

Site Investigations



Geologists



Environmental &
Geotechnical
Engineers



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FAO Jon Wells
Steve Wells Associates

Date: 16th August 2024

HISTORIC GROUND GAS RISK ASSESSMENT AND COMMENTRY ON PROPOSED GAS PROTECTION MEASURES FOR SITE DEVELOPMENT

**Top Park, Bury
M24-042**

Dear Sirs

INTRODUCTION

Authorisation

Solmek were instructed by Steve Wells Associates to assess the risk posed by historic ground gas contamination and to comment on their proposed strategy for site development concerning the mitigation of potential ground gas contamination. A drawing showing the position of the site is appended to this letter. Sources of information, including previous work undertaken at the site, are detailed below:

- *Solmek Phase 1 Desk Study (M24-042) July 2024*
- *BURY MBC LANDFILL AUDIT 2007 (Bolton Road West Landfill Site C059) August 2007*
- *Steve Wells Associates Commentary on The Desk Study and Associated Strategy for Site Development*

Reference should be made to the above report for details of the site's history, environmental/contamination setting and expected underlying geological conditions and proposed mitigation schemes.

Scope of Works

The proposed development comprises a floodlit football pitch and extension to existing pavilion on site.

The information provided in this Ground Gas Assessment is based on previous investigation fieldwork and is subject to the comments and approval of the various Regulatory Authorities. There may be other conditions prevailing on the site which have not been disclosed by this investigation and which have not been taken into account by this report. Solmek reserve the right to alter conclusions and recommendations should further information be available or provided. Any schematic representation or opinion of the possible configuration of ground conditions between exploratory holes is conjectural and given for guidance only and confirmation of intermediate ground conditions should be considered if deemed necessary.

REVIEW OF SITE HISTORY AND INVESTIGATION WORKS

Previous and Current Land Use

Historic maps show that from 1850 to 1963 the site was primarily open fields adjacent to an iron works and Hope Works, a bleaching tanning and finishing works located on the site's northwestern boundary. However, from 1963 to 1987 the site is noted to have a refuse tip in its southern portion.

Today the site is primarily occupied by playing fields with a small carpark, children's play area, and pavilion located in the northwest of the site, outside the boundary of the historic landfill.

Ground Conditions

Below is a summary of ground conditions based of BGS borehole records in the site's surrounding area as well as geological maps for the area. Sources of information used to determine possible ground conditions at the site are detailed below:

- British Geological Survey (BGS): 1:50 000 geological map series sheet 85 Manchester Solid and Drift Edition (2011)
- British Geological Survey (BGS): 1:10 000 geological map series sheet SD7NE Solid and Drift geology.
- British Geological Survey (BGS): Borehole Records SD71NE3, SD71NE163, and SD71NE4

The borehole records and maps have been appended to this letter.

Made Ground

BGS borehole records from the surrounding area suggest that there is little to no made ground, with borehole SD71NE163 suggesting that the extend of made ground is c. 0.20m of topsoil. Given the site's history it is unlikely that there is little to no made ground at the site. This however could only be proven with an intrusive investigation on site.

Natural Deposits

Natural deposits on site are noted to be Diamicton Till. This is supported by BGS borehole records, noting interbedded boulder clays and sands to a maximum depth of c. 42.00mbgl (borehole record SD71NE4). The solid geology of the site is noted to be the Brooksbottoms Grit formation, which consists of sandstone.

Groundwater

The Environment Agency has dictated that the site is underlain by a solid geology that is classified as a Secondary Aquifer – A, with the overlying drift classified as a Secondary Aquifer – Undifferentiated.

Historical Gas Monitoring and Assessment

Historical Ground Gas Monitoring Results

The Bury MBC Landfill Audit 2007 report states that upon monitoring three of the boreholes (BH10, BH11 and BH19) no methane was detected, a maximum concentration of 0.8% carbon dioxide was reported, and the maximum flow rate recorded was 0.2l/hr. It should be noted that none of the boreholes located within the precise area of the historic landfill could be found. It is noted by Solmek that given the age of the landfill, the peak gas generation period is likely to have passed.

Historical Ground Gas Prevention Measures

As reported in the Bury MBC Landfill Audit 2007 report, in 1993/4 a passive venting trench with venting columns and cowls was installed along the east, south and southeastern border of the site. Additionally, a bentonite cutoff wall was installed along the Bolton Road West boundary. Furthermore, it is noted that current pavilion sits north of this bentonite cutoff wall atop of c. 2.5m of glacial till fill above natural strata. It should be noted that glacial till can be considered to have a low permeability acting as a barrier to ground gas migration. The table below from Solmek's Phase 1 Desk Study shows the potential ground gas pollution linkages for the site.

