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# Installation Manual

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## Vertical-Shiplap Cavity System

Flexible Underlay – Structural Cavity Batten

**Accoya**

## **\*\*IMPORTANT\*\***

This Installation Manual (IM) is specific to

**ACCOYA (AC) and VERTICAL SHIPLAP cavity system (VC)** profile only.

**Specific drawings** in this Installation Manual can be found attached.

There are CertClad Installation Manuals in the following profiles and timber species.

Profiles are Vertical Shiplap, Horizontal Bevelback and Horizontal Rusticated. The timber species are, Western Red Cedar, Radiata Pine and Accoya.

CertClad is a certified installation system and supplied by ITI NZ.

These documents can be found on our website **iti.net.nz**. If you have any questions about our products or manuals/specifications, please feel free to contact us. Auckland office (09)620-0260 or [technical@iti.net.nz](mailto:technical@iti.net.nz)

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# 1 SCOPE

## 1.1 INTENDED USE

This Vertical Shiplap Weatherboard Cavity System has been designed for use as cladding for residential and light commercial buildings. It is suitable for buildings with a 'Risk Score' of 0 - 20 Calculated in accordance with New Zealand Building Code (NZBC) Clause E2/AS1 Table 1 and Wind Zones up to and including extra high.

## 1.2 VALIDITY

CertClad is only valid when all products in the weatherboard system are as listed in the product certificate and this manual. This is to ensure that all products meet the requirements of the CertClad system and are installed in the correct manner.

## 1.3 PERFORMANCE

When installed and maintained as specified in this manual and the work is done by a qualified tradesman using accepted trade practices, it will meet the applicable sections of the following requirements of the NZBC (New Zealand Building Code):

- B1 Structure
- B2 Durability
- E2 External Moisture
- F2 Hazardous Building Material

## 1.4 LIFESPAN

### 1.4.1 SERVICEABLE LIFE

Under normal conditions, the Accoya® Vertical Shiplap Weatherboard Cavity System is warranted for 50 years in above ground applications. This includes Cladding that sits above the ground as per E2 minimum requirements.

Please see Warranty Terms & Conditions <https://iti.net.nz/Downloads/6733/>.

Although Accoya® may be installed either coated or uncoated, it is recommended that to achieve desired aesthetic qualities, the coating and maintenance requirements sections below should be followed.

More *importantly*, some timber boards may require replacement over the lifetime of the cladding as part of normal maintenance.

### 1.4.2 COATING REQUIREMENTS

Accoya® can be left uncoated but if a coating is chosen, ITI NZ recommends that all faces (hidden and exposed) must be completely coated, or envelope sealed. The second and third coat are to cover the face only. Any cut ends and bare timber must be recoated with 2 coats of oil or stain.

Refer to section 4.3 Priming and Sealing (page 9) and 5.2.4 Coating (Page 10) for more information.

For further information read the “Accoya® Wood Information Guide” which you can obtain from our website or contact us directly <https://iti.net.nz/Downloads/6733/>

Contact Information is [technical@iti.net.nz](mailto:technical@iti.net.nz); (09) 620-0260 or <https://iti.net.nz/>

### 1.4.3 MAINTENANCE REQUIREMENTS

Due to its dimensional stability, Accoya® Wood typically has a longer service life than other timber species, however the coating manufacturers specifications must always be followed.

Refer to section 12, On-Going Maintenance (page 19) for more information about the required maintenance.

## 1.5 WARRANTY

### 1.5.1 WARRANTY

Accoya® wood is backed by a 50-year warranty for above-ground use where the timber is installed at least 200mm above the ground, and a 25-year warranty for use within 200mm of ground contact or in freshwater immersion.

A copy of the warranty is available in the Warranties section at <https://iti.net.nz/Downloads/6733/>.

## 2 HEALTH AND SAFETY

### 2.1 CUTTING OF TIMBER

Cutting of timber is to be done in a well-ventilated area and appropriate PPE must be worn, including a suitable dust mask, eye protection, and ear protection.

### 2.2 COATING AND PRIMING

Coating and priming are to be done in a well-ventilated area, refer to the coating/primer supplier for all matters relating to health and safety. All relevant sections of AS/NZS 2311:2017 (Guide to the painting of buildings) and all the coating manufacturer's requirements must be adhered to.

For further information refer to the Essential Coatings Guide <https://iti.net.nz/Downloads/6733/>

Contact Information is [technical@iti.net.nz](mailto:technical@iti.net.nz); (09) 620-0260 or [www.iti.net.nz](http://www.iti.net.nz)



## 3 SITE PREPARATION

### 3.1 STRUCTURE AND FRAMING

#### 3.1.1 NEW ZEALAND STANDARD 3604

Generally, the timber framing must comply with NZS 3604:2011 (Timber-framed residential buildings), however, where specific engineering design is required, the framing shall be at least of equivalent stiffness as the framing provisions of NZS 3604:2011.

#### 3.1.2 LAYOUT

Studs must be spaced at a maximum of 600mm between centres. Dwangs (nogging) must be spaced at maximum 800mm between centres. Studs and Dwangs must form a flush plane for cavity battens and weatherboards to be fixed to as per NZS 3604:2011, table 4.

Additional framing may be required at soffits, corners, and penetrations such as window and door openings to support the installation of battens.

#### 3.1.3 MOISTURE CONTENT

Framing and cavity battens must comply with the moisture content limits outlined in NZS 3602 and the New Zealand Building Code prior to the installation of weatherboards.

Testing must be carried out in accordance with industry standards to confirm compliance.

### 3.1 BUILDING UNDERLAY

#### 3.2.1 MATERIAL

Flexible underlay and rigid wall underlays must comply with properties stipulated in NZBC Clause E2/AS1 Table 23 (Properties of roof underlays and wall underlays) or equivalent proof of compliance to NZBC such as Code Mark or BRANZ Appraisal where the conditions of use and scope comply with the application.

#### 3.2.2 INSTALLATION

Wall underlay to be installed in accordance with underlay manufacturer's specification, and in accordance with conditions set out in NZBC Clause E2/AS1. 9.1.7 (Wall Underlay).

## 4 PRE-INSTALLATION

### 4.1 ON-SITE STORAGE AND HANDLING

Care must be taken to ensure that timber and accessories are kept clean and dry and are not damaged whilst in storage awaiting application.

Extra care is to be taken while handling weatherboards to ensure that they are not damaged.

Timber is to be stacked on flat level bearers/dunnage that is a maximum of 900mm apart and at least 100mm off the ground. Timber should either be stored inside an enclosed building or covered with an additional waterproof layer and protected from the elements when stored outside.

**IMPORTANT** Timber weatherboards should not be installed if their moisture content is above 8%.

### 4.2 DOCKING OUT DEFECTS

Before coating or installing boards, check for any defects that may require docking out.

**IMPORTANT** All docked ends, any exposed or bare timber of stained or painted weatherboards will require end sealing with a minimum of one coat of primer or stain. Double priming or coating is recommended.

### 4.3 PRIMING AND SEALING

Apply the first coat of stain or primer to all sides and edges of the weatherboard prior to installation. Ensure Accoya® is at the correct moisture content prior to priming. Remember that all docked ends will require priming as noted in section 1.4.2.

We recommend the use of a Primer with a fungicidal and/or mouldicide in it, these biocides are usually also found in coatings used to prevent unsightly (but non-detrimental) surface moulding. Primers that contain calcium carbonate cannot be used, refer to coating manufacturer for directions.

Opaque coatings with calcium carbonate (chalk) fillers can cause coating blistering on Accoya and should be avoided. Please consult your coatings provider.

Follow the coating manufacturer's directions and ensure further coats are applied as required. All relevant sections of standard AS/NZS 2311:2017 (Guide to the painting of buildings) must be adhered to.

For optimal coating performance it is strongly recommended that a primer is factory applied.

**NOTE** Accoya® weatherboards can be ordered to arrive on site pre-primed or pre-coated. This ensures the timber is at the correct moisture content.

# 5 MATERIALS - CAVITY SYSTEM COMPONENTS

## 5.1 CAVITY SYSTEM COMPONENTS

**IMPORTANT** All cavity system components must be supplied by or approved by ITI NZ. This is to ensure that all items are up to a suitable standard and to ensure the compatibility and suitability of all items. Any substitutions or products supplied by others will invalidate the CertClad Warranty unless written confirmation is obtained from ITI NZ.

## 5.2 TIMBER SPECIES: ACCOYA®

### 5.2.1 MATERIAL

New Zealand grown Radiata Pine modified to the core by a non-toxic, proprietary acetylation process, sold by ITI NZ under the trade name 'Accoya®'.

### 5.2.2 ABOUT ACETYLATION

Accoya® has exceptional durability and stability as a result of the acetylation process. The Acetylation process is a molecular conversion in the cellular structure of the timber which effectively changes the free hydroxyls groups (cell groups that readily absorb and release water, causing shrinkage and swelling) within the wood into stable acetyl groups. This is done by reacting the wood with acetic anhydride, which comes from acetic acid (known as vinegar when in its dilute form). When the free hydroxyl group is transformed to an acetyl group, the ability of the wood to absorb or react with water is greatly reduced, rendering the wood very stable and more durable.

### 5.2.3 DURABILITY

Accoya® is class one durable, furthermore, it is guaranteed not to rot for 50 years in above-ground applications.

*For the purpose of this guarantee, rot is defined as fungal decay that materially damages the timber caused by the soft-rot fungal species: poria placenta, coniophora puteana, gloeophyllum trabeum, coriolus versicolor or serpula lacrymans but does not include common surface moulding, mildew or any other organism either bacteria or fungi on the timber surface. Please note, some timber boards may require replacement over the lifetime of the cladding as part of normal maintenance.*

### 5.2.4 COATING

Accoya® can be installed uncoated, in accordance with NZS 3602:2003, Table 2.A.1. However a coating can be applied to enhance the appearance of the cladding.

If choosing an Oil/Stain, it is recommended a coating system comprising one base coat of a suitable penetrating oil or stain be applied followed by a minimum two more coats once installed.

If choosing a Paint, it is recommended a coating system comprising one base coat of a suitable alkyd based primer be applied, followed by another coat of an acrylic based primer and then two topcoats of a suitable and compatible paint.

## 5.3 ACCOYA SHIPLAP WEATHERBOARDS

Accoya® can be machined into a variety of profiles, including the range of Shiplap weatherboards as listed on our website [www.iti.net.nz](http://www.iti.net.nz)

## 5.4 FLASHINGS

### 5.4.1 MATERIAL

Flashings can be either: Stainless Steel (316), or uPVC.

