Date: 30th October 2024
Reference: 15-974 V17

GAS MEMBRANE VALIDATION – BENNETT STREET

Project Name:	Bennett Street
Project Number:	15-974
Client:	Kellen Homes
Date:	04-10-2024
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:	99-100 and 91-92 garages

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 101-104, 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 99-100 and 91-92 garages 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

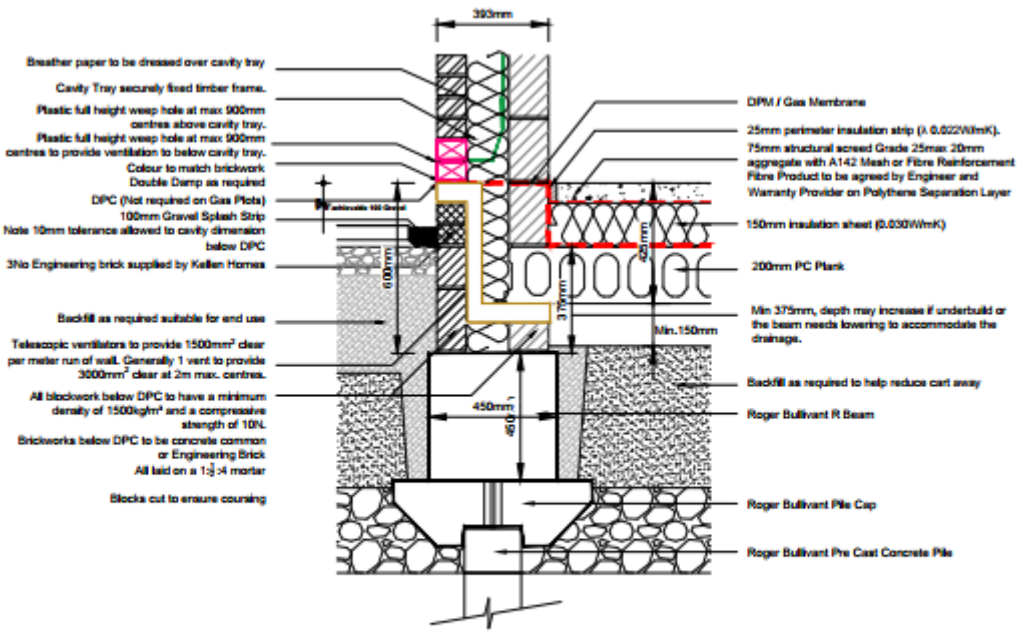
GP® TITANFLEX®

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	1.0×10^{-12} m²/S

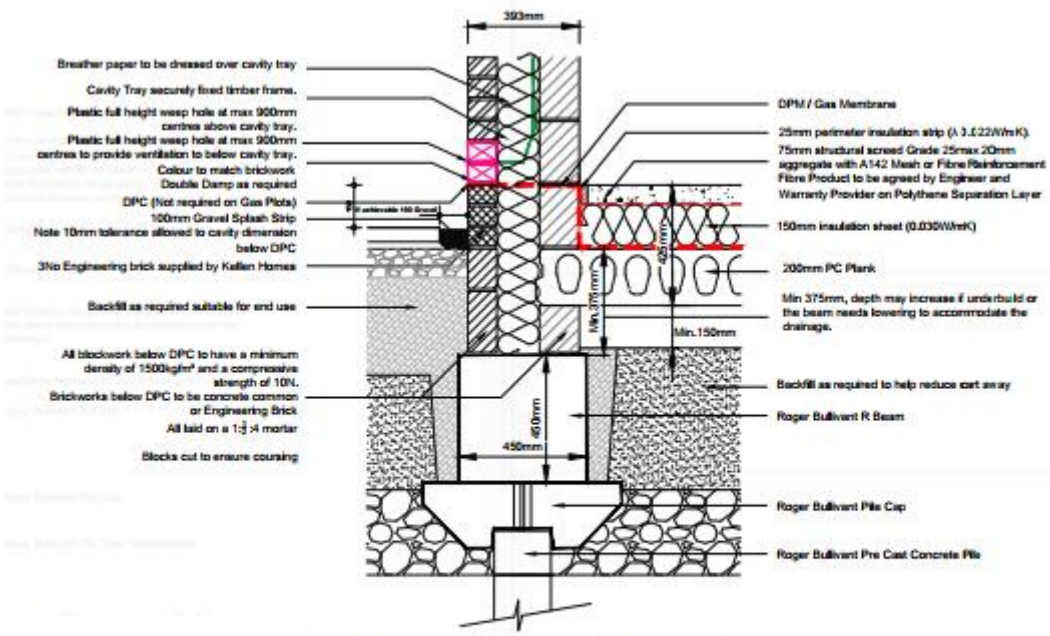
JUTA | TITANTECH

Juta.co.uk

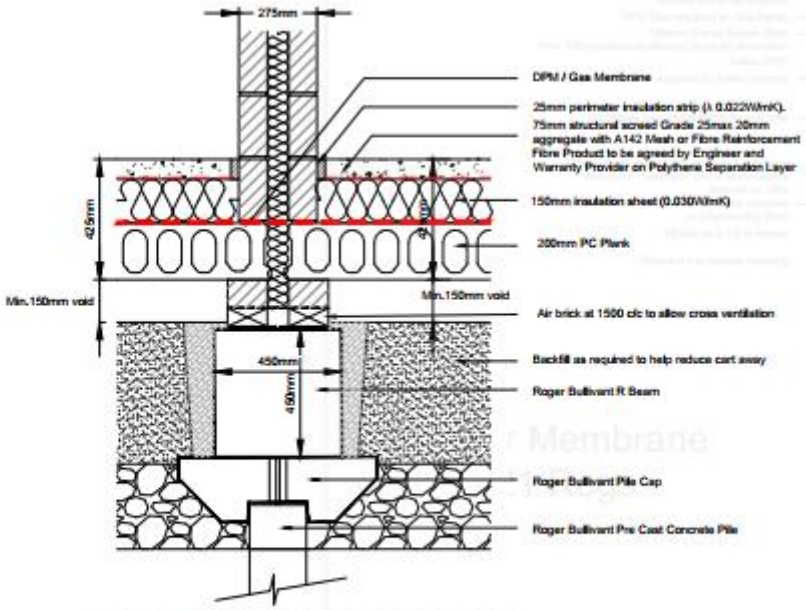
STRUCTURAL ENGINEER'S SUBSTRUCTURE DESIGN



BENNETT STREET SUBSTRUCTURE DETAIL
APARTMENTS
Locations with Telescopic Vents



BENNETT STREET SUBSTRUCTURE DETAIL
APARTMENTS
Locations with Telescopic Vents



BENNETT STREET SUBSTRUCTURE DETAIL
APARTMENTS
Party Wall

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

WELDED GAS MEMBRANE VALIDATION

Complete

Score	49 / 49 (100%)	Flagged items	0	Actions	0

Site Name	Bennet street
Location	54 Brick Kiln Road Manchester England M12 United Kingdom (53.47040316742082, -2.2107117848026356)
Project Manager	MD
Project number	15974
Developer	Kellen homes
Site representative Signature	[redacted] 4 Oct 2024 2:38 PM BST
Conducted on	4 Oct 2024 1:59 PM BST
Prepared by	Joe Newall
Have you got the correct Gas Membrane detail (attached to the job in synergist)?	Yes

Gas Membrane Inspection	48 / 48 (100%)
Plot Inspection	48 / 48 (100%)
Plot Inspection 1	12 / 12 (100%)
Plot Number	99
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)	Juta titan flex
Installer's name, company and qualification	JCW
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