POTENTIAL GROUND GAS POLLUTION LINKAGES

Potential Sources	Potential Pathway	Receptor
Made ground (CO ₂ , CO and CH ₄). Coal measures (CO ₂ , CO and CH ₄) and stythe gas or oxygen depletion. Landfills (CO ₂ and CH ₄).	Ingress and Accumulation into buildings from vertical and horizontal migration	Future users of site are likely to include adults and children. Construction workers.
Preliminary Comparison of Consequence verses Probability		
	Classification	Justification
Probability (Based on Table 8.1, CIRIA C665, 2007)	LOW LIKELIHOOD	Ground gas from made ground.
		Landfills located within the site boundary, however a bentonite cut off wall is noted between the pavilion and landfill, limiting lateral migration.
		No coal mining in area.
Consequence (Based on Table 8.2, CIRIA C665, 2007)	LOW - HIGH	Recreational open-air development. Extension to building/pavilion.
	Risk	Details
Consequence vs. Probability (Based on Table 8.3, CIRIA C665, 2007)	LOW/MODERATE RISK	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the long term. (Based on Table 8.4, CIRIA C665, 2007).

As can be seen from the above information, with the existing migration structures in place the risk from ground gas has initially been assessed to be low to moderate.

GROUND GAS ASSESSMENT AND COMMENTS ON PROPOSED GAS PROTECTION MEASURES

In order to quantify ground gas risk, the previously stated results have been used to calculate a gas screening value for the site.

Ground Gas Analysis

The historically obtained results have been compared with relevant guidance that includes the following:

- BRE/Environment Agency BR414 (2001) – Protective Measures for Housing on Gas-Contaminated Land
- Wilson & Card (1999) – Reliability and Risk in Gas Protection Design
- CIRIA 149 (1995) – Protecting Development from Methane
- CIRIA C665 (2007) – Assessing Risks Posed by Hazardous Ground Gases to Buildings.
- BS8485 (2015) + A1 (2019) – Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings

The Building Regulations set action levels for both methane and carbon dioxide from which an initial assessment can be made. The action threshold for methane is 1% while for carbon dioxide an initial consideration should be undertaken if gas concentrations exceed 1.5%. Action might be required if carbon dioxide concentrations exceed 5%. If these thresholds are exceeded, reference should be made to specific documentation to determine the nature and extent of the gas control measures required.

A Characteristic Situation ranking of between 1 and 6 is given based on the ground gas monitoring results coupled with the gas flow rate. These combined produces a Gas Screening Value (GSV). Where no flow is recorded a flow rate of 0.1l/hr is assumed. The GSV and risk classification define the characteristic situation, which are comparable to the table below, taken from CIRIA C665, and derived from CIRIA R149. Given that the site will be covered by hardstanding and the building will be for high rise residential land use, the protection measures required are based on CIRIA R149, shown in Table 1 below.

CIRIA R149 GAS REGIMES

Characteristic Situation (CS)	Risk Classification	Gas Screening Value CH ₄ or CO ₂ (l/hr)	Additional Factors
1	Very Low Risk	<0.07	CS1 where CH ₄ is <1% and/or CO ₂ is <5%, Otherwise increase to CS2
2	Low Risk	<0.7	
3	Moderate Risk	<3.5	
4	Moderate to High Risk	<15	
5	High Risk	<70	
6	Very High Risk	>70	

The worst case GSV can be taken from the highest flow rate recorded over the visits (0.2l/hr) along with the greatest volume of CO₂ (0.80%). Based on these figures the worst GSV has been calculated as 0.0016(l/hr). The gas screening values from the monitoring visits would place the site in **Characteristic Situation (CS) 1 giving it a very low risk classification.**

A series of tables adapted from **BS:8485** are appended to this letter. The type of building and gas protection level generate a minimum gas protection points score, in this case a private or commercial/public building (Type B) combined with CS1 has a score of **0 points**. However, given that this is based of historic ground gas measures, and given the nature of the site, it may be prudent to assume characteristic situation of 3, meaning the site would have to have a minimum gas protection score of **4 points** to provide an adequate level of ground gas protection.