All flashings to comply with NZBC Clause E2/AS1. 4.0 and Table. 7.

See also ITI NZ construction details for specific flashing sizes and covers.

**IMPORTANT** Weatherboard fixings are not to penetrate flashings as this may provide a path for water to track through.

## 5.5 NAILS

### 5.5.1 MATERIAL

Accoya® has slightly higher acidity levels than most timber and will cause oxidization or corrosion when in direct contact with certain metals and moisture. Do not use Accoya® in direct contact with copper, galvanized steel, bare/low grade aluminium, zincalume, or zinc plated steel.

Stainless Steel (316) or brass fastenings/fixings must be used as these will not degrade like other metals.

Factory applied paint or powder coated aluminium may be used in contact with Accoya®.

## 5.6 CAVITY BATTENS

### 5.6.1 MATERIAL

Minimum H3.1 treated Radiata Pine.

### 5.6.2 DIMENSIONS

Battens are 45 x 45 mm. Timber battens shall be castellated.

# 6 MATERIALS - ACCOMPANYING ELEMENTS

## 6.1 ACCOMPANYING ELEMENTS

All items that precede the installation of the weatherboard system (building underlay, roofing underlay, flashing tape, etc.) and all consumables and items successive to the weatherboard system (PEF backing rods, flexible sealants, etc.) will not be supplied by ITI NZ as these are outside the scope of this specification. These items still require careful evaluation to determine their suitability and still play a critical role as part of the cladding system.

**IMPORTANT** It is the builder's responsibility to ensure that all these accompanying items meet the requirements and properties stated and more *importantly* are compatible with adjacent materials and are suitable for the intended use and comply with the relevant clauses of the NZBC.

## 6.2 TIMBER FRAMING

Timber framing must meet the requirements of NZS 3604:2011 (Timber-framed residential buildings), or where an alternative framing product is used (such as steel framing) strength and stiffness must be equal or greater than the performance requirements as set out in NZS 3604:2011.

## 6.3 BUILDING UNDERLAY

The building underlay used must also meet all the requirements stated in NZBC Clause E2/AS1 Table 23 (Properties of roof underlays and wall underlays).

A rigid wall underlay is required for Extra High wind zones as per E2/AS1.

## 6.4 FLASHING TAPE

The flashing tape used must meet all the requirements stated in NZBC Clause E2/AS1 section 4.3.11 with a valid BRANZ Appraisal or other certification and suitable to be used with the wall underlay selected.

The flashing tape must be compatible with all materials that it is in contact with, specifically the building underlay.

## 6.5 SEALANTS AND ADHESIVES

### 6.5.1 MODIFIED SILICONE OR CO-POLYMER CONSTRUCTION SEALANT

All construction sealants are to be a modified silicone with a valid certification to NZBC.

### 6.5.2 SELF-EXPANDING POLYURETHANE FOAM

All self-expanding foams must be rapidly expanding polyurethane foams that bond with all materials they will come into contact with. The foams must not shrink and must cure to an airtight, moisture resistant seal.

## 6.6 PEF ROD

PEF backing rod must be closed cell polyethylene foam specifically designed for use as a backing rod.

It should have a diameter 25% larger than the gap width and should be pushed into the gap with a blunt tool to ensure an even and continuous seal.

## 6.7 METER BOX

Meter box penetrations have a higher risk of water ingress, and as such all possible steps should be taken to minimise this risk. A good quality meter box manufactured by a leading NZ supplier will certainly help this.

Meter boxes are to be manufactured from aluminium, hot-dipped galvanised steel, glass-reinforced plastic or other suitable rigid, UV resistant, non-combustible material. They also must be coated on the inside and outside surfaces with a material giving a hard, durable finish providing a service life of not less than 20 years.

**NOTE** If using uncoated Aluminium or Galvanised Steel, ensure there is separation between these metals and Accoya®, by means of DPC or flashing tape.

The door must have a troughed lip around the front perimeter and if a drain is present, it should be made in a way to minimise water entry.

# 7 INSTALLING CAVITY BATTENS

## 7.1 CAVITY CONSTRUCTION

### 7.1.1 COMPLIANCE

Cavities must comply with NZBC Clause E2/AS1 paragraph 9.1.8.

### 7.1.2 PRECAUTIONS

As solvents in LOSP treatments can affect bitumen-based building papers, it is necessary to fillet stack LOSP treated timber for 7 days after treatment to ensure that solvent has evaporated before contact with any bitumen-based building paper.

### 7.1.3 FIXING (STRUCTURAL) CAVITY BATTENS

Cavity battens are to be fixed to the studs with extra vertical battens to corners to support flashings where required.

NOTE Structural cavity battens are fixed to every stud and weatherboards are then fixed to the structural cavity battens only.

### 7.1.4 TOP OF WALL DETAIL

No ventilation shall be provided at the top of the cavity. Use a Vertical D4S profile (not a Castellated or Cavibat batten) at the top of the wall to close off the top of the cavity. This prevents damp air circulating from the cavity space into interior spaces such as roof framing or eaves and is extremely *important* where the cavity finishes beneath an area that is open to a roof space (such as a wall finishing under a soffit).

### 7.1.5 BOTTOM OF WALL DETAIL

Use a 'Cavity Base Closure Flashing' at the bottom of the wall to allow drainage and ventilation but prevent the entry of vermin. This also applies where cavities end over a window, door, or another opening. Ensure building underlay laps over rear upstand of the cavity base closure or use flashing tape to seal the top of the cavity base closure to the building underlay. An angle packer (or part board) may be required to support bottom of lower weatherboard.

# 8 FIXING DETAILS FOR WEATHERBOARD

## 8.1 INSTALLATION

### 8.1.1 FIXING METHOD - SHIPLAP WEATHERBOARDS

Ensure correct nails are selected in accordance with the nail selection chart 8.1.2. below.

Nail placement is to be 30 - 35mm up from bottom edge of weatherboard. Use a single nail per board at each fixing point. Maximum stud centres to be 600mm and minimum stud centres 300mm. The nail must not penetrate the underlapping (lower) board. Nail shank must be annular grooved.

Pre-drill all nail holes using a bit that is 0.3 – 0.5mm smaller in diameter than the nail shank to prevent splitting and ensure a snug fit.

Nail on a slight upward angle to prevent water running down the nail through the cavity.

Ensure nail shank has a minimum framing penetration of 35mm for painted weatherboards, or 30mm for stained or bare weatherboards.

Hand-drive all nails. Gun-driven nails should not be used as they may damage the surface of the timber or cause splitting or crushing damage in the battens.

Flat head, pentagon head or crown head nails to finish flush onto; but not into, the face of the weatherboard.

Jolt head nails must be punched just below the surface, spot primed and filled using a two-part high quality non-shrinking filler and sanded smooth prior to painting.

Ensure weatherboards are set out to achieve correct 25mm overlap at join, and a 1-2mm expansion gap between boards at rear of profiles.

One board on any given wall elevation may need to be cut down to fit wall height. Do not extend or reduce the 25mm lap requirement or 'creep' the boards to fit.

### 8.1.2 NAIL SELECTION CHART

Reference to NZBC clause E2AS1 Table 24:

Fixing lengths need to increase where installed over a rigid wall underlay to ensure minimum penetration of fixing into stud.

Weatherboards	Nail Size	Material	Nail Head	Nail Shank	Minimum Framing Penetration
Painted	95 x 3.15mm	Stainless Steel (316)	Jolt head	annular grooved	to achieve minimum 35mm framing penetration
Stained/ Bare	95 x 3.20mm	Stainless Steel (316)	Rose head or Pentagon head	annular grooved	to achieve minimum 30mm framing penetration



## 9 INTER-STOREY CAVITY JUNCTION

### 9.1 DEFINITION

Cavities may be continuous up to two storeys or 7m in height (whichever is the lesser). Walls over this height require an inter-storey junction to drain the cavity.

# 10 WITHIN-BOARD JOINS (SCARF JOINT)

Use a within-board or scarf joint to join two shorter weatherboards together, to cover full wall width.

## 10.1 LIMITATIONS

A within-board joint should not be placed where it is directly adjacent to another join, a junction, a corner or a penetration i.e., stagger joins across the wall.

## 10.2 METHOD

Weatherboards may be joined by scarfing two boards together over a supporting batten. Cut boards with a minimum 30-degree and maximum 45-degree angle. Use an appropriate adhesive to bond the boards together and nail through the overlapping board, only as close as practicable to the join, but do not nail through the angle join as boards may split. The nail should be 25mm from the edge of the join to avoid hitting the underlapping board. Care should be taken to select and use two boards that are similar in grain and appearance, and that have equal moisture contents; otherwise, one board may shrink or expand at a differing rate, putting stress on the joint.

# 11 SITE CLEAN-UP

## 11.1 DEFINITION

After completion, the installer is to leave the site in a clean and tidy manner, including:

- Replacing or repairing any damaged or marked items; and
- Removing all rubbish, debris, and unused items from the building site.

Any treated and/or coated timber off-cuts (e.g. cladding & cavity battens) or rubbish are to be disposed of in accordance with local council requirements.

# 12 ON-GOING MAINTENANCE

It is the building owner's responsibility to ensure that the cladding system receives regular maintenance so that it continues to perform at its required level.

## 12.1 MAINTENANCE INTERVAL

Maintenance should be called up as at least annually, and more often in aggressive environments - coastal, industrial, and geothermal as appropriate.

