

Waterproofing Scheme
For
Radcliffe, The Hub



PHA Reference: PHA/GEN/L/HUB/600

**Project Ref: RADHUB-PHA-V4-B1-RP-Y-
0600**



Prepared by:

M. A. Earle | WDS CSSW

Initial Date:

15th September 2023

Instructed by:

Mr Danny Sinclair, Director of AJP Ltd, acting as agent on behalf
of Vinci Construction UK

Legacy of Revision:

A - 15/09/23 – RIBA Stage 4 issue

B – 25/09/23 – Project Naming Convention implemented

C - 21/02/24 – Stage 5 issue

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- 2. Appendix

PHA Details

RADHUB-PHA-Y4-00-DR-Y-0001
RADHUB-PHA-Y4-00-DR-Y-0002
RADHUB-PHA-Y4-B1-DR-Y-0003
RADHUB-PHA-Y4-B1-DR-Y-0004
RADHUB-PHA-Y4-B1-DR-Y-0005
RADHUB-PHA-Y4-B1-DR-Y-0006
RADHUB-PHA-Y4-ZZ-DR-Y-0007
RADHUB-PHA-Y4-ZZ-DR-Y-0008
RADHUB-PHA-Y4-ZZ-DR-Y-0009

Flood Zone Map

UKRadon.org Radon Map

Product Specification

RIW LAC BBA Cert
RIW LAC TDS
RIW SHEETSEAL GR TDS
RIW SHEETSEAL DoP
RIW STRUCTURESEAL GPT TDS
RIW Gas Seal Black DPM BBA Cert
RIW Gas Seal Black DPM TDS
RIW SHEETSEAL 9000 DPC BBA Cert
RIW SHEETSEAL 9000 DPC TDS
RIW Double Drain TDS
RIW Double Drain DoP
RIW CEMENTFILL HB TDS

AJP Ltd
1 Dale Street
Liverpool
Merseyside
L2 2ET

15th September 2023

PHA-GEN-L-MB-600

Radcliffe Hub & Market - **Waterproofing Scheme**

Dear Mr Sinclair

I write further to our e-mails and correspondence regarding the waterproofing of the above-mentioned scheme.

To confirm you have appointed me as the Waterproofing Specialist as recommended in BS8102:2022.

The purpose of my appointment is to review the various issues relating to the waterproofing design in conjunction with the method of construction for this particular project and comment as necessary on its compliance to BS8102:2022.

I have also been provided with the following documents as part of my review alongside the structures design:

- Geoenvironmental Appraisal (iD Geoenvironmental Ltd ref: 5238-G-R001– August 2022).

To begin with I will look at outlining BS:8102's requirements/principles.

WATERPROOFING PRINCIPLES AND BS:8102:2022

Penetration of Water from the Ground

Water can penetrate a below ground structure in two ways:

Where the ground is not saturated, it will move through the capillaries of the ground and structure by capillary suction. When this form of moisture comes to the internal surface of the building, surface dampness is evident but there will be no free flow (flooding) of water. Capillary moisture can enter a structure laterally, such as when a wall is earth retaining, and/or it can rise up from the ground through floors or free-standing walls, appearing internally as rising damp.

Where the ground is saturated and hydrostatic pressure occurs, this pressure will push the water through the capillaries of the ground and structure. Where the water comes to the surface, the pressure behind it will force it into the property in the form of liquid water and flooding will occur.

Where a wall is earth-retaining penetration will be lateral, through the retained soil. If the water table is high (either naturally or when water is trapped in a sump created in a low permeability soil when the foundations are excavated), or if rainwater causes the soil to become saturated, then this water will be under hydrostatic pressure and could flood the property internally. If there is no water pressure present, then penetration will be through capillary action, and the property will not flood internally.

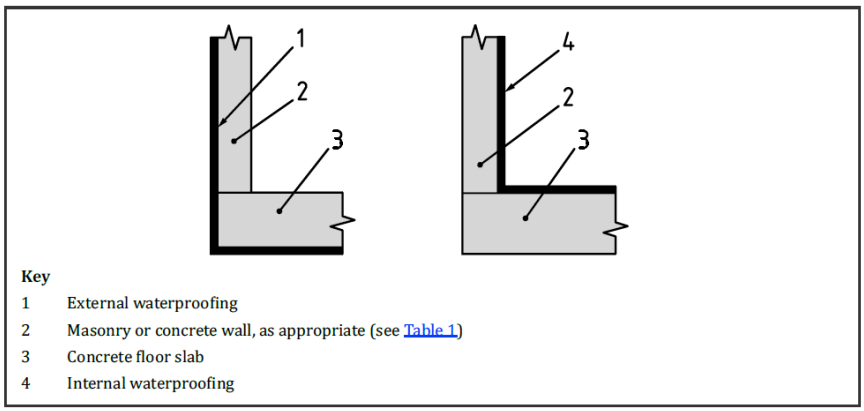
Producing a Dry Environment

Nothing is absolutely dry. Water and water vapour will always exist bound up in the building and in the air. However, a building will be perceived as being dry if the water present does not pose a problem for the inhabitants or contents of that building, or cause damage to internal finishes.

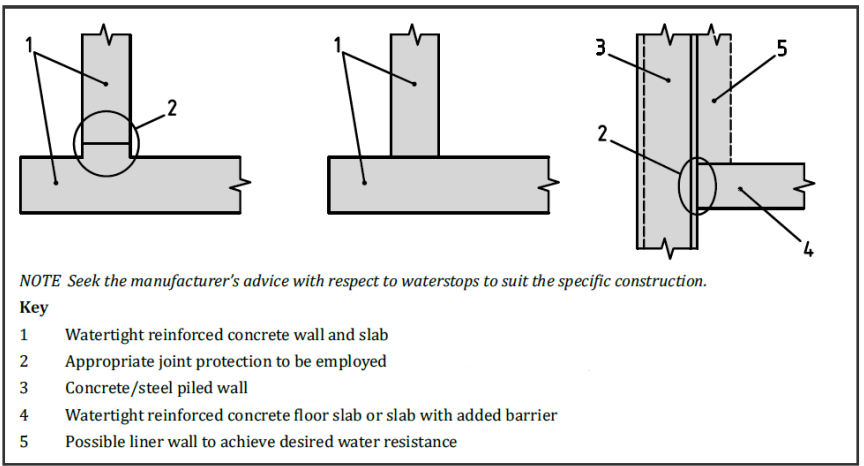
Producing a dry basement requires two distinct and separate steps.

Firstly, penetration of water from the ground must be stopped. BS:8102:2022, Code of Practice for Protection of Below Ground structures against water ingress, defines three forms of waterproofing construction:

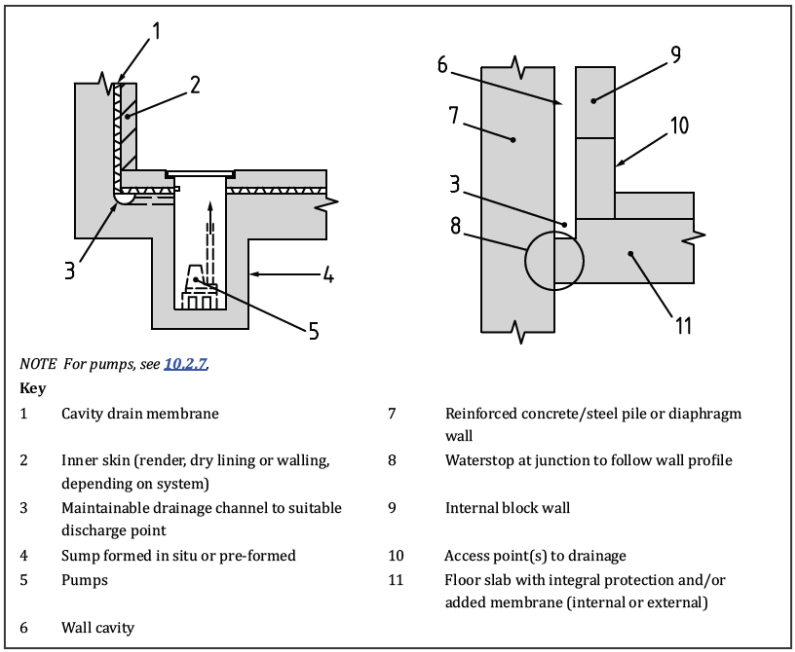
Type A - Barrier Protection, where groundwater is stopped at the point of entry by the application of a waterproof membrane.



Type B - Structurally Integral Protection, where the basement structure is designed and built in such a way that the structure is watertight in its own right. This is usually done using reinforced concrete designed to BS EN 1992-1 Part1 and BS EN 1992-3 and may contain the addition of a concrete waterproofing additive (also see complimenting standards BS:8110 and BS:8007). Waterstops/bars should be present in ALL construction joints.



Type C – Drained Protection, where the structure allows limited groundwater to penetrate, and then diverts that water, in a controlled manner, to a point from where it is removed by drainage or pumping.



Secondly, the internal environment needs to be heated to the appropriate temperature. Furthermore, excess humidity, created by the normal activities of the occupants, must be removed. This is normally done by ensuring there is adequate ventilation (natural or forced) in the area although, in extreme cases, air conditioning or dehumidification may prove to be necessary.

Groundwater

Clause 5.1.2 of BS:8102 says “Even when the site investigation indicates dry conditions, the risk of waterlogging in the future should be assumed”. This effectively means that, regardless of conditions at the time of any site survey/inspection, and regardless of the findings of the soil survey, some groundwater pressure must be assumed.

Defects and Remedial Measures

Paragraph 4.3.2 of BS:8102 says “An ideal waterproofing solution would be defect-free. However, it should be taken into

account that defects might occur in the waterproofing, which then, if subjected to water pressure, could result in the required internal environment not being achieved.”

It then lists types of defect, most of which is avoidable by taking due care during design and installation. However, a category of defect (inherent in the particular system being used) must be allowed for in the design, and it goes on to say, “In either case, the issue of reparability should be taken into account and the

feasibility of remedial measures after completion of the project with finishes in place assessed”.

