



**BROWNFIELD
SOLUTIONS LTD**

GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

THE DEAN TRUST

Dean Trust Academy, Ardwick, Manchester

Verification Plan for Ground Gas Protection Systems

CM/M4246/12358 Rev A

May 2024

PROJECT QUALITY CONTROL DATA SHEET

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Issued By:	Client:	Engineer:
Brownfield Solutions Ltd William Smith House 173 – 183 Witton Street Northwich Cheshire CW9 5LP Tel: 01606 344 844 brownfield-solutions.com	The Dean Trust Cecil Avenue Sale Cheshire M33 5BP	Marston & Grundy LLP Consulting Engineers Priory House Ellesmere Avenue Marple Stockport Cheshire SK6 7AN
	Contact: Mr N David	Contact: Mr A James

Written by:



C McShane
BSc (Hons) FGS
Project Engineer

Checked by:



N Swallow
BSc (Hons) MSc MEnvSc
Senior Project Engineer

Approved by:



D M Gates
MGeoscience FGS
Principal Project Engineer



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1.0 INTRODUCTION

1.1 Objectives

This report describes a Verification Plan for Ground Gas Protection Systems produced by Brownfield Solutions Limited (BSL) for The Dean Trust on a site at The Dean Trust Academy, Ardwick

This document has been produced in accordance with BS 8485:2015+A1:2019 and CIRIA 735 (2014) which states that the Verification Plan forms an integral part of the design of the gas protection system to ensure and demonstrate that the systems are adequately installed.

The Verification Plan will set out:

- The need for, and scope of, inspection/verification.
- Who will carry out the inspections (in terms of competence and independence).
- Over what period and at what frequency these inspections will take place.
- The elements of the gas protection system to be inspected.
- How the inspections will be recorded and reported.

The Verification Plan should be presented to all relevant stakeholders who will be required to implement and consider ground gas protection systems within their duties as part of the development.

1.2 Proposed Development

BSL has had extensive involvement in assisting the Dean Trust through their contaminated land planning conditions since the school which was built in 2015 began to be extended in 2019 to facilitate its growing needs.

In 2019 a planning application was submitted for a new two storey extension and undercroft car parking, a single storey dining extension, and the removal of earth bunds for construction of new surface level car park and hard surfaced play areas. These have since been constructed at the site, and the school now proposes to construct a new fitness suite under the recently constructed classroom extension, in the area of the undercroft parking as shown on drawing ref. 5627-HMA-DTA-00-DR-A-00003 and 5627-HMA-00-00-DR-A-20101 appended. It is also proposed to build two covered cycle parking bays which is demonstrated on the proposed landscaping and fencing plan ref. 5627-HMA-DTA-00-DR-A-20105. No areas of soft landscaping are proposed. Planning for this has been granted in July 2023 (137058/FO/2023).

This letter report has been produced to satisfy the 'site investigation report' element of condition 4a and looks to reassess existing information relevant to the new application.

1.3 Available Information

The following reports have been issued for the site and should be read in conjunction with this Verification Plan:

Phase 1 Desk Study	• Brownfield Solutions Ltd Report (GP/M4246/8660) issued July 2019.	Available
	• Atkins Dean Trust Ardwick High School (Revised Scheme) Phase 1: Geo-Environmental Assessment (5130327/DTAHS-RS/002) issued August 2015.	Available

Phase 2 / Site Investigation	• Atkins Manchester Schools Basic Needs Programme: Daisy Mill Ground Investigation Report (GTG20140378/5130327/19/Rev 0) issued December 2014.	Available
	• Geotechnics Limited Factual Report on Ground Investigation issued December 2014.	Not Available
	• Atkins Dean Trust Ardwick High School (Revised Scheme) Ground Investigation Report – Contaminated Land Risk Assessment (5130327/09/CLRA/Rev 0) issued August 2015.	Available
	• Atkins Manchester Schools Programme: Dean Trust Ardwick Remediation Strategy (5119532_1) issued June 2015.	Available
	• ESG Factual Report (LO/R5141/001/NB) issued October 2015.	Not Available
	• ESG Detailed Quantitative Risk Assessment Report (R5141b) issued October 2015.	Not Available
	• Solmek Phase 2 Site Investigation Report (S160937/SI) issued November 2016.	Available
	• Brownfield Solutions Ltd Phase II Geo-Environmental Assessment Report (NS/M4246/8662 Rev B) issued October 2019.	Available
Remediation / Validation	• Atkins Manchester Schools Programme: Dean Trust Ardwick Remediation Strategy (5119532_1) issued June 2015.	Available
	• ESG Remediation Strategy (R5141/2) issued October 2015.	Not Available
	• ESG Remediation Verification Report (R5141/3) issued December 2016.	Available
	• Brownfield Solutions Ltd Remedial Strategy (NS/M4246/8855 Rev A) issued November 2020.	Available
	• Brownfield Solutions Ltd Clean Cover System Validation (NS/M4246/9858) issued January 2021.	Available
Other	• ESG Materials Management Plan Dean Trust Ardwick 2016 (R5141/MMP) issued December 2015.	Available
	• Zetica Site Safe UXO Desk Study (P5220-15-R1-A) issued April 2015.	Available
	• Brownfield Solutions Ltd Phase II Geo-Environmental Assessment Report (NS/M4246/8662 Rev B) issued October 2019.	Available

We assume the above reports have been submitted to the relevant regulatory bodies and the assessments therein have been accepted for the purposes of this Verification Plan.

1.4 Limitations

Recommendations on the suitable options for ground gas protection systems have been provided by third parties and BSL has not been involved in the design process, therefore we extend no professional liability in respect to prior assessments and design. However, we will confirm if the chosen designs are appropriate and will validate the system in accordance with the designs and confirm the required points have been achieved in accordance with BS8485.

We recommend the suitability of all designs are confirmed with the Local Authority and the Warranty Provider (if applicable) and / or Building Control prior to any irrevocable action at the site. If we feel the designs are incorrect, we have a duty of care to inform the Client.

This Verification Plan does not in itself constitute the actual verification that the gas membrane and protection systems have been installed in accordance with this document and therefore offers no warranty thereto.

There may be other conditions prevailing on the site which are outside the scope of work and have not been highlighted by previous assessments and therefore not been taken into account by this Verification Plan. Responsibility cannot be accepted for such site conditions not revealed by the assessments.

This report has been prepared for the sole use of the client, The Dean Trust. No other third parties may rely upon or reproduce the contents of this report without the written permission of Brownfield Solutions Ltd (BSL). If any unauthorised third party comes into possession of this report, they rely on it at their own risk and BSL do not owe them any Duty of Care. Should the Client require copies of the report to be passed to third parties for information purposes, then the whole report should be included without any omissions.

2.0 GROUND MODEL SUMMARY

2.1 Location

The site is located off Stockport Road, Ardwick, M13 0LF. It is situated approximately 2.7km south-east of Manchester City Centre, centred on National Grid Reference 386240, 396308.

2.2 Site Description

The site comprises The Dean Trust Academy, a secondary school built and opened in 2015. The building is an irregular shape two to three storey which is situated in the north-western corner of the site. The southern half of the site comprises a Multi-Use Games Area (MUGA), hard surfaced sports courts are present centrally in the east of the site and a grass sports field is present in the north-east of the site. A hard play area is located within a semi-enclosed courtyard between two wings of the school building and a large area of car parking is present centrally in the north half of the site.

2.3 Ground Conditions

Several site investigations have been undertaken. A summary of the ground conditions is presented below:

Topsoil

Topsoil was encountered up to 0.60m in thickness comprising of clayey slightly gravelly sand.

Made Ground

Made ground was encountered from 0.30m to between 1.00m and 4.80m bgl. The strata generally comprised slightly sandy to sandy slightly gravelly clay.

Natural Strata

Natural strata were encountered to 17.60m and 20.32m bgl And generally comprised slightly sandy to sandy slightly gravelly clay.

Peat was recorded in BH03 at a depth of 2.50 to 2.90m bgl within the Atkins 2014 investigation.

Bedrock

Weathered sandstone/mudstone was encountered to a maximum proven depth of 21.45m bgl during the Atkins 2014 investigation.

Groundwater

Groundwater depths range from 0.30m to 19.70m bgl.

2.4 Ground Gas

In accordance with the Conceptual Site Model and the recommendations within CIRIA C665 'Assessing risks posed by hazardous ground gases to buildings.

A summary of the ground gas monitoring carried out by BSL and Atkins (2014) is presented below:

- Atkins conducted six groundwater and ground gas monitoring visits between 17th November 2014 and 11th February 2015 from ten exploratory holes.
- Gas monitoring recorded levels of carbon dioxide to a maximum of 9.2% v/v and a maximum flow of 10.5l/hr. Methane was not recorded above the detection limit of 0.1% v/v.
- Soil Vapour Headspace Monitoring revealed elevated readings in BH01 at 0.50m bgl (37.0ppm), BH02A at 3.50m bgl (201.0ppm) and 3.40m bgl (28.3ppm).

-
- Six monitoring visits were undertaken by SOLMEK between December 2016. and May 2017, which indicated carbon dioxide was present at concentrations between 0.1 and 1.0%v/v whilst methane was not recorded over the detection limit.
 - BSL conducted only 1 monitoring visit on 8th July 2019 to confirm the above findings.
 - Gas monitoring recorded levels of carbon dioxide to a maximum of 3.5% v/v and a maximum flow of 0.3l/hr. Methane was not recorded above the detection limit of 0.1% v/v.
-

On the basis of the above, the site is classified to fall within Characteristic Situation 2 in accordance with CIRIA 665 and therefore mitigation measures are required.

Assessment

In order to assess the ground gas situation and the requirement for ground gas precautions guidance was taken from CIRIA C665 'Assessing risks posed by hazardous ground gases to buildings' and BS 8485:2015.

The proposed end use dictates that the gas monitoring results are assessed in accordance with Wilson and Card (1999) as stated in CIRIA C665

The Wilson and Card OR Boyle and Witherington method uses the concept of a gas screening value (GSV), which is calculated as a worst case scenario using the maximum concentration of the ground gas and the flow rate.

The site is classified to fall within Characteristic Situation 2 in accordance with CIRIA 665.

3.0 PROPOSED PROTECTION SYSTEMS

As mentioned in the Remedial Strategy Reference NS/M4246/8855 Rev A dated October 2019 to comply with the required level of protection and in accordance with BS8485:2015 for a Type C building placed within CS2, a minimum of 2.5 points is required.

The gas protection system should consist of at least 2 separate elements including a structural barrier, ventilation systems and/or a gas resistant membrane.

For a Type C building falling within CS2 the following gas protection systems are proposed in line with BS 8485:2015:

-
- A gas resistant membrane which is suitably impervious to carbon dioxide and methane and verified in accordance with CIRIA C735 - 2.0 score.
 - A cast in-situ monolithic reinforced ground bearing raft or reinforced cast in-situ suspended floor slab with minimal penetrations (1.0 or 1.5 score depending on construction quality) and a passive sub floor dispersal layer with good performance (1.5 score).
 - A pressure relief pathway (0.5 score) or passive sub floor dispersal layer with good performance (1.5 score).
-

The drawings as produced by Halliday Meecham Architects for Ardwick Academy indicating the installation of the proposed ground gas protection systems within the proposed structure(s) are presented in Appendix A.

Structural Barrier

A 250mm suspended slab will be used, incorporating reinforcement within the concrete placed over by 60mm insulation and a 70mm layer of screed at the top as a finish.

Gas Resistant Membrane

The gas membrane proposed for use in construction is the Monarflex Reflex Super membrane and the Hyload Gastite DPC. The membranes will be joined using the Icopal Monobond LT and Hyload DPC Jointing Tape, respectively. The product data sheets, indicative installation details and manufacturer methods of installation are presented in Appendix A.