Review of Proposed Gas Protection Measures

Steve Wells Associates have proposed that the extension to the existing pavilion building on site. The strategy for the development has a total of a 4.5-point gas protection score. The details of the proposed protection measures are summarised in the table below:

Proposed Development Gas Protection Measures

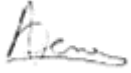
Protection Measures	Details	Score (BS8485:2015)
Structural Barrier: Ground Floor	Floor & Sub Structure Design: Precast Suspended Segmental Subfloor (Beam and Block)	0 from Table 5, Page 23.
Ventilation Protection Measures: Passive Sub-Floor Dispersal Layer.	Design: Very Good Performance: A clear void connecting to periscopic vents terminating in vents above ground level. - Sub-floor void to be a minimum of 100mm thick - A minimum side ventilation area of 1500mm² per meter run of wall to be achieved	2.5 from Table 6, Page 25
Gas Resistant Membrane	Membrane to conform to the following criteria: - Methane and Carbon Dioxide resistant - Average gas transmission rate <40.00ml/day/m²/atm for sheets and joints - Sufficiently strong to withstand installation/in-service stresses - Must remain serviceable for the design life of building - Provide a complete barrier to entry of relevant gases and vapour. - Verified in accordance with CIRIA C735	2 from Table 7, Page 27
Total Score		4.5

A datasheet for the membrane to be used has been appended to this letter. It should be noted that the contractor is required to install the gas protection measures in line with the YALPAG Verification Proforma, adopted from CIRIA C735, an example of this has also been appended to this letter.

Concluding Comments on Proposed Gas Protection Measures

Solmek deems that in lieu of gas monitoring the proposed development possesses the proposed gas protection measures necessary to protect against the risk posed by historic ground gas generation. It should also be noted that should a CS 3 be adopted as a present day 'worst case scenario' the proposed development would still possess the necessary gas protection measures needed. Therefore, a new cycle of gas monitoring is not deemed necessary for the proposed development.

Yours sincerely,

A handwritten signature in blue ink, appearing to read 'Archie Crane', is positioned above the printed name.

Archie Crane
On behalf of Solmek Ltd.

GAS PROTECTION REQUIREMENTS IN LINE WITH BS8485:2015 + A1:2019

Characteristic Situation	Minimum gas protection score (points)			
	High Risk	Medium Risk		Low Risk
	Type A (Private)	Type B (Private or commercial /public)	Type C (Commercial /public)	Type D (Commercial /industrial)
1	0	0	0	0
2	3.5	3.5	2.5	1.5
3	4.5	4	3	2.5
4	6.5 A)	5.5 A)	4.5	3.5
5	B)	6.0 A)	5.5	4.5
6	B)	B)	B)	6.0
A) Residential should not be built on CS4 or higher without additional levels of protection				
B) The gas hazard is too high for this empirical method used to define gas protection measures				

Adapted from Table 4 of BS:8485:2015 +A1:2019

Element	Score
Floor and Substructure Design	
Precast suspended segmental subfloor (i.e. Beam and block)	0
Cast in situ ground bearing floor slab (with only minimum mesh reinforcement)	0.5
Cast in situ monolithic reinforced ground bearing raft or suspended floor slab with minimal penetrations	1 or 1.5
Basement floor and walls conforming to BS8102:2009 Grade 2 C) + D)	2
Basement floor and walls conforming to BS8102:2009 Grade 3 C) + D)	2.5
Venting Design	
Pressure relief pathway	0.5
Passive sub floor dispersal layer	1.5 or 2.5
Active dispersal layer	1.5-2.5
Active positive pressurization	1.5-2.5
Ventilated car park	4
Gas Membrane	
Gas membrane meeting requirements	2

