



AS4654.2 – Interpretation of External Waterproofing as it applies to Melbourne, Class 1 buildings

Climate Zone: 6

Wind Class: N1

Membrane Types: Liquid Applied Class II and Class III as defined and tested in accordance with AS4858 and suitable for use relating to AS4654.1

All membranes we recommend for use are capable of servicing the conditions, namely:

- UV Stable
- Heat aging tested
- Operating Temperatures
- Bio-resistant
- Water immersion tested
- Chemical resistant

SUBSTRATE

Both builder and waterproofer need to check the substrate material in contact with the waterproofing ensuring that it shall be suitable for, and compatible with, the waterproofing membrane system. Additionally, the substrate is to be resistant to moisture damage caused by condensation forming on the underside.

NB: particleboard sheeting shall not be used, plus tile and slate underlay is un-acceptable.

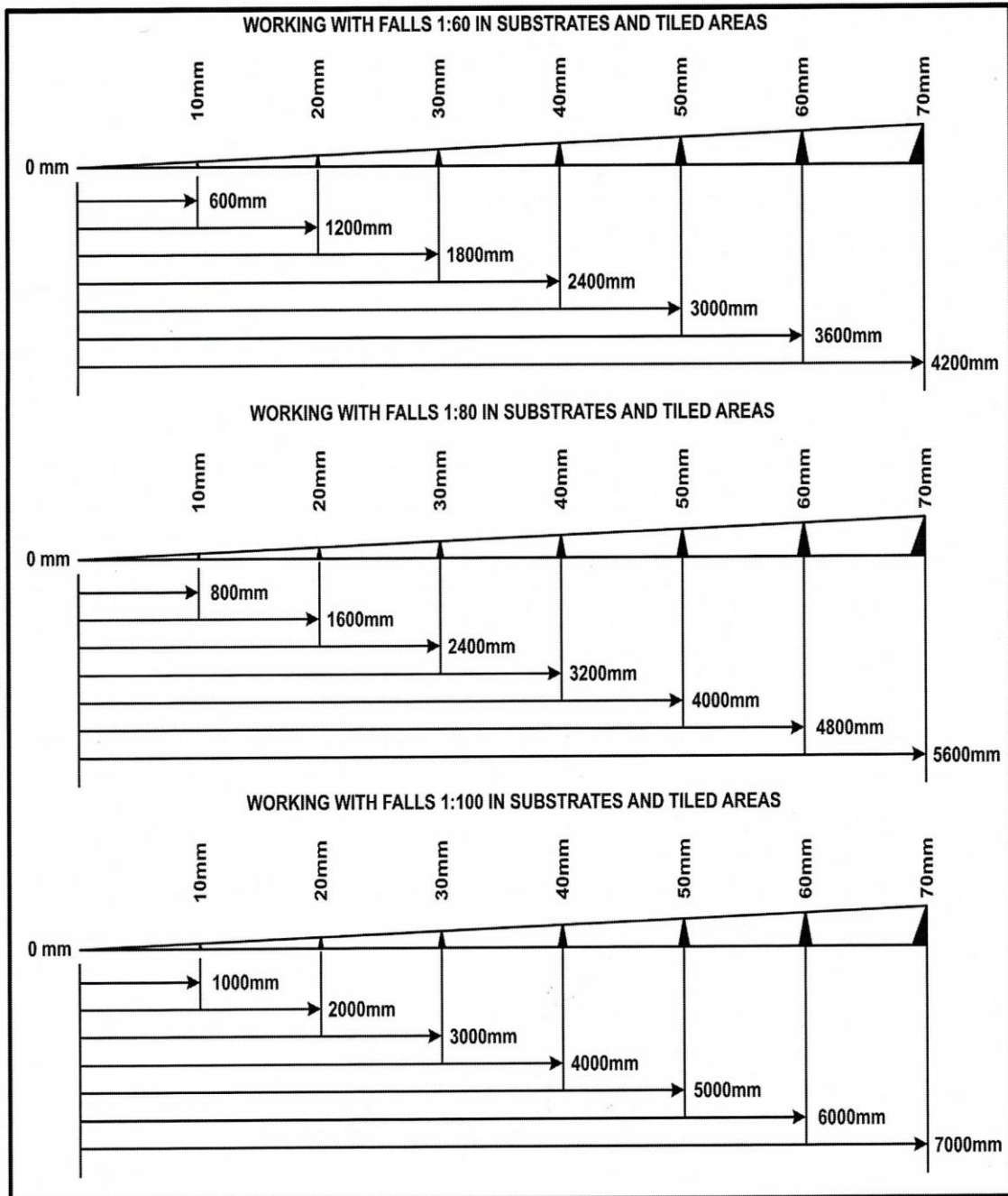
Suitable substrate materials refer:

AS3600	Concrete
AS3700	Masonry
AS1684	Timber
AS2269	Plywood
AS2908	Cellulose-cement



Falls:

The fall can be formed in the structural substrate or formed by a screed over the structural substrate, which must not be less than 1 in 100 (10mm per 1m). Falls in finishes must ensure water drains to the drainage outlet, with no water retention on the finished surface.



- NOTE: DRAWINGS NOT TO SCALE



LAYING MEMBRANES

Junctions, lap joints, seams and cold joints:

Liquid applied membranes usually don't have a manufacturer's description covering these issues relating to the weak points in 'sheet' systems. However, should the liquid applied system incorporate reinforcing fabric a lap joint, usually a min of 40mm is applicable.

Curing:

All components of the membrane system must be cured before considered 'fit for purpose'. Considerations for liquid applied membrane systems are:

- Low temperatures, wet film thickness, relative humidity, solids content and air movement can delay curing.
- No further work should be commenced until the membrane is cured
- Premature covering of the membrane may prevent curing and lead to degradation.
- Intervals between applied membrane coatings should take into account the necessary curing times.

FILLETS

When a membrane changes from horizontal to vertical plane it requires a '**bond breaker**' application.

Membrane Class	Elongation at break	Min bond breaker/tape width to bridge joints opening up by 5mm
II	60% to 300%	35 mm
III	>300%	12 mm

TERMINATION OF MEMBRANES

Upward terminations:

Height:

The membrane termination is created to prevent water entry, the finished height of the membrane should cater for the surface coverage height to prevent water, including wind driven, from flowing over the top of the membrane. In wind class N1 the termination height must be not less than 40mm

Membrane termination finishing:

The Standard is mostly concerned with sheet membranes relating to over-flashing or cover-flashing, However some points relate to liquid applied:-

Termination of a pressure seal flashing:

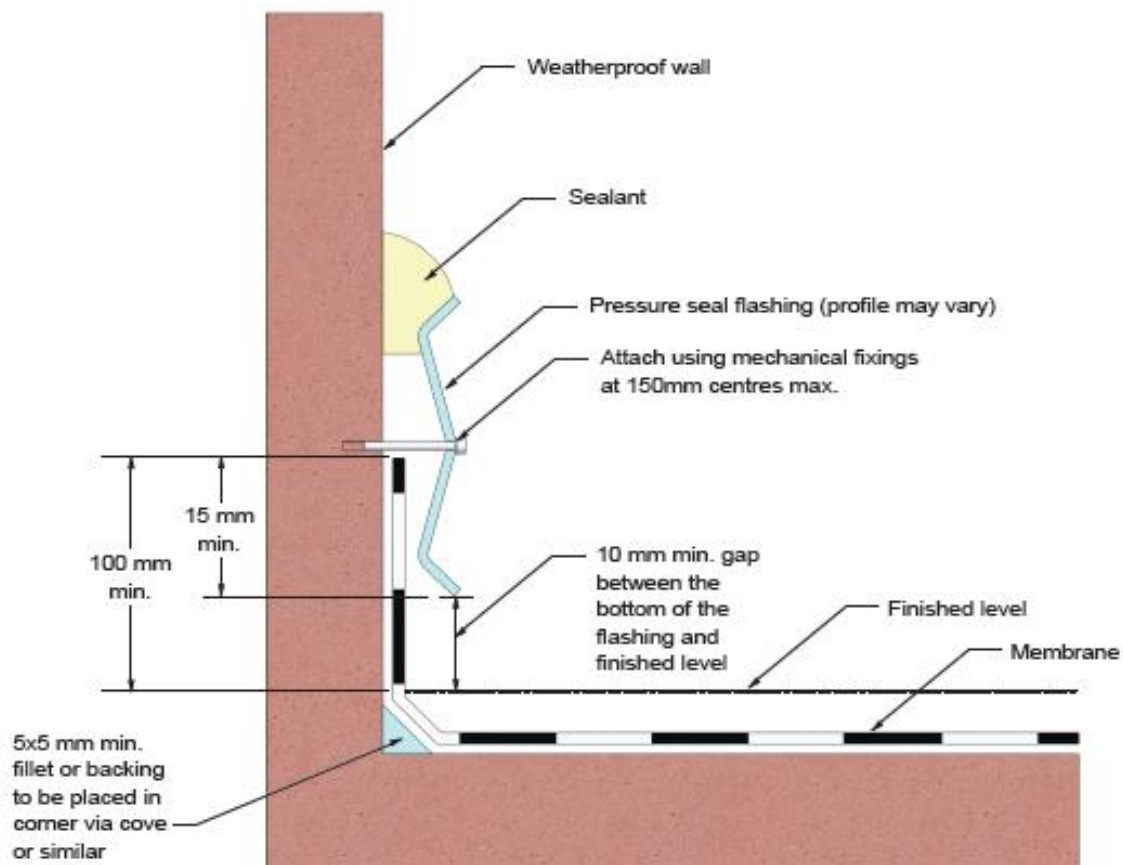
- Pressure seal flashing to be attached using mechanical fixings at a maximum of 150mm centres. The lap from the bottom edge of the mechanical fixing, to the bottom edge of the pressure seal flashing shall be a minimum of 15mm.