Environmental Grades

In Table 2 of BS:8102, it defines three grades of internal environment. Grade 1 is generally used for car parks or any other area where absolute dryness is not paramount. Some water ingress may be acceptable provided it does not adversely affect the performance of the area.

Grades 2 & 3 do not permit any penetration of water from the ground but define different levels internal dryness with Grade 3 being reserved normally for habitable or ‘dry’ spaces.

THE STRUCTURE CONSTRUCTION AND USE

Looking at this particular scheme the following observations are relevant in terms of waterproofing design.

1. The scheme is understood to comprise of a new build, mixed use civic centre development. Consisting of swimming pools, communal areas, rock climbing, library, and associated plant & infrastructure. Along with the new build portion there is the redevelopment of an existing Victorian market under separate cover; RADHUB-PHA-Y3-B1-RP-Y-0001.

2. The retaining elements are against the lift pits, integral pool plant room, water tank room, swimming pools, stair cores and clip and climb area. The lift pits, integral pool plant and water tank room would be considered a Grade 2 environment. The swimming pools, stair cores and clip climb would be considered Grade 3, due to proposed use and internal finishes.
3. Where there are retaining element, these are to be formed from reinforced concrete retaining walls and reinforced concrete slab(s). The lift pits also include a reinforced concrete pile cap foundation.

4. The soils encountered during the site investigation are summarised below, as per iD Geoenvironmental Ltd Geoenvironmental Appraisal: 5238-G-R001, Executive summary:

Made Ground between 0.6m – 1.8m thick is present across the site with several below ground obstructions associated with former buildings encountered during the investigation.

Glaciofluvial Sheet Deposits typically comprising low shear strength brown sandy gravelly clay underlain by medium dense grey gravelly sand were encountered directly beneath the Made Ground and were proven to depths ranging between 3.0m to 5.2mbgl.

Geotechnical testing indicates that cohesive Glaciofluvial Sheet Deposits at the site should be regarded as being of medium volume change potential.

Pennine Middle Coal Measures (PMCM) bedrock comprising grey to dark grey thinly laminated Mudstone with extremely variable rock mass characteristics was encountered at depths ranging from 3.0mbgl to 5.2mbgl and were proven to a maximum depth of 18.0m in BH07. A thin band of coal was encountered in BH06 at a depth of 13.2-13.3m.

5. Groundwater was encountered during site investigations at depth between 1.33mbgl to 4.15mbgl. It should be noted that a slightly deeper, secondary body of water was observed, resting approx. 1m above the Pennine Middle Coal Measures bedrock, this sits the body between 0.3m to 0.4m to the underside of -02 basement lvl.

6. The site is identified to be within a Gas Risk Zone. The site is not identified to be in a Flood Zone (Flood Zone 1) as per UK Government website flood maps flood-map-for-planning.service.gov.uk. However, it runs parallel to a Flood Zone 3 area and body of water in the form of the river Irwell. The South-eastern wall of the Hub's sister-building; the market building, retains against the river. In December 2015, Irwell broke its banks causing localised flooding. See images below featuring The Market Building retaining wall:



7. The site is within an area identified as needing basic Radon protection measures. Radon levels recorded in 1% - 3% of dwellings above actionable levels. As per ukradon.org mapping information. Please advise if otherwise.

Waterproofing of this scheme

Looking at the ground conditions, groundwater has been encountered. Whilst the soil types found within the superficial deposits are permeable, of that found in Secondary A Aquifers, the water table is high. The site, specifically the Market Building, has been found to reside parallel to Flood Zone 3 and a flowing body of water. With this in mind, we would class the risk of the site to be high. As such, a form(s) of waterproofing should be introduced.

What follows are the waterproofing strategies/rational for each scenario.

The Hub

The Hub will be forming a brand new three storey community centre for the people of Radcliffe. This includes a basement portion and swimming pools which will be fully retaining. Due to the elevated risk of this site, a dual system approach will be taken for all Grade 3 areas in-line with BS:8102:2022, 6.2.3. This will be in the form of a combined Type A + Type B system. The most appropriate Type A barrier would be a pre-applied mechanically bonded membrane. The Type B should be formed of reinforced concrete with a water-tight additive, all construction joints secured with waterstops. The Type B approach as described would be the most robust system for all Grade 2 areas, as an exposed concrete finish will allow for unimpeded access should remediation be required. Where a Grade 2 and grade 3 space are side-by-side, the Type A membrane should extend min. 1m from the Grade 2 footprint across the Grade 3 space. The below ground structural waterproofing should terminate min. 150mm above ground, and where appropriate, tie into the superstructures DPC.

Habitable Space less than 150mm above ground level

Where the FFL of a habitable space is less than 150mm above the external ground level, a premium Full Bonded Pre-Applied Type A barrier membrane is to lap vertically up the edge or toe of the RC Slab. A Liquid-Applied Fully Bonded Self-Adhesive Membrane is to be installed to the ground retaining blockwork, lapping the Pre-Applied Membrane min. 150mm and terminate up to the gas proof DPC/cavity tray.

A protective system, such as a geo-synthetic drainage board should be applied externally to protect the membrane situated against the retaining ground/backfill.

Further consideration for a land drain system may be required as to alleviate any localise perched water or hydrostatic pressure.

Please refer to PHA detail RADHUB-PHA-Y4-00-DR-Y-0001_P02 & RADHUB-PHA-Y4-00-DR-Y-0002_P02.

Swimming Pools

As the swimming pools are water-retaining structures that also reside in a habitable space, it is as much to keep the water ‘out’

as it is ‘in’. With this in mind, the pools have been designated as a Grade 3 space that will benefit from a dual system. This will be in the form of sprayed Type B structural integral waterproof concrete and a fully bonded pre-applied Type A barrier membrane. The pool structure will be sprayed monolithically directly against the barrier membrane, this will be conducted by an independent specialist. As access for remediation will be limited due to the containment of chlorinated water, utilising the Type A as the primary form of defence and Type B as the secondary will best mitigate the possibility of failure.

Any and all service penetrations should be secured correctly with waterbar and/or an appropriate puddle flange. Services penetrating through a water retaining structure should be ‘cast-in’, box-out and cord detailing should be avoided.

Clip and Climb

The Clip & Climb is situated across two storeys, -02 basement and -01 lower ground floor. It is formed through typical civil construction consisting of contiguous piling, RC pile cap, RC liner wall and RC slab. Type B structurally integral waterproof concrete lends itself to be the most effective waterproofing system for this type of construction. The addition of a fully bonded pre-applied Type A barrier membrane should be utilised as the area is designated as a Grade 3 habitable space, and as such, a dual system approach should be adopted. Due to the application of internal finishes and the fixing of the Clip & Climb frame system, access for remediation will be limited, utilising the Type A as the primary form of defence and Type B as the secondary will best mitigate the possibility of failure.

All new ‘Type B’ to ‘Type B’ construction joints should be prepared correctly with clean, exposed aggregate and secured with a hydrophilic waterbar. Any and all service penetrations should be secured correctly with waterbar and/or an appropriate puddle flange. Services that reside within a cord, duct, sleeve or conduit will also need to be secured with appropriate hydrophilic and high-density grout.

Please refer to PHA detail RADHUB-PHA-Y4-B1-DR-Y-0003_P02.

Water Tank Room and Pool Plant Room

The retaining reinforced concrete walls and slab (and where applicable, service trench(es)) are to be formed in Type B structurally integral waterproof concrete. As this is a Grade 2 space, where no penetration of liquid water is acceptable, but damp/condensation through use is acceptable, a single system will be sufficient. Further to this, the concrete finishes will be exposed, meaning that any remedial work that may be required due to failure in the waterproofing can be performed with relative ease.

A Type A Fully Bonded Pre-applied Sheet Membrane is also to be introduced as a gas proofing measure, adding a another line of defence to the structural waterproofing.

All new 'Type B' to 'Type B' construction joints should be prepared correctly with clean, exposed aggregate and secured with a hydrophilic waterbar. Any and all service penetrations should be secured correctly with waterbar and/or an appropriate puddle flange. Services/mains that reside within the ducting entering the plant area are the responsibility of the DNO/IDNO to secure and make water-tight.

Please refer to PHA detail RADHUB-PHA-Y4-B1-DR-Y-0004_P02.

Stair Cores

Where the stair cores are retaining ground, either semi or fully, they are to be formed in Type B structurally integral waterproof concrete with the addition of a fully bonded pre-applied Type A membrane. This adoption of a dual system approach is recommended as the cores will benefit from internal finishes along with the appropriate environmental management, deeming them a Grade 3 habitable space. Access for remediation may be limited due to the internal finishes, so utilising the Type A as the primary form of defence and Type B as the secondary will best mitigate the possibility of failure.

All new 'Type B' to 'Type B' construction joints should be prepared correctly with clean, exposed aggregate and secured with a hydrophilic waterbar. Any and all service penetrations should be secured correctly with waterbar and/or an appropriate puddle flange. Services that reside within a cord, duct, sleeve or conduit will also need to be secured with appropriate hydrophilic and high-density grout.

Please refer to PHA detail RADHUB-PHA-Y4-B1-DR-Y-0006_P02.

Lift Pit

Type B structurally integral waterproof concrete lends itself to be the most effective waterproofing system for this type of construction. As this is a Grade 2 space, where no penetration of liquid water is acceptable, but damp/condensation through use is acceptable, a single system will be sufficient. Further to this, the concrete finishes will be exposed, meaning that any remedial work that may be required due to failure in the waterproofing can be performed with relative ease.

A Type A Fully Bonded Pre-applied Sheet Membrane is also to be introduced as a gas proofing measure, adding a another line of defence to the structural waterproofing.

All new 'Type B' to 'Type B' construction joints should be prepared correctly with clean, exposed aggregate and secured with a hydrophilic waterbar. Any and all service penetrations should be secured correctly with waterbar and/or an appropriate puddle flange. Services that reside within a cord, duct, sleeve or conduit will also need to be secured with appropriate hydrophilic and high-density grout.

Please refer to PHA detail RADHUB-PHA-Y4-B1-DR-Y-0005_P02.