Adapted from Tables 5, 6 and 7 of BS:8485:2015 +A1:2019



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Figure Title

Superficial Geology Plan

Project Number

M24-042

Project Name

Top Park

Client

Steve Wells Associates

Date

August 2024

DRG Number

Figure 1

Scale

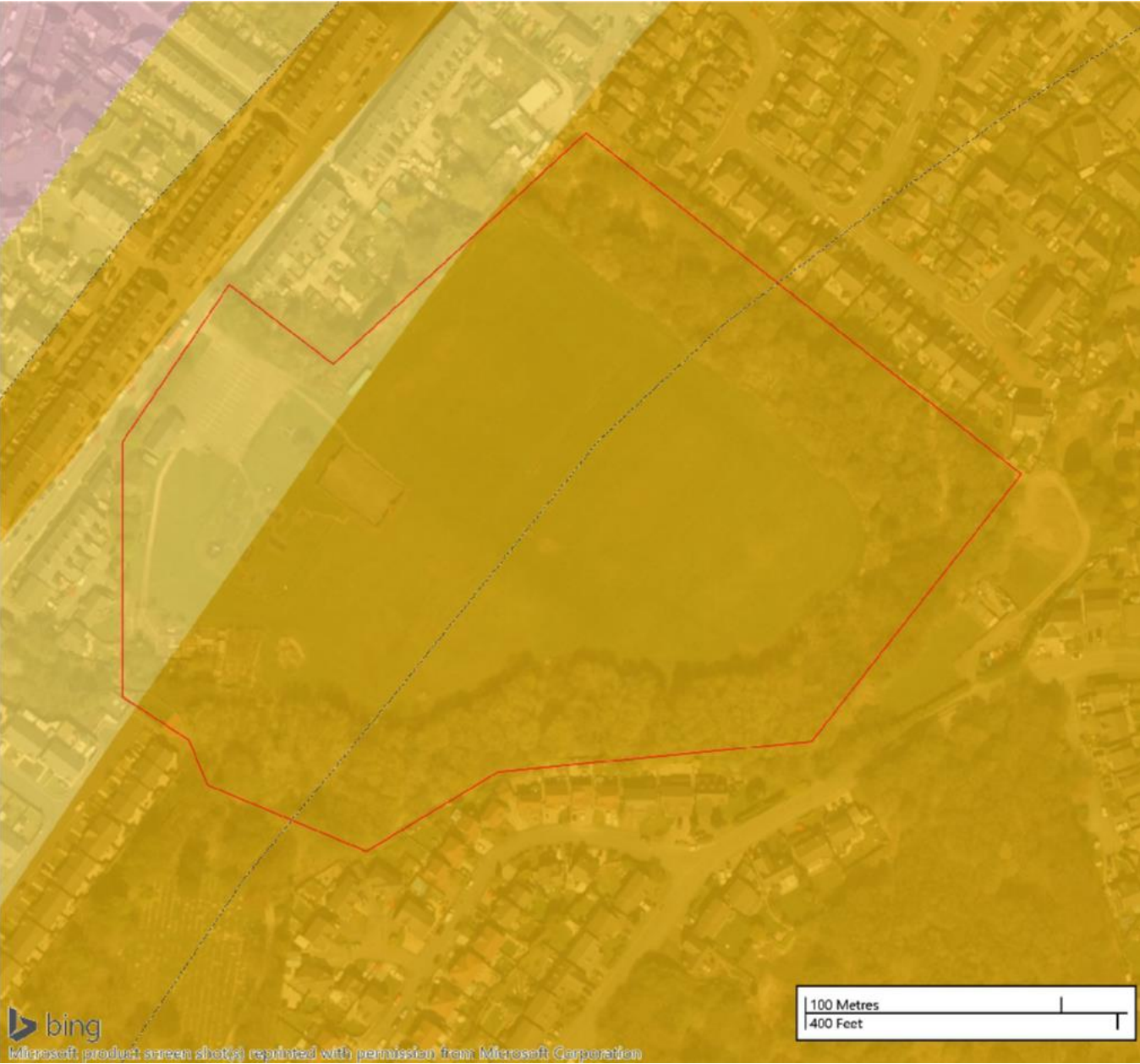
1:2500 @ A4 [DO NOT SCALE]

Legend Key

-  Locations By Type - Empty
-  Project Bounds - Project Bounds



Diamicton Till



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Figure Title

Solid Geology Plan

Project Number

M24-042

Project Name

Top Park

Client

Steve Wells Associates

Date

August 2024

DRG Number

Figure 2

Scale

1:2500 @ A4 [DO NOT SCALE]

Legend Key

-  Locations By Type - Empty
-  Project Bounds - Project Bounds

-  Brooksbottoms Grit
-  Marsden Formation
-  Rossendale Formation

Visqueen Ultimate Gas Damp Proof Course

About Visqueen

The Visqueen name has long been recognised as one of the leading manufacturers of high quality advanced membrane technologies and design based solutions by specifiers, distributors, builders merchants and contractors throughout the UK and Europe.

For further guidance on the Visqueen services shown below, please refer to the relevant section of the Visqueen website (www.visqueen.com) or contact Visqueen Technical Services on +44 (0) 333 202 6800 or enquiries@visqueen.com

Complete Range, Complete Solution



Structural
Waterproofing



Gas
Protection



Damp Proof
Membrane



Tapes



Damp Proof
Course



Stormwater



Vapour
Control

Visqueen Technical Support

Visqueen combine an extensive product portfolio with industry leading levels of service and support which includes guidance over the phone, bespoke CAD drawings to help with complex detailing, electronic NBS specifications and access to a dedicated team of highly knowledgeable and experienced field based Technical Support Managers.

Visqueen Technical Support is available to all our customers including architects, specifiers, distributors, builders merchants, contractors and end users. All of our technical team have been awarded the industry recognised qualification Certificated Surveyor in Structural Waterproofing (CSSW).

