sample locations etc) annotated on site plans are not drawn to scale but are centred over the approximate location. Such features should not be used for setting out and should be considered indicative only.

For contamination purposes, the objectives of the investigation are limited to establishing the risks associated with potential contamination sources with the potential to cause harm to human health, building materials, the environment (including adjacent land), or controlled waters.

For geotechnical investigations, the purpose is to broadly consider potential development constraints associated with the physical property of the soils underlying the site within the context of the proposed future or continued use of the site, as stated within the report.

The amount of exploratory work, soil property testing and chemical testing undertaken has necessarily been restricted by various factors which may include accessibility, the presence of services; existing buildings; current site usage or short timescales. The exploratory holes completed assess only a small



percentage of the area in relation to the overall size of the Site, and as such can only provide a general indication of conditions.

The number of sampling points and the methods of sampling and testing do not preclude the possible existence of contamination where concentrations may be significantly higher than those actually encountered or ground conditions that vary from those identified. In addition, there may be exceptional ground conditions elsewhere on the site which have not been disclosed by this investigation and which have therefore not been taken into account in this report.

The inspection, testing and monitoring records relate specifically to the investigation points and the timeframe that the works were undertaken. They will also be limited by the techniques employed. As part of this assessment, E3P has used reasonable skill and care to extrapolate conditions between these points based on assumptions to develop our interpretation and conclusions.

The assumption made in forming our conclusions is that the ground and groundwater conditions (both chemically and physically) are the same as have been encountered during the works undertaken at the specific points of investigation and at the time of the investigation.

Conditions can change between investigation points both spatially and over time and these interpretations should therefore be considered indicative. The assessment of extreme weather events and their impact on ground conditions is not within the scope of E3P's work.

The risk assessment and opinions provided are based on currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values. Specific assumptions associated with the risk assessment process have been outlined within the body or associated appendix of the report.

Additional investigations may be required in order to satisfy relevant planning conditions or to resolve any engineering and environmental issues.

Where soil contamination concentrations recorded as part of this investigation are used for commentary on the potential waste classification of soils for disposal purposes, these should be classed as indicative only. Due consideration should be given to the variability of contaminant concentrations taken from targeted samples versus bulk excavated soils and the potential variability of contaminant concentrations between sampling locations. Where major waste disposal operations are considered, targeted waste classification investigations should be designed and the waste classification and any subsequent disposal option agreed upon with licenced subcontractors and/or the relevant regulators.

The results of the asbestos testing are factually reported and interpretation is given as to how this relates to the previous use of the site, the types of ground encountered and site conceptualisation. This does not however constitute a formal asbestos assessment. These results should be treated cautiously and should not be relied upon to provide detailed and representative information on the delineation, type and extent of bulk ACMs and/or trace loose asbestos fibres within the soil matrix at the site.

If costs have been included in relation to additional site works, and/or site remediation works these must be considered as indicative only and must be confirmed by a qualified quantity surveyor.

EUROCODE 7: GEOTECHNICAL DESIGN

On 1st April 2010, BS EN 1997-1:2004 (Eurocode 7: Geotechnical Design – Part 1) became the mandatory baseline standard for geotechnical ground investigations.

In terms of geotechnical design for foundations, slopes, retaining walls and earthworks, EC7 sets guidance on design procedures including specific guidance on the numbers and spacings of boreholes for geotechnical design, there are limits to methods of ground investigation and the quality of data obtained and there are also prescriptive methods of assessing soil strengths and methods of design. Unless otherwise explicitly stated, the work has not been undertaken in accordance with EC7. A



standard geotechnical interpretative report will not meet the requirements of the Geotechnical Design Report (GDR) under Eurocode 7. The GDR can only be prepared following confirmation of all structural loads and serviceability requirements. The report is likely to represent a Ground Investigation Report (GIR) under the Eurocode 7 guidance.

DETAILED QUANTITATIVE RISK ASSESSMENTS AND REMEDIATION AND ENABLING WORK STRATEGY REPORTS

These reports build upon previous report versions and associated notes. The scope of the investigation, further testing and monitoring and associated risk assessments were selected based on the specific development and land use scenario proposed by the Client and may not be appropriate to another form of development or scheme layout. The risk assessment and opinions provided are based on currently available approaches in the generation of Site Specific Assessment Criteria relating to contamination concentrations and are not considered to represent a risk in a specific land use scenario to a specific receptor. No liability can be accepted for the retrospective effects of any future changes or amendments to these values, associated models or associated guidance.

The outputs of the Detailed Quantitative Risk Assessments are based upon the manipulation of standard risk assessment models. These are our interpretation of the risk assessment criteria.

Before adoption on-site, assessment criteria will need to be discussed and agreed upon with the Regulatory Authorities prior to adoption on site. The regulatory discussion and engagement process may result in an alternative interpretation being determined and agreed. The process and timescales associated with the Regulatory Authority engagement are not within the control of E3P. All costs and programmes presented as a result of this process should be validated by a quantity surveyor and should be presumed to be indicative.

E3P does not accept liability for any subcontract work that has not been completed in strict accordance with an approved E3P Remediation and Enabling Works Strategy.

