

Date: 15th August 2025
Reference: 12-969-V2

GAS MEMBRANE VALIDATION – DRAW WELL ROAD

Project Name:	Draw Well Road, Knowsley
Project Number:	12-969
Client:	Acornfield Properties Ltd
Date:	14-08-2025
Project Manager & Qualifications:	R. Horseman
E3P Engineer & Qualifications:	J. Newall
Gas Membrane Installers Name & Qualifications:	Hydro WMS
Ground Gas Risk Assessment	CS2
Plots:	Unit 1

The gas mitigation measures validation site inspection record and associated photographs are enclosed within this letter as a Controlled Quality Assurance (CQA) site data capture record.

FINAL QUALITY ASSURANCE

E3P SITE VALIDATION CQA	QUALIFICATIONS	POSITION
Joe Newall	CL:AIRE Course – Verification of Gas Protection Measures	Technician

PREPARED BY	QUALIFICATIONS	POSITION
Harriet Mason	BSc (Hons), FGS	Project Manager

AUTHORISED BY	QUALIFICATIONS	POSITION
Rob Horseman	BSc (Hons), MEnvSci, CEnv	Associate Director

Table 1 Validation Letter References

PLOT NUMBER	DATE	REPORT REFERENCE
Unit 2 and 3	06-07/ 08-2025	V1
Unit 1	14-08-2025	V2





GROUND GAS MITIGATION DESIGN

The Ground Gas Risk Assessment for the site determined that site should be classified as Characteristic Situation 2 in accordance with BS8485 2015 (+A1 2019). In this instance, the proposed development is classified as a Type C Building (offices) and Type D Warehousing.

Based on the ground gas risk assessment and the proposed Type C / D Building, it is envisaged that a point score of 2.5 will be required for the office sector and 1.5 for the main warehouse building, as per the below.

- ✚ Cast In-Situ Monolithic Reinforced Ground-Bearing slab– 1.5 points
- ✚ Specialist Membrane installed and validated in accordance with C735 – 2.0 points

OVERVIEW OF GROUND GAS MITIGATION DESIGN & CONSTRUCTION REQUIREMENTS

Characteristic Situation 2 – Design Mitigation Requirements.

- ✚ Cast In-Situ Monolithic Reinforced Ground-Bearing Raft or Reinforced Cast In-Situ Suspended Floor Slab With Minimal Penetrations.
- ✚ Lapped and taped / sealed gas resistant membrane in the floor slab construction which meets all the criteria as set out in Table 7 of BS8485:2015 (+A1 2019) and Verification in Section 3.2.2 of CIRIA 735³³