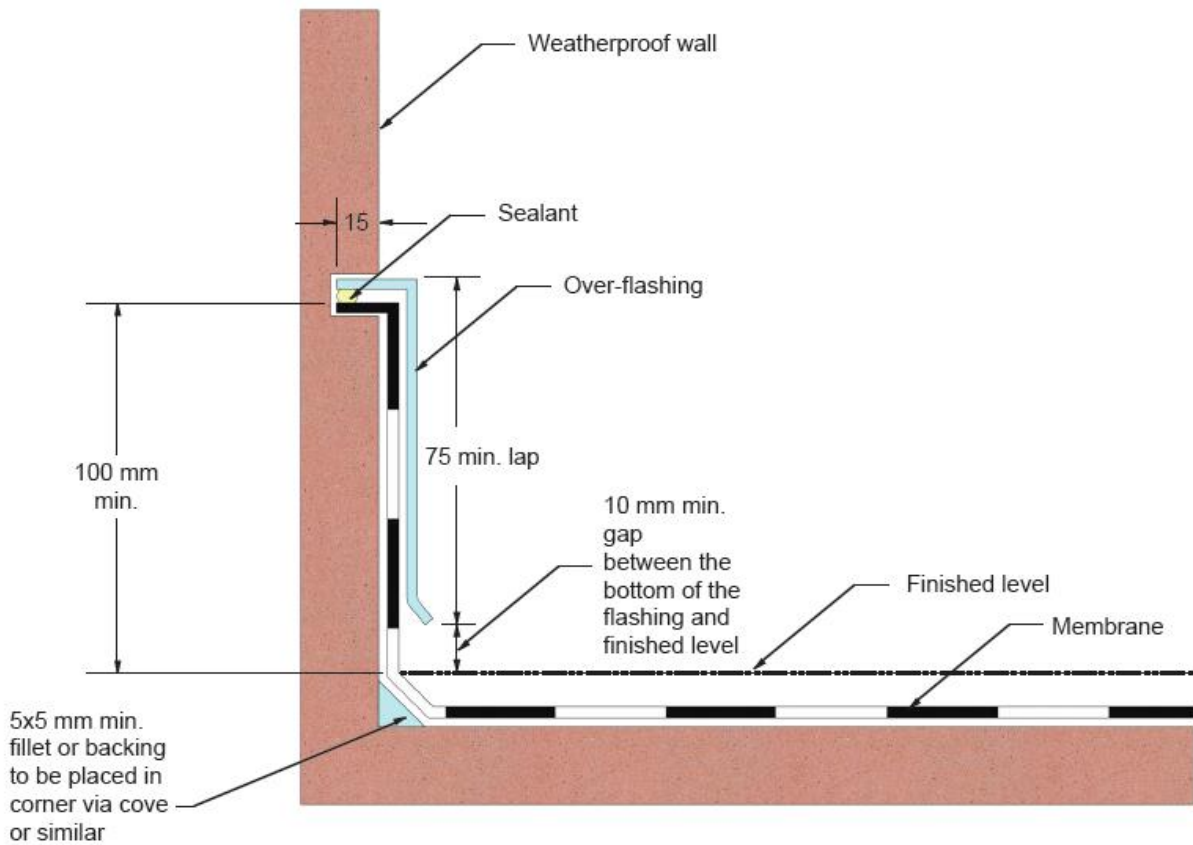
- Sealant to encapsulate the pressure seal flashing to the weatherproof wall
- There is to be a minimum of 10mm gap between the bottom of the flashing and the finished level.

Termination of overflashing:

- The overflashing is to be attached into the waterproof wall via a rigulet of minimum 15mm and fixed in place, inclusive of sealant
- The lap from the top edge of the sealed rigulet to the bottom of the membrane is a minimum of 75mm
- The gap between the bottom of the flashing and the finished level must be a minimum of 10mm



VERTICAL UPWARD TERMINATION – DETAIL OF PRESSURE SEAL

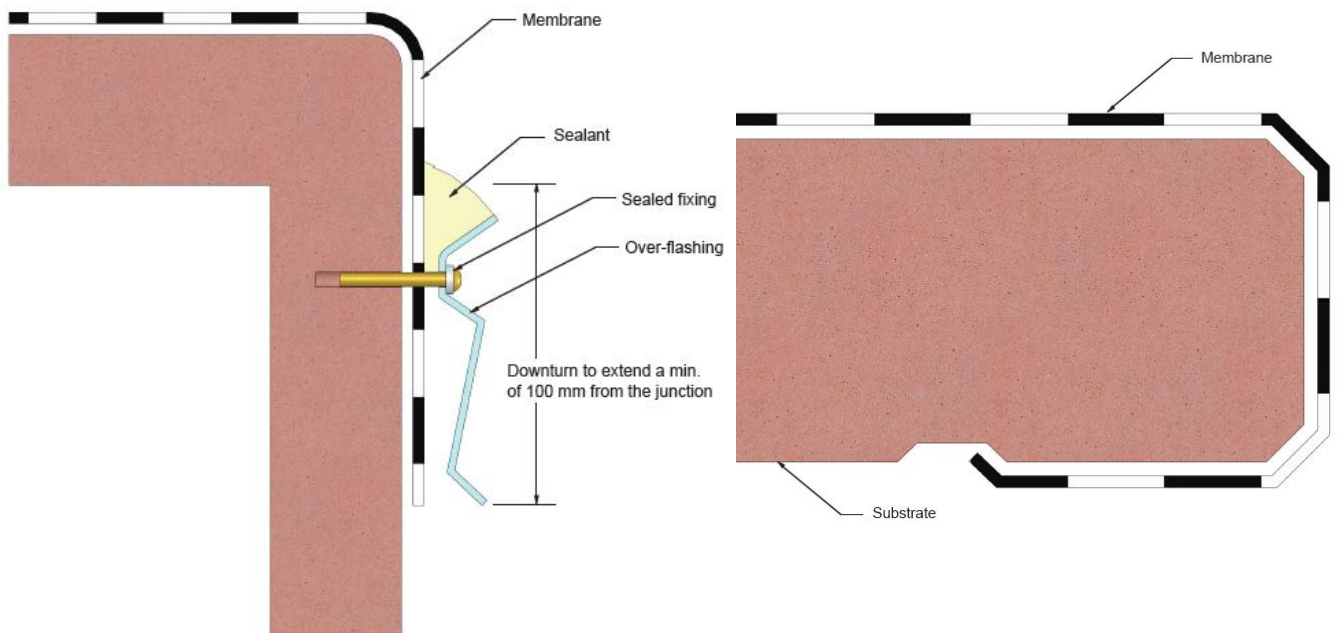


VERTICAL UPWARD TERMINATION – DETAIL OF OVERFLASHING

Vertical downward terminations:

Roofs:

Vertical downward terminations for roofs or similar structures using a reinforced (or sheet) membrane need to extend a minimum of 100mm from the junction.

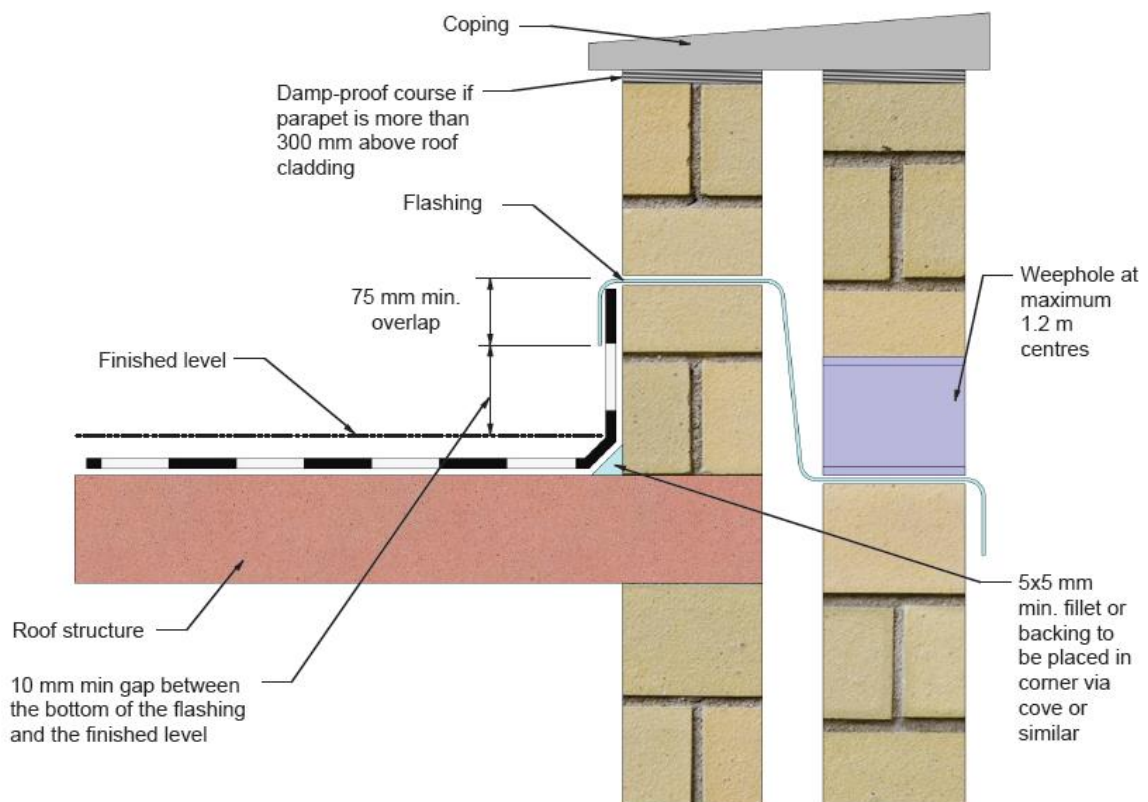
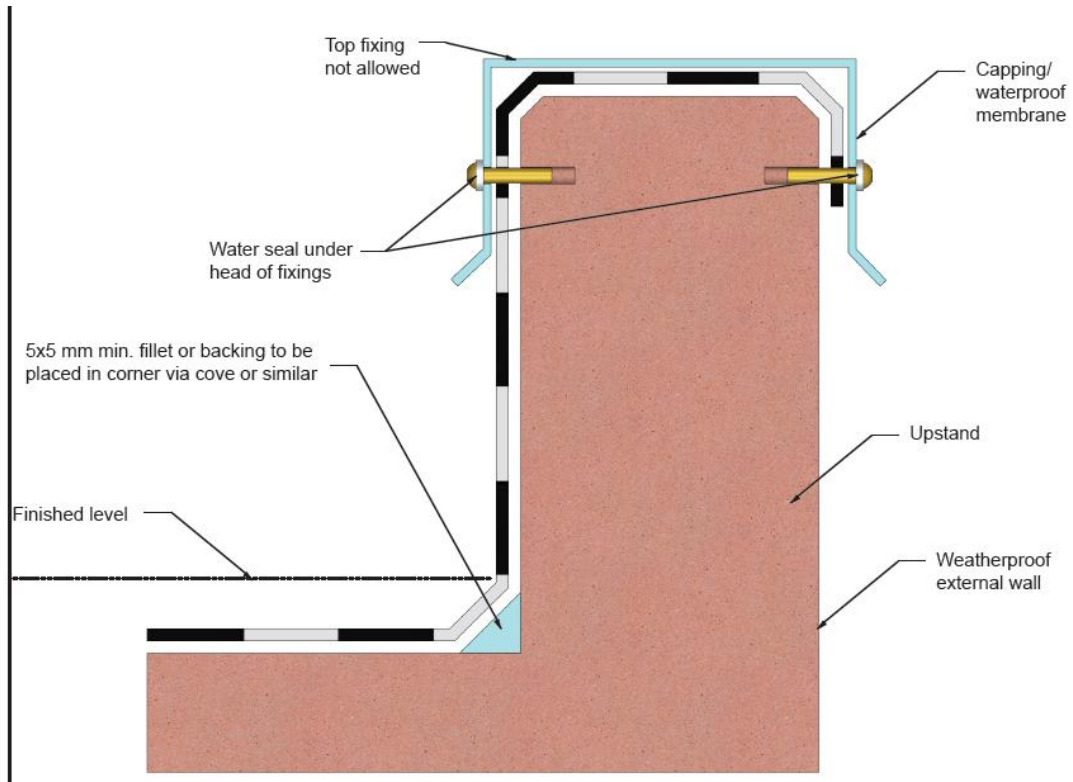