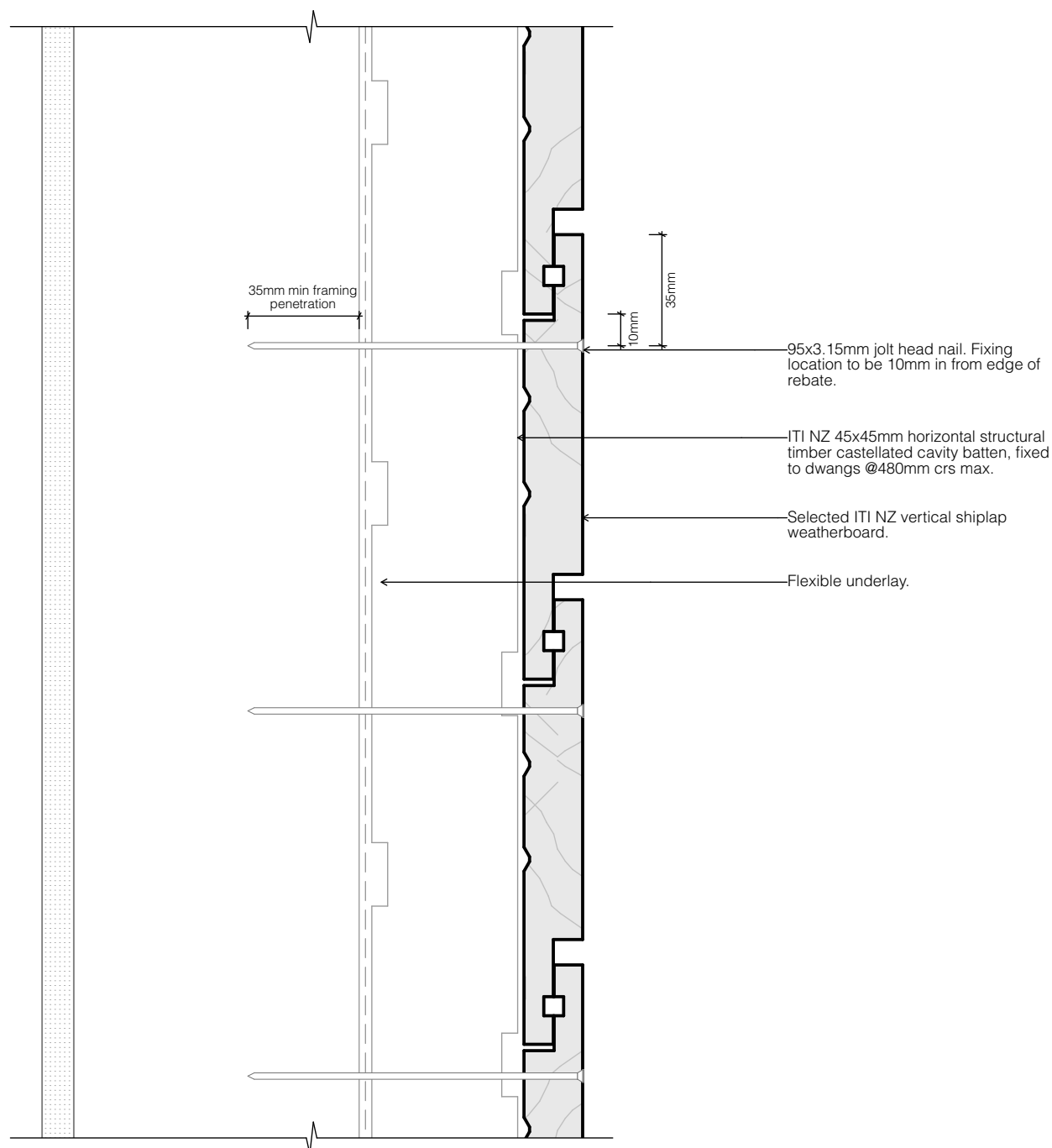
## 12.2 MAINTENANCE REQUIREMENTS

Regular maintenance shall include, but is not limited to, the following five steps. In all instances, it is recommended to first clean a small test area to ensure no damage occurs to the timber surface.

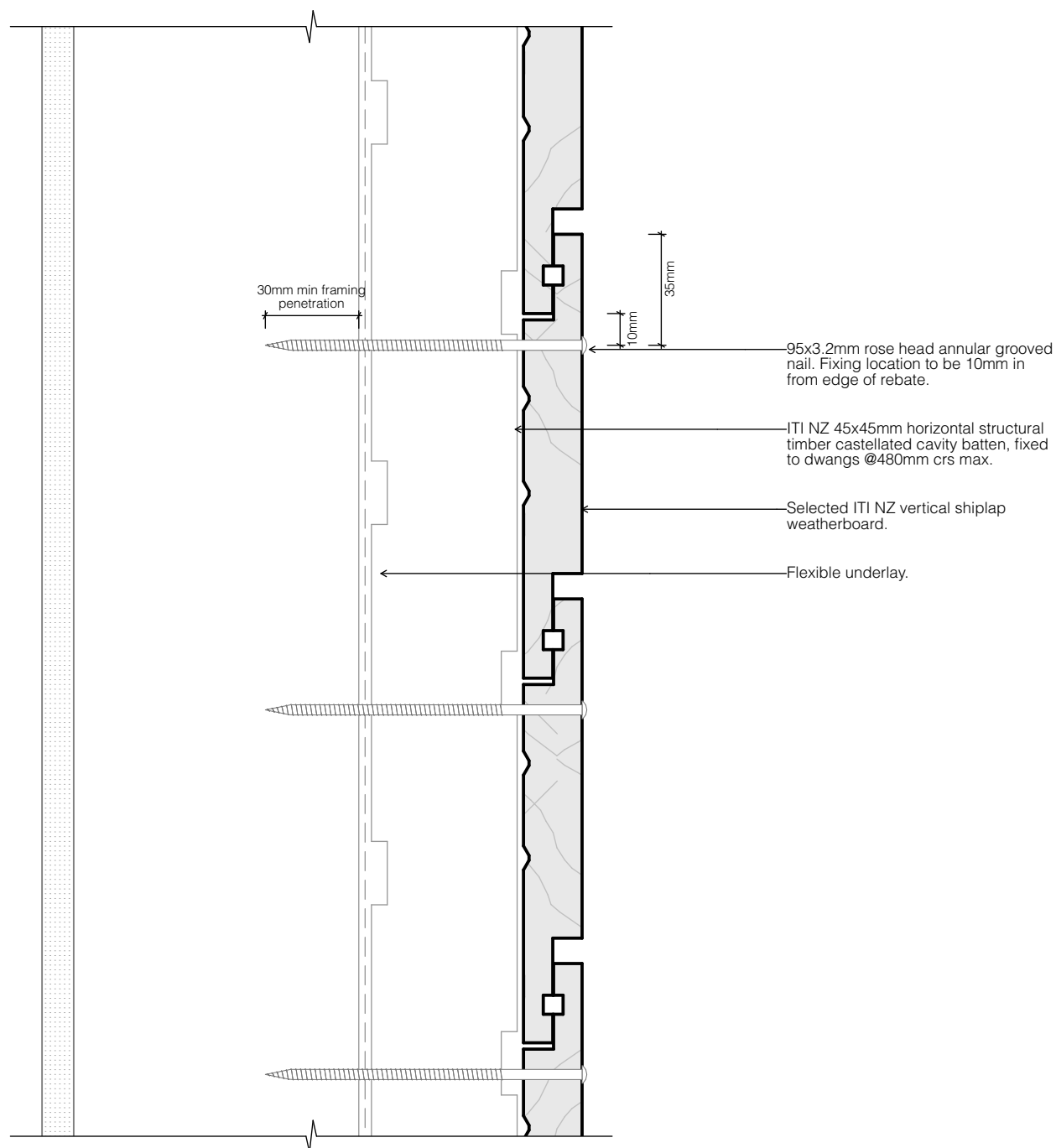
1. Wash all exterior surfaces with low-pressure water to remove dust, dirt and other contaminants.
  - a. Extra attention should be given to areas that are not exposed to rain such as sheltered areas below eaves.
  - b. Do not direct high-pressure water at any part of the cladding system as this may damage the timber surface. Take care especially around sensitive junctions such as joinery surrounds and other flashings where you must avoid forcing water past anti-capillary gaps and flashings into the wall cavity.
2. Use a soft bristle nylon brush or broom with water and an appropriate cleaning agent (refer to paint manufacturer for correct cleaning agent specific to their paint system) to remove stubborn or persistent dirt and surface contaminants. Rinse thoroughly with water after the cleaning operation to remove any excess cleaning chemicals. **DO NOT** use aggressive cleaning chemicals.
3. Inspect all surfaces and junctions for signs of damage, wear-and-tear, or coating breakdown. Where coating surface has broken or eroded remedial action is required in accordance with the coating manufacturer.
4. Repairing or replacing any damaged or deteriorated items to preserve the weather tightness of the building:
  - a. Small, isolated areas of dry rot (highly unlikely) in timber can be cut out and filled then primed and coated.
  - b. For larger areas of deterioration: remove and replace either the damaged section or the entire board for any deteriorated timber boards (includes scribes, cover boards and weatherboards). Prime and coat the replacements as required.
  - c. Other items (soakers, flashings, and capping's) may need to be replaced in their entirety.
5. When a coating is applied, periodic recoating is required to ensure the integrity of the coating is sustained. This will generally mean applying another exterior coat every 2 – 4 years if Oil/Stain and every 7 - 10 years if Paint. This is dependent on the coating used, building location after washing and maintenance, and coating manufacturer's specification.

# 13 CONSTRUCTION DETAILS

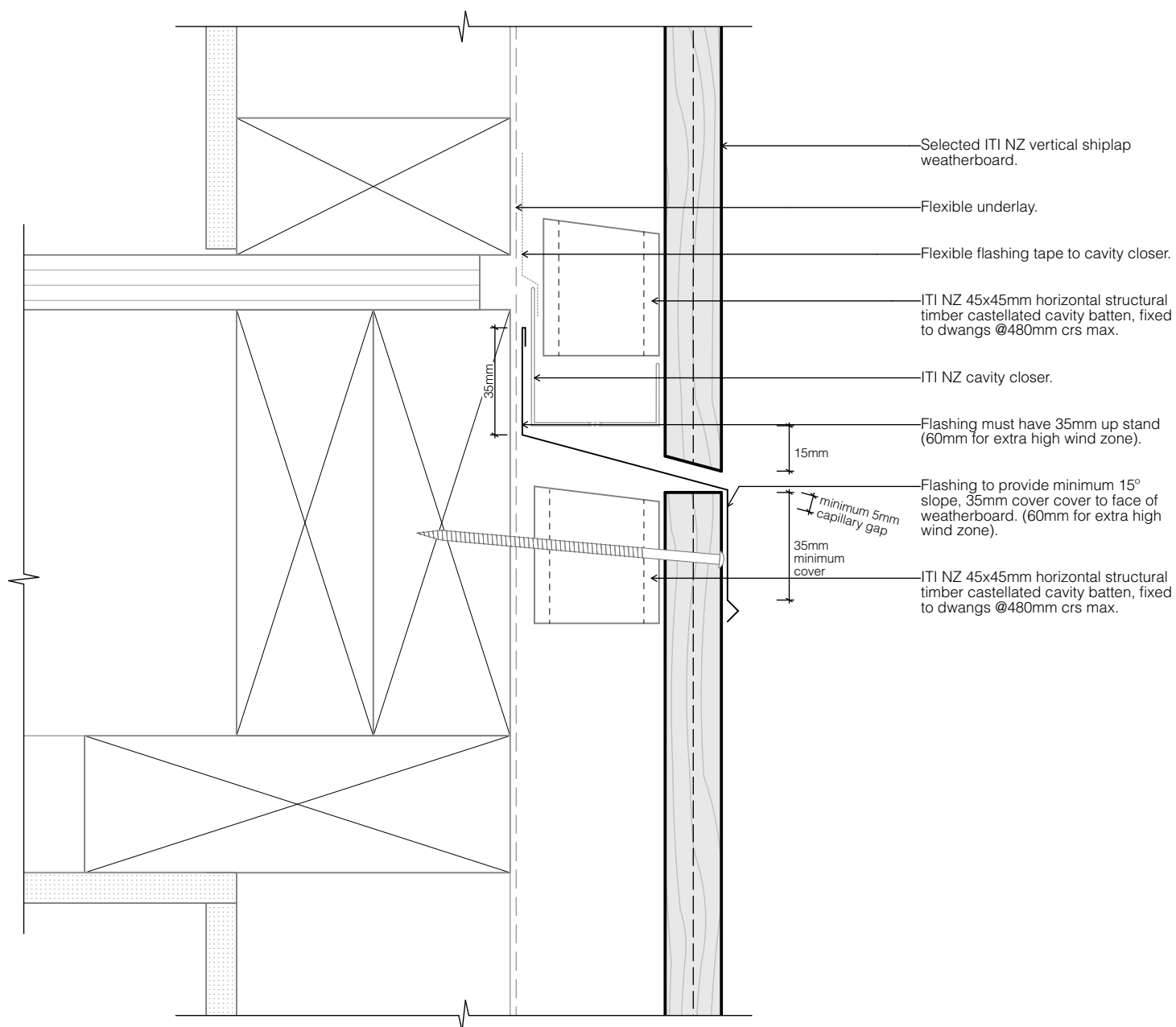
## DETAIL 13.1 – 101 FIXING DETAIL STANDARD CAVITY – PAINT FINISH (PLAN VIEW)