GEOTECHNICAL DESIGN REPORT (GDR)

The GDR can only be prepared following confirmation of all structural loads and serviceability requirements. All the relevant information needs to be provided to allow for a GDR to be produced.

MONITORING (INCLUDING REMEDIATION MONITORING REPORTS AND BUILD PHASE MITIGATION)

These reports are factual and comprise monitoring, normally groundwater and ground gas and data provided by contractors as part of earthworks or remedial works.

The data is presented and will be compared with assessment criteria.

Appendix II: Glossary





ACM	Asbestos-containing material	MMP	Materials management plan
ADS	Acoustic design statement	ND	Not detected
AST	Above-ground storage tank	NDP	Nuclear density probe
BGS	British Geological Survey	NMP	Noise management plan
BSI	British Standards Institute	NPSE	Noise policy statement for England
BTEX	Benzene, toluene, ethylbenzene, xylenes	NR	Not recorded
MRA	Mining Remediation Authority	PAH	Polycyclic aromatic hydrocarbon
CBR	California bearing ratio	PCB	Polychlorinated biphenyl
CIEH	Chartered Institute of Environmental Health	PI	Plasticity index
CIRIA	Construction Industry Research Association	PID	Photo ionisation detector
CLEA	Contaminated land exposure assessment	POS	Public open space
CML	Council of Mortgage Lenders	PPE	Personnel protective equipment
CoC	Contaminants of concern	ProPG	Professional practice guidance
CSM	Conceptual site model	QA	Quality assurance
DNAP L	Dense non-aqueous phase liquid (chlorinated solvents, PCB)	SGV	Soil guideline value
DWS	Drinking water standard	SPH	Separate-phase hydrocarbon
EA	Environment Agency	SPT	Standard penetration test
EQS	Environmental quality standard	SVOC	Semi-volatile organic compound
FFL	Finished floor level	TPH	Total and speciated petroleum hydrocarbon
GAC	General assessment criteria	TPH CWG	Total Petroleum Hydrocarbon (Criteria Working Group)
GL	Ground level	UKWIR	United Kingdom Water Infrastructure Risk
GSV	Gas screening value	UST	Underground storage tank
HCV	Health criteria value	VCC	Vibro-concrete column
ICSM	Initial conceptual site model	VOC	Volatile organic compound
LEL	Lower explosive limit	VRSC	Vibro-replacement stone columns
LMRL	Lower method reporting limit	VSC	Vibro-stone columns
LNAP L	Light non-aqueous phase liquid (petrol, diesel, kerosene)	WHO	World Health Organisation
MCV	Moisture condition value	WRAP	Waste and Resources Action Programme



