



e3p

Validation Completion Report
Plots 1-54
Bowes Street, Manchester

Reference:11-813-R5-1
Date: March 2022



VALIDATION COMPLETION REPORT

Plots 1-54
Former Stagecoach Bus Depot
Land off Bowes Street
Manchester

Prepared for:
Rowlinson Construction

The Rowlinson logo, consisting of the word 'Rowlinson' in a bold, black, sans-serif font, enclosed within a thin black rectangular border.

Report Ref: 11-813-R5-1
Date Issued: March 2022

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QUALITY ASSURANCE

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QUALIFICATIONS	MSci (Hons), FGS		
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QUALIFICATIONS	BSc (Hons), FGS, CEnv		



Table of Contents

1. INTRODUCTION	3
1.1. Background	3
1.2. Objectives	3
1.3. Limitations	3
1.4. Confidentiality	3
2. GARDEN VALIDATION	4
3. CHEMICAL VALIDATION	5
3.1. Topsol and Subsoil	5
3.2. Chemical Validation	5
4. GAS MEMBRANE VALIDATION	6
4.1. Summary of Ground Gas Risk Assessment	6
4.2. Gas Membrane Validation	6
5. CONCLUSIONS	7
APPENDIX I LIMITATIONS	8
APPENDIX II GLOSSARY	10
APPENDIX III DRAWINGS	13
APPENDIX IV CHEMICAL TESTING RESULTS	14
APPENDIX V GAS MEMBRANE VALIDATION CERTIFICATES	15



1. INTRODUCTION

1.1. BACKGROUND

E3P Ltd has been commissioned by Rowlinson Construction to produce a Completion Report in relation to the validation of the garden plots and gas membrane installations for plots 1-54 at their newly constructed site at Bowes Street in Manchester.

Manchester City Council confirmed their general acceptance of the remediation works and subsequent validation works for the proposed residential development, pending the following information:

-  Validation of the 600 mm cover system; and
-  Validation of the ground gas protection measures.

Interim validation letters pertaining to the above have been produced previously, however all outstanding information is included within this report.

All acronyms used within this report are defined in the Glossary presented in Appendix II.

1.2. OBJECTIVES

E3P have been instructed to develop a detailed Validation Completion Report associated with the validation of the residential development that will incorporate the following:

-  Overview of the validation works undertaken on the development site within the garden areas;
-  Chemical laboratory analysis undertaken of the imported material; and
-  Overview of the validation works undertaken on the development site pertaining to the installation of gas protection measures to Amber 1 where required.

1.3. LIMITATIONS

The limitations of this report are presented in Appendix I.

1.4. 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. GARDEN VALIDATION

Independent validation of plots 1-54 was undertaken between 18th February 2020 and 24th June 2021. In total, twelve visits were made during which the depth of the cover system was measured to confirm the installation of 450 mm subsoil (imported) and 150 mm topsoil (imported) with photographs taken by way of validation.

All material used for the cover system was confirmed chemically suitable for use through chemical analysis, discussed further in Section 3.0. All validation works have been completed in strict accordance with the specification previously agreed with Manchester City Council.

Table 2.1 below shows the Garden Validation reference and date of validation for each garden area.

TABLE 2.1 SUMMARY OF GARDEN VALIDATIONS

DATE	REPORT NUMBER	PLOT NUMBER
18 th February 2020	V4	45, 46, 51-54
10 th August 2020	V5	47-50
25 th August 2020	V6	32-33, 35-39
18 th September 2020	V7	30-31
22 nd September 2020	V8	25-29, 34, 40-44
20 th January 2021	V9	4-6
9 th February 2021	V10	3 & 5
24 th February 2021	V11	2, 19-24
24 th February 2021	V12	1
31 st March 2021	V13	7-12
13 th May 2021	V14	13-16
24 th June 2021	V15	17-18

The full details of the cover system depths of each plot garden area are detailed within the individual letters issued, as per the report reference listed within Table 2.1. All garden validation letter reports are available on request.



3. CHEMICAL VALIDATION

3.1. TOPSOL AND SUBSOIL

All gardens and landscaped areas require a 600 mm chemically suitable cover system comprising at least 450 mm subsoil and 150 mm topsoil.

Topsoil

There was no suitable source of topsoil available on the site prior to remediation and enabling works. As such, topsoil was imported from Freeland Horticulture, Nook Lane, Astley and chemically validated by E3P to confirm suitability for use within the upper 150 mm cover system.

Subsoil

Subsoil was imported as a horticultural sand from Tarmac Crown Farm in Northwich and chemically validated by E3P to confirm suitability for use within the cover system.

3.2. CHEMICAL VALIDATION

Nine topsoil samples were submitted for chemical analysis, the results confirmed that the material is suitable for use within the 600 mm cover system within the residential development.

Laboratory certificates 19-55101, 20-21973 and 21-74222 provide the results for the topsoil testing, providing a validated volume of 450 m³ of topsoil.

Three samples of subsoil were analysed in accordance with the regulatory approved Remediation Strategy. Chemical analysis identified no contaminant exceedances; therefore, it has been determined that the subsoil would be suitable for utilisation within the proposed gardens.

Laboratory certificate 19-55101 provides analysis of the imported subsoil, providing a validated volume of 750 m³ of subsoil.

All samples were analysed in accordance with the regulatory approved Remediation Strategy

Furthermore, E3P inspected the materials intended for topsoil and subsoil. Chemical analysis identified no contaminant exceedances; therefore, it has been determined that the topsoil and subsoil is suitable for utilisation within the proposed gardens.

Sufficient samples have been obtained and analysed to meet the agreed sample frequency of 1 sample per 50 m³ topsoil and 1 sample per 250 m³ subsoil. Laboratory certificates have been attached within the individual garden validation letters and are also included within Appendix IV of this report.



4. GAS MEMBRANE VALIDATION

4.1. SUMMARY OF GROUND GAS RISK ASSESSMENT

The ground gas assessment, as detailed within the Capita Geo-Environmental Report, indicated that the site is Characteristic Situation 2 – Amber 1, thus requiring mitigation measures that conform to BS8485 (2015) (A1-2019) in the construction of new homes. Due to the presence of hydrocarbon vapours within the Made Ground, all plots all required the installation of a hydrocarbon resistant membrane to be constructed in accordance with BS8485 (2015).

4.2. GAS MEMBRANE VALIDATION

The ground gas membranes were validated within plots 1-54 with the full details included within the Gas Membrane Validation Certificates included within Appendix V.

In brief, the works included the validation of the following for each plot:

-  General condition of the membrane;
-  Verification of the joints; and
-  Verification of service entries and top hats.

Following the completion of the above, E3P can confirm that Plots 1-54 have been installed with gas protection measures in accordance with Amber 1 to an acceptable level of workmanship.



5. CONCLUSIONS

On completion of the validation works undertaken in relation to the installation of a chemically suitable cover system and gas protection measures, E3P can confirm that all works were undertaken in strict accordance with the agreed Remediation Strategy and therefore would deem the site suitable for use as a residential development.

E3P do not consider that any further work is necessary.

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 re-interpretation 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	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
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 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
LNAPL	Light non-aqueous phase liquid (petrol, diesel, kerosene)	WHO	World Health Organisation
MCV	Moisture condition value	WRAP	Waste and Resources Action Programme

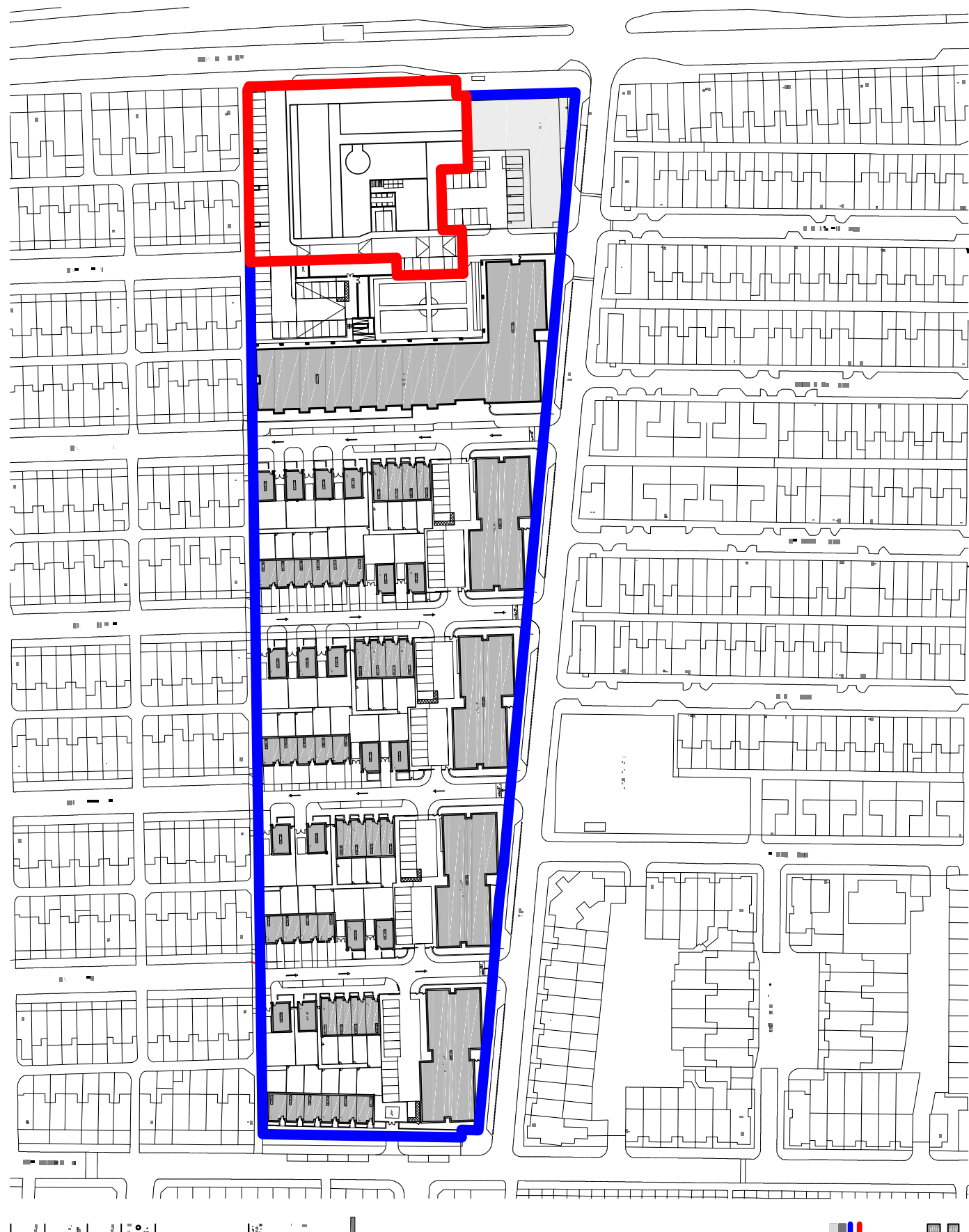


MIBK	Methyl isobutyl ketone	WTE	Water table elevation
m	Metres	ppm	Parts per million
km	Kilometres	mg/m³	Milligram per metre cubed
% v/v	Percent volume in air	m bgl	Metres below ground level
mb	Millibars (atmospheric pressure)	m bcl	Metre below cover level
l/hr	Litres per hour	mAOD	Metres above ordnance 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: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



Notes:				
P1	REVA	29.04.2021	EB	RH
Phase	Issue	Date	Drawn	Checked

Client: Rowlinson Construction	
Job Title: Bowes Street, Manchester	

Job No: 11-813	Date: 29.04.2021
Drawing No: 002	Scale: NTS@ A3
Drawing Title: Proposed Development Plan	



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APPENDIX IV CHEMICAL TESTING RESULTS



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Analytical Report Number : 19-55101

Project / Site name: Bowes Street

Samples received on: 16/08/2019

Your job number:

Samples instructed on: 16/08/2019

Your order number:

Analysis completed by: 23/08/2019

Report Issue Number: 1

Report issued on: 23/08/2019

Samples Analysed: 6 soil samples

Signed: 

Karolina Marek
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

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

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

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

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

Excel copies of reports are only valid when accompanied by this PDF certificate.

