

Date: 16th December 2025
Reference: 16465-V15

GAS MEMBRANE VALIDATION – EDENFIELD ROAD, NORDEN

Project Name:	Edenfield Road, Norden
Project Number:	16-465
Client:	Stonebond Group Ltd
Date:	10-12-2025
Gas Membrane Installers Name & Qualifications:	Arch and Wood Construction & Commercial Ltd NVQ Level 2 Qualified Installer
Ground Gas Risk Assessment	Vapour resistant membranes (Plots 1-10) Characteristic Situation (CS2) (11-49)
Plots:	31-35

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
Richard Webster	CL:AIRE Course – Verification of Gas Protection Measures	Technician

PREPARED BY	QUALIFICATIONS	POSITION
Mark Wilson	BSc (Hons) Ind, FGS, MEnvSc, CSci	Principal Consultant

AUTHORISED BY	QUALIFICATIONS	POSITION
Mark Wilson	BSc (Hons) Ind, FGS, MEnvSc, CSci	Principal Consultant





Table 1 Validation Letter References

PLOT NUMBER	DATE	REPORT REFERENCE
1-6	22-11-204	V1
7-10	25-11-2024	V2
7-10 New Detail	10-04-2025	V3
1-6 New Detail	23-04-2025	V4
17-19	07-05-2025	V5
43-45	12-05-2025	V6
40-42	14-05-2025	V7
20-23	20-05-2025	V8
24-25	27-05-2025	V9
36-39 & 49	03-06-2025	V10
46-48	05-06-2025	V11
11-12	10-06-2025	V12
13-14	20-06-2025	V13
15-16	11-07-2025	V14
31-35	10-12-2025	V15

GROUND GAS MITIGATION DESIGN

The Ground Gas Risk Assessment for the site determined that the site should be classified as Characteristic Situation 2 in accordance with BS8485 2015 (+A1 2019).

In addition, vapour resistant membranes are required to be installed for plots located within the east and southeast part of the site (Plots 1-10) due to elevated concentrations of volatile contaminants.

A Gas Protection Design Report (GPDR) was prepared by E3P as detailed within their document (Ref: 16-465-R7-2) dated April 2025.

The GPDR has been prepared, reviewed, and authorised by a suitably qualified person who holds the relevant technical and professional qualifications as prescribed within the NHBC Document NF94 2023.

OVERVIEW OF GROUND GAS MITIGATION DESIGN & CONSTRUCTION REQUIREMENTS

Characteristic Situation 2 – Design Mitigation Requirements.

- ✿ Passive sub-floor dispersal layer of very good performance which meets all criteria in Paragraph B.6 of BS8485:2015 (minimum 150 mm clear void space and with correct frequency of side ventilation).
- ✿ 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 735:2014.

For Plots 1-10, the following mitigation measures will be required:

Volatile Organic Compounds – Design Mitigation Requirements

- ✿ Sealed/welded vapour resistant membrane in the floor slab construction which meets all the criteria as set out in Table 7 of BS8485:2015 (+A1 2019), Verification in Section 3.2.2 of CIRIA 735:2014, and is compliant with CIRIA 748:2014.



- Every second plot constructed will be subject to air lancing integrity testing in accordance with an internationally recognised standard – to be undertaken by specialist third party contractor and reported separately.

A detailed sub-structure design has been prepared by AJP Consulting Engineers as detailed within their Drawing EDE-AJP-XX-00-DR-S-2013, Rev P05, dated 7th April 2025.

The sub-structure design forms a key component of the validation procedure to ensure the constructed mitigation requirements meet the specified design criteria.

