



Ground Gas Addendum Report
Land South of Lickers Lane, Whinston

Reference: 15-065-R3-1
Date: March 2022



GROUND GAS ADDENDUM REPORT

Land South of Lickers Lane
Whinston
Prescot
L35 3JE

Prepared for:



Report Ref: 15-065-R3-1
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Land South of Lickers Lane

Ground Gas Addendum

March 2022

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1. INTRODUCTION

1.1. BACKGROUND

E3P has previously completed a ground investigation on the site known as Land to the south of Lickers Lane, Prescott. The findings of the ground investigation are presented within the E3P report entitled 15-065-R2-1- Phase II GSA - Land south of Lickers Lane - Report reference 15-065-R2-1, dated November 2021).

During the investigation, E3P installed six ground gas monitoring wells, which were to be monitored over a period of three months after installation with at least two sets of readings at low or falling atmospheric pressure. 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

At the time of this report being prepared E3P understands that Vistry Partnerships considering the proposed acquisition and future redevelopment of a parcel of land to the south of Lickers Lane, Whiston for low rise residential housing with associated adopted estate roads and utility infrastructure.

1.3. OBJECTIVES

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 contents of the report, written approval must be sought from E3P; a charge may be levied against such approval.

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.

2.1. GROUND CONDITIONS

Topsoil deposits were formed from dark grey to black slightly clayey, gravelly SAND with frequent rootlets. Gravels were made up of fine to medium subrounded to rounded of mudstone and sandstone.

Drift deposits were encountered within all exploratory hole locations and consisted of granular medium dense gravelly SAND becoming dense at depth within weathered sandstone. Clay deposits were identified within the central northern sector of the site which comprised of firm to very stiff medium to very high strength gravelly clays.

The solid bedrock geology was encountered between 1.00 m and 40.00 m bgl. The bedrock was consistent across the site being formed of yellow brown SANDSTONE.

Groundwater was not encountered during the site investigation.

2.2. SOURCES AND PATHWAYS OF GROUND GAS (CSM)

In this instance, the CSM (15-065-R2, November 2021) identified the following potential sources of ground gas:

-  Localised pockets of Made Ground;
-  Infilled features (field boundaries);
-  Extensive topsoil deposits;
-  Granular drift deposits; and
-  Coal workings

No landfill sites (current or historic) are located within 250 m of the site.

There is potential for localised ground gas migration in proximity of the identified sources.

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 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.

3. GROUND GAS RISK ASSESSMENT

3.1. 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 3.1.

TABLE 3.1 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

1. The CS is equivalent to the characteristic GSV 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.

NHBC guidance (Report No 10627R01) can also be considered, if appropriate, which is based on standard residential houses with precast concrete floors (block and beam) / suspended cast in situ concrete floor slabs.

The thresholds for GSVs based upon NHBC guidance are provided within Table 3.2.

TABLE 3.2 THRESHOLDS FOR GAS SCREENING VALUES (GSV) IN ACCORDANCE WITH NHBC REPORT NO 10627R01 – RESIDENTIAL END USE

NHBC – SUBFLOOR VOID				
CLASSIFICATION	Methane ¹		Carbon Dioxide ¹	
	TYPICAL MAXIMUM CONCENTRATION ³ (%V/V)	GAS SCREENING VALUE ^{2,4} (l/hr)	TYPICAL MAXIMUM CONCENTRATION ³ (%V/V)	Gas Screening Value ^{2,4} (l/hr)
Green	< 1	< 0.16	< 5	< 0.78
Amber 1	< 5	< 0.63	< 10	< 1.56
Amber 2	< 5	< 1.56	< 30	< 3.10
Red	> 20	> 1.56	> 30	> 3.10

Notes

1. 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 will be the decider as to what Traffic Light is allocated;
2. Gas Screening Value is the Borehole Gas Volume Flow Rate, in litres per hour, as defined in Wilson and Card (1999), which is the borehole flow rate multiplied by the concentration in the air stream of the particular gas being considered;
3. The Typical Maximum Concentrations can be exceeded in certain circumstances should the Conceptual Site Model indicate it is safe to do so;
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.

