



GeoShield Verification Plan



PROJECT DESCRIPTION

GEO103260

Structural Waterproofing Contracts Limited,
300-22-1018 Riverside Academy,
Reading,
RG1 8EQ

The proposed development for which gas protection measures are required involves a new main school building, separate sports block, Multi Use Games Area ("MUGA"), new playing pitches together with car and cycle parking works, new accesses onto the public highway and all ancillary works and landscaping.

In accordance with BS8485:2015 + A1 2019 for a type B building and the building must conform to a Characteristic Specification (CS) rating of 2, so mitigation will need to be 2.5 points. A VOC/Hydrocarbon resistant vapour barrier has been specified. Extra precautions have been taken into consideration due to the building type being a high school.

Geoshield have adopted the highest validation and verification principles associated with BS8485:2015 + A1 2019, BR 211, Public Health England, NHBC Technical Extra April 2016 and CIRIA 735. This pre-verification plan reviews the design to ensure it is compliant with the developer and planning authority requirements and in conjunction with the relevant investigation report in accordance with BS8485:2015 +A1 2019. Included in this pre-verification plan are all the items for the requirements in section 8 BS8485:2015+A1 2019 CIRIA 735.

In summary, the design does achieve a required level of attention to detail with its robust specific gas membrane design (2.0 points), the structural barrier of a reinforced ground bearing concrete slab above the basal membrane (0.5 point) and a 625mm sub floor void for ventilation provisions (1.5 points).

The pre-verification plan confirms how the installation will be tested in accordance with CIRIA735. The verification visits will be documented in verification reports during the project that are suitable for submission to the local planning authority in order to satisfy and discharge planning consent. All faults identified during inspection and the verification site visit of the ground gas system will be itemised as remediations which will need to be signed off in the remediation log for the proposed building.



GeoShield Verification Plan



PROJECT DESCRIPTION

Pre-Verification Plan

GeoShield are appointed by the Client to carry out independent validation, verification and integrity testing of the ground gas protection system on site. The Pre-Verification plan sets out the requirements and procedures that GeoShield will adopt to ensure that the installation is in line with the proposed design, relevant UK standards and guidance. GeoShield take no responsibility for any warranties to third parties for the design of the system or the installation.

Limitations

The Pre-Verification plan prepared by GeoShield Limited is limited to the proposed ground gas protection measures installed. The Pre-Verification plan has been prepared in line with the relevance UK Standards and Guidance (BS8485:2015+A1:2019 & CIRIA 735) alongside the information made available to GeoShield by the Client. The conclusions made in the report are considered to be correct at the time of writing, but additional information provided/discovered may require amendments to the Plan. GeoShield recognises that changes to relevant standard and guidance may occur at any time which may cause the conclusions made to be incorrect - GeoShield do not accept any responsibility or liability for the implications of such changes.

The Pre-Verification plan does not in itself constitute verification that the membrane has been installed in accordance with this document. Validation and verification of the installed membrane will be covered in separate verification reports following physical inspection of the gas barrier and will include photographic evidence of the installation.

Waterproofing elements (where applicable) do not fall into the remit of this Pre-Verification plan or future inspections. GeoShield will provide the opinion on membrane's suitability for ground gas protection purposes – no liability is offered or implied for the waterproofing element which should be checked by others.



GeoShield Verification Plan



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GeoShield Verification Plan



PROJECT REFERENCE:

GEO103260

PROJECT:

300-22-1018 Riverside Academy

PROJECT ADDRESS:

Reading,

RG1 8EQ

SPECIFICATION:

Verified in accordance with CIRIA 735.

Design in accordance with BS8485 2015 + 2019 for Methane and Carbon Dioxide.

Substrate prepared in accordance with manufacturer's instructions.

JUTA GP1 Gas Membrane

JUTA GP1 SAM

JUTA GP Titanflex (basal lower level membrane)

JUTA GP Titantank



GeoShield Verification Plan



NAME OF SURVEYOR:

Paul Colbeck

VERIFICATION COMPANY:

GeoShield Limited

Icon Business Centre

4100 Park Approach

Thorpe Park

Leeds

CONTACT NUMBER:

07462 546 926

EMAIL ADDRESS:

pcolbeck@geoshield.co.uk

ORDER NUMBER:

To be confirmed

PER VISIT:

YES:

☐

NO:

☐

PROJECT:

YES:

☐

NO:

☐



GeoShield Verification Plan



Geoshield CV

Since 2015 construction and design standards in the UK had begun to be restructured with the aim of eliminating all possible factors that relate to the failure of systems applied to protect against life threatening ground gas ingress into new constructions. The spearhead of these changes was in the UK with the updated version of the British Standard Code of practice for the design of protective measures for Methane and Carbon Dioxide ground gases for new buildings (BS8485:2015 +A1 2019).

Since 2015 GeoShield is a leading company in ground gas verification. A fully independent company working to the highest standards of CIRIA735 – Good practice on the testing and verification of protection systems for buildings against hazardous ground gases.



GeoShield Verification Plan



Geoshield CV

Field Services (Operational) team is lead by Paul Colbeck who has over 20 years' experience in the construction industry and is 1 of 9 SGPV's in the country. (SGPV - Specialists in Gas Protection Verification under Gas Protection Verification Scheme accredited by CL:AIRE. There are only 9 accredited SGPV's currently in the UK, 2 of which are employed by GeoShield).

Paul is also an assessor for NVQ Level 2 in the installation of Gas Membrane Systems designed to protect against hazardous ground gases (Radon, Methane, Carbon Dioxide & Hydro-Carbons) as well as NVQ Level 4 in Verification of Ground Gas protection systems.

GeoShield are active members of British Geomembrane Association, Property Care Association, The Radon Council, UK Radon Association and European Radon Association.

Paul Colbeck also resides as a chair of the British Verification Council (a platform dedicated to raising standards in the ground gas verification).



GeoShield Verification Plan



SPECIFICATION



The Gas Protection Verification Accreditation Scheme (GPVS) is a scheme that seeks to raise standards in membrane inspection, verification and reporting and provide all stakeholders involved in land contamination management with confidence that risks associated with ground gases have been adequately managed. The scheme applies to both the practical installation of the gas mitigation measures and to the verification reporting process.

Title Reference & Description:

Declaration Section

Geoshield has two qualified SGPV's under the CL:AIRE accreditation scheme this allows us to create a declaration for this project and our verification reports and verification plans are subject to independent audit by CL:AIRE.

SPECIFICATION

CERTIFICATE of ACCREDITATION

This is to certify that

Paul Colbeck

has been awarded the following accreditation

***Gas Protection Verification Scheme (GPVS)
Specialist (SGPV)***

Certificate No.: YQ7mZNE8x6

Issued: 4 December 2020
Valid for 4 years from the above date



Richard Froggatt
CL:AIRE Chairman



CL:AIRE is a Charitable Company Limited by Guarantee
Registered in England 3740059 / Entrust Enrolment No. 119820 / Registered Charity No. 1075611
Chiltern House, Haddenham Business Centre, Thame Road, Haddenham, Buckinghamshire, HP17 8BY
Telephone: +44 (0)1844 296112 | Email: enquiries@claire.co.uk | Website: www.claire.co.uk

Title Reference & Description:

Certificate of Accreditation (SGPV) - Paul Colbeck

BGA
British Geomembrane Association

GeoShield Verification Plan



SPECIFICATION



Certificate of Achievement

(Full Award)

This is to certify that

Paul Colbeck

has been assessed as meeting the required level of competence for all
the units necessary to achieve the full award

**ABBE Level 4 NVQ Diploma in Verification of Ground Gas Protection
Systems**

603/3266/9

Units achieved:

Mandatory Units K/617/0687, M/617/0688, K/617/0690, M/617/0691,
A/617/0693, F/617/0694, J/617/0695

Signed :

Professor Julian Beer, Chair of ABBE Board

Date:

06/07/2021

Candidate Registration No : 0000037535 Certificate Issue No : 145402

ofqual
REGULATED
register.ofqual.gov.uk



00029035

Title Reference & Description:

Certificate of Achievement - NVQ Level 4 (ABBE) - Paul Colbeck

BGA
British Geomembrane Association

GeoShield Verification Plan



SPECIFICATION

CERTIFICATE of ACCREDITATION

This is to certify that

Jake Purdie-Clark

has been awarded the following accreditation

***Gas Protection Verification Scheme (GPVS)
Specialist (SGPV)***

Certificate No.: KBQ62grG22

Issued: 22 February 2021
Valid for 4 years from the above date

A handwritten signature in black ink, appearing to read 'Richard Froggatt'.

Richard Froggatt
CL:AIRE Chairman



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Registered in England 3740059 / Entrust Enrolment No. 119820 / Registered Charity No. 1075611
Chiltern House, Haddenham Business Centre, Thame Road, Haddenham, Buckinghamshire, HP17 8BY
Telephone: +44 (0)1844 296112 | Email: enquiries@claire.co.uk | Website: www.claire.co.uk

Title Reference & Description:

Certificate of Accreditation (SGPV) - Jake Purdie-Clark



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INFORMATION INCLUDED

GG52686 River Academy, Reading GGVRA Final

FS0949-ASO-XX-XX-RP-Y-0005 Remediation Strategy S3 P02

FS0949-HEX-01-FN-DR-S-1601-FOUNDATION LAYOUT_P07

SWC_RVS-Det_Version A (6 pages)

JUTA Material Specification Technical Data Sheets

Radon Maps UK - (Map 1) Site Location & (Map 2) Nearby Location

Information presented to at the pre-verification stage assumed correct

Any change client will let GeoShield know or this Pre-verification Plan will be void.



GeoShield Verification Plan



SPECIFICATION

GGS Ltd.

Unit 10, Bamford Business Park,
Hibbert Street, Stockport, SK4 1PL
Telephone: 0161 232 7465
Email: info@ggs-uk.com
Web: www.ggs-uk.com



GGs2686 Ground Gas & VOC Vapour Risk Assessment River Academy, Reading



GGs Site Photograph (November 2021)

Prepared for:
Ashfield Solutions Group



For: Ashfield Solutions Group
Ref No.: GGS2686GGVRA01
Date: 02/03/2022

Title Reference & Description:

GGs2686 River Academy, Reading GGVRA Final

SPECIFICATION

*** GGG Ground Gas & VOC Vapour Risk Assessment River Academy, Reading

6 Generic Qualitative Ground-Gas Risk Assessment

6.1 Methane and carbon dioxide

As an initial approach, GGS has undertaken a Generic Screening Assessment for the Site using the maximum concentrations of methane and carbon dioxide which have been identified within the monitoring locations during all recorded ground gas monitoring carried out by GGS and REC, along with maximum steady positive flow to represent 'worst possible' current conditions as per CIRIA C665 guidance. These are as follows:

- Methane – 25.9%v/v;
- Carbon dioxide – 39.3%v/v;
- Steady flow rate – 0.6 l/hr.

The hazardous gas flow rates have been calculated using the following equation:

$$\text{Hazardous gas flow rate (litres of gas per hour)} = (\text{Chg} - \text{measured hazardous gas concentration (\% v/v / 100)}) \times q \text{ (borehole flow rate in litres per hour)}$$

Hazardous gas flow rates can be used (with consideration of additional factors) to determine appropriate Characteristic Situations based on the modified Wilson and Card classification system as shown in Table 6.1 below:

Table 6.1 Modified Wilson and Card classification system

Hazardous gas flow rates	Risk Classification	Characteristic Situation
<0.07	Very Low Risk	1
<0.7	Low Risk	2
<3.5	Moderate Risk	3
<15	Moderate to High Risk	4
<70	High Risk	5
>70	Very High Risk	6

For: Ashfield Solutions Group
Ref No.: GGS2686GGVRA01
Date: 02/03/2022

ggs
Experts in Continuous Monitoring

Title Reference & Description:

GGG2686 River Academy, Reading GGVRA Final

6 Generic Qualitative Ground-Gas Risk Assessment

SPECIFICATION

*** GGS Ground Gas & VOC Vapour Risk Assessment River Academy, Reading

Table 6.2 below summarises hazardous gas flow rates and the Characteristic Situation calculated using the maximum gas concentrations and maximum positive steady flow measured during all monitoring completed at the Site to represent 'worst possible' conditions as per CIRIA guidance C665 Situation A (e.g., factories, shops, commercial, warehouses, schools, cinemas, sports centres, stadiums, high rise housing, housing with basements).