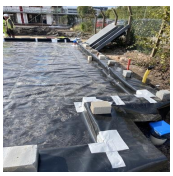


Photo 3

Photo 4

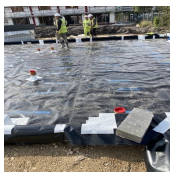


Photo 5

Photo 6

Are welds complete?	Yes

Photo 7

Photo 8

Photo 9

Photo 10

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

Photo 11

Photo 12

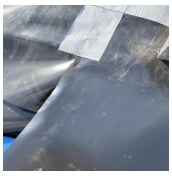


Photo 13

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

Photo 14

Photo 15

Photo 16

Photo 17

Photo 18

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

Photo 19

Photo 20

Photo 21

Photo 22

Photo 23

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

Photo 24

Photo 25

Photo 26

Photo 27

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

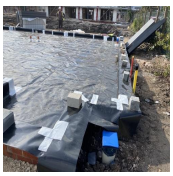


Photo 28

Photo 29

Photo 30

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 an 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

Photo 33

Photo 34

Plot Inspection 2	12 / 12 (100%)
Plot Number	100
Type of Development: if other add Note	House
Floor Slab Type	Block and beam suspended
Are telescopic vents present?	Yes

Photo 35

Photo 36

Gas Membrane Type: Manufacturer, gauge, and colour. (Take photos were possible showing Label)	Juta titan flex
Installer's name, company and qualification	JCW
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

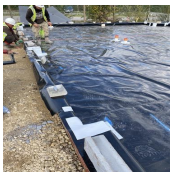


Photo 37

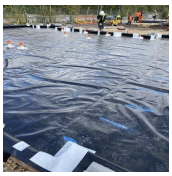


Photo 38

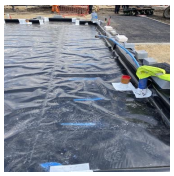


Photo 39

Photo 40

Photo 41

Are welds complete?	Yes

Photo 42

Photo 43

Photo 44

Photo 45

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

Photo 46

Photo 47

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

Photo 48

Photo 49

Photo 50

Photo 51

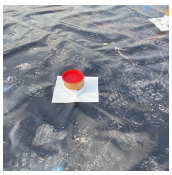


Photo 52

Photo 53

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

Photo 54

Photo 55

Photo 56

Photo 57

Photo 58

Photo 59

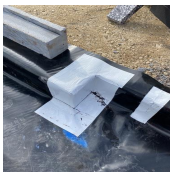


Photo 60

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

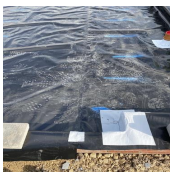


Photo 61

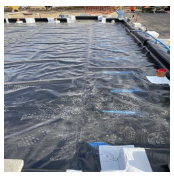


Photo 62

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

Photo 63

Photo 64

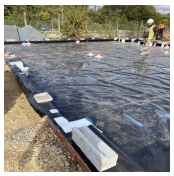


Photo 65

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 an 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

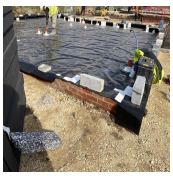


Photo 67

Photo 68

Photo 69

Photo 70

Photo 71

Plot Inspection 3	12 / 12 (100%)
Plot Number	92 garage
Type of Development: if other add Note Garage	Other
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 were possible showing Label)	Juta titan flex
Installer's name, company and qualification	JCW
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 74

Photo 75

Are welds complete?	Yes

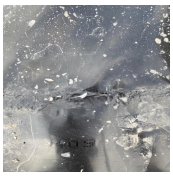


Photo 76

Photo 77

Photo 78

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

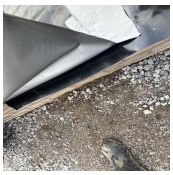


Photo 79

Photo 80

Photo 81

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

Pass

Photo 82

Photo 83

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

Pass

Photo 84

Photo 85

Photo 86

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

Pass

Photo 87

Photo 88

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

Yes

Photo 89

Photo 90

Photo 91

Photo 92

Photo 93

Photo 94

Photo 95

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 an 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 96

Photo 97

Photo 98

Plot Inspection 4	12 / 12 (100%)
Plot Number	91 garage
Type of Development: if other add Note Garage	Other
Floor Slab Type	Block and beam suspended
Are telescopic vents present?	Yes