General Notes

Any sub-soil land drainage must be positioned no higher than the bottom of underfloor void and must have provision for access should maintenance be required. This should be designed by an appropriately qualified engineer to take into consideration levels, discharge points etc.

Waterproofing must link in with the superstructure damp-proofing. This has been achieved by taking a post applied Type A waterproof membrane from the below ground 'tanking' and linking up to the cavity tray/DPC.

Any service penetrations through the retaining elements should be detailed appropriately. If such items are present, please let me know and I will comment accordingly.

I confirm I am a Certificated Surveyor of Structural Waterproofing (CSSW) and appear on the Waterproofing Design Specialist Register, both of which can be confirmed if required by contacting the Property Care Association (PCA).

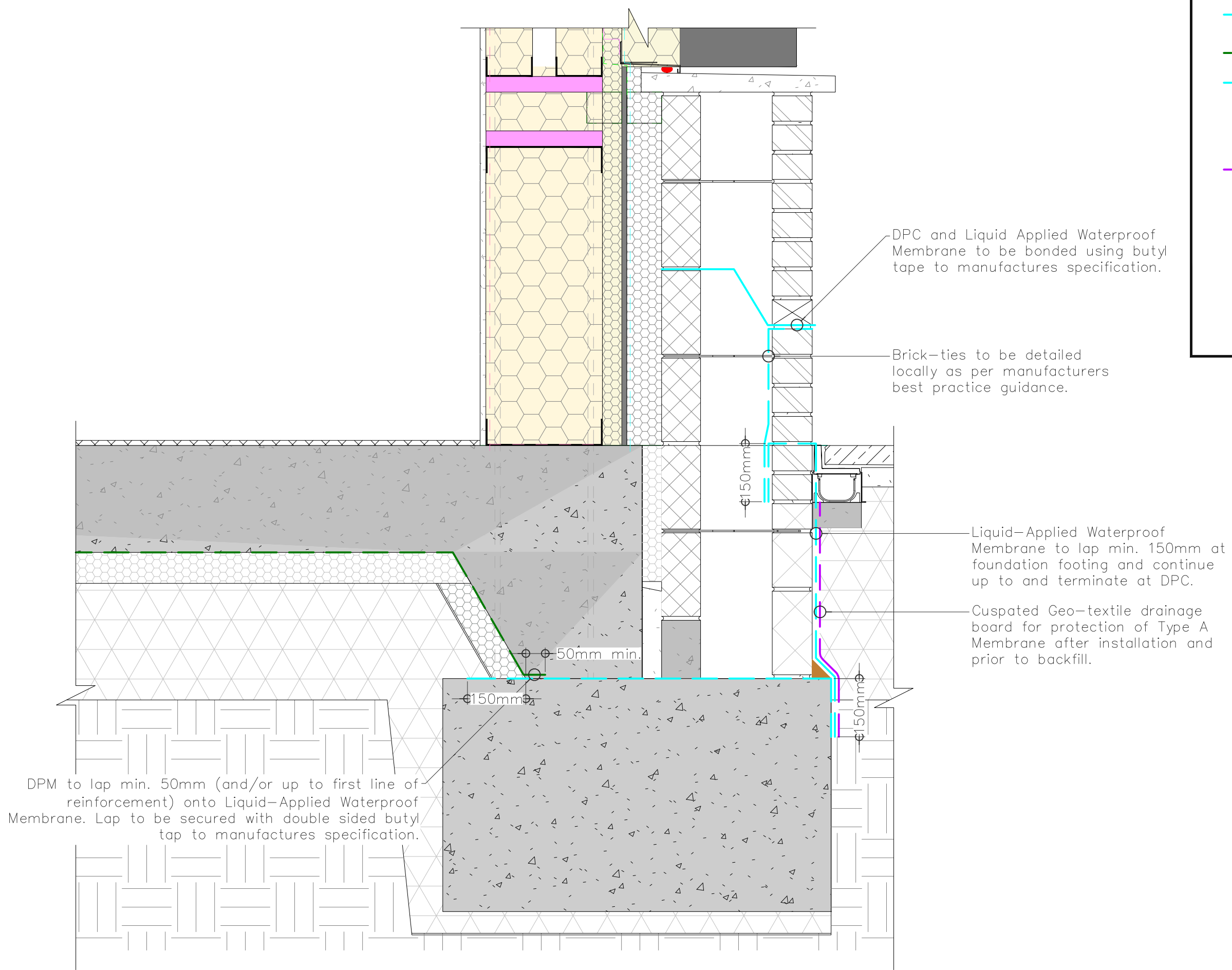
Yours sincerely,



Michael Earle | WDS CSSW

Director

Enc.



DPM to lap min. 50mm (and/or up to first line of reinforcement) onto Liquid-Applied Waterproof Membrane. Lap to be secured with double sided butyl tap to manufactures specification.

DPC and Liquid Applied Waterproof Membrane to be bonded using butyl tape to manufactures specification.

Brick-ties to be detailed locally as per manufacturers best practice guidance.

Liquid-Applied Waterproof Membrane to lap min. 150mm at foundation footing and continue up to and terminate at DPC.

Cuspated Geo-textile drainage board for protection of Type A Membrane after installation and prior to backfill.

K E Y

- RIW
- Sheetseal
- 9000 DPC
- RIW Gas Seal
- Black RIW
- LAC
- 50mm x 50mm triangular fillet of RIW Cementfill HB
- RIW Double Drain (as protection)

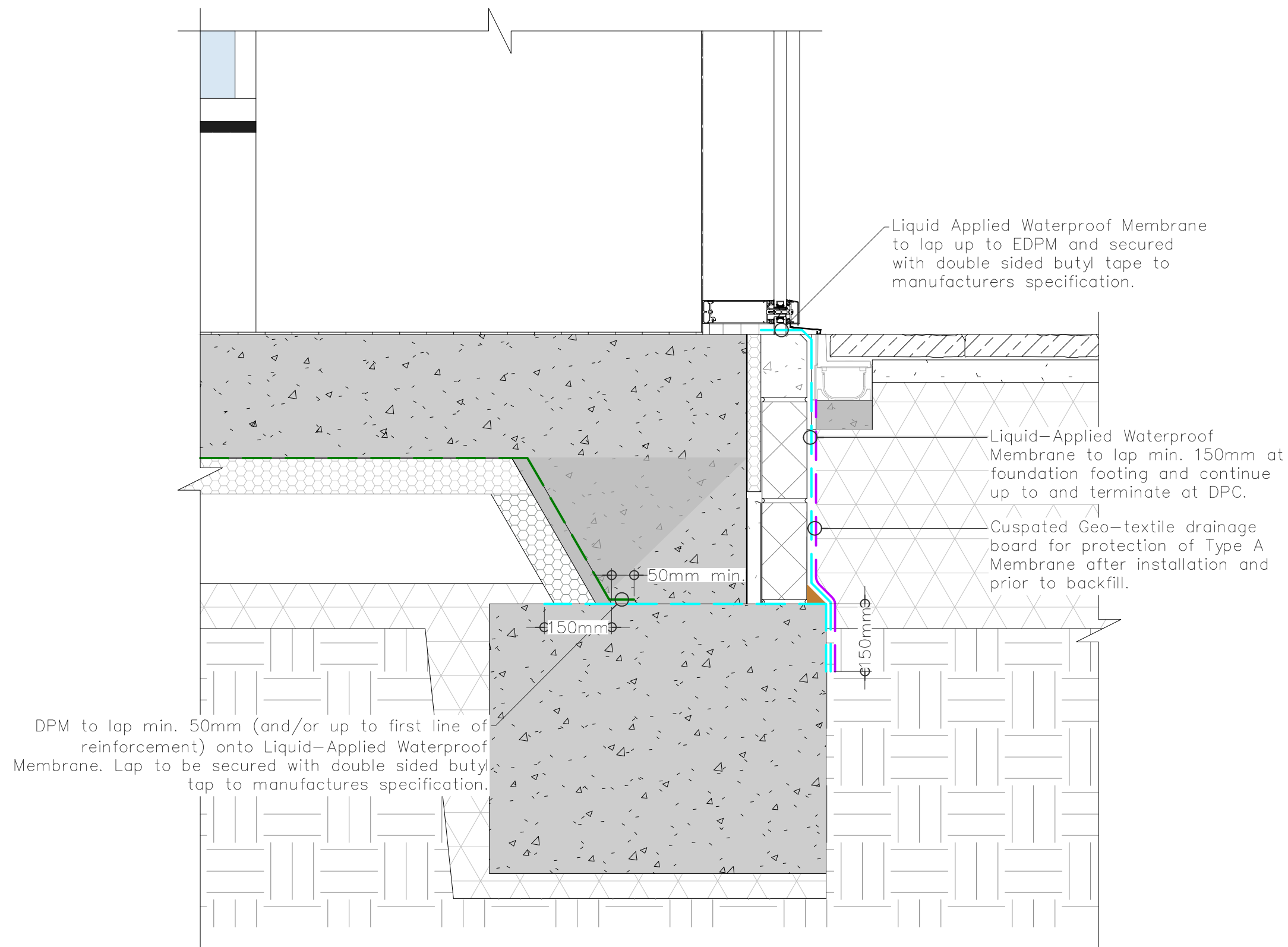
N.A. — Where the FLL at perimeter of the building is up to 150mm below ground, this detail may also be utilized.

N.B. — For original architects detail please refer to Pozzoni drawing:

Rev C01	21/02/24	ME
Construction stage issue		
Rev P02	23/09/23	LD
DRG updated in-line with VINCI Project Naming Convention		
Rev P01	13/09/23	LD
First Issue		



PROJECT		
Radcliffe		
CLIENT		
AJP		
DRAWING TITLE		
Building Perimeter FFL Less than 150mm Above Ground Le		
DRAWING NUMBER		
RADHUB-PHA-V4-00-DR-Y-0001		
REVISION		
C01		
STATUS		
CONSTRUCTION		
SCALE		
1:10 on A3		



KEY

- RIW Gas Seal Black RIW
- LAC
- 50mm x 50mm triangular fillet of RIW Cementfill HB
- RIW Double Drain (as protection)

N.A. — Where the FLL at perimeter of the building is up to 150mm below ground, this detail may also be utilized.