It should be noted that in the first instance, this assessment has been carried out in accordance with BS8485:2015 and the thresholds given in Table 3.1.

3.2. MONITORING METHODOLOGY

Concentrations of methane (CH₄), carbon dioxide (CO₂) and oxygen (O₂) (hydrogen sulphide) 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 500 seconds at each location, 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 3.2.

In addition to the raw data, the results for each individual standpipe have been assessed with reference to guidance provided in BS8485:2015. 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 ultimately be determined.

TABLE 3.2 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	Granular Drift	04/11/2021	0.1	0.1	0.0001	1.4	1.4	0.0014	19.1	1009	Steady	0.1	0.1	0.50-1.50	1.39	Dry	
		15/11/2021	0.1	0.1	0.0001	2.1	1.9	0.0021	19	1020	Rising	0.1	0.1		1.4	1.2	
		10/12/2021	0.1	0.1	0.0001	2.6	2.6	0.0026	18.1	1023	Steady	0.1	0.1		1.4	0.9	
		31/12/2021	0.1	0.1	0.0001	2.3	1.4	0.0023	18.1	996	Falling	0.1	0.1		1.4	1.2	
		20/01/2022	-0.1	-0.1	- 0.0001	0.1	0.1	0.0001	19.4	1032	Steady	0.1	0.1		1.49	Dry	
		28/01/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.8	1021	Falling	0.1	0.1		1.49	Dry	
WS102	Granular Drift	04/11/2021	0.1	0.1	0.0001	4.1	4.1	0.0041	15.2	1009	Steady	0.1	0.1	0.50-1.00	0.86	Dry	
		15/11/2021	0.1	0.1	0.0001	4.1	4.1	0.0041	16	1020	Rising	0.1	0.1		0.9	Dry	
		10/12/2021	0.1	0.1	0.0001	3.7	3.6	0.0037	15.7	1023	Steady	0.1	0.1		0.9	0.5	
		31/12/2021	0.1	0.1	0.0001	3.5	3.5	0.0035	15.7	996	Falling	0.1	0.1		0.9	0.5	
		20/01/2022	0.1	-0.1	0.0001	0.1	0.1	0.0001	19.3	1032	Steady	0.1	0.1		0.95	Dry	
		28/01/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.8	1021	Falling	0.1	0.1		0.95	Dry	
WS103	Granular Drift	04/11/2021	0.1	0.1	0.0001	1.6	0.8	0.0016	19	1009	Steady	0.1	0.1	0.50-1.50	1.1	Dry	
		15/11/2021	0.1	0.1	0.0001	5.6	5.1	0.0056	12.5	1020	Rising	0.1	0.1		1.1	Dry	
		10/12/2021	0.1	0.1	0.0001	4.7	4.2	0.0047	14	1023	Steady	0.1	0.1		1.1	Dry	
		31/12/2021	Well Flooded												1.1	GL	
		20/01/2022	-0.1	-0.1	- 0.0001	0.1	0.1	0.0001	19.3	1032	Steady	0.1	0.1		1.23	Dry	
		28/01/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.8	1021	Falling	0.1	0.1		1.23	Dry	

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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)	
WS104	Granular Drift	04/11/2021	0.1	0.1	0.0001	1.4	1.4	0.0014	18.7	1009	Steady	0.1	0.1	0.50-2.00	1.65	Dry	
		15/11/2021	0.1	0.1	0.0001	4.3	4.3	0.0043	16	1020	Rising	0.1	0.1		1.65	Dry	
		10/12/2021	0.1	0.1	0.0001	3.8	3.8	0.0038	16.2	1023	Steady	0.1	0.1		1.65	Dry	
		31/12/2021	Well Flooded												1.65	GL	
		20/01/2022	-0.1	-0.1	- 0.0001	0.1	0.1	0.0001	19.4	1032	Steady	0.1	0.1		1.92	Dry	
		28/01/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.8	1021	Falling	0.1	0.1		1.92	Dry	
WS105	Natural CLAY Drift	04/11/2021	Well Destroyed											0.70-1.70	N/A		
WS106	Natural CLAY Drift	04/11/2021	0.1	0.1	0.0001	3.3	3.3	0.0033	17.1	1009	Steady	0.1	0.1	0.50-2.50	2.5	2.2	
		15/11/2021	0.1	0.1	0.0001	2.8	2.6	0.0028	17.2	1020	Rising	0.1	0.1		2.5	Dry	
		10/12/2021	0.1	0.1	0.0001	2.5	1.8	0.0025	17	1023	Steady	0.1	0.1		2.5	1.8	
		31/12/2021	Well destroyed then repaired														
		20/01/2022															
		28/01/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.8	1021	Falling	0.1	0.1		2.42	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		