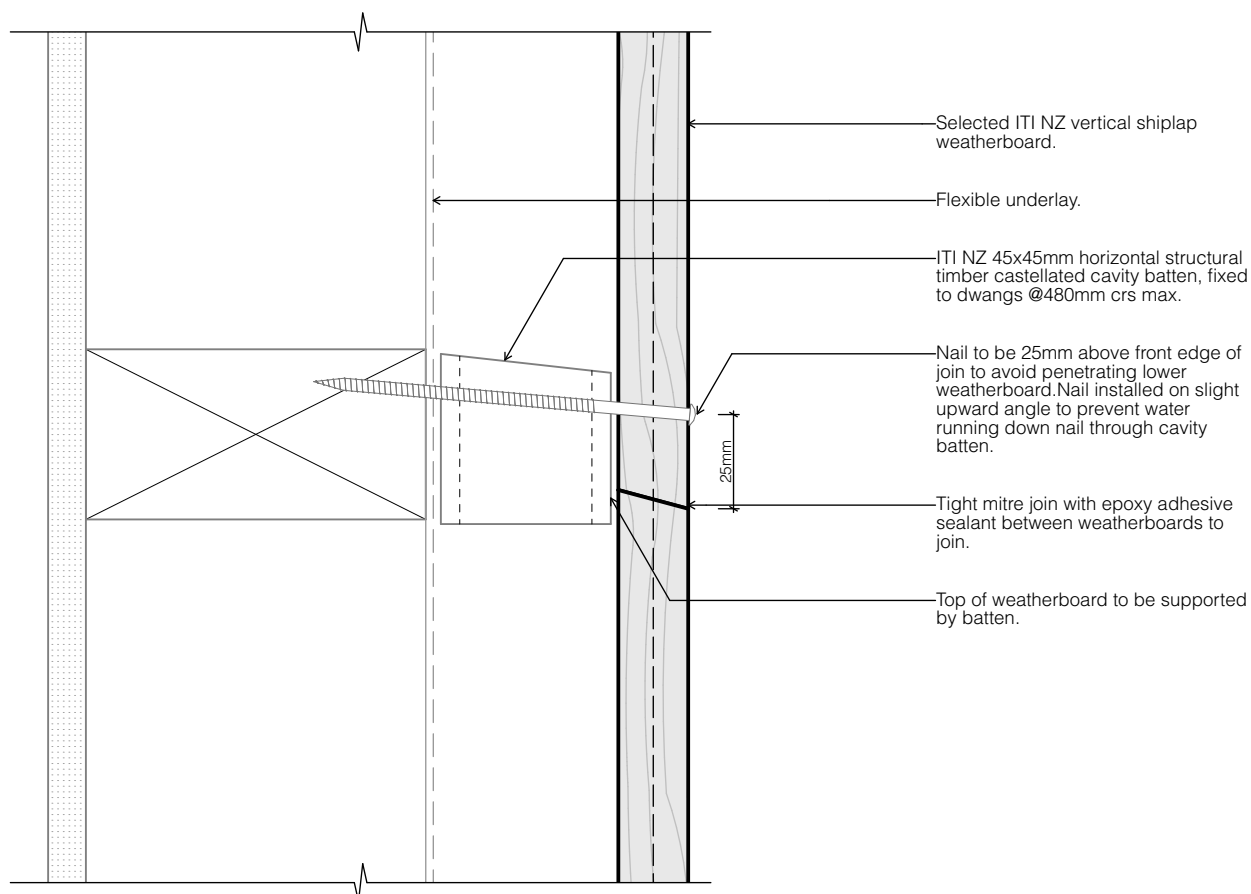
## DETAIL 13.2 – 102 FIXING DETAIL STANDARD CAVITY – STAIN FINISH (PLAN VIEW)