Figure 1 Industrial Unit Ground Bearing Slab – Typical Detail

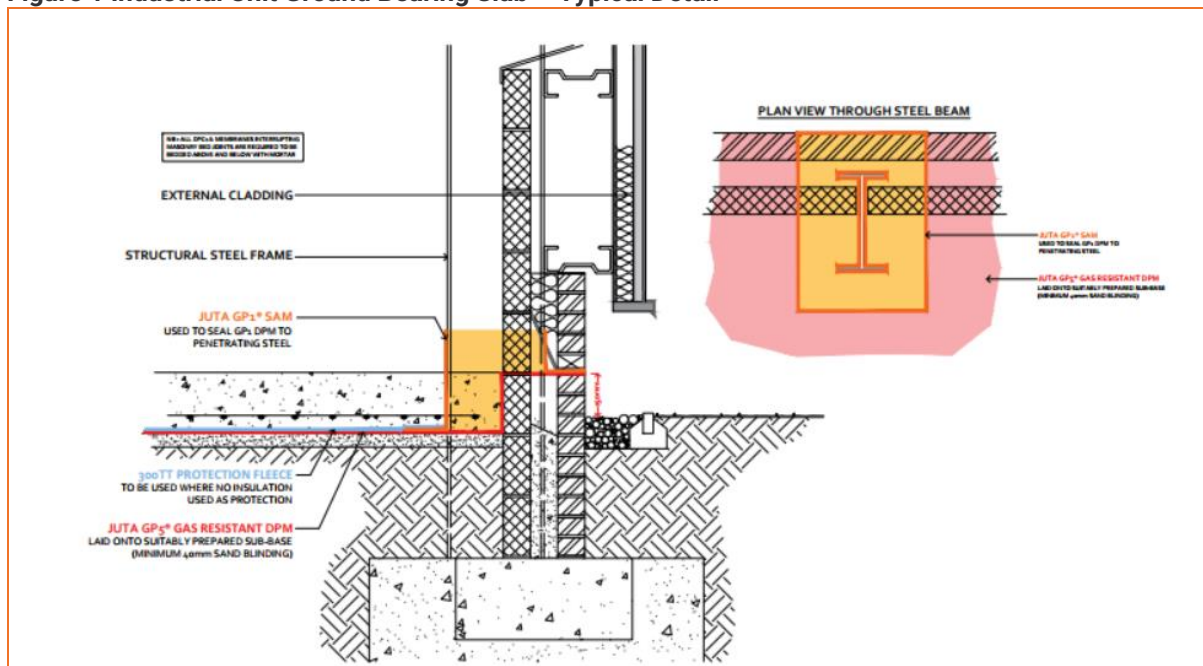




Figure 2 Structural Engineers Substructure Design – Party Wall

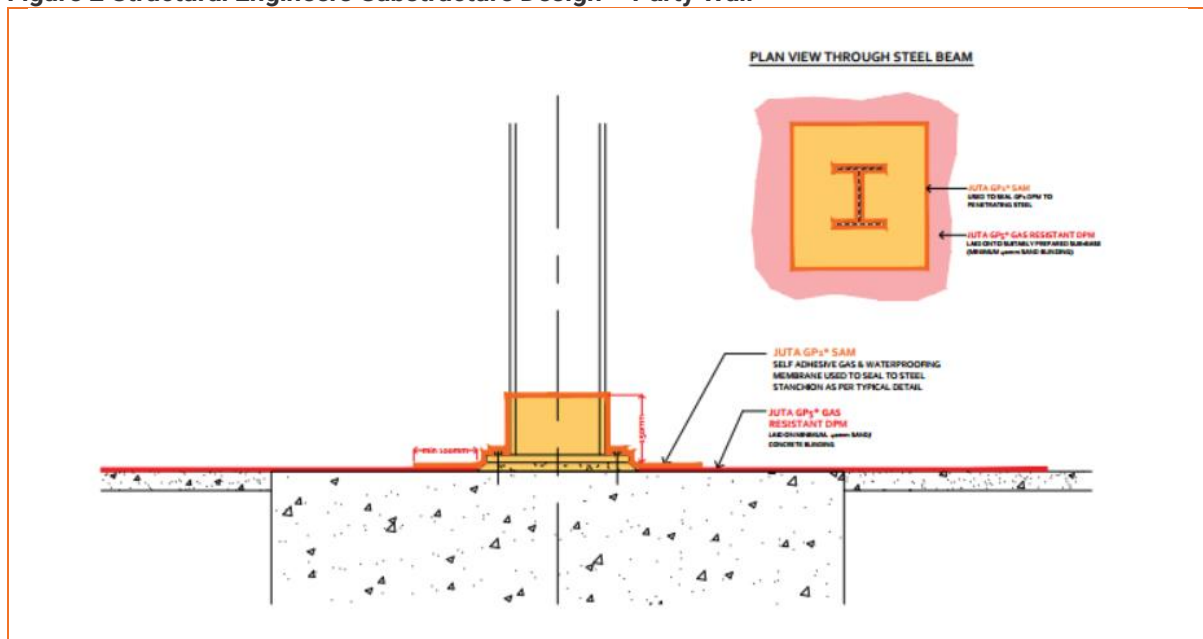
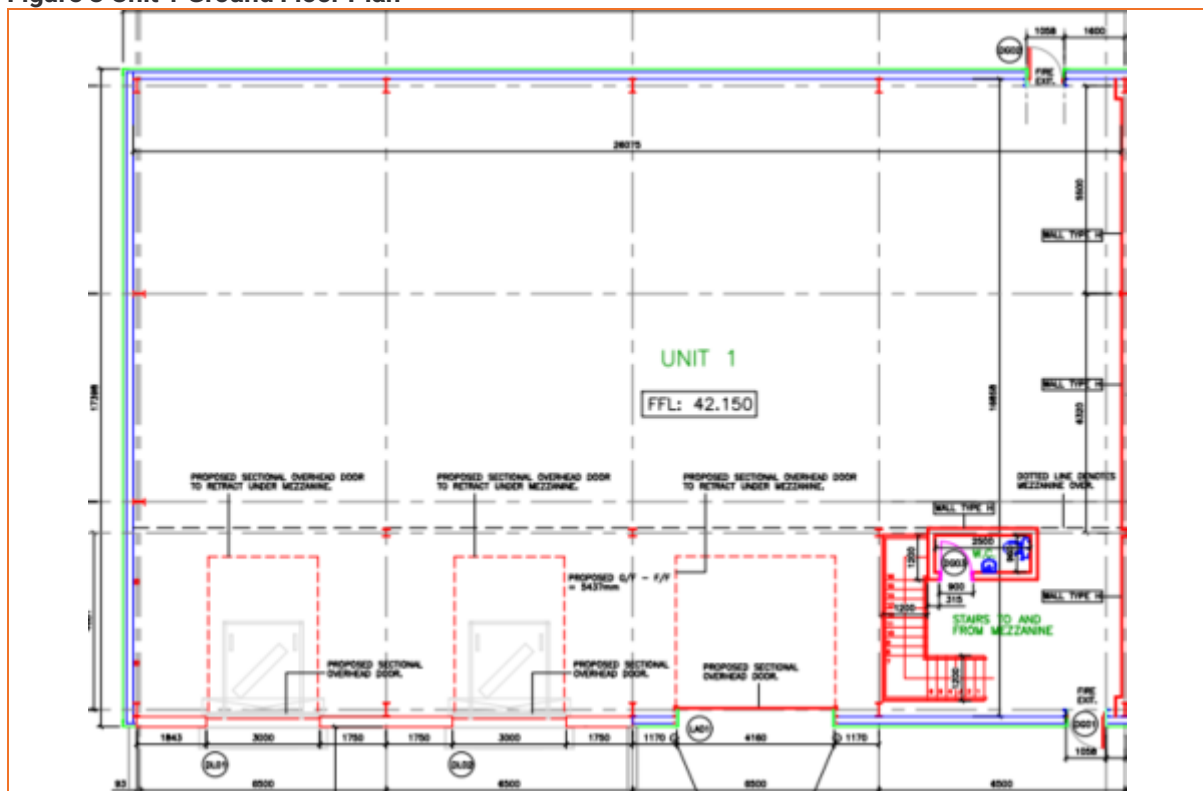