Figure 1 **Suspended Floor Slab – Typical Edge – VSC**

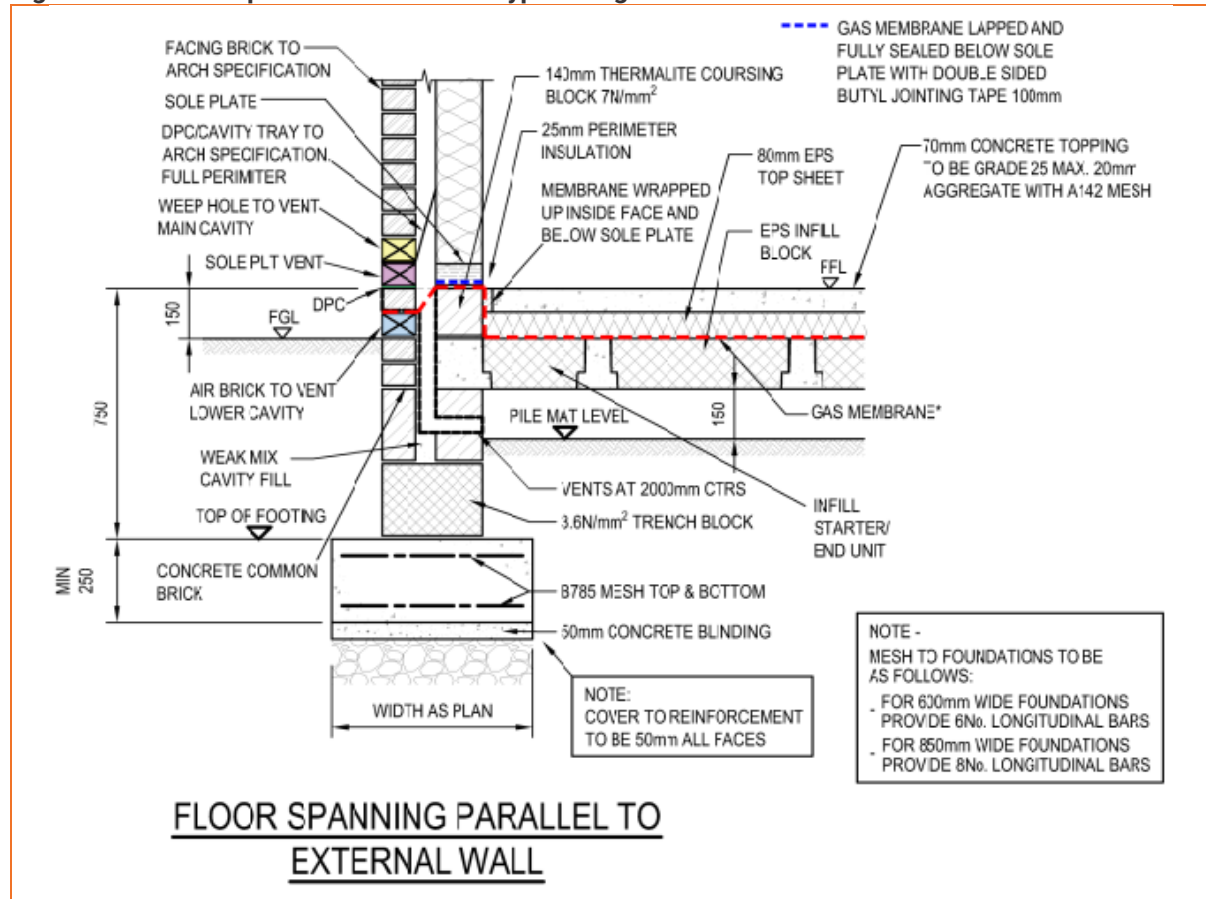




Figure 2 **Suspended Floor Slab – Typical Party Wall**

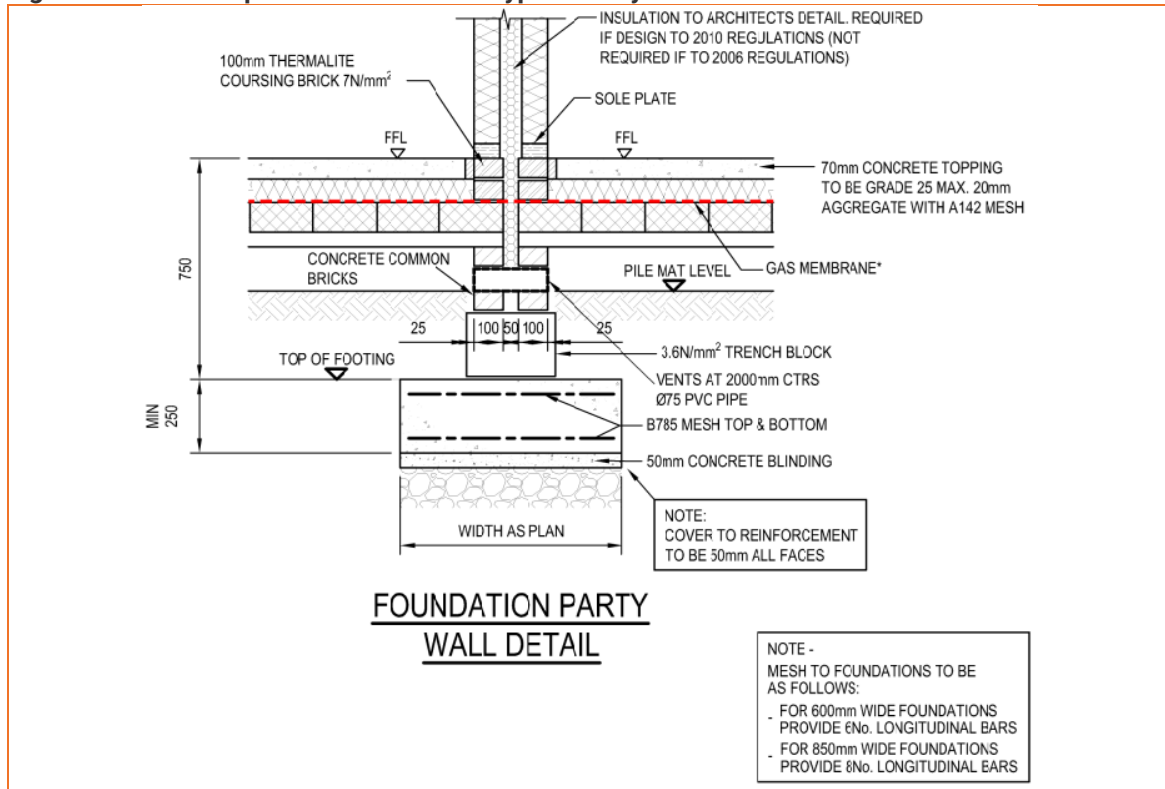