## DETAIL 13.3 – 201 INTERSTORY JUNCTION

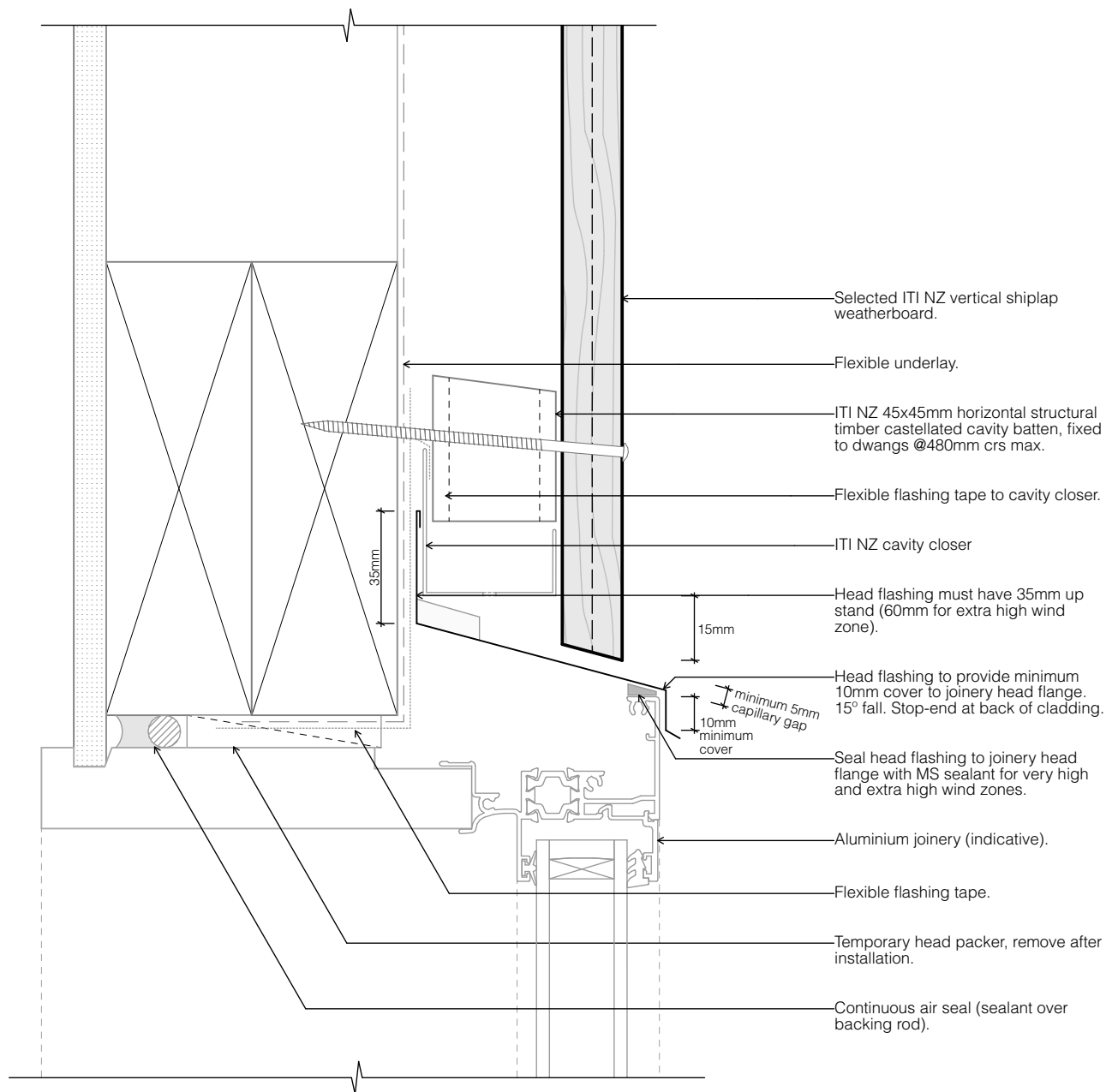


## DETAIL 13.4 – 202 WITHIN BOARD JOINS – SCARF JOINT

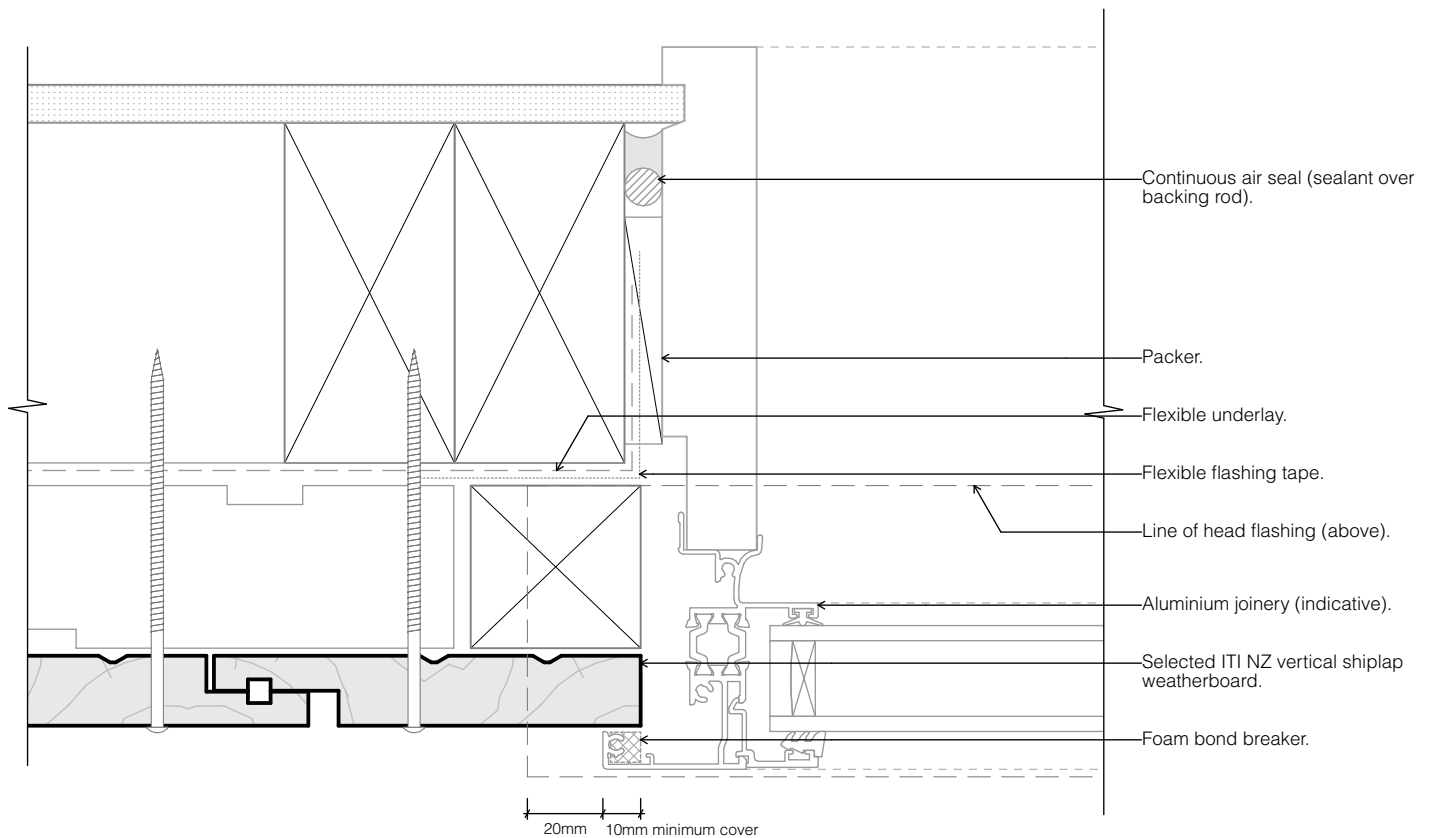




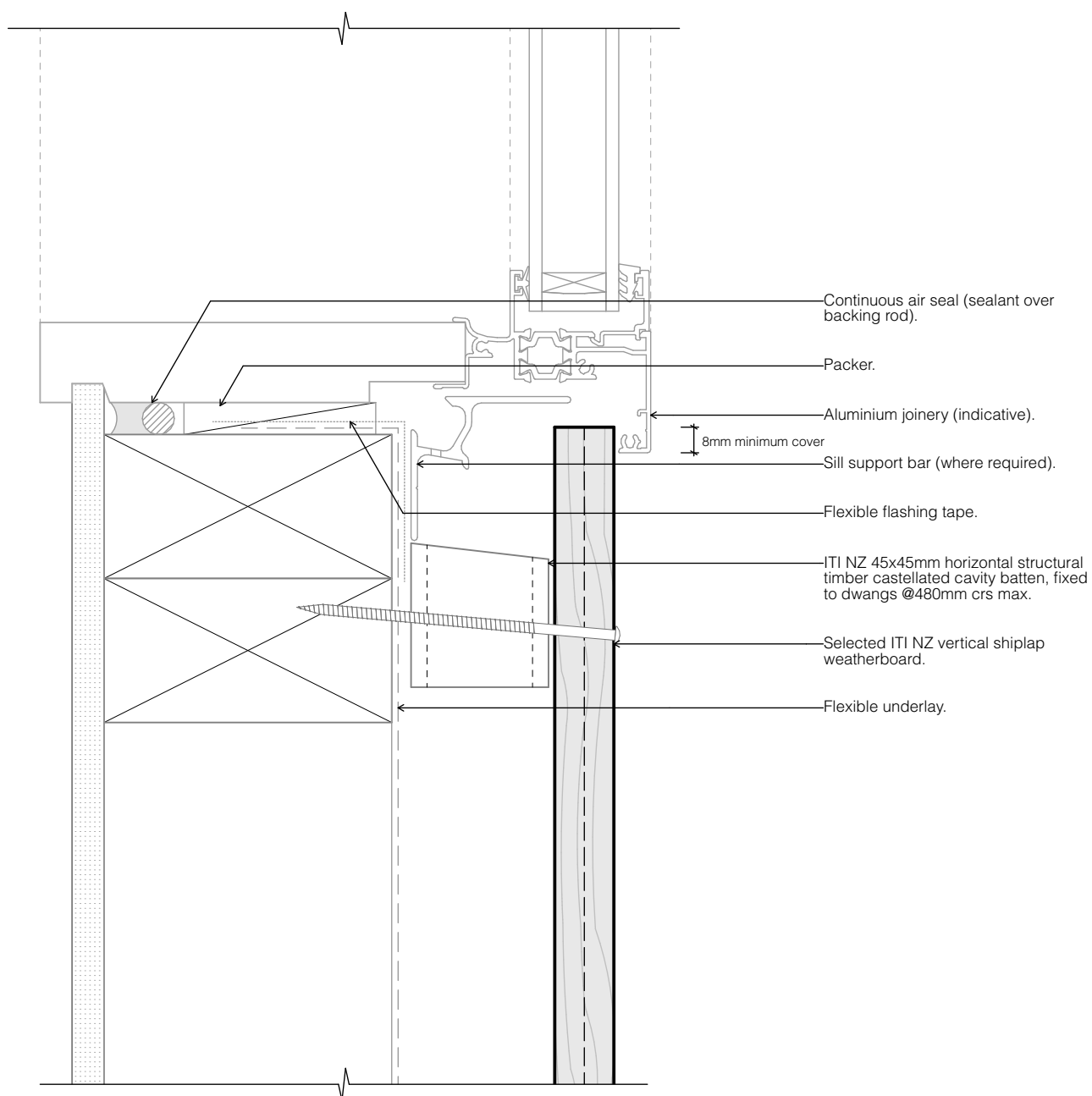
## DETAIL 13.5 – 301 ALUMINIUM JOINERY - HEAD



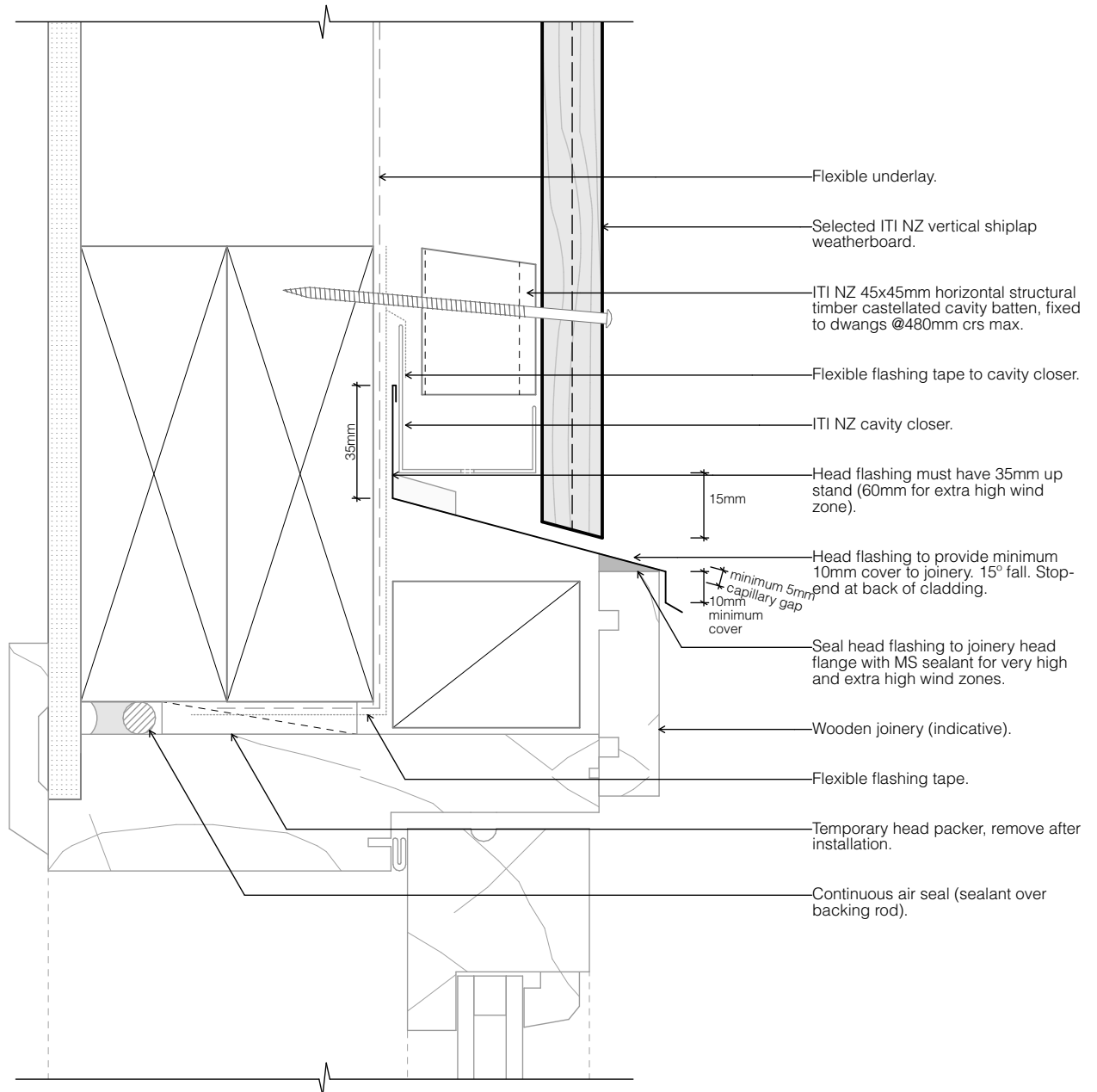
## DETAIL 13.6 – 302 ALUMINIUM JOINERY - JAMB