Table 6.2 Gas Screening Value Calculation as per CIRIA C665 Situation A from all monitoring completed at the site

Maximum CH ₄ concentration (% v/v)	Maximum CO ₂ concentration (% v/v)	Maximum steady state flow rate (L/hr)	Hazardous CH ₄ Flow Rate (L/hr)	Hazardous CO ₂ Flow Rate (L/hr)	Characteristic Situation (CS)
25.3	39.3	0.6	0.152	0.236	2

The generic screening assessment indicates that the 'Worst Possible' classification is CS2, or Low risk, with respect to methane and carbon dioxide for the proposed development at the Site.

Tables 6.3 below summarise hazardous gas flow rates and the Characteristic Situation calculated on a borehole-by-borehole basis, using maximum concentration and worst-case steady flow measured at the Site from GGS and REC monitoring investigations to represent 'worst possible' current conditions as per BS8485:2015+A1:2019.

Table 6.3 Gas Screening Value Calculations on borehole-by-borehole basis (using GGS and REC data)

Monitoring Location	Max. positive Steady Flow Rate (L/hr)	Max. CH ₄ (% v/v)	Max. CO ₂ (% v/v)	Hazardous CH ₄ Flow Rate (L/hr)	Hazardous CO ₂ Flow Rate (L/hr)	Characteristic Situation (CS)
BH01	<0.1	25.3	39.3	0.025	0.039	1
BH02	<0.1	14.2	20.1	0.014	0.020	1
BH03*	<0.1	2.3	2.1	0.0023	0.0021	1
BH04	<0.1	<0.1	37.5	0.0001	0.038	1
BH05	<0.1	<0.1	34.6	0.0001	0.035	1
BH06	<0.1	5.3	32.6	0.0053	0.033	1
MW1	<0.1	4.0	28.2	0.0040	0.028	1
MW3	0.6	16.3	32.2	0.0978	0.193	2
MW4	<0.1	22.9	38.0	0.023	0.038	1
MW5	<0.1	12.0	23.0	0.012	0.023	1
MW6	<0.1	0.1	15.7	0.0001	0.016	1
MW7	0.2	<0.1	7.9	0.0002	0.016	1

For: Ashfield Solutions Group
Ref No.: GGS2686GGVRA01
Date: 02/03/2022


Experts in Continuous Monitoring

Title Reference & Description:

GGs2686 River Academy, Reading GGVRA Final

Table 6.2 - The site has been classified as a CS2 ground gas regime due to elevated levels of carbon dioxide and methane ground gases.

BGA
British Geomembrane Association

GeoShield Verification Plan



SPECIFICATION

ASHFIELD
— SOLUTIONS GROUP —

+44(0) 1443 803 540
info@ashfieldsolutions.com
ashfieldsolutions.com

Planning & Development

Remediation Strategy and Verification Plan
River Academy, Reading
Bowmer and Kirkland

Title Reference & Description:

FS0949-ASO-XX-XX-RP-Y-0005 Remediation Strategy S3 P02

SPECIFICATION

Where materials are derived from natural aggregates (e.g. quarry), upon provision of appropriate testing / certification from the supplier no further independent testing shall be required.

Recycled aggregates may be acceptable for use in the scheme. However, these shall require acceptable certification from the supplier and testing once the material arrives at site. Testing should be undertaken at a rate of one test per 250m³, with a minimum of three tests per import round. The use of recycled aggregates shall be as approved by the Client and appointed geo-environmental consultant.

7.9 Task 9 - VOC Vapour Protection

A full assessment of ground gas and VOC vapour risk and conceptual design for ground gas and VOC vapour mitigation is presented in the GGS 2022 report to which the reader is referred.

In summary, the concept design provides protection via a combination of the following elements:

- (1) A ground gas retardation apron to prevent the accumulation of VOC vapours / odours within the void space beneath buildings.
- (2) Inherent passive ventilation provided by the floorspace.
- (3) An upgrade of the proposed waterproof membrane to a Gas and VOC resistant membrane (fully welded and sealed).

The following outlines the key aspects of the mitigation to be adopted for the site and the further detailed design works that are required.

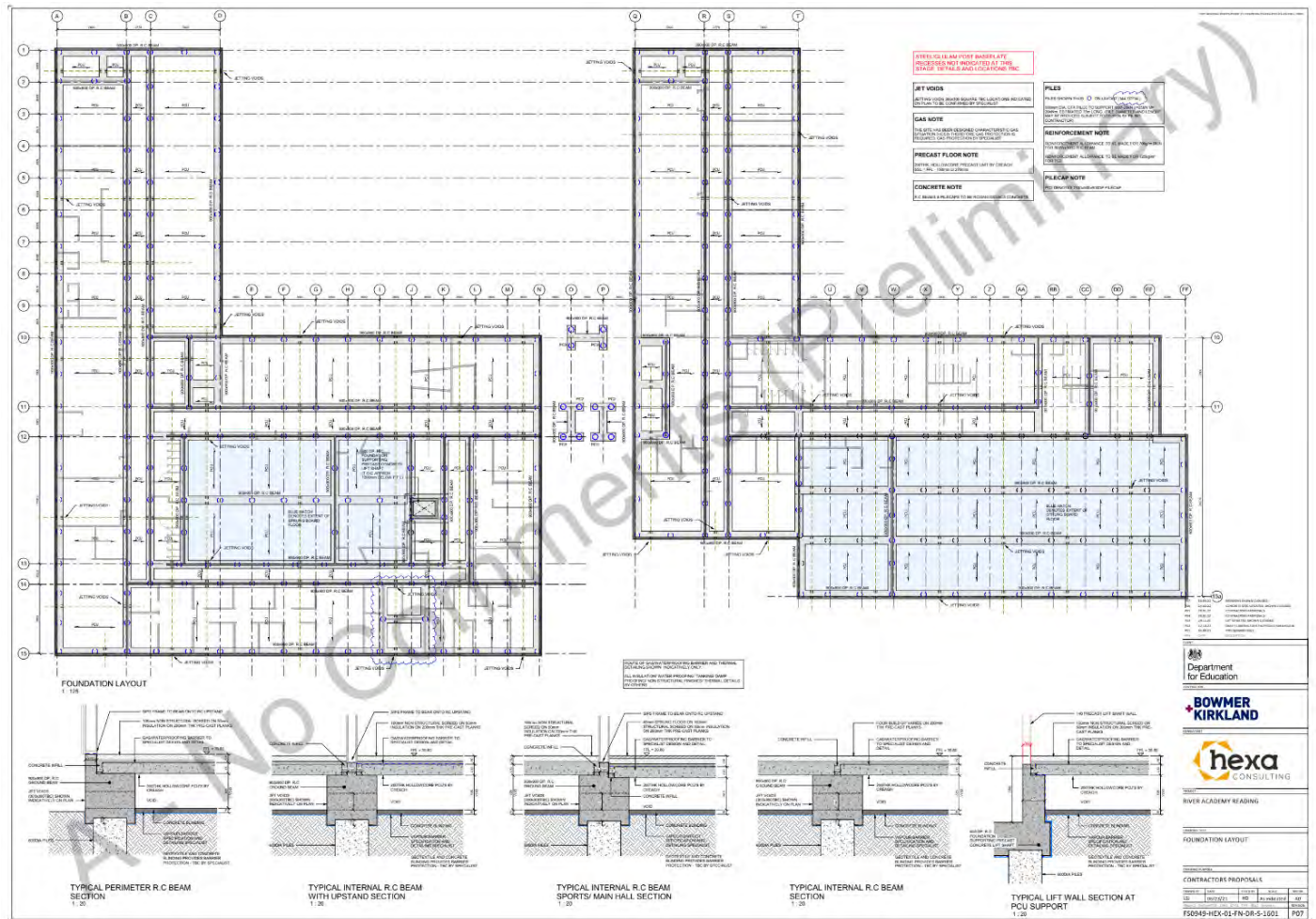
- Piling of the foundations is completed.
- Installation of service ducts. Note service trenches should ideally not breach the site capping. Where this cannot be avoided, service ducts to be fully sealed at joints to prevent gas or VOC vapour ingress into the void. Where the trench reaches the protection apron, a suitable low permeability plug should be formed within the trench to retard gas and VOC vapour migration. The trench should be lined where it interfaces with waste to manage migration of pollution along preferential pathways.
- Suitable compaction and rolling of the piling mat, and apron around the building footprint. This should extend to where the existing thickness of clay capping is maintained. This layer should be suitable to minimise soil settlement.
- Provision of access locations to the piling mat, should pressure relief or active gas management be required as a future safeguard.
- Laying of a suitably robust geotextile over the piling mat.
- Installation of a sub membrane monitoring network (building footprints only).
- Installation of a suitably robust geomembrane. The membrane should extend across the full apron and be keyed into the capping. Any service penetrations shall be suitably sealed. The membrane shall be chemically resistant to hydrocarbons and retard methane, carbon dioxide and VOCs.
- Covering the surface with a suitable thickness of concrete suitable for water loading under flood conditions and aid post flood cleaning requirements. It is not a design requirement that the concrete does not crack from a gas and VOC management point of view.
- Sealing the internal ducting following installation of services.
- Suitable protection of the membrane shall be included to ensure follow-on trades do not damage the membrane in the period following installation but before the floor slab is constructed.

Title Reference & Description:

FS0949-ASO-XX-XX-RP-Y-0005 Remediation Strategy S3 P02

VOC Vapour resistant protection measures have been specified.

SPECIFICATION



Title Reference & Description:

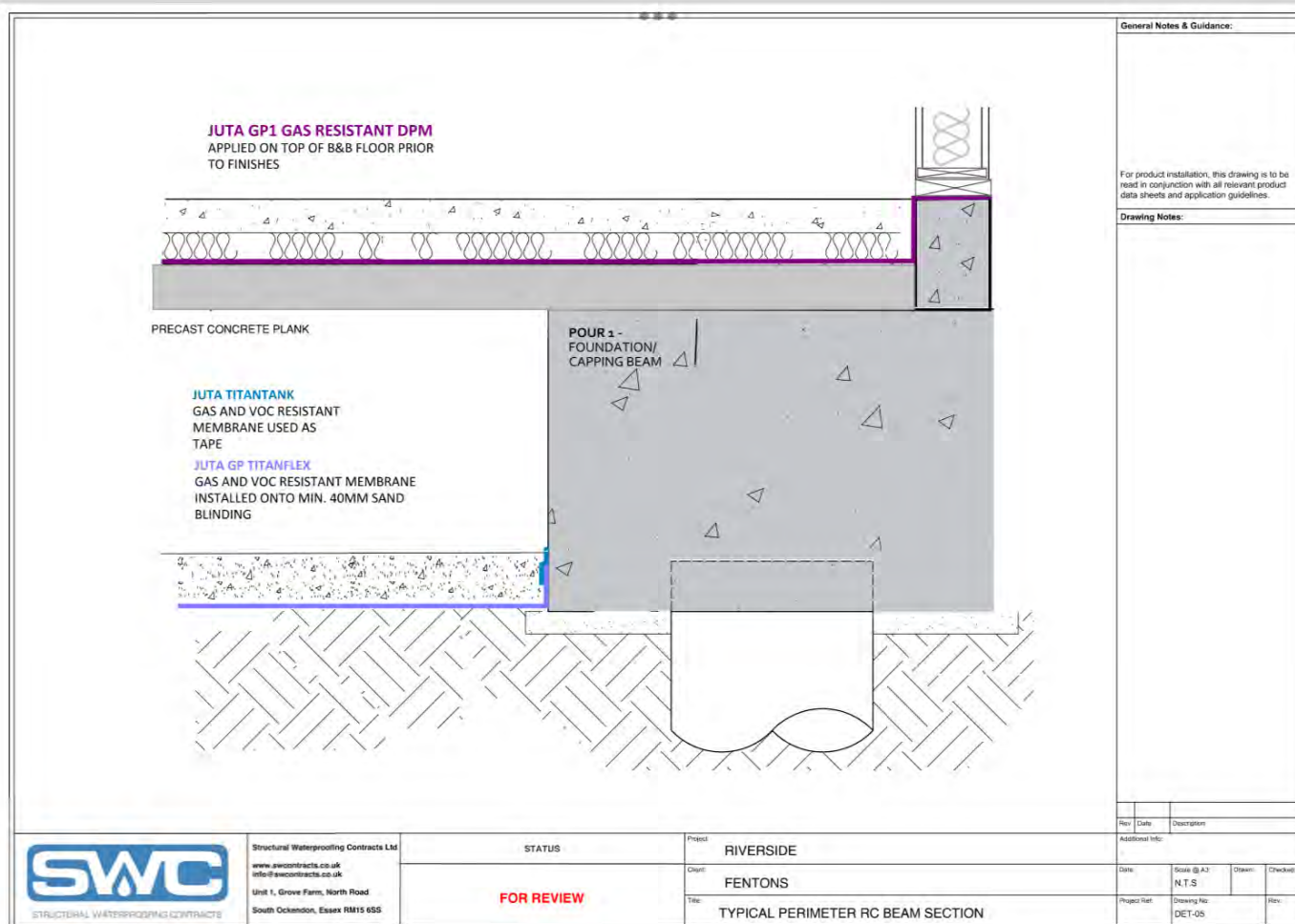
FS0949-HEX-01-FN-DR-S-1601-FOUNDATION LAYOUT_P07