Figure 3 Unit 1 Ground Floor Plan





SUMMARY OF VALIDATION INSPECTION & APPROVAL

GAS RESISTANT MEMBRANE

The membrane utilised on-site comprises: Juta GP5 resistant to Carbon Dioxide, Methane and Radon

It has been confirmed as part of the validation that the membrane utilised in the units (office areas) discussed herein matches that of **Figure 1-2**.

The E3P Technician has inspected the installation of this membrane in line with the specifications in terms of placement and position (**Figure 1-2**), and the manufacturer's detail in terms of the workmanship. **Figure 3** illustrates the ground floor layout for the unit numbers validated within this letter.

E3P can confirm that sand blinding has been utilised to protect the membrane and there were no holes or rips at the inspection time.

Where any rips or tares have been noted patches have been applied in line with the manufacturer's detail with sufficient overlap to ensure long-term performance of the membrane.

E3P inspected all joints including corner details, and can confirm that the membrane was overlapped in accordance with the manufacturer specification and heat welded

Where any penetration or service duct is present within the floor area E3P inspected each one in turn and can confirm that rigid black polyethylene top hat units have been adequately sealed against the membrane with double-sided jointing tape at both the base and the protruding pipe as well as being secured against the pipe with a metal jubilee clip.

Based on the information provided within this report, the site inspection and validation checklists, E3P can confirm that Unit 1 has been installed with gas protection measures in accordance with the detailed structural design and the requirements of BS8485 Characteristic Situation 2 to an acceptable level of workmanship.

E3P ENGINEER'S SITE CHECK SHEET

The engineer check sheet completed whilst on-site during the validation on a plot-by-plot basis is attached, and a complete set of images is presented as evidence. Larger images are presented at the rear of this section.

All information provided within this validation letter report was accurate at the time of construction. E3P operates under the assumption that all data provided by installers is reliable.