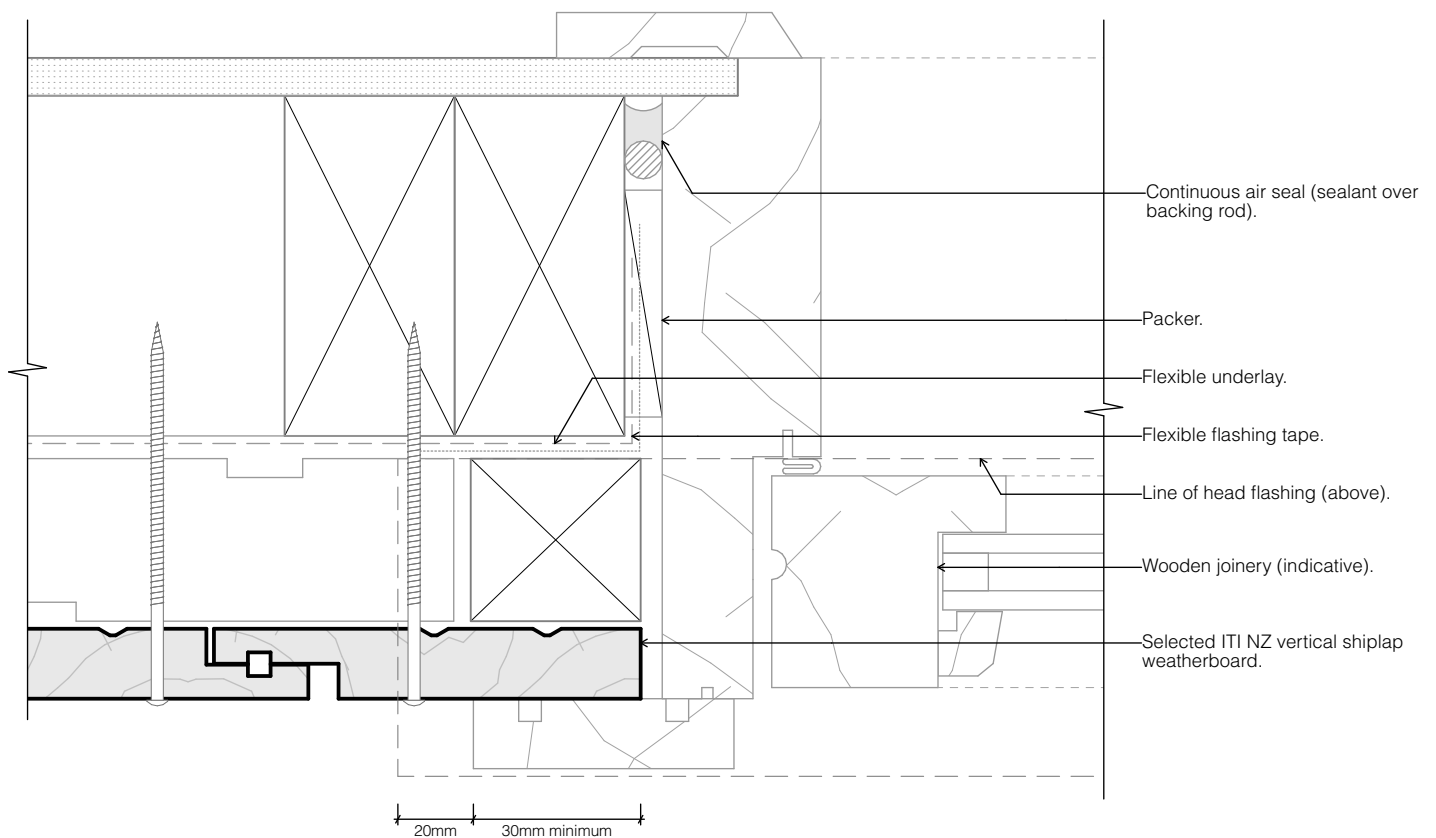
## DETAIL 13.7 – 303 ALUMINIUM JOINERY - SILL



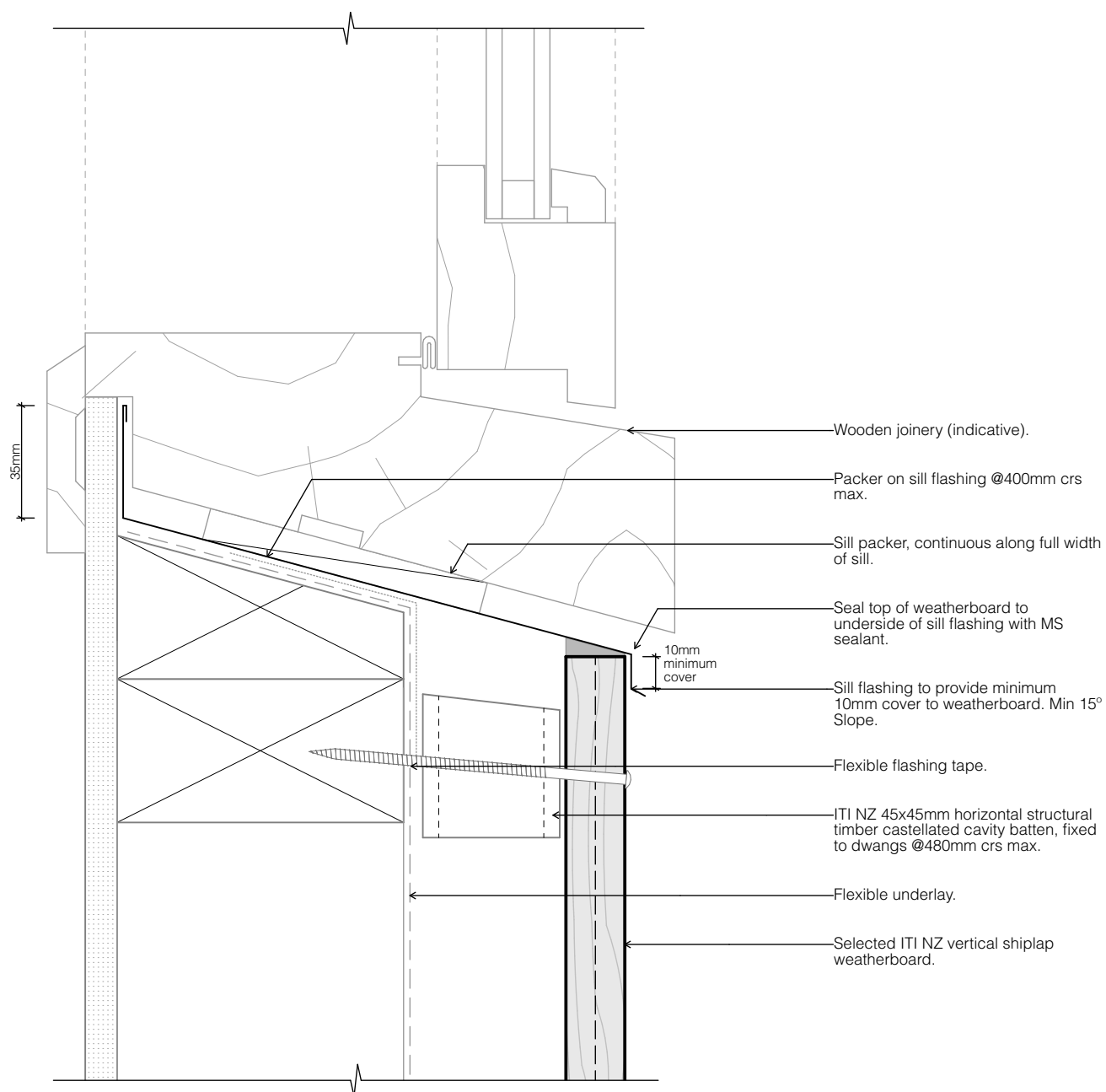
## DETAIL 13.8 – 304 WOODEN JOINERY - HEAD



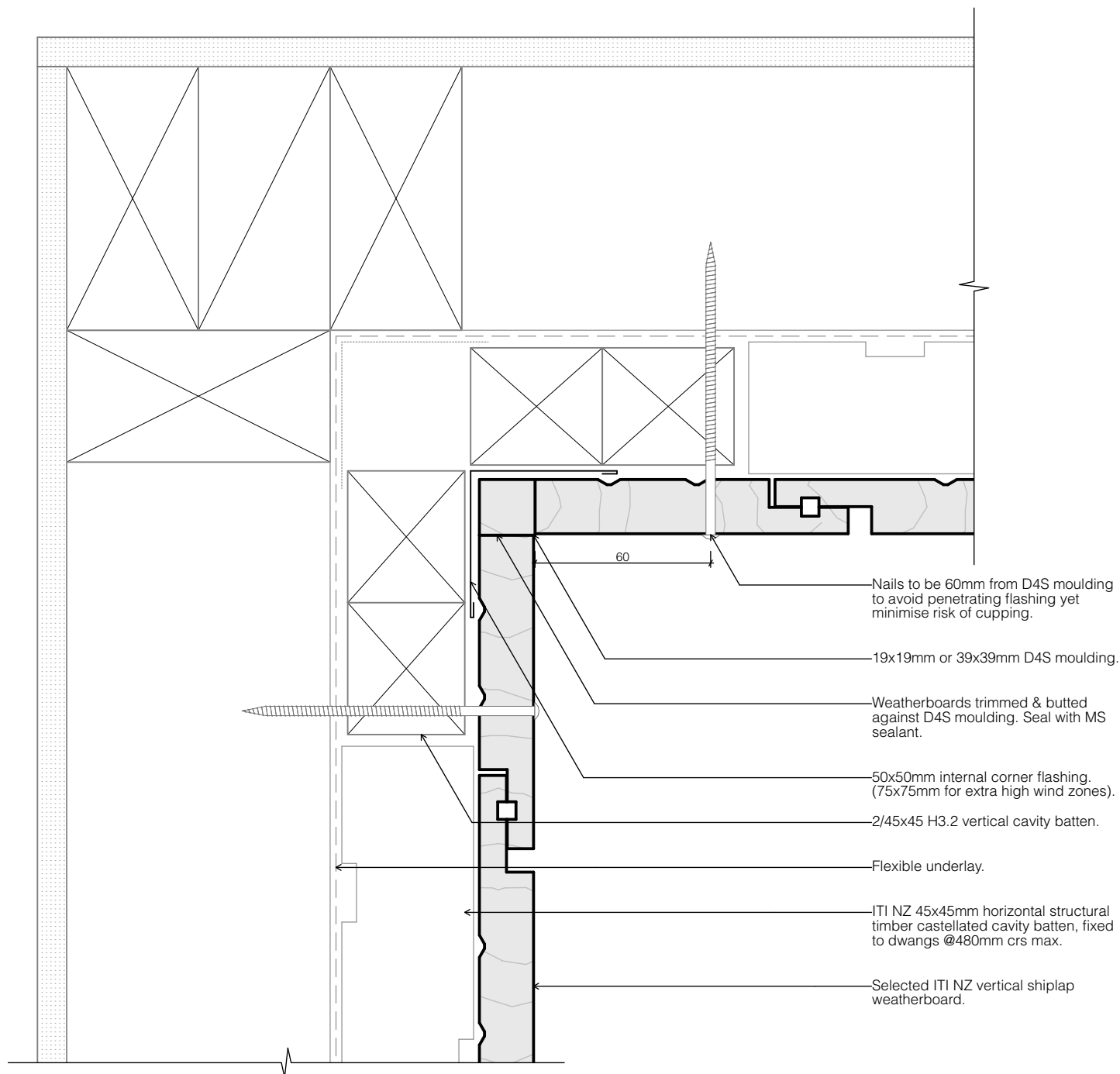
## DETAIL 13.9 - 305 WOODEN JOINERY - JAMB