N.B. — For original architects detail please refer to Pozzoni drawing:

Rev C01	21/02/24	ME
Construction stage issue		
Rev P02	25/09/23	LD
DRG updated in-line with VINCI Project Naming Convention		
Rev P01	13/09/23	LD
First issue		



PROJECT

Radcliffe

CLIENT

AJP

DRAWING TITLE

Building Perimeter Curtain Wall Level Threshold

DRAWING NUMBER

RADHUB-PHA-V4-00-DR-Y-0002

REVISION

C01

STATUS

CONSTRUCTION

SCALE

1:10 on A3



Rev C01	21/02/24 = ME
Construction stage issue	
Rev P02	25/09/23 = LE
DRG updated in-line with VNCI Project Naming Convention	
Rev P01	14/09/23 = LE
First issue	

KEY

RIW Gas Seal

Black

LAC

RIW Sheesteeal

GR

RIW Structuredseal

GPT

Hydrophilic Waterbar

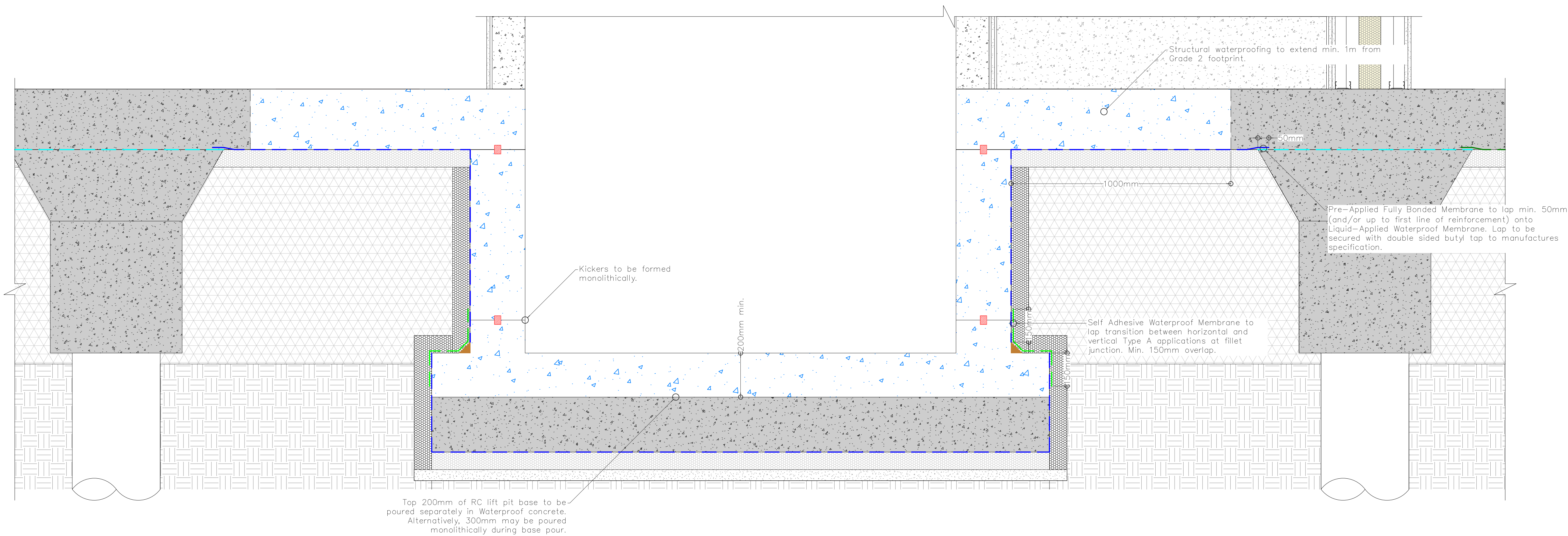
Waterproof Concrete

50mm x 50mm triangular fillet of RIW Cementfill HB

RIW Double Drain (as protection)

N.A.

For original architects details please refer to Pozzoni drawing: 'RADHUB-POZ-V4-XX-DR-A-6250_P



Rev	CD1	21/02/24	ME
Construction stage issue			
Rev	PO2	25/09/23	LO
DSD updated in-line with WIG Project Name Change			
Rev	PO1	14/09/23	LO
First issue			

PHIA

INDEPENDENT WATERPROOFING CONSULTANTS

PROJECT

Radcliffe

CLIENT

AJP

DRAWING TITLE

LIFT PIT

DRAWING NUMBER

RADHUB-PIA-V4-B1-DR-Y-0005

REVISION

CD1

STATUS

CONSTRUCTION

SCALE

1:10 on A1

INDEPENDENT WATERPROOFING CONSULTANTS

info@phiawaterproofing.co.uk
www.phiawaterproofing.co.uk
0208 067 3032

KEY

RIW

Sheetseal

9000 DPC

RIW Gas Seal

Black

RIW

LAC

RIW Sheesteal

GR

RIW Structuredseal

GPT

Hydrophilic

Waterbar

Waterproof

Concrete

Continuous

profiling fillet of

SBR

RIW Double Drain

(as protection)

N.A.

— For original architects

details please refer to Pozzoni

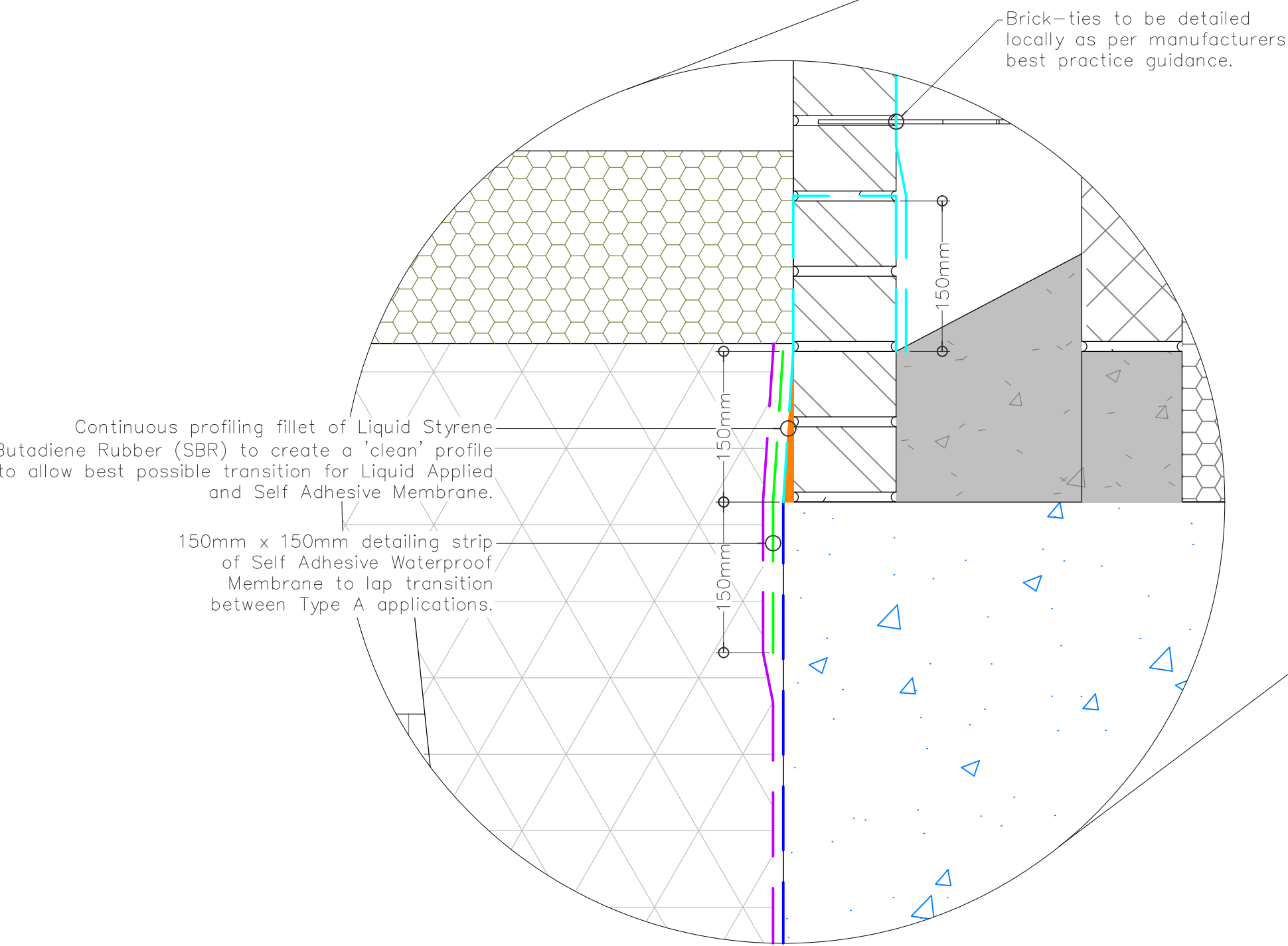
drawing:

RADHUB-POZ-V4-ZZ-DR-A-3603_P

2

Blockwork Wall to Capping Beam Profiling Detail

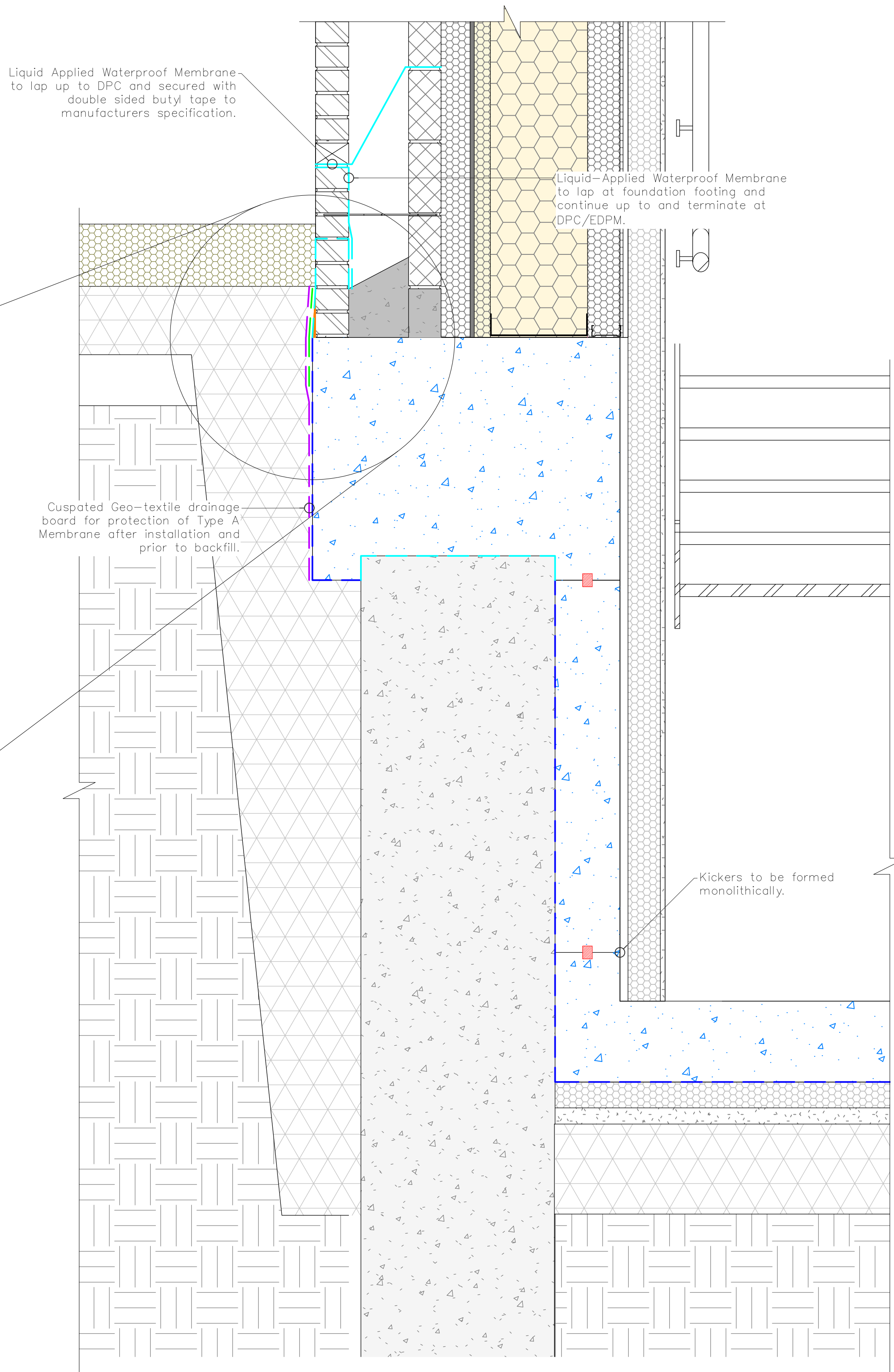
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1

Staircore Piled Retaining Wall Detail

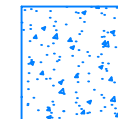
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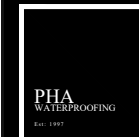


Hydrophilic
Waterbar



Waterproof
Concrete

Rev C01	21/02/24 – ME
Construction stage issue	
Rev P02	25/09/23 – LD
DRG updated in-line with VINCI Project Naming Convention	
Rev P01	15/09/23 – LD
First Issue	



PROJECT

Radcliffe

CLIENT

CONSTRUCTION

DRAWING TITLE

RC Slab Joint

DRAWING NUMBER

RADHUB-PHA-V4-ZZ-DR-Y-0007

REVISION

C01

STATUS

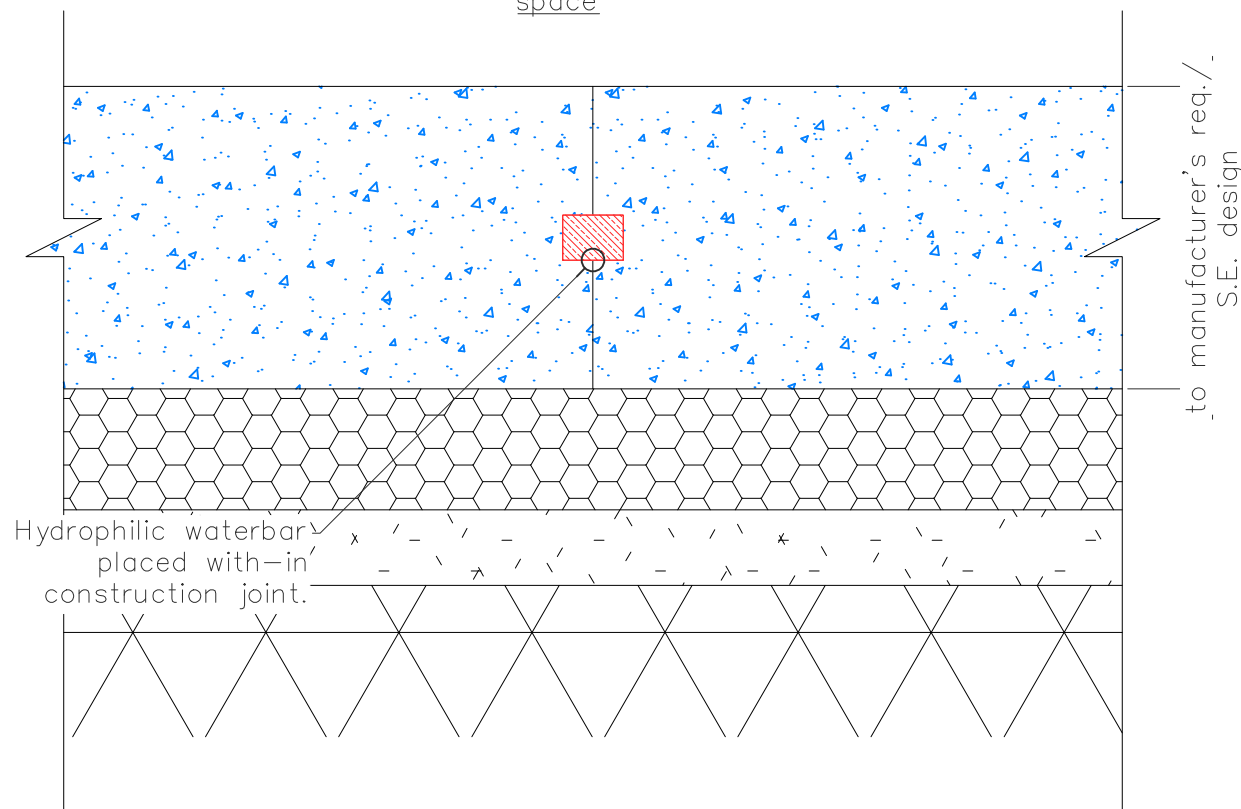
PRELIMINARY

SCALE

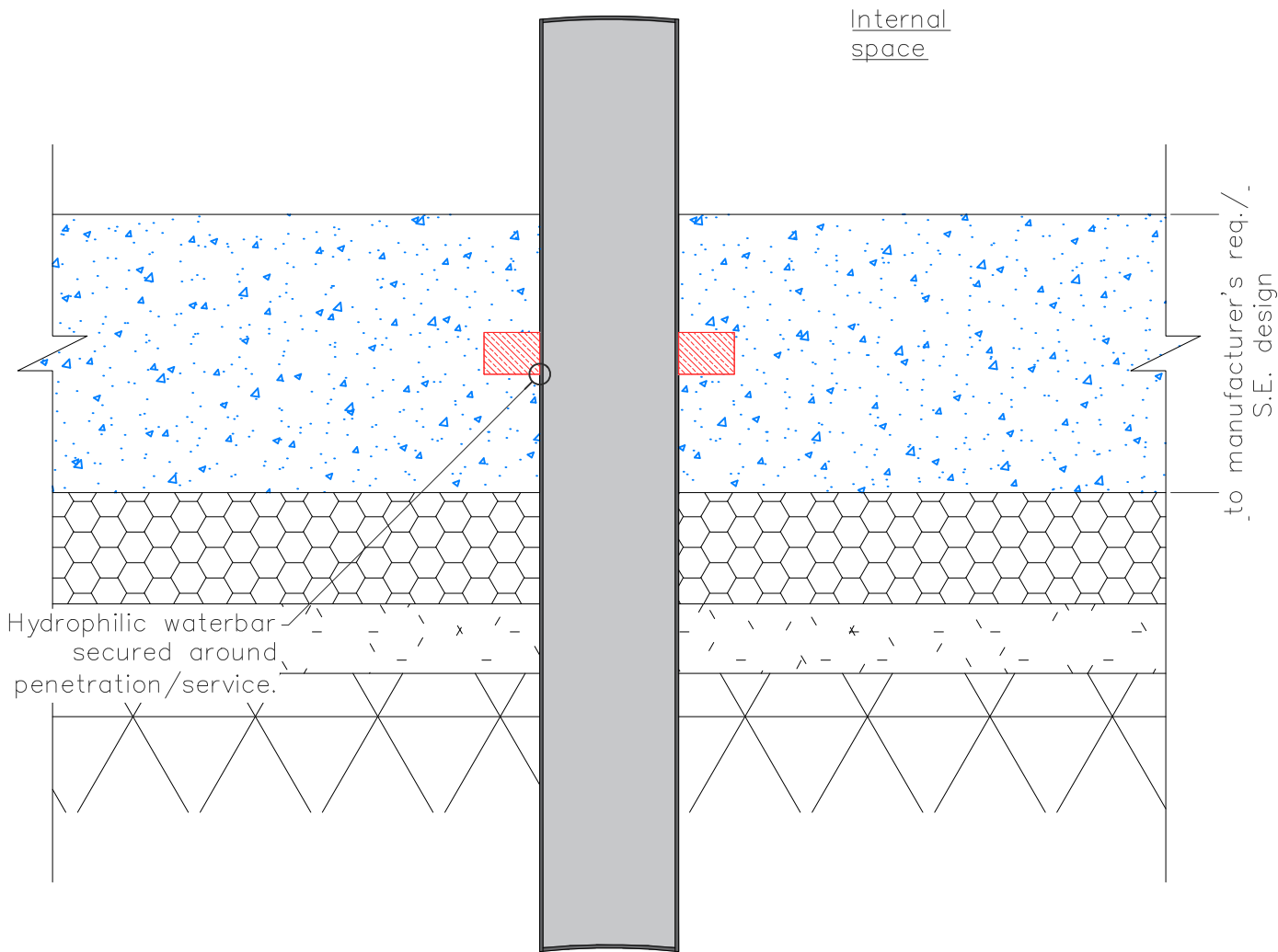
1:5 on A4

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info@philhewitt.co.uk |
www.philhewitt.co.uk
0208 087 3032

Internal
space



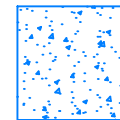
Hydrophilic waterbar
placed with-in
construction joint.