GeoShield Verification Plan



SPECIFICATION



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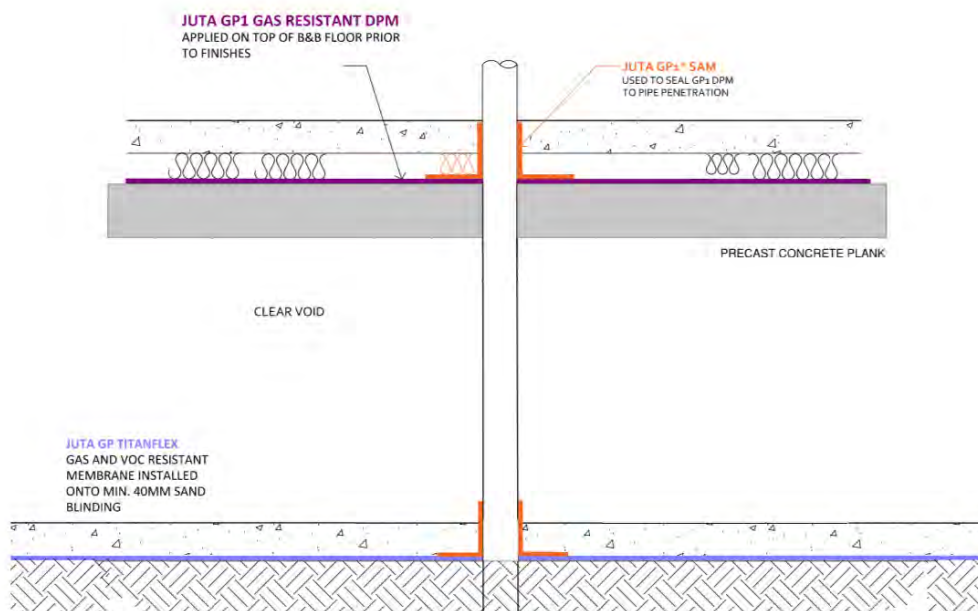
SWC_RVS-Det_Version A



GeoShield Verification Plan



SPECIFICATION



General Notes & Guidance:

For product installation, this drawing is to be read in conjunction with all relevant product data sheets and application guidelines.

Drawing Notes:



Structural Waterproofing Contracts Ltd
www.swcontracts.co.uk
info@swcontracts.co.uk
Unit 1, Grove Farm, North Road
South Ockendon, Essex RM15 6SS

STATUS

FOR REVIEW

Project RIVERSIDE

Client FENTONS

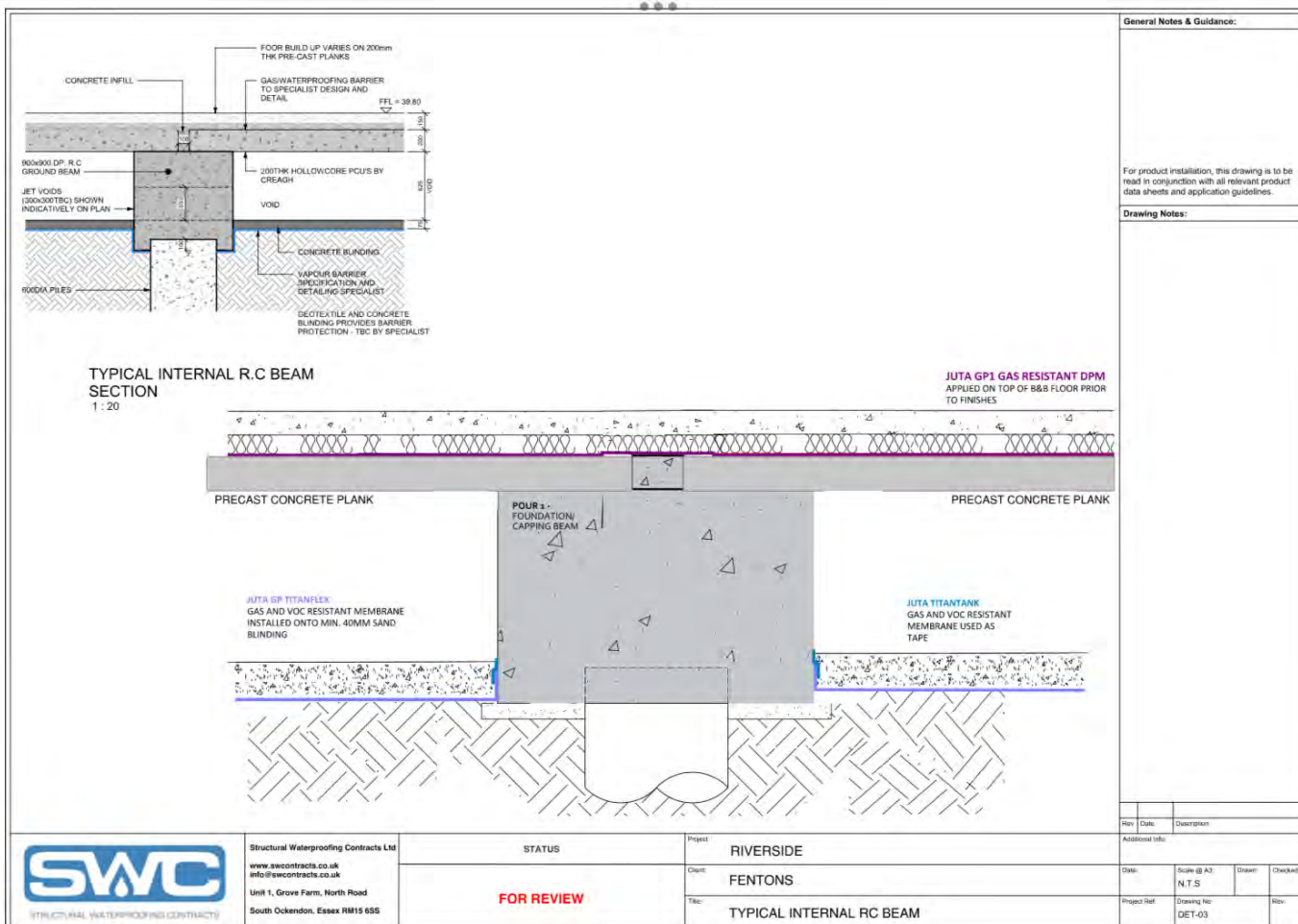
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Rev	Date	Description
Additional Info:		
Date:	Drawn By: A.J.	Drawn:
	N.T.S	Checked:
Project Ref:	Drawing Ref:	Rev:
	DET-04	

Title Reference & Description:

SWC_RVS-Det_Version A

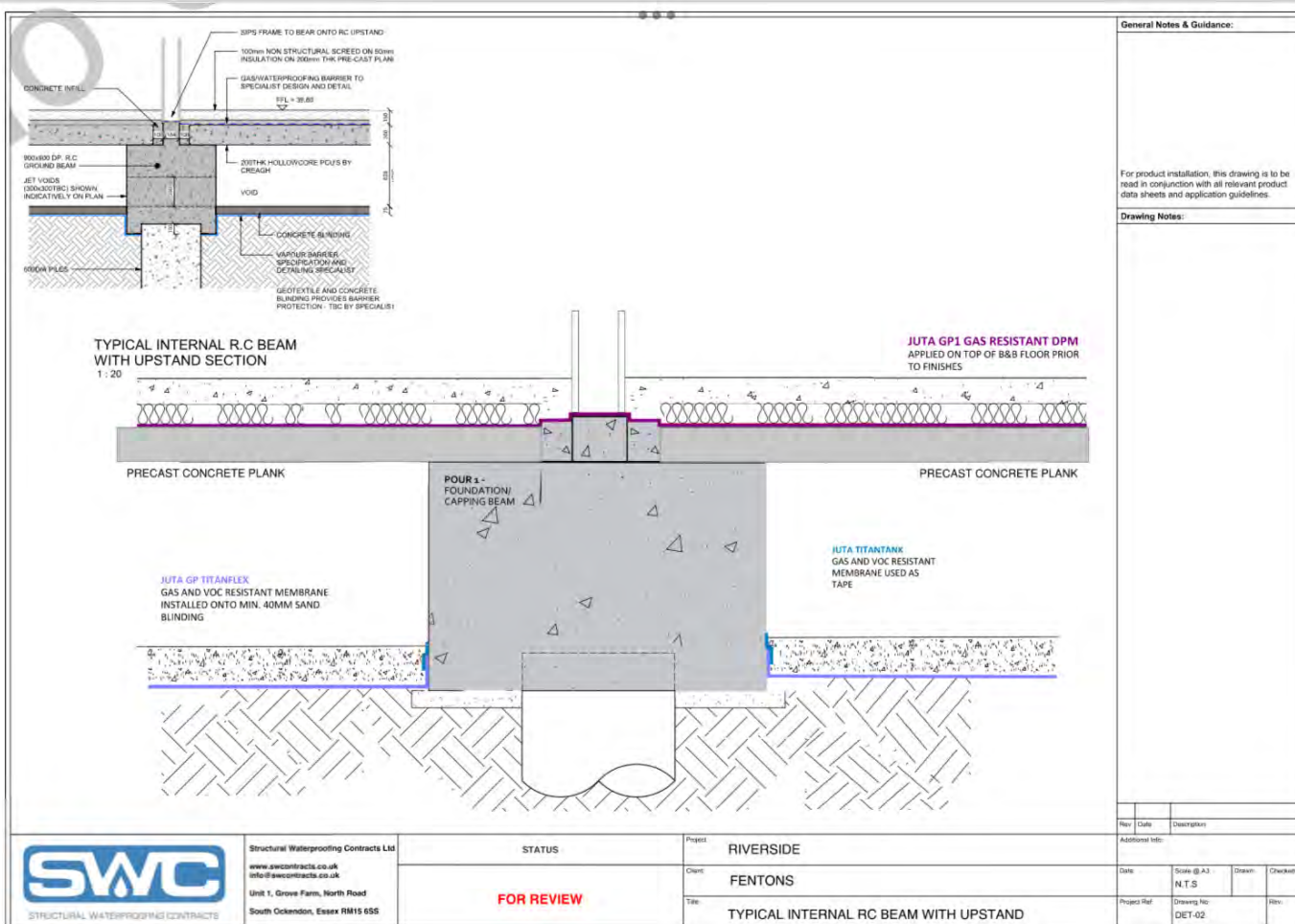
SPECIFICATION



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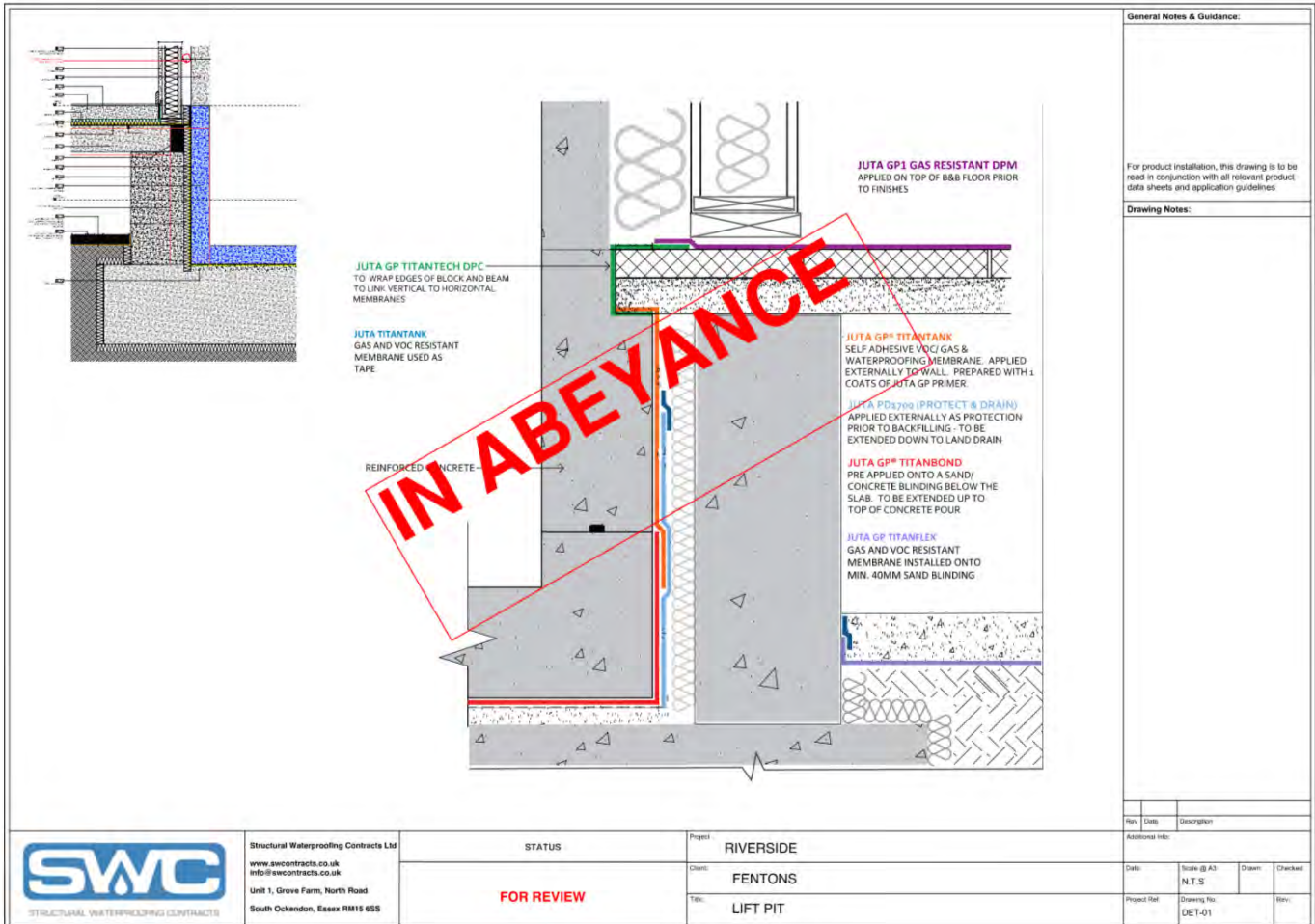
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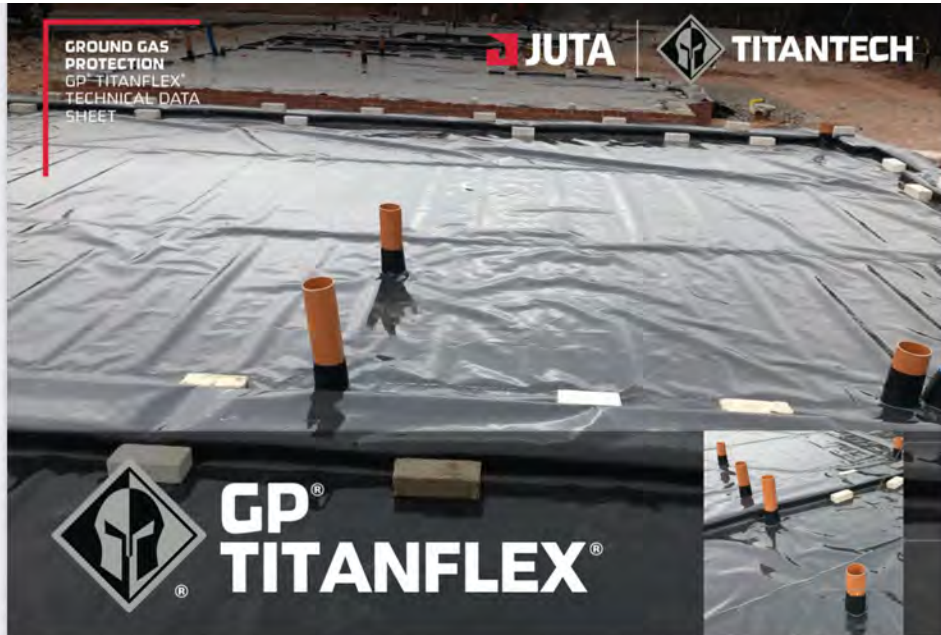
SPECIFICATION



Title Reference & Description:

SWC_RVS-Det_Version A

SPECIFICATION



**GROUND GAS PROTECTION
GP TITANFLEX®
TECHNICAL DATA SHEET**

JUTA | **TITANTECH**

GP TITANFLEX®

GP® TITANFLEX® gas and hydrocarbon barrier is a multi-layer, polyethylene membrane. GP® TITANFLEX® is specifically designed, manufactured, tested and certified to perform as a methane, carbon dioxide, radon ground gas, VOC, Air moisture and hydrocarbon protection system.

Thickness	0.5 mm
Width	2 m
Length	50 m
Weight	500 g/m ²

TITANTECH®
For developers of brownfield and contaminated sites the TITANTECH® family of products represent a major step forward in safeguarding projects against gaseous and chemical contamination.

GP® TITANFLEX® complies with the latest codes of practice as published by BRE, CIRIA (C748) and BSI (BS8485:2015). Suitable for use as ground gas/hydrocarbon protection for NHBC, Green, Amber 1, Amber 2 and Red site characterisations.

Handling
Roll weights can be in excess of 20kg and hence appropriate care and equipment is required for unloading and handling.

Storage
Rolls of GP® TITANFLEX® should be stored on stable/level ground and stacked not more than five rolls high, with no other material stacked on top. The rolls can be stored outdoors when packaged, but should be protected from exposure to UV.

Installation
GP® TITANFLEX® should be installed in accordance with the product installation guidelines, and in accordance with best practice.

BBA
CE **UK** **CA**

Title Reference & Description:

JUTA GP Titanflex Technical Data Sheet

GeoShield Verification Plan

SPECIFICATION

**GROUND GAS
PROTECTION
GP[®] TITANFLEX[®]
TECHNICAL DATA
SHEET**



**GP[®]
TITANFLEX[®]**

Feature	Characteristics	Test Method	GP [®] TITANFLEX [®]
Physical Properties	Thickness	EN 1849-2	0.5 mm
	Width	EN 1849-2	2 m
	Length	EN 1849-2	50 m
	Weight	EN 1849-2	500 g/m ²
Hydraulic Press	Water Vapour Transmission Rate	EN 1931	0.11 - 0.18 g/m ² /day
	Water Tightness (60 kPa)	EN 1928	Pass
	Water Tightness (196 kPa - 20 m Water Head) (Basement Application)	EN 1928	Pass
Mechanical Properties	Resistance to Static Load	EN 12730-B	≥ 20 kg
	Puncture Resistance	EN 12236	≥ 2.0 kN
	Tensile Strength (MD)	EN 12311-1	> 550 N/50mm
	Tensile Strength (CMD)	EN 12311-1	> 400 N/50mm
	Tensile Elongation (MD/CMD)	EN 12310-1	> 550 %
	Tear Resistance (MD/CMD)	EN 12310-1	> 300 N
	Resistance to Impact	EN 12691-B	650 mm
	Reaction to Fire	EN 13501-1	E Class
	Resistance to Artificial Ageing	EN 1296/EN 1928	Pass
Compliance and Certification	Resistance to Chemicals	EN 1296/EN 1928	Pass
	CE Mark - EN13967:2012		
	NHBC Standards Compliant		
	CIRIA C748 Compliant		
Vapour Permeability 100% Concentration	BS B485:2015 Compliant		
	Transmission Rate of Benzene	EN ISO 15105-2	< 3.6 mg/m ² /day
	Transmission Rate of Toluene	EN ISO 15105-2	< 13.8 mg/m ² /day
	Transmission Rate of Ethyl Benzene	EN ISO 15105-2	< 2.7 mg/m ² /day
	Transmission Rate of Xylenes (M,P,O)	EN ISO 15105-2	< 7.7 mg/m ² /day
	Transmission Rate of Hexane	EN ISO 15105-2	< 0.6 mg/m ² /day
	Transmission Rate of Vinyl Chloride	EN ISO 15105-2	< 0.05 mg/m ² /day
	Transmission Rate of Trichloroethene (TCE)	EN ISO 15105-2	< 54.7 mg/m ² /day
	Transmission Rate of Tetrachloroethene (PCE)	EN ISO 15105-2	< 26.2 mg/m ² /day
Gas Permeability	Transmission Rate of Naphthalene	EN ISO 15105-2	< 0.0006 mg/m ² /day
	Transmission Rate of CIS-1,2-Dichloroethylene	EN ISO 15105-2	< 1.1 mg/m ² /day
	Methane Permeability	EN ISO 15105-1	0.13 ml/m ² /day/atm
	Methane Permeability (Jointed)	EN ISO 15105-1	1.00 ml/m ² /day/atm
	Carbon Dioxide Permeability	EN ISO 15105-1	3.01 ml/m ² /day/atm
	Vinyl Chloride Gas Permeability	EN ISO 15105-1	0.04 ml/m ² /day/atm
	Radon Permeability	K124/02/195	1.0 x 10 ⁻¹² m ² /S

Title Reference & Description:

JUTA GP Titanflex Technical Data Sheet

SPECIFICATION

**GROUND GAS
PROTECTION
GP® TITANFLEX®
TECHNICAL DATA
SHEET**



**GP®
TITANFLEX®**

Feature	Characteristics	Test Method	GP® TITANFLEX®
Durability and Chemical Resistance	Chemical Resistance - Sulfuric ACID (10% Solution of Sulfuric Acid (H ₂ SO ₄)) 50° For 56 Days	EN 14414-A	TENSILE STRENGTH RETAINED 100% RESULT - PASS
	Chemical Resistance - BASIC (Calcium Hydroxide Saturated Suspension) 50° For 56 Days	EN 14414-B	TENSILE STRENGTH RETAINED 100% RESULT - PASS
	Chemical Resistance - SOLVENTS (35% Diesel, 35% Paraffin, 30% Oil Hd30 (Vol)) 50° For 56 Days	EN 14414-C	TENSILE STRENGTH RETAINED ~80% RESULT - PASS
	Chemical Resistance - SYNTHETIC LEACHATE (Mixture of 14 Acids, Chlorides, Sulphates & Phosphates) 50° For 56 Days	EN 14414-D	TENSILE STRENGTH RETAINED 100% RESULT - PASS
	Resistance to Leaching - HOT WATER (Deionised Water) 50° For 56 Days	EN 14415-A	TENSILE STRENGTH RETAINED 100% RESULT - PASS
	Resistance to leaching - AQUEOUS ALKALINE (Saturated Calcium Hydroxide) 50° For 56 Days	EN 14415-B	TENSILE STRENGTH RETAINED 100% RESULT - PASS
	Resistance to Leaching - ORGANIC ALCOHOL (30% Methanol, 30% Isopropanol, 40% Glycol) 50° For 56 Days	EN 14415-C	TENSILE STRENGTH RETAINED 100% RESULT - PASS
	Chemical Resistance - BENZENE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 95% (MD), 102% (CMD) RESULT - PASS
	Chemical Resistance - TOLUENE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 94% (MD), 91% (CMD) RESULT - PASS
	Chemical Resistance - ETHYL BENZENE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 99% (MD), 97% (CMD) RESULT - PASS
	Chemical Resistance - XYLENES - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 91% (MD), 106% (CMD) RESULT - PASS
	Chemical Resistance - TCE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 99% (MD), 93% (CMD) RESULT - PASS
	Chemical Resistance - PCE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 93% (MD), 93% (CMD) RESULT - PASS
	Chemical Resistance - NAPHTHALENE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 101% (MD), 93% (CMD) RESULT - PASS
	Chemical Resistance - HEXANE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 99% (MD), 104% (CMD) RESULT - PASS

Title Reference & Description:

JUTA GP Titanflex Technical Data Sheet

BGA
British Geomembrane Association

GeoShield Verification Plan



SPECIFICATION

GROUND GAS PROTECTION GP® TITANFLEX® TECHNICAL DATA SHEET



**GP®
TITANFLEX®**

JUTA UK

Please contact JUTA
UK Directly for more
Information on GP®4

Jointing and Sealing

GP® TITANFLEX® can be heat welded or taped, with jointing carried out by competent personnel with suitable qualifications in accordance with best practice. GP® TITANFLEX® should be overlapped by at least 100mm. If taping joints, only suitable tape must be used, ensuring application with a silicone roller to remove trapped air. JUTA pre-formed details, or self adhesive gas membrane are available for sealing around protuberances.

