Date: 1st July 2025
Reference: 15-974 V35

GAS MEMBRANE VALIDATION – BENNETT STREET

Project Name:	Bennett Street
Project Number:	15-974
Client:	Kellen Homes
Date:	10-06-2025
Project Manager:	M. Dee
Engineer:	J. Newall
Ground Gas Risk Assessment:	Vapor Membranes Required
Gas Membrane Installers Name & Qualifications:	JCW Gas Membranes Ltd, NVQ Level 2 – Installation of Gas Membranes in Construction
Plot:	5-8

OVERVIEW

The membrane comprised a Juta TITANFLEX (black) gas and hydrocarbon barrier, in line with the required specification set out in the agreed Build Phase Contamination Risk Mitigation Strategy (report ref: 15-974-R5). E3P can confirm there were no holes or rips at the inspection time. Upon being laid, the membrane is to be covered with a Celotex (closed cell) floor insulation material which is considered to provide a high degree of protection.

E3P inspected all external joints, and E3P can confirm that the membrane was overlapped and welded. Corners and patch repairs were sealed with a GP TITAN butyl tape, resistant to vapour and bulk ground gas. Plots have service duct(s) located at the outer edge of the property. E3P inspected each one and can confirm that the top hats have been adequately sealed against the membrane using a self-adhesive gas style product and fixed with a layer of GP TITAN butyl tape.

As per the Build Phase Contamination Risk Mitigation Strategy (report ref: 15-974-R5), sub-floor voids require inspection and validation at 50% ratio of substructures completed. E3P previously undertook subfloor void inspections for plots 47-50, inspections confirmed there was a minimum void space of 150 mm for each plot. Validation photographs included within this letter.

Based on the information provided within this report, the site inspection and validation checklists, E3P can confirm that plots 5-8 have been installed with gas & vapour protection measures in line with the agreed Build Phase Contamination Risk Mitigation Strategy (report ref: 15-974-R5) to an acceptable level of workmanship.

MEMBRANE SPECIFICATION: JUTA TITANFLEX (BLACK)