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

Analytical Report Number: 19-55101

Project / Site name: Bowes Street

Lab Sample Number				1293738	1293739	1293740	1293741	1293742
Sample Reference				TS101	TS102	TS103	SS101	SS102
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				15/08/2019	15/08/2019	15/08/2019	15/08/2019	15/08/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	17	18	18	19	17
Total mass of sample received	kg	0.001	NONE	0.48	0.49	0.50	0.40	0.52

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
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General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.7	7.7	7.7	7.8	7.7
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Total Sulphate as SO ₄	mg/kg	50	MCERTS	530	460	620	510	500
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	100	120	99	120	110
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.051	0.061	0.050	0.059	0.053
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	50.9	60.9	49.7	58.5	53.2
Sulphide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphur	mg/kg	50	MCERTS	350	360	380	360	380

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.63	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.34	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	1.3	1.0	0.75	2.5	0.83
Anthracene	mg/kg	0.05	MCERTS	0.28	0.17	0.17	0.43	0.18
Fluoranthene	mg/kg	0.05	MCERTS	2.2	2.0	1.4	2.6	1.6
Pyrene	mg/kg	0.05	MCERTS	2.0	1.9	1.4	2.3	1.4
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.0	1.1	0.73	1.2	0.81
Chrysene	mg/kg	0.05	MCERTS	0.98	0.84	0.73	1.2	0.73
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	1.3	1.1	0.89	1.3	0.99
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.40	0.44	0.25	0.51	0.22
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.98	0.84	0.68	1.0	0.70
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.44	0.43	0.34	0.48	0.34
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.59	0.52	0.40	0.70	0.44

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	11.4	10.4	7.75	15.2	8.24
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Analytical Report Number: 19-55101

Project / Site name: Bowes Street

Lab Sample Number	1293738	1293739	1293740	1293741	1293742
Sample Reference	TS101	TS102	TS103	SS101	SS102
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled	15/08/2019	15/08/2019	15/08/2019	15/08/2019	15/08/2019
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	16	16	16	14	17
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.5	0.5	0.6	0.4	0.6
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	22	17	16	17	17
Copper (aqua regia extractable)	mg/kg	1	MCERTS	61	54	62	58	63
Lead (aqua regia extractable)	mg/kg	1	MCERTS	85	76	85	73	80
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.3	0.6	< 0.3	0.7	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	17	17	18	15	18
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	1.8	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	88	73	100	86	85

Petroleum Hydrocarbons

TPH (C5 - C6)	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (C6 - C8)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH (C12 - C16)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	5.7	< 4.0
TPH (C16 - C21)	mg/kg	1	MCERTS	12	16	11	19	6.8
TPH (C21 - C35)	mg/kg	1	MCERTS	49	29	36	43	10
TPH (C35 - C40)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH Total C5 - C40	mg/kg	10	MCERTS	63	47	49	70	19

Analytical Report Number: 19-55101

Project / Site name: Bowes Street

Lab Sample Number				1293743				
Sample Reference				SS103				
Sample Number				None Supplied				
Depth (m)				None Supplied				
Date Sampled				15/08/2019				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1				
Moisture Content	%	N/A	NONE	18				
Total mass of sample received	kg	0.001	NONE	0.52				

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected				
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General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.8				
Total Cyanide	mg/kg	1	MCERTS	< 1				
Total Sulphate as SO ₄	mg/kg	50	MCERTS	510				
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	120				
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.060				
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	59.8				
Sulphide	mg/kg	1	MCERTS	< 1.0				
Total Sulphur	mg/kg	50	MCERTS	410				

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0				
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05				
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05				
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05				
Fluorene	mg/kg	0.05	MCERTS	< 0.05				
Phenanthrene	mg/kg	0.05	MCERTS	0.89				
Anthracene	mg/kg	0.05	MCERTS	0.22				
Fluoranthene	mg/kg	0.05	MCERTS	1.7				
Pyrene	mg/kg	0.05	MCERTS	1.6				
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.79				
Chrysene	mg/kg	0.05	MCERTS	0.77				
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.87				
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.41				
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.72				
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.35				
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05				
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.48				

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	8.76				
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Analytical Report Number: 19-55101

Project / Site name: Bowes Street

Lab Sample Number				1293743				
Sample Reference				SS103				
Sample Number				None Supplied				
Depth (m)				None Supplied				
Date Sampled				15/08/2019				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	16				
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.6				
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0				
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	20				
Copper (aqua regia extractable)	mg/kg	1	MCERTS	70				
Lead (aqua regia extractable)	mg/kg	1	MCERTS	90				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3				
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	20				
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0				
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	93				

Petroleum Hydrocarbons

TPH (C5 - C6)	mg/kg	1	NONE	< 1.0				
TPH (C6 - C8)	mg/kg	0.1	MCERTS	< 0.1				
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1				
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0				
TPH (C12 - C16)	mg/kg	4	MCERTS	< 4.0				
TPH (C16 - C21)	mg/kg	1	MCERTS	5.8				
TPH (C21 - C35)	mg/kg	1	MCERTS	25				
TPH (C35 - C40)	mg/kg	10	MCERTS	< 10				
TPH Total C5 - C40	mg/kg	10	MCERTS	33				



Analytical Report Number : 19-55101

Project / Site name: Bowes Street

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1293738	TS101	None Supplied	None Supplied	Brown clay and loam with gravel and vegetation.
1293739	TS102	None Supplied	None Supplied	Brown clay and loam with gravel and vegetation.
1293740	TS103	None Supplied	None Supplied	Brown clay and sand with gravel.
1293741	SS101	None Supplied	None Supplied	Brown clay and sand with gravel.
1293742	SS102	None Supplied	None Supplied	Brown clay and sand with gravel.
1293743	SS103	None Supplied	None Supplied	Brown loam and clay with vegetation and gravel

Analytical Report Number : 19-55101

Project / Site name: Bowes Street

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, and MEWAM 2006 Methods for the Determination of Metals in Soil	L038-PL	D	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30°C.



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Analytical Report Number : 20-21973

Project / Site name:	Bowes Street	Samples received on:	28/07/2020
Your job number:	11-813	Sample instructed/ Analysis started on:	28/07/2020
Your order number:	11 813 IIM A	Analysis completed by:	01/08/2020
Report Issue Number:	1	Report issued on:	05/08/2020
Samples Analysed:	3 soil samples		

Signed: *A. Czerwińska*

Agnieszka Czerwińska

Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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



Analytical Report Number: 20-21973

Project / Site name: Bowes Street

Your Order No: 11-813-HM-A

Lab Sample Number				1576829	1576830	1576831		
Sample Reference				TS101	TS102	TS103		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				None Supplied	None Supplied	None Supplied		
Date Sampled				27/07/2020	28/07/2020	27/07/2020		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1		
Moisture Content	%	N/A	NONE	10	11	12		
Total mass of sample received	kg	0.001	NONE	0.40	0.40	0.40		

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected		
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General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.6	8.4	8.1		
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1		
Total Sulphate as SO ₄	mg/kg	50	MCERTS	290	320	520		
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	250	300	610		
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.13	0.15	0.30		
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	126	150	303		
Sulphide	mg/kg	1	MCERTS	2.0	< 1.0	1.3		
Total Sulphur	mg/kg	50	MCERTS	620	600	810		

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
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Analytical Report Number: 20-21973

Project / Site name: Bowes Street

Your Order No: 11-813-HM-A

Lab Sample Number				1576829	1576830	1576831		
Sample Reference				TS101	TS102	TS103		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				None Supplied	None Supplied	None Supplied		
Date Sampled				27/07/2020	28/07/2020	27/07/2020		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80		
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Analytical Report Number: 20-21973

Project / Site name: Bowes Street

Your Order No: 11-813-HM-A

Lab Sample Number				1576829	1576830	1576831		
Sample Reference				TS101	TS102	TS103		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				None Supplied	None Supplied	None Supplied		
Date Sampled				27/07/2020	28/07/2020	27/07/2020		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	4.3	4.3	4.0		
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2		
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0		
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	13	12	14		
Copper (aqua regia extractable)	mg/kg	1	MCERTS	15	16	19		
Lead (aqua regia extractable)	mg/kg	1	MCERTS	14	16	17		
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3		
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	11	10	12		
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	43	44	47		

Petroleum Hydrocarbons

TPH (C5 - C6)	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0		
TPH (C6 - C8)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1		
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1		
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	2.6	< 2.0		
TPH (C12 - C16)	mg/kg	4	MCERTS	< 4.0	6.9	< 4.0		
TPH (C16 - C21)	mg/kg	1	MCERTS	< 1.0	14	< 1.0		
TPH (C21 - C35)	mg/kg	1	MCERTS	< 1.0	21	< 1.0		
TPH (C35 - C40)	mg/kg	10	MCERTS	< 10	< 10	< 10		
TPH Total C5 - C40	mg/kg	10	MCERTS	< 10	49	< 10		



Analytical Report Number : 20-21973

Project / Site name: Bowes Street

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1576829	TS101	None Supplied	None Supplied	Brown loam and sand with vegetation and glass.
1576830	TS102	None Supplied	None Supplied	Brown loam and sand with vegetation and gravel.
1576831	TS103	None Supplied	None Supplied	Brown loam and sand with vegetation and gravel.

Analytical Report Number : 20-21973

Project / Site name: Bowes Street

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

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Analytical Report Number : 21-74222

Project / Site name:	Bowes Street	Samples received on:	11/05/2021
Your job number:	11813	Samples instructed on/ Analysis started on:	11/05/2021
Your order number:	11813	Analysis completed by:	18/05/2021
Report Issue Number:	1	Report issued on:	18/05/2021
Samples Analysed:	3 soil samples		

Signed:

Karolina Marek
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

Analytical Report Number: 21-74222

Project / Site name: Bowes Street

Your Order No: 11813

Lab Sample Number				1867030	1867031	1867032
Sample Reference				TP101	TP102	TP103
Sample Number				Plot 16	Plot 15	Plot 13
Depth (m)				None Supplied	None Supplied	None Supplied
Date Sampled				10/05/2021	10/05/2021	10/05/2021
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status			
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	20	22	23
Total mass of sample received	kg	0.001	NONE	0.50	0.50	0.50

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected
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General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.3	8.3	8.2
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Total Sulphate as SO ₄	mg/kg	50	MCERTS	540	540	510
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	g/l	0.00125	MCERTS	0.13	0.13	0.11
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/kg	2.5	MCERTS	270	270	220
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/l	1.25	MCERTS	134	135	111
Sulphide	mg/kg	1	MCERTS	1.3	1.4	1.4
Total Sulphur	mg/kg	50	MCERTS	500	520	570

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	4.5	4.5	5.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	13	12	14
Copper (aqua regia extractable)	mg/kg	1	MCERTS	13	12	21
Lead (aqua regia extractable)	mg/kg	1	MCERTS	20	20	26
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	12	11	12
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	45	44	55

Analytical Report Number: 21-74222

Project / Site name: Bowes Street

Your Order No: 11813

Lab Sample Number				1867030	1867031	1867032
Sample Reference				TP101	TP102	TP103
Sample Number				Plot 16	Plot 15	Plot 13
Depth (m)				None Supplied	None Supplied	None Supplied
Date Sampled				10/05/2021	10/05/2021	10/05/2021
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status

Petroleum Hydrocarbons

TPH (C5 - C6)	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0
TPH (C6 - C8)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0
TPH (C12 - C16)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0
TPH (C16 - C21)	mg/kg	1	MCERTS	3.2	< 1.0	3.3
TPH (C21 - C35)	mg/kg	1	MCERTS	8.2	< 1.0	5.6
TPH (C35 - C40)	mg/kg	10	MCERTS	< 10	< 10	< 10
TPH Total C5 - C40	mg/kg	10	MCERTS	13	< 10	11

U/S = Unsuitable Sample I/S = Insufficient Sample



Analytical Report Number : 21-74222
Project / Site name: Bowes Street

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1867030	TP101	Plot 16	None Supplied	Brown loam with vegetation.
1867031	TP102	Plot 15	None Supplied	Brown loam with vegetation and gravel
1867032	TP103	Plot 13	None Supplied	Brown loam with vegetation and gravel

Analytical Report Number : 21-74222

Project / Site name: Bowes Street

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO ₄ in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS
Sulphate, water soluble, in soil (1hr extraction)	Sulphate, water soluble, in soil (1hr extraction)	In-house method	L038-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.



Analytical Report Number : 21-74222
Project / Site name: Bowes Street

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

APPENDIX V GAS MEMBRANE VALIDATION CERTIFICATES



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GAS MEMBRANE VALIDATION

Site: Bowes Street	
Date: 23-09-2020	Project Number: 11-813
Project Manager: R. Horseman	E3P Engineer: T. Preston
PM Qualifications: BSC(Hons) FGS Cenv	Engineer Qualifications: Verification of Gas Protection Systems July 18
Ground Gas Risk Assessment: Characteristic Situation 2 / Amber 1	
Overview: The membrane comprised Visqueen GX DPC wrapped under slab and spanned across internal and external walls which was taped to VOC block with GX jointing tape. E3P can confirm there were no punctures or tears at the time of inspection. Upon being laid the membrane was covered with a Celotex (closed Cell) floor insulation material which is considered to provide a high degree of protection. All external joints were inspected and E3P can confirm that the membrane was overlapped and double taped to external and internal gas resistant GX DPM. The membrane was taped to the gas resistant VOC Block DPM using a double-sided jointing tape. All the overlaps were then additionally taped using foil backed girth tape. Each unit has a service duct located to the front and outer edge of the property. E3P inspected each one and can confirm that the top hats have been adequately sealed against the membrane. Based on the information provided within this report, the site inspections and validation checklists, E3P can confirm that Plots 1-6 have been installed with gas protection measures in accordance with Characteristic Situation 2 to an acceptable level of workmanship. Based on the information provided within this report, the site inspections and validation checklists, E3P can confirm that Plots 1-6 have been installed with gas protection measures in accordance with Characteristic Situation 2 / Amber 1 to an acceptable level of workmanship.	
Membrane Specification: Hydrocarbon Resistant Membrane (VOC Blok and Visqueen GX)	



Plot – 1

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Plot - 2

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Verification of ventilation-Good Condition



Plot - 3

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Verification of ventilation-Good Condition



Plot - 4

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Verification of ventilation-Good Condition



Plot - 5

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Verification of ventilation-Good Condition



Plot - 6

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Verification of Ventilation-Good Condition





e3p

Gas Protection Validation Site Record

Plot No:

Inspection date/time:

23/9/20

Inspected by:

S JAMES

Photographed:

✓

✓/x Notes/recommendations

Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	
Damp-proof course	✓	
Service entries	✓	
Fabricated Membrane Joint Taped & inspected	✓	

This Plot has **PASSED** inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT* required for this Plot.