Where products used on site are identified to differ from the above or not meet expectations, then the verifier classify this as a non-conformance, or if it is deemed that the non-conforming product is of a suitable specification to the original specified product, a variation of the specification will be required from the designer. This may also need to be agreed with the Local Authority and / or warranty provider.

Suitability of Proposed System

The above proposed system totals 3.5 points, which meets the minimum requirements. BSL therefore confirm the proposed protection system meets requirements.

4.0 VERIFICATION INSPECTION REGIME

4.1 Pre-Verification

Stakeholders

The key project stakeholders are listed below:

Client	Designer(s)	Installer	Verifier	Regulators
The Dean Trust Cecil Avenue Sale Cheshire M33 5BP	Marston & Grundy Associated Ltd	TBC	Brownfield Solutions Ltd (BSL)	- Manchester City Council (regulator - Human Health risk and planning consent) - Building control. - Warranty Provider

Pre-Start Meeting and Requirements

Prior to installation, a pre-starting meeting should be held to discuss requirements between the installer, the verifier and site managers. This should help mitigate delays during the verification process.

The installer will be checked by the verifier (BSL) as to why they are considered appropriate to undertake the role, prior to construction. To aid this, the installer should provide their RAMS to BSL for records. Evidence of any qualifications and past experience will be required to be provided to BSL prior to installation and should be checked on site.

Attendance for verification is required prior to the placement of any construction over the installed membrane (e.g. before laying insulation or a concrete pour).

Due to the nature of the proposed development, the installed protection systems will be verified in sections as they become available, closely liaising with the site manager in regard to progress.

Records of installation shall be maintained by the verifier and installer and once all proposed installations are complete, a copy of the records will be issued within a separate Verification Report.

4.2 The Installer

The ground gas protection system will be installed as per the manufacturers recommendations, the design drawings and the installers method statement enclosed in Appendix C.

Prior to the installation of protection system, all on site personnel should be made aware of the presence of the installed membrane and should be informed that damage needs to be prevented. Adequate protection of the gas membrane (appropriate to the build sequences of follow-on trades and the robustness of the gas membrane used) will always be required to ensure that installed gas membranes have retained their integrity. A warning label to display and assist is included in Appendix F.

It is essential that an appropriately experienced and qualified workforce is employed on site to install ground gas protection systems.

Since the site is assessed low risk CS2 (with venting systems to be installed), a general builder/groundworker with relevant experience, but no relevant formal qualification in gas membrane installation could be employed. However, the verifier (consultant or qualified and experienced installer) will be required to conduct a thorough verification (visual) inspection prior to all concrete pours.

If a qualified installer is carrying out the works: ,In accordance with CIRIA 735, personnel undertaking the installation will be specifically qualified in Cskills Awards L2 NVQ Diploma in sub-structure work occupations (construction) – installation of gas membranes. Operatives installing gas protection systems without this qualification should have at least attended the Cskills installation of gas membrane sector apprenticeship and up-skilling course or equivalent scheme, and be registered as working towards the L2 NVQ Diploma. Evidence of the qualification will be required to be provided to BSL prior to installation and should be checked on site.

The installer will also be required to maintain their own records of installation, which will include sign off sheets detailing areas and dates of installation alongside photos of before, during and after installation. This information is required by BSL to be included in our Verification report.

The installer shall notify the independent verifier of progress so that they can visit site and conduct verification in accordance with above scope.

4.3 The Independent Verifier

The installation of the ground gas protection systems shall be visually inspected and verified by an independent and suitably competent ground engineering professional or third party independent qualified and experienced installer. The competence of BSL verifiers is presented in Appendix E.

It will be necessary for the verifier to attend site prior to the installation of the membrane in order to discuss requirements and view the floor slab construction/ventilation systems. Note that prior to attending site, the verifier will require each area ready for inspection to be free of overlap/lapping tape on all seams where applicable during the visit.

When installed, the verifier will check the membrane used meets the requirements set out within this Verification Plan.

Edges, walls, pillars, service entries etc. will be checked that they have enough overlap in accordance with the manufacture's specification. The inspection should cover floor areas, paying attention to walls and any other locations where venting systems might be positioned. Areas where the membrane may be bridging across unsupported will be checked. Any discrepancies with the design drawings should be highlighted.

BSL reserves the right to increase levels of inspection should the quality of installation of the membrane deteriorate significantly over any phase of the construction works.

During the inspections, photographs will be taken as evidence and a pro forma check sheet will be used to record the assessment of the installation of the required ground gas precautions. A plan detailing which areas of the structure have been installed/verified shall also be maintained. A copy of the pro forma is presented in Appendix E.

Repairs should be instructed and observed on the same day as the site visit or re-inspected later.

Systems taken to minimise any damage to membranes whilst working (e.g. placement of insulation) will also be recorded and reported. A warning label to display and assist is included in Appendix F.

4.4 Integrity testing

Integrity testing should be carried out based on the requirements within Section 4.2.

Integrity testing is not a substitute for well designed and installed gas protection systems. When used, integrity testing should always be combined with visual inspection.

To ensure a high standard installation, mechanical point stressing to ASTM D4437-08:2013) will be carried during the visual inspection which involves running a blunt instrument (e.g. a blunted pick) along the edge of the seam to identify any unbonded seams. 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 gas membrane is open to question).

4.5 Non-Conformances

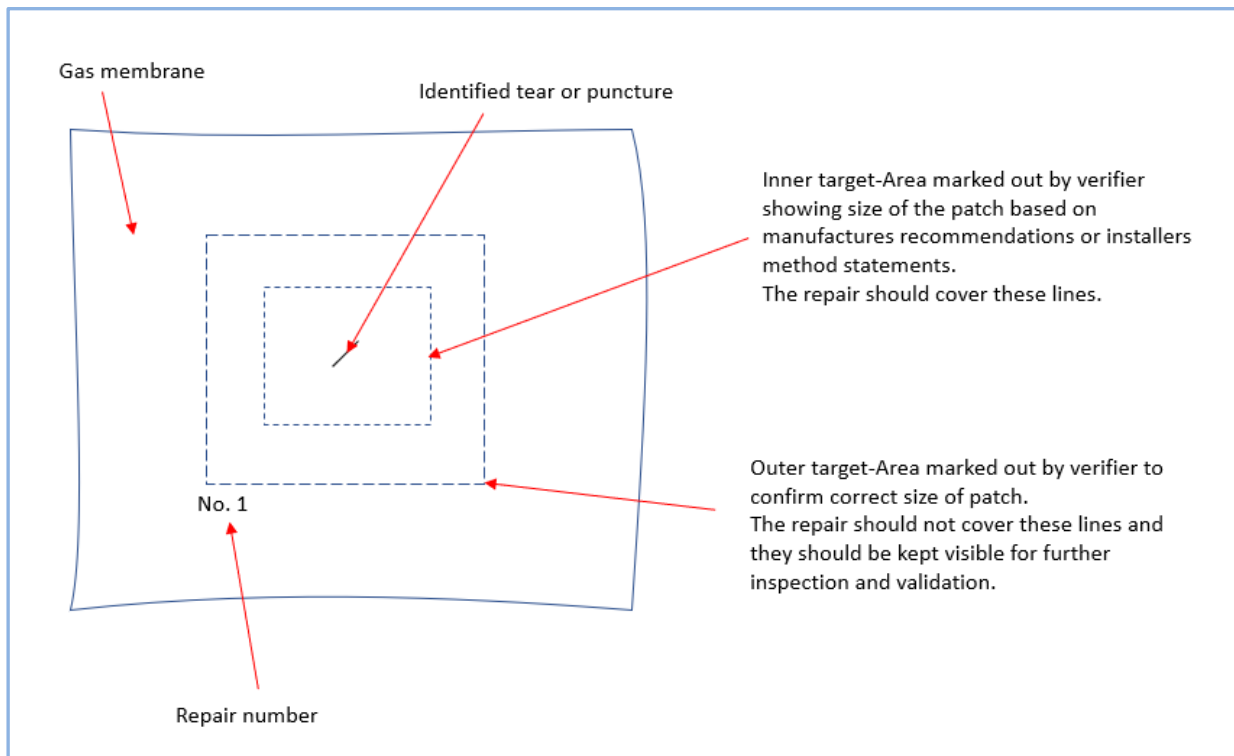
If installed incorrectly or damaged during the construction process, the membrane is rendered ineffective and will fail to provide adequate protection against the ingress of ground gas or vapours.

All damaged areas should be repaired in accordance with the manufacturer's instructions/installers method statements, ensuring a minimum lap is maintained and the repair subsequently verified. No bridging of unsupported membrane is permitted.

The following procedure will apply for any identified non-conformances:

-
- Damaged areas will be marked on site using a permanent marker (e.g. BSL, date, initials) and photographed to be included in the final verification report.
 - The mark will highlight the area to be patched or repaired, maintaining a suitable lap.
 - Verbally inform the installers on site of the repair(s) for them to address.
 - When repaired, the area(s) will then be inspected again (re-verified).
 - Once repaired to a satisfactory standard, a second mark will then be placed outside of the highlighted area to indicate the location of the repair (e.g. BSL, date, initials, repaired and a tick mark) with photographic evidence of the repair taken to be included in the final verification report.
 - If there are a very high number of non-conformances and installation is generally very poor, do not attempt to identify all non-conformances; stop works and discuss the issues with the installer and the site manager. Indicate that the installation is not to a satisfactory standard and that further training should be provided prior to continuing installation, with re-verification once addressed.
 - Where repairs can be reasonably achieved during the allotted time available for the inspection visit, then re-verification be conducted. Where this cannot be achieved; additional visits will be required.
-

The below diagram provides a sketch of typical repair requirements:



Following each inspection visit, the verifier will provide a verbal summary of their findings to the site manager and/or client.

It should be noted that on rare occasions, the BSL engineer carrying out the verification works may accidentally cause damage to the membrane during the verification visit by walking over the membrane. This typically occurs when the underside of the membrane has not been suitably cleared of debris prior to laying. Should this occur then a non-conformance will be recorded, and a repair will be required. BSL and the engineer in attendance shall not be held accountable for such damage unless it is proven to have been deliberate.

A time allowance should be made during the construction phase to address non-conformance highlighted during inspection. Incorrect installation may have an impact on timescales for concrete pours and subsequent follow on works, therefore good workmanship is essential to save on time and potential additional costs/delays.

If changes to the development design or installers method statement take place during construction, then these changes must be communicated to the verifier to ensure requirements continue to be met.

Gross non-conformance (e.g. inaccurate records or no records of installation whatsoever) may result in not achieving regulatory sign off, which may have significant financial implications.

Note that any form of abusive or threatening behaviour, deception, bribery or other corruptive activity towards BSL and its staff before, during or after verification activities will potentially result in our services being suspended with immediate effect and withdrawn where such activity has been shown to have occurred.

4.6 Post Verification

Once the installed membrane has been verified and all non-conformances addressed, it will be considered acceptable. Once acceptable the membrane should be protected from follow on trades as best as possible (e.g. placement of insulation over the membrane to avoid damage). Any damage to the

membrane after this will render the gas protection systems unsuitable and BSL should be advised immediately. Repair works and re-verification may be required in that instance.

It is not the Verifier or the Installers responsibility to ensure that all follow-on works are aware of the risk to damage to the gas protection systems present at the site.

The importance of the membrane will need to be communicated to all site personnel during the site induction. It is recommended that the Warning Notice provided in Appendix F is displayed in a number of clear locations to indicate the presence of the membrane and to avoid damage to this element.

We also strongly recommend that any follow-on trades responsible for preparing sub-base surfaces for gas protection systems are made aware of finishing requirements. Damage to the installed membrane can be minimised by providing toolbox talks given to follow on trades and by the use of sacrificial protection layers applied where traffic across the exposed membrane is necessary.