Figure 3 **Suspended Floor Slab - Typical Level Threshold Detail - VSC**

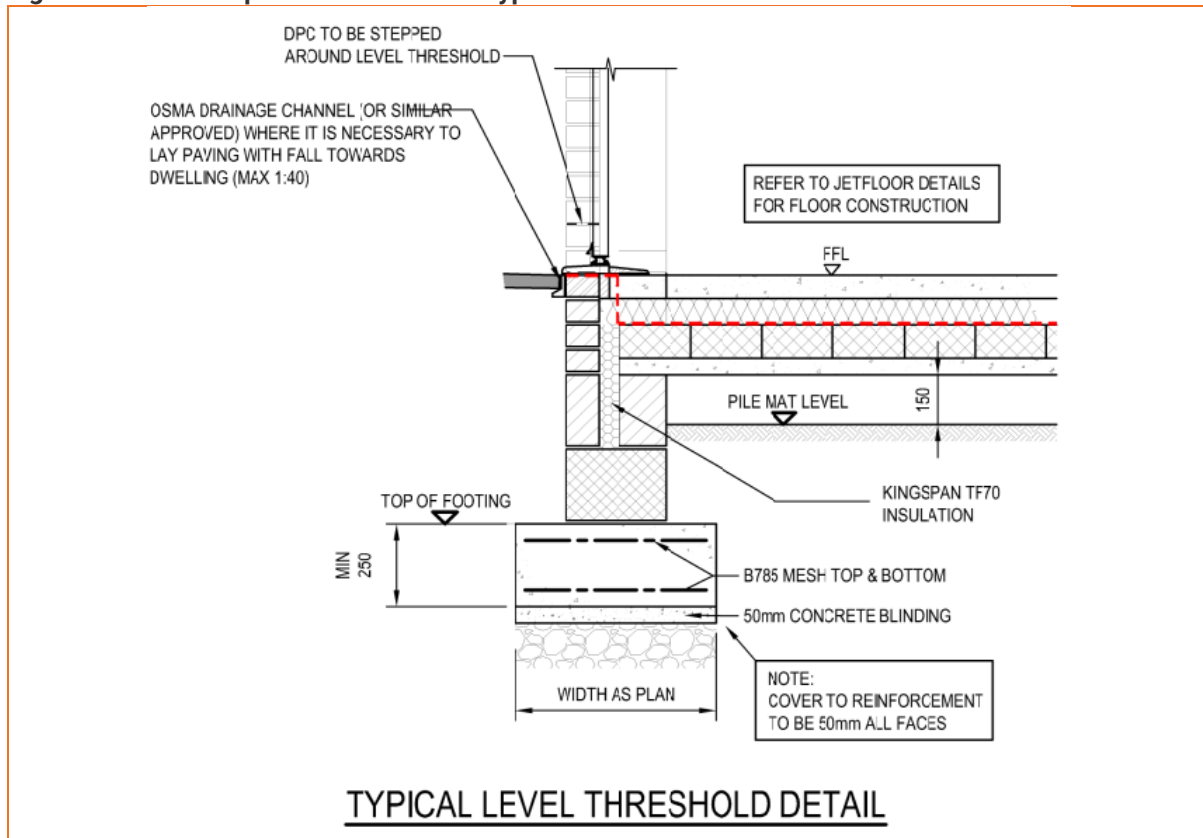
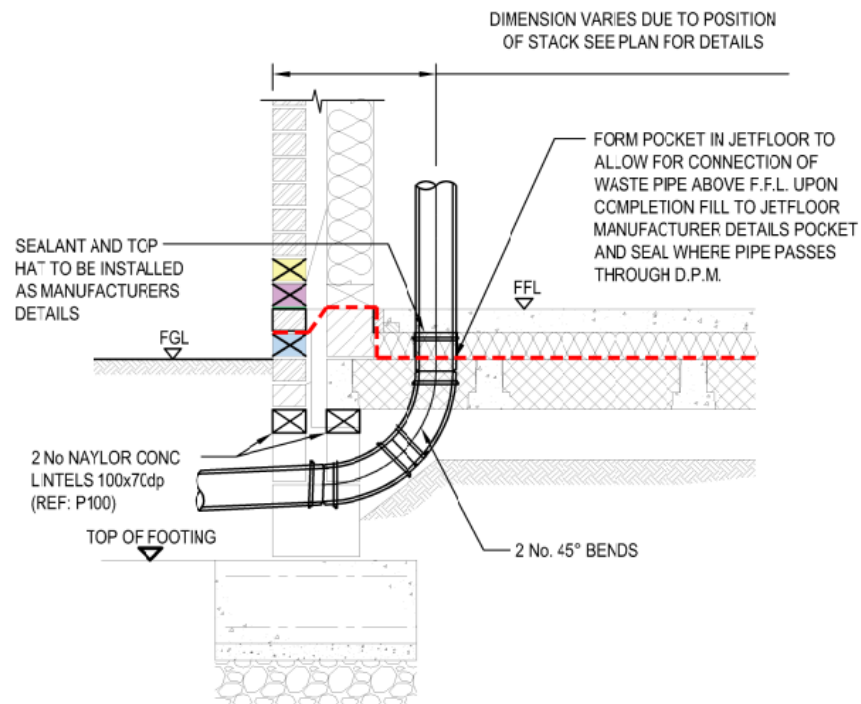