Inspection by: *S JAMES* Signed: *S JAMES*

One record sheet to be completed for each plot - To be completed by E3P Professional Inspecting.



e3p

Gas Protection Validation Site Record

Plot No:

Inspection date/time:

23/9/20

Inspected by:

J JAMES

Photographed:

✓

✓/x Notes/recommendations

Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	
Damp-proof course	✓	
Service entries	✓	
Folded Membrane Joint	✓	
Taped & inspected	✓	

This Plot has PASSED/FAILED* inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT* required for this Plot

Inspection by: J JAMES Signed: J JAMES

One record sheet to be completed for each plot - To be completed by E3P Professional Inspecting.



Gas Protection Validation Site Record

inspection date/time:

23.9.20

Inspected by:

5. IMF

Photographed:

1/2

Notes/recommendations

Member Type: Correct

Extent of Coverage Correct

Underside of *Montraria*

Slab / membrane condition

Lapels and Joints

Disrupt-proof course

Service centers

Folded Membrane Joint

Inspected & approved

This Plot has PASSENT-ALLEN inspection. (Any discrepancy is NOT required for this Plot)

Signed: M. A. [Signature]
Completed by EAP Professional Inspecting

Inspection by: _____
Sheet to be completed for each plot - 10 per corner

One record sheet to be completed



Gas Protection Validation Site Record

Plot No:

Inspection date/time:

23/9/20

Inspected by:

SJAMES

Photographed:

✓/x ✓

✓/x Notes/recommendations

Membrane Type: Correct ✓

Extent of Coverage: Correct ✓

Underside of Membrane ✓

Seals / membrane evaluation ✓

Tags and joints ✓

Diving/wheel repairs ✓

Service entries ✓

Filled Membrane Joint
Taped & Inspected ✓

This Plot has PASSENGER MILLER inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT required for this Plot.

Inspection by: SJAMES Signed: [Signature]

One record sheet to be completed for each plot - To be completed by E3P Professional Inspecting.



Gas Protection Validation Site Record

Plot No: 5

✓/x

Photographed:

5/11/13

Inspected by:

23/9/13

Inspection date/time:

✓/x Notes/recommendations

Membrane Type: Correct ✓

Extent of Coverage: Correct ✓

Underside of Membrane: ✓

Slab / membrane condition: ✓

Laps and joints: ✓

Damp proof course: ✓

Service entries: ✓

Finished Membrane Joint
Taped & inspected: ✓

This Plot has **FAILED** inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT required for this Plot.

Inspection by: John King Signed: John King

One record sheet to be completed for each plot - to be completed by ESP Professional Inspector.



Gas Protection Validation Site Record

Plot No: 688

Inspection date/time:	23/9/20	Inspected by:	SUMER	Photographed:	✓
✓/x Notes/recommendations					
Membrane Type-Correct	✓				
Extent of Coverage-Correct	✓				
Underside of Membrane	✓				
Seals / Insulation condition	✓				
Laps and joints	✓				
Damage-free course	✓				
Service entries	✓				
Folded Membrane Joint Filled & inspected	✓				

This Plot has passed **FINAL** inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).
An additional inspection visit (SJS NOT required for this Plot)
Inspection by: Sumar Signed: [Signature]
One record sheet to be completed for each plot - To be completed by E3p Professional Inspecting.



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GAS MEMBRANE VALIDATION

Site: Bowes Street	
Date: 26-11-2020	Project Number: 11-813
Project Manager: R. Horseman	E3P Engineer: M. Whittaker
Ground Gas Risk Assessment: Characteristic Situation 2 / Amber 1	
Overview: The membrane comprised Visqueen GX DPC wrapped under slab and spanned across internal and external walls which was taped to VOC block with GX jointing tape. E3P can confirm there were no punctures or tears at the time of inspection. Upon being laid the membrane was covered with a Celotex (closed Cell) floor insulation material which is considered to provide a high degree of protection. All external joints were inspected and E3P can confirm that the membrane was overlapped and double taped to external and internal gas resistant GX DPM. The membrane was taped to the gas resistant VOC Block DPM using a double-sided jointing tape. All the overlaps were then additionally taped using foil backed girth tape. Each unit has a service duct located to the front and outer edge of the property. E3P inspected each one and can confirm that the top hats have been adequately sealed against the membrane. Based on the information provided within this report, the site inspections and validation checklists, E3P can confirm that Plots 7-8 have been installed with gas protection measures in accordance with Characteristic Situation 2 to an acceptable level of workmanship. Based on the information provided within this report, the site inspections and validation checklists, E3P can confirm that Plots 7-8 have been installed with gas protection measures in accordance with Characteristic Situation 2 / Amber 1 to an acceptable level of workmanship.	
Membrane Specification: Hydrocarbon Resistant Membrane (VOC Blok and Visqueen GX)	



Plot – 7

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Plot – 8

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Verification of Ventilation- Good Condition





Gas Protection Validation Site Record

Inspection date/time:	26/11/2010 10:20	Inspected by:	Mullahtala	Photographed:	YK ✓
Type of development:	LEST	Plot number:	7	Developer:	Eastman

Notes/recommendations	Comments
Membrane Type	VOC BLOT Grey Visqueen 2000g
Extent of Coverage	Full extent internally fixed to damp tray
Underside of Membrane	Block & Beam
Slab / membrane condition (is membrane clear of debris or insulation)	Good Condition
Type of joints	☒ Tape Joint ☒ Welded Joint ☐ Other (please state)
Service entries - Jubilee clips, Top hats installed correctly	Yes
External Wall Air bricks Present?	Yes
Corners inspected?	Yes
Membrane joints inspected has Double-sided butyl tape been used?	Yes
Folds in membrane inspected?	N/A
Has the membrane been installed as per the design detail drawing?	Yes

This Plot has **PASSED** inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form). An additional inspection visit is/IS NOT required for this Plot.
Inspection by: *Mullahtala* Signed: *YK*



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GAS MEMBRANE VALIDATION

Site: Bowes Street	
Date: 26-04-2021	Project Number: 11-813
Project Manager: R. Horseman	E3P Engineer: T.Preston
Ground Gas Risk Assessment: Characteristic Situation 2 / Amber 1	
Overview: The membrane comprised Visqueen GX DPC wrapped under slab and spanned across internal and external walls which was taped to VOC block with GX jointing tape. E3P can confirm there were no punctures or tears at the time of inspection. Upon being laid the membrane was covered with a Celotex (closed Cell) floor insulation material which is considered to provide a high degree of protection. All external joints were inspected and E3P can confirm that the membrane was overlapped and double taped to external and internal gas resistant GX DPM. The membrane was taped to the gas resistant VOC Block DPM using a double-sided jointing tape. All the overlaps were then additionally taped using foil backed girth tape. Each unit has a service duct located to the front and outer edge of the property. E3P inspected each one and can confirm that the top hats have been adequately sealed against the membrane. Based on the information provided within this report, the site inspections and validation checklists, E3P can confirm that Plots 7-8 have been installed with gas protection measures in accordance with Characteristic Situation 2 to an acceptable level of workmanship. Based on the information provided within this report, the site inspections and validation checklists, E3P can confirm that Plots 9-12 & 17 have been installed with gas protection measures in accordance with Characteristic Situation 2 / Amber 1 to an acceptable level of workmanship.	
Membrane Specification: Hydrocarbon Resistant Membrane (VOC Blok and Visqueen GX)	



Plot – 9

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Verification of Ventilation- Good Condition



Plot – 10

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Verification of Ventilation- Good Condition



Plot – 11

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Verification of Ventilation- Good Condition



Plot – 12

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Verification of Ventilation- Good Condition



Plot – 17

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Verification of Ventilation- Good Condition





Gas Protection Validation Site Record

e3p

Inspection date/time:	18/4/21	Inspected by:	Tom Reston	Photographed:	0/1x	✓
Type of development:	residential	Plot number:	10	Developer:		
Notes/recommendations		Comments				
Membrane Type		bold Hydrocarbon				
Extent of Coverage		Full Plot				
Underside of Membrane		✓				
Sash / membrane condition (is membrane clear of debris or insulation)		✓				
Type of joints		☒ Tape Joint ☒ Welded Joint ☐ Other (please state)				
Service entries – Jubilee clips, Top hats installed correctly		✓				
External Wall Air Bricks Present?		✓				
Corners inspected?		✓				
Membrane joints inspected has double-sided butyl tape been used?		✓				
Folds in membrane inspected?		✓				
Has the membrane been installed as per the design detail drawing?		✓				
This project has PASSED/FAILED inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form). An additional inspection will follow.						
Inspected by:		Tom Reston		Signed: Tom Reston		



Gas Protection Validation Site Record			
Inspection date/time:	7/6/4/21	Inspected by:	Tara Preston
Type of development:	residential	Plot number:	10
Notes/recommendations		Photographed:	G/S ✓
		Developer:	
Membrane Type		bold Hydrocarbon	
Extent of Coverage		Full Plot	
Unsurpassed at Membrane		✓	
Sub / membrane condition (is membrane area of debris or insulation)		✓	
Type of joints		☒ Type Joint ☒ Welded Joints ☐ Other (please state)	
Service entries – Juculer clips, Top hats installed correctly		✓	
External Wall Air Tights Present?		✓	
Covers Installed?		✓	
Membrane joints inspected has double-sided burl tape been used?		✓	
Falls in membrane inspected?		✓	
Has the membrane been installed as per the design detail drawing?		✓	
This report has been issued for All Ed's inspection. Any proposed remedial works will be quoted in the "Remarks" column on this form. An additional inspection visit may be required for this job. Inspected by: Tara Preston signed: Tara Preston			

Gas Protection Validation Site Record

Inspection date/time: 16/4/21
Type of development: Residential
Inspected by: Tom Preston
Photographed: [initials]
Plot number: 12
Developer: [initials]

Notes/recommendations

Membrane Type: **bold Hydrocarbon**
Extent of Coverage: **Full Plot**

Underside of Membrane: ☒ **Full**
Tight / membrane condition (is membrane clear of debris or excavation): ☒ **Full**

Type of joints: ☒ **Full**

Sealing entries - Adhesive clips, Top hats installed correctly: ☒ **Full**

External Wall All Bricks Present? ☒ **Full**

Comments inspected: ☒ **Full**

Membrane joints inspected has Double-sided butyl tape been used? ☒ **Full**

Fold-in membrane inspected? ☒ **Full**

Has the membrane been installed as per the design detail drawing? ☒ **Full**

Inspection by: Tom Preston
Signed: Tom Preston

Any proposed remedial works will be noted in the "Remarks" column on this form. An additional inspection visit 15/15



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GAS MEMBRANE VALIDATION

Site: Bowes Street

Date: 11-01-2021

Project Number: 11-813

Project Manager: R. Horseman

E3P Engineer: J.James

Ground Gas Risk Assessment: **Characteristic Situation 2 / Amber 1**

Overview:

The membrane comprised Visqueen GX DPC wrapped under slab and spanned across internal and external walls which was taped to VOC block with GX jointing tape.

E3P can confirm there were no punctures or tears at the time of inspection. Upon being laid the membrane was covered with a Celotex (closed Cell) floor insulation material which is considered to provide a high degree of protection.

All external joints were inspected and E3P can confirm that the membrane was overlapped and double taped to external and internal gas resistant GX DPM. The membrane was taped to the gas resistant VOC Block DPM using a double-sided jointing tape. All the overlaps were then additionally taped using foil backed girth tape.

Each unit has a service duct located to the front and outer edge of the property. E3P inspected each one and can confirm that the top hats have been adequately sealed against the membrane.

Based on the information provided within this report, the site inspections and validation checklists, E3P can confirm that Plots 7-8 have been installed with gas protection measures in accordance with Characteristic Situation 2 to an acceptable level of workmanship.

Based on the information provided within this report, the site inspections and validation checklists, E3P can confirm that **Plots 13&18** have been installed with gas protection measures in accordance with Characteristic Situation 2 / Amber 1 to an acceptable level of workmanship.

Membrane Specification: Hydrocarbon Resistant Membrane (VOC Blok and Visqueen GX)



Plot – 13

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Verification of Ventilation- Good Condition



Plot – 18	
General Condition of Membrane-Good Condition	
	
Verification of Joints and Seals-Good Condition	
	
Verification of Service Penetrations-Good Condition	
	
Verification of Ventilation- Good Condition	
	





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Gas Protection Validation Site Record

Inspection date/time:	11/1/21	Inspected by:	STAMES
Type of development:	Residing	Plot number:	13
Notes/recommendations:		Photographed:	Yes
Membrane Type		Developer:	Rowlinson
Comments			
Extent of Coverage	Cold Hydrocarbon		
Underside of Membrane	✓		
Slab / membrane condition (is membrane clear of debris or insulation)	✓		
Type of joints	☒ Tape Joint ☒ Welded Joint ☐ Other (please state)		
Service entries - Jubilee clips, Top hats installed correctly	✓		
External Wall Air bricks Present?	✓		
Corners inspected?	✓		
Membrane joints inspected has Double - sided butyl tape been used?	✓		
Folds in membrane inspected?	✓		
Has the membrane been installed as per the design detail drawing?	✓		

This Plot has **PASSED/FAILED** inspection. (Any proposed remedial works will be noted in the 'Remarks' column on this form). An additional inspection visit IS/IS NOT required for this Plot.