Note that if damage is caused to a gas protection system by follow on trades post verification and BSL observe this, then BSL reserves the right to retract any Verification Report until suitable repairs are completed and revalidated.

5.0 VERIFICATION REPORTING

5.1 Report contents

The final report is a concise document that relates to the history of the ground gas protection system installation process. The final report should contain:

-
- A description of the inspection regime.
 - A description of the elements of the ground gas protection system.
 - A presentation of the material specifications etc.
 - Dates of inspection, inspection staff present, weather conditions and the surrounding trades activity.
 - Specifics relating to the level of training, competency and accuracy of the installation team.
 - Installation photos.
 - Recognised defects and repairs.
 - Areas inspected along sectors and grid lines if appropriate.
 - Areas of limitation: areas unable to be inspected, identified and noted.
 - Records of CPD and any certifications that the verifier holds (staff competency).
-

The final verification report will need to be submitted to the regulators to obtain regulatory sign off for the works undertaken.

6.0 REFERENCES

BS 8576:2013 'Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOCs)'.

BS 8485:2015+A1:2019 'Code of practise for the design of protective systems for methane and carbon dioxide ground gases for new buildings' 2019.

Card & Steve Wilson in 'A pragmatic approach to ground gas risk assessment for the 21st Century'- CIRIA/Environmental Protection UK Ground gas seminar 2011.

CIRIA 149 'Protecting development from methane' 1995.

CIRIA 150 'Methane Investigation Strategies' 1995.

CIRIA 151 'Interpreting measurements of gas in the ground' 1995.

CIRIA 152 'Risk assessment for methane and other gases from the ground' 1995.

CIRIA 552 'Contaminated Land Risk Assessment – A guide to good practice' 2001.

CIRIA C665 'Assessing Risks Posed by Hazardous Ground Gases to Buildings' 2007.

CIRIA C735 'Good practice on the testing and verification of protection systems for buildings against hazardous ground gases' 2014.

CIRIA C748 'Guidance on the use of plastic membranes as VOC vapour barriers' 2014.

Wilson & Card 'Proposed method classifying gassing sites' Ground Engineering 1999.

YALPAG Technical Guidance for Developers, Landowners and Consultants, Verification Requirements for Gas Protection Systems. "JNJJN"

APPENDIX A

Gas Protection Systems Datasheets

Icopal Ltd

BMI House
2 Pitfield
Kiln Farm
Milton Keynes MK11 3LW

Tel: 01908 015760

e-mail: technical.uk@bmigroup.com

website: www.icopal.co.uk



Agrément Certificate

00/3668

Product Sheet 1

MONARFLEX GAS-RESISTANT MEMBRANES

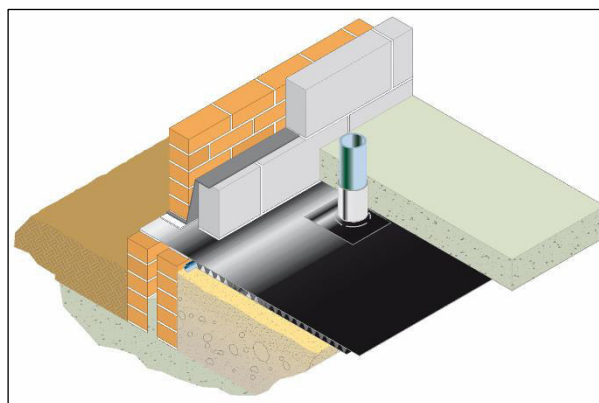
MONARFLEX REFLEX SUPER GAS-RESISTANT MEMBRANE

This Agrément Certificate Product Sheet⁽¹⁾ relates to Monarflex Reflex Super Gas-Resistant Membrane, for use above or below concrete ground floor slabs not subject to hydrostatic pressure, as a gas barrier and damp-proof membrane (dpm) to protect the building against moisture, radon, methane and carbon dioxide from the ground.

(1) Hereinafter referred to as 'Certificate'.

CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.



KEY FACTORS ASSESSED

Resistance to water and water vapour — the membrane provides an effective barrier to the passage of liquid water and water vapour from the ground (see section 6).

Resistance to underground gases — the membrane is capable of restricting the ingress of radon, methane and carbon dioxide into the building (see section 7).

Resistance to puncture — the membrane has a high resistance to puncture and on a smooth or blinded surface will not be damaged by foot or site traffic (see section 8).

Durability — under normal service conditions, the membrane will remain effective against the ingress of water and water vapour, and will restrict the ingress of radon, methane and carbon dioxide during the lifetime of the flooring construction in which it is installed (see section 12).



The BBA has awarded this Certificate to the company named above for the product described herein. This product has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of Sixth issue: 24 June 2020

Originally certificated on 18 February 2000

Hardy Giesler
Chief Executive Officer

The BBA is a UKAS accredited certification body – Number 113.

The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk
Readers MUST check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.

Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.

British Board of Agrément

Bucknalls Lane
Watford
Herts WD25 9BA

©2020

tel: 01923 665300
clientservices@bbacerts.co.uk
www.bbacerts.co.uk

Regulations

In the opinion of the BBA, Monarflex Reflex Super Gas-Resistant Membrane, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



The Building Regulations 2010 (England and Wales) (as amended)

Requirement:	C1(2)	Preparation of site and resistance to contaminants
Comment:		The product can contribute to a structure satisfying this Requirement. See section 7.1 of this Certificate.
Requirement:	C2(a)	Resistance to moisture
Comment:		When properly installed in a correctly designed structure, the product forms an effective barrier to the movement of water within the ground floor slab, enabling compliance with this Requirement. See sections 6.1 and 6.2 of this Certificate.
Regulation:	7(1)	Materials and workmanship
Comment:		The product is acceptable. See section 12.1 and the <i>Installation</i> part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)	Durability, workmanship and fitness of materials
Comment:		The use of the product satisfies the requirements of this Regulation. See section 12.1 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	3.1	Site preparation – harmful and dangerous substances
Standard:	3.2	Site preparation – protection from radon gas
Comment:		The product will enable a floor to satisfy the requirements of these Standards, with reference to clauses 3.1.2 ⁽¹⁾⁽²⁾ , 3.1.6 ⁽¹⁾⁽²⁾ , 3.1.7 ⁽¹⁾⁽²⁾ , 3.1.8 ⁽¹⁾⁽²⁾ and 3.2.2 ⁽¹⁾⁽²⁾ . See section 7.1 of this Certificate.
Standard:	3.4	Moisture from the ground
Comment:		When properly installed in a correctly designed structure, the product forms an effective barrier to the movement of water within the ground-floor slab, enabling compliance with clauses 3.4.2 ⁽¹⁾⁽²⁾ , 3.4.4 ⁽¹⁾⁽²⁾ and 3.4.6 ⁽¹⁾⁽²⁾ of this Standard. See sections 6.1 and 6.2 of this Certificate.
Standard:	7.1(a)	Statement of sustainability
Comment:		The product can contribute to meeting the relevant requirements of Regulation 9, Standards 1 to 6 and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard.
Regulation:	12	Building standards applicable to conversions
Comment:		All comments given for the product under Regulation 9, Standards 1 to 6 also apply to this Regulation, with reference to clause 0.12.1 ⁽¹⁾⁽²⁾ and Schedule 6 ⁽¹⁾⁽²⁾ .

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).



The Building Regulations (Northern Ireland) 2012 (as amended)

Regulation:	23(a)(i)	Fitness of materials and workmanship
Comment:	(iii)(b)(i)	The product is acceptable. See section 12.1 and the <i>Installation</i> part of this Certificate.

Regulation:	26(2)	Site preparation and resistance to contaminants
Comment:		The product can contribute to a structure satisfying the requirements of this Regulation. See section 7.1 of this Certificate.
Regulation:	28(a)	Resistance to moisture and weather
Comment:		When properly installed in a correctly designed structure, the product forms an effective barrier to the movement of water within the ground floor slab, enabling compliance with this Regulation. See sections 6.1 and 6.2 of this Certificate.

Construction (Design and Management) Regulations 2015

Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

See section: 1 *Description* (1.3) of this Certificate.

Additional Information

NHBC Standards 2020

In the opinion of the BBA, Monarflex Reflex Super Gas-Resistant Membrane, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Chapters 4.1 *Land quality – managing ground conditions* and 5.1 *Substructure and ground bearing floors*.

CE marking

The Certificate holder has taken the responsibility of CE marking the product in accordance with harmonised European Standard EN 13967 : 2012.

Technical Specification

1 Description

1.1 Monarflex Reflex Super Gas-Resistant Membrane is a gas barrier and dpm used to protect against moisture, radon, methane and carbon dioxide from the ground, comprising a composite six-layer polyethylene membrane encapsulating an aluminium foil and reinforcement grid. The membrane has a thickness of 0.4 mm (excluding the reinforcement grid) and total product thickness of 0.6 mm (including the reinforcement grid).

1.2 The top surface is sand-coloured and ribbed, while the underside is silver with a smooth finish.

1.3 The membrane is manufactured to the nominal characteristics of:

Total Product Thickness (mm)	0.6 (including reinforcement)
Effective thickness (mm)	0.4
Width (m)	2.05
Roll length (m)	25, 50
Roll weight (kg) ⁽¹⁾	23, 46
Mass per unit area (g·m ⁻²)	440
Tensile strength (N per 50 mm)	
MD	≥550
CD	≥550
Elongation (%)	
MD	≥15
CD	≥12
Nail tear resistance (N)	
MD	≥300

CD	≥300
Resistance to liquid water	Pass at 2 kPa
Joint strength (N per 50 mm)	
tape Monobond	≥50
welding	≥100.

(1) Pre-welded sheets are available to order.

1.4 Ancillary items for use with the product include:

- Monobond — a 70 mm wide, double-sided gas barrier sealant tape, for joining side and end overlaps
- MonarSeal MRX — a self-adhesive gas membrane for three-dimensional sealing and patching.

2 Manufacture

2.1 The product is manufactured by extrusion and lamination processes.

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

2.3 The management systems of the manufacturer have been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 by TÜV SUD Slovakia s.r.o. (Certificate Q 1243-3).

3 Delivery and site handling

3.1 Rolls and pre-welded sheets are wrapped in clear polythene film, marked with a label bearing the product name, width and length, and the Certificate holder's address and phone number. The BBA logo incorporating the number of this Certificate is printed on the wrapper.

3.2 Rolls must be stacked on a flat surface, kept under cover and protected from mechanical damage.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Monarflex Reflex Super Gas-Resistant Membrane.

Design Considerations

4 Use

4.1 Monarflex Reflex Super Gas-Resistant Membrane is satisfactory for use as a gas-resistant barrier to restrict the ingress of radon, methane and carbon dioxide into buildings from landfill and naturally occurring sources.

4.2 Buildings in areas of risk should be constructed in accordance with the recommendations of BRE Report BR 211 : 2015, and following the guidance set out in BS 8485 : 2015.

4.3 The product is also satisfactory for use as a dpm in accordance with CP 102 : 1973 Section 3, BS 8000-0 : 2014 and BS 8000-4 : 1989.

5 Practicability of installation

The product is designed to be installed by a competent general builder, or a contractor, experienced with this type of product.

6 Resistance to water vapour



6.1 The membrane, including joints, provides an effective barrier to the passage of moisture from the ground.

6.2 When installed in accordance with the following documents, the membrane will comply with the minimum sheet thickness detailed in the documents supporting the national Building Regulations.

6.3 The membrane is impervious to water and provides a waterproof layer capable of accepting minor structural movements without damage.

7 Resistance to underground gases



7.1 The product will restrict the ingress of radon, methane and carbon dioxide into buildings from landfill and naturally occurring sources, and satisfy the performance criteria for a gas-resistant membrane as defined in BS 8485 : 2015⁽¹⁾.