VERTICAL DOWNWARD TERMINATION – PRESSURE SEAL



Parapets:

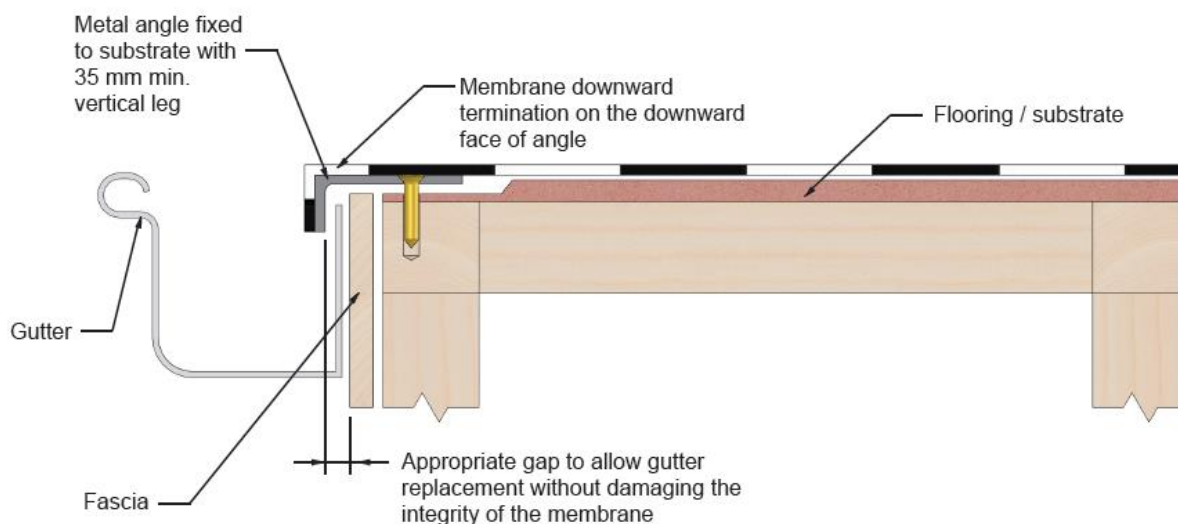
The top edges of the membrane is to be protected by the downturn of the cavity flashing.





Gutter Termination:

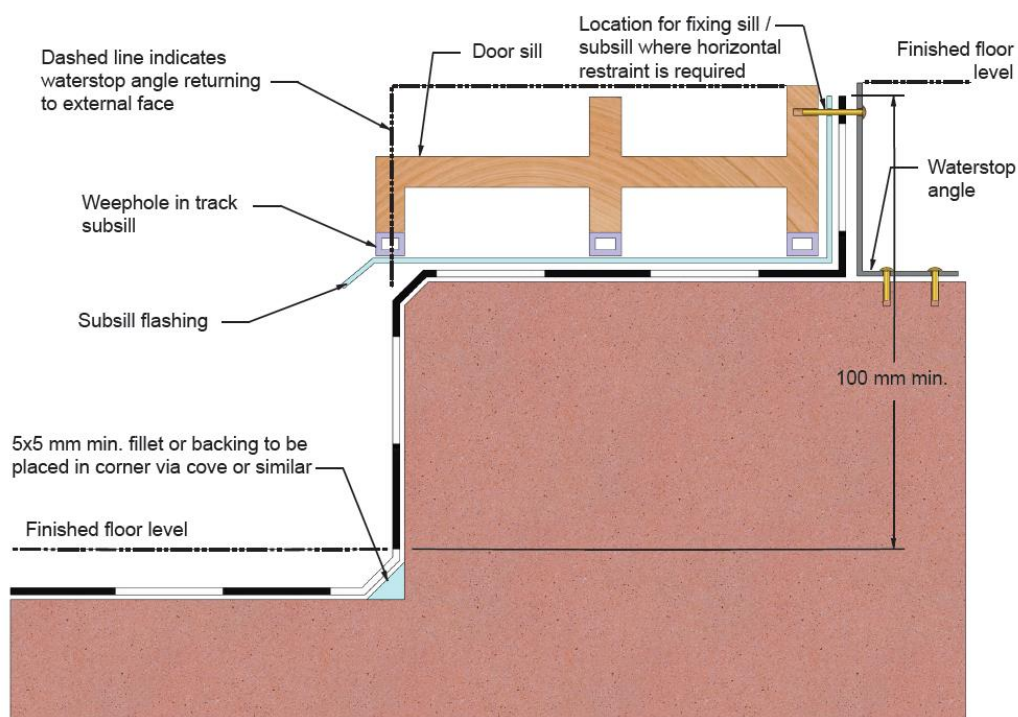
A metal angle with a vertical leg of a minimum of 35mm is to be fixed to the substrate.



Doors and windows onto external waterproofed areas:

The following applies for doors and windows onto external waterproofed areas:

- Subsill flashing to be included as part of the membrane system.
- Where the internal and external finished floor levels do not allow an upturn :-
 - The deck surface must fall away from the grate; and
 - The grate is to be to the width or greater than the opening
- If the fixing of the sill/subsill is required, it is to be done horizontally to an angle behind the door sill/subsill.



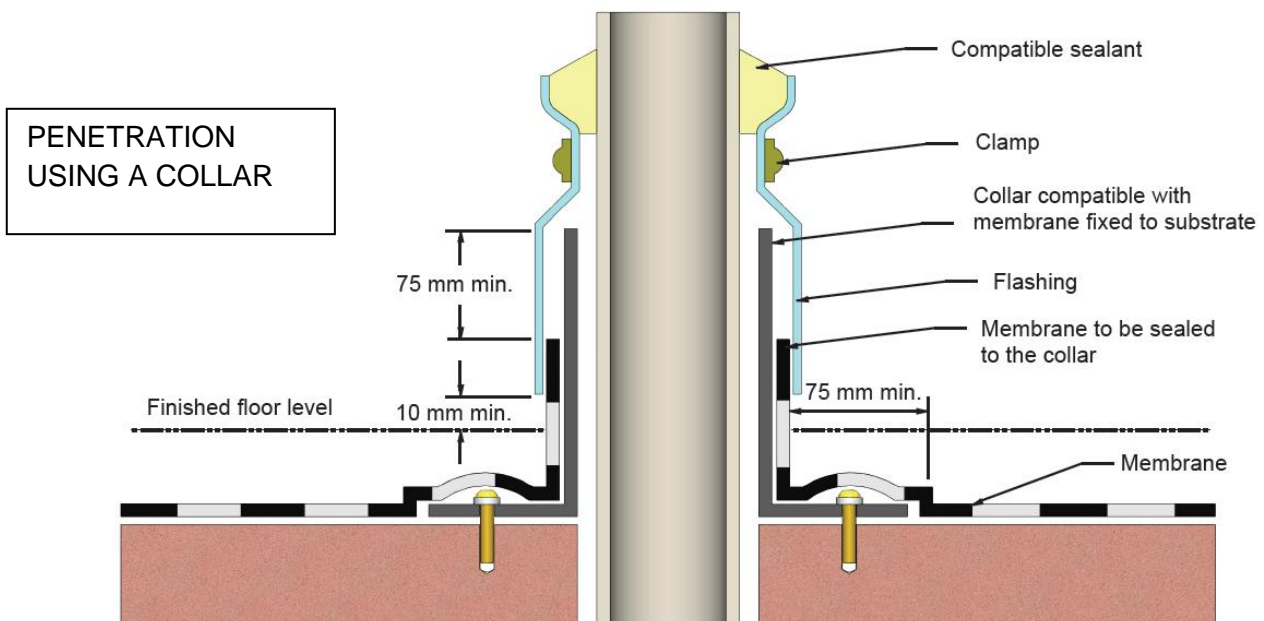
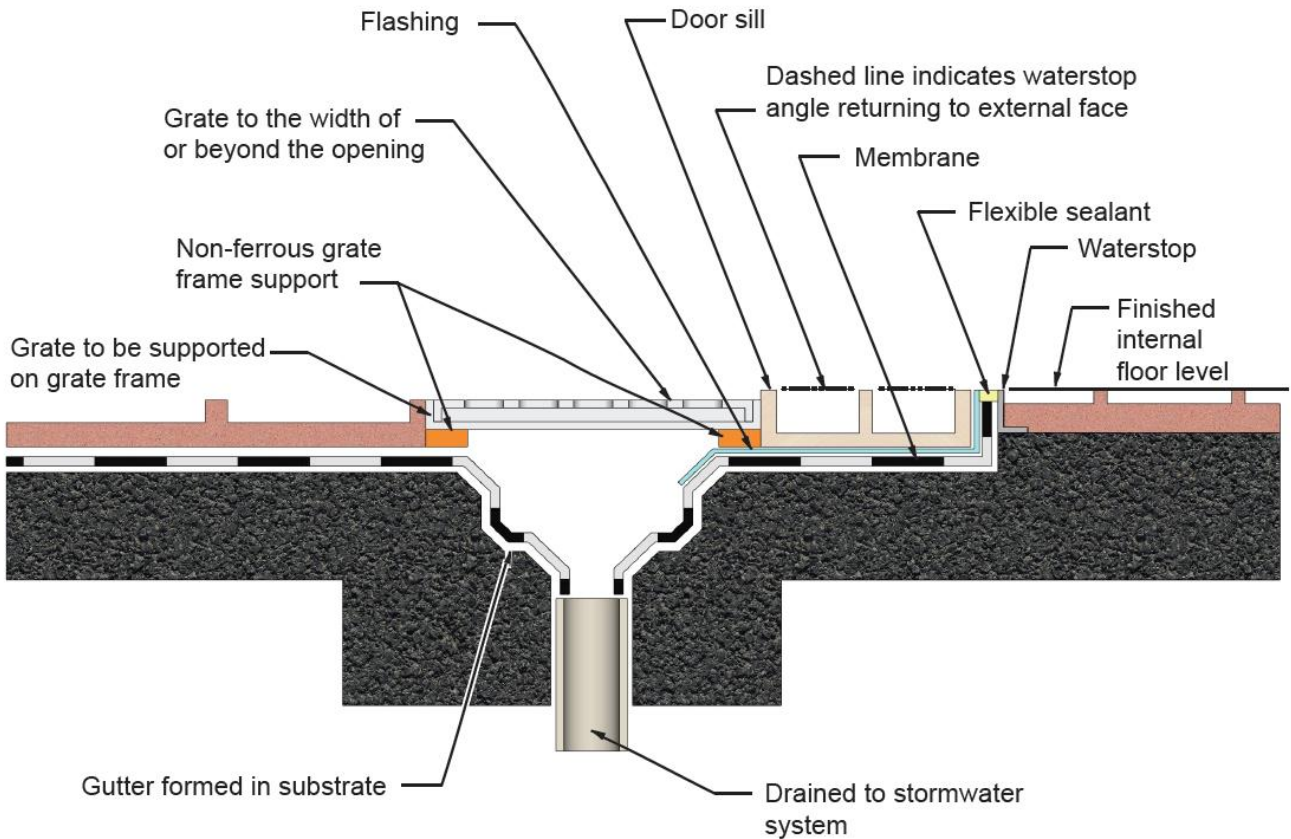