Inspection by: Adam Jones Signed: [Signature]

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 Environmental Engineering Partnership Limited trading as E3P



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GAS MEMBRANE VALIDATION

Site: Bowes Street	
Date: 07-01-2021	Project Number: 11-813
Project Manager: R. Horseman	E3P Engineer: M. Whittaker
Ground Gas Risk Assessment: Characteristic Situation 2 / Amber 1	
Overview: The membrane comprised Visqueen GX DPC wrapped under slab and spanned across internal and external walls which was taped to VOC block with GX jointing tape. E3P can confirm there were no punctures or tears at the time of inspection. Upon being laid the membrane was covered with a Celotex (closed Cell) floor insulation material which is considered to provide a high degree of protection. All external joints were inspected and E3P can confirm that the membrane was overlapped and double taped to external and internal gas resistant GX DPM. The membrane was taped to the gas resistant VOC Block DPM using a double-sided jointing tape. All the overlaps were then additionally taped using foil backed girth tape. Each unit has a service duct located to the front and outer edge of the property. E3P inspected each one and can confirm that the top hats have been adequately sealed against the membrane. Based on the information provided within this report, the site inspections and validation checklists, E3P can confirm that Plots 7-8 have been installed with gas protection measures in accordance with Characteristic Situation 2 to an acceptable level of workmanship. Based on the information provided within this report, the site inspections and validation checklists, E3P can confirm that Plots 14-16 have been installed with gas protection measures in accordance with Characteristic Situation 2 / Amber 1 to an acceptable level of workmanship.	
Membrane Specification: Hydrocarbon Resistant Membrane (VOC Blok and Visqueen GX)	



Plot – 14

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Verification of Ventilation- Good Condition



Plot – 15

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Verification of Ventilation- Good Condition



Plot – 16

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Verification of Ventilation- Good Condition





Gas Protection Validation Site Record

Inspection date/time:	7.1.21	Inspected by:	M. S. H. H. H.	Photograph:	1/1
Type of development:	Estimated	Plot number:	14.15.16	Developer:	Paul Johnson
Notes/recommendations	Comments				
Membrane Type	Cold Voc Hydrocarbon Blat.				
Extent of Coverage	Full internal coverage.				
Underside of Membrane	Blot + Beam.				
Slab / membrane condition (is membrane clear of debris or insulation)	Good Sub condition.				
Type of joints	☒ Tape Joint ☐ Welded Joint ☐ Other (please state)				
Service entries - Jutee clips, Top hats installed correctly	Service entries fitted with Self Adhesive Tape.				
External Wall Air bricks Present?	Yes..				
Corrugs inspected?	Corrugs attached to DPM. Re installed.				
Membrane joints (inspected here Double - sided strip tape been used?	Blot bulyl tape 11mm Tanning Membranes.				
Folds in membrane inspected?	No visible folds.				
Has the membrane been installed as per the design detail drawing?	Yes				

This form has to be completed by the Inspector. (Any proposed remedial work will be noted in the "Remarks" column on this form). An additional inspection visit may be required for this Plot.

Inspected by: M. S. H. H. H. Signed: P. H. H. H. H.





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GAS MEMBRANE VALIDATION

Site: Bowes Street	
Date: 02-11-2020	Project Number: 11-813
Project Manager: R. Horseman	E3P Engineer: J. James
PM Qualifications: BSC(Hons) FGS Cenv	Engineer Qualifications: Verification of Gas Protection Systems July 18
Ground Gas Risk Assessment: Characteristic Situation 2 / Amber 1	
Overview: The membrane comprised Visqueen GX DPC wrapped under slab and spanned across internal and external walls which was taped to VOC block with GX jointing tape. E3P can confirm there were no punctures or tears at the time of inspection. Upon being laid the membrane was covered with a Celotex (closed Cell) floor insulation material which is considered to provide a high degree of protection. All external joints were inspected and E3P can confirm that the membrane was overlapped and double taped to external and internal gas resistant GX DPM. The membrane was taped to the gas resistant VOC Block DPM using a double-sided jointing tape. All the overlaps were then additionally taped using foil backed girth tape. Each unit has a service duct located to the front and outer edge of the property. E3P inspected each one and can confirm that the top hats have been adequately sealed against the membrane. Based on the information provided within this report, the site inspections and validation checklists, E3P can confirm that Plots 1-6 have been installed with gas protection measures in accordance with Characteristic Situation 2 to an acceptable level of workmanship. Based on the information provided within this report, the site inspections and validation checklists, E3P can confirm that Plots 19-20 have been installed with gas protection measures in accordance with Characteristic Situation 2 / Amber 1 to an acceptable level of workmanship.	
Membrane Specification: Hydrocarbon Resistant Membrane (VOC Blok and Visqueen GX)	



Plot – 19

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Verification of Ventilation- Good Condition



Plot - 20

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Verification of ventilation-Good Condition





e3p

Plot No:

19

Gas Protection Validation Site Record

Inspection date/time

2/11/20

Inspected by:

J. SAMES

Photographed:

✓

✓/x Notes/recommendations

Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Leaps and joints	✓	
Damp-proof course	✓	
Service entries	✓	
Folded Membrane Joint Taped & Inspected	✓	

This Plot has **PASSED/FAILED** inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT required for this Plot

Inspection by: J. SAMES Signed: J. SAMES

One record sheet to be completed for each plot - To be completed by E3P Professional Inspecting.



e3p

PLOT No. 20

Gas Protection Validation Site Record

Inspection date/time:	21/1/20	Inspected by:	J. S. APPEL	Photographed:	✓
-----------------------	---------	---------------	-------------	---------------	---

✓/x Notes/recommendations					
Membrane Type Correct	✓				
Extent of Coverage Correct	✓				
Underside of Membrane	✓				
Slab / membrane condition	✓				
Laps and joints	✓				
Damp-proof course	✓				
Service entries	✓				
Folded Membrane Joint Taped & inspected	✓				

This Plot has PASSED / FAILED inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT required for this Plot.

Inspection by: J. S. APPEL signed: J. S. APPEL

One record sheet to be completed for each plot - To be completed by E3P Professional Inspecting.



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GAS MEMBRANE VALIDATION

Site: Bowes Street	
Date: 06-10-2020	Project Number: 11-813
Project Manager: R. Horseman	E3P Engineer: J. James
PM Qualifications: BSC(Hons) FGS Cenv	Engineer Qualifications: Verification of Gas Protection Systems July 18
Ground Gas Risk Assessment: Characteristic Situation 2 / Amber 1	
Overview: The membrane comprised Visqueen GX DPC wrapped under slab and spanned across internal and external walls which was taped to VOC block with GX jointing tape. E3P can confirm there were no punctures or tears at the time of inspection. Upon being laid the membrane was covered with a Celotex (closed Cell) floor insulation material which is considered to provide a high degree of protection. All external joints were inspected and E3P can confirm that the membrane was overlapped and double taped to external and internal gas resistant GX DPM. The membrane was taped to the gas resistant VOC Block DPM using a double-sided jointing tape. All the overlaps were then additionally taped using foil backed girth tape. Each unit has a service duct located to the front and outer edge of the property. E3P inspected each one and can confirm that the top hats have been adequately sealed against the membrane. Based on the information provided within this report, the site inspections and validation checklists, E3P can confirm that Plots 1-6 have been installed with gas protection measures in accordance with Characteristic Situation 2 to an acceptable level of workmanship. Based on the information provided within this report, the site inspections and validation checklists, E3P can confirm that Plots 21-24 have been installed with gas protection measures in accordance with Characteristic Situation 2 / Amber 1 to an acceptable level of workmanship.	
Membrane Specification: Hydrocarbon Resistant Membrane (VOC Blok and Visqueen GX)	

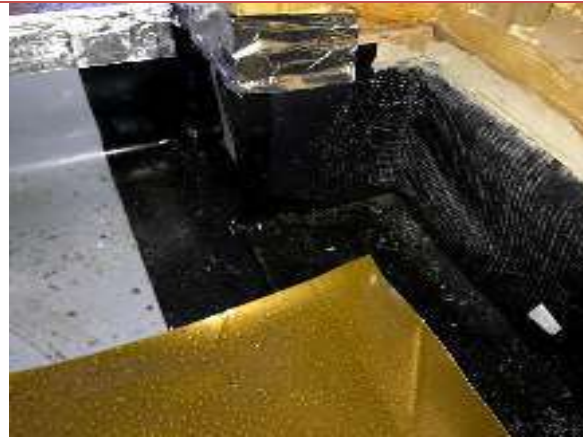


Plot – 21

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Verification of Ventilation- Good Condition



Plot - 22

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Verification of ventilation-Good Condition



Plot -23

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Verification of ventilation-Good Condition



Plot - 24

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition





e3p

Gas Protection Validation Site Record

Pit No. 21

Inspection date/time:

6/10/20

Inspected by:

J. JAMES

Photographed:

✓

1 Notes/recommendations

Remedial Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Manhole	✓	
Shall monitor condition	✓	
Leaps and joints	✓	
Chimney good condition	✓	
Service vehicle	✓	
Existing Manhole Joint	✓	
Inspected & inspected	✓	

This Pit has been inspected. Any proposed remedial works will be noted in the "Remarks" column on this form.

An additional inspection visit (SAS NOT required for this Pit).

Inspected by: J. JAMES Signed: J. JAMES

One record sheet to be completed for each pit - To be completed by E3P Professional Inspectors.



Gas Protection Validation Site Record

Plot No: 22

Inspection date/time:

6/10/20

Inspected by:

J JAMES

Photographed:

✓

✓/N Notes/recommendations

Membrane Type Correct

✓

Extent of Coverage Correct

✓

Under side of Membrane

✓

Seals / membrane condition

✓

Seals and joints

✓

Damp-proof course

✓

Service entries

✓

Existent Membrane Joint

✓

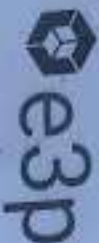
Inspected & inspected

This Plot has PASSED/FAILED inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT required for this Plot.

Inspection by: J JAMES Signed: J JAMES

One record sheet to be completed for each plot - To be completed by E3p Professional Inspecting.



Gas Protection Validation Site Record

Pit No. 24

Inspection date/time

6/10/20

Inspected by:

J. S. M. S.

Photographed

Y/N

Y/N Notes/recommendations

Maintenance Type Correct

✓

External of Coverage Correct

✓

Underneath of Manhole

✓

Signs / smooth / good condition

✓

Lids and joints

✓

Damp / good concrete

✓

Surface entries

✓

✓ without maintenance detail
✓ signed & inspected

This Pit has been inspected by E3P. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection was/is NOT required for this Pit.

Inspected by: J. S. M. S. Signed: J. S. M. S. One record sheet to be completed for each pit - To be completed by E3P Professional Inspectors.



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GAS MEMBRANE VALIDATION

Site: Bowes Street

Date: 03-02-2020

Project Number: 11-813

Project Manager: R. Horseman

E3P Engineer. A. Taylor

Ground Gas Risk Assessment: **Characteristic Situation 2 / Amber 1**

Overview:

The membrane comprised Visqueen GX DPC wrapped under slab and spanned across internal and external walls which was taped to VOC block with GX jointing tape.

E3P can confirm there were no punctures or tears at the time of inspection. Upon being laid the membrane was covered with a Celotex (closed Cell) floor insulation material which is considered to provide a high degree of protection.

All external joints were inspected and E3P can confirm that the membrane was overlapped and double taped to external and internal gas resistant GX DPM. The membrane was taped to the gas resistant VOC Block DPM using a double-sided jointing tape. All the overlaps were then additionally taped using foil backed girth tape.

Each unit has a service duct located to the front and outer edge of the property. E3P inspected each one and can confirm that the top hats have been adequately sealed against the membrane.