7.2 Measured methane gas permeability for the membrane is given in Table 1.

Table 1 Methane gas permeability

Gas	Method	Result
Methane	ISO 15105-1 : 2007	$\leq 0.12 \text{ ml}\cdot\text{m}^{-2}\cdot\text{day}^{-1}\cdot\text{atm}^{-1}$

(1) BS 8485 : 2015 requires that the methane gas transmission rate measured in accordance with ISO 15105-1 : 2007 for a gas resistant membrane is $< 40 \text{ ml}\cdot\text{m}^{-2}\cdot\text{day}^{-1}\cdot\text{atm}^{-1}$.

7.3 In the opinion of the BBA, the product satisfies the criteria for a radon gas-resistance membrane of BRE Report BR 211 : 2015.

8 Resistance to puncture

8.1 The membrane can be punctured by sharp objects, and care should be taken when handling building materials over the exposed surface.

8.2 Provided there are no sharp objects present on the membrane's surface prior to and during installation of the protective layer, the product will not be damaged by normal foot traffic.

9 Compatibility with other materials

The membrane contains an aluminium foil interply which may be subject to corrosion by alkaline conditions if damage to the membrane and exposure occurs. However, under normal circumstances, the polyethylene faces of the membrane are compatible with other materials and products typically used in the same areas, with the exception of those containing pitch.

10 Effects of temperature

The product can be installed in all normal site conditions down to -12°C . The membrane must be dry and free from ice during jointing operations.

11 Maintenance

As the product is confined under concrete and has suitable durability (see section 12), maintenance is not required. However, any damage occurring before enclosure must be repaired (see section 16).

12 Durability



12.1 The membrane will, in normal circumstances, remain effective against the ingress of water and water vapour, and will restrict the ingress of radon, methane and carbon dioxide during the lifetime of the building.

12.2 Long periods of exposure to ultraviolet light will reduce the effectiveness of the membrane.

13 Reuse and recyclability

The product comprises polyethylene, which can be recycled.

Installation

14 General

14.1 Monarflex Reflex Super Gas-Resistant Membrane must be installed and fixed in accordance with the Certificate holder's instructions, the relevant clauses of CP 102 : 1973 Section 3, BS 8000-0 : 2014 and BS 8000-4 : 1989.

14.2 Unless the base is smooth, a surface blinding of soft sand (or similar material) must be used to prevent puncturing during installation or when concrete screed is being placed.

14.3 If the membrane is installed below a steel-reinforced floor or concrete slab, it should be covered with a screed or protection boards prior to the positioning of the reinforcement.

14.4 If the membrane is above the slab, installation should be delayed until just before laying the screed or flooring top to avoid damage from site traffic.

15 Procedure

15.1 Monarflex Reflex Super Gas-Resistant Membrane must only be applied to surfaces that have a smooth finish, ie free from voids, projections and mortar deposits. Surfaces must also be dry and free from dust and frost.

15.2 Concrete surfaces must be dense. Vertical surfaces of brickwork and blockwork must be dry, and rendered to provide an even surface. Brickwork or blockwork not rendered must be pointed to give a smooth surface without sudden changes in level.

15.3 The product is rolled out, ensuring that it is properly aligned. All end and side overlaps must be a minimum of 150 mm, and prepared in accordance with the manufacturer's instructions.

15.4 The surface of the membrane to be lapped must be dry and dust-free. To ensure a watertight bond and gas-tight integrity, all laps and joints must be extrusion welded where possible. When using the specified 70 mm wide Monobond gas sealant tape, the joints must be firmly pressed down and well rolled.

15.5 All service penetrations and direction changes must be properly detailed. Service ducts must be vented to prevent the possibility of gas accumulating in confined spaces.

15.6 The product must extend over the footprint of the building, with a stepped damp-proof course separated with a mortar joint.

15.7 The product must be covered by a screed or other protective layer as soon as possible after installation. If blockwork protection is used, care must be taken to avoid damage to the product during construction.

15.8 The membrane installation should be subject to third-party independent validation, in accordance with the BS 8485 : 2015.

16 Repair

Any damage to the product must be repaired using a patch of the membrane welded in place or a patch of MonarSeal MRX self-adhesive gas membrane. All patches must extend a minimum of 150 mm from the damaged area. If required by the local authority, repair work must be confirmed by an independent validation report, as all gas membrane installations should be subject to third-party validation in accordance with BS 8485 : 2015.

Technical Investigations

17 Tests

17.1 An assessment was made of data to BS EN 13967 : 2012 in relation to:

- dimensions
- tensile strength and elongation
- nail tear resistance
- resistance to static loading
- impact resistance
- joint strength
- watertightness on controls and following heat ageing
- watertightness after exposure to chemicals
- bitumen compatibility.

17.2 Tests were carried out to determine:

- water vapour transmission and resistance
- resistance to chisel impact
- resistance to leakage
- tensile strength of joints on controls and after 28 days heat ageing at 60°C
- low temperature flexibility
- tensile strength and elongation on controls and after 28 days heat ageing at 60°C and 100 hours UVB exposure
- nail tear strength on controls and after 56 days heat ageing at 60°C
- dimensional stability

in order to assess:

- product characteristics
- durability of the product and joints.

18 Investigations

18.1 The manufacturing process was evaluated, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

18.2 An evaluation was made of data on the permeability of radon, methane and carbon dioxide in relation to the product.

18.3 A site visit was carried out to assess the practicability of installation.

Bibliography

BRE Report BR 211 : 2015 *Radon : Guidance on protective measures for new buildings*

BS 8000-0 : 2014 *Workmanship on construction sites — Introduction and general principles*

BS 8000-4 : 1989 *Workmanship on building sites — Code of practice for waterproofing*

BS 8485 : 2015 *Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings*

BS EN 13967 : 2012 + A1 : 2017 *Flexible sheets for waterproofing — Plastic and rubber damp proof sheets including plastic and rubber basement tanking sheet — Definitions*

BS EN ISO 9001 : 2015 *Quality management systems — Requirements*

CP 102 : 1973 *Code of practice for protection of buildings against water from the ground*

ISO 15105-1 : 2007 *Plastics — Film and sheeting — Determination of gas-transmission rate — Differential-pressure methods*

19 Conditions

19.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page – no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
- is valid only within the UK
- has to be read, considered and used as a whole document – it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English Law.

19.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

19.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

19.4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

19.5 In issuing this Certificate the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

19.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.

IKO HYLOAD GASTITE DPC

PRODUCT INFORMATION

IKO Hyload Gastite DPC is an SBS modified bitumen DPC system with a 50 micron aluminium core. This core gives greater material resistance to the passage of radon, carbon dioxide and methane. When used within a suitably designed ground gas system, it serves to resist gas migration into the cavity of the masonry wall construction.

The products primary area of use is within hazardous ground gas systems; however it can also be used within masonry walls to prevent passage of moisture from the ground and at all levels as cavity tray to prevent the downward movement of water.

As the product is sand surfaced, it achieves an excellent bond with mortar and can be used to provide protection under situations of minimal loading such as parapet walls, under throated coping stones and under brick-on edge detailing for both solid masonry and cavity wall construction.

Roll Width	Product Code
100mm - 1m	373*****



USE

IKO Hyload Gastite DPC is used as a horizontal, vertical or stepped damp proof coursing system and is also suitable for the on-site creation of cavity trays within masonry cavity wall construction.

It is primarily used within ground gas protection systems designed in accordance with the guidance of CIRIA C665 and NHBC Traffic Light system.

The product does not currently conform to the requirements of ground gas protection measures designed to BS8485:2015

FEATURES & BENEFITS

Gas Resistant – a 50 micron aluminium core gives an improved material resistance to gas permeation

Developed Components – as part of the IKO Hyload brand, the product has a full range of system components.

Excellent Mortar Bond – when installed in between fresh beds of mortar, the product displays excellent mortar adhesion and bond properties.

PERFORMANCE & COMPOSITION

Composition:	Modified Bitumen
Form:	Roll
Colour:	Black
General Dimension Data	
Nominal Thickness:	3mm
Weight:	3.44kg/m ²
Roll Length:	8m
Roll Width:	100mm – 1000mm
Performance Data	
Water tightness (EN 1928):	2kPa for 24 hrs
Reaction to Fire:	F
Water Vapour Resistance:	>5000 MNs/g
Tensile Strength at Break:	MD 450N/mm ² CD 450N/mm ²
Elongation at break:	MD 25% CD 50%
Tear Strength:	MD 180N CD 200N
Methane gas transmission	
Rate:	<0.14ml/m ² /24hrs
Low Temperature flexibility:	-15°C

INDEPENDENT ACCREDITATION



0086-CPD-537587

SPECIFICATION

NBS Clauses can be made available for Common Arrangement Work Sections:

F30 – Accessories/Sundry Items for Brick/Block/Stone Walling

All construction detailing and specification should conform to UK Building Regulations, relevant Codes of Practice, industry reports and British Standards.

In particular it is recommended that reference is made to the relevant parts of:

BS6398:1983 Specification for bitumen damp-proof courses for masonry

BS 8215:1991 Code of Practice for design and installation of damp-proof courses in masonry construction

BS 8000-3:2001 Workmanship on building sites. Code of Practice for masonry

BS EN 1996-1-1:2005+A1:2012 Eurocode 6: Design of masonry structures – Part 1-1: General rules for reinforced and unreinforced masonry structures

PD 6697:2010 Recommendations for the design of masonry structures to BS EN 1996-1-1 and BS EN 1996-2.

BRE Report 212 Construction of new buildings on gas-contaminated land

BRE Report 414 Protective measures for housing on gas-contaminated land

Where required by building warranty providers i.e. NHBC, LABC, etc. installers and those undertaking specifications should seek guidance from Technical Standards as issued by the provider in addition to the above.

If required, please consult with IKO Technical Services.

SYSTEM COMPONENTS

IKO have a range of essential system components, specifically tailored to facilitate the multiple uses of the IKO Gastite DPC system.

The following represents the system components available as part of that range:

IKO Hyload DPC Jointing Tape – a black, double-sided bituminous tape in 100mm x 10m rolls. Used for bonding overlaps in DPC material and DPC to IKO Hyload Pre-formed Cloak Units.

IKO Hyload DPC Joint Support Board – is a twin walled polypropylene reinforced support board, which can be bent to form the required profile. Employed directly under joints in the system, the board provides resistance when applying pressure during the joints creation.

IKO Hyload DPC Fixing Strip – is a 29mm wide x 2mm thick x 2m long corrosion resistant rigid plastic strip, used specifically to provide surface fixing solutions in cavity tray formation. Pre-drilled at set 150mm centres, the component is complemented by fixings pins specific to the substrates of masonry and insulation.

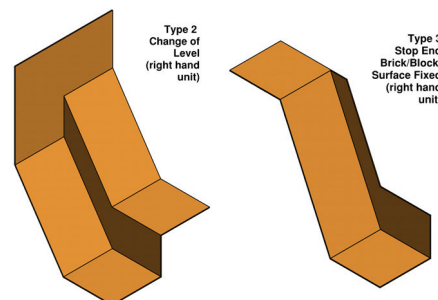
IKO Hyload DPC Fixing Pins For Masonry - used with IKO Hyload DPC Fixing Strip, IKO Hyload DPC Fixing Pins for masonry are corrosion resistant and can be used for surface fixing IKO Hyload high performance DPC systems to any solid internal substrate such as brick, stone and concrete. IKO Hyload DPC Fixing Pin bodies are made from moulded nylon and the drive pins are made from polycarbonate. Drill a clearance hole 6mm diameter by 45mm deep into substrate and when the drive pin is located, the barbed portion of the fixing pin body expands giving a secure grip and pull out resistance.

IKO Hyload DPC Fixing Pins For Insulation - used with IKO Hyload DPC Fixing Strip, IKO Hyload DPC Fixing Pins for insulation are corrosion resistant and can be used for surface fixing to the rigid insulation of composite inner skins. Using a tool such as a bradawl, a pilot hole should be formed prior to inserting the push fit pin. The fir tree portion securely locates into the rigid insulation.