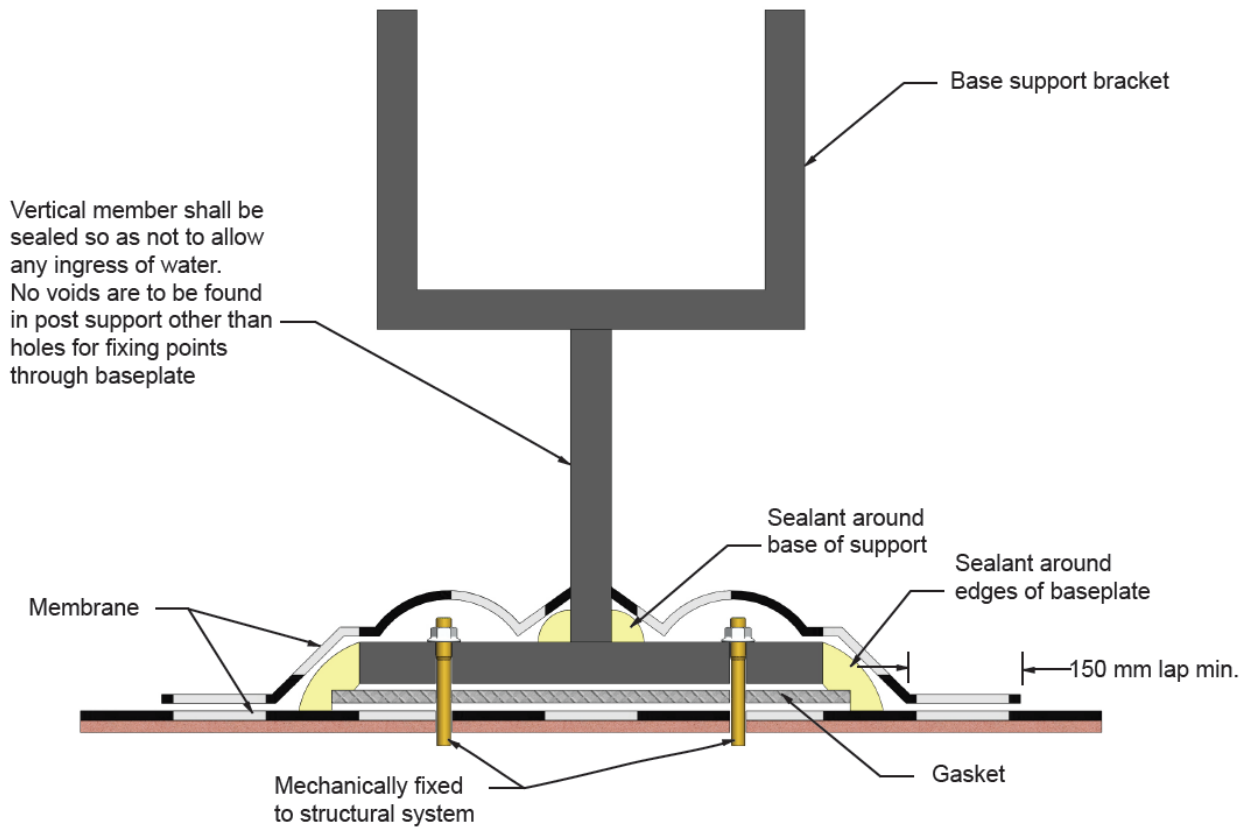
Penetrations:

Any fixings that penetrate the membrane must be sealed. The sealant is to be compatible with the surface material.

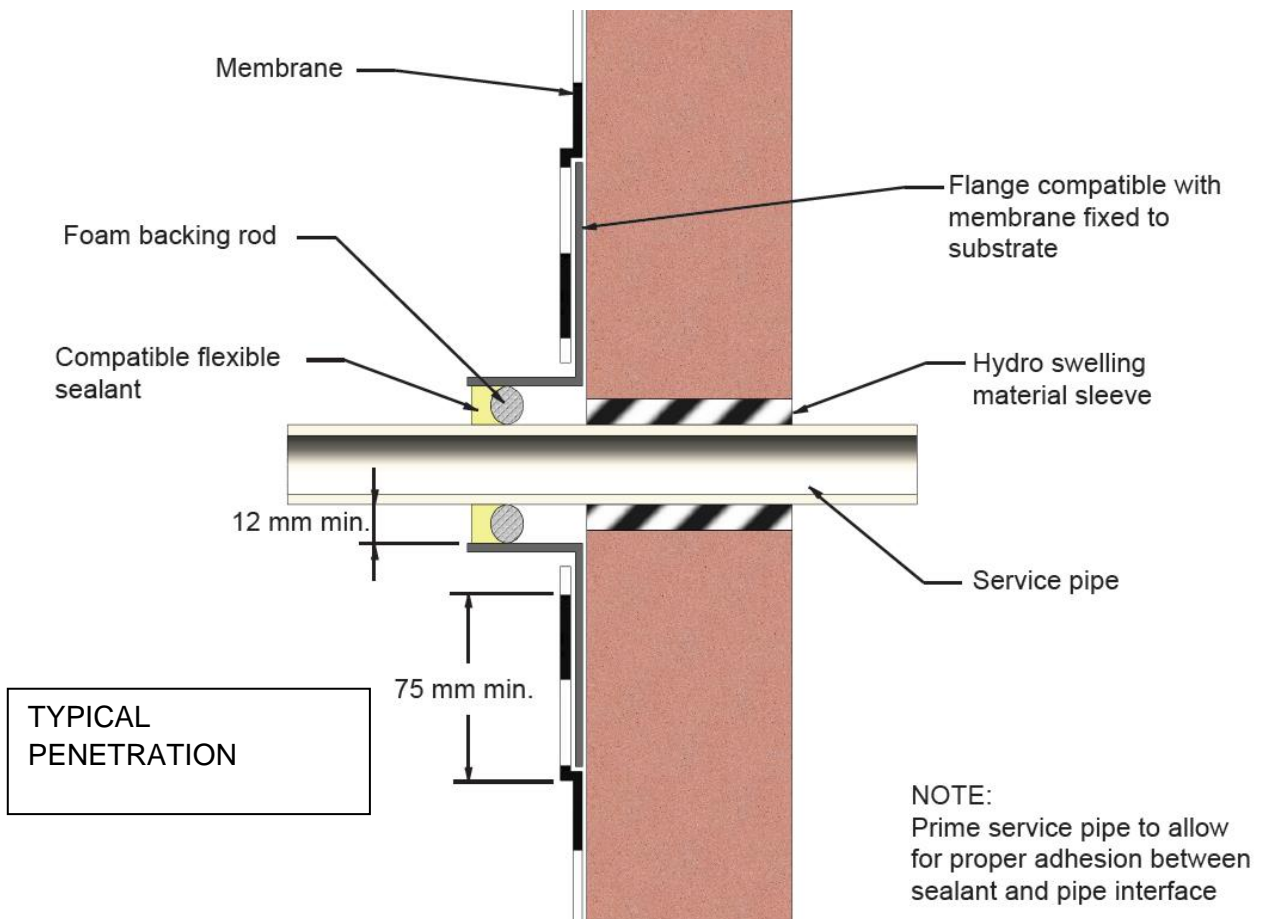
Where a backing rod is used in support of the sealant, they shall be a minimum of 12mm

TERMINATIONS AT WALL OPENINGS WHERE INTERNAL AND EXTERNAL FLOOR LEVELS DO NOT ALLOW AN UPTURN





METAL POST SUPPORT PENETRATION



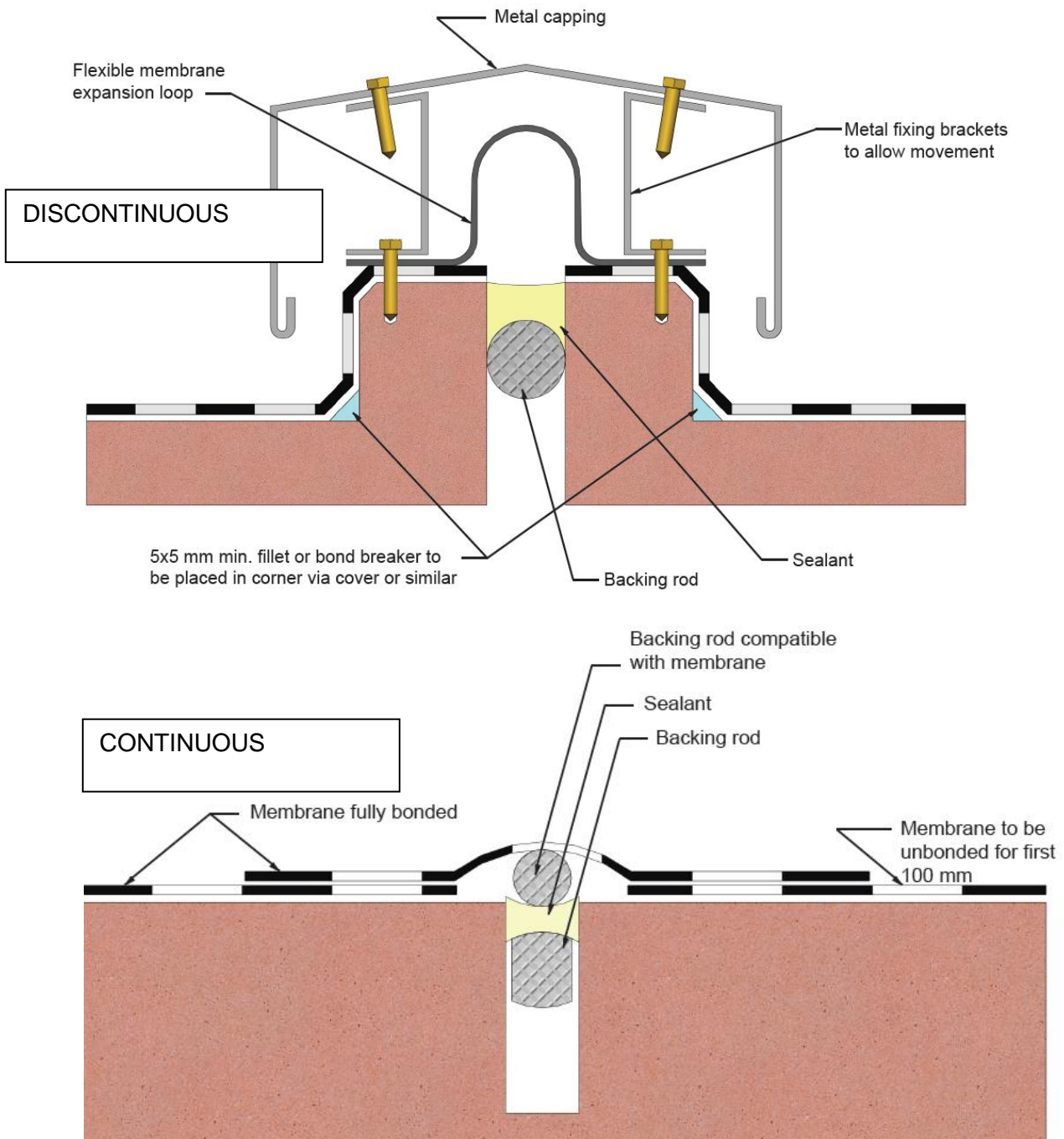


Skylights:

The membrane is to be upturned at the skylight to prevent water entry to a minimum of 40mm

MOVEMENT AND CONTROL JOINTS

Where a building or structure has construction joints, movement joints or control joints, the membrane is to be either discontinuous over the joint or continuous, to allow for the designed anticipated movement. Where continuous joint is installed, the membrane is to be unbonded for the first 100mm.