Based on the information provided within this report, the site inspections and validation checklists, E3P can confirm that plots 25-29 have been installed with gas protection measures in accordance with Characteristic Situation 2 to an acceptable level of workmanship

Membrane Specification: Hydrocarbon Resistant Membrane (VOC Blok and Visqueen GX)

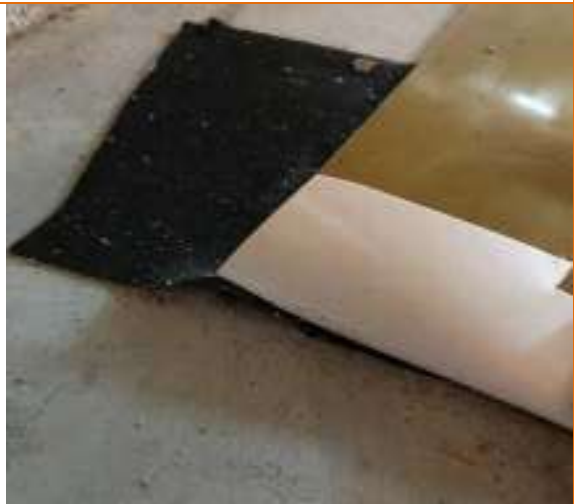


Plot – 25

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Plot – 26

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Plot – 27

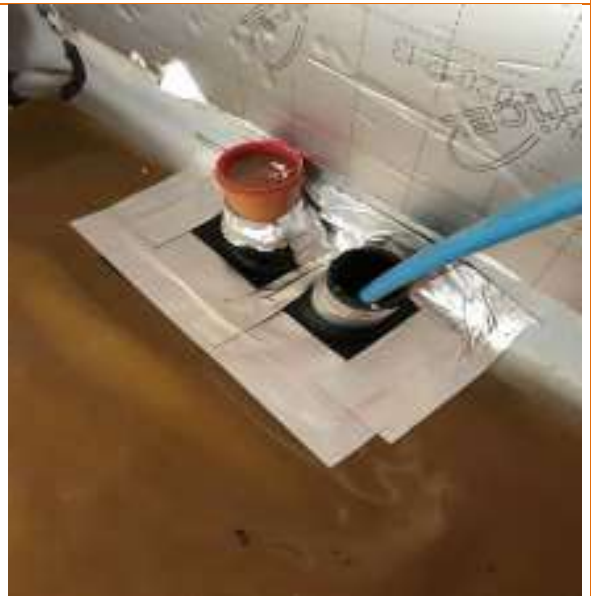
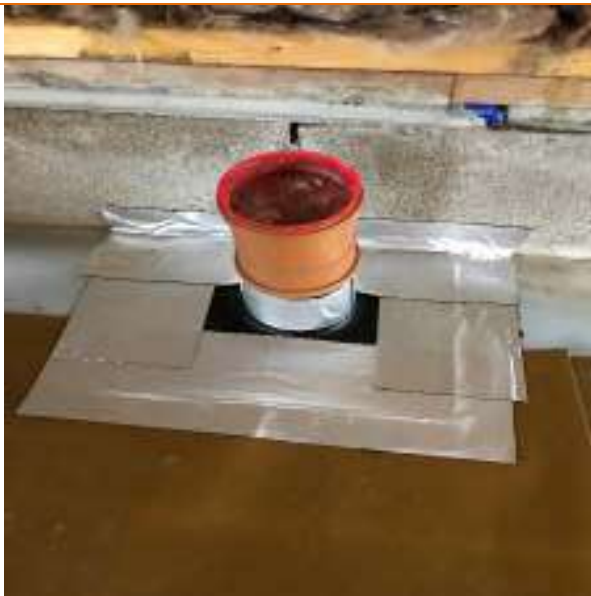
General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Plot – 28

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Plot – 29

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition





e3p

11212

GAS PROTECTION VALIDATION

Plot No:

25

Inspection date/time:

3/2/20

Inspected by:

A. Taylor

Photographed:

✓/x

✓

	✓/x	Notes/recommendations
Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	
Damp-proof course	✓	
Service entries	✓	
Folded Membrane Joint	✓	
Taped & Inspected	✓	

This Plot has **PASSED/FAILED** inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit (S/S NOT* required for this Plot.

Inspection by: A. Taylor Signed: [Signature]

Needs re-inspecting to make sure work are installed.

One record sheet to be completed for each plot - To be completed by E3P Professional Inspecting.



e3p

11813

GAS PROTECTION VALIDATION

Plot No:

26

Inspection date/time:

3/2/20

Inspected by:

A. Taylor

Photographed:

✓

Membrane Type Correct

✓

✓

Notes/recommendations

Extent of Coverage Correct

✓

Underside of Membrane

✓

Slab / membrane condition

✓

Laps and joints

✓

Damp-proof course

✓

Service entries

✓

Folded Membrane Joint

✓

Taped & Inspected

✓

This Plot has ~~FAILED~~ PASSED inspection. (Any proposed remedial works will be noted in the 'Remarks' column on this form).

An additional inspection visit (S/S NOT* required for this Plot).

Inspection by:

A. Taylor

Signed:

Needs re-inspection to note
S/S not installed.

One record sheet to be completed for each plot - To be completed by E3P Professional Inspecting.



e3p

11813

GAS PROTECTION VALIDATION

Plot No:

27

Inspection date/time:

3/2/20

Inspected by:

A. Tass

Photographed:

✓

	✓/x	Notes/recommendations
Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	
Damp-proof course	✓	
Service entries	✓	
Folded Membrane joint	✓	
Taped & inspected	✓	

This Plot has PASSED/FAILED* inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit (S/S NOT* required for this Plot).

Inspection by: A. Tass

Signed:

[Signature]

Needs re inspecting to make sure
vents have been installed.

One record sheet to be completed for each plot - To be completed by E3P Professional Inspecting.



e3p

GAS PROTECTION VALIDATION

11213

PLOT No:

28

Inspection date/time:

3/2/20

Inspected by:

A. Taylor

Photographed:

✓

✓ Notes/recommendations

Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	
Damp-proof course	✓	
Service entries	✓	
Folded Membrane Joint	✓	
Taped & inspected	✓	

This Plot has ~~FAILED~~ **PASSED** inspection. (Any proposed remedial works will be noted in the 'Remarks' column on this form).

An additional inspection visit IS/IS NOT* required for this Plot.

Inspection by: A. Taylor

Signed:

Not to be signed to make sure

works are fitted.

One record sheet to be completed for each plot - To be completed by E3P Professional Inspecting.



11813

GAS PROTECTION VALIDATION

Plot No: Z 4

Inspection date/time:	3/12/26	Inspected by:	Adl T	Photographed:	✓/x
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	✓/x	Notes/recommendations
Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	
Dump proof course	✓	
Service entries	✓	
Folded Membrane Joint	✓	
Taped & inspected	✓	

This Plot has PASSED/FAILED inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).
An additional inspection visit IS/IS NOT required for this Plot.

Inspection by: A. Tealor Signed: Adl

One record sheet to be completed for each plot - To be completed by E3P Professional Inspecting.

GAS MEMBRANE VALIDATION

Site: Bowes Street

Date: 18-11-2019

Project Number: 11-813

Project Manager: R. Horseman

E3P Engineer: J Newall

Ground Gas Risk Assessment: **Characteristic Situation 2 / Amber 1**

Overview:

The membrane comprised Visqueen GX DPC wrapped under slab and spanned across internal and external walls which was taped to VOC block with GX jointing tape.

E3P can confirm there were no punctures or tears at the time of inspection. Upon being laid the membrane was covered with a Celotex (closed Cell) floor insulation material which is considered to provide a high degree of protection.

All external joints were inspected and E3P can confirm that the membrane was overlapped and double taped to external and internal gas resistant GX DPM. The membrane was taped to the gas resistant VOC Block DPM using a double-sided jointing tape. All the overlaps were then additionally taped using foil backed girth tape.

Each unit has a service duct located to the front and outer edge of the property. E3P inspected each one and can confirm that the top hats have been adequately sealed against the membrane.

Based on the information provided within this report, the site inspections and validation checklists, E3P can confirm that plots 30-31 & 48-49 have been installed with gas protection measures in accordance with Characteristic Situation 2 to an acceptable level of workmanship

Membrane Specification: Hydrocarbon Resistant Membrane (VOC Blok and Visqueen GX)



Plot - 30

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Plot - 31

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Plot - 48

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Plot - 49

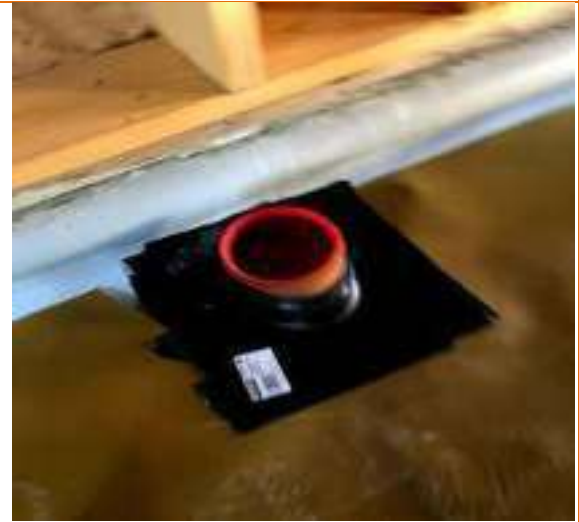
General Condition of Membrane-Good Condition

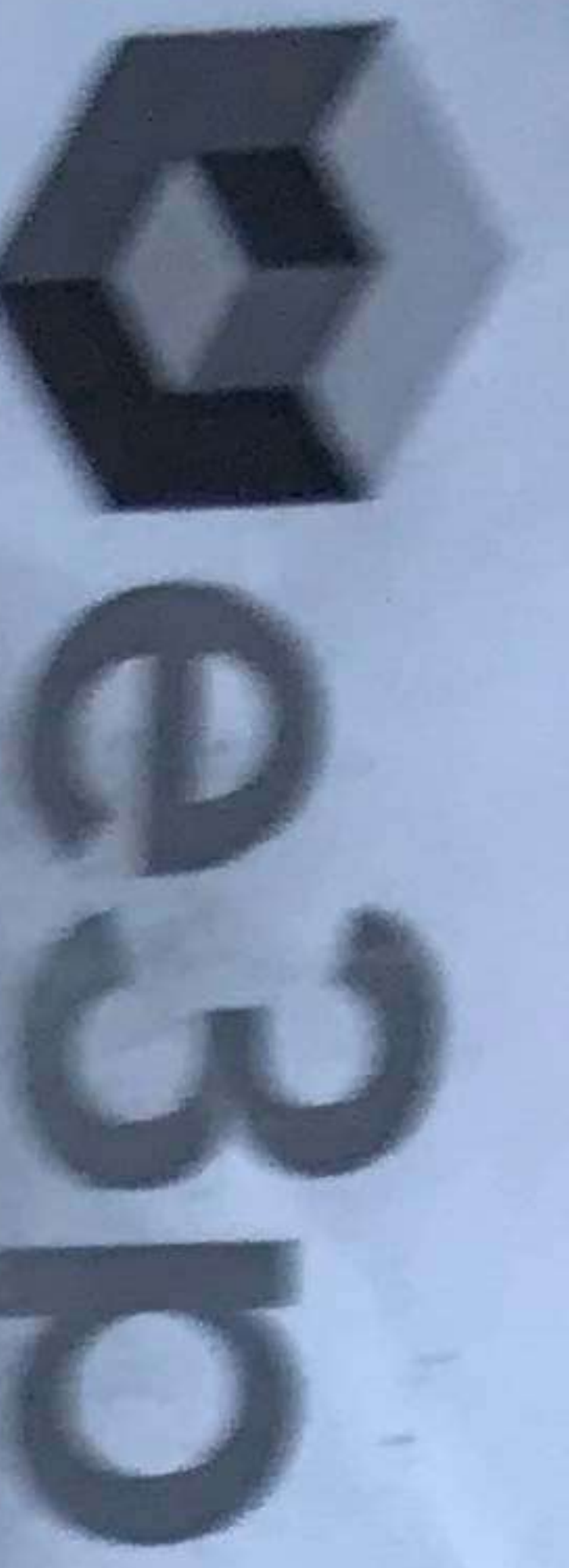


Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition





Gas Protection Validation Site Record

Plot No: 3D

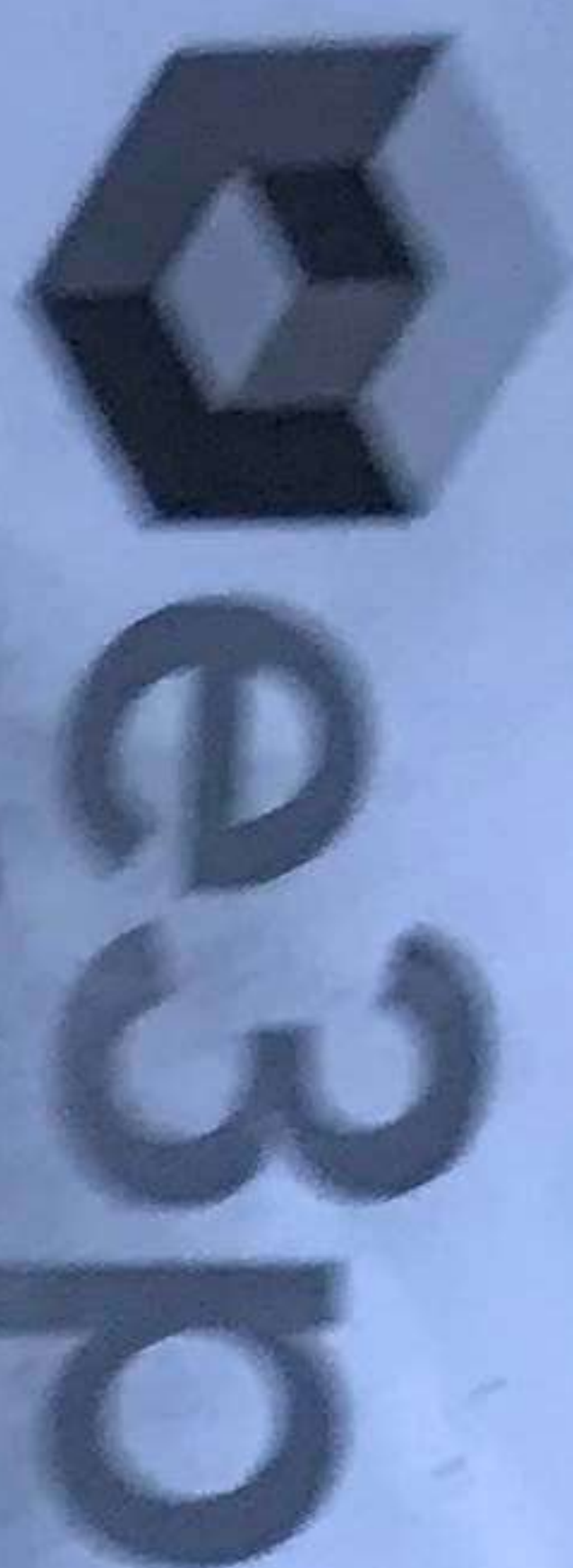
Inspection date/time:	18/11/19	Inspected by:	JJMEs	Photographed:	✓	✓/x
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✓/x	Notes/recommendations
✓	Membrane Type Correct
✓	Extent of Coverage Correct
✓	Underside of Membrane
✓	Slab / membrane condition
✓	Laps and joints
✓	Damp-proof course
✓	Service entries
✓	Folded Membrane Joint Taped & Inspected

This Plot has PASSED/FAILED* inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).
An additional inspection visit IS/IS NOT* required for this Plot.