WELDED GAS MEMBRANE VALIDATION

Complete

Score	12 / 12 (100%)	Flagged items	0	Actions	0
Site Name	Draw well road				
Location	11 Draw Well Road Liverpool England L33 7BJ United Kingdom (53.48101978560526, - 2.8506907547304987)				
Project Manager	RH				
Project number	12969				
Developer	Acornfields				
Site representative Signature	 14 Aug 2025 8:18 AM BST				
Conducted on	14 Aug 2025 8:11 AM BST				
Prepared by	Joe Newall				
Have you got the correct Gas Membrane detail (attached to the job in synergist)?	Yes				



Gas Membrane Inspection	11 / 11 (100%)
Plot Inspection	11 / 11 (100%)
Plot Inspection 1	11 / 11 (100%)
Plot Number	Unit 1
Type of Development: if other add Note	Commercial
Floor Slab Type	Raft
Are telescopic vents present?	N/A
Gas Membrane Type: Manufacturer, gauge, and colour. (Take photos where possible showing Label)	GP5 Juta
Installer's name, company and qualification	Hydrowms
Gas Membrane Condition: Open punctures, tears, rips, stretching, Presence of debris, Repairs, Signs of weakness such as raised or sunken indentations, Protection plan in place to restrict access to gas membrane? IF FAIL DESCRIPTION IN ACTIONS AND PHOTOS REQUIRED	Pass
 Photo 1  Photo 2  Photo 3  Photo 4  Photo 5  Photo 6	
Are welds complete?	Yes
 Photo 7  Photo 8  Photo 9	
Are Joints lapped and sealed in accordance with manufacturer's requirements/ specification?	Yes
 Photo 10  Photo 11	



Service entries seals: Top hats seal arrangements fixed around service entries? Use of Jubilee clips or Bitumastic Sealant

Pass



Photo 12



Photo 13



Photo 14



Photo 15



Photo 16

Corners / Internal joints: Check all corners are correctly formed or contractor has used preformed corners.

Pass



Photo 17



Photo 18



Photo 19



Photo 20



Photo 21



Photo 22



Photo 23



Photo 24



Photo 25

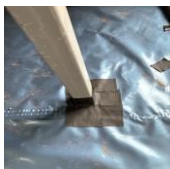


Photo 26



Photo 27



Photo 28

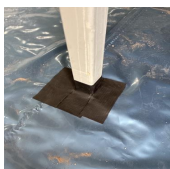


Photo 29



Photo 30



Photo 31



Photo 32

Are folds running in line with joints? (no joints cutting across folds)

Pass



Photo 33



Photo 34

Extent of Coverage: Is the membrane covering the entire plot? Does membrane span over outside walls?

Yes



Photo 35



Photo 36



Photo 37



Photo 38

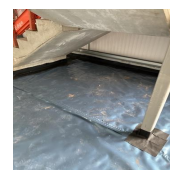


Photo 39



Photo 40



Photo 41



Photo 42

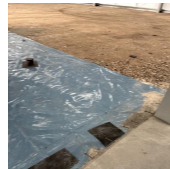


Photo 43



Photo 44



Photo 45

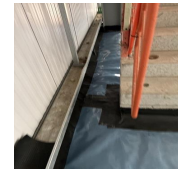


Photo 46



Photo 47

Sealant to the underside of the membrane at the sole plate position (Check with PM if not noted on schedule)	N/A
Condition of sub-grade and underside of gas membrane: Check that the subgrade 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. (Lift back the membrane and photo the subfloor)	Pass
Slab / membrane condition (is membrane clear of snow, standing water, debris or insulation): Can membrane be fully seen and photographed – ask contractor to remove any debris so membrane can be fully seen an inspected – this is a requirement of NHBC and local authorities.	Pass
External Wall Air bricks: Numbers, size. positions as design drawing? (Minimum of 3 walls)	N/A
Passive Venting	
Sub-floor Void: Is a check possible on future plots (insert Plot number or NO in text box)	NO