Figure 4 **Suspended Floor Slab – Typical Service Penetration - VSC**



TYPICAL SERVICE CONNECTION DETAIL AT
EXTERNAL WALL LOCATION



SUMMARY OF VALIDATION INSPECTION & APPROVAL

SUB-FLOOR VOID

As per NHBC guidance and the structural engineers design, the sub-floor voids should be a minimum of 150 mm with no visible inclusions that would limit the performance of the ventilation mechanism.

The GPDR requires sub-floor voids to be inspected every plot for the first ten structures to establish protocols (as and where possible), and then every ten plots thereafter for sub-floor void (minimum 150 mm sub-floor void) and internal sleeper wall ventilation (to ensure uninhibited airflow). Plots requiring vapour-resistant membranes (i.e. Plots 1-10) will require 50% of sub-floor voids to be inspected.

The sub-floor voids for Plots 32-35 were inspected on 2nd December 2025. The sub-floor voids were observed and inspected to be a minimum of 150 mm with no visible inclusions that would limit the performance of this ventilation mechanism.

Photographs of the sub-floor voids for Plots 32-35 are included in the final section of this CQA Validation Report.

AIR BRICKS & TELESCOPIC VENTILATION

As per NHBC guidance and the structural engineer's design as part of the mitigation a telescopic vent and vent brick is required at 2.00 m intervals in the brick course. E3P can confirm these have also been fitted accurately on all elevations of the plot (party walls exempt) to allow the sufficient function of the passive sub-floor ventilation system.

GAS RESISTANT MEMBRANE

The membrane utilised on-site comprises: Juta - GP1 Gas Barrier resistant to Carbon Dioxide, Methane and Radon.

It has been confirmed as part of the validation that the membrane utilised in the plots discussed herein matches that of **Figures 1-4**.

The E3P Technician has inspected the installation of this membrane in line with the structural engineer's specifications in terms of placement and position (**Figures 1-4**), and the manufacturer's detail in terms of the workmanship.

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's specification and heat welded

All the overlaps were then additionally taped to avoid damage/trip hazards using foil-backed girth tape.

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.



Upon confirmation of suitable installation, the membrane is to be covered with a floor insulation material which is considered to provide a high degree of protection before the application of the cast in situ concrete monolithic floor slab.

Based on the information provided within this report, the site inspection and validation checklists, E3P can confirm that **Plots 31-35** have been installed with gas protection measures in accordance with the detailed structural design and the requirements of BS8485:2015 (+A1 2019) 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	53 / 53 (100%)	Flagged items	0	Actions	0
Site Name	Edenfield Road				
Location	Tenterhouse Mill, Greenbooth Road Rochdale England OL12 7TD United Kingdom (53.62931899021629, - 2.2179743085179995)				
Project Manager	M. Wilson				
Project number	16-465				
Developer	Stonebond				
Site representative Signature	 Ryan 11 Dec 2025 12:46 PM GMT				
Conducted on	10 Dec 2025 2:41 PM GMT				
Prepared by	Richard Webster				
Have you got the correct Gas Membrane detail (attached to the job in synergist)?	Yes				
Type of Development: if other add Note	House				
Floor Slab Type	Block and beam suspended				
Gas Membrane Type: Manufacturer, gauge, and colour. (Take photos where possible showing Label)	Juta GP1 Gas Barrier				
Installer's name, company, and qualification	Arch and Wood				



Gas Membrane Inspection	50 / 50 (100%)
Plot Inspection	50 / 50 (100%)
Plot Inspection 1	10 / 10 (100%)

Plot Number

35

Are telescopic vents present?