GROUND GAS PROTECTION
GP® TITANFLEX®
TECHNICAL DATA SHEET

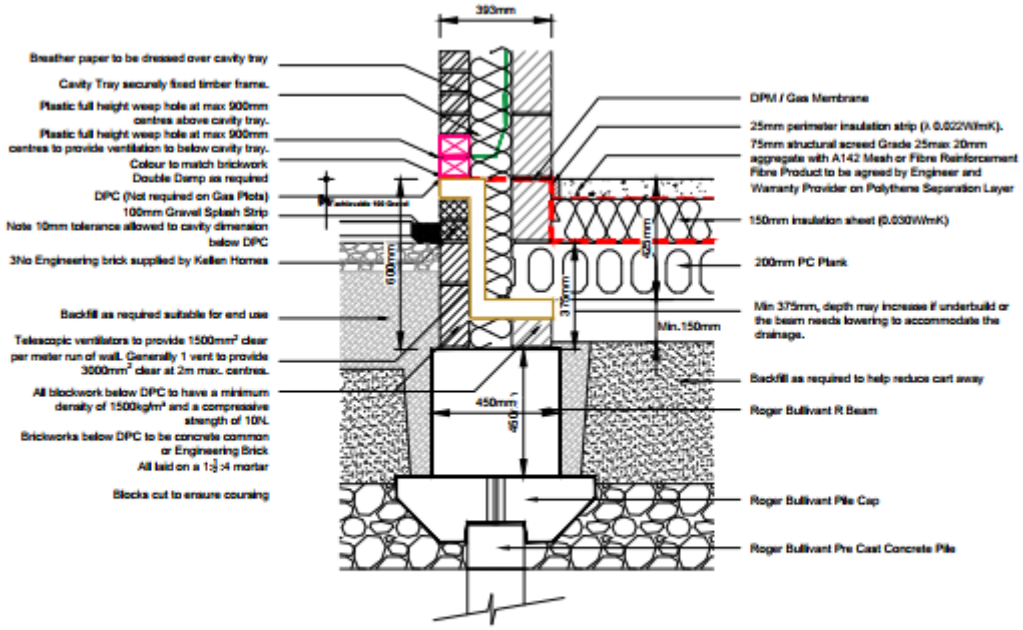
GP® TITANFLEX®

Feature	Characteristics	Test Method	GP® TITANFLEX®
Physical Properties	Thickness	EN 1849-2	0.5 mm
	Width	EN 1849-2	2 m
	Length	EN 1849-2	50 m
	Weight	EN 1849-2	500 g/m²
Hydraulic Press	Water Vapour Transmission Rate	EN 1931	0.11 - 0.18 g/m²/day
	Water Tightness (60 kPa)	EN 1928	Pass
	Water Tightness (196 kPa - 20 m Water Head) (Basement Application)	EN 1928	Pass
Mechanical Properties	Resistance to Static Load	EN 12730-B	≥ 20 kg
	Puncture Resistance	EN 12236	≥ 2.0 kN
	Tensile Strength (MD)	EN 12311-1	> 550 N/50mm
	Tensile Strength (CMD)	EN 12311-1	> 400 N/50mm
	Tensile Elongation (MD/CMD)	EN 12310-1	> 550 %
	Tear Resistance (MD/CMD)	EN 12310-1	> 300 N
	Resistance to Impact	EN 12691-B	650 mm
	Reaction to Fire	EN 13501-1	E Class
	Resistance to Artificial Ageing	EN 1296/EN 1928	Pass
	Resistance to Chemicals	EN 1296/EN 1928	Pass
Compliance and Certification	CE Mark - EN13967:2012		
	NHBC Standards Compliant		
	CIRIA C748 Compliant		
	BS 8485:2015 Compliant		
Vapour Permeability 100% Concentration	Transmission Rate of Benzene	EN ISO 15105-2	< 3.6 mg/m²/day
	Transmission Rate of Toluene	EN ISO 15105-2	< 13.8 mg/m²/day
	Transmission Rate of Ethyl Benzene	EN ISO 15105-2	< 2.7 mg/m²/day
	Transmission Rate of Xylenes (M,P,O)	EN ISO 15105-2	< 7.7 mg/m²/day
	Transmission Rate of Hexane	EN ISO 15105-2	< 0.6 mg/m²/day
	Transmission Rate of Vinyl Chloride	EN ISO 15105-2	< 0.05 mg/m²/day
	Transmission Rate of Trichloroethene (TCE)	EN ISO 15105-2	< 54.7 mg/m²/day
	Transmission Rate of Tetrachloroethene (PCE)	EN ISO 15105-2	< 26.2 mg/m²/day
	Transmission Rate of Naphthalene	EN ISO 15105-2	< 0.0006 mg/m²/day
	Transmission Rate of CIS-1,2-Dichloroethylene	EN ISO 15105-2	< 1.1 mg/m²/day
Gas Permeability	Methane Permeability	EN ISO 15105-1	0.13 ml/m²/day/atm
	Methane Permeability (Jointed)	EN ISO 15105-1	1.00 ml/m²/day/atm
	Carbon Dioxide Permeability	EN ISO 15105-1	3.01 ml/m²/day/atm
	Vinyl Chloride Gas Permeability	EN ISO 15105-1	0.04 ml/m²/day/atm
	Radon Permeability	K124/02/95	1.0 x 10^{-12} m²/S