3.3. SUMMARY OF MONITORING RESULTS

3.3.1. GROUNDWATER

Two wells were flooded on one occasion on the 31/12/2021 (WS103 and WS104). Groundwater levels remained stable throughout the monitoring period.

3.3.2. BAROMETRIC PRESSURE

All visits were undertaken on days where atmospheric pressure was relatively low, with the lowest pressure being recorded on Visit 4 (31/12/2021), with a reading of 996 mbar.

Visit 2 were undertaken during periods of rising pressure and visits 4 and 6 was undertaken during a period of falling pressure, the remaining visits were taken over a steady pressure.

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

3.3.3. GAS FLOW

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

3.3.4. 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 5.1% v/v (WS103).

3.4. CONCLUSION

The determined Characteristic Situation for each standpipe for each visit is presented in Table 3.3. This indicates that based on the peak flow rates the majority of the monitoring visits classify as Characteristic Situation (CS)1 – Very Low Gas Risk.

TABLE 3.3 GAS RISK PROFILE AND LOCATION

WELL	DATE	DEPTH TO WATER (m bgl)	MAX FLOW (l/hr)	MAX CH ₄ (%V/V)	MAX CH ₄ Q _{hg} (l/hr)	MAX CO ₂ (%V/V)	MAX CO ₂ Q _{hg} (l/hr)	CHARACTERISTIC SITUATION	NHBC TRAFFIC LIGHT
WS101	04/11/2021	-	0.1	0.1	0.0001	1.4	0.0014	CS1	Green
	15/11/2021	1.2	0.1	0.1	0.0001	1.9	0.0021	CS1	Green
	10/12/2021	0.9	0.1	0.1	0.0001	2.6	0.0026	CS1	Green
	31/12/2021	1.2	0.1	0.1	0.0001	1.4	0.0023	CS1	Green
	20/01/2022	2	0.1	-0.1	-0.0001	0.1	0.0001	CS1	Green
	28/01/2022	2	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
WS102	04/11/2021	-	0.1	0.1	0.0001	4.1	0.0041	CS1	Green
	15/11/2021	-	0.1	0.1	0.0001	4.1	0.0041	CS1	Green
	10/12/2021	0.5	0.1	0.1	0.0001	3.6	0.0037	CS1	Green

WELL	DATE	DEPTH TO WATER (m bgl)	MAX FLOW (l/hr)	MAX CH ₄ (%V/V)	MAX CH ₄ Q _{hg} (l/hr)	MAX CO ₂ (%V/V)	MAX CO ₂ Q _{hg} (l/hr)	CHARACTERISTIC SITUATION	NHBC TRAFFIC LIGHT
	31/12/2021	0.5	0.1	0.1	0.0001	3.5	0.0035	CS1	Green
	20/01/2022	-	0.1	-0.1	0.0001	0.1	0.0001	CS1	Green
	28/01/2022	-	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
WS103	04/11/2021	-	0.1	0.1	0.0001	0.8	0.0016	CS1	Green
	15/11/2021	-	0.1	0.1	0.0001	5.1	0.0056	CS2	Amber 1
	10/12/2021	-	0.1	0.1	0.0001	4.2	0.0047	CS1	Green
	31/12/2021	-	0.1	0.1	0.0001	4.3	0.0043	CS1	Green
	20/01/2022	-	-0.1	-0.1	-0.0001	0.1	0.0001	CS1	Green
	28/01/2022	-	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
WS104	04/11/2021	1.46	0.1	0.1	0.0001	1.4	0.0014	CS1	Green
	15/11/2021	1.54	0.1	0.1	0.0001	4.3	0.0043	CS1	Green
	10/12/2021	1.65	0.1	0.1	0.0001	3.8	0.0038	CS1	Green
	31/12/2021	1.6	0.1	0.1	0.0001	3.8	0.0038	CS1	Green
	20/01/2022	1.7	0.1	-0.1	-0.0001	0.1	0.0001	CS1	Green
	28/01/2022	1.6	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
WS106	04/11/2021	2.2	0.1	0.1	0.0001	3.3	0.0033	CS1	Green
	15/11/2021	-	0.1	0.1	0.0001	2.6	0.0028	CS1	Green
	10/12/2021	1.8	0.1	0.1	0.0001	1.8	0.0025	CS1	Green
	28/01/2022	-	0.1	0.1	0.0001	0.1	0.0001	CS1	Green