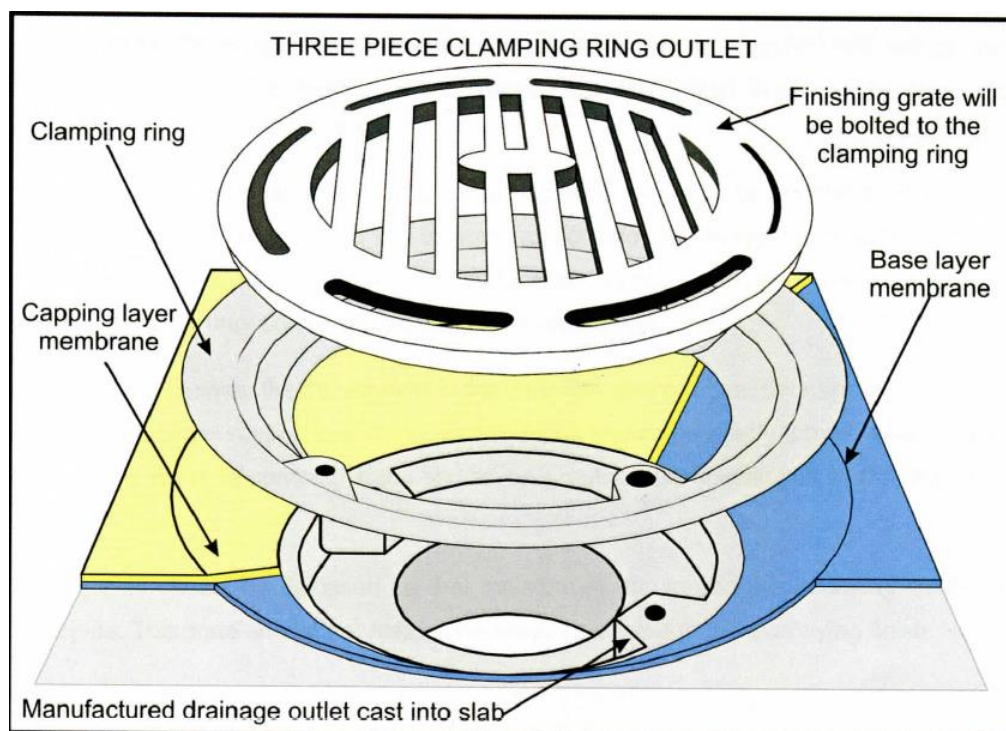
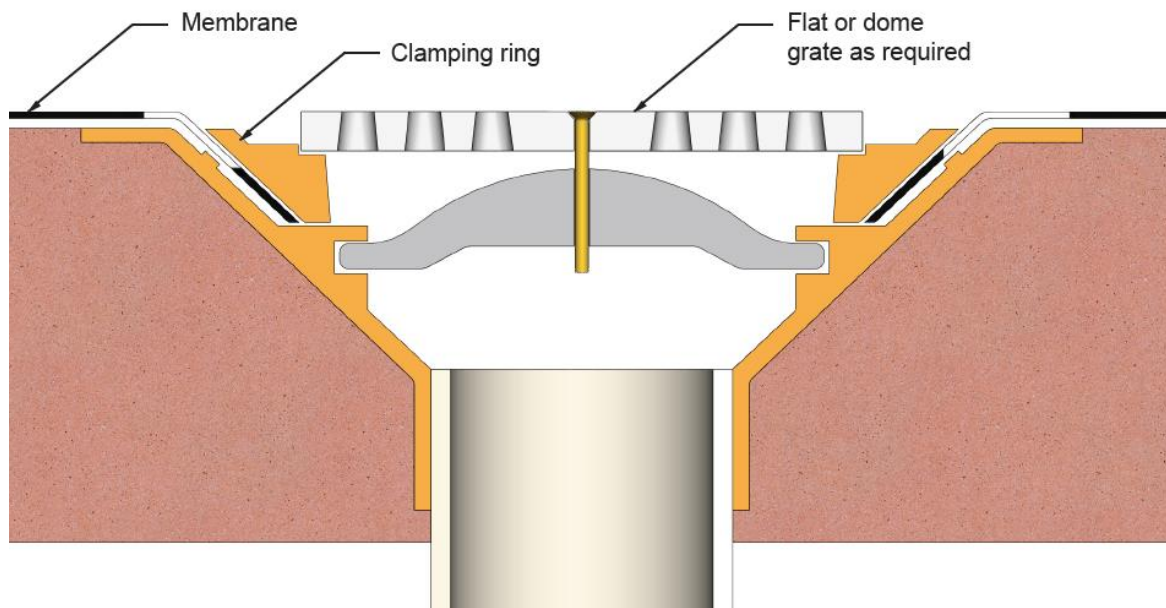


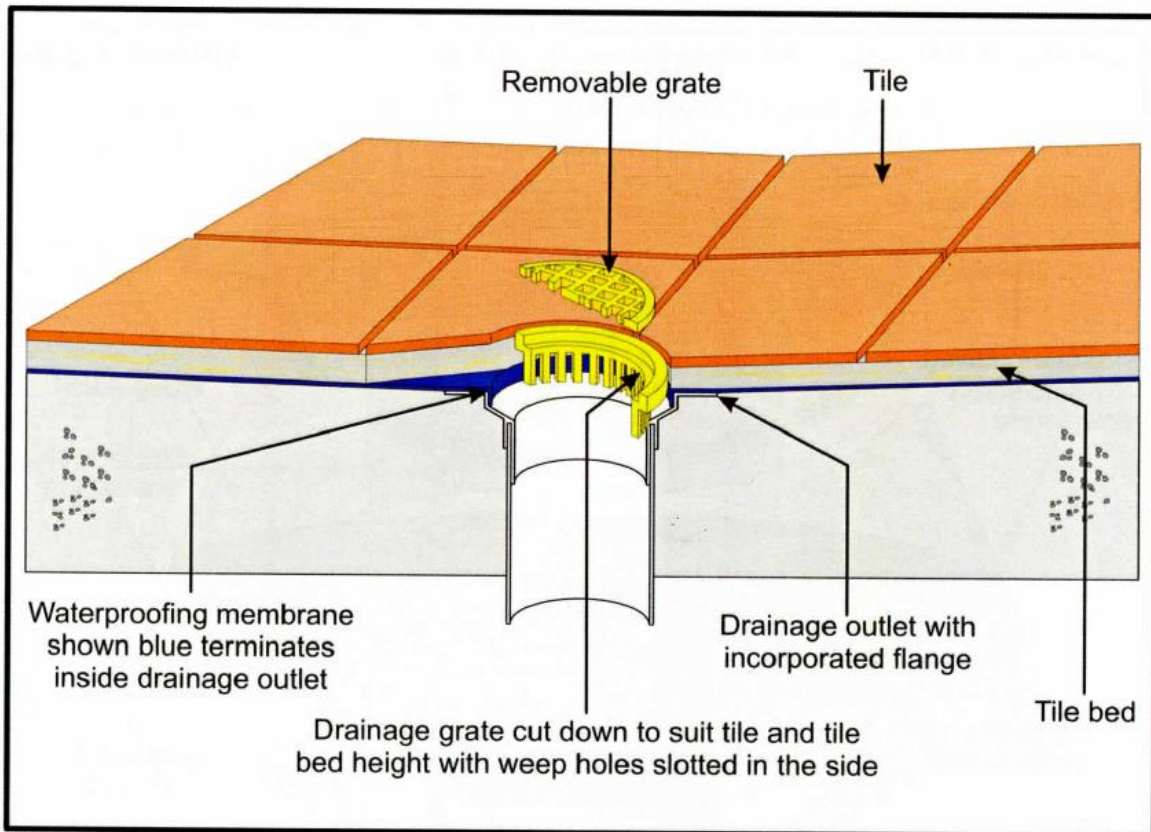
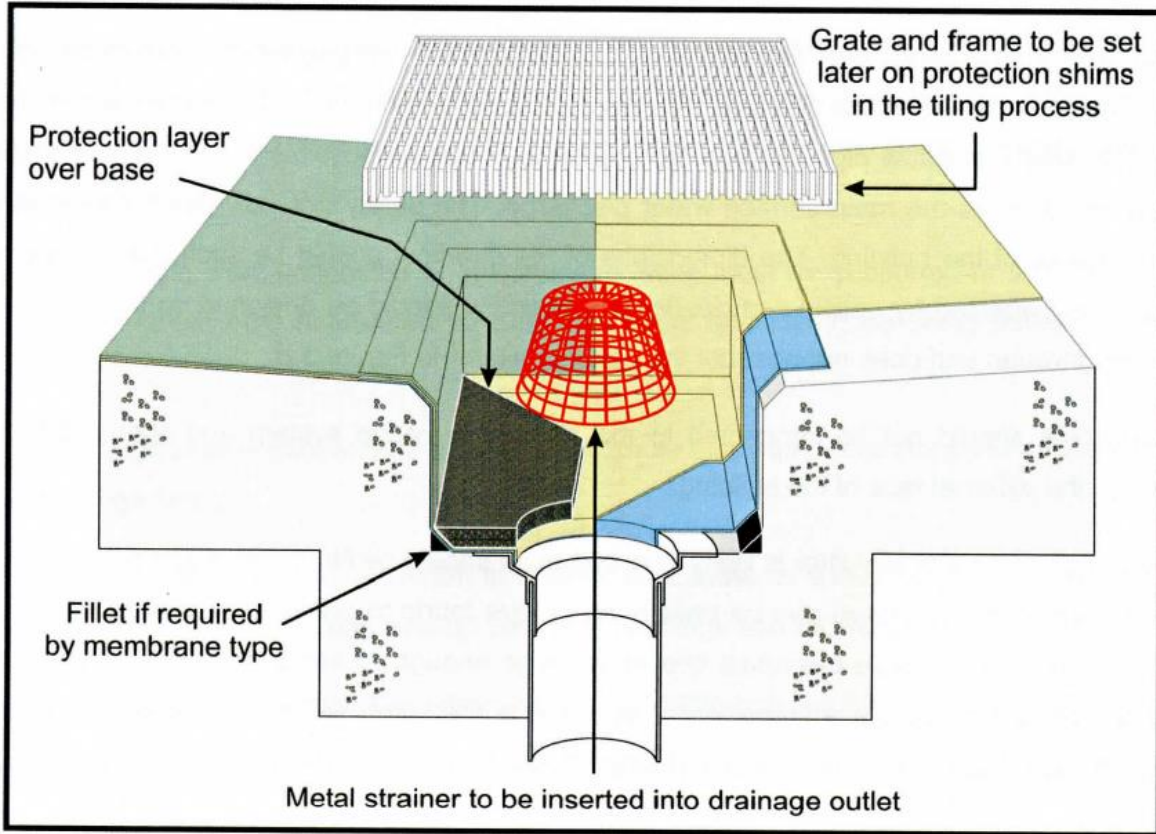
DRAINS

The membrane is to be connected to the stormwater drainage system through a down turn of membrane into the inlet.