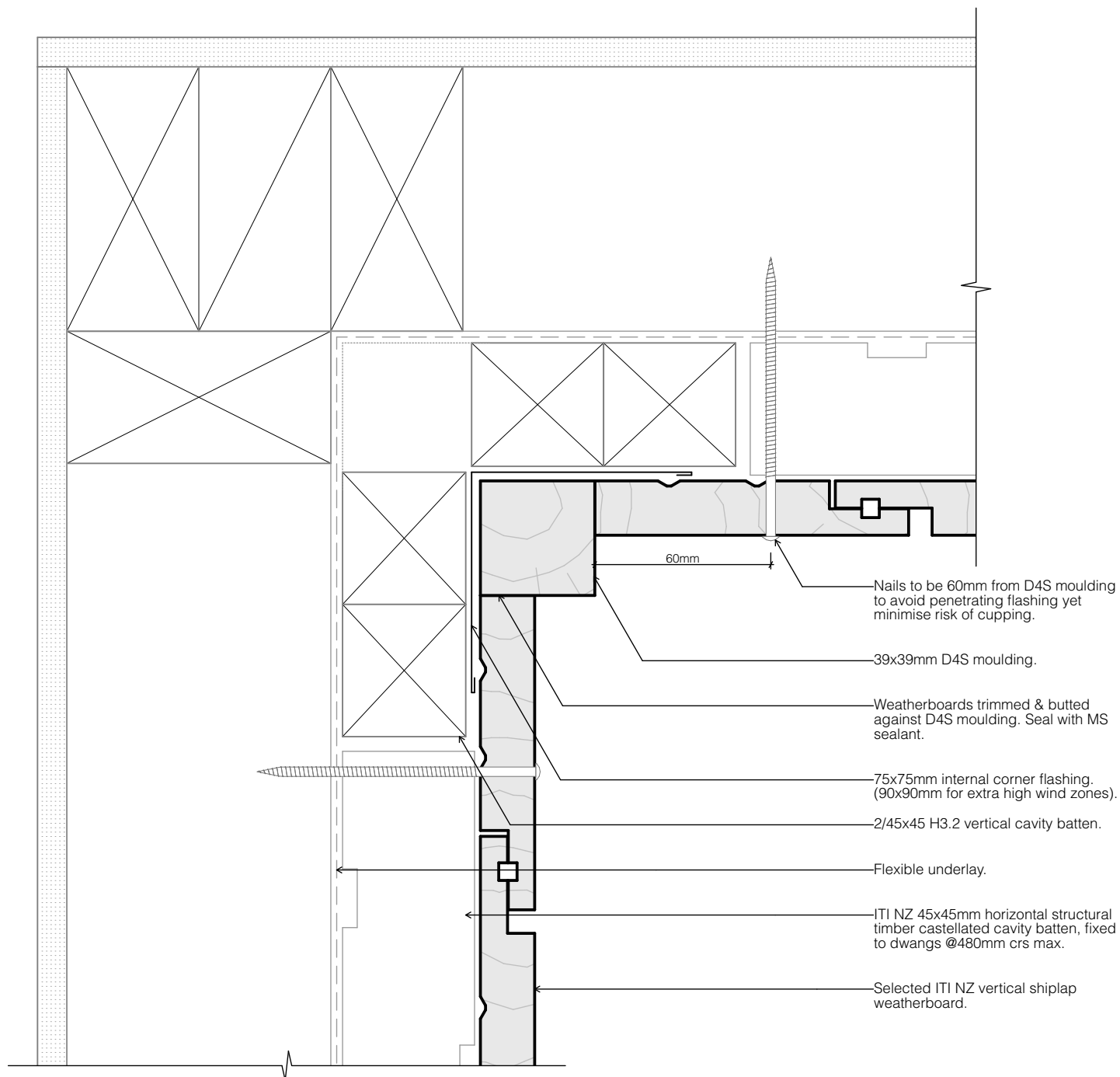
## DETAIL 13.10 – 306 WOODEN JOINERY - SILL