Accessory Products

- GP® DPC
- GP® Tape
- GP® Self Adhesive Membrane (SAM)
- GP® Primer
- GP® Top Hats and Preformed Corners
- GP® Protection Fleece
- GP® Void Vent (24/40mm)

Title Reference & Description:

JUTA GP Titanflex Technical Data Sheet

SPECIFICATION

GROUND GAS PROTECTION
GP® TITANTANK®
TECHNICAL DATA SHEET

JUTA | **TITANTECH**

GP® TITANTANK®

GP® TITANTANK® is a self adhesive version of the GP® TITANFLEX®; composed of self-adhesive with an upper surface finish of GP® TITANFLEX®, and a lower surface finish of siliconized polypropylene release film . TITANTANK® is used for the gas /waterproofing/ tanking of underground structures where harmful ground gases are anticipated, as a post applied fully bonded membrane.

Thickness	1.2 mm
Width	0.9 m or 0.3 m
Length	20 m
Weight	1350 g/m²

TITANTECH®
For developers of brownfield and contaminated sites the TITANTECH® family of products represent a major step forward in safeguarding projects against gaseous and chemical contamination.

Handling
Roll weights can be in excess of 20kg and hence appropriate care and equipment is required for unloading and handling.

Storage
Rolls of GP® TITANTANK® should be stored on stable/level ground and stacked not more than five rolls high, with no other material stacked on top. The rolls can be stored outdoors when packaged, but should be protected from exposure to UV.

Installation
GP® TITANTANK® should be installed in accordance with the product installation guidelines, and in accordance with best practice.

BBA
CE **UK** **CA**

Title Reference & Description:

JUTA GP Titantank Technical Data Sheet

SPECIFICATION

**GROUND GAS
PROTECTION**
GP[®] TITANTANK[®]
TECHNICAL DATA
SHEET



**GP[®]
TITANTANK[®]**

Feature	Characteristics	Test Method	GP [®] TITANTANK [®]
Physical Properties	Thickness	EN 1849-2	1.2 mm
	Width	EN 1849-2	0.9 or 0.3 m
	Length	EN 1849-2	20 m
	Weight	EN 1849-2	1350 g/m ²
Hydraulic Press	Water Vapour Transmission Rate	EN 1931	0.11 - 0.18 g/m ² /day
	Water Tightness (60 kPa)	EN 1928	Pass
	Water Tightness (196 kPa - 20 m Water Head) (Basement Application)	EN 1928	Pass
Mechanical Properties	Resistance to Static Load	EN 12730-B	≥ 20 kg
	Puncture Resistance	EN 12236	≥ 2.0 kN
	Tensile Strength (MD)	EN 12311-1	> 550 N/50mm
	Tensile Strength (CMD)	EN 12311-1	> 400 N/50mm
	Tensile Elongation (MD/CMD)	EN 12310-1	> 550 %
	Tear Resistance (MD/CMD)	EN 12310-1	> 300 N
	Resistance to Impact	EN 12691-B	650 mm
	Reaction to Fire	EN 13501-1	E Class
	Resistance to Artificial Ageing	EN 1296/EN 1928	Pass
Compliance and Certification	Resistance to Chemicals	EN 1296/EN 1928	Pass
	CE Mark - EN13967:2012		
	NHBC Standards Compliant		
	CIRIA C748 Compliant (VOC Barrier)		
Vapour Permeability 100% Concentration	BS 8485:2015 Compliant (Methane and Carbon Dioxide Barrier)		
	BS 8102:2009 Compliant (Type A Waterproofing)		
	Transmission Rate of Benzene	EN ISO 15105-2	< 3.6 mg/m ² /day
	Transmission Rate of Toluene	EN ISO 15105-2	< 13.8 mg/m ² /day
	Transmission Rate of Ethyl Benzene	EN ISO 15105-2	< 2.7 mg/m ² /day
	Transmission Rate of Xylenes (M,P,O)	EN ISO 15105-2	< 7.7 mg/m ² /day
	Transmission Rate of Hexane	EN ISO 15105-2	< 0.6 mg/m ² /day
	Transmission Rate of Vinyl Chloride	EN ISO 15105-2	< 0.05 mg/m ² /day
	Transmission Rate of Trichloroethene (TCE)	EN ISO 15105-2	< 54.7 mg/m ² /day
Gas Permeability	Transmission Rate of Tetrachloroethene (PCE)	EN ISO 15105-2	< 26.2 mg/m ² /day
	Transmission Rate of Naphthalene	EN ISO 15105-2	< 0.0006 mg/m ² /day
	Transmission Rate of CIS-1,2-Dichloroethylene	EN ISO 15105-2	< 1.1 mg/m ² /day
	Methane Permeability	EN ISO 15105-1	0.13 ml/m ² /day/atm
	Methane Permeability (Jointed)	EN ISO 15105-1	1.00 ml/m ² /day/atm
	Carbon Dioxide Permeability	EN ISO 15105-1	3.01 ml/m ² /day/atm
	Vinyl Chloride Gas Permeability	EN ISO 15105-1	0.04 ml/m ² /day/atm
	Radon Permeability	K124/02/195	1.0 x 10 ⁻¹² m ² /S

Title Reference & Description:

JUTA GP Titantank Technical Data Sheet

GeoShield Verification Plan

SPECIFICATION

GROUND GAS
PROTECTION
GP[®] TITANTANK[™]
TECHNICAL DATA
SHEET



GP[®]
TITANTANK[™]

Feature	Characteristics	Test Method	GP [®] TITANFLEX [®]
Durability and Chemical Resistance	Chemical Resistance - Sulfuric ACID (10% Solution of Sulfuric Acid (H ₂ SO ₄)) 50° For 56 Days	EN 14414-A	TENSILE STRENGTH RETAINED 100% RESULT - PASS
	Chemical Resistance - BASIC (Calcium Hydroxide Saturated Suspension) 50° For 56 Days	EN 14414-B	TENSILE STRENGTH RETAINED 100% RESULT - PASS
	Chemical Resistance - SOLVENTS (35% Diesel, 35% Paraffin, 30% Oil Hd30 (Vol)) 50° For 56 Days	EN 14414-C	TENSILE STRENGTH RETAINED >80% RESULT - PASS
	Chemical Resistance - SYNTHETIC LEACHATE (Mixture of 14 Acids, Chlorides, Sulphates & Phosphates) 50° For 56 Days	EN 14414-D	TENSILE STRENGTH RETAINED 100% RESULT - PASS
	Resistance to Leaching - HOT WATER (Deionised Water) 50° For 56 Days	EN 14415-A	TENSILE STRENGTH RETAINED 100% RESULT - PASS
	Resistance to leaching - AQUEOUS ALKALINE (Saturated Calcium Hydroxide) 50° For 56 Days	EN 14415-B	TENSILE STRENGTH RETAINED 100% RESULT - PASS
	Resistance to Leaching - ORGANIC ALCOHOL (30% Methanol, 30% Isopropanol, 40% Glycol) 50° For 56 Days	EN 14415-C	TENSILE STRENGTH RETAINED 100% RESULT - PASS
	Chemical Resistance - BENZENE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 95% (MD), 102% (CMD) RESULT - PASS
	Chemical Resistance - TOLUENE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 94% (MD), 91% (CMD) RESULT - PASS
	Chemical Resistance - ETHYL BENZENE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 99% (MD), 97% (CMD) RESULT - PASS
	Chemical Resistance - XYLENES - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 91% (MD), 106% (CMD) RESULT - PASS
	Chemical Resistance - TCE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 99% (MD), 93% (CMD) RESULT - PASS
	Chemical Resistance - PCE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 93% (MD), 93% (CMD) RESULT - PASS
	Chemical Resistance - NAPHTHALENE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 101% (MD), 93% (CMD) RESULT - PASS
	Chemical Resistance - HEXANE - 100% Saturated Concentration	EN 14414-D (MOD)	TENSILE STRENGTH RETAINED 99% (MD), 104% (CMD) RESULT - PASS

Title Reference & Description:

JUTA GP Titantank Technical Data Sheet

BGA
British Geomembrane Association

GeoShield Verification Plan



SPECIFICATION

GROUND GAS PROTECTION GP® TITANTANK® TECHNICAL DATA SHEET



GP®
TITANTANK®

JUTA UK

Please contact JUTA
UK Directly for more
information on GP®4

Jointing and Sealing

GP® TITANTANK® can be heat welded or taped, with jointing carried out by competent personnel with suitable qualifications in accordance with best practice. GP® TITANTANK® should be overlapped by at least 100mm. If taping joints, only suitable tape must be used, ensuring application with a silicone roller to remove trapped air. JUTA pre-formed details, or self adhesive gas membrane are available for sealing around protuberances.

Accessory Products

- GP® Primer
- GP® Protection Board
- GP® Protection Fleece
- PD1700

Title Reference & Description:

JUTA GP Titantank Technical Data Sheet

SPECIFICATION

GP® 1

Rev: June 2019

Juta GP® 1 - Gas Barrier is a multi-layer, low density polyethylene membrane, reinforced with a polypropylene reinforcing grid with an integral aluminium foil. GP® 1 is specifically designed and manufactured to perform as a Methane, Carbon Dioxide, Radon, Ground Gas, VOC/Hydrocarbon vapors, air & moisture protection system.

**Ground Gas
Protection**

JUTA GP® 1			
Characteristics	Test Method	Unit	JUTA GP® 1
Physical Properties			
Thickness	EN 1849-2	mm	0.6
Thickness - Between Scrim	BS EN ISO 9863-1:2016	Mm	0.4
Width	EN 1849-2	m	Various
Length	EN 1849-2	m	Various
Weight	EN 1849-2	G/M2	370
Hydraulic Properties			
Thickness	EN 20811	-	>300
Resistance to Water Penetration	EN 13967, EN 1928	-	Pass
Water Tightness	EN 1296, EN 1367, EN 1928	-	Pass
Mechanical Properties			
Resistance to Static Load	EN 12730-B	Kg	20
Tensile Strength (MD)	EN 12311-1	N/50mm	600
Tensile Strength (CMD)	EN 12311-1	N/50mm	480
Tensile Elongation (MD)	EN 12310-1	%	20
Tensile Elongation (CMD)	EN 12310-1	%	20
Puncture Resistance	EN 12236	kN	1.25
Resistance to Tearing (Nail Shank) MD	EN 12310-1	N	330
Resistance to Tearing (Nail Shank) CMD	EN 12310-1	N	400
Durability and Chemical Resistance			
Transmission Rate of Volatile Liquids - Diesel	ISO 6179:2010 (B)	g/m ² /h	0.246
Transmission Rate of Volatile Liquids - Xylene	ISO 6179:2010 (B)	g/m ² /h	0.571
Transmission Rate of Volatile Liquids - Toluene	ISO 6179:2010 (B)	g/m ² /h	0.583
Transmission Rate of Volatile Liquids - Petrol	ISO 6179:2010 (B)	g/m ² /h	0.135
Gas Permeability			
Methane Permeability	BS EN ISO 15105-1	ml/m ² /day/atm	<0.09
Carbon Dioxide Permeability	BS EN ISO 15105-1	ml/m ² /day/atm	<0.09
Radon Permeability	K124/02/95	m ² /s	8.0 x 10 ⁻¹⁵
Compliance and Certification			
CE Mark - EN13967:2012			
NHBC Standards Compliant			
BS 8485:2015 + A1 2019 Accordant			
BBA Certified - Certificate No. 12/4912			

Contact us to find out more information.



Title Reference & Description:

JUTA GP1 Gas Barrier Technical Data Sheet

SPECIFICATION

Additional Information

HANDLING

Roll weights can be in excess of 20kg and hence appropriate care and equipment is required for unloading and handling.

STORAGE

Rolls of JUTA GP® 1 should be stored on stable/level ground and stacked not more than five rolls high, with no other material stacked on top. The rolls can be stored outdoors when packaged, but should be protected from exposure to UV.

INSTALLATION

JUTA GP® 1 should be installed in accordance with the product installation guidelines, and in accordance with BS 8485:2015.

JOINTING AND SEALING

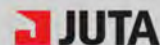
It is recommended JUTA GP® 1 be heat welded where possible, with welding carried out by competent personnel with suitable qualifications in accordance with best practice, and guidance contained within BS 8485:2015. JUTA GP® 1 should be overlapped by at least 100mm. If taping joints, only suitable tape must be used, ensuring application with a silicone roller to remove trapped air. JUTA pre-formed details, or Self Adhesive Gas Membrane are available for sealing around protuberances.