KEY



Hydrophilic
Waterbar



Waterproof
Concrete

Rev C01	21/02/24 - ME
Construction stage Issue	
Rev P02	25/09/23 - LD
DRG updated in-line with VINCI Project Naming Convention	
Rev P01	15/09/23 - LD
First Issue	



PROJECT

Radcliffe

CLIENT

AJP

DRAWING TITLE

RC Slab Pipe Penetration Cast-in

DRAWING NUMBER

RADHUB-PHA-V4-ZZ-DR-Y-0008

REVISION

C01

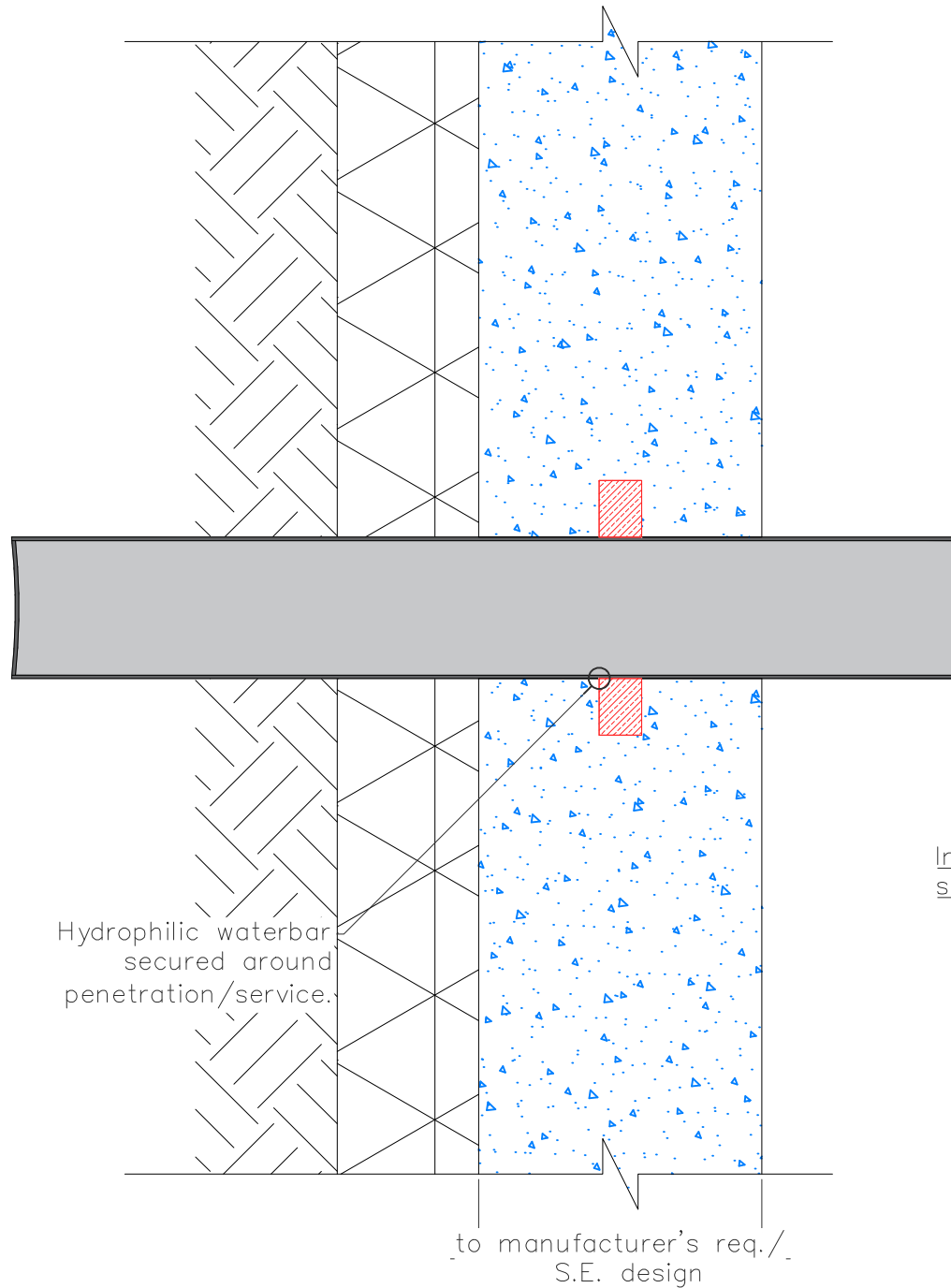
STATUS

CONSTRUCTION

SCALE

1:5 on A4

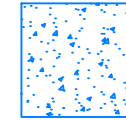
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0208 087 3032



KEY



Hydrophilic
Waterbar



Waterproof
Concrete

Rev C01	21/02/24 – ME
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Rev P02	25/09/23 – LD
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First Issue	



PROJECT

Radcliffe

CLIENT

AJP

DRAWING TITLE

RC Wall Pipe Penetration Cast-in

DRAWING NUMBER

RADHUB-PHA-V4-ZZ-DR-Y-0009

REVISION

C01

STATUS

CONSTRUCTION

SCALE

1:5 on A4

INDEPENDENT WATERPROOFING CONSULTANTS
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www.philhewitt.co.uk
0208 087 3032

Flood map for planning

Your reference
600_FloodZone

Location (easting/northing)
378556/406924

Created
18 Oct 2022 11:46

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following:**

- bigger than 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

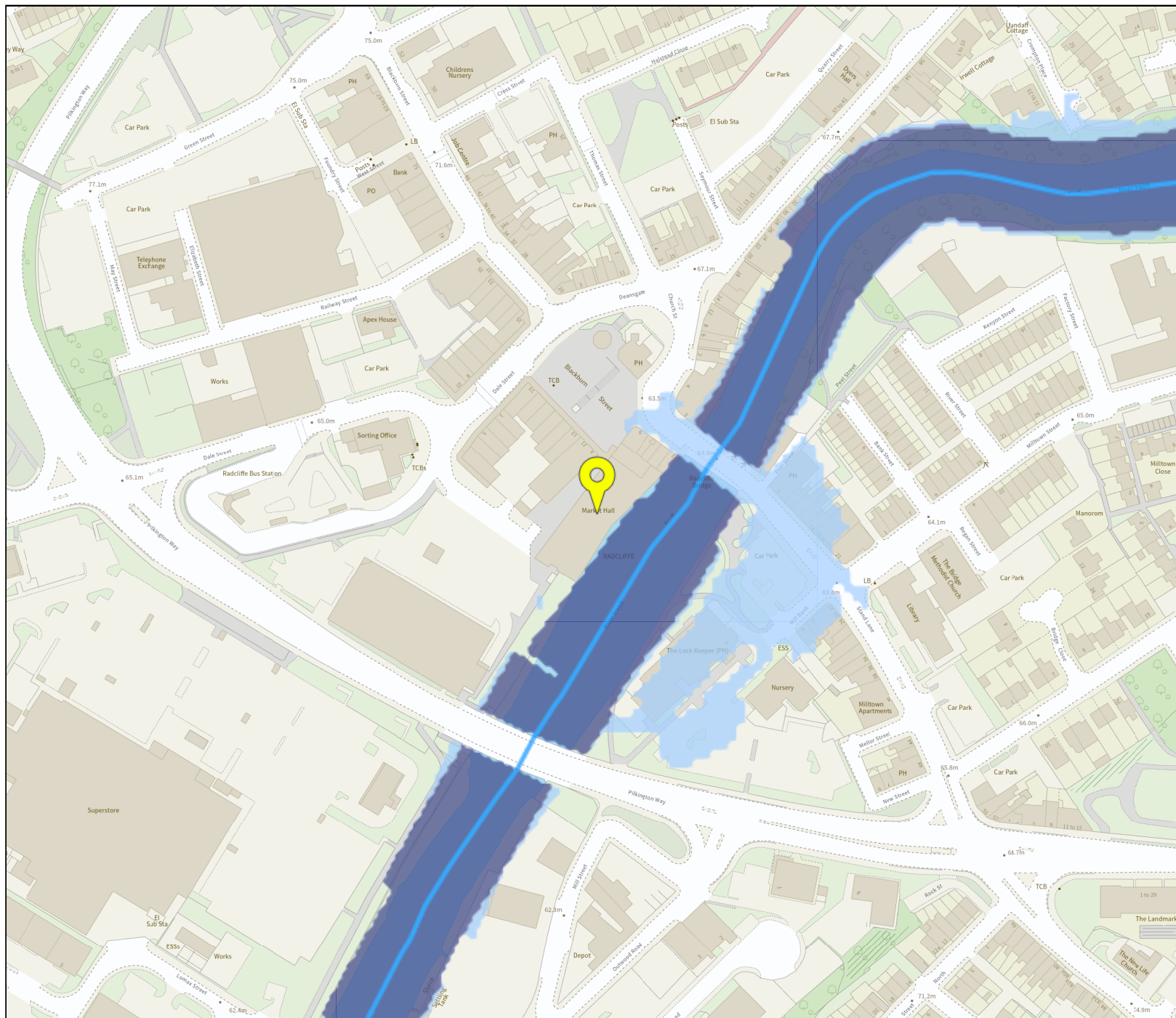
Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence **which** sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