E3P has assessed the previous variables and come to the following conclusions:

- ✳ Ground gas monitoring suggests that the site can be predominantly classified as CS1, and in these areas, it is considered that gas protection measures will not be required.
- ✳ In the vicinity of WS103, carbon dioxide has been identified above the 5% v/v threshold, however as this was an isolated occurrence and the GSV is noted to be within a CS1 classification for the remainder of the monitoring period. Additionally, the GSV fell into CS1 characteristic and therefore the overall gas risk can be reduced to CS1 Green.
- ✳ The elevated carbon dioxide is likely due to possible infilled field boundaries.
- ✳ With due consideration to the Conceptual Site Model and the absence of any persistent gas source and gas generation potential, it is considered by E3P that the site can be classified as CS1, and therefore no gas protection measures are required.

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.

END OF REPORT

APPENDIX I

LIMITATIONS

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between E3P and the client as indicated in Section 1.3.
2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information it has been assumed it is correct. No attempt has been made to verify the information.
3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination which are enforced by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.
4. During the site walkover, reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover, no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not been made known or accessible.
5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.
6. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.
7. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos containing materials, this is for indicative purposes only and do not constitute or replace full and proper surveys.
8. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.
9. E3P cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by E3P is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by E3P in this connection without their explicit written agreement there to by E3P.
10. New information, revised practices or changes in legislation may necessitate the reinterpretation of the report, in whole or in part.

APPENDIX II

GLOSSARY

TERMS

ACM	Asbestos containing material	MMP	Materials management plan
ADS	Acoustic design statement	ND	Not detected
AST	Aboveground 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
CA	Coal 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
DNAPL	Dense nonaqueous 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	Vibronaceae column
ICSM	Initial conceptual site model	VOC	Volatile organic compound
LEL	Lower explosive limit	VRSC	Vibroreplacement stone columns
LMRL	Lower method reporting limit	VSC	Vibrostone columns
LNAPL	Light nonaqueous 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