Inspection by: Jordan Jany Signed: [Signature]

One record sheet to be completed for each plot - To be completed by E3P Professional Inspecting.



Gas Protection Validation Site Record

Plot No:

31

Inspection date/time:

18/11/19

Inspected by:

JJMEs

Photographed:

✓

✓/x

✓/x Notes/recommendations

Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	
Damp-proof course	✓	
Service entries	✓	
Folded Membrane Joint Taped & Inspected	✓	

This Plot has PASSED / FAILED * Inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT * required for this Plot.

Inspection by:

Jordan Jany

Signed:

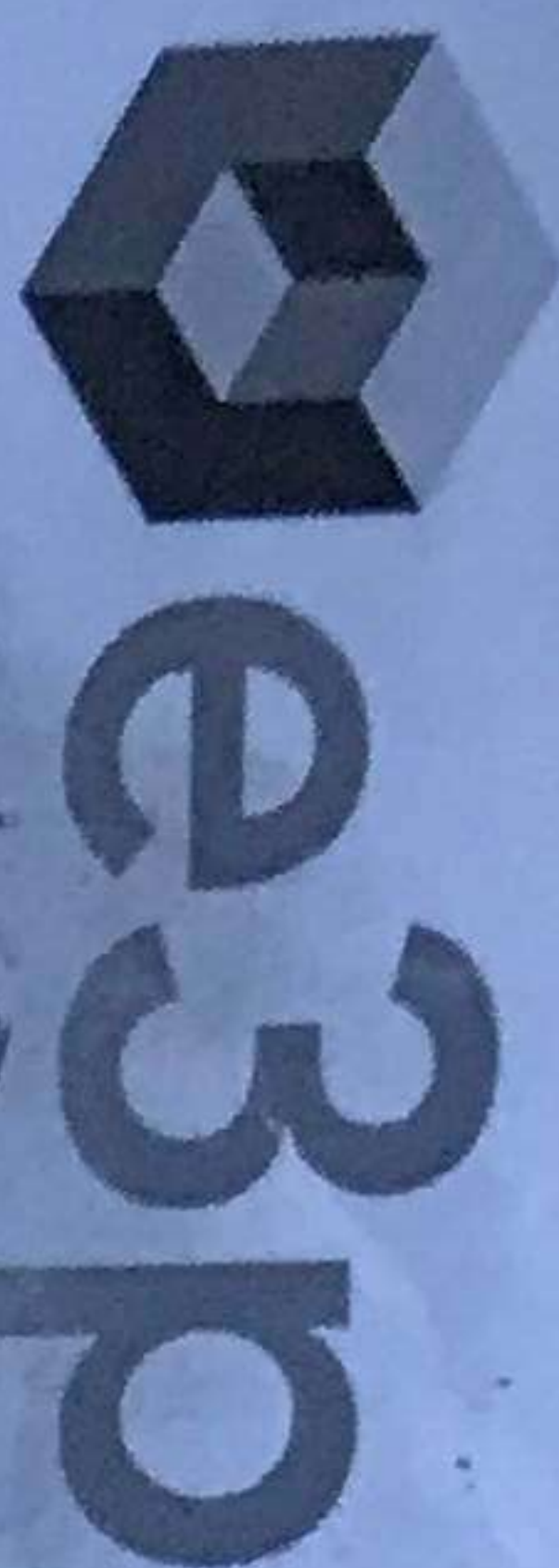
JJMEs

One record sheet to be completed for each plot - To be completed by E3P Professional Inspecting.

Ref: QY11-1-1 January 2014 - Prepared by A. Edgar

Environmental Engineering Partnership Limited trading as E3P

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Gas Protection Validation Site Record

Plot No: 48

Inspection date/time:	18/11/19	Inspected by:	JJAMES	Photographed:	✓	✓/x
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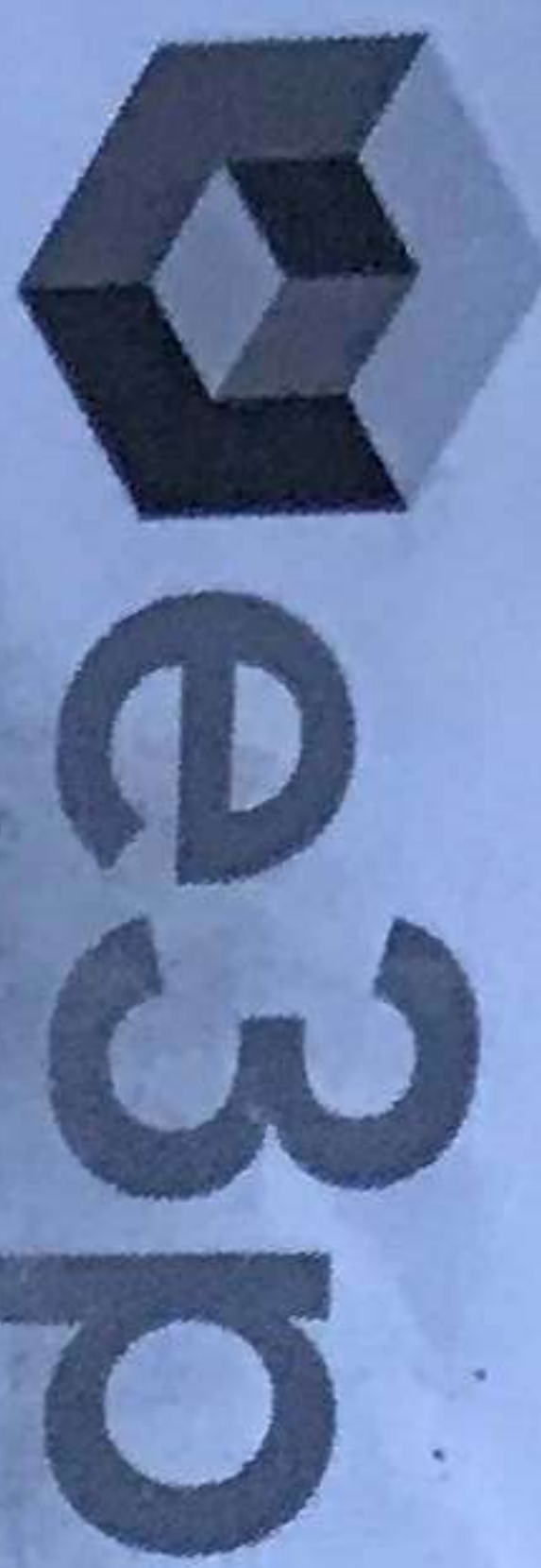
✓/x		Notes/recommendations	
Membrane Type Correct	✓		
Extent of Coverage Correct	✓		
Underside of Membrane	✓		
Slab / membrane condition	✓		
Laps and joints	✓		
Damp-proof course	✓		
Service entries	✓		
Folded Membrane Joint Taped & inspected	✓		

This Plot has PASSED/FAILED* inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT* required for this Plot.

Inspection by: Jordan James Signed: JJAMES

One record sheet to be completed for each plot – To be completed by E3P Professional Inspecting.



Gas Protection Validation Site Record

Plot No: 49

Inspection date/time:	18/11/19	Inspected by:	JJAMES	Photographed:	✓	✓/x
-----------------------	----------	---------------	--------	---------------	---	-----

	✓/x	Notes/recommendations
Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	
Damp-proof course	✓	
Service entries	✓	
Folded Membrane Joint	✓	
Taped & inspected	✓	

This Plot has PASSED/FAILED* inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT* required for this Plot.

Inspection by: Jordan James Signed: JJAMES

One record sheet to be completed for each plot – To be completed by E3P Professional Inspecting.

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GAS MEMBRANE VALIDATION

Site: Bowes Street	
Date: 21-01-2020	Project Number: 11-813
Project Manager: R. Horseman	E3P Engineer: M. Whittaker
PM Qualifications: BSC(Hons) FGS Cenv	Engineer Qualifications: Ground Gas Protection Oct 2018
Ground Gas Risk Assessment: Characteristic Situation 2 / Amber 1	
Overview: The membrane comprised Visqueen GX DPC wrapped under slab and spanned across internal and external walls which was taped to VOC block with GX jointing tape. E3P can confirm there were no punctures or tears at the time of inspection. Upon being laid the membrane was covered with a Celotex (closed Cell) floor insulation material which is considered to provide a high degree of protection. All external joints were inspected and E3P can confirm that the membrane was overlapped and double taped to external and internal gas resistant GX DPM. The membrane was taped to the gas resistant VOC Block DPM using a double-sided jointing tape. All the overlaps were then additionally taped using foil backed girth tape. Each unit has a service duct located to the front and outer edge of the property. E3P inspected each one and can confirm that the top hats have been adequately sealed against the membrane. Based on the information provided within this report, the site inspections and validation checklists, E3P can confirm that plots 32-34 have been installed with gas protection measures in accordance with Characteristic Situation 2 to an acceptable level of workmanship	
Membrane Specification: Hydrocarbon Resistant Membrane (VOC Blok and Visqueen GX)	



Plot – 32

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Plot – 33

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition

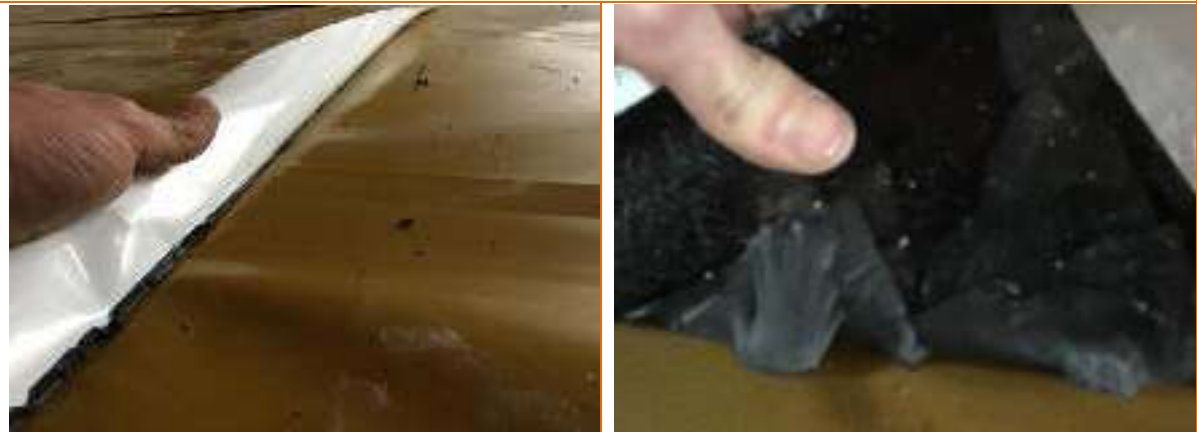


Plot – 34

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition





Bowes Street.

Gas Protection Validation Site Record

Plot No. 32

Inspection date/time:	<u>21.1.2020</u> <u>11.30</u>	Inspected by:	<u>Mike Whittaker</u>	Photographed:	<u>✓/x</u> ✓
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✓/x Notes/recommendations

Membrane Type Correct	✓	<u>Yellow Visaqueen Membrane.</u>
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Leaps and joints	✓	
Damp-proof course	x	<u>installed after slab pour.</u>
Service entries	✓	
Folded Membrane Joint Taped & inspected	✓	

This Plot has PASSED/FAILED* inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS NOT required for this Plot.

Inspection by: M. Whittaker

Signed: [Signature]

One record sheet to be completed for each plot - To be completed by E3P Professional Inspecting.



Gas Protection Validation Site Record

Plot No: 33

Inspection date/time:	21.1.2020 11.40	Inspected by:	M. Whittaker	Photographed:	✓/x ✓
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✓/x Notes/recommendations

Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	
Damp proof course	X	
Service entries	✓	
Folded Membrane Joint Taped & Inspected	✓	

This Plot has PASSED/FAILED inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT required for this Plot.