ACCESSORY PRODUCTS

- JUTA GP® 1 Starter Band
- JUTA GP® Tape
- JUTA GP® Self Adhesive Membrane
- JUTA GP® Primer
- JUTA GP® Top Hats and Preformed Corners
- JUTA GP® Protection Fleece
- JUTA GP® Void Vent (25/40mm)

PLEASE CONTACT JUTA UK DIRECTLY FOR MORE INFORMATION ON JUTA GP® 1

Contact us to find out more information.
info@juta.co.uk | 01772 746177 | JUTA.CO.UK

 JUTA

Title Reference & Description:

JUTA GP1 Gas Barrier Technical Data Sheet

SPECIFICATION

GROUND GAS PROTECTION GP1 SAM TECHNICAL DATA SHEET

JUTA **TITANTECH**

GP[®]1 SAM

GP[®]1 SAM, gas protection self adhesive membrane, is a bituminous gas proof and water proof sheet, composed of self-adhesive SBS polymer modified bitumen incorporating GP[®]1 with an upper surface finish of black reinforced LDPE, and a lower surface finish of siliconized release film. GP[®]1 SAM is used for the gas/ waterproofing of underground structures where harmful ground gasses are anticipated, and as a self adhesive accessory to GP[®]1.

Thickness	1.2 mm
Width	0.9 m or 0.3 m
Length	20 m
Weight	1100 g/m ²

TITANTECH[®]
For developers of brownfield and contaminated sites the TITANTECH[®] family of products represent a major step forward in safeguarding projects against gaseous and chemical contamination.

Handling
Roll weights can be in excess of 20 kg (approx 33 kg/roll) and hence appropriate care and equipment is required for unloading and handling. This product is non-toxic nor flammable.

Storage
Rolls of GP[®]1 SAM should be stored on in a cool, dry place, and be protected from exposure to rain, sun, heat and cold temperatures prior to installation. Exposure to sunlight for extended period of time could cause difficulty with removal of the release film.

BBA
CE **UK** **CA**

Title Reference & Description:

JUTA GP1 SAM Technical Data Sheet

SPECIFICATION

GROUND GAS PROTECTION GP[®]1 SAM TECHNICAL DATA SHEET



GP[®]1 SAM

Feature	Characteristics	Test Method	GP [®] 1 SAM
Physical Properties	Thickness	EN 1849-2	1.2 mm
	Width	EN 1849-2	0.9 or 0.3 m
	Length	EN 1849-2	20 m
	Weight	EN 1849-2	1100 g/m ²
Hydraulic Press	Water Tightness	EN 1928	Pass
	Water Vapour Transmission	EN 1931	0.013 g/m ² /day
Mechanical Properties	Tensile Strength (MD/CMD)	EN 12311-2 (A)	500 N/50mm
	Elongation (MD/CMD)	EN 12311-2 (A)	> 12 %
	Resistance to Static Load	EN 12370	20 kg
	Joint Strength	EN 12317-2	> 30 N
	Durability and Water Tightness (Ageing and Chemicals) 60 kPa	EN 1847	Pass
	Resistance to Nail Tear (MD/CMD)	EN 12310-1	> 300 N
	Resistance to Fire	EN 13501	F Euro Class
Gas Permeability	Methane Permeability	EN ISO 15105-1	< 0.68 ml/m ² /day/atm
	Carbon Dioxide Permeability	EN ISO 15105-1	< 2.81 ml/m ² /day/atm
	Radon Permeability	K124/02/95	8.0 x 10 ⁻¹⁵ m ² /S
Compliance and Certification	CE Mark - EN13967:2012 + A1:2017 Type (A/T)		
	BS 8485:2015 Compliant (Methane and Carbon Dioxide Barrier)		

JUTA UK

Please contact JUTA UK Directly for more information on GP[®]1 SAM

Installation

GP[®]1 SAM should be installed in accordance with the product installation guidelines, and in accordance with BS 8485:2015, and/or BS 8102:2009.

It is recommended that GP[®]1 SAM is not applied in temperatures below 10°C, in colder weather the material can be warmed slightly to aid adhesion.

Accessory Products

- GP[®] Primer
- GP[®] Protection Board
- GP[®] Protection Fleece

Title Reference & Description:

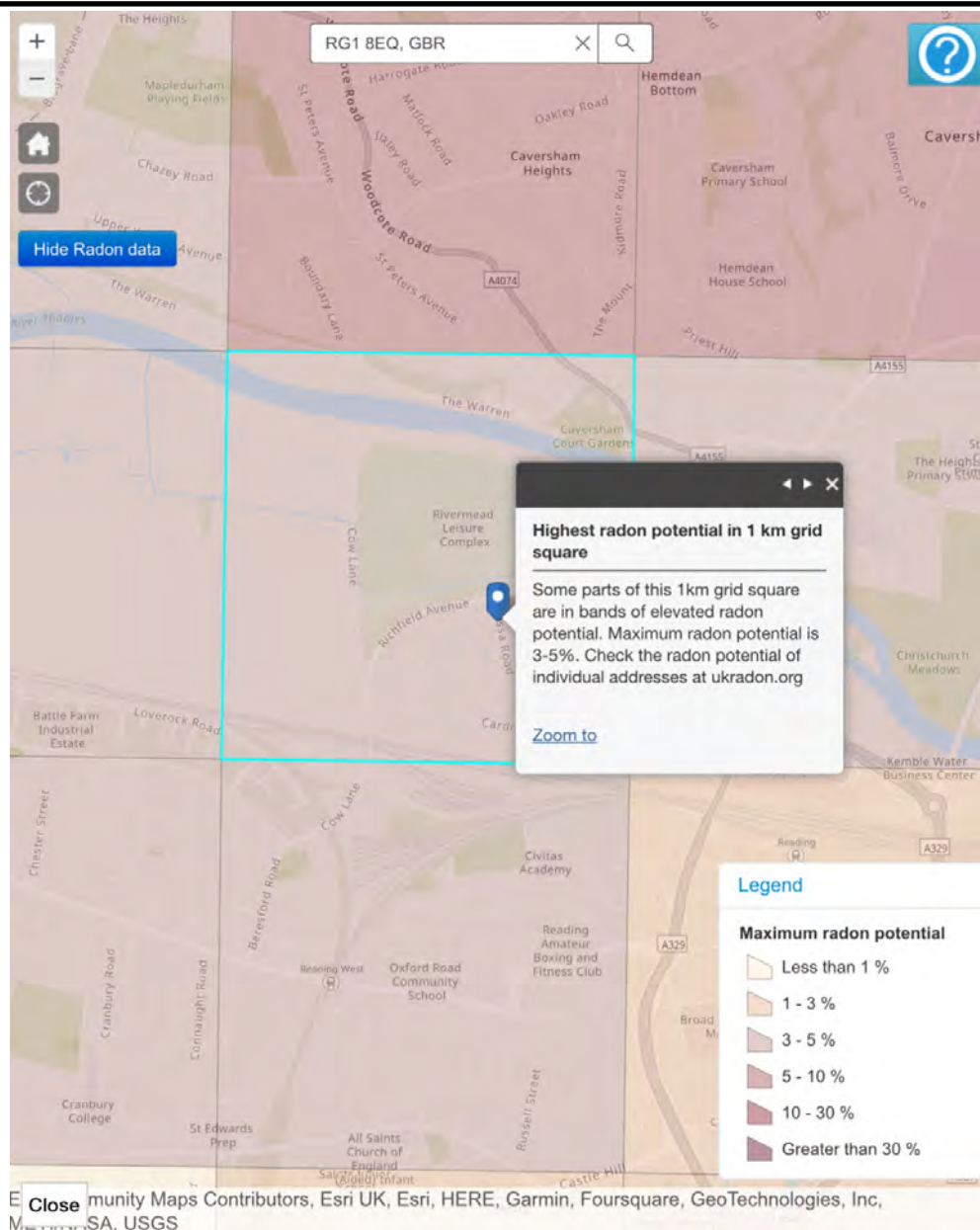
JUTA GP1 SAM Technical Data Sheet



GeoShield Verification Plan



RADON MAPS UK - (Map 1) Site Location



Maximum Radon Potential:

3-5%

Description:

Basic radon protection measures are required.

Postcode:

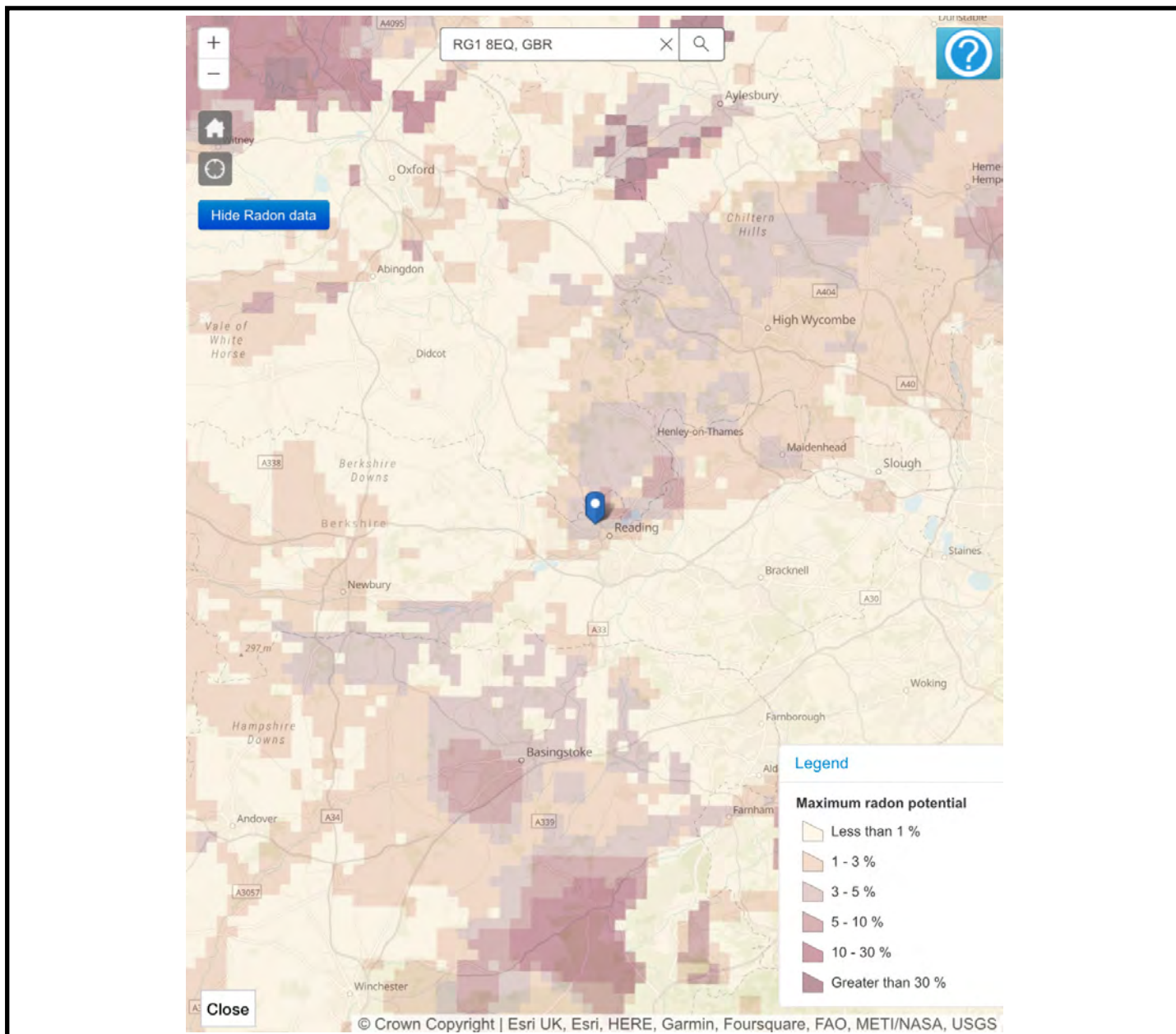
RG1 8EQ



GeoShield Verification Plan



RADON MAPS UK - (Map 2) Nearby Location



Maximum Radon Potential:

3-5%

Description:

Basic radon protection measures are required.