Land South of Lickers Lane

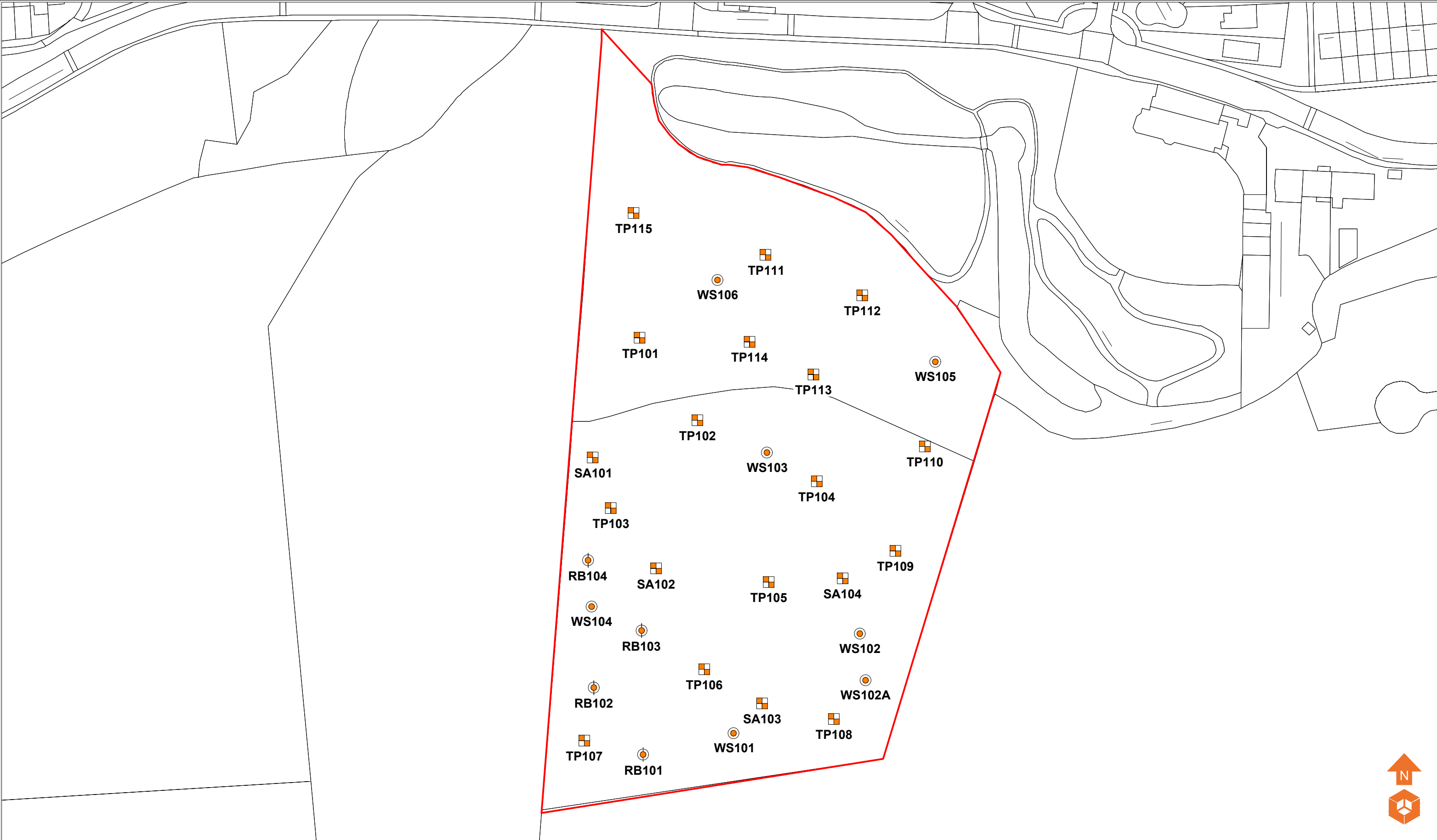
Ground Gas Addendum

March 2022

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:AIRE	Contaminated Land: Applications in 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

APPENDIX III

DRAWINGS



Location Symbols  WS101 Approximate Window Sample Probehole Location  TP101 Approximate Trial Pit Location  RB101 Approximate Rotary Borehole Location  SA101 Approximate Soakaway Test Location					Notes:					Client: Vistry		Job No: 15-065		Date: 25.11.2021		 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: 005		Scale: NTS@ A3																		
					<table><tr><td>P1</td><td>REVB</td><td>25.11.2021</td><td>LM</td><td>RH</td></tr><tr><td>P1</td><td>REVA</td><td>18.10.2021</td><td>EB</td><td>RH</td></tr><tr><td>Phase</td><td>Issue</td><td>Date</td><td>Drawn</td><td>Checked</td></tr></table>					P1	REVB	25.11.2021	LM	RH	P1	REVA	18.10.2021	EB	RH	Phase	Issue	Date	Drawn	Checked	Job Title: Halnsead, Lickers Lane		Drawing Title: Exploratory Hole Location 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	REVB	25.11.2021	LM	RH																										
P1	REVA	18.10.2021	EB	RH																										
Phase	Issue	Date	Drawn	Checked																										

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