

Date: 19 March 2025
Reference: 14-768-V2

GAS MEMBRANE VALIDATION – HAWKS VIEW, CASTLETON

Project Name:	Hawks View, Castleton (formerly known as Castleton Sidings)
Project Number:	14-768
Client:	Kellen Homes
Date:	19 March 2025
Project Manager & Qualifications:	J Sheridan (MeSci, FGS)
E3P Engineer:	J Newall
Gas Membrane Installers Name & Qualifications:	Westbourne Civil Engineers Ltd & Keytec Installation Services
Ground Gas Protection Design Report:	E3P Gas Protection Design Report (14-768-R8, March 2025)
Plots:	Membrane – Plots 18-21

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
Jessica Sheridan	MeSci, FGS, MEnvSci	Senior Consultant
PREPARED BY	QUALIFICATIONS	POSITION
Jessica Sheridan	MeSci, FGS, MEnvSci	Senior Consultant
AUTHORISED BY	QUALIFICATIONS	POSITION
Martin Dyer	BSc (Hons), FGS, FEnvSci, CEnv	Director

Table 1 Validation Letter References

PLOT NUMBER	DATE	REPORT REFERENCE
Subfloor 9-15, 18-21, 127-129	14/03/2025	V1
Membrane – Plots 18-21	19/03/2025	V2





GROUND GAS MITIGATION DESIGN

The Ground Gas Risk Assessment for the site determined that site should be classified as Characteristic Situation 2 with incorporation of low-level VOC resistant membrane in accordance with BS8485 2015 (+A1 2019).

A Gas Protection Design Report (GPDR) was prepared by E3P (14-768-R8, March 2025). Since the issue of the report, minor revisions have been made to the subfloor design, which are presented within this verification letter for clarity.

The GPDR has been prepared, reviewed, and authorised by a suitably qualified person who holds the relevant technical and professional qualifications.

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 out 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 and low-level VOC 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

Banners Gate prepared the site-specific engineering drawings on behalf of Kellen Homes as Foundation Detail Ref: 23147 500 F.

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 Structural Engineers Substructure Design – External Wall