IKO Hyload DPC Mastic - a thick synthetic rubber mastic adhesive with gap filling properties up to 6mm. Supplied in 2.5L tins or 400ml cartridges, IKO Hyload DPC Mastic is suitable for bonding surface-fixed IKO Hyload high performance DPC cavity trays and preformed cloak units to a wide range of common building materials such as block, concrete or metal.

IKO Hyload Pre-formed Cloak Units – covering all aspects of detailing from stop ends to complex and awkward interface detailing, pre-formed cloak units reduce on site detailing work to a rapid position and fix operation, whilst providing consistent quality of work throughout.

Ultrasonic welding technology allows the semi-rigid polymeric cloak material to be formed into a vast number of profiles and shapes.



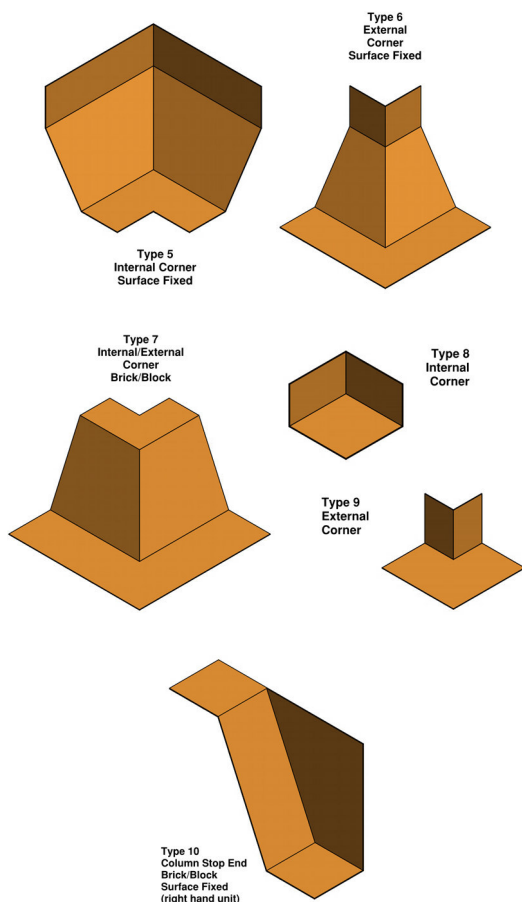


Figure 1 – Hyload Pre-formed Cloak Units

SITE STORAGE

GENERAL

DPC material and any product ancillary to the system should be stored in the dry, under cover, and protected against damage.

DPC rolls should be stored on their ends on a flat and stable surface, and stacking above 1m high should be avoided.

Materials should be kept away from direct sources of heat.

Check all labels on adhesives for any particular storage recommendations, and for any hazards relating to that specific product.

24 HOURS PRIOR TO WORK

DPC material should be checked to ensure that they conform to the project specification prior to removal from the main storage area, to avoid the risks of damage from undue handling.

Store a sufficient number of rolls of DPC and any adhesive tapes for the next day's use in a warm place prior to use. This will ensure the desired performance is achieved i.e. good flexibility and tape adhesion.

IMMEDIATELY PRIOR TO WORK

Storage of the product at the place of work should be no less satisfactory than that experienced within the main storage areas to prevent damage immediately before use i.e. flat, dry, clean and free from contaminants.

When being used around the work area, rolls should **not** be stacked irrespective of their size.

In periods of inclement weather, DPC materials and any components should be returned to the conditions of the main storage area as soon as practicable.

CONSTRUCTION

PRIOR TO COMMENCEMENT

For instances where installation of the DPC involves the use of gas torches to create sealed lap arrangements in line with the following sections, the work must always follow good, safe working practice.

Prior to commencing works, it is advisable to consult relevant Health and Safety Executive Guidance documents irrespective of levels of competence, to ensure all works are being planned and undertaken in a safe, pragmatic manner.

Torch applied materials should only be applied by those competent, conversant and capable of undertaking hot works safely, and that are experienced in the use of gas torches and procedures.

Care must be taken when using torch applied membranes in close proximity to combustible materials, decorative coatings and heat sensitive materials.

APPLICATION

The IKO Hyload DPC system, when correctly specified and installed provides a satisfactory horizontal, vertical or stepped damp proof coursing system and is also suitable for the on-site creation of cavity trays within masonry cavity wall construction.

LINEAR DAMP PROOF COURSES

IKO Hyload DPC systems are suitable for inclusion into solid single skin masonry walls or in instances which do not employ cavity trays i.e. separate horizontal DPC within each constituent masonry leaf.

When installing linear DPC, it is essential that:

- The DPC material is laid in continuous lengths as far as practicable. Instances where the DPC must be lapped, installation must achieve 100 mm overlap as a minimum with overlaps at angles i.e. corners, etc. achieving the full width of the receiving masonry leaf;
- The DPC width is equal to that of the masonry leaf into which it is being installed;
- The DPC **must** be sandwiched between even beds of wet mortar, receiving a further course of masonry units on mortar on the DPC. The weight of these immediate courses helps to develop good adhesion between the masonry units, the mortar and the DPC;

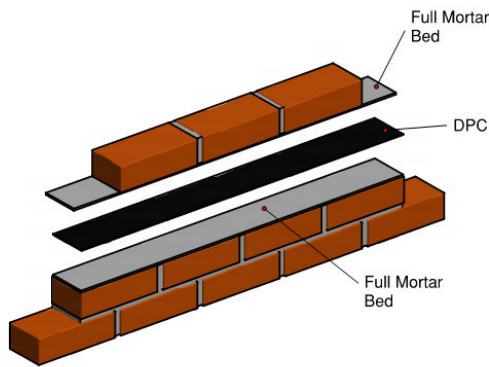


Figure 2 – Hyload DPC bedding

- The edge of the DPC remains visible through the completed mortar joint inclusive of pointing, finishes, etc. to a position which leaves it at least flush with the outer surface of the wall;
- In the construction of cavity walls where there are separate DPCs within each masonry leaf, the edge of the DPC must not project into the cavity as this can provide a place for debris to lodge and create a potential for moisture to bridge the cavity;
- Underneath coping stones or units that create an overhang to the wall surface below, the edge of the DPC should project no less than 5mm beyond the face of the wall surface (Figure 3);
- DPC under coping stones on cavity walls should be supported across any cavity using an appropriate support board, with all overlaps set at 100 mm and fully sealed in using Hyload DPC Jointing Tape;

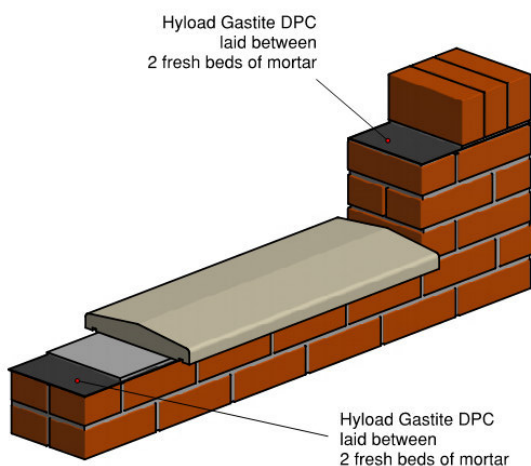


Figure 3 – Coping Stones and Brick-on-Edge Detailing

CAVITY TRAYS

When constructing cavity walls, bridges that create the opportunity for water to cross the cavity from the external masonry leaf to the inner leaf can occur. Typically such instances are found above window and door openings, above ducts and horizontal cavity barriers.

In these situations IKO Hyload DPC systems can be used to create cavity trays, which divert this water back to the external leaf and out through masonry via weep vents within the external leaf.

When installing cavity trays, it is essential that:

- They are created in continuous lengths, as far as practicable;
- All overlaps are 100 mm and **must** be fully sealed. Joints with pre-formed cloaks are completed by gently heating the contact surfaces of the DPC to disperse sand and adequately prepare for the application of IKO Hyload DPC Jointing Tape; overlaps occurring at joints within the DPC may also be gently heat bonded together without the use of Hyload DPC Jointing Tape.
- They are fully supported at joints with either IKO Hyload Joint Support Boards or IKO Hyload Pre-formed Cloak Units;

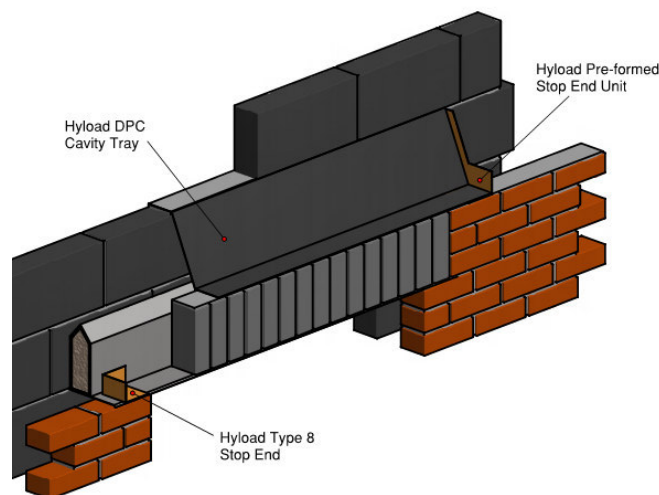


Figure 4 – Typical Hyload Cavity Tray above lintel position

- When they are intermittent or cover isolated areas of detailing i.e. lintels, ducts, etc. they cover the full extent of the obstruction within the cavity, extending not less than 150 mm beyond ends of bridged cavity positions and incorporate stop ends to create a defined termination;
- They are securely fixed to maintain their position and profile across the cavity, and step up towards the inner leaf a minimum of 150mm;
- The DPC passing through the respective masonry leaves **must** be sandwiched between even beds of wet mortar, receiving at least one further course of masonry units on mortar on the DPC. The weight of this immediate course helps to develop good adhesion between the masonry units, the mortar and the DPC;

- On the outer face of the outer masonry leaf, the edge of the DPC remains visible through the completed mortar joint inclusive of pointing, finishes, etc. to a position which leaves it at least flush with the outer surface of the wall.

GAS DETAILING

IKO Hyload Gastite DPC can be used as part of a fully sealed gas system to close cavities at their base and inhibit the movement of gas from the ground.

Gas detailing must follow the good practices highlighted by the relevant documents noted within the 'Specification' section of this document.

Linear DPC and cavity tray installation must follow the requirements indicated within the above sections.

General arrangement requires a horizontal portion of DPC across the cavity to create a physical barrier to migrating gas, which should then be linked with the chosen gas barrier within the main floor area.

This DPC **must be fully supported** by either rigid insulation, cavity lean mix or a suitable support board and **fully sealed** using the aforementioned techniques. Detailing at the base of the cavity is then concluded with a cavity tray to ensure water from the cavity above is not able to cross to the inner leaf.

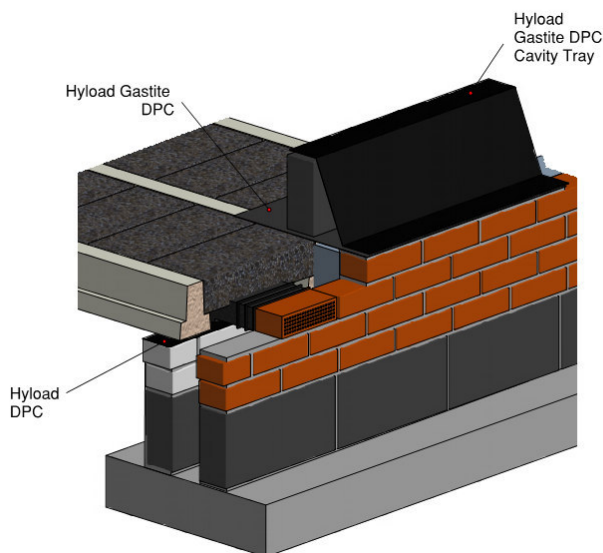


Figure 5 – Typical Arrangement of Hyload Gastite at a wall base

CLEANING

DURING INSTALLATION

During the process of installation, damp proof course materials can incur damage from careless cleaning operations.