Other connections could have a flange for the membrane to be attached.

The installation of the drain should include a sump, inlet pit, grate or cage, to minimize blockage from debris

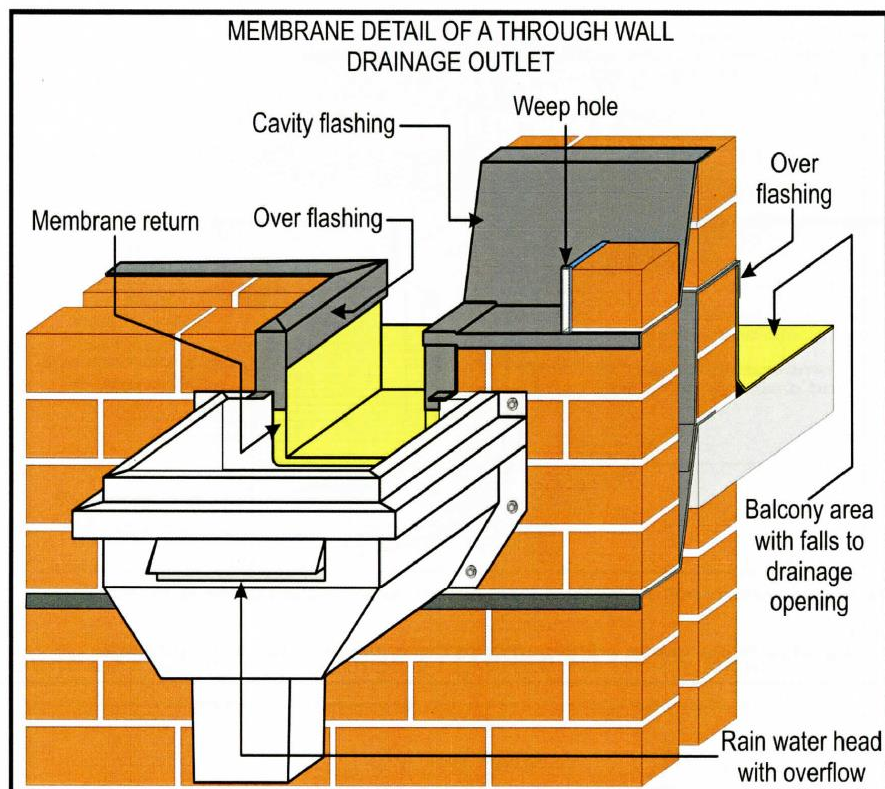
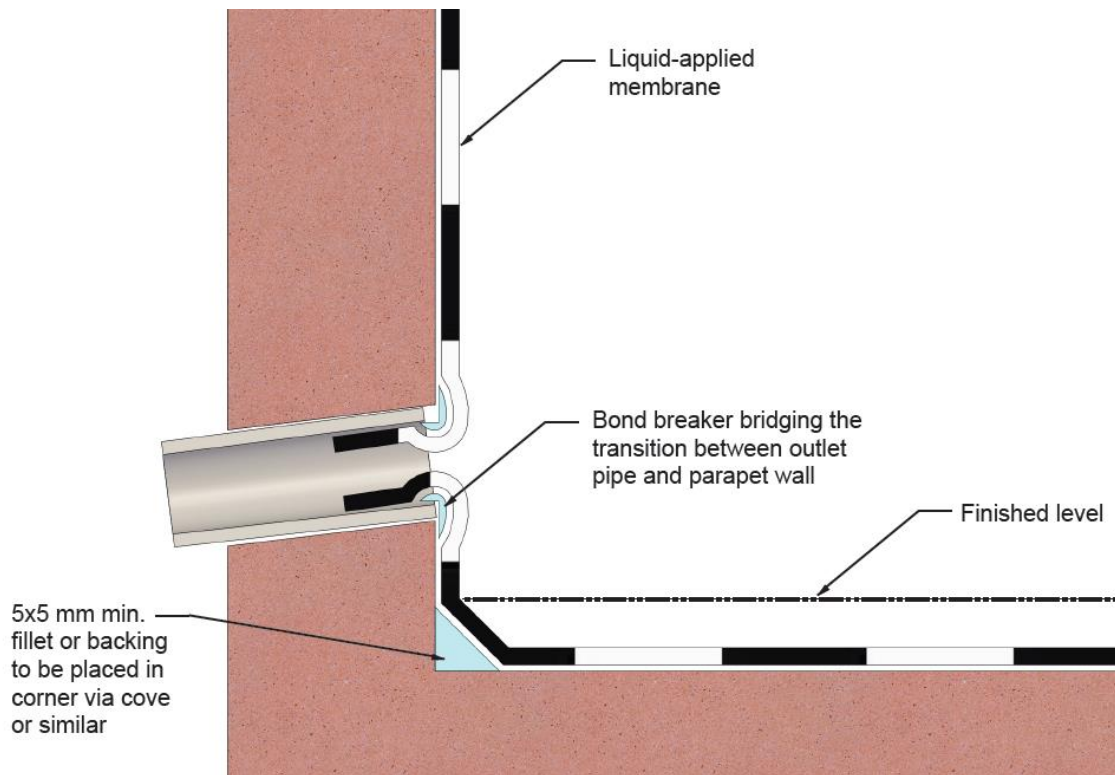






OVERFLOWS

The membrane must be turned into the overflow to prevent moisture from tracking behind the membrane.





CHANGES IN DIRECTION OR UPSTANDS

Any changes of direction for the membrane from horizontal to vertical is to follow the same criteria as expressed in MOVEMENT AND CONTROL JOINTS

Bond breakers are to be used where movement between substrates is expected.

Upstands & Hobs (piers, posts, etc.) are to be treated as with the detail outlined in TERMINATION OF MEMBRANES

PLANTER BOXES

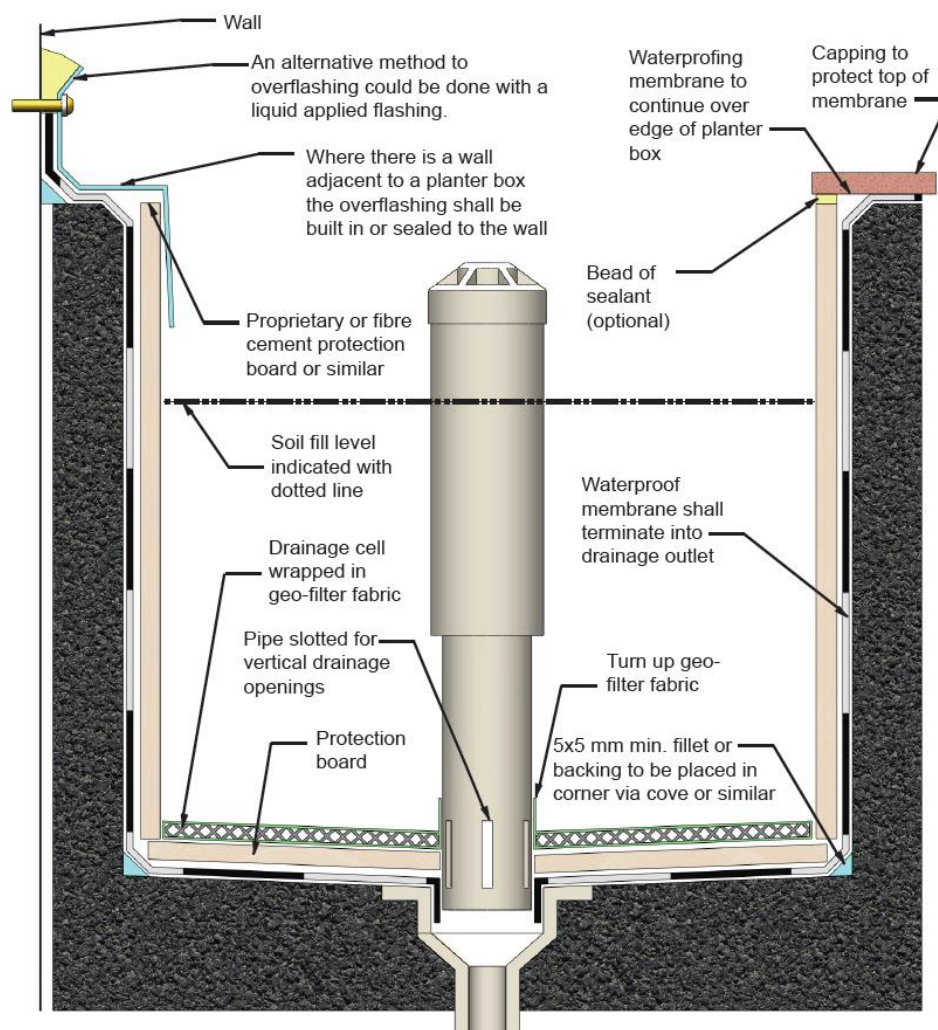
The membrane is to be sealed to the drainage outlet and extend vertically to a height of 100mm above the soil or fill level.

Falls in the planter box should be a minimum of 1 to 100 (10mm per 1 m)

A suitable overflow should be provided

Protection board should be installed to minimize root damage to the membrane

Externally exposed walls of the planter boxes should be waterproofed to prevent failure of the internal membrane.





PROTECTION DURING CONSTRUCTION

When a membrane system is not designed to be trafficable, the membrane must be protected from damage after installation until covered or finishes are installed. Typically, protection boards, physical barriers, restricted access and elevated walkways are used.

OVERLAYING SURFACE FINISHES

Where a membrane is to be overlaid with another system (tiles, pavers, ballast, insulation, soil etc), the overlaying system shall be compatible with, and not cause damage to the membrane.

Where the topping or bedding mortar is to be bonded to the membrane, sufficient movement joints to be provided in the topping or bedding mortar to accommodate the movement over the membrane.

NOTE: for bonded finished, the movement joints are to be located above the movement and control joints in substrate.