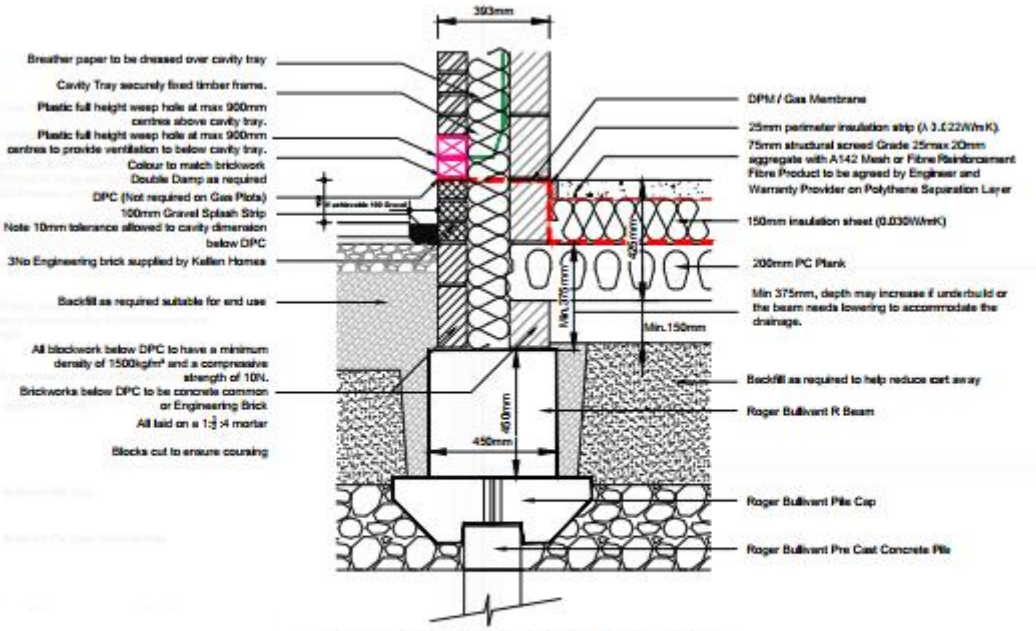
JUTA | TITANTECH

Juta.co.uk

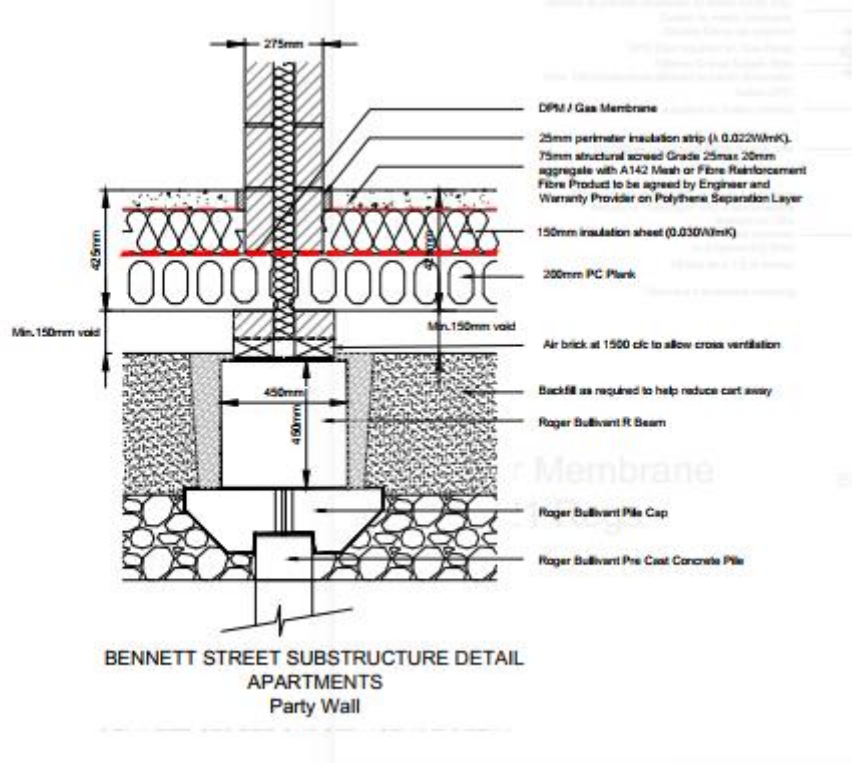
STRUCTURAL ENGINEER'S SUBSTRUCTURE DESIGN



BENNETT STREET SUBSTRUCTURE DETAIL
APARTMENTS
Locations with Telescopic Vents



BENNETT STREET SUBSTRUCTURE DETAIL
APARTMENTS
Locations with Telescopic Vents



PROPOSED DEVELOPMENT PLAN



The gas membrane validation photographs are enclosed within this letter. For information, Table 1 includes references and validation dates of previously validated plots.

Table 1 – Validation Letter Reference

PLOT NUMBER	DATE	REPORT REFERENCE
9-15	19-10-2023	V1
16 & 17	24-10-2023	V2
18 & 19	01-11-2023	V3
Apartment Block 3	08-03-2024	V4
Apartment Block 1	14-03-2024	V5
Apartment Block 2	19-03-2024	V6
136-138 and 147-148	15-05-2024	V7
130-135	28-06-2024	V8
123-127	06-08-2024	V9
119-122	22-08-2024	V10
112-114	23-08-2024	V11
117-118	06-09-2024	V12
105 - 107	16-09-2024	V13
95, 96, 101-104, 128, 129	23-09-2024	V14
139-146	16-09-2024	V15
91-94, 97, 98	02-10-2024	V16
99-100 and 91-92 garages	04-10-2024	V17
80-86	11-10-2024	V18
89-90	06-11-2024	V19
71-76	14-11-2024	V20
77-79 and 87-88	12-11-2024	V21
170-172	22-11-2024	V22
162-169	28-11-2024	V23
60-65	02-12-2024	V24
66-70	04-12-2024	V25
49-59 and 149-150	22-01-2025	V26
20-23	27-01-2025	V27
24-25	30-01-2025	V28
43-48, 155-159	20-02-2025	V29
29-30, 151-154	04-03-2025	V30
1-4, 33-36	12-03-2025	V31
31-32	18-03-2025	V32
26-28	20-03-2025	V33
37-42	19-05-2025	V34
5-8	10-06-2025	V35

WELDED GAS MEMBRANE VALIDATION

Complete

Score	13 / 13 (100%)	**Flagged items**	0	**Actions**	0

Site Name	Bennett street
Location	Olympic Freight Terminal, 6 Brick Kiln Road Manchester England M12 United Kingdom (53.468906217956466, -2.208427152366524)
Project Manager	MD
Project number	15974
Developer	Kellen homes
Site representative Signature	[redacted] 10 Jun 2025 7:47 AM BST
Conducted on	10 Jun 2025 7:33 AM BST
Prepared by	Joe Newall
Have you got the correct Gas Membrane detail (attached to the job in synergist)?	Yes

Gas Membrane Inspection	12 / 12 (100%)
Plot Inspection	12 / 12 (100%)
Plot Inspection 1	12 / 12 (100%)
Plot Number	5-8
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 were possible showing Label)	Black gas membrane
Installer's name, company and qualification	Prs
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


Photo 6


Photo 7


Photo 8


Photo 9

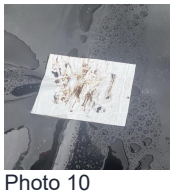

Photo 10


Photo 11


Photo 12

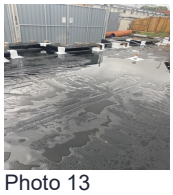

Photo 13


Photo 14


Photo 15

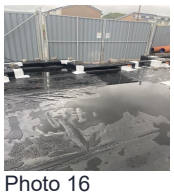
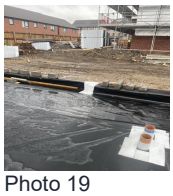
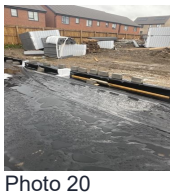
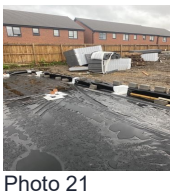

Photo 16

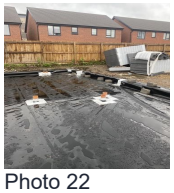

Photo 17

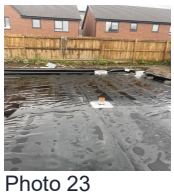

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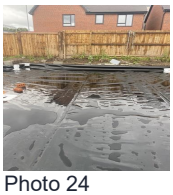

Photo 19


Photo 20


Photo 21


Photo 22


Photo 23


Photo 24

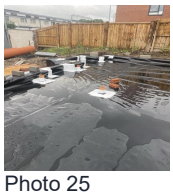
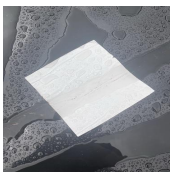
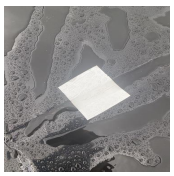

Photo 25


Photo 26


Photo 27


Photo 28

Are welds complete?

Yes


Photo 29


Photo 30

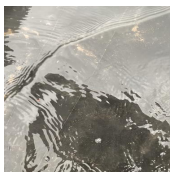
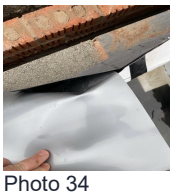

Photo 31


Photo 32


Photo 33

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

Yes


Photo 34

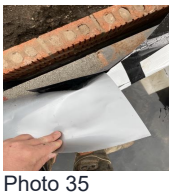

Photo 35


Photo 36

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

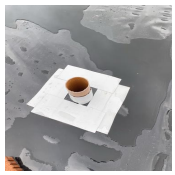
Pass


Photo 37


Photo 38


Photo 39


Photo 40


Photo 41

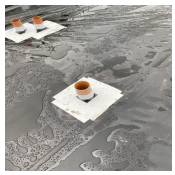

Photo 42


Photo 43


Photo 44


Photo 45


Photo 46


Photo 47

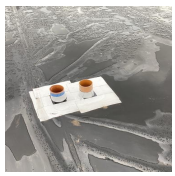

Photo 48


Photo 49

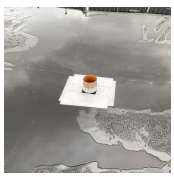

Photo 50


Photo 51

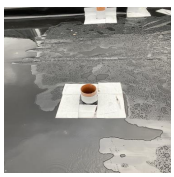
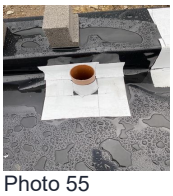
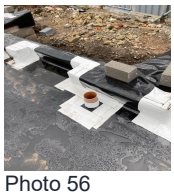

Photo 52


Photo 53


Photo 54


Photo 55


Photo 56

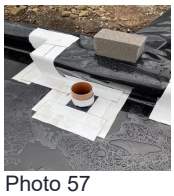

Photo 57


Photo 58

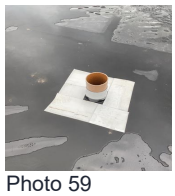

Photo 59


Photo 60

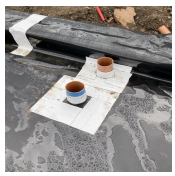

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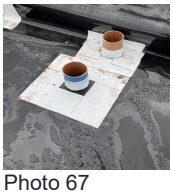

Photo 62


Photo 63


Photo 64


Photo 65


Photo 66


Photo 67

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

Pass


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

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

Pass

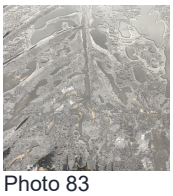
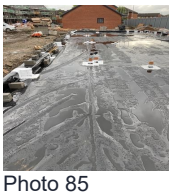
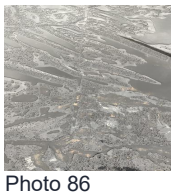
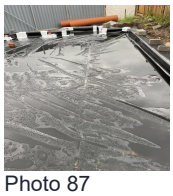
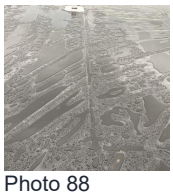

Photo 83

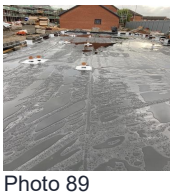

Photo 84

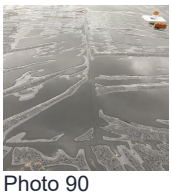

Photo 85

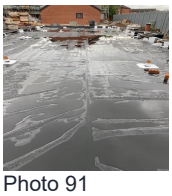

Photo 86


Photo 87


Photo 88


Photo 89


Photo 90


Photo 91

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

Yes


Photo 92


Photo 93

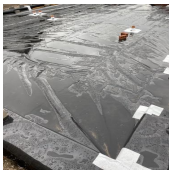

Photo 94


Photo 95


Photo 96


Photo 97


Photo 98


Photo 99


Photo 100


Photo 101

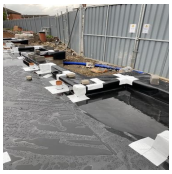

Photo 102


Photo 103


Photo 104


Photo 105


Photo 106


Photo 107


Photo 108


Photo 109


Photo 110


Photo 111


Photo 112

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

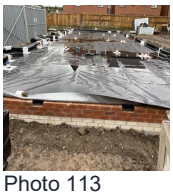
No

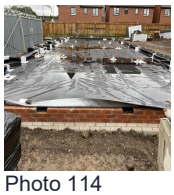
Placing above afterwards

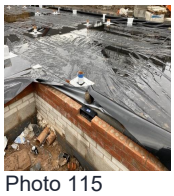
Condition of sub-grade and underside of gas membrane: Check that the subgrade does not contain rough/uneven surfaces, is appropriately clean and that there are no hard/sharp objects. That protective sand blinding or geotextile (if specified) is present and meets the design criteria. (Lift back the membrane and photo the subfloor)

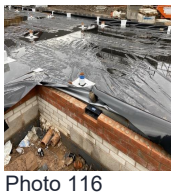
Pass

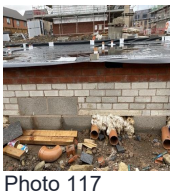
Slab / membrane condition (is membrane clear of snow, standing water, debris or insulation): Can membrane be fully seen and photographed – ask contractor to remove any debris so membrane can be fully seen an inspected – this is a requirement of NHBC and local authorities.	Pass
External Wall Air bricks: Numbers, size. positions as design drawing? (Minimum of 3 walls)	Pass


Photo 113


Photo 114


Photo 115


Photo 116


Photo 117

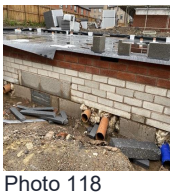

Photo 118


Photo 119

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

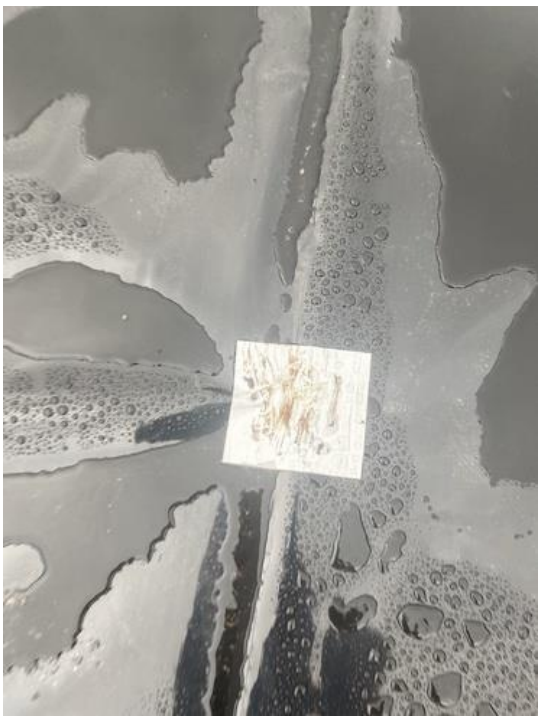


Photo 9



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

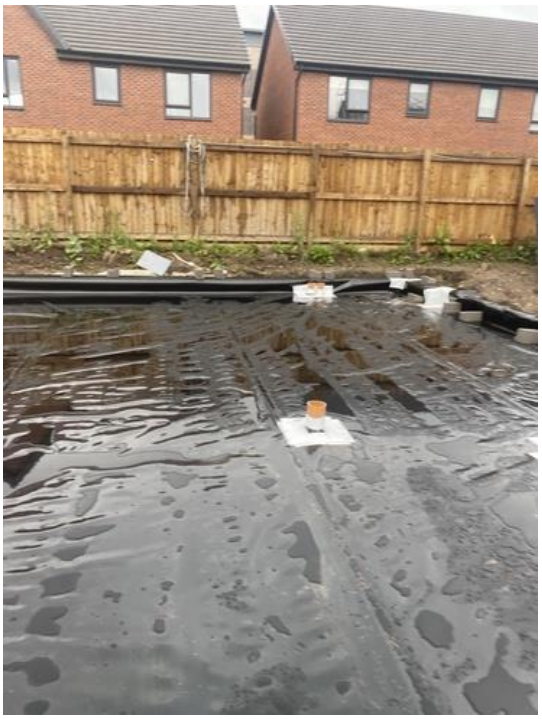


Photo 23



Photo 24



Photo 25



Photo 26

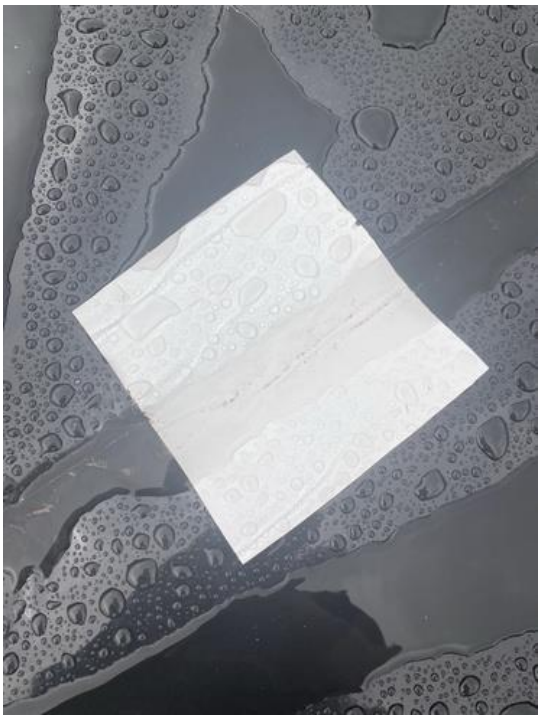


Photo 27



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

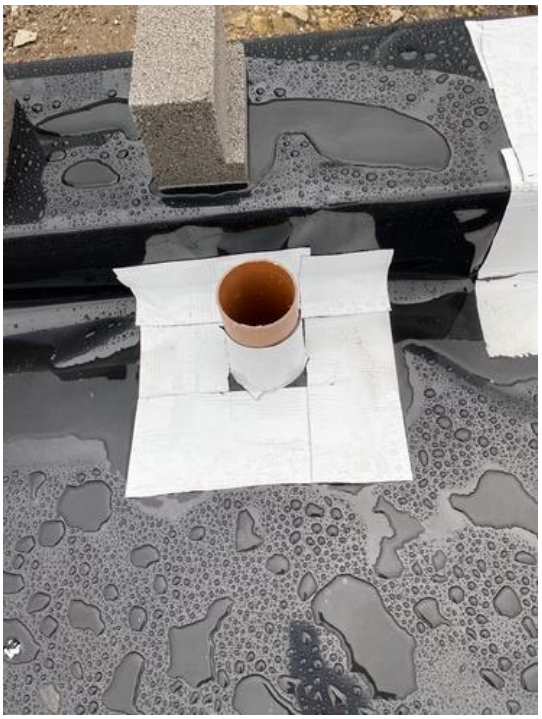


Photo 55



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



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

Subfloor Void Pictures



Plot 47



Plot 48



Plot 49



Plot 50