Yes

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 lain gas membrane? IF FAIL DESCRIPTION IN ACTIONS AND PHOTOS REQUIRED

Pass

Are welds complete?

Yes

Are Joints lapped and sealed in accordance with manufacturer's requirements/ specification?

Yes



Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6



Photo 7



Photo 8



Photo 9



Photo 10

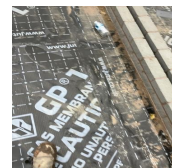


Photo 11

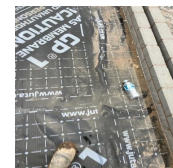


Photo 12



Photo 13



Photo 14



Photo 15



Photo 16



Photo 17

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

Pass



Photo 18



Photo 19



Photo 20



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

Pass



Photo 21



Photo 22



Photo 23



Photo 24



Photo 25



Photo 26

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

Pass

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

Yes

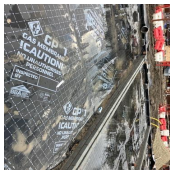


Photo 27

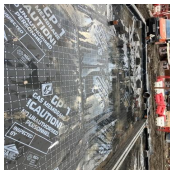


Photo 28

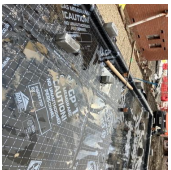


Photo 29



Photo 30

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)

Pass



Photo 31

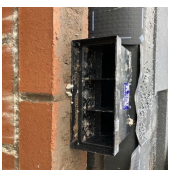
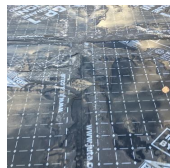
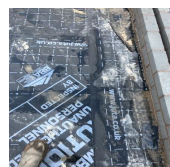
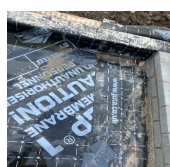


Photo 32



Plot Inspection 2		10 / 10 (100%)
Plot Number		34
Are telescopic vents present?		Yes
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 lain gas membrane? IF FAIL DESCRIPTION IN ACTIONS AND PHOTOS REQUIRED		Pass
Are welds complete?		Yes
Are Joints lapped and sealed in accordance with manufacturer's requirements/ specification?		Yes
                      		
Service entries seals: Top hats seal arrangements fixed around service entries? Use of Jubilee clips or Bitumastic Sealant		Pass
   		



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

Pass



Photo 60



Photo 61



Photo 62

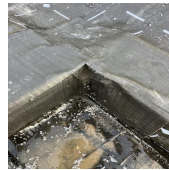


Photo 63

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

Pass

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

Yes

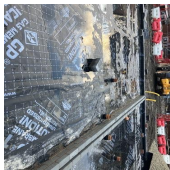


Photo 64

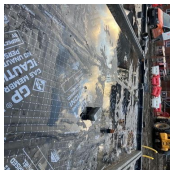


Photo 65

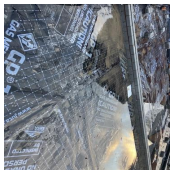


Photo 66

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)

Pass



Photo 67



Photo 68



Photo 69



Plot Inspection 3		10 / 10 (100%)
Plot Number		33
Are telescopic vents present?		Yes
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 lain gas membrane? IF FAIL DESCRIPTION IN ACTIONS AND PHOTOS REQUIRED		Pass
Are welds complete?		Yes
Are Joints lapped and sealed in accordance with manufacturer's requirements/ specification?		Yes
              		
Service entries seals: Top hats seal arrangements fixed around service entries? Use of Jubilee clips or Bitumastic Sealant		Pass
   		
Corners / Internal joints: Check all corners are correctly formed or contractor has used preformed corners.		Pass



Photo 89



Photo 90



Photo 91



Photo 92



Photo 93



Photo 94



Photo 95



Photo 96



Photo 97



Photo 98

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

Pass

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

Yes

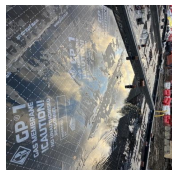


Photo 99

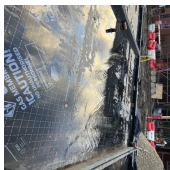


Photo 100

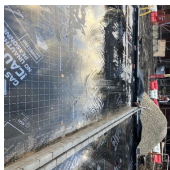


Photo 101

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)