INSPECTION AND ACCEPTANCE TEST

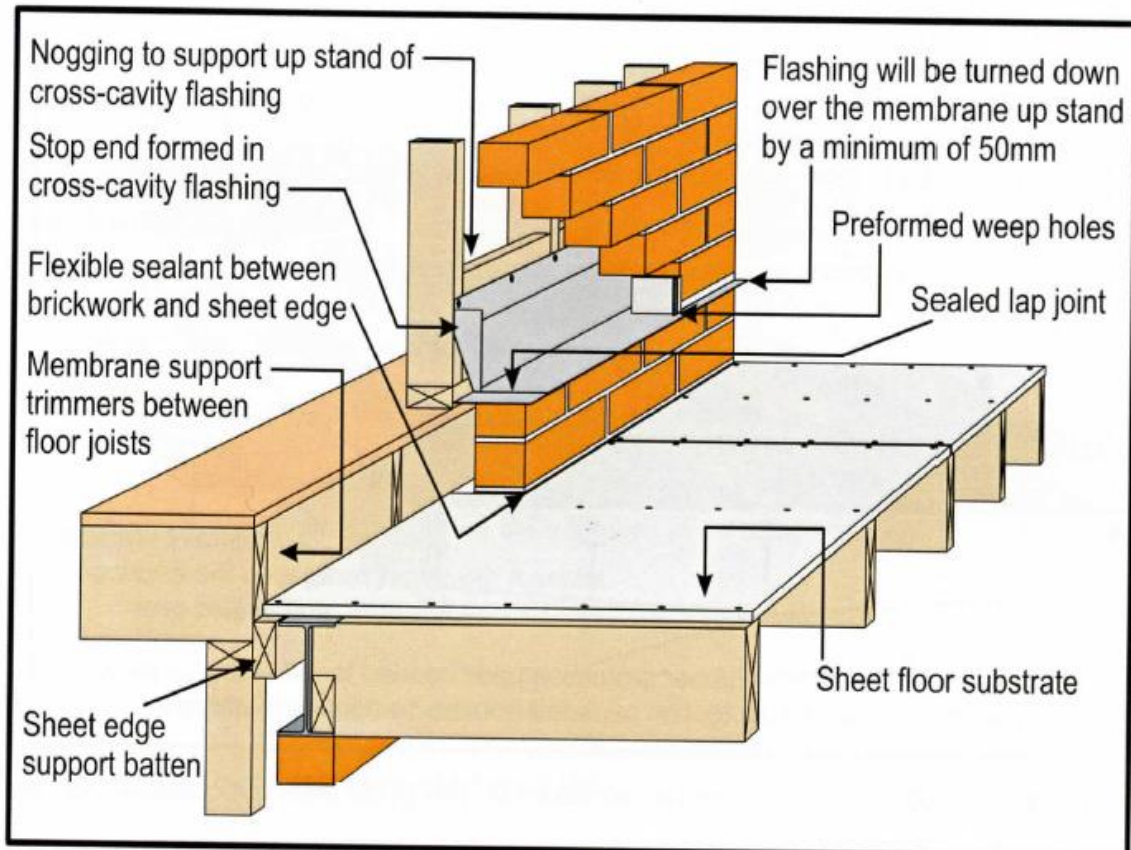
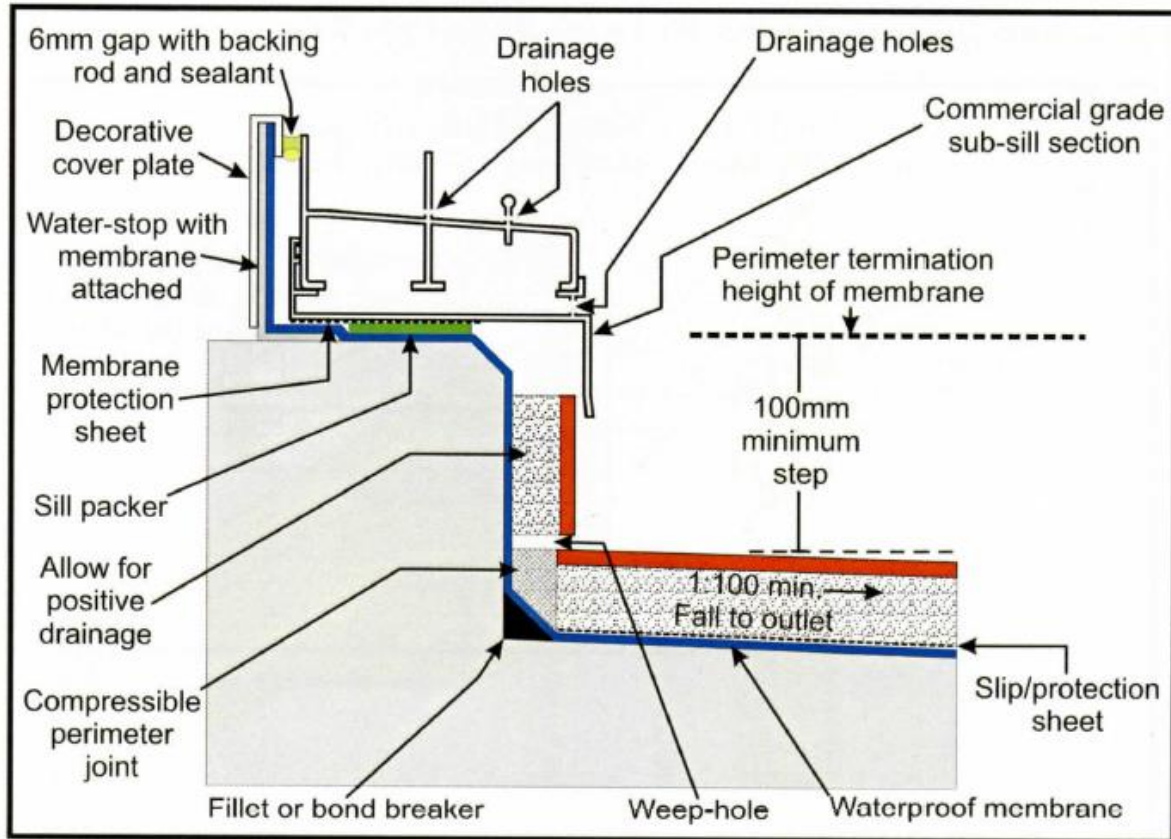
On the completion of the installation of a membrane system, inspection and acceptance testing must be conducted. In addition to the visual inspection, either the dry film thickness test (DFT) by non-destructive means or a controlled water test for a minimum of 24 hours duration is required.

Wet Film Thickness (microns)	Dry Film Thickness after Full Cure (microns)		
	100% Solids	80% Solids	60% Solids
500	500	400	300
750	750	600	450
1000	1000	800	600
1500	1500	1200	900



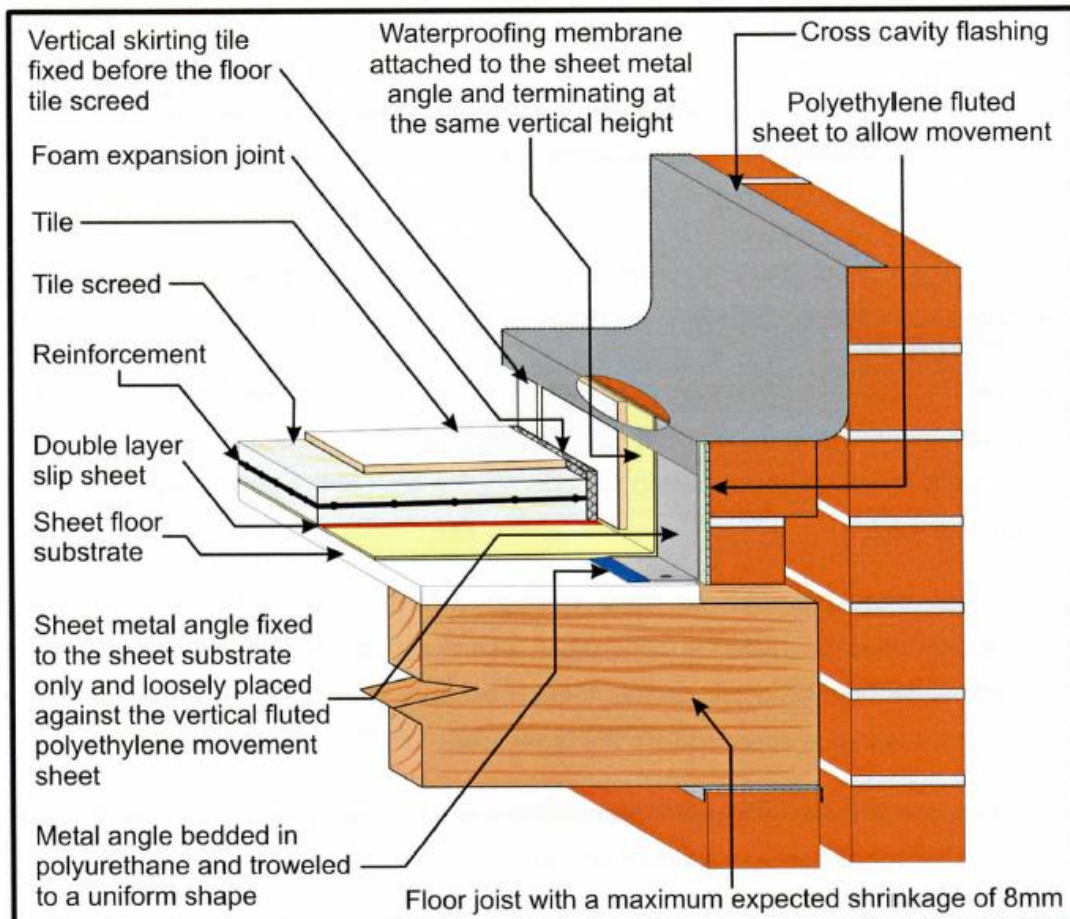
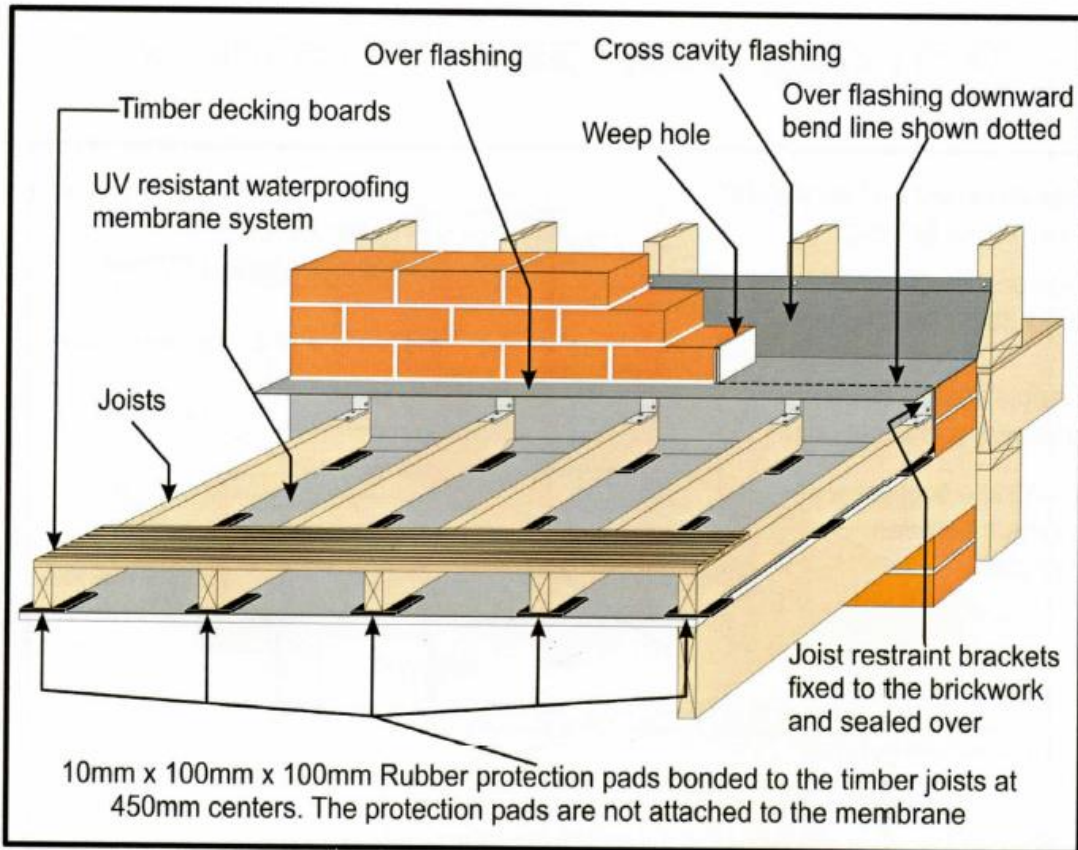
BALCONY CONSIDERATIONS