Photo 99

Photo 100

Gas Membrane Type: Manufacturer, gauge, and colour. (Take photos were possible showing Label)	Juta titan flex
Installer's name, company and qualification	JCW
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 101

Photo 102

Are welds complete?	Yes

Photo 103

Photo 104

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

Photo 105

Photo 106

Photo 107

Photo 108

Photo 109

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

Photo 110

Photo 111

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

Photo 112

Photo 113

Photo 114

Photo 115

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

Photo 116

Photo 117

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

Photo 118

Photo 119

Photo 120

Photo 121

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 an 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 122

Photo 123

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

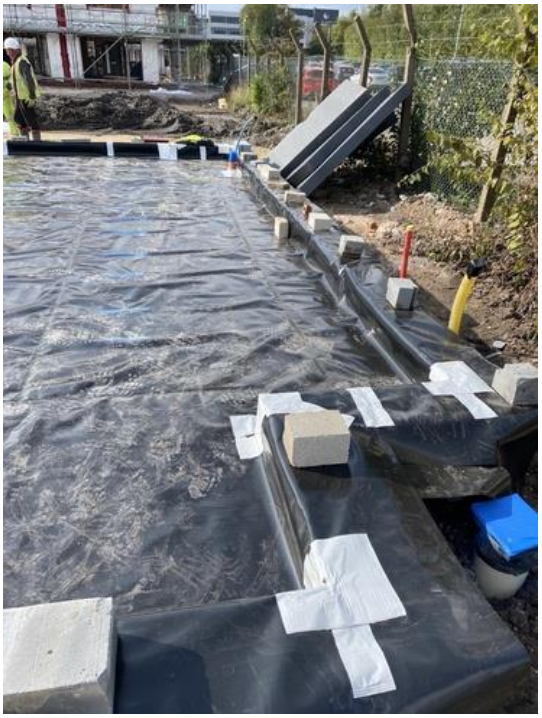


Photo 3

Photo 4

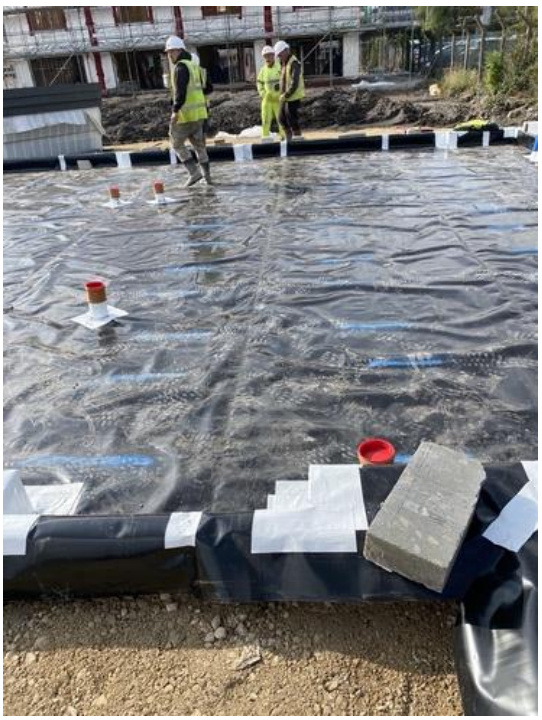


Photo 5

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

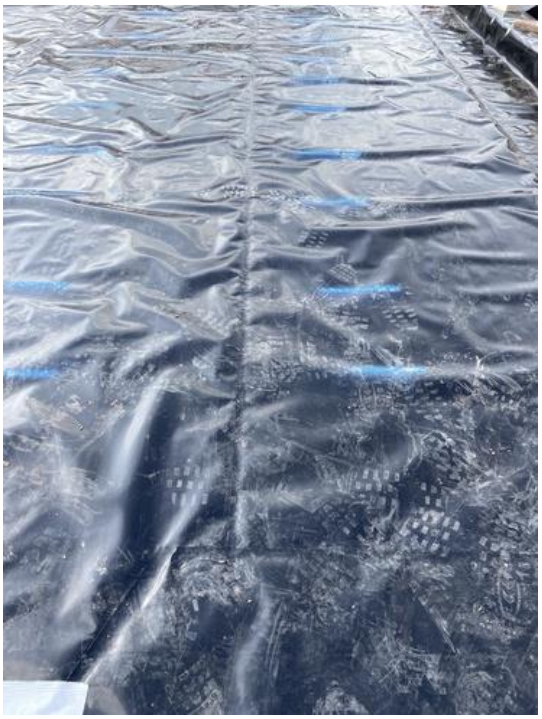


Photo 24

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

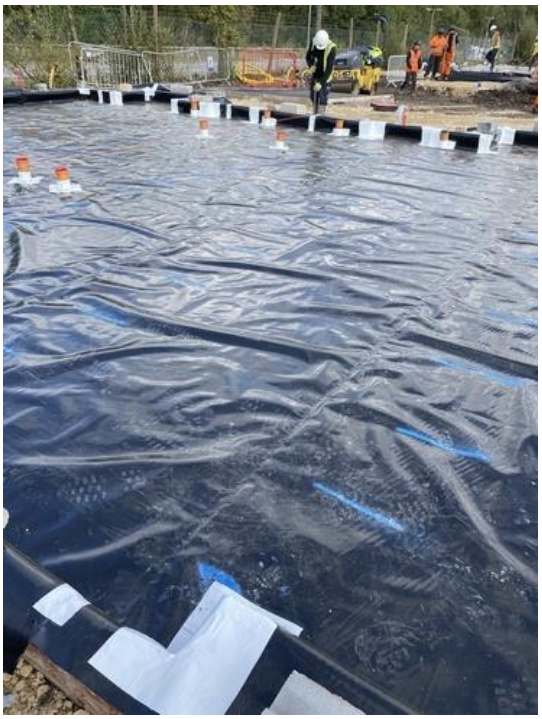


Photo 38

Photo 39

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Photo 41

Photo 42

Photo 43

Photo 44

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Photo 46

Photo 47

Photo 48

Photo 49

Photo 50

Photo 51

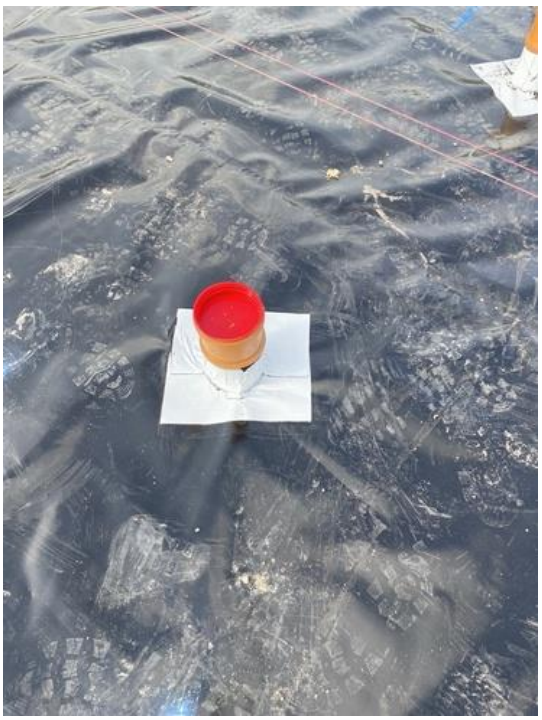

Photo 52

Photo 53