## DETAIL 13.11 – 401 INTERNAL CORNER – 19X19MM INTERNAL MOULDING

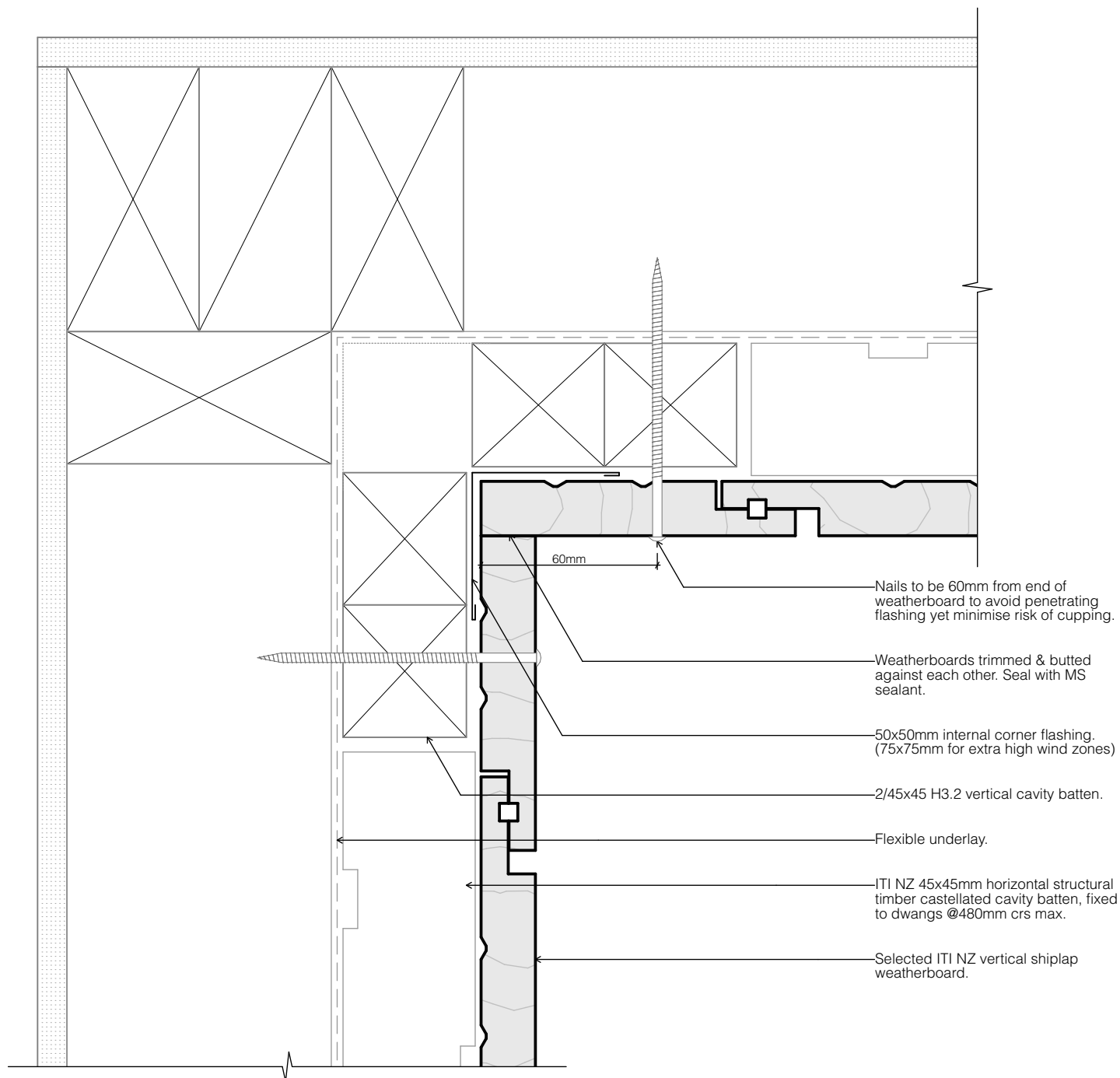


## DETAIL 13.12 – 402 INTERNAL CORNER – 39X39MM INTERNAL MOULDING

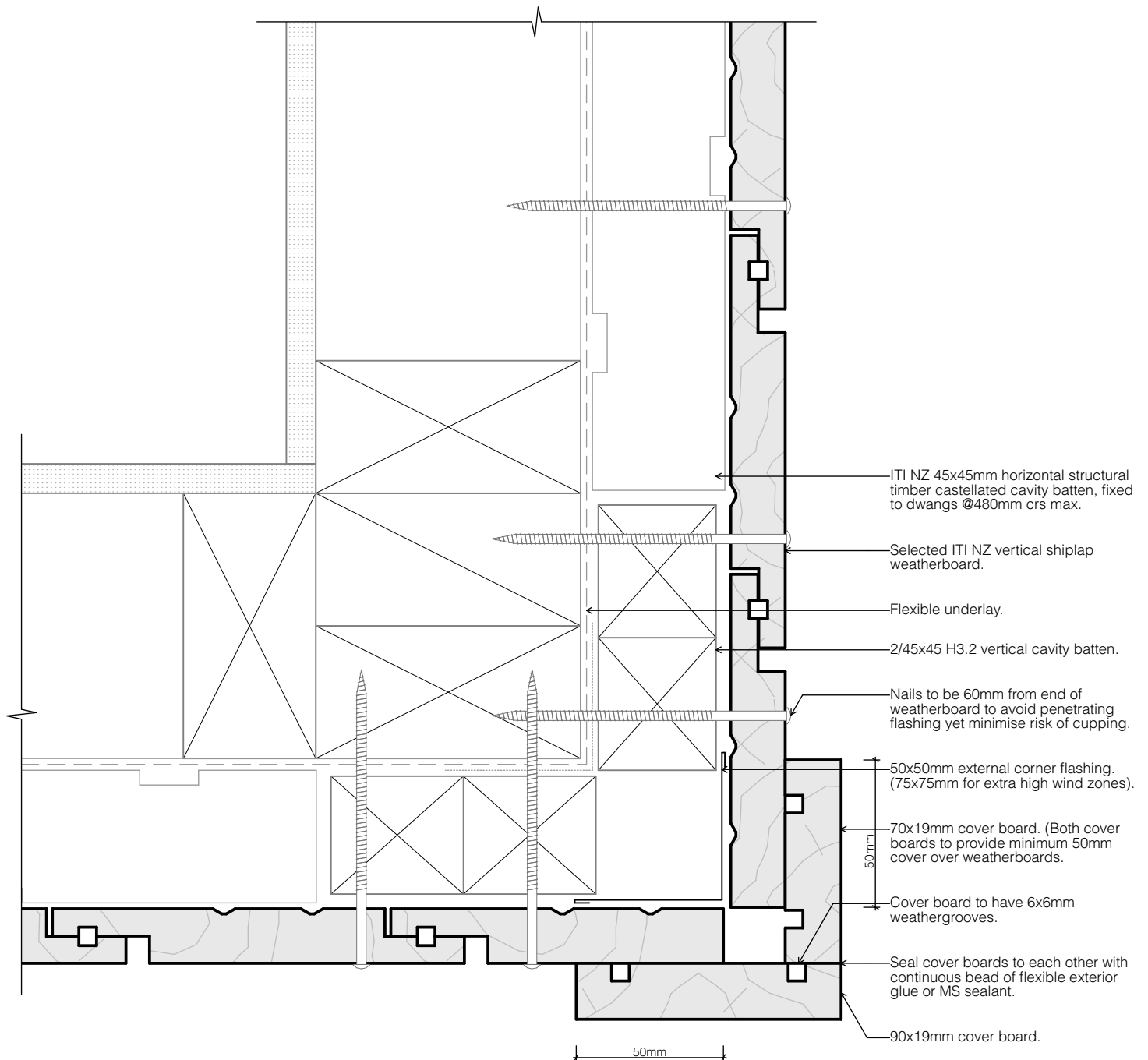




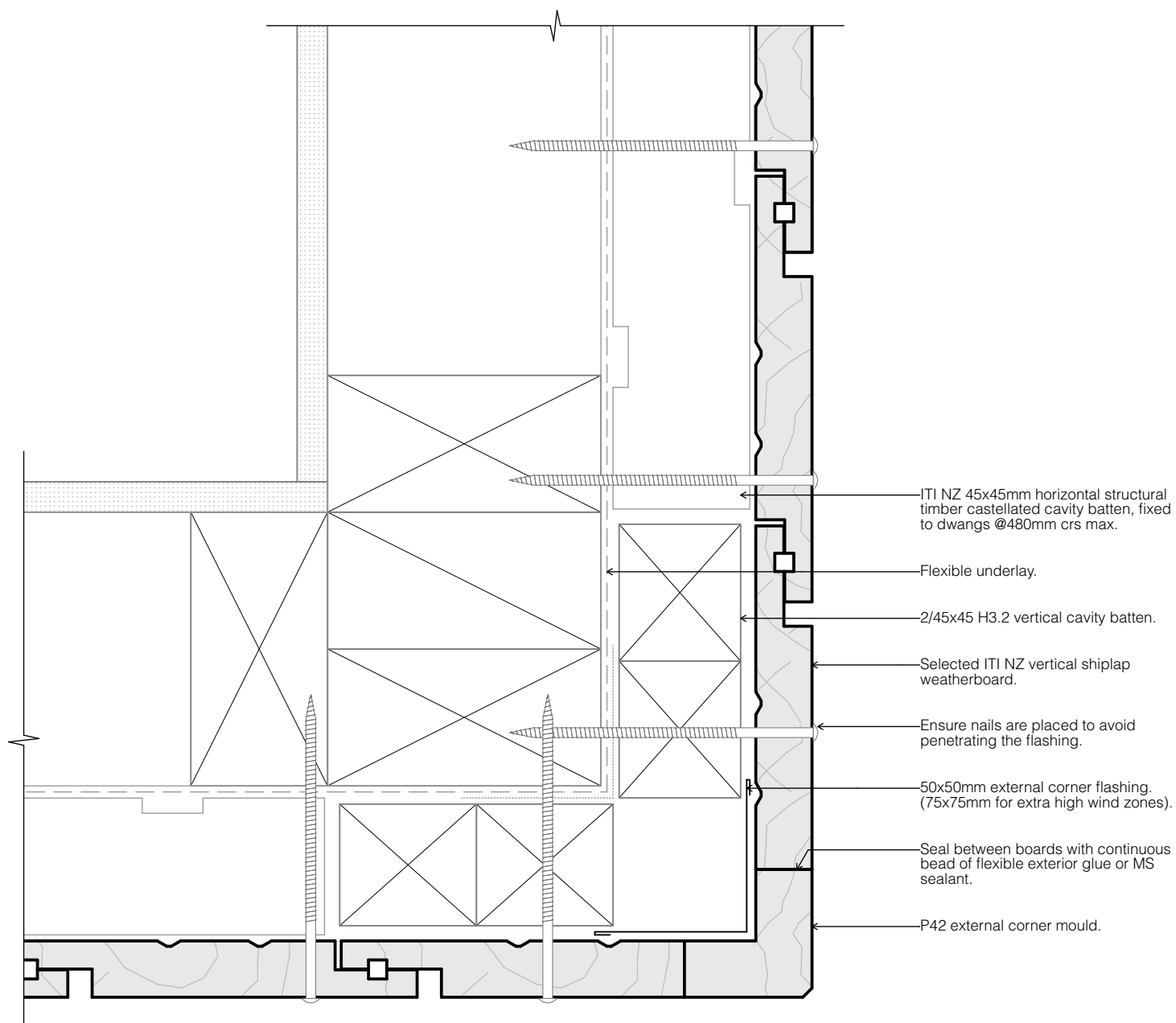
## DETAIL 13.13 – 403 INTERNAL CORNER - BUTTED



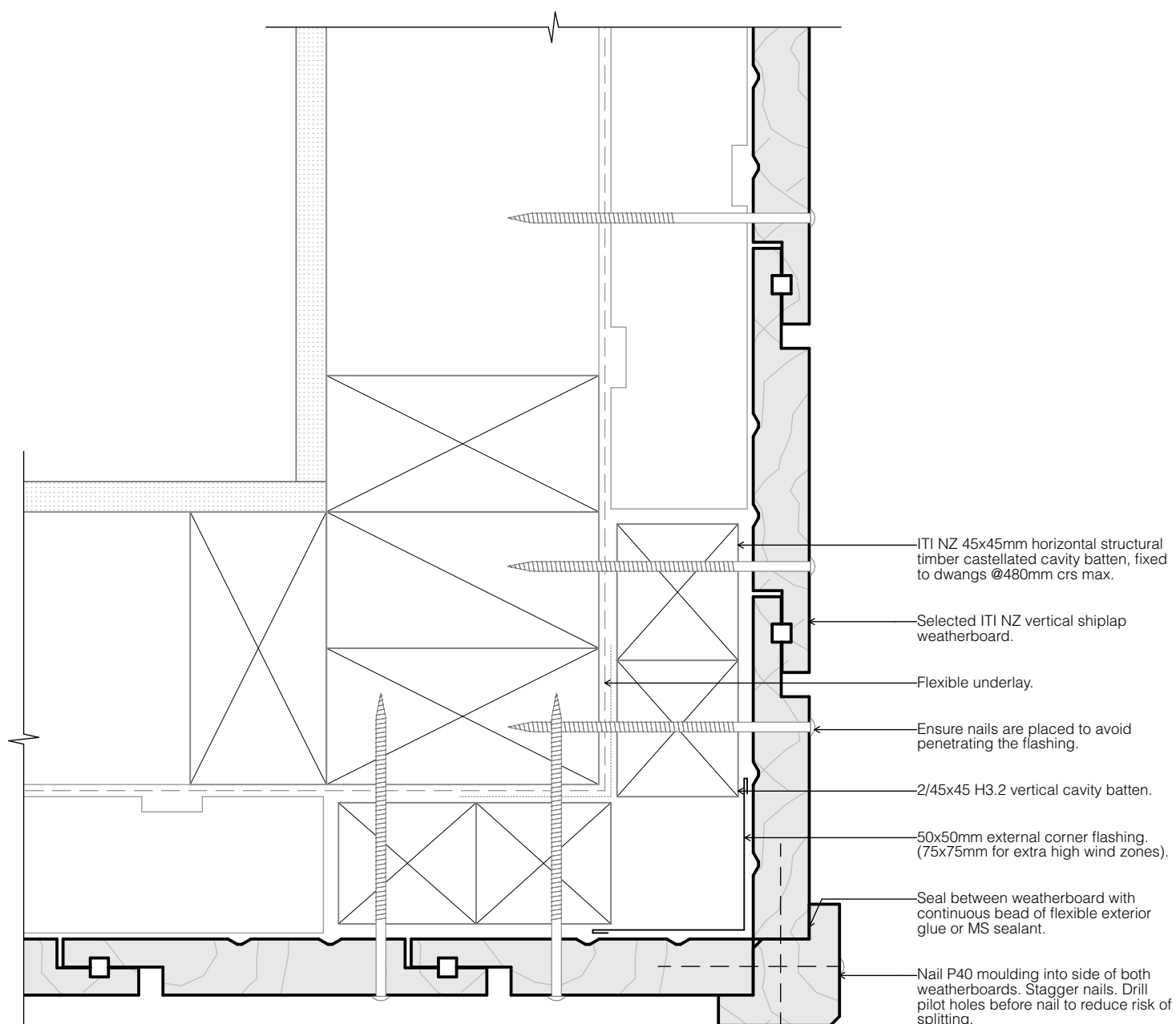
## DETAIL 13.14 – 501 EXTERNAL CORNER – BOXED CORNER