Inspection by: M. Whittaker Signed: [Signature]

One record sheet to be completed for each plot - To be completed by E3P Professional Inspecting.



Gas Protection Validation Site Record

Plot No: 34

Inspection date/time:	<u>21.1.2020</u> <u>11.50</u>	Inspected by:	<u>M. Whittaker</u>	Photographed:	<u>✓/x</u>
-----------------------	----------------------------------	---------------	---------------------	---------------	------------

✓/x Notes/recommendations

Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Seal / membrane condition	✓	
Laps and joints	✓	
Damp proof course	✓	
Service entries	✓	
Folded Membrane Joint Taped & Inspected	✓	

This Plot has PASSED inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS NOT required for this Plot.

Inspection by: M. Whittaker Signed: [Signature]

One record sheet to be completed for each plot – To be completed by E3P Professional Inspecting.



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GAS MEMBRANE VALIDATION

Site: Bowes Street	
Date: 18-02-2020	Project Number: 11-813
Project Manager: R. Horseman	E3P Engineer. T. Preston
Ground Gas Risk Assessment: Characteristic Situation 2 / Amber 1	
Overview: The membrane comprised Visqueen GX DPC wrapped under slab and spanned across internal and external walls which was taped to VOC block with GX jointing tape. E3P can confirm there were no punctures or tears at the time of inspection. Upon being laid the membrane was covered with a Celotex (closed Cell) floor insulation material which is considered to provide a high degree of protection. All external joints were inspected and E3P can confirm that the membrane was overlapped and double taped to external and internal gas resistant GX DPM. The membrane was taped to the gas resistant VOC Block DPM using a double-sided jointing tape. All the overlaps were then additionally taped using foil backed girth tape. Each unit has a service duct located to the front and outer edge of the property. E3P inspected each one and can confirm that the top hats have been adequately sealed against the membrane. Based on the information provided within this report, the site inspections and validation checklists, E3P can confirm that plots 35-38 have been installed with gas protection measures in accordance with Characteristic Situation 2 to an acceptable level of workmanship	
Membrane Specification: Hydrocarbon Resistant Membrane (VOC Blok and Visqueen GX)	



Plot – 35

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Plot – 36

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Plot – 37

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Plot – 38

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition





e3p

GAS PROTECTION VALIDATION

Plot No:

36

Inspection date/time:

18/12/20

Inspected by:

Tom Preston

Photographed:

✓/x

Notes/recommendations

✓

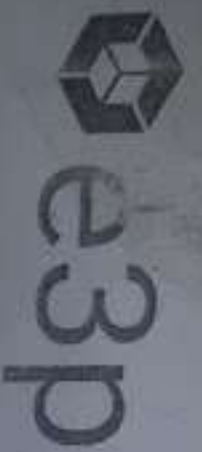
✓/x

Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	
Damp-proof course	✓	
Service entries	✓	
Folded Membrane Joint Taped & inspected	✓	

This Plot has **PASSED/FAILED** inspection. (Any proposed remedial works will be noted in the 'Remarks' column on this form).
An additional inspection visit IS/IS NOT required for this Plot.

Inspection by: Tom Preston Signed: [Signature]

One record sheet to be completed for each plot - To be completed by E3P Professional Inspecting.



GAS PROTECTION VALIDATION

Plot No:

37

Inspection date/time:

18/12/20

Inspected by:

Tom Preston

Photographed:

✓/x

✓/x

Notes/recommendations

✓

Membrane Type Correct	✓	
Extent of Coverage Correct	✓	✓
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	✓
Damp-proof course	✓	
Service entries	✓	
Folded Membrane Joint	✓	
Taped & inspected	✓	

This Plot has PASSED/FAILED* inspection. (Any proposed remedial works will be noted in the 'Remarks' column on this form.)

An additional inspection visit IS/IS NOT* required for this Plot.

Inspection by:

Tom Preston

Signed:

[Signature]

One record sheet to be completed for each plot - To be completed by E3P Professional Inspecting.



e3p

GAS PROTECTION VALIDATION

Plot No:

38

Inspection date/time:

18/12/20

Inspected by:

Tom Preston

Photographed:

✓/x

✓/x

Notes/recommendations

Membrane Type Correct	✓/x	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	
Damp-proof course	✓	
Service entries	✓	
Folded Membrane Joint Taped & inspected	✓	

This Plot has PASSED/FAILED* inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).
An additional inspection visit IS/IS NOT* required for this Plot.

Inspection by:

Tom Preston

Signed:

[Signature]

One record sheet to be completed for each plot – To be completed by E3P Professional Inspecting.



e3p

Plot No:

BS

GAS PROTECTION VALIDATION

Inspection date/time:

18/12/20

Inspected by:

Tom Preston

Photographed:

✓/x

Membrane Type Correct

✓/x

Notes/recommendations

Extent of Coverage Correct

Underside of Membrane

Slab / membrane condition

Laps and joints

Damp-proof course

Service entries

Folded Membrane Joint
Taped & inspected

This Plot has PASSED/FAILED* inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT* required for this Plot.

Inspection by:

Tom Preston

Signed:

[Signature]

One record sheet to be completed for each plot - To be completed by E3P Professional Inspecting.



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GAS MEMBRANE VALIDATION

Site: Bowes Street

Date: 06-01-2020

Project Number: 11-813

Project Manager: R. Horseman

E3P Engineer. M. Whittaker

PM Qualifications: BSC(Hons) FGS Cenv

Engineer Qualifications: Ground Gas Protection
Oct 2018 (Proctor Group)

Ground Gas Risk Assessment: **Characteristic Situation 2 / Amber 1**

Overview:

The membrane comprised Visqueen GX DPC wrapped under slab and spanned across internal and external walls which was taped to VOC block with GX jointing tape.

E3P can confirm there were no punctures or tears at the time of inspection. Upon being laid the membrane was covered with a Celotex (closed Cell) floor insulation material which is considered to provide a high degree of protection.

All external joints were inspected and E3P can confirm that the membrane was overlapped and double taped to external and internal gas resistant GX DPM. The membrane was taped to the gas resistant VOC Block DPM using a double-sided jointing tape. All the overlaps were then additionally taped using foil backed girth tape.

Each unit has a service duct located to the front and outer edge of the property. E3P inspected each one and can confirm that the top hats have been adequately sealed against the membrane.

Based on the information provided within this report, the site inspections and validation checklists, E3P can confirm that plots 39-44 have been installed with gas protection measures in accordance with Characteristic Situation 2 to an acceptable level of workmanship

Membrane Specification: Hydrocarbon Resistant Membrane (VOC Blok and Visqueen GX)



Plot – 39

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Plot – 40

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Plot – 41

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Plot – 42

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Plot – 43

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Plot – 44

General Condition of Membrane-Good Condition

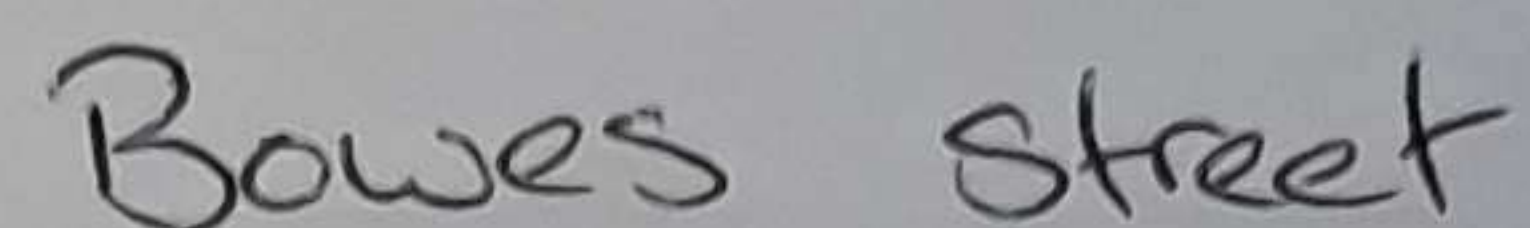


Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition





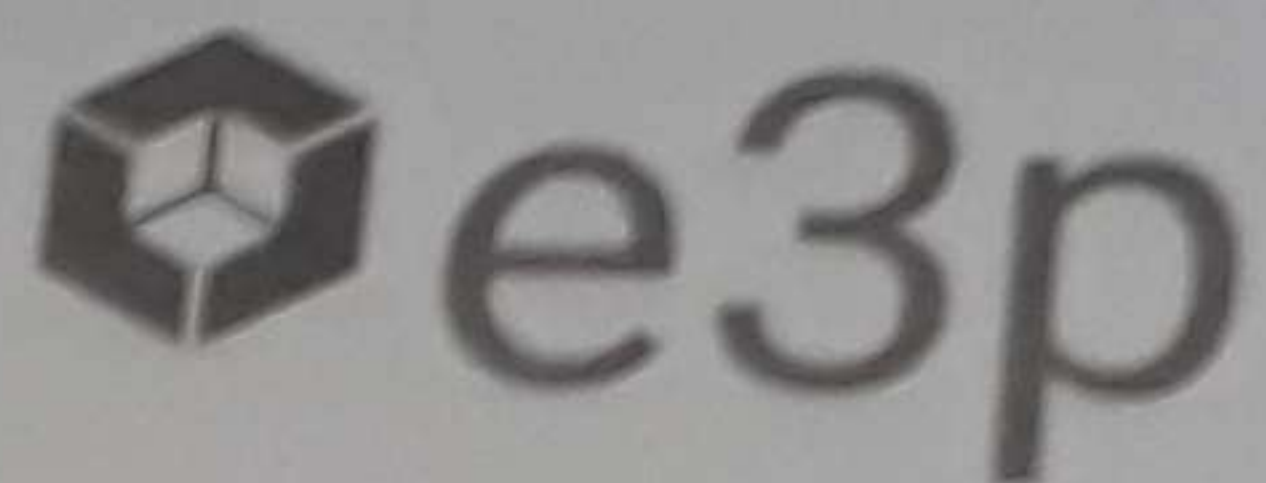
Plot No: 39

This Plot has **PASSED** ~~inspection~~ inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT* required for this Plot.

Inspection by: M. Whittaker Signed: M. Whittaker

Inspection by: M. Whittaker Signed: [Signature]
One record sheet to be completed for each plot – To be completed by E3P Professional Inspecting.



Gas Protection Validation Site Record

Plot No: 40

Inspection date/time:

7-01-2020
11:30

Inspected by:

M. Whittaker

Photographed:

✓/x

✓

✓/x Notes/recommendations

Membrane Type Correct

✓

Extent of Coverage Correct

✓

Underside of Membrane

✓

Slab / membrane condition

✓

Laps and joints

✓

Damp-proof course

✓

Service entries

✓

Folded Membrane Joint

✓

Taped & inspected

This Plot has ~~FAILED~~ PASSED inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit ~~IS~~ IS NOT required for this Plot.

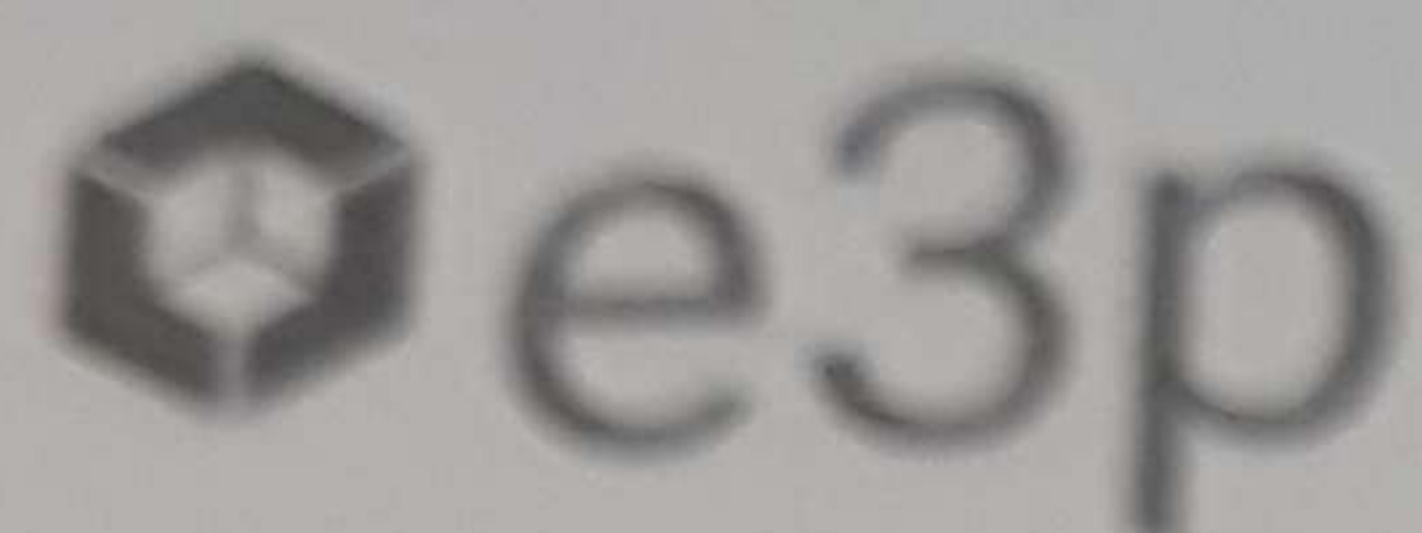
Inspection by:

M. Whittaker

Signed:

[Signature]

One record sheet to be completed for each plot - To be completed by E3P Professional Inspecting.