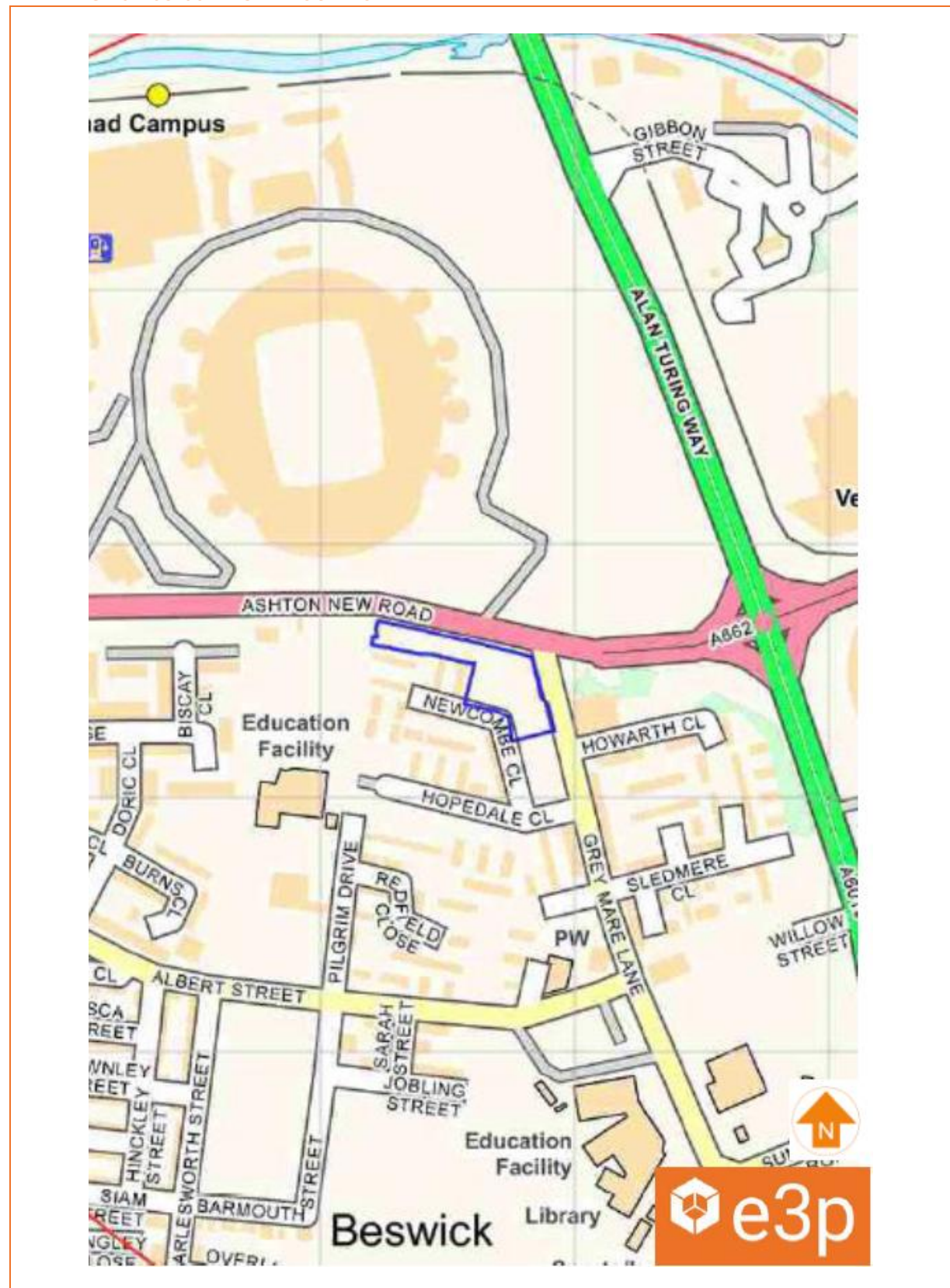
MIBK	Methyl isobutyl ketone	WTE	Water table elevation
m	Metres	ppm	Parts per million
km	Kilometres	mg/m³	Milligram per metre cubed
% v/v	Percent volume in air	m bgl	Metres below ground level
mb	Millibars (atmospheric pressure)	m bcl	Metre below cover level
l/hr	Litres per hour	mAOD	Metres above ordnance datum (sea level)
µg/l	Micrograms per litre (parts per billion)	kN/m²	Kilonewtons per metre squared
ppb	Parts per billion	µm	Micrometre
mg/kg	Milligrams per kilogram (parts per million)	SSRT	Site Specific Remediation Target
PSD	Particle Size Distribution	DD	Dry Density
CL:AI RE	Contaminated Applications in Land: Real Environments	Mc	Moisture Content
ρ	Bulk Density	GPR	Ground Penetrating Radar
NDP	Nuclear Density Probe	FFL	Finished Floor Level
LEL	Lower Explosive Limit	UKWIR	UK Water Industry Research
CIRIA	Construction Industry Research and Information Association	LOD	Limit of Detection
PFAS	Per- and Poly-Fluorinated Substances	PFOA	Perfluorooctanoic Acid

Appendix III: Drawings



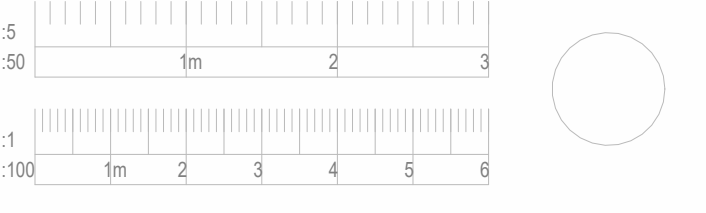


DRAWING 16-908-001 – SITE LOCATION PLAN





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Report Errors and Omissions to the Architect.
Check all dimensions on site.
Drawing to be read in conjunction with the Health and Safety Plan and all relevant Risk Assessments.



Schedule of Accommodation			
House Type	Area	Count	
1b2p	50 m ²	28	
1b2p	51 m ²	24	
1b2p	52 m ²	5	
		57	70%
2b3p	61 m ²	14	
2b3p	63 m ²	2	
2b3p	64 m ²	5	
2b3p	67 m ²	4	
		25	30%
		82	

6 No. Accessible = 7% Total Car Parking

H	7/03/25	KLM	Amended to suit landscape plans.		CL
G	17/02/25	KLM	Updated to suit revised ground floor plan. Cycle store increased in size. Schedule of accommodation updated.		
F	16/12/24	KLM	Updated to suit revised ground floor plan.		CL
E	30/10/24	KS	Building & site plan updated.		KLM
D	15/08/24	KLM	Paths amended. Schedule of accommodation updated.		
C	14/08/24	ACo	Internal layouts, window positions, and schedule of accommodation amended.		MD
B	30/07/24	KLM	Minor updates.		
A	12/07/24	KS	Graphics updated for consultation.		MD
Rev.	Date	Drn.			Chkd.

BowkerSadler

Project
Grey Mare Lane

Client
Great Places Housing Group

Drawing
Proposed Site Plan

Scale	Sheet Size	Drawn	Checked	Date			
1 : 200	@ A1	KS	MD	31/05/2024			
Project No.	Originator	Zone	Level	Form	Discipline	Number	Revision
22-049 - BSA -					A - 1005 H		
Status							
Planning							
Hatherlow House, Hatherlow, Romiley, Stockport, SK6 3DY							
0161 406 7333 office@bowker-sadler.co.uk www.bowker-sadler.co.uk							

Proposed Site Plan
1 : 200