Visqueen CPD Seminars

The Visqueen Continuing Professional Development (CPD) Seminars provide up-to-date information on changes within Building Regulations/Building Standards and nationally recognised industry guidance affecting damp proofing, water vapour control, hazardous ground gas protection and below ground structural waterproofing.

The one hour seminars have been produced for design specialists within the construction sector and are delivered by our team of Technical Support Managers.

Visqueen Training Academy

Based at our manufacturing facility in Derbyshire, the Visqueen Training Academy is available to support Visqueen customers throughout the UK by providing a wide range of both theory and practical skills related training.

Courses include one day product awareness training for our distributors and builders merchants to help them in their day-to-day jobs, through to intensive three day courses giving detailed hands-on training in the practical skills required for safe and robust product installation.

Visqueen Ultimate Gas Damp Proof Course

Property	Test method	Units	Criteria	Result	
			Fail		
Resistance to impact	BS EN 12691	mm	>MLV	200	
Durability watertightness after heat ageing	BS EN 1296	-	Pass/ Fail	Pass	
Durability watertightness against chemicals	BS EN 1847	-	Pass/ Fail	Pass	
Resistance to tearing (nail shank) CD	BS EN 12310-1	N	MDV	245	
Resistance to tearing (nail shank) MD	BS EN 12310-1	N	MDV	270	
Water vapour transmission - resistance	BS EN 1931	MNs/g	MDV	1034	
Water vapour transmission - permeability	BS EN 1931	g/m ² /d	MDV	0.13	
Radon permeability	Sp Method 3873	m ² /s	MDV	<1.5 x 10 ⁻¹²	

Health and safety information

Refer to the Visqueen Ultimate Gas Damp Proof Course safety datasheet (SDS).

Visqueen Ultimate Gas Damp Proof Course

Property	Test method	Units	Criteria	Result	
Colour				Gold/white	
Weight		g/m ²		490	
Length	BS EN 1848-2	m	-0/+10%	20	
Width	BS EN 1848-2	mm	-0/+10%	500, 600, 750 and 900	
Thickness	BS EN 1849-2	mm	+/-10%	0.5	
BS 8485:2015 and C748:2014 physical test results					
Puncture	BS EN ISO 12236:2006	N	MDV	1640	
Impact resistance Method A hard surface	BS EN 12691	mm	MDV	200	
Impact resistance Method B soft surface	BS EN 12691	mm	MDV	1250	
Tensiles yield strength MD 1	ASTM D4885-01	kN/m	MDV	5.1	
Tensiles yield strength CD 1	ASTM D4885-01	kN/m	MDV	4.91	
Yield elongation MD 1	ASTM D4885-01	%	MDV	76	
Yield elongation CD 1	ASTM D4885-01	%	MDV	62	
Tear resistance - trouser method A - MD	BS ISO 34-1	kN/m	MDV	60.2	
Tear resistance - trouser method A - CD	BS ISO 34-1	kN/m	MDV	66.1	
Tear resistance - angle method B - MD	BS ISO 34-1	N	MDV	48.7	
Tear resistance - angle method B - CD	BS ISO 34-1	N	MDV	49.6	
1 - at yield and not break as equipment used was not strong enough to break the DPC					
BS 8485:2015 - Methane testing					
Methane permeability unjointed	ISO 15105-1	ml/m ² /d/atm	<40	1.3	
Methane permeability welded joint	ISO 15105-1	ml/m ² /d/atm	<40	24	
Carbon dioxide	ISO 15105-1	ml/m ² /d/atm	<40	8.3	
C748:2014 - Permeation vapour tests - 100% concentration					
Benzene	ISO 15105-2	MDV	0.08	70	2.92
Toluene	ISO 15105-2	MDV	0.09	78.5	3.27
Ethyl benzene	ISO 15105-2	MDV	0.11	93.8	3.91
m,p xylene	ISO 15105-2	MDV	0.01	6.7	0.28
Hexane	ISO 15105-2	MDV	gas	2.6	0.11
Vinyl chloride	ISO 15105-2	MDV	0	6.4	0.27
Tetrachloroethene (PCE)	ISO 15105-2	MDV	0	3.2	0.13
Trichloroethene (TCE)	ISO 15105-2	MDV	solid	0.3	0.01
Naphthalene	ISO 15105-2	MDV	0.03	19.7	0.82
UKCA, CE, UKNI Mark EN 14909:2012					
Characteristic					
Tensile strength - MD	BS EN 12311	N/mm ²	MDV	32.8	
Tensile strength - CD	BS EN 12311	N/mm ²	MDV	33.1	
Tensile elongation - MD	BS EN 12311	%	MDV	699	
Tensile elongation - CD	BS EN 12311	%	MDV	723	
Joint strength	BS EN 12317-2	N	MDV	265	
Watertightness 2kPa	BS EN 1928	-	Pass/	Pass	

Visqueen Ultimate Gas Damp Proof Course

Storage and handling

Visqueen Ultimate Gas Damp Proof Course should be stored vertically, under cover in its original packaging.