GeoShield Verification Plan



CLIENT DETAILS

CLIENT CONTACT:	James Hay
CONTACTS ROLE:	Commercial Director
MOBILE PHONE:	07507 560 728
EMAIL ADDRESS:	jameshay@swcontracts.co.uk

CLIENT CONTACT:	
CONTACTS ROLE:	
MOBILE PHONE:	
EMAIL ADDRESS	
NOTES:	



GeoShield Verification Plan



APPLICATOR'S DETAILS

APPLICATOR NAME: Tom Everymy

COMPANY: SWContracts Limited

APPLICATOR TEL:

APPLICATOR EMAIL:

APPLICATOR NAME: Michael Crump

COMPANY: SWContracts Limited

APPLICATOR TEL:

APPLICATOR EMAIL:

NOTES:

At least one member of each team group will have a NVQ Level 2

qualification in the gas membrane installation.



GeoShield Verification Plan



Tom Every NVQ 2



PART OF nocn GROUP

This is to certify that

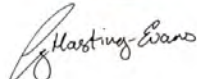
Tom Every

has achieved the following Qualification

**NOCN_Cskills Awards Level 2 NVQ Diploma
in Sub-structure Work Occupations
(Construction) - Installation of Gas
Membranes**

Qualification Approval No: 603/1279/8
ULN: 7961359868
Award Date: 22/09/2022
Certificate No: 47901558




Graham Hasting-Evans
Chief Executive
NOCN Group



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GeoShield Verification Plan



Tom Evely NVQ 2



PART OF nocn GROUP

Tom Evely

Unit(s) Awarded

Unit Title	Unit Code	Credit(s)	Level
Conforming to General Health, Safety and Welfare in the Workplace	A/503/1170	2	L1
Moving, Handling and Storing Resources in the Workplace	F/503/1171	5	L2
Conforming to Productive Working Practices in the Workplace	J/503/1169	3	L2
Preparing to install gas membranes in the workplace	K/615/6045	15	L2
Installing gas membranes in the workplace	M/615/6046	19	L2

Qualification Approval No: 603/1279/8
ULN: 7961359868
Award Date: 22/09/2022
Certificate No: 47901558




Graham Hasting-Evans
Chief Executive
NOCN Group



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British Geomembrane Association

GeoShield Verification Plan



Michael Crump NVQ 2



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This is to certify that

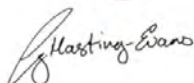
Michael Crump

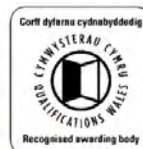
has achieved the following Qualification

**NOCN_Cskills Awards Level 2 NVQ Diploma
in Sub-structure Work Occupations
(Construction) - Installation of Gas
Membranes**

Qualification Approval No: 603/1279/8
ULN: 2812637152
Award Date: 02/12/2022
Certificate No: 47947779




Graham Hasting-Evans
Chief Executive
NOCN Group



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GeoShield Verification Plan



Michael Crump NVQ 2



PART OF nocn GROUP

Michael Crump

Unit(s) Awarded

Unit Title	Unit Code	Credit(s)	Level
Conforming to General Health, Safety and Welfare in the Workplace	A/503/1170	2	L1
Moving, Handling and Storing Resources in the Workplace	F/503/1171	5	L2
Conforming to Productive Working Practices in the Workplace	J/503/1169	3	L2
Preparing to install gas membranes in the workplace	K/615/6045	15	L2
Installing gas membranes in the workplace	M/615/6046	19	L2

Qualification Approval No: 603/1279/8
ULN: 2812637152
Award Date: 02/12/2022
Certificate No: 47947779



Graham Hasting-Evans

Graham Hasting-Evans
Chief Executive
NOCN Group



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GeoShield Verification Plan



APPLICATOR'S DETAILS

TRAINING LEVEL:

SPECIALIST CONTRACTOR:	YES	☒	NO	☐
NVQ LEVEL 2:	YES	☒	NO	☐
NVQ LEVEL 4:	YES	☐	NO	☒
COMPETENT APPLICATOR :	YES	☒	NO	☐

REASON FOR VISIT:

DURING INSTALLATION:	☒	UNDERSLAB VENTILATION	☒
PRE - POUR:	☒	DPC MEMBRANE CONNECTION	☐
TESTING:	☒	OTHER (PLEASE SPECIFY):	☒

NOTES: OTHER - Attendance for 12 month gas monitoring.

NOTES: Having worked with SWC on numerous successful projects these applicators will be deemed to be at an appropriate skill level for the job of installing the ground gas protection measures.



GeoShield Verification Plan



HEALTH AND SAFETY

INDUCTION:

YES



NO:



INDUCTION TIME:

TBC at the pre-start meeting

CSCS CARD:

YES



NO:



CSCS CARD NUMBER:

13466546

METHOD STATEMENT:

YES



NO:



RISK ASSESSMENT:

YES



NO:



COSHH:

YES



NO:



SITE SPECIFIC HAZARDS:

Materials falling from height

Slips, trips and falls

Excavations

Confined spaces

Plant



GeoShield Verification Plan



Riverside Academy

In accordance with guidance from
CIRIA 735 & CIRIA C748.

Radon gas protection measures
specify to the guidance from the
BR 211 document:

VOC/Hydrocarbons



RADON BASIC



RADON FULL



Characteristic Specification (CS) Rating

CS2

Building Type:

TYPE B

POINTS REQUIRED UNDER BS8485:2019

3.5 POINTS

POINTS GAINED FROM BS8485:2019

Score for Structural Barrier:

0.5 POINT

Grade 2 Basement:

N/A

Grade 3 Basement:

N/A

Score for Venting:

1.5 POINTS

Car Park:

N/A

Score for Membrane:

2.0 POINTS

POINTS ACHIEVED UNDER BS8485 2019:

4.0 POINTS



GeoShield Verification Plan



TESTING PROCEDURES

VISUAL: PICK & PROBE/MECHANICAL POINT STRESS TEST:



NON-DESTRUCTIVE COMPRESSED AIR LANCE TEST:



NON-DESTRUCTIVE SMOKE TEST:



DESTRUCTIVE JOINT TESTING:



NON-DESTRUCTIVE TRACER GAS TESTING:



DIELECTRIC POROSITY TEST:



PUMP TEST FOR "Twinny" WELD



NOTES: From the risk assessment GeoShield will initially conduct a visual

NOTES: and pick and probe testing regime for this project.

NOTES: Air lance testing will be conducted to test the installed membrane in

NOTES: accordance with CIRIA 735.

NOTES: Verification and air lance testing will be 100%.

NOTES: Only if the application falls below the accepted standard will other testing

NOTES: be used.

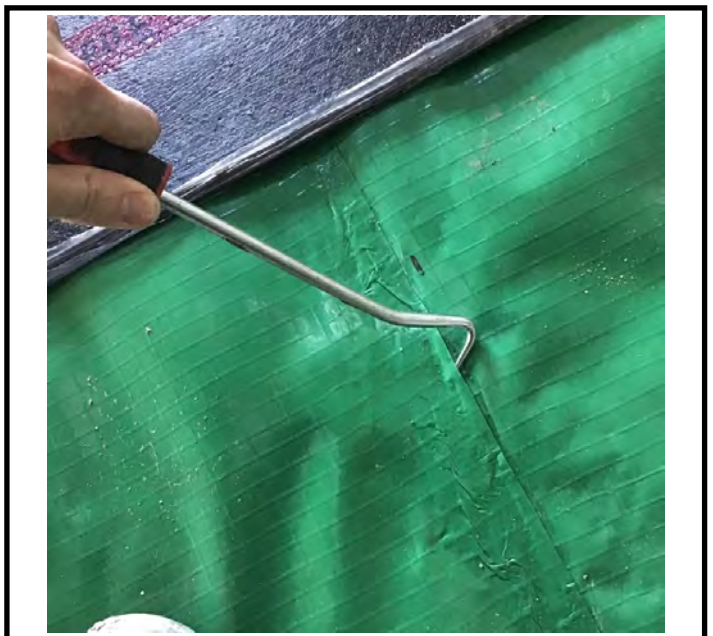
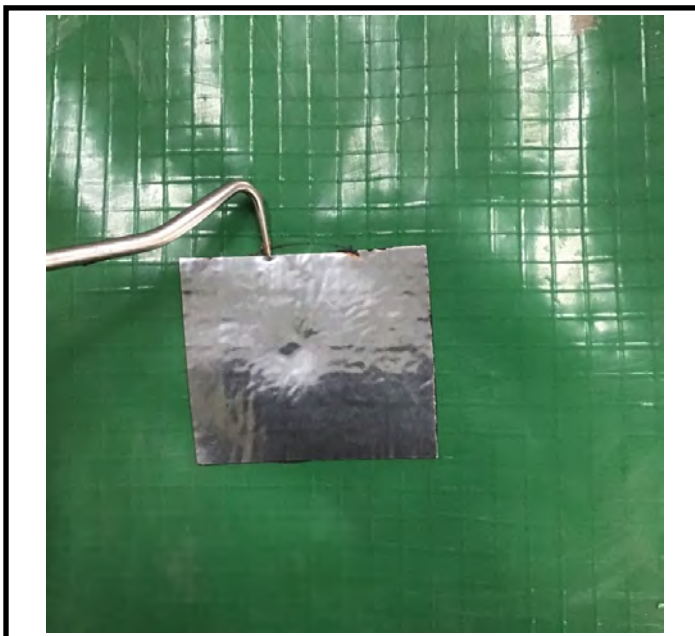


GeoShield Verification Plan



SPECIFICATION

Mechanical Point Stress/ 'Pick and Probe' Testing



CIRIA 735

4.3.2 - Mechanical point stress tests involve running a blunt instrument (e.g. a screwdriver) along the edge of a seam to identify any unbonded seams. This method is not as effective as air lancing but it can be especially useful in hard to reach areas where it is not possible to air lance.

The instrument used should not puncture the gas membrane. This method is less appropriate for materials that are easily punctured where an air lance test is more suitable (although if a gas membrane can be easily punctured its suitability as a membrane is open to question).



GeoShield Verification Plan



SPECIFICATION

Air Lance Testing



CIRIA 735

4.3.3 - Air lance testing identifies unbonded areas of seam by directing a high pressure jet of air at the seam. The air is at a minimum pressure of 345kPa via a 4.8mm nozzle and is located no more than 50mm from the seam being tested.

In order to achieve the requirements of ASTM D4437-08:2013 bespoke specialist equipment is required to maintain the required pressure.



GeoShield Verification Plan



RISK ASSESSMENT

SITE SPECIFIC CIRCUMSTANCES	1	2	3	4	5
Complexity of Design	1	2 ✓	3	4	5
Repetition of design	1	2	3 ✓	4	5
Experience of workforce	1 ✓	2	3	4	5
Gas regime	1	2 ✓	3	4	5
Project management experience	1	2 ✓	3	4	5
Installation conditions (exposed?)	1	2 ✓	3	4	5
Robust Project specific gas design	1 ✓	2	3	4	5

TYPE OF RISK	RANGE	RISK
High Risk	23 - 30	
Medium High Risk	19 - 22	20
Medium Risk	15 - 18	
Medium Low Risk	11 - 14	
Low Risk	0 - 10	

GeoShield have classed this project as a medium high risk.

GeoShield will lay all parameters down for standards at the pre-verification meeting to assist both the installer and the main contractor.



GeoShield Verification Plan



VERIFICATION REPORT

These items will be included in the report

- NUMBER 1 GAS MEMBRANE SPECIFICATION
- NUMBER 2 ELEMENTS OF THE GAS MEMBRANE
- NUMBER 3 DATE, TIME and WEATHER CONDITIONS
- NUMBER 4 PLANS and DETAILS ISSUED
- NUMBER 5 INSTALLATION PHOTO's RELATING TO GRID LINES
- NUMBER 6 REPORTING DEFECTS AND LOGGING IN REMEDIATION LOG
- NUMBER 7 AREAS OF LIMITATION (areas unable to inspect)
- NUMBER 8 LOGGING AND REPORTING RESULTS OF TESTING

VERIFICATION REPORT ISSUE

HARD COPY:	☐ YES	☒	☐ NO	☐	EMAIL:	☐ YES	☒	☐ NO	☐
DROP BOX LINK:	☐ YES	☒	☐ NO	☐	FLASH DRIVE:	☐ YES	☐	☐ NO	☒



GeoShield Verification Plan



METHOD STATEMENT - Page 1

EXPECTED VISITS:- 30 site visits are deemed necessary for verification, however extra visits may be considered for potential remediations before sign off.

12 months of gas monitoring testing will be conducted (Geoshield attendance).

TESTING:- Mechanical Point Stress (Pick & Probe) testing on taped areas.

Air lancing will be 100% verified however where health and safety concerns or restricted access is applicable then a risk assessment will be done on the day.

PURPOSE:- Geoshield are 3rd party gas membrane verifiers and in order of this project to be compliant with BS8485:2019 and in accordance with CIRIA 735.