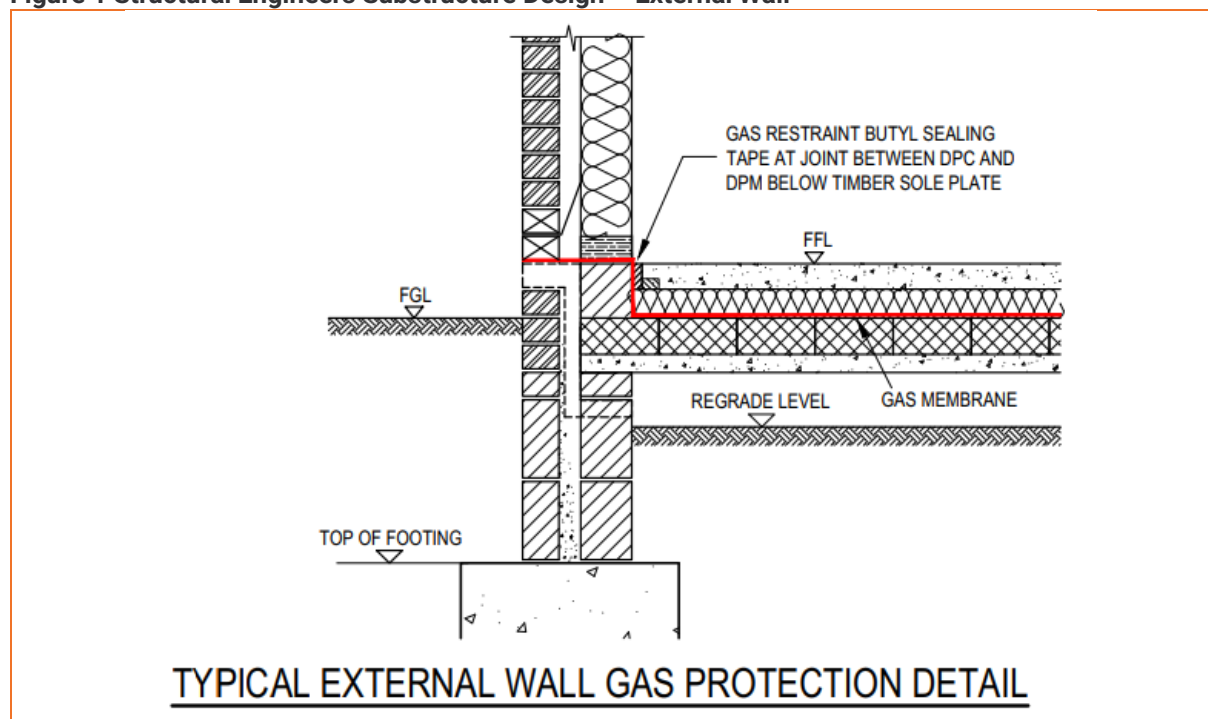




Figure 2 Structural Engineers Substructure Design – Party Wall

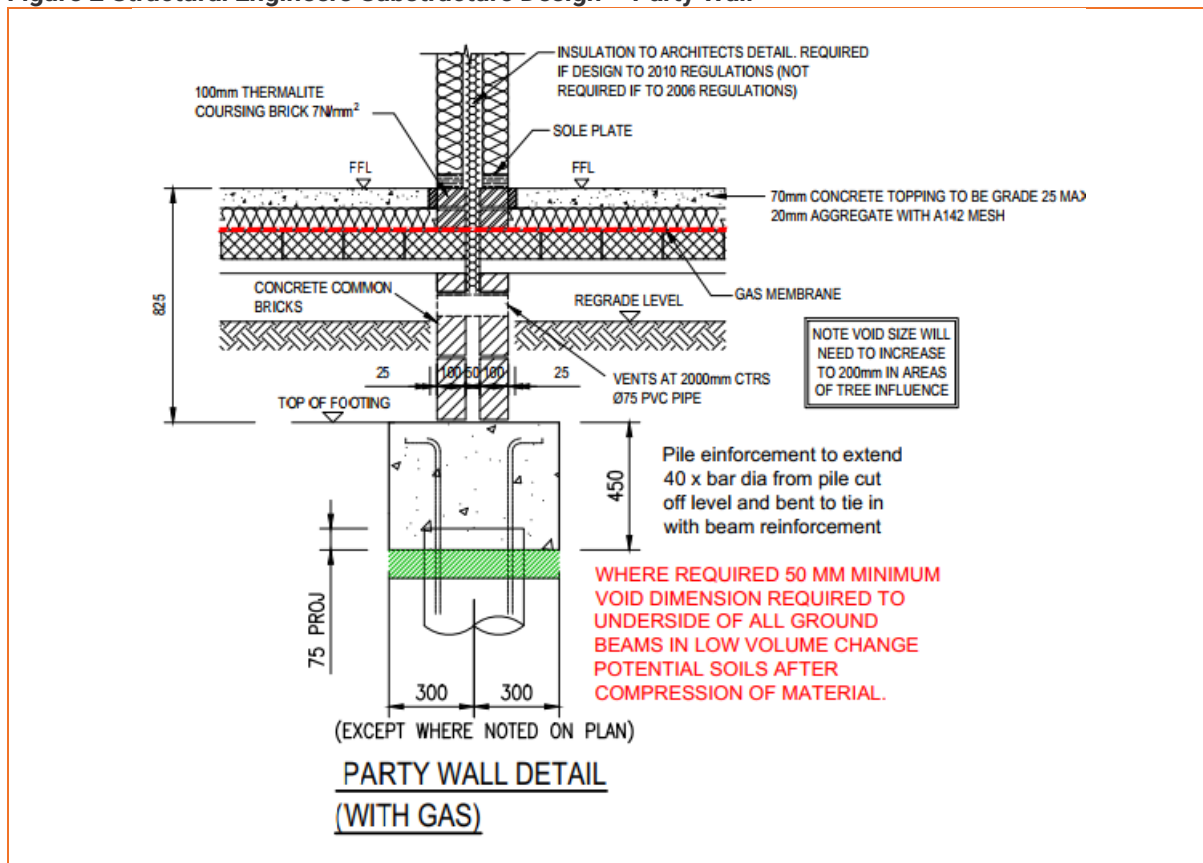
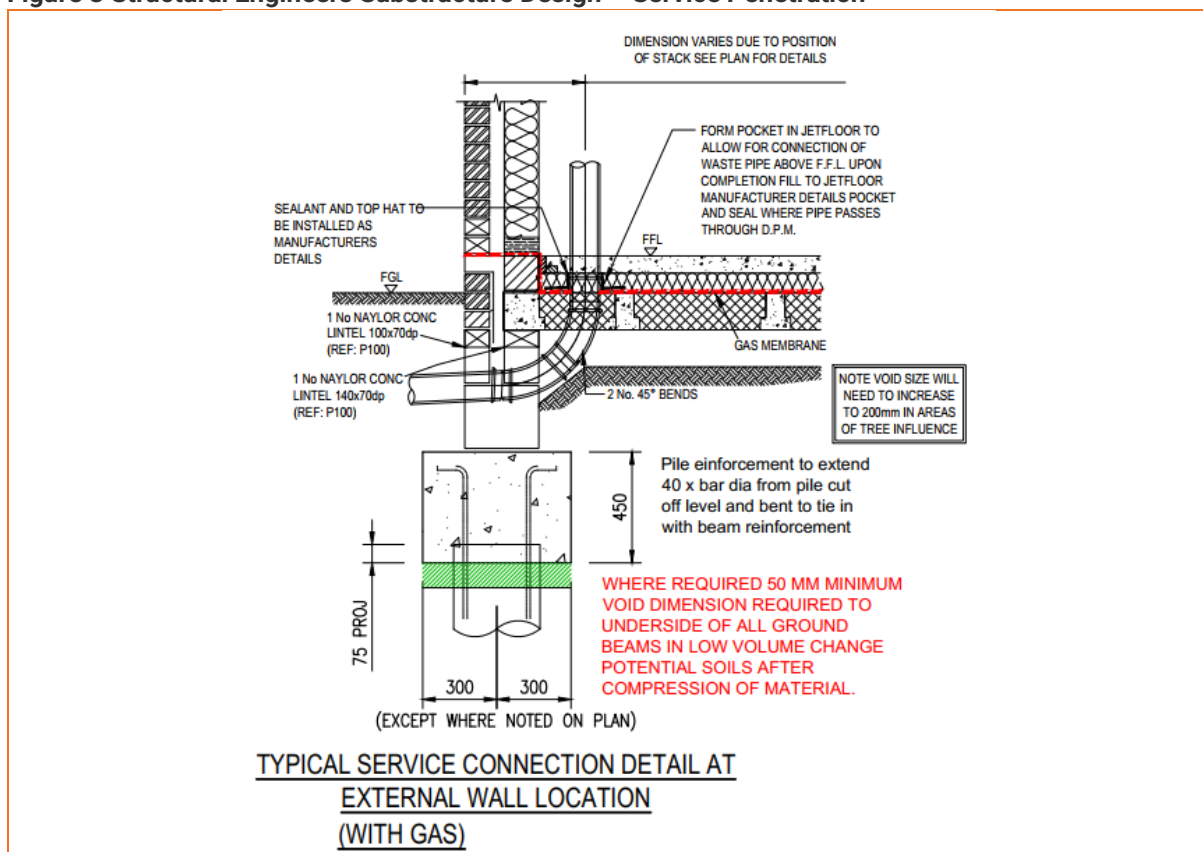


Figure 3 Structural Engineers Substructure Design – Service Penetration





SUMMARY OF VALIDATION INSPECTION & APPROVAL

SUB-FLOOR VOID

The sub-floor void for plots 9-15, 18-21, 127-129 was inspected on 14th and 17th March 2025.

The sub-floor void was observed and inspected to be a minimum of 150 mm with no visible inclusions that would limit the performance of this ventilation mechanism. Sleeper wall ventilation bricks were also observed to be present

Photographs of the sub-floor voids are included in validation letter V1.

AIR BRICKS & TELESCOPIC VENTILATION

As per NHBC guidance and the structural engineers design as part of the mitigation a telescopic vent and vent brick is required at 2 m intervals in the brick course. E3P can confirm these have also been fitted accurately on all elevations of the plot to allow the sufficient function of the passive sub-floor ventilation system.

GAS RESISTANT MEMBRANE

The membrane utilised on-site comprises: JUTA GP5 resistant to radon, carbon dioxide, methane and low-level Volatile Organic Compounds .

It has been confirmed as part of the validation that the membrane utilised in the plots discussed herein matches the membrane described.

The E3P Technician has inspected the installation of this membrane in line with the structural engineer's specifications in terms of placement and position (Figure 1-3), and the manufacturer's detail in terms of the workmanship.

E3P can confirm that there were no holes or rips at the inspection time.

Where any rips or tears 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.

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.

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 Plot 18-21 has been installed with gas protection measures in accordance with the detailed structural design and the requirements of BS8485 Characteristic Situation 2 (including low-level VOC resistant membrane) 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 letter.

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	37 / 37 (100%)	Flagged items	0	Actions	0
Site Name	Castleton sidings				
Location	136 Fairway Rochdale England OL11 3BZ United Kingdom (53.58903663090497, - 2.182053889028942)				
Project Manager	Jessica Sheridan				
Project number	14-768				
Developer	Kellen homes				
Site representative Signature	 19 Mar 2025 9:50 AM GMT				
Conducted on	19 Mar 2025 9:28 AM GMT				
Prepared by	Joe Newall				
Have you got the correct Gas Membrane detail (attached to the job in synergist)?	Yes				



<u>Gas Membrane Inspection</u>	36 / 36 (100%)
<u>Plot Inspection</u>	36 / 36 (100%)
Plot Inspection 1	12 / 12 (100%)
Plot Number	18
Type of Development: if other add Note	House
Floor Slab Type	Block and beam suspended
Are telescopic vents present?	Yes
  Photo 1 Photo 2	
Gas Membrane Type: Manufacturer, gauge, and colour. (Take photos where possible showing Label)	Juta GP5 membrane
Installer's name, company and qualification	Keytec
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
   Photo 3 Photo 4 Photo 5	
Are welds complete?	Yes
  Photo 6 Photo 7	
Are Joints lapped and sealed in accordance with manufacturer's requirements/ specification?	Yes



Photo 8



Photo 9

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

Pass

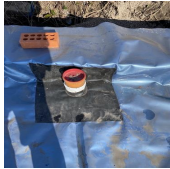


Photo 10

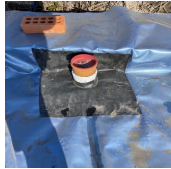


Photo 11

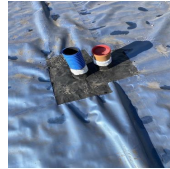


Photo 12

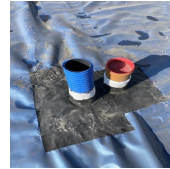


Photo 13

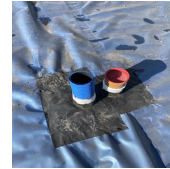


Photo 14

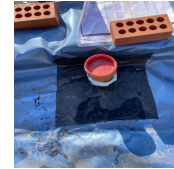


Photo 15

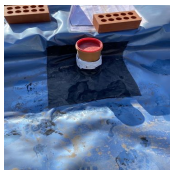


Photo 16

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

Pass



Photo 17



Photo 18



Photo 19



Photo 20

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

Pass



Photo 21



Photo 22

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

Yes



Photo 23



Photo 24



Photo 25



Photo 26



Sealant to the underside of the membrane at the sole plate position (Check with PM if not noted on schedule)

Yes



Photo 27



Photo 28



Photo 29

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 and 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 30



Photo 31



Photo 32



Photo 33

Plot Inspection 2

12 / 12 (100%)

Plot Number

19

Type of Development: if other add Note

House

Floor Slab Type

Block and beam suspended

Are telescopic vents present?

Yes



Photo 34

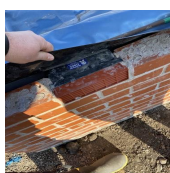


Photo 35

Gas Membrane Type: Manufacturer, gauge, and colour. (Take photos where possible showing Label)

Juta GP5 membrane



Installer's name, company and qualification

Keytec

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



Photo 36



Photo 37



Photo 38



Photo 39

Are welds complete?

Yes



Photo 40



Photo 41

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

Yes



Photo 42



Photo 43



Photo 44

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

Pass



Photo 45



Photo 46



Photo 47



Photo 48



Photo 49



Photo 50



Photo 51



Photo 52

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

Pass



Photo 53



Photo 54



Photo 55



Photo 56



Photo 57

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

Pass



Photo 58



Photo 59

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

Yes



Photo 60



Photo 61



Photo 62



Photo 63

Sealant to the underside of the membrane at the sole plate position (Check with PM if not noted on schedule)

Yes



Photo 64

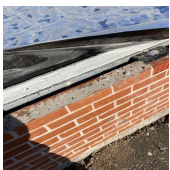


Photo 65

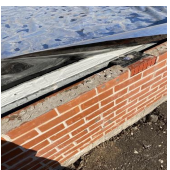


Photo 66

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 and 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



Photo 70



Photo 71

Plot Inspection 3

12 / 12 (100%)

Plot Number

20 & 21

Type of Development: if other add Note

House

Floor Slab Type

Block and beam suspended

Are telescopic vents present?

Yes



Photo 72

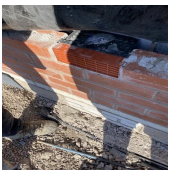


Photo 73

Gas Membrane Type: Manufacturer, gauge, and colour. (Take photos where possible showing Label)

Juta blue membrane

Installer's name, company and qualification

Keytec

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 74



Photo 75



Photo 76



Photo 77



Photo 78

Are welds complete?

Yes



Photo 79



Photo 80

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

Yes



Photo 81



Photo 82

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

Pass



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

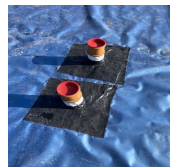


Photo 97



Photo 98



Photo 99

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

Pass



Photo 100



Photo 101



Photo 102



Photo 103



Photo 104



Photo 105



Photo 106



Photo 107



Photo 108



Photo 109

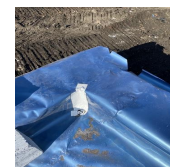


Photo 110



Photo 111



Photo 112



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

Pass



Photo 113

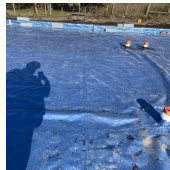


Photo 114



Photo 115



Photo 116

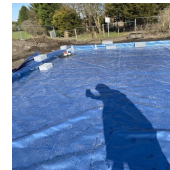


Photo 117



Photo 118



Photo 119

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

Yes



Photo 120



Photo 121



Photo 122



Photo 123



Photo 124



Photo 125



Photo 126



Photo 127

Sealant to the underside of the membrane at the sole plate position (Check with PM if not noted on schedule)

Yes

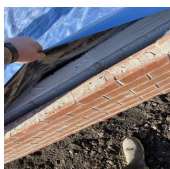


Photo 128



Photo 129



Photo 130



Photo 131



Photo 132



Photo 133



Photo 134



Photo 135



Photo 136



Photo 137

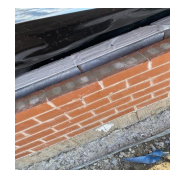


Photo 138



Photo 139



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 140



Photo 141



Photo 142



Photo 143



Photo 144



Photo 145

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



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 61



Photo 62



Photo 63



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

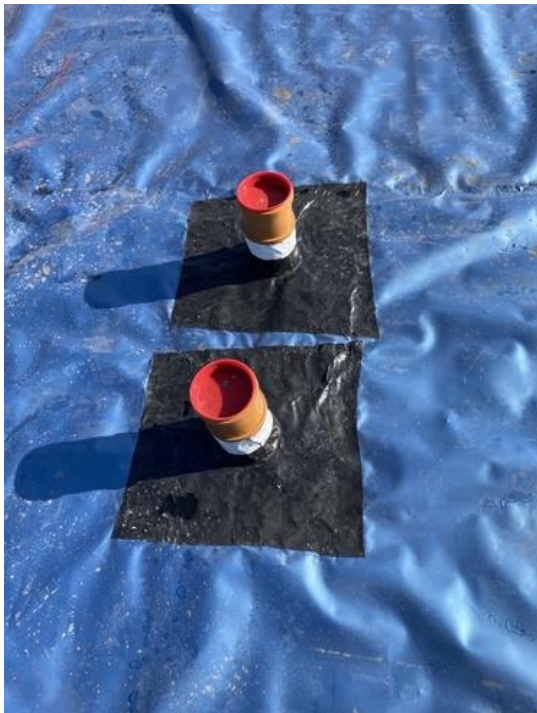


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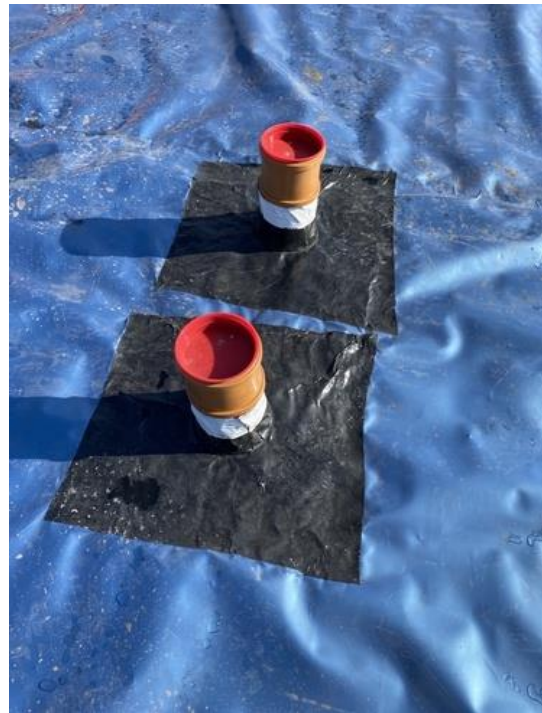


Photo 96



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

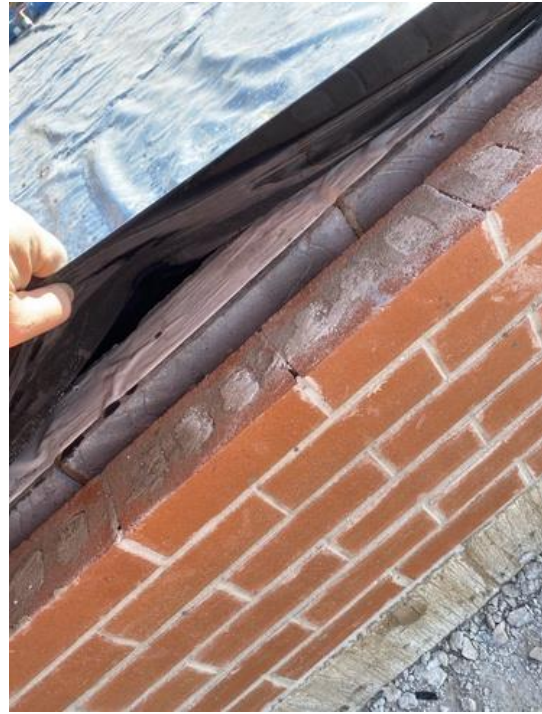


Photo 136



Photo 137



Photo 138

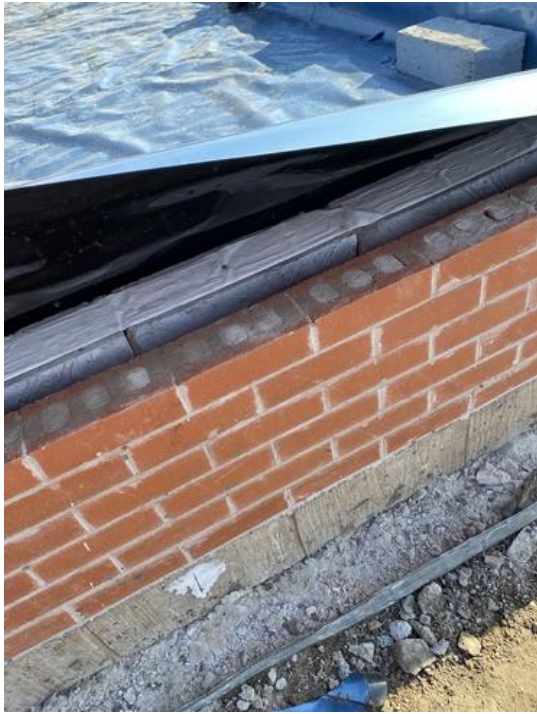


Photo 139



Photo 140



Photo 141



Photo 142



Photo 143



Photo 144



Photo 145