Care should be taken when handling the product in line with current manual handling regulations.

Preparation

Visqueen Ultimate Gas Damp Proof Course can be cut with a sharp retractable safety knife or robust scissors.

Installation

DPCs and DPC cavity trays systems to be designed and installed in accordance with the relevant sections of BS 8215:1991, PD 6697:2019 and BS 8000-3:2020.

When built into a masonry wall construction the DPC should be installed on an even bed of wet mortar, and any perforations in adjacent courses of masonry should be completely filled with mortar. To ensure mortar adhesion, as soon as possible after laying the DPC, lay at least one further course of masonry including a bed of mortar. If positioned on the sleeper walls below a suspended ground floor e.g. beam and block floor system, the DPC can be dry laid, however all sharp protrusions must be removed from the substrate. The DPC must extend through the full thickness of the masonry wall, including pointing, applied rendering or other facing materials.

When used as a site formed cavity tray, the DPC can be either built-in to the inner leaf or surface fixed to the cavity face of the inner leaf.

When surface fixing the cavity tray, the substrate should be primed with Visqueen HP Tanking Primer and allowed to dry. The DPC should be bonded to the inner leaf using Visqueen 100mm Double Sided Butyl Tape and permanently secured using Visqueen Fixing Strip and fixing suitable for the substrate. Visqueen Fixing Pins for both rigid urethane foam insulation boards, and pins for masonry substrates are available.

To simplify complex or awkward junctions e.g. corners, changes of level, etc, an extensive range of Visqueen Ultimate Preformed Units are available.

All DPC to DPC laps and DPC to Visqueen Ultimate Preformed Unit laps should be a minimum of 100mm and bonded with Visqueen 100mm Double Sided Butyl Tape. Alternatively, the above laps can be heat welded.

Usable temperature range

It is recommended that Visqueen Ultimate Gas Damp Proof Course and all associated system components should not be installed below 5°C.

Additional information

For additional detailing information, contact Visqueen Technical Services +44 (0) 333 202 6800.

The information in this datasheet was correct at the time of publication. It is the user's responsibility to obtain the latest version of the datasheet as it is updated on a regular basis. The information contained in the latest datasheet supersedes all previously published editions.

Visqueen Ultimate Gas Damp Proof Course

Features and benefits

- Complies with CIRIA C748:2014 - industry standard for volatile organic compounds (VOC) protection
- Complies with the methane gas transmission rate, mass per unit area and thickness requirements of BS 8485:2015 + A1:2019 - industry standard for methane and carbon dioxide protection
- Provides protection against radon, carbon dioxide, methane and VOCs
- Dual jointing methods - lap joints can be taped or heat welded
- Visqueen Ultimate Preformed Units available - simplifies complex or awkward detailing

Product description

Visqueen Ultimate Gas DPC utilises Visqueen's Advanced Barrier Technology. The DPC is a 0.5mm thick, flexible 7 layer co-extruded film providing volatile organic compound (VOC) and ground gas resistance.

The DPC has an embossed/debossed finish, is coloured gold/white and can be installed with either surface facing upwards.

It is supplied in 20m length rolls and the following widths as standard: 500mm, 600mm, 750mm and 900mm.

Approvals and standards

- Complies with CIRIA C748:2014
- Complies with the methane gas transmission rate, mass per unit area and thickness requirements of BS 8485:2015 + A1:2019
- Suitable for all Characteristic Gas Situation (CS) ground gas regimes
- Conforms to the specification requirements of NHBC Amber 1 and Amber 2 applications
- Conforms to the specification requirements of BR 211:2015
- Shear strength tested to BS EN 1052-4:2000 Methods of test for masonry - Part 4.
- Flexural mortar bond strength tested in accordance with DD 86-1:1983
- UKCA UKNI CE to EN 14909:2012 Type A
- Visqueen certified with Quality Management System ISO 9001:2015
- Visqueen certified with Occupational Health and Safety System ISO 45001:2018
- Visqueen certified with Environmental Management System ISO 14001:2015

Usage

Visqueen Ultimate Gas Damp Proof Course is suitable for all masonry wall applications including residential, commercial and multi storey buildings. It can be site formed into a built-in or surface fixed cavity tray to manage the downward passage of water in cavity wall applications.