This project will NOT achieve sign off for gas membrane installation unless independent verification is carried out.

REPORTING:- Each site visit be accompanied with a written and electronic report.

Any remediations either completed on the visit or outstanding for a later date will be recorded and logged, sign off will not be achieved for each section area until all remediations has been completed. This will be fully recorded at all times.



GeoShield Verification Plan



METHOD STATEMENT - Page 2

GROUND GAS RISK:- From detail design drawings this project has been classified as a Type B building and a CS2 rating in accordance with BS8485:2015+A1 2019. This will require to mitigate a minimum score of 3.5 points. A VOC/hydrocarbon resistant vapour membrane has been specified. Basic Radon protection measures are also required. This will be achieved by 3rd party verification, slab or ground type and ventilation provision. Both of the gas membranes will be fully verified and tested. A combination of which will achieve the necessary requirements.

GAS MEMBRANE PROTECTION:- It is essential that upon satisfactory install of that the gas membrane is protected, during and after verification work is completed. In addition warning labels will be issued by Geoshield to advise on the need to restrict access to the installed area by follow on trades and their due diligence. This will help to reduce potential damage caused. This is essential before the final slab or screed is poured over the membrane.

FINAL:- Geoshield will liaise with the projects site supervision and all relevant parties prior to the installation start. This plan will be presented and reviewed, all points made clear as previously stated. Any alterations will be listed at the end of this plan as an all party agreed way forward.



GeoShield Verification Plan



VERIFICATION PLAN

METHOD STATEMENT

VERIFICATION STRATEGY:

Percentage Strategy: 1st 10 Plots (100%), 11-50 Plots (1:5) & 51 or > (1:10)

☐

Percentage Strategy: 100% Verification for VOC/Hydrocarbons

☒

Verification Percentage on site: 100%

Not Specified

☐

Remarks: Geoshield will work with the installer and contractor so that a robust

Methodology for protecting the gas membranes will be put in place.

It is recommended that the installers are present at the time of testing so any

remediations can be rectified. If remediations are not rectified the nature of the fault

found will determine whether or not extra visits are required to test remediations.

Protection Type:-

Protection Board

☐

Protection Fleece

☐

Insulation

☐

Remarks: Not specified.

TESTING PROCEDURE

Method Statement - Pipe Penetrations and Service Entries Notice Signs



Geoshield Notice Signs -

During testing on site, notice signs will be tied to all pipe penetrations and a service entries which have not passed inspection.

Areas cannot be passed unless verification stickers have been applied to the Notice Signs, once remediations have been successfully carried out.



GeoShield Verification Plan



SUBSTRATE METHOD STATEMENT

SUBSTRATE TYPE:

Block and Beam Construction	Yes	☒	No	☐
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Minimum Preparation	Swept Clear	Yes	☒	No	☐
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Minimum Preparation	Vacuuming	Yes	☐	No	☒
---------------------	-----------	-----	--------------------------	----	-------------------------------------

Minimum Preparation	Compressed air to remove	Yes	☐	No	☒
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Minimum Preparation	Remove Mortar Droppings	Yes	☒	No	☐
---------------------	-------------------------	-----	-------------------------------------	----	--------------------------

Stone Substrate	Yes	☒	No	☐
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Minimum Preparation	Minimum 25mm Sand Blinding	Yes	☒	No	☐
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Minimum Preparation	Limestone Dust	Yes	☒	No	☐
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Minimum Preparation	Compacted Substrate	Yes	☒	No	☐
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Minimum Preparation	No large stones	Yes	☒	No	☐
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Concrete Substrate	Yes	☐	No	☒
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Minimum Preparation	No Hollows	Yes	☐	No	☒
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Minimum Preparation	Troweled Surface	Yes	☐	No	☒
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Remarks:	The concrete planks will be swept clean of snots and debris before
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the JUTA GP1 membrane is to be installed on the floor level.
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GeoShield Verification Plan



PRE-CONTRACT MEETING

Items for discussion at the Pre-Contract meeting	☐
>Induction Procedure	☐
>Identification of installation team and point of contact	☐
>Identification of Project management team	☐
>Identification of Sub-Contractors associated with membrane installation	☐
>Validation of Membrane and design specification	☐
>Verification procedure	☐
>Notifications for Verification	☐
>Preparation of substrate	☐
>Program of works	☐
>Utility entry	☐
>Protection of Membrane	☐
>Remediation Procedure	☐
>Testing Procedures	☐
>Sign off Procedure	☐
>Installer PI	☐

All information is assumed correct at time of issue.

DATE:



GeoShield Verification Plan



PRE-CONTRACT MEETING SUMMARY

A pro-forma quality assurance document will be discussed during the Pre-Verification meeting and training undertaken with the management team for non verified areas.

The Pre-Verification meeting will be led by Geoshield and should include all relevant parties who have an impact on the installation and future protection. Geoshield will provide guidance and strategy for all parties.

The site specific checklist will be covered as well as the risk assessment.

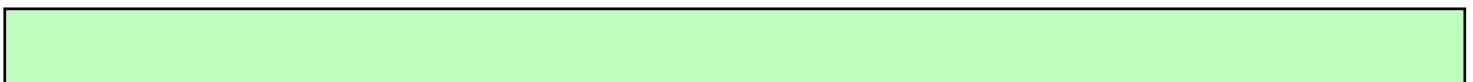
This site has been classified as a CS2 gas regime rating with VOC protection measures.

Any design alterations will be discussed and included in a revised Pre-Verification Plan.

Any specification changes must also be included in a revised Pre-Verification Plan.

All items will be minuted by the Geoshield representative.

This Pre-Verification plan follows all current guidance and the aim is to make all parties aware of the ramifications of poor installation and their responsibilities if they damage the membrane.





GeoShield Verification Plan



Appendices

Appendix A - Geoshield Method Statement

Geoshield will be in attendance for the gas monitoring over the 12 month period.

The probes and Pipework will also be verified for the 12 months testing also.



GEOSHIELD

River Academy Reading

12 Month Gas Monitoring Method Statement

Rev 4





GEOSHIELD

Purpose of this document

This method statement lays out the methodology that GeoShield will adopt to monitor the VOC's, CO₂ and Methane to alleviate the requirements in:
RBC Planning Application Number
212061 Ref. EP/734261

This method statement provides a robust accurate strategy to show the performance of the Basal membrane. Although the Basal membrane is fully verified in accordance with CIRIA 735 it provides real life monitoring over a 12 month period.



GEOSHIELD

Contents

- Method Statement
 - Sample Pipework
 - Plans and Probe design below Basal layer
- Method Statement
 - Testing Strategy
- Appendix 1
 - Risk assessment Pipe work
- Appendix 2
 - CV GeoShield
- Appendix 3
 - CV Gas sampling consultant



GEOSHIELD

Method Statement Pipework Install



GEOSHIELD

Method Statement

GeoShield will incorporate a live proactive approach.

The locations of the testing points are located on drawings

- GEO103260.2a REV4 Plan 1
- GEO103260.2b REV4 Plan 2

PROPOSAL

It is proposed to supply and install 19no. sub floor probes within the sub floor void and 13no. sub floor probes within the building footprint oversite immediately below the basal membrane terminating in 13no. externally located probe monitoring points.

Materials

1. 13no. lockable wall mounted monitoring point probe boxes IP65 Rated

dims 200mm x 300mm x 130mm complete with 4no. T-Mex LT 2000 monitoring valves and 1no. 30mm diam. probe pipe input point.

2. 32no. sub floor probes see attached drawing no. 5719 AA(57) 002 P2.

3. Probe sample pipe ext. diam. 8.0mm and proprietary wall fittings.

4. 110mm inground manifold plastic pipework and proprietary fittings.



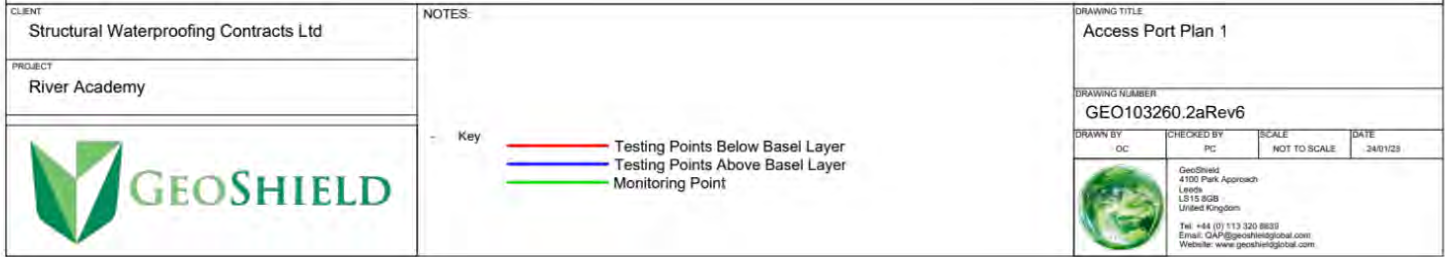
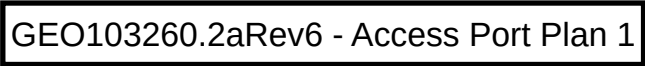
GEOSHIELD

Installation

1. 13no. sub floor probes complete with probe sample pipe to be shallow trenched in the building footprint oversite within horizontal sections of 110mm plastic manifold pipework. Manifold pipework to be taken through the perimeter construction and turned vertically immediately adjacent to the perimeter to terminate at a low level wall mounted probe sample box. Trenching and back filling for sub floor probes and manifold and any passings required to be by main contractor. Location of sub floor probes, manifolds and monitoring points to be as detailed on drawings numbers GEO103260 2a, 2b Rev 4, see attached.

2. 19no. sub floor probes to be wall mounted within the sub floor void with sections of probe sample pipework surface mounted and fixed to the sub floor walls and taken back to the externally located probe sample points as detailed on drawings numbers GEO103260.2a, 2b Rev 4, see attached. At each sample point location to be 1no. passing through the sub floor void perimeter construction, passing to either be 50mm diam. clear or approx. 40mm diam. plastic pipe section, pipe to extend min 100mm either side of wall construction, to be provided by main contractor.

3. Risk assessments APPENDIX 1 1, 2 3, 5, 31, 103, 104

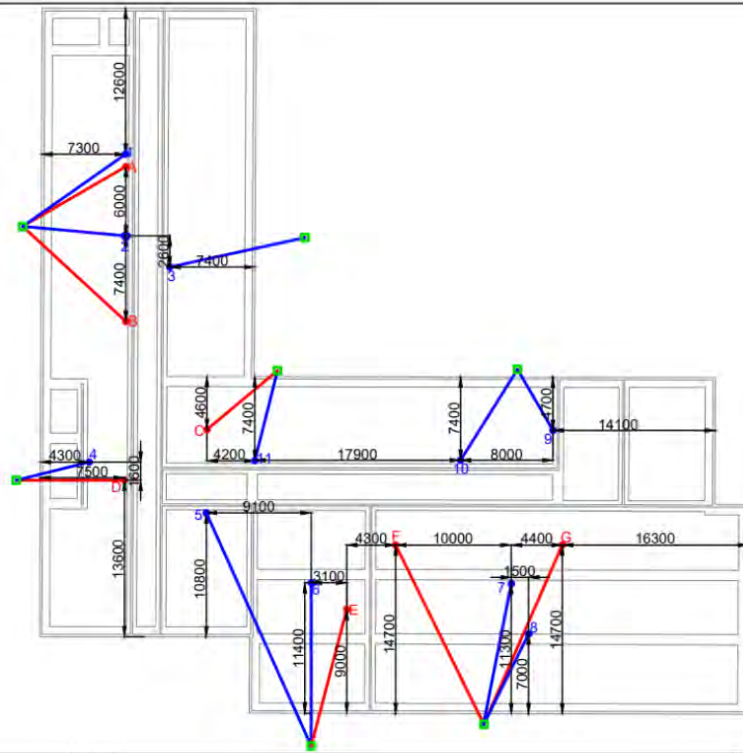




GeoShield Verification Plan



GEO103260.2bRev6 - Access Port Plan 2



CLIENT
Structural Waterproofing Contracts Ltd

PROJECT
River Academy



NOTES:

- Key
- Testing Points Below Basel Layer
 - Testing Points Above Basel Layer
 - Monitoring Point

DRAWING TITLE
Access Port Plan 2

DRAWING NUMBER
GEO103260.2bRev6

DRAWN BY	CHECKED BY	SCALE	DATE
OC	PC	NOT TO SCALE	24/01/23



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