Recommendations to prevent damage, particularly for cavity tray installations, are:

- To utilise cavity battens to prevent excessive amounts of mortar reaching the DPC;
- Remove mortar droppings before hardening occurs;
- To ensure that implements such as steel rods **are not** used for cleaning.

As the DPC system cannot be repaired once covered, it is strongly recommended that work is regularly inspected for damage and rectified prior to continuing works. In most instances, it is necessary to cut out the damaged sections and replace where necessary, utilising the aforementioned jointing materials and techniques.

AFTER INSTALLATION

Due to the concealed nature of DPC work, it is not necessary to conduct any special tasks for the aftercare of DPC after masonry is completed.

Any clean down operations conducted to the masonry itself should be done so in a manner which does not adversely affect the DPC material.

DURABILITY

When properly specified and installed, the system in normal circumstances, will remain effective for the lifetime of the building.

DISCLAIMER

Whilst every precaution is taken to ensure that the information given in this literature is correct and up to date it is not intended to form part of any contract or give rise to any collateral liability, which is hereby specifically excluded. IKO reserve the right to amend and/or withdraw this document without notice.

Intending purchasers of our materials should therefore verify with the company whether any changes in our specification, application details, withdrawals or otherwise have taken place since this literature was issued.

APPENDIX B

Drawings Detailing Gas Protection Systems

Column surround. Cut around pressed metal. Allow for timber and shaped ply former to retain cut edge

H11/110 Curtain Walling

Curtain Walling overlaps brick by 30mm

Aluminium Cill

F30/361 Single leaf DPC
min 150 above ground

60mm Kooltherm M10/290

F10/111 Brickwork below FFL

Proposed Air Tightness line

Silicone Sealant

P20/201 Cill Board

F30/361 DPC lapped and sealed to DPM

K10/185 Plasterboard on dabs

Uprand as per SE design

Aerofil M10/115

M10/290 Polythene slip membrane

Floor finish - Refer to finishes plan

M10/115 70mm Screed

M10/290 60mm Kooltherm

DPM J40/141 Gas membrane

Foundation to SE design

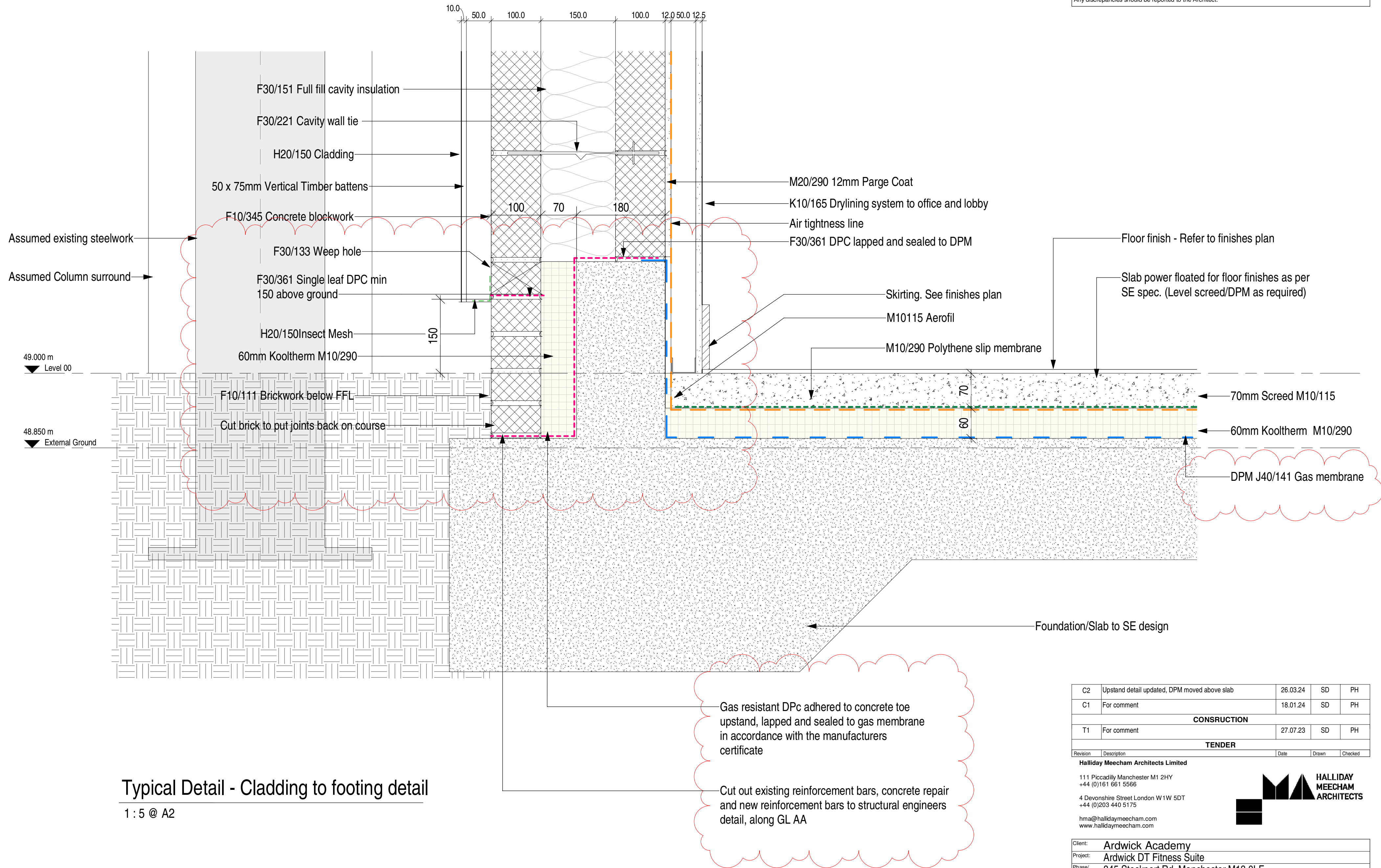
Gas resistant DPC adhered to concrete toe upstand, lapped and sealed to gas membrane in accordance with the manufacturers certificate

Cut brick to put joints back on course

Typical Detail - Curtain wall to footing

1 : 5 @ A3

C2	Updated ground level, DPM membrane	26.03.24	SD	PH
C1	For comment	18.01.23	SD	PH
CONSTRUCTION				
T1	For comment	27.07.23	SD	PH
TENDER				
Revision	Description	Date	Drawn	Checked
Halliday Meecham Architects Limited				
111 Piccadilly Manchester M1 2HY +44 (0)161 661 5566				
4 Devonshire Street London W1W 5DT +44 (0)203 440 5175				
hma@hallidaymeecham.com www.hallidaymeecham.com				
Client: Ardwick Academy				
Project: Ardwick DT Fitness Suite				
Phase/ Location: 345 Stockport Rd, Manchester M13 0LF				
Drawing: Typical Detail - Curtain Wall to footing				
Scale @ A3	Date: 07/03/23	Drawn: SD	Checked: PEH	Job No. 5627
Drawing Ref.	5627-HMA-DTA-XX-DR-A-21206			Revision C2



Typical Detail - Cladding to footing detail

1 : 5 @ A2

C2	Upstand detail updated, DPM moved above slab	26.03.24	SD	PH
C1	For comment	18.01.24	SD	PH
CONSTRUCTION				
T1	For comment	27.07.23	SD	PH
TENDER				
Revision	Description	Date	Drawn	Checked

Halliday Meecham Architects Limited

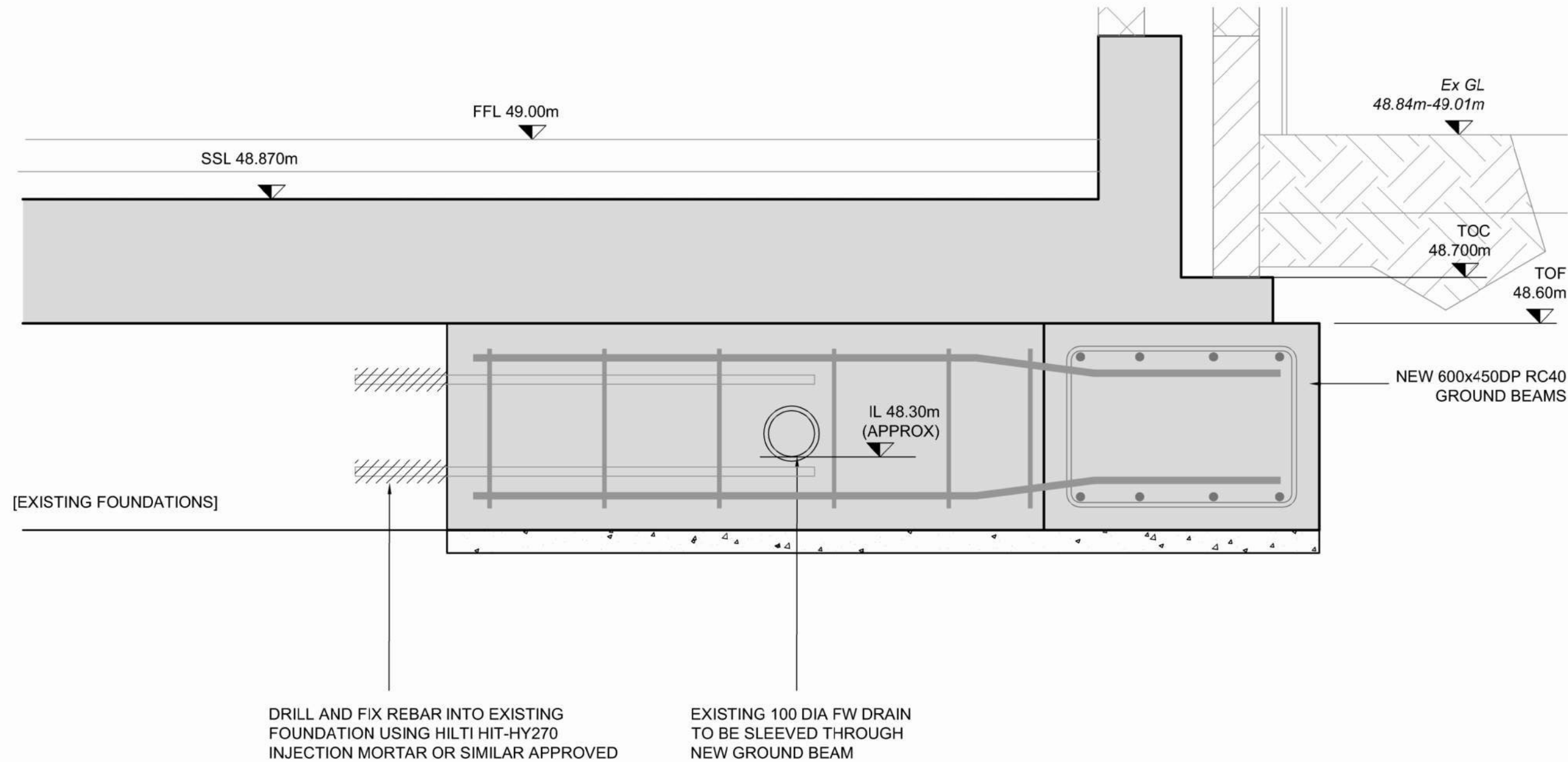
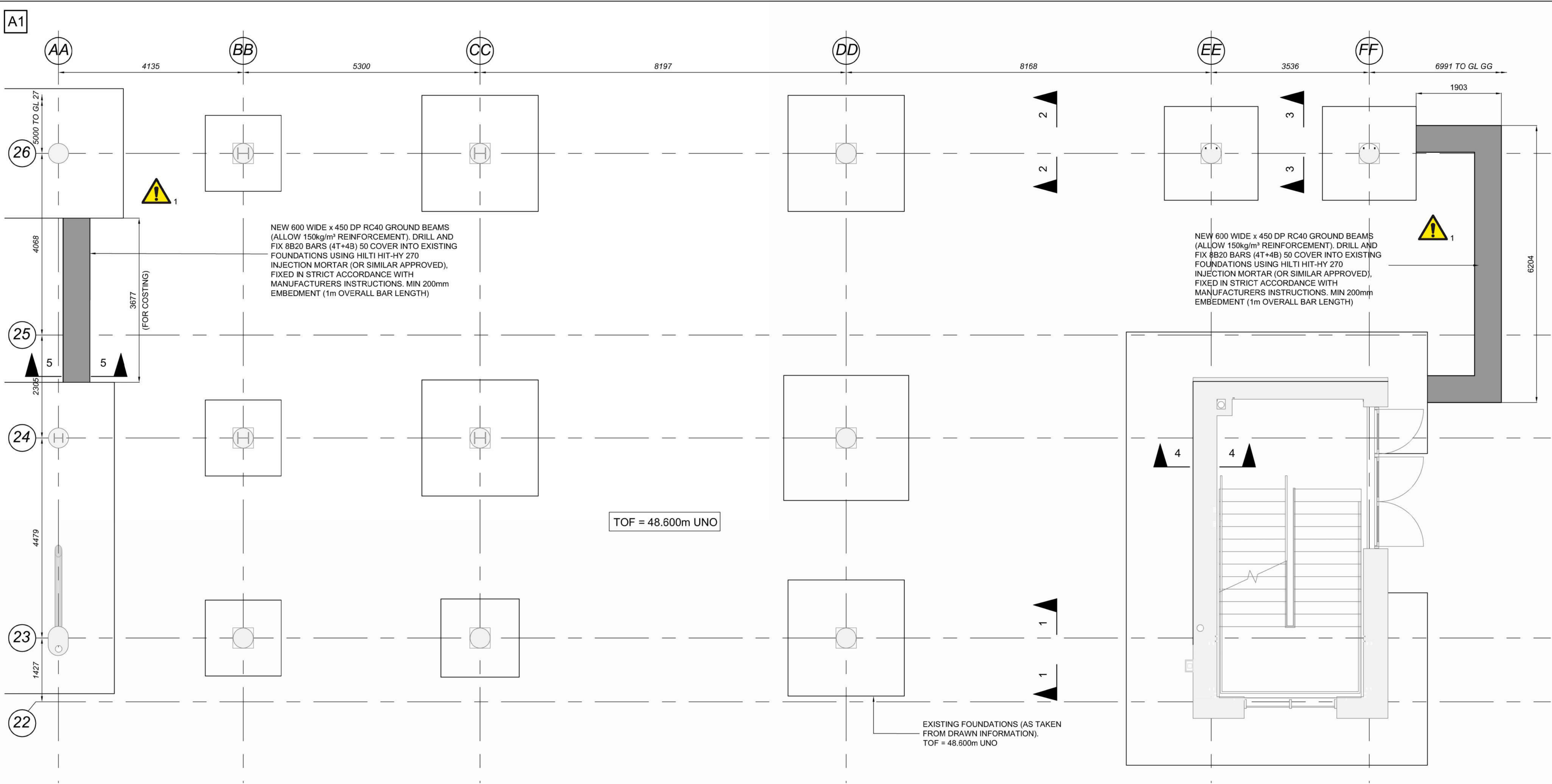
111 Piccadilly Manchester M1 2HY
+44 (0)161 661 5566

4 Devonshire Street London W1W 5DT
+44 (0)203 440 5175

hma@hallidaymeecham.com
www.hallidaymeecham.com



Client:	Ardwick Academy			
Project:	Ardwick DT Fitness Suite			
Phase/Location:	345 Stockport Rd, Manchester M13 0LF			
Drawing:	Typical Detail - Cladding to Footing			
Scale @ A2	Scale @ A3	Date: 07/03/23	Drawn: SD	Checked: PEH
		Job No: 5627	Drawing No: 21201	
Drawing Ref: 5627-HMA-DTA-XX-DR-A-21201				Revision C2



TYPICAL GROUND BEAM DETAIL
(SCALE 1:10)

CONCRETE NOTES

- ALL CONCRETE IS IN ACCORDANCE WITH NATIONAL STRUCTURAL CONCRETE SPECIFICATION (LATEST EDITION).
- DRAWINGS SHOULD BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND OTHER CONSULTANTS DRAWINGS, SPECIFICATIONS AND DESIGNERS RISK ASSESSMENTS.
- 50mm THICK BLINDING CONCRETE IS TO BE PLACED UNDER ALL REINFORCED CONCRETE IN CONTACT WITH THE GROUND.
- ALL CONCRETE MIX DESIGNS TO CONFORM TO BS8500-1:2015 AND -2:2015.
- POSITION OF CONSTRUCTION JOINTS AND SIZE OF BAY TO BE AGREED WITH THE STRUCTURAL ENGINEER PRIOR TO CONCRETING.
- REFER TO ARCHITECT'S DRAWINGS FOR ADDITIONAL REBATES, CHAMFERS AND CAST-IN ITEMS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT ALL ARE CAST AT THE TIME OF POURING.
- THE CHAIRS AND SPACERS TO BE PROVIDED IN ACCORDANCE WITH CONCRETE SOCIETY PUBLICATION "SPACERS FOR REINFORCED CONCRETE".
- FOR DETAILS OF BUILDERS WORK PENETRATIONS INTO AND SERVICE THROUGH THE STRUCTURE REFER TO ARCHITECT'S AND ENGINEERS' DRAWINGS. ANY ADDITIONAL PENETRATIONS MUST BE SUBMITTED TO M&G FOR REVIEW PRIOR TO ISSUE. ALL HOLES IN REINFORCED CONCRETE ARE TO BE FORMED U.N.O.
- HOLES / CHASES ETC OTHER THAN THOSE DETAILED ON THE STRUCTURAL DRAWINGS SHOULD NOT BE MADE WITHOUT THE APPROVAL OF THE ENGINEER.
- THE CONCRETE CONTRACTOR SHALL PROVIDE ADEQUATE METHODS OF CONTROLLING CURING.
- ANY WATERPROOFING REQUIRED TO BE INSTALLED AS SPECIFIED SPECIALIST DETAILS BY THE ARCHITECT IN ACCORDANCE WITH SPECIALIST DRAWINGS.
- NOMINAL CONCRETE COVER TO BE NOTED ON THE REINFORCEMENT DRAWINGS AND INCLUDES $\Delta C_{dev} = 10mm$.

- WHERE CONCRETE IS CAST DIRECTLY AGAINST NON-AGGRESSIVE SOIL, THE COVER TO REINFORCEMENT SHALL BE INCREASED A FURTHER 50mm.
- CONTRACTOR TO ENSURE THAT ALL OTHER WORKS ARE PROTECTED DURING CONCRETING WORKS.
- HAND SCABBLING OF CONCRETE IS NOT ALLOWED UNDER ANY CIRCUMSTANCES. CONTRACTOR TO ADOPT ALTERNATIVE (NON-VIBRATORY) METHODS FOR SURFACE ROUGHENING OF JOINTS PRIOR TO CASTING ADJACENT CONCRETE.

REINFORCEMENT NOTES:

- ALL REINFORCEMENT TO BE IN ACCORDANCE WITH BS4449: B - HIGH YIELD TYPE 2 DEFORMED BARS WITH STRESS OF 500N/mm².
- THE MINIMUM LAP LENGTHS TO BE AS FOLLOWS:
 - A193 MESH = 300mm
 - A252 MESH = 400mm
 - A393 MESH = 500mm
 - LAPS TO LOSE BAR REINFORCEMENT = 50xTHE SMALLER BAR
 - ALL MESH TO BE PROVIDED WITH FLYING ENDS TO ALLOW REINFORCEMENT LAP IN PLANE.
- WELDING OF REINFORCEMENT IS NOT PERMITTED WITHOUT PRIOR APPROVAL.

WORK IN PROGRESS (PRELIMINARY)
The information on this drawing is an optimised cost solution based upon external information as of the 27/07/23. It may be subject to change based upon external influences through design development such as client brief & scope changes, services / b.w.i.c, sub-contractor requirements etc. The information must therefore be used with a suitable contingent approach with respect to strategic decision making, cost management, N.I.A measurement etc.

NOTES

This drawing is copyright and owned by Marston and Grundy LLP, and is for use on this site only unless contractually stated otherwise.

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All other design team elements, where indicated, have been imported from the consultant's drawings and reference should be made to the individual consultant's drawings for exact setting out, size and type of component.

Discrepancies and / or ambiguities within this drawing, between it and information given elsewhere, must be reported immediately to the architect for clarification before proceeding.

All works are to be carried out in accordance with the latest British Standards and Codes of Practice unless specifically directed otherwise in the specification.

Responsibility for the reproduction of this drawing in paper form, or if issued in electronic format, lies with the recipient to check that all information has been replicated in full and is correct when compared to the original paper or electronic Graphical representations of equipment on this drawing have been co-ordinated, but are approximations Please refer to the Specifications and / or Details for actual sizes and / or specific contractor construction information.

This original document is issued for the purpose indicated below and contains information of confidential nature. Further copies and circulation will be strictly in accordance with the confidentiality agreement under the contract. This original must be destroyed or returned to the contractor.

DRAWING STATUS

S0 = Work In Progress S1 = Co-Ordination S2 = Information
S3 = Review / Comment S4 = Approval D1 = Costing D2 = Tender
D3 = Contractor Design D4 = Construction FC = Final Construction

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION
IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING:
CONSTRUCTION CONTRACTOR TO NOTE POTENTIAL FOR CONTAMINATED GROUND (ASSUMED) LOCATED BELOW EXISTING PILING MAT AND DEMARCATED WITH A GEOTEXTILE BARRIER - REFER TO GROUND INVESTIGATIONS AND SITE REMEDIATION REPORTS
MAINTENANCE / CLEANING NO ABNORMAL RESIDUAL RISKS.
DECOMMISSIONING / DEMOLITION NO ABNORMAL RESIDUAL RISKS.
IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT

NOTE: THE EXISTING STRUCTURAL INFORMATION / ARRANGEMENT SHOWN IS TAKEN FROM DRAWN FINAL CONSTRUCTION ISSUE / FABRICATION DRAWINGS. CONTRACTOR TO ALLOW VERIFYING KEY DIMENSIONS ON SITE PRIOR TO ORDERING MATERIALS AND HIGHLIGHT ANY DISCREPANCIES.

! CONTRACTOR TO ALLOW FOR WORKING IN POTENTIALLY CONTAMINATED GROUND (INCLUDING ASBESTOS). REFER TO SITE INVESTIGATION REPORTS AND TO BE ADDRESSED IN THE ASBESTOS MANAGEMENT PLAN.

P1	ISSUED FOR STAGE 4 TENDER	PJK	28.07.23	RAJ
Rev	Description	By	Date	Chkd
Marston & Grundy LLP Consulting Engineers Priory House, Ellesmere Ave Marple, Stockport, Cheshire, SK6 7AN Telephone: 0161 427 7231 Email: mail@marstonandgrundy.com				
Client	THE DEAN TRUST			
Project	FITNESS SUITE DEAN TRUST ACADEMY ARDWICK			
Drawing	FOUNDATION GENERAL ARRANGEMENT			
Purpose of Issue	PRELIMINARY		Status	D2
Project No.	13743	Scale @ A1	1:50	JUL '23
Drawing Identifier	project	origin	zone	level
DTA-MaG-ZZ-FN-DR-S-001				
Revision	P1			

APPENDIX C

Installer Risk Assessment and Method Statements

APPENDIX D

BSL Verification Staff Competence Records

Experience and Qualifications of Verifiers of Ground Gas Protection Systems

Brownfield Solutions Ltd hold ISO9001 and 14001 accreditations for our IMS. We are registered members of the CHAS Health and Safety accreditation scheme, members of the Association of Geotechnical and Geo-Environmental Specialists (AGS) and are registered and validated by Achilles.

Aaron Stokoe

Qualifications:

BSc (Hons) (Geology) CSci MEnvSc FGS
Chartered Scientist (2018)

Professional Bodies:

Member of the Institute of Environmental Science (IES)
Fellow of the Geological Society (FGS)

Relevant CPD Training and Experience Summary:

Valid and in date CSCS Card held (scan available on request)
GGs Two Day A-Z of Ground Gas Protection June 2016
CL:AIRE Webinar "An Introduction to the Verification of Ground Gas Protection Measures"
Visqueen CPD Seminar 1: Gas Protection - Protecting against gas on contaminated land 28 March 2019
LQM Technical Briefing Webinar (Ground Gases) "Correct Application of BS8485 to Characterise Gas Risk" 3 May 2019
Proctor Group Webinar "Protection of Buildings on Brownfield Sites" 18 February 2020
Environmental Analyst Webinar "Mine Gas Risk Assessment: Best Practice" 2 April 2020
Property Care Association (PCA) Webinar "Verification of Ground Gas Protection Systems" 23 July 2020.
Property Care Association (PCA) Webinar "Controlling Ground Gases & Water – How to get Synergy" watched 12 January 2021
SoBRA – Ground Gas September 2021
SoBRA – Vapour Risk October 2021
Atlas Copco Compressors "Introduction to Compressed Air" 8 January 2021 (compressor for air lance)
British Compressed Air Society "Working Safely with Compressed Air" January 2021 (compressor for air lance)
GGs Webinar Verification of ground gas protection – How to do it well May 2023.

Chartered Scientist with over 13 years' experience in ground investigation, characterisation of ground gas regimes, recommendations for ground gas protection systems and verification of installed systems.

Dan Gates

Qualifications:

MGeoscience (Geology) FGS

Professional Bodies:

Fellow of the Geological Society (FGS)

Relevant CPD Training and Experience Summary:

Valid and in date CSCS Card held (scan available on request)
GGs Two Day A-Z of Ground Gas Protection 18 October 2017
Visqueen CPD Seminar 1: Gas Protection - Protecting against gas on contaminated land 28 March 2019
Atlas Copco Compressors "Introduction to Compressed Air" 8 January 2021 (compressor for air lance)

British Compressed Air Society "Working Safely with Compressed Air" January 2021 (compressor for air lance).

Senior project engineer with circa 11 years' experience in ground investigation, characterisation of ground gas regimes, recommendations for ground gas protection systems and verification of installed systems.

Jack Mather

Qualifications:

BSc (Hons) FGS (Geology)

Professional Bodies:

Fellow of the Geological Society (FGS)

Relevant CPD Training and Experience Summary:

Valid and in date CSCS Card held (scan available on request)

Visqueen CPD Seminar 1: Gas Protection - Protecting against gas on contaminated land 28 March 2019

Neil Salvidge TD&A Ltd "Ground Gas Protection installation covering basic membrane installation methods of heat fusing, detailing, and implementation of Verification in accordance with CIRIA C735" 29 January 2020 (Full day Course)

Proctor Group CPD Webinar: Ground Gas Protection 16 October 2020

CL:AIRE CPD Webinar: Verification of Gas Protection Systems 16 October 2020

Property Care Association CPD Webinar: Verification of Ground Gas Protection Systems 16 October 2020

Project engineer with over 5 years' experience in ground investigation, characterisation of ground gas regimes, recommendations for ground gas protection systems and verification of installed systems.

Tim Mayall

Qualifications:

MGeol (Hons) (Geology) FGS

Professional Bodies:

Fellow of the Geological Society (FGS)

Relevant CPD Training and Experience Summary:

Valid and in date CSCS Card held (scan available on request)

Visqueen CPD Seminar 1: Gas Protection - Protecting against gas on contaminated land 28 March 2019

Neil Salvidge TD&A Ltd "Ground Gas Protection installation covering basic membrane installation methods of heat fusing, detailing, and implementation of Verification in accordance with CIRIA C735" 29 January 2020 (Full day)

Environmental Analyst Webinar "Mine Gas Risk Assessment: Best Practice" 2 April 2020

Atlas Copco Compressors "Introduction to Compressed Air" 8 January 2021 (compressor for air lance)

British Compressed Air Society "Working Safely with Compressed Air" January 2021 (compressor for air lance)

Project engineer with over 5 years' experience in ground investigation, characterisation of ground gas regimes, recommendations for ground gas protection systems and verification of installed systems.

Nicola Swallow

Qualifications:

BSc (Hons) (Environmental Science) MSc MEnvSc

Professional Bodies:

Member of the Institute of Environmental Science (IES)

Relevant CPD Training and Experience Summary:

Valid and in date CSCS Card held (scan available on request)

Visqueen CPD Seminar 1: Gas Protection - Protecting against gas on contaminated land 28 March 2019

Senior Project engineer with over 10 years' experience in ground investigation, characterisation of ground gas regimes, recommendations for ground gas protection systems and verification of installed systems.

Tim Wilson

Relevant CPD Training and Experience Summary:

Valid and in date CSCS Card held (scan available on request)

Neil Salvidge TD&A Ltd "Ground Gas Protection installation covering basic membrane installation methods of heat fusing, detailing, and implementation of Verification in accordance with CIRIA C735" 25 January 2022 (Full day Course)

Senior Geo-Environmental Technician with over 20 years' experience in the construction industry trade.

Will Griffiths

Qualifications:

BSc (Hons) CEnv MEnvSc

Professional Bodies:

Member of the Institute of Environmental Science (IES)

Relevant CPD Training and Experience Summary:

Neil Salvidge TD&A Ltd "Ground Gas Protection installation covering basic membrane installation methods of heat fusing, detailing, and implementation of Verification in accordance with CIRIA C735" 22 June 2022 (Half day Course).

Neil Salvidge TD&A Ltd – Air Lance Integrity Testing including set up and demonstration

Associate Director with 15 years experience in ground investigation, characterisation of ground gas regimes, risk assessment, recommendations for ground gas protection systems and verification of installed systems.

Jake Wheaton

Qualifications:

BSc (Hons) FGS (Geology)

Professional Bodies:

Fellow of the Geological Society (FGS)

Relevant CPD Training and Experience Summary:

Valid and in date CSCS Card held (scan available on request)

Neil Salvidge TD&A Ltd "Ground Gas Protection installation covering basic membrane installation methods of heat fusing, detailing, and implementation of Verification in accordance with CIRIA C735" 22 June 2022 (Half day Course)

Senior project engineer with circa 7 years' experience in ground investigation, characterisation of ground gas regimes, recommendations for ground gas protection systems and verification of installed systems.

Amy Thornes

Qualifications:

BSc (Hons)(Geology) MSc (Geotechnical Engineering) FGS

Professional Bodies:

Fellow of the Geological Society (FGS)

Relevant CPD Training and Experience Summary:

Valid and in date CSCS Card held (scan available on request)

Neil Salvidge TD&A Ltd "Ground Gas Protection installation covering basic membrane installation methods of heat fusing, detailing, and implementation of Verification in accordance with CIRIA C735" 22 June 2022 (Half day Course)

Project engineer with circa 4 years' experience in ground investigation, characterisation of ground gas regimes, recommendations for ground gas protection systems and verification of installed systems.

Henry Dunlop

Relevant CPD Training and Experience Summary:

Valid and in date CSCS Card held (scan available on request)

Neil Salvidge TD&A Ltd "Ground Gas Protection installation covering basic membrane installation methods of heat fusing, detailing, and implementation of Verification in accordance with CIRIA C735" 22 June 2022 (Half day Course)

Geo-Environmental Technician with circa 1 years' experience in the construction industry trade.

APPENDIX E

Inspection Pro-Forma

Verification of Ground Gas Protection Systems



Job No:

Client:

Site Name:

Plot/Area Number (s):

Weather:

Verifier/Inspector (s):

Drawing Refs:

Structure Type:

Floor Slab Type:

Gas protection Type:

Installer and competency (e.g. NVQ)

Passive Venting Measures	✓/✖	Inspection Date (s)	Photos:	
Void Former				
Void Height				
Gravel Type				
External Wall Air Bricks				
Internal Sleeper Wall Vents				
External Vent Trench/Duct				

Gas Barrier/Membrane	✓/✖	Inspection Date (s)	Photo	
Underside of membrane				
Membrane Type				
Extent of Coverage				
Slab/membrane condition				
Jointing tape product				
Laps, joints, welds and seals				
Damp-proof course				
Service entries and seals				
Cavity inspection				

This plot/area

REQUIRES FURTHER INSPECTION

Where the above inspection indicates a Pass, construction worksn for that plot/area may proceed, subject to suitable protection measures of the membrane being applied in accordance with the manufacturer’s recommendations.

Compiled by:

Insert Signature here

Print Name (overwrite here)

Checked By:

Insert Signature here

Print Name (overwrite here)

Gas Protection Measures Inspection Checklist

Sub-floor void	Is a check possible? Void former? Gravel (type/specification)? Height of void space? Is it clear?
External wall airbricks	Numbers, size, positions as design drawing?
Internal sleeper walls	Ventilation holes (honeycomb brickwork/pipe crossings?) – size, spacing, location in accordance with design?
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 structure?
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.
Gas membrane type	Manufacturer and product specification, gauge, colour, brand/name, material batch/roll numbers, storage arrangements (protected from dirt/damage?)
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 gas membrane?
Joining tape product	Product type, brand, thickness, material, width, colour? Use of double sided tape?
Lapping design	Joints lapped and sealed in accordance with manufacturer's requirements/ specification? Minimum overlap? Sections taped twice?
Laps and joints sealed	Welds complete? Appropriate joining/double sided tape used?
Service entries sealed	Top hats seal arrangements fixed around service entries? Use of Jubilee clips?
Cavity Inspection	Confirm that the cavity is not blocked with debris, check that there are no rips in the membrane across the cavity and the jointing detail (if present) is fully sealed.

APPENDIX F

Warning Label

CAUTION

THE MEMBRANE YOU WILL ENCOUNTER ACROSS THIS SITE IS NOT JUST A DPM. THIS MEMBRANE IS A **GAS BARRIER!!**

IT HAS BEEN PURPOSEFULLY SELECTED TO PROTECT THE FUTURE OCCUPANTS OF THIS BUILDING.

PLEASE BE CAREFUL NOT TO **DAMAGE**.
ALTHOUGH IT CAN BE REPAIRED AND PATCHED, UNREPORTED
DAMAGE AND CUTS CAN RENDER THE MEMBRANE **USELESS**.

THE GROUND CONDITIONS BENEATH YOUR FEET ON THIS SITE HAVE THE POTENTIAL TO PRODUCE ASPHYXIAN OR EXPLOSIVE GASES. THESE PRESENT NO RISK IN YOUR DAILY TASKS BUT CAN ACCUMULATE IN A CLOSED BUILDING OVER TIME. THE GAS BARRIER IS VITAL FOR THE HEALTH AND WELLBEING OF THOSE WHO OCCUPY THIS BUILDING.



North West

**William Smith House
173 – 183 Witton Street
Northwich
Cheshire
CW9 5LP**

Tel: 01606 334 844

Midlands

**Unit 5, Alfred Court
Saxon Business Park
Stoke Prior
Bromsgrove
Worcestershire
B60 4AD**

Tel: 01215 729 014

www.brownfield-solutions.com