The DPC is used to prevent harmful volatile organic compounds (VOCs) and hazardous ground gases from entering into the cavity from the ground or entering the building via internal walls. The DPC is also suitable for use on NHBC Amber 1 and 2 sites or where radon gas exists. It can also be used on sleeper walls below a ground floor construction e.g. beam and block floor system.

System components

- Visqueen 100mm Double Sided Butyl Tape, 100mm x 15m
- Visqueen Zedex DPC Surface Fixing System
- Visqueen Preformed Units
- Visqueen DPC Joint Support
- Visqueen HP Tanking Primer, 5L

Appendix 5 –Verification Proforma

Copied Directly From Appendix A5 CIRIA C735

Mallett, H, Cox (nee Taffel-Andureau), L, Wilson, S, Corban, M (2014) Good practice on the testing and verification of protection systems for buildings against hazardous ground gases, CIRIA, C735, London (ISBN: 978-0-86017-739-5). Go to: www.ciria.org

VISUAL INSPECTION OF GAS PROTECTION MEASURES

Site name:	Gas characteristic situation:
Job number:	Type of development and building/block checked: (residential/commercial/other)
Date:	Building description:
Visit by:	Foundation type: (suspended floor/raft/other)
Weather at time of inspection:	Gas protection type: passive/active

No.	Item	Comments (see notes)
1 Gas membrane		
1.1	Condition of sub-grade and underside of gas membrane	
1.2	Gas membrane type	
1.3	Gas membrane condition	
1.4	Joining tape product	
1.5	Lapping design	
1.6	Laps, welds and joints seals	
1.7	Service entries seals	
2 Passive venting		
2.1	Sub-floor void	
2.2	External wall airbricks	
2.3	Internal sleeper walls	
2.4	External vent trenches/ducts	
3 Active venting		
3.1	System details	
Additional notes:		

Notes: inspection checklist

1.1	Underside of gas membrane	Check that the sub grade does not contain rough/uneven surfaces, is appropriately clean and that there are no hard/sharp objects. That protective sand blinding or geotextile (if specified) is present and meets the design criteria.
1.2	Gas membrane type	Manufacturer and product specification, gauge, colour, brand/name, material batch/roll numbers, storage arrangements (protected from dirt/damage?)
1.3	Gas membrane condition	Open punctures, tears, rips, stretching? Excessive footprints/evidence of traffic? Presence of debris? Repairs? Signs of weakness such as raised or sunken indentations? Protection plan in place to restrict access to lain gas membrane?
1.4	Joining tape product	Product type, brand, thickness, material, width, colour? Use of double sided tape?
1.5	Lapping design	Joints lapped and sealed in accordance with manufacturer's requirements/ specification? Minimum overlap insured? Sections taped twice?
1.6	Laps and joints sealed	Welds complete? Appropriate joining/double sided tape used?
1.7	Service entries sealed	Top hats seal arrangements fixed around service entries? Use of Jubilee clips?
2.1	Sub-floor void	Is a check possible? Void former? Gravel (type/specification)? Height of void space? Is it clear?
2.2	External wall airbricks	Numbers, size, positions as design drawing?
2.3	Internal sleeper walls	Ventilation holes (honeycomb brickwork/pipe crossings?) – size, spacing, location in accordance with design?
2.4	External vent trenches/ducts	Located and constructed in accordance with design drawings? If open-topped gravel – gravel type/presence of fines? If pipe or other vent, check position and construction for functionality and absence of blockages. Ability of void former to withstand bearing of the superstructure?
3.1	Active venting	Type of air supply: mechanical, natural, combined? Location/condition/number of fans and vents? Location and size of inlets? Provision of air-cleaning devices and air heaters? Supply and exhaust ductwork? Alarm provision/installation? Gas monitoring system in under-floor void?

Photographs

No.	Description

The gas protection measures inspected:	a Are acceptable and comply with the specification
	b Are acceptable but attention is drawn to issues related to item no. xxx
	c Are not acceptable due to the issues related to item no. xxx

Name:

Signature:

Date:

♣Solmek conditions of offer, notes on limitations & basis for contract (ref: version1/2024)

These conditions accompany our tender and supercede any previous conditions issued. Solmek will prepare a report solely for the use of the Client (the party invoiced) and its agent(s). No reliance should be placed on the contents of this report, in whole or in part by 3rd parties. The report, its content and format and associated data are copyright, and the property of Solmek. Photocopying of part or all of the contents, transfer or reproduction of any kind is forbidden without written permission from Solmek. A charge may be levied against such approval, the same to be made at the discretion of Solmek.

Solmek cannot be held liable and do not warrant, or otherwise guarantee the validity of information provided by third parties and subsequently used in our reports. Solmek are not responsible for the action negligent of otherwise of subcontractors or third parties.