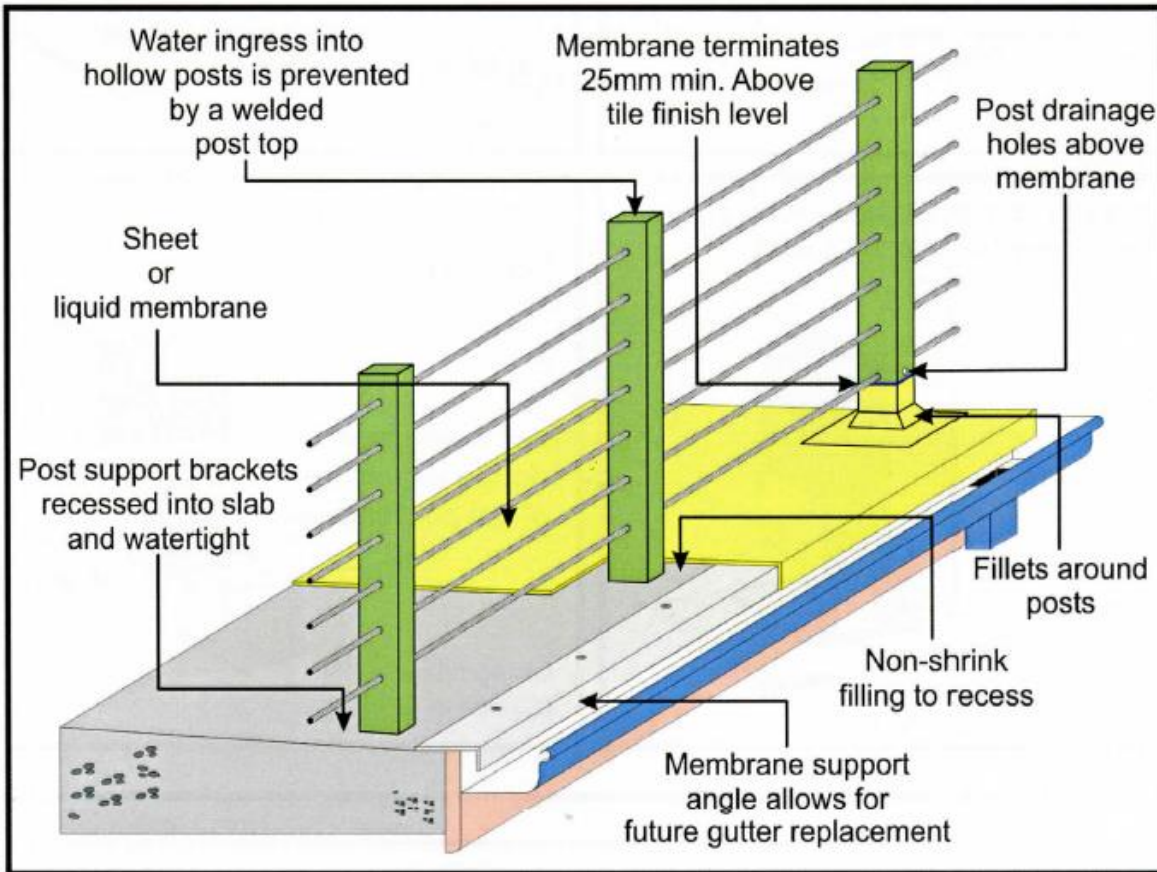
DOOR STOP DETAIL



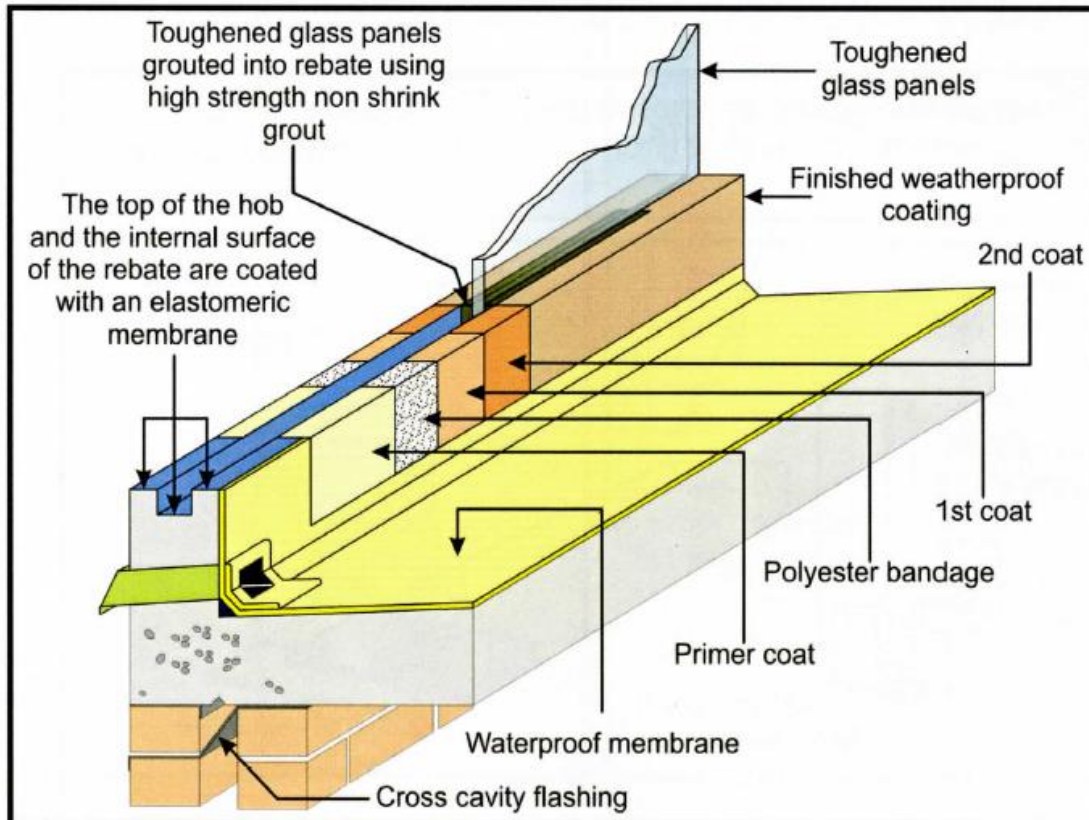


TIMBER DECKING OVER WATERPROOFED STRUCTURE





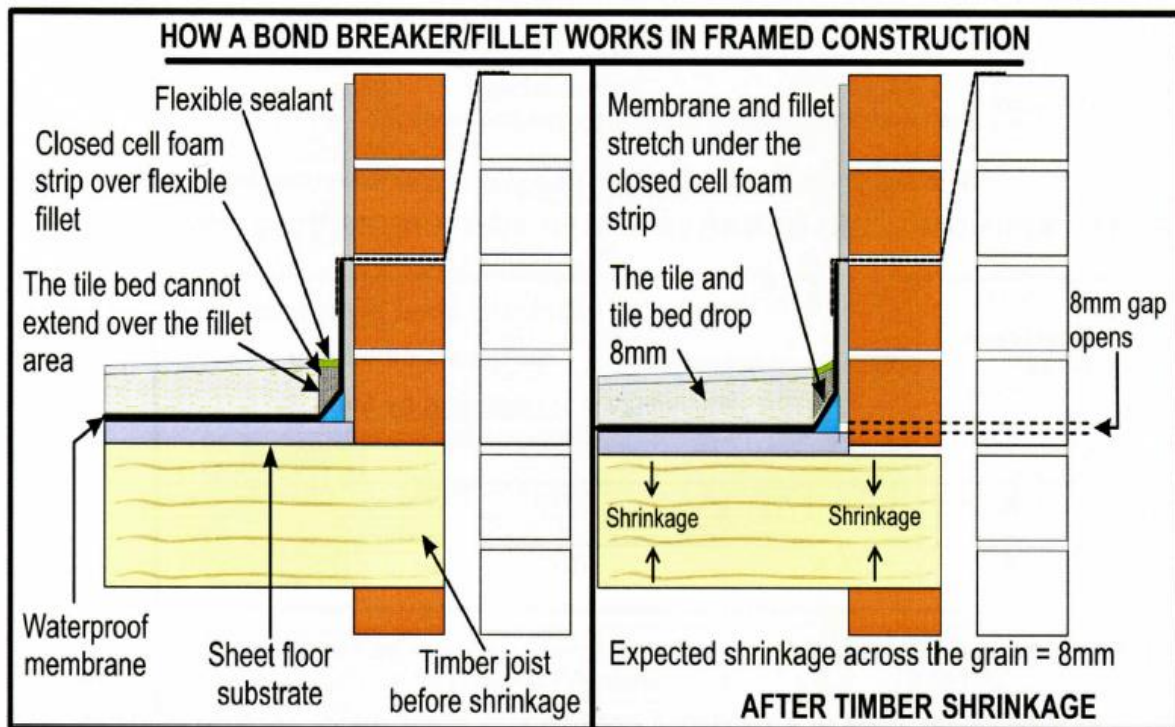
BALUSTRADE





NOTES

BOND BREAKER PRINCIPLE





SUMMARY CHECK LIST

The following is a summary check list for external waterproofing to meet and exceed the Standard AS4654.2. It is both the builder and the waterproofing contractor's responsibility to understand and comply with the NCC and Australian Standard. This summary is a guide only.

1. Inspect and check the condition of the substrate before waterproofing:
 - Correct substrate materials installed
 - Movement Joints have been installed correctly
 - Flashings are correctly installed
 - Door sills are correctly installed
 - Plumbing and other penetrations have been correctly installed
 - Falls meet or exceed the Standard
2. Choose a Membrane system suitable for site purpose, incorporating final finishes requirements
3. Apply 'Bond Breaker' principle to all fillets, penetrations, vertical and horizontal joints
4. Ensure membrane system extends into drains, overflows, gutters etc. as required.
5. Install falls as required
6. Ensure all upturns and downturns extend to or exceed the Standard
7. Ensure the membrane system is working with the movement and control joints
8. Ensure the membrane system is protected and fully cured
9. Complete a final inspection, plus conduct membrane test
10. Issue a certificate of compliance that the waterproofing has met and exceeded the AS4654.2

References:

AS4654.2 Waterproofing membranes for external above-ground use. Part 2: Design and installation

MBA – NSW: Guide to External Waterproofing: Balcony Decks

Australian Institute of Waterproofing (AIW): External technical drawings