Pass



Photo 102

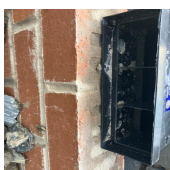


Photo 103



Photo 104



Plot Inspection 4		10 / 10 (100%)
Plot Number		32
Are telescopic vents present?		Yes
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 lain gas membrane? IF FAIL DESCRIPTION IN ACTIONS AND PHOTOS REQUIRED		Pass
Are welds complete?		Yes
Are Joints lapped and sealed in accordance with manufacturer's requirements/ specification?		Yes
 Photo 105  Photo 106  Photo 107  Photo 108  Photo 109  Photo 110  Photo 111  Photo 112  Photo 113  Photo 114  Photo 115  Photo 116  Photo 117  Photo 118  Photo 119  Photo 120  Photo 121  Photo 122  Photo 123		
Service entries seals: Top hats seal arrangements fixed around service entries? Use of Jubilee clips or Bitumastic Sealant		Pass
 Photo 124  Photo 125  Photo 126  Photo 127		



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

Pass



Photo 128



Photo 129



Photo 130



Photo 131



Photo 132



Photo 133



Photo 134

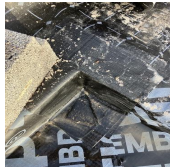


Photo 135



Photo 136



Photo 137

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

Pass

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

Yes

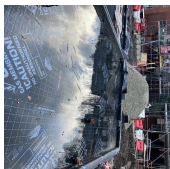


Photo 138

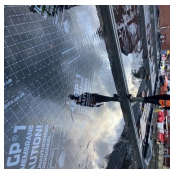


Photo 139



Photo 140

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)

Pass

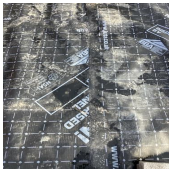


Photo 141



Photo 142



Plot Inspection 5		10 / 10 (100%)
Plot Number		31
Are telescopic vents present?		Yes
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 lain gas membrane? IF FAIL DESCRIPTION IN ACTIONS AND PHOTOS REQUIRED		Pass
Are welds complete?		Yes
Are Joints lapped and sealed in accordance with manufacturer's requirements/ specification?		Yes
 Photo 143  Photo 144  Photo 145  Photo 146  Photo 147  Photo 148  Photo 149  Photo 150  Photo 151  Photo 152  Photo 153		
Service entries seals: Top hats seal arrangements fixed around service entries? Use of Jubilee clips or Bitumastic Sealant		Pass
 Photo 154  Photo 155  Photo 156  Photo 157		
Corners / Internal joints: Check all corners are correctly formed or contractor has used preformed corners.		Pass
 Photo 158  Photo 159  Photo 160  Photo 161  Photo 162  Photo 163		
Are folds running in line with joints? (no joints cutting across folds)		Pass



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

Yes

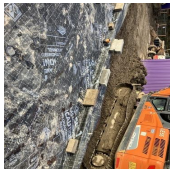


Photo 164



Photo 165

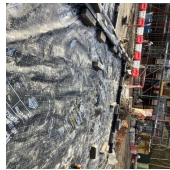


Photo 166

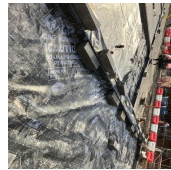


Photo 167

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)

Pass



Photo 168



Photo 169

Passive Venting

Sub-floor Void: Is a check possible on future plots (insert Plot number or NO in text box)