Gas Protection Validation Site Record

Plot No. 41

Inspection date/time: 7-01-2020
11:10

Inspected by: M. J. H. H. H.

Photographed: ✓

✓/x	Notes/recommendations
	Membrane Type Correct ✓
	Extent of Coverage Correct ✓
	Underside of Membrane ✓
	Slab / membrane condition ✓
	Leaps and joints ✓
	Damp-proof course ✓
	Service entries ✓
	Folded Membrane Joint ✓
	Inspected & inspected ✓

This Plot has passed inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS NOT required for this Plot.

Inspection by M. J. H. H. H.

Signed

One record sheet to be completed for each plot - To be completed by E3P Professional Inspecting.



Gas Protection Validation Site Record

Plot No. 42

Inspection date: 7-01-2020
16-4-20

Inspected by: M. L. H. H. H. Photographer: CH

Notes/Recommendations

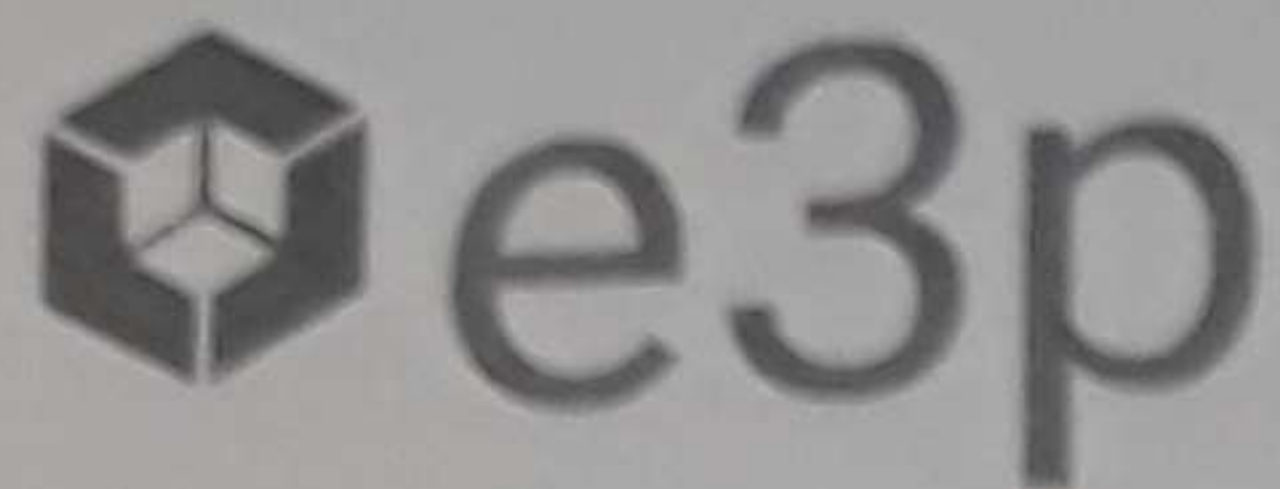
Manhole Type/Correct	✓
Extent of Coverage/Correct	✓
Condition of Manhole	✓
State / manhole condition	✓
Light and path	✓
Compartment correct	✓
Access correct	✓
Excluded Manhole Area	✓
Excluded & inspected	

This Plot has passed inspection. (Any proposed remedial works will be noted in the 'Remarks' column on this form).

An additional inspection will be NOT required for this Plot.

Inspected by: M. L. H. H. H. Signed: [Signature]

One record sheet to be completed for each plot - To be completed by E3P Professional Inspectors.



Gas Protection Validation Site Record

Plot No: 44

Inspection date/time: 07-01-2020
10:25 Inspected by: M Whithaker Photographed: ✓/x

✓/x	Notes/recommendations
	Membrane Type Correct ✓
	Extent of Coverage Correct ✓
	Underside of Membrane ✓
	Slab / membrane condition ✓
	Laps and joints ✓
	Damp-proof course ✓
	Service entries ✓
	Folded Membrane Joint Taped & inspected ✓

This Plot has ~~FAILED~~ **PASSED** inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit ~~IS~~ **IS NOT*** required for this Plot.

Inspection by: M Whithaker Signed: [Signature]

One record sheet to be completed for each plot - To be completed by E3P Professional Inspecting.



43

43

07-01-2020
10:30

M. Shittaka

 $\frac{1}{x}$

✓

✓

✓

✓

✓

✓

✓

✓

An additional inspection visit ~~IS~~ IS NOT* required for this Plot

Signed: _____

Inspection by: To be completed by E3P Professional Inspecting.

GAS MEMBRANE VALIDATION

Site: Bowes Street

Date: 07-11-2019

Project Number: 11-813

Project Manager: R. Horseman

E3P Engineer: A. Ahmed

Ground Gas Risk Assessment: **Characteristic Situation 2 / Amber 1**

Overview:

The membrane comprised Visqueen GX DPC wrapped under slab and spanned across internal and external walls which was taped to VOC block with GX jointing tape.

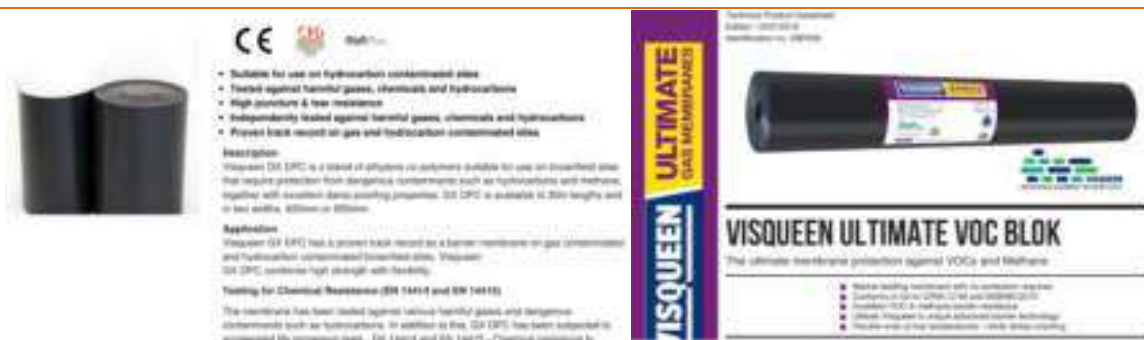
E3P can confirm there were no punctures or tears at the time of inspection. Upon being laid the membrane was covered with a Celotex (closed Cell) floor insulation material which is considered to provide a high degree of protection.

All external joints were inspected and E3P can confirm that the membrane was overlapped and double taped to external and internal gas resistant GX DPM. The membrane was taped to the gas resistant VOC Block DPM using a double-sided jointing tape. All the overlaps were then additionally taped using foil backed girth tape.

Each unit has a service duct located to the front and outer edge of the property. E3P inspected each one and can confirm that the top hats have been adequately sealed against the membrane.

Based on the information provided within this report, the site inspections and validation checklists, E3P can confirm that Plots 45 and 46 have been installed with gas protection measures in accordance with Characteristic Situation 2 to an acceptable level of workmanship

Membrane Specification: Hydrocarbon Resistant Membrane (VOC Blok and Visqueen GX)



Plot - 45

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Verification of Ventilation-Good Condition



Plot - 46

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Verification of Ventilation-Good Condition





Gas Protection Validation Site Record

Plot No: 11-813 Plot ~~11-813~~ 46

Inspection date/time:

7/11/19

Inspected by:

A Ahmed

Photographed:

0/x

0/x Notes/recommendations

Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	lt repairs
Damp-proof course	✓	
Service entries	✓	
Folded Membrane Joint	✓	
Taped & inspected	✓	

This Plot has PASSENGER AIR* Inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT* required for this Plot.

Inspection by:

A Ahmed

Signed:

A Ahmed

One record sheet to be completed for each plot - To be completed by E3P Professional Inspecting.



Plot No:

11-813 Plot 245

✓ 10x

Notes/recommendations

Let reports

An additional inspection visit IS/IS NOT* required for this Plot.

Inspection by

Signed:

One record sheet to be completed for each plot – To be completed by E3P Professional Inspecting.



GAS MEMBRANE VALIDATION

Site: Bowes Street	
Date: 02-12-2019	Project Number: 11-813
Project Manager: R. Horseman	E3P Engineer: T. Preston
PM Qualifications: BSC(Hons) FGS Cenv	Engineer Qualifications: Verification of Gas Protection Systems July 18
Ground Gas Risk Assessment: Characteristic Situation 2 / Amber 1	
Overview: The membrane comprised a Visqueen low permeability gas membrane (Yellow) resistant to radon, carbon dioxide and low levels of methane. E3P can confirm there were no holes or rips at the time of inspection. Upon being laid the membrane is to be covered with a Celotex (closed Cell) floor insulation material which is considered to provide a high degree of protection. All external joints were inspected and E3P can confirm that the membrane was overlapped and double taped to external and internal gas resistant DPM. The membrane was taped to the gas resistant DPM using a double-sided jointing tape. All the overlaps were then additionally taped using foil backed girth tape. Each unit has a service duct located to the front and outer edge of the property. E3P inspected each one and can confirm that the top-hats have been adequately sealed against the membrane. Based on the information provided within this report, the site inspections and validation checklists, E3P can confirm that Plots 47 50-54 have been installed with gas protection measures in accordance with Characteristic Situation 2 / Amber 1 to an acceptable level of workmanship.	
Membrane Specification: Visqueen Gas Membrane (Yellow)	
	



Plot – 47

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Plot - 50

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Plot - 51

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Plot - 52

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Plot - 53

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition



Plot - 54

General Condition of Membrane-Good Condition



Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition





Gas Protection Validation Site Record

Plot No: 47

Inspection date/time:	<u>11/12/19</u>	Inspected by:	<u>T. Pender</u>	Photographed:	<u>(Signature)</u>
-----------------------	-----------------	---------------	------------------	---------------	--------------------

✓/x Notes/recommendations	
Membrane Type Correct	✓
Extent of Coverage Correct	✓
Underside of Membrane	✓
Slab / membrane condition	✓
Laps and joints	✓
Damp-proof course	✓
Service entries	✓
Folded Membrane Joint Taped & Inspected	✓

This Plot has PASSED / FAILED inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).
An additional inspection visit is IS / IS NOT required for this Plot.
Inspection by: T. Pender Signed: (Signature)



Gas Protection Validation Site Record

Plot No: 50

Inspection date/time:	<u>2/12/19</u>	Inspected by:	<u>T. B. S.</u>	Photographed:	<u>(initials)</u>
-----------------------	----------------	---------------	-----------------	---------------	-------------------

✓/x Notes/recommendations

Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	
Damp-proof course	✓	
Service entries	✓	
Folded Membrane Joint Taped & inspected	✓	

This Plot has PASSED / FAILED inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit is NOT required for this Plot.

Inspection by: T. B. S. Signed: T. B. S.



Gas Protection Validation Site Record

Plot No: S1

Inspection date/time:

21/12/19

Inspected by:

T. Preston

Photographed:

GP

✓/x Notes/recommendations

Membrane Type Correct	/	
Extent of Coverage Correct	/	
Underside of Membrane	/	
Slab / membrane condition	/	
Laps and joints	/	
Damp-proof course	/	
Service entries	/	
Folded Membrane Joint Taped & inspected	/	

This Plot has PASSED ~~FAILED~~ inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit is NOT required for this Plot.

Inspection by: T. Preston Signed: T. Preston



e3p

Plot No:

SZ

Gas Protection Validation Site Record

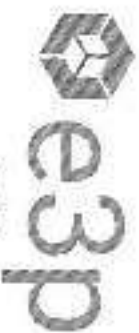
Inspection date/time:	2/12/19.	Inspected by:	T. Preston	Photographed:	
-----------------------	----------	---------------	------------	---------------	--

✓/x Notes/recommendations	
Membrane Type Correct	✓
Extent of Coverage Correct	✓
Underside of Membrane	✓
Slab / membrane condition	✓
Laps and joints	✓
Damp-proof course	✓
Service entries	✓
Folded Membrane Joint Taped & inspected	✓

This Plot has PASSED/FAILED* Inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT* Required for this Plot.

Inspection by: T. Preston Signed: T. Preston



Gas Protection Validation Site Record

Plot No: 53

Inspection date/time: 2/12/19 Inspected by: T. Bredon Photographed: (21x)

✓/x Notes/recommendations	
Membrane Type Correct	✓
Extent of Coverage Correct	✓
Underside of Membrane	✓
Slab / membrane condition	✓
Laps and joints	✓
Damp-proof course	✓
Service entries	✓
Folded Membrane Joint Taped & Inspected	✓

This Plot has PASSED inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT required for this Plot.

Inspection by: T. Bredon Signed: T. Bredon



e3p

Gas Protection Validation Site Record

Plot No:

54

Inspection date/time:

2/12/19

Inspected by:

T. Presk

Photographed:

OK

✓/x Notes/recommendations

Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	
Damp proof course	✓	
Service entries	✓	
Folded Membrane Joint Taped & inspected	✓	

This Plot has PASSED/FAILED inspection. (Any proposed remedial works will be noted in the 'Remarks' column on this form).

An additional inspection visit ISDS NOT required for this Plot.

Inspection by: T. Presk Signed: T. Presk