Site investigation is a process of sampling. The scope and size of an investigation may be considered proportional to levels of confidence regarding the ground and groundwater conditions. The exploratory holes undertaken investigate only a small volume of the ground in relation to the overall size of the site, and can only provide a general indication of site conditions. The opinions provided and recommendations given in this report are based on the ground conditions as encountered within each of the exploratory holes. There may be different ground conditions elsewhere on the site which have not been identified by this investigation and which therefore have not been taken into account in this report. Reports are generally subject to the comments of the local authority and Environment Agency. The comments made on groundwater conditions are based on observations made at the time that site work was carried out. It should be noted that mobile contamination, ground gas levels and groundwater levels may vary owing to seasonal, tidal and/or weather related effects. Solmek cannot be held liable for any unrecorded or unforeseen obstructions between exploratory boreholes and trial pits. This includes instances where previous structures on the site (buried man made structures) or the presence of boulder clay (cobbles and/or boulder obstructions) have been anticipated. All types of piling operations should make allowance for obstructions within the construction budget to accommodate this. Unrecorded ancient mining may occur anywhere where seams that have been worked and influence the rock and soil above. Dissolution cavities can occur where gypsum or chalk is present. Rotary drilling is the recommended technique to prove the integrity of the rock.

Where the scope of the investigation is limited via access to information, time constraints, equipment limitations, testing, interpretation or by the client or his agents budgetary constraints, elements not set out in the proposal and excluded from the report are deemed to be omitted from the scope of the investigation.

Desk studies are generally prepared in accordance with RICS guidelines. Environmental site investigations are generally undertaken as 'exploratory investigations' in accordance with the definitions provided in paragraph 5.4 of BS 10175:2011 in order to confirm the conceptual assumptions. You are advised to familiarize yourself with the typical scope of such an investigation. No pumping of water will be undertaken unless a licence or facilities/equipment have been arranged by others.

Where the type, number or/and depth of exploratory hole is specified by others, Solmek cannot and will not be responsible for any subsequent shortfall or inadequacy in data, and any consequent shortfall in interpretation of environmental and geotechnical aspects which may be required at a later date in order to facilitate the design of permanent or temporary works.

All information acquired by Solmek in the course of investigation is the property of Solmek, and, only also becomes the joint property of the Client only on the complete settlement of all invoices relating to the project. Solmek reserve the right to use the information in commercial tendering and marketing, unless the Client expressly wishes otherwise in writing. The quoted rates do not include VAT, and payment terms are 30 days from dispatch of invoice from our offices. Quotes are subject to a site visit.

We have allowed for 1 mobilisation and normal working hours unless otherwise stated. The scope of the investigation may be reviewed following the desk study and/or fieldwork. The presence or otherwise of Japanese Knotweed or other invasive plants can be difficult to identify especially during winter months. If Japanese Knotweed or other invasive species are suspect, it should be confirmed by an ecologist. We have not allowed for acquiring services information, and cannot be responsible for damage to underground services or pipes not shown to us or not clearly shown on plans. Costs incurred will be passed on to you, and in commissioning Solmek you understand and accept that you/your agent have a contractual relationship with Solmek & you accept this. Our rates assume unobstructed, reasonably level and firm access to the exploratory positions and adequate clear working areas and headroom. We have priced on the basis that you or your client have the necessary permissions, wayleaves and approvals to access land. All boreholes and pits are backfilled with arisings except where gas monitoring pipes are installed with stopcock covers. Solmek are not responsible for any uneven surfaces as a result of siteworks and rutting and backfilled excavations may require re-levelling and/or making good by others after fieldwork is complete, and Solmek has not allowed for this. No price has been provided or requested for a return visit to remove pipework and covers. Hourly rates apply to consultancy only and do not include expenses unless otherwise shown. If warranties are required, legal costs incurred will be passed on to you assuming Solmek agree to complete such warranties, modified or otherwise and you understand and agree to pay all costs.

We reserve the right to pursue full payment of the invoice prior to release of any information including reports. We advise you/your client that we may elect to pursue our statutory rights under late payment legislation, and will apply 8% to the base rate for unreasonably late payments. Solmek are exempt from the CIS Scheme. Solmek offer to undertake work only in strict accordance with conditions covered by our current insurances, which are available for inspection. Solmek are not responsible for acts, negligent or otherwise of subcontractors and as a matter of policy cannot indemnify any other parties. Professional indemnity Insurance is limited to ten times the invoice net total except where stated otherwise by Solmek. Solmek give notice that consequential loss as a direct or indirect result of Solmek's activities or omission of the same are excluded.