Yes – Plots 32-35



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



Photo 48



Photo 49



Photo 50



Photo 51



Photo 52



Photo 53



Photo 54



Photo 55



Photo 56



Photo 57



Photo 58



Photo 59



Photo 60



Photo 62



Photo 64

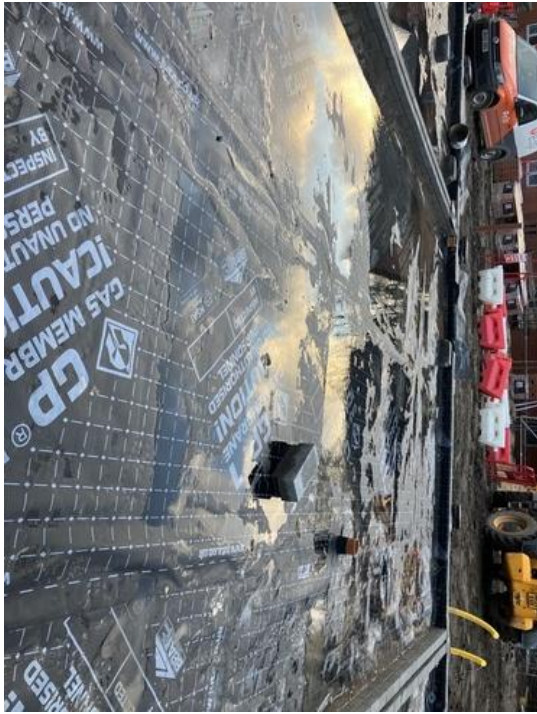


Photo 65



Photo 66



Photo 67



Photo 68



Photo 69



Photo 70



Photo 71



Photo 72



Photo 73



Photo 74



Photo 75



Photo 76



Photo 77



Photo 78



Photo 79



Photo 80



Photo 81

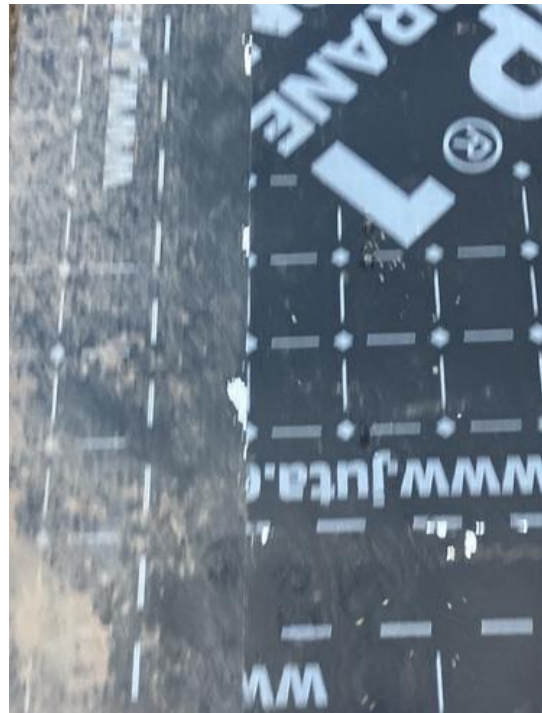


Photo 82



Photo 83



Photo 84



Photo 85



Photo 86



Photo 87



Photo 88



Photo 89



Photo 90



Photo 91



Photo 92



Photo 93



Photo 94



Photo 95



Photo 96



Photo 97



Photo 98

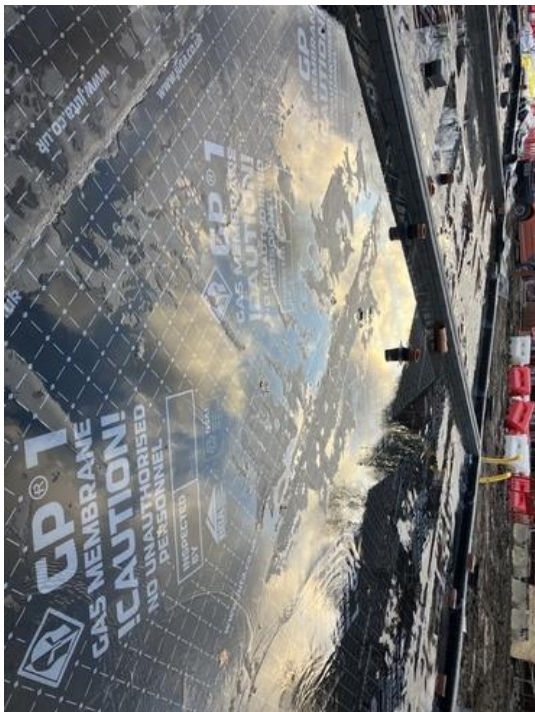


Photo 99

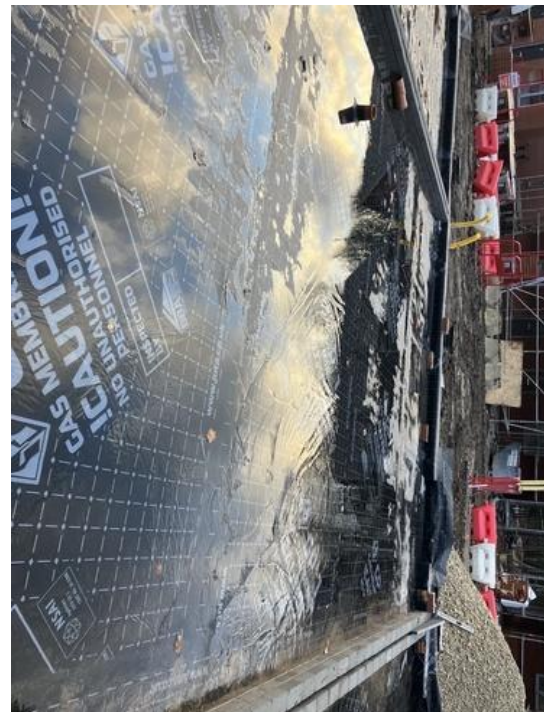


Photo 100

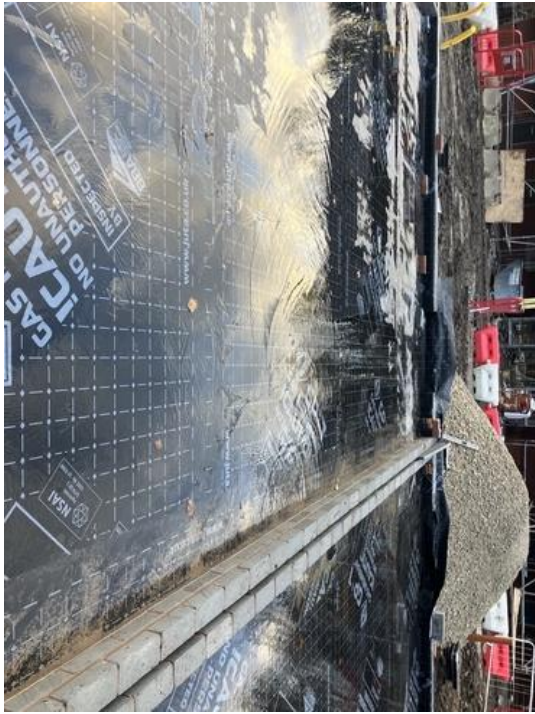


Photo 101



Photo 102



Photo 103



Photo 104



Photo 105



Photo 106



Photo 107



Photo 108



Photo 109



Photo 110



Photo 111



Photo 112



Photo 113



Photo 114



Photo 115



Photo 116



Photo 117



Photo 118



Photo 119



Photo 120



Photo 121



Photo 122



Photo 123



Photo 124



Photo 125



Photo 126



Photo 127



Photo 128



Photo 129



Photo 130



Photo 131



Photo 132



Photo 133



Photo 134



Photo 135



Photo 136



Photo 137



Photo 138



Photo 139



Photo 140



Photo 141



Photo 142



Photo 143



Photo 144



Photo 145



Photo 146



Photo 147



Photo 148



Photo 149



Photo 150



Photo 151



Photo 152



Photo 153