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Flood map for planning

Your reference
600_FloodZone

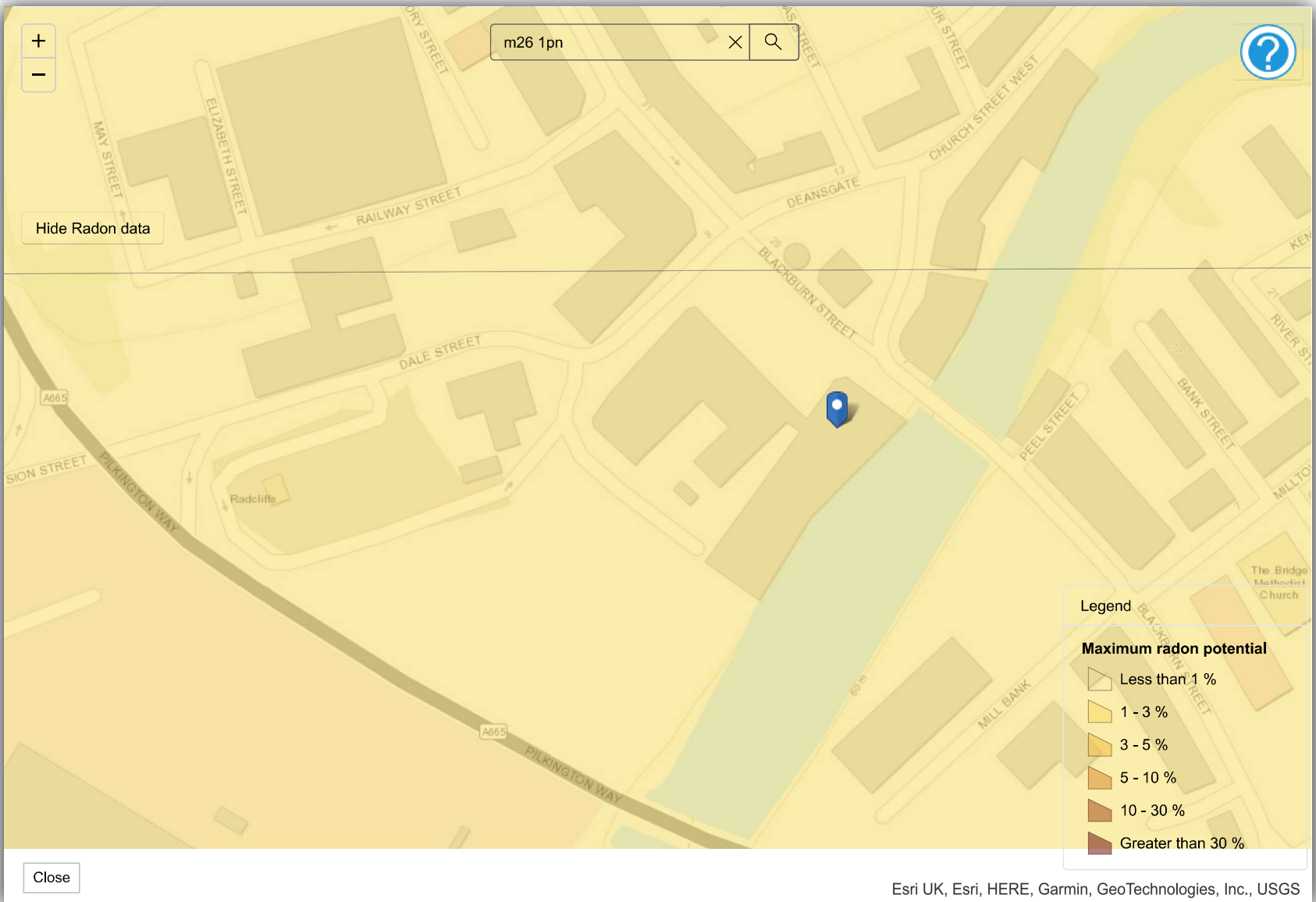
Location (easting/northing)
378556/406924

Scale
1:2500

Created
18 Oct 2022 11:46

-  Selected point
-  Flood zone 3
-  Flood zone 3: areas benefitting from flood defences
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Water storage area


0 20 40 60m



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Agrément Certificate

89/2278

Product Sheet 1

RIW LIQUID APPLIED WATERPROOFING SYSTEMS

RIW LAC (LIQUID ASPHALTIC COMPOSITION)

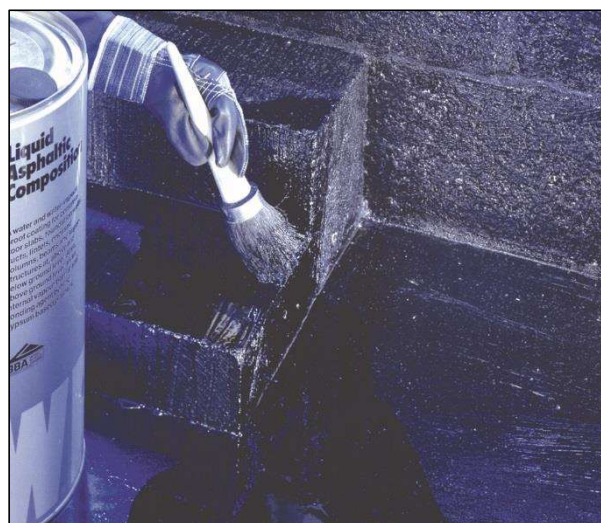
This Agrément Certificate Product Sheet⁽¹⁾ relates to RIW LAC⁽²⁾ (Liquid Asphaltic Composition), a sandwich membrane for use as a waterproofing layer in above and below ground structures of concrete, brickwork, blockwork or masonry, or to form a damp-proof membrane (dpm) for solid floors.

(1) Hereinafter referred to as 'Certificate'.

(2) LAC is a registered trade mark.

CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.



KEY FACTORS ASSESSED

Resistance to water and water vapour — the product will resist the passage of moisture into the structure (see section 6).

Resistance to mechanical damage — the product will accept the limited foot traffic and loads associated with installation and maintenance of the product and the effects of thermal or other minor movement likely to occur in service (see section 7).

Durability — under normal service conditions, the product will provide an effective barrier to the transmission of moisture for the life of the structure in which it is incorporated (see section 9).



The BBA has awarded this Certificate to the company named above for the product described herein. This product has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of Third issue: 10 August 2020

Originally certificated on 22 August 1989

Hardy Giesler
Chief Executive Officer

The BBA is a UKAS accredited certification body – Number 113.

*The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk
Readers MUST check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.*

Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.

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Regulations

In the opinion of the BBA, RIW LAC (Liquid Asphaltic Composition), if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



The Building Regulations 2010 (England and Wales) (as amended)

Requirement:	C2(a)	Resistance to moisture
Comment:		The product will enable a structure to satisfy this Requirement. See section 6 of this Certificate.
Regulation:	7(1)	Materials and workmanship
Comment:		The product is acceptable. See section 9.1 and the <i>Installation</i> part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)	Durability, workmanship and fitness of materials
Comment:		The product satisfies the requirements of this Regulation. See section 9.1 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	3.4	Moisture from the ground
Comment:		The product will enable a structure to satisfy the requirements of this Standard, with reference to clauses 3.4.1 ⁽¹⁾⁽²⁾ , 3.4.2 ⁽¹⁾⁽²⁾ and 3.4.5 ⁽¹⁾⁽²⁾ to 3.4.7 ⁽¹⁾⁽²⁾ . See section 6 of this Certificate.
Standard:	7.1(a)	Statement of sustainability
Comment:		The product can contribute to meeting the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard.
Regulation:	12	Building standards applicable to conversions
Comment:		Comments made in relation to the product under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1 ⁽¹⁾⁽²⁾ and Schedule 6 ⁽¹⁾⁽²⁾ .
(1) Technical Handbook (Domestic).		
(2) Technical Handbook (Non-Domestic).		



The Building Regulations (Northern Ireland) 2012 (as amended)

Regulation:	23(a)(b)(i)	Fitness of materials and workmanship
Comment:		The product is acceptable. See section 9.1 and the <i>Installation</i> part of this Certificate.
Regulation:	28(a)	Resistance to moisture and weather
Comment:		The product will enable a structure to satisfy the requirements of this Regulation. See section 6 of this Certificate.

Construction (Design and Management) Regulations 2015

Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

See section: 3 *Delivery and site handling* of this Certificate.

NHBC Standards 2020

In the opinion of the BBA, RIW LAC (Liquid Asphaltic Composition), if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Chapters 5.1 *Substructure and ground-bearing floors* Clause 5.1.20 *Damp proofing concrete floors* and 5.4 *Waterproofing of basements and other below ground structures*, and *NHBC Standards for Conversions and Renovations*, taking account of other relevant guidance within this document on the suitability of the substrate to receive the product, and where necessary, the relevant chapters of *NHBC Standards*.

Where Grade 3 protection is required and the below ground wall retains more than 600 mm (measured from the top of the retained ground to the lowest finished floor level) the product should be used in combination with either a Type B or C waterproofing protection.

Technical Specification

1 Description

1.1 RIW LAC (Liquid Asphaltic Composition) is a solution of natural and petroleum bitumens in white spirit to form a waterproof layer.

1.2 An ancillary item necessary for installation of the product is RIW Sheetseal 226, a flexible sheet membrane used over RIW LAC (Liquid Asphaltic Composition), for reinforcing areas subject to movement.

1.3 Other items which may be used with the product, but which are outside the scope of this Certificate, include:

- RIW Cementfill FC — a cement-based waterproof fairing coat and repair mortar for filling minor holes, voids and defects
- RIW Cementfill HB — a cement-based waterproof high-build repair mortar for profiling and providing fillets
- RIW Double Drain — a drainage board for protecting the membrane during backfilling operations, and also promoting drainage of water away from the structure
- RIW Protection Board — a 3 mm thick bitumen-impregnated board to prevent damage to the waterproof membrane during backfilling operations
- RIW Adhesive Tape — a 150 mm wide double-sided tape for temporarily adhering RIW Protection Board or RIW Double Drain to RIW LAC (Liquid Asphaltic Composition)
- RIW Sheetseal 9000 DPC — a range of high-performance polymeric damp-proof courses (dpc) and pre-formed cavity trays.