Media summary



Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6



Photo 7



Photo 8



Photo 9



Photo 10



Photo 11



Photo 12



Photo 13



Photo 14



Photo 15



Photo 16



Photo 17



Photo 18



Photo 19



Photo 20



Photo 21



Photo 22



Photo 23



Photo 24



Photo 25

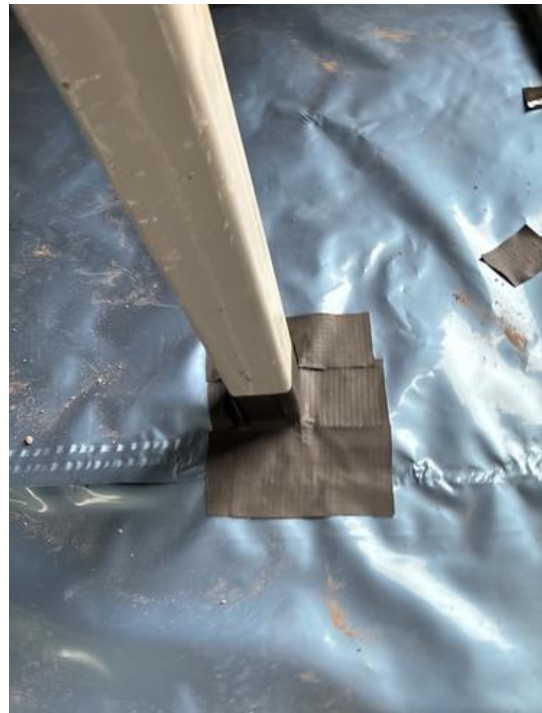


Photo 26



Photo 27



Photo 28

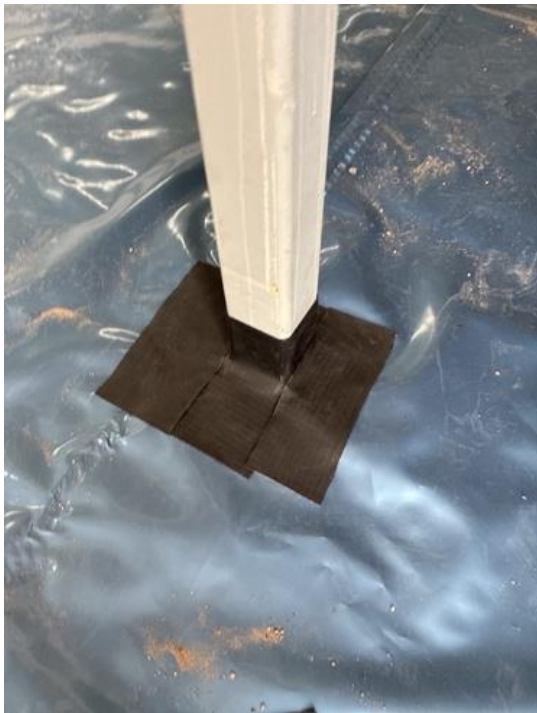


Photo 29



Photo 30



Photo 31



Photo 32



Photo 33



Photo 34



Photo 35



Photo 36



Photo 37



Photo 38



Photo 39

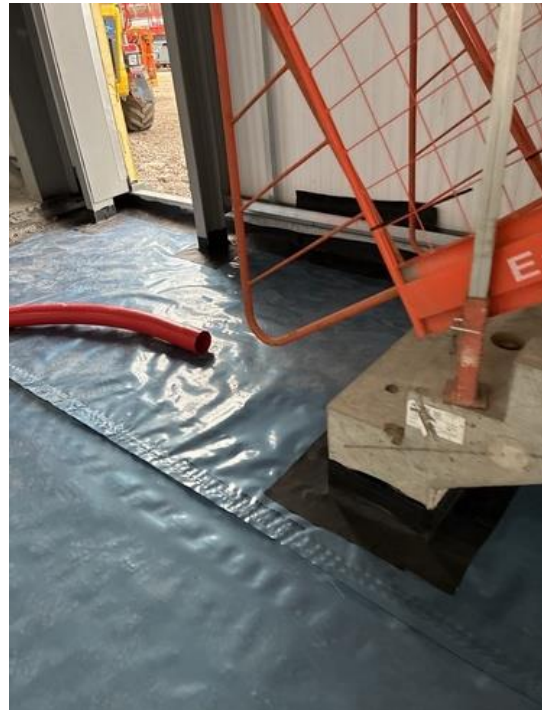


Photo 40



Photo 41



Photo 42



Photo 43



Photo 44



Photo 45



Photo 46



Photo 47