Photo 154



Photo 155



Photo 156



Photo 157



Photo 158



Photo 159



Photo 160



Photo 161



Photo 162



Photo 163

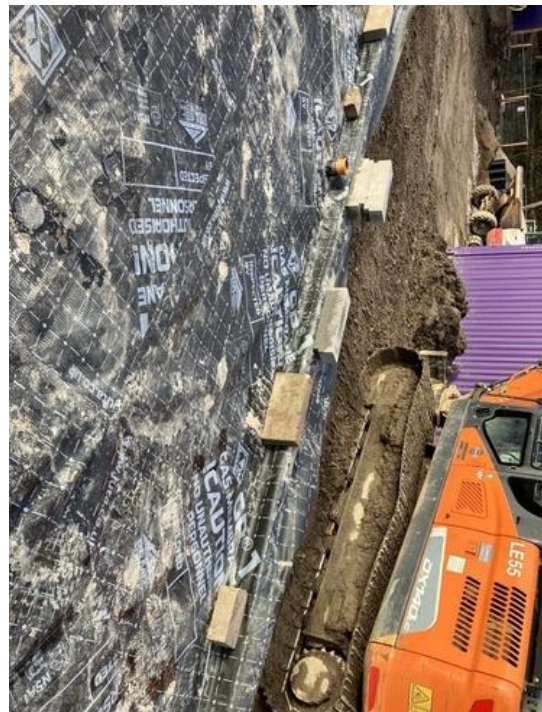


Photo 164



Photo 165



Photo 166



Photo 167



Photo 168



Photo 169



Floor Void Inspection

2 Dec 2025 / Richard Webster

Complete

Score	4 / 4 (100%)
Site Name	Edenfield Road
Project Number	16-465
Conducted on	2 Dec 2025 10:19 AM GMT
Prepared by	Richard Webster
Location	Tenterhouse Mill, Greenbooth Road Rochdale England OL12 7TD United Kingdom (53.62938568652004, - 2.2180784570709635)
Plot Inspection	4 / 4 (100%)
Plot Inspection 1	1 / 1 (100%)
Plot Number	32
Is the void clear?	Yes
	
Photo 1	
Depth of Void	300
	
Photo 2	
Are Sleeper Walls present (if present take photos)	N/A
If sleeper walls are present are they vented?	N/A



Plot Inspection 2		1 / 1 (100%)
Plot Number		33
Is the void clear?	Yes	
 Photo 3		
Depth of Void		250
 Photo 4		
Are Sleeper Walls present (if present take photos)		N/A
If sleeper walls are present are they vented?		N/A

Plot Inspection 3		1 / 1 (100%)
Plot Number		34
Is the void clear?	Yes	
 Photo 5		
Depth of Void		300
 Photo 6		
Are Sleeper Walls present (if present take photos)		N/A
If sleeper walls are present are they vented?		N/A



Plot Inspection 4		1 / 1 (100%)
Plot Number		35
Is the void clear?		Yes
		
Photo 7		
Depth of Void		300
		
Photo 8		
Are Sleeper Walls present (if present take photos)		N/A
If sleeper walls are present are they vented?		N/A



Media summary



Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6



Photo 7



Photo 8