2 Manufacture

2.1 The product is manufactured by a batch-blending process.

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

2.3 The management systems of the manufacturer have been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 by Alcumus (Certificate 16494 Q15-001).

3 Delivery and site handling

3.1 The product is delivered to site in 5 and 25 litre drums. Each container bears the product name, manufacturer's name and the BBA logo incorporating the number of this Certificate. Unopened containers have a minimum shelf-life of 12 months.

3.2 The Certificate holder has taken the responsibility of classifying and labelling the product under the *CLP Regulation (EC) No 1272/2008 on the classification, labelling and packaging of substances and mixtures*. Users must refer to the relevant Safety Data Sheet(s).

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on RIW LAC (Liquid Asphaltic Composition).

Design Considerations

4 Use

4.1 RIW LAC (Liquid Asphaltic Composition) forms a sandwich membrane which is satisfactory for use as a waterproofing layer in above and below ground structures of concrete, brickwork, blockwork or masonry, or to form a dpm for solid floors.

4.2 The product is satisfactory for use as a waterproofing and damp-proofing membrane in up to Grade 3 basement constructions, as defined in BS 8102 : 2009, Table 2, in structures where subsequent movement of the substrate is not anticipated.

4.3 The product is compatible with concrete, smooth brickwork, blockwork and screeded substrates, and is resistant to those chemicals likely to occur in normal service conditions.

5 Practicability of installation

The product is designed to be installed by a competent contractor experienced with this type of product.

6 Resistance to water and water vapour



The product will adequately resist the passage of moisture from the ground into the structure and enable a structure to comply with the requirements of the national Building Regulations.

7 Resistance to mechanical damage

7.1 The bond between the product and substrate is satisfactory.

7.2 The product can accommodate limited hairline cracking in the substrate but cannot bridge active cracks, movement or construction joints between different substrates where movement is likely. In these situations, conventional treatment with sealants and waterstops must be used, and continuity must be maintained between the joint and membrane [the Certificate holder and the sealant manufacturer must be consulted on the sealant's compatibility and the need for primer(s)].

7.3 The product can be damaged by sharp objects and care must therefore be taken, particularly when the membrane is exposed during construction and screeding operations.

7.4 Providing sufficient care is taken, the product will not be damaged by normal foot traffic. Additional protection from foot traffic can be given by using RIW Protection Board.

8 Maintenance

As the product is confined within the structure and has satisfactory durability, maintenance is not required. Any damage occurring during construction works must be repaired in accordance with section 12, prior to the application of protection or backfilling.

9 Durability



9.1 RIW LAC (Liquid Asphaltic Composition), when subjected to normal service conditions, will provide an effective barrier to the transmission of moisture for the life of the structure in which it is incorporated.

9.2 The product is not affected by contact with an alkaline substrate.

Installation

10 General

10.1 Installation of RIW LAC (Liquid Asphaltic Composition) must generally be in accordance with this Certificate, the relevant requirements of BS 8000-0 : 2014, BS 8000-4 : 1989, CP 102 : 1973 Section 3, or BS 8102 : 2009, and the Certificate holder's application instructions.

10.2 New concrete, screeds or renderings should have a trowelled, lightly tamped or brushed finish, and be free from defects. Brickwork, blockwork or masonry should be flush-pointed or finished with a sand/cement render. Defects in existing surfaces should be made good. All surfaces must be clean, sound and surface-dry.

10.3 The product must not be applied to exposed surfaces in wet conditions (ie rain or standing water), at temperatures below 5°C, nor if these conditions are likely to occur before the membrane has dried.

11 Procedure

11.1 The product must be applied by brush or roller in two coats to concrete floors and walls at above or below ground level.

11.2 The first coat of the product is applied by brush or roller at a coverage rate of 1.7 m² per litre. When dry, a second coat is applied at a coverage rate of 2.5 m² per litre. The coats should not be sanded and the membrane must be linked to any adjacent dpc.

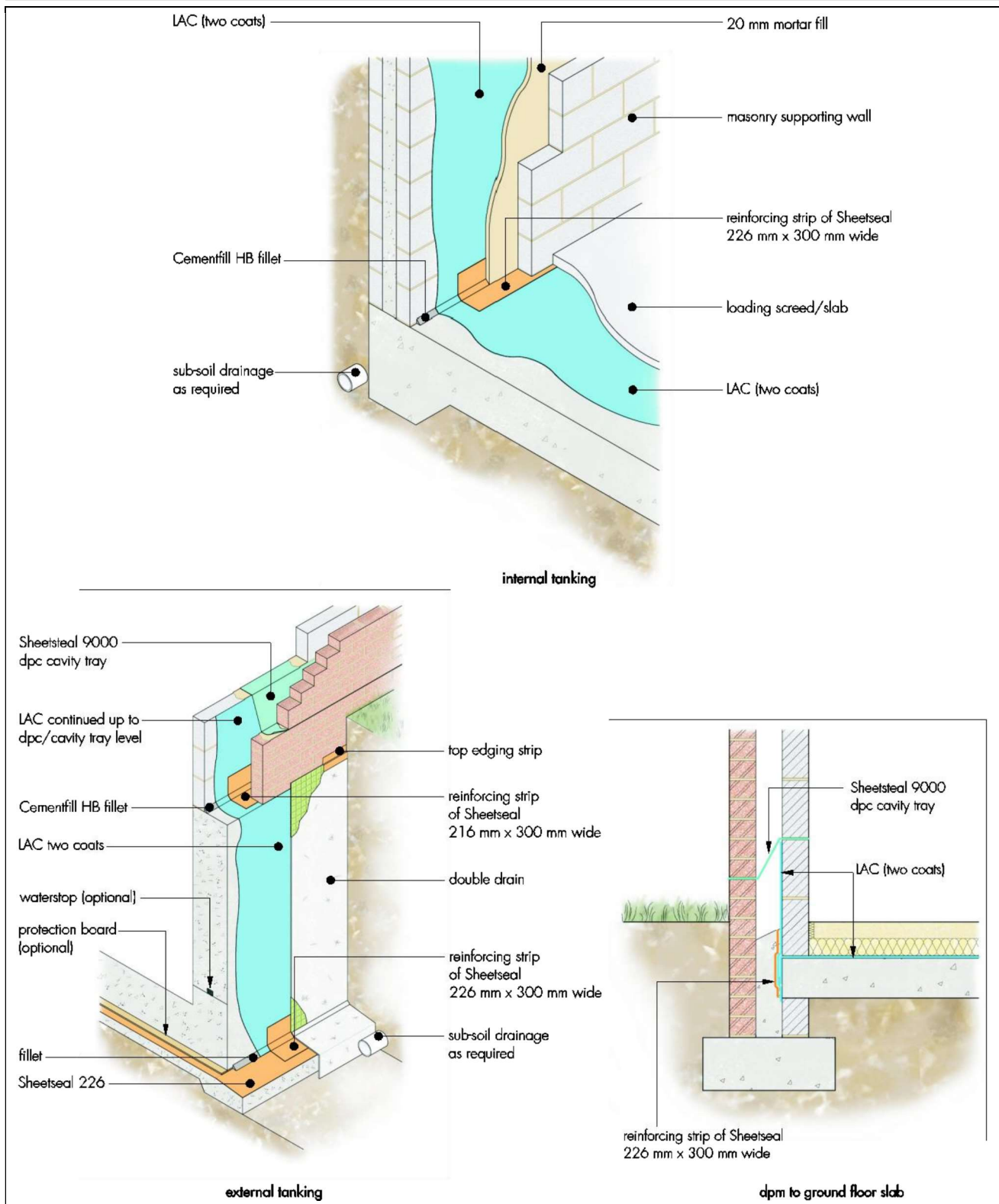
11.3 The product must be allowed to dry fully throughout its thickness, before a second coat, or any mechanical protection, is applied. Under normal conditions of temperature and ventilation, this is possible after 24 hours.

11.4 The product must always be protected by a layer of concrete, un-bonded screed, or by brickwork or blockwork. Alternatively, where backfilling is to occur, the membrane can be protected by the use of a drainage composite or by a layer of rot-proof non-compressible board. Care must be taken to avoid damaging the membrane before and during these operations (see Figure 1).

11.5 When used as an internal tanking, the membrane is loaded against back pressure, for example by erecting a brick or blockwork skin 20 mm from the membrane, and filling the cavity with sand-cement mortar. The outside of the wall is not backfilled until after the membrane has cured and been protected (see Figure 1).

11.6 Where the structure is penetrated (eg by pipes or conduits), movement capability is required at construction joints, or dissimilar materials meet at internal/external angles, RIW Sheetseal 226 may be used at these points to form a sleeve, link or additional reinforcement respectively.

Figure 1 Installation details



12 Repair

If damage occurs, the product may be repaired by recoating the damaged area at the appropriate rate for the application prior to the installation of any protection.

13 Tests

Tests were conducted on RIW LAC (Liquid Asphaltic Composition) and the results assessed to determine:

- water vapour permeability
- resistance to water pressure
- resistance to crazing
- resistance to screeding
- effect of hard body impact
- resistance to alkali
- effect of heat ageing
- effect of cold water soak (effect on adhesion).

14 Investigations

14.1 The manufacturing process was evaluated, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

14.2 A user survey was carried out to assess the performance of the product in use.

Bibliography

BS 8000-0 : 2014 *Workmanship on construction sites — Introduction and general principles*

BS 8000-4 : 1989 *Workmanship on building sites — Code of practice for waterproofing*

BS 8102 : 2009 *Code of practice for protection of below ground structures against water from the ground*

BS EN ISO 9001 : 2015 *Quality management systems — Requirements*

CP 102 : 1973 *Code of practice for protection of buildings against water from the ground*