Photo 54

Photo 55

Photo 56

Photo 57

Photo 58

Photo 59

Photo 60

Photo 61

Photo 62

Photo 63

Photo 64

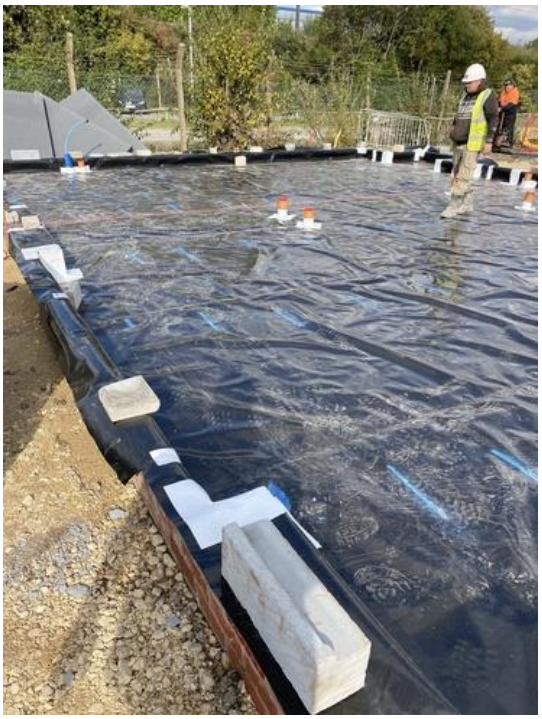

Photo 65

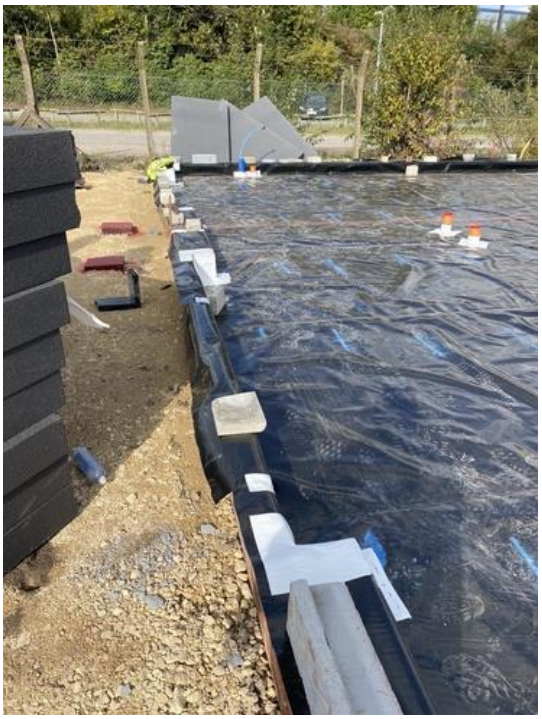

Photo 66

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

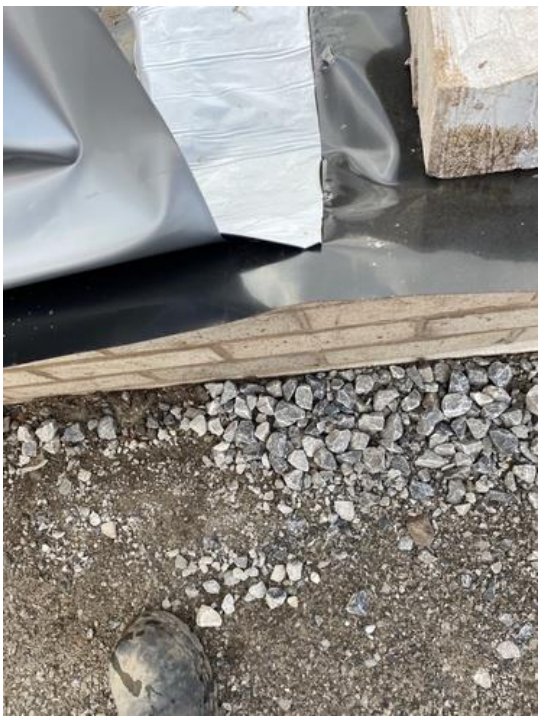

Photo 81

Photo 82

Photo 83

Photo 84

Photo 85

Photo 86

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Photo 95

Photo 96

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Photo 110

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Photo 113

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Photo 121

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Photo 123

SUB-FLOOR VOID PHOTOS

Plot 101	Plot 102
Plot 103	Plot 104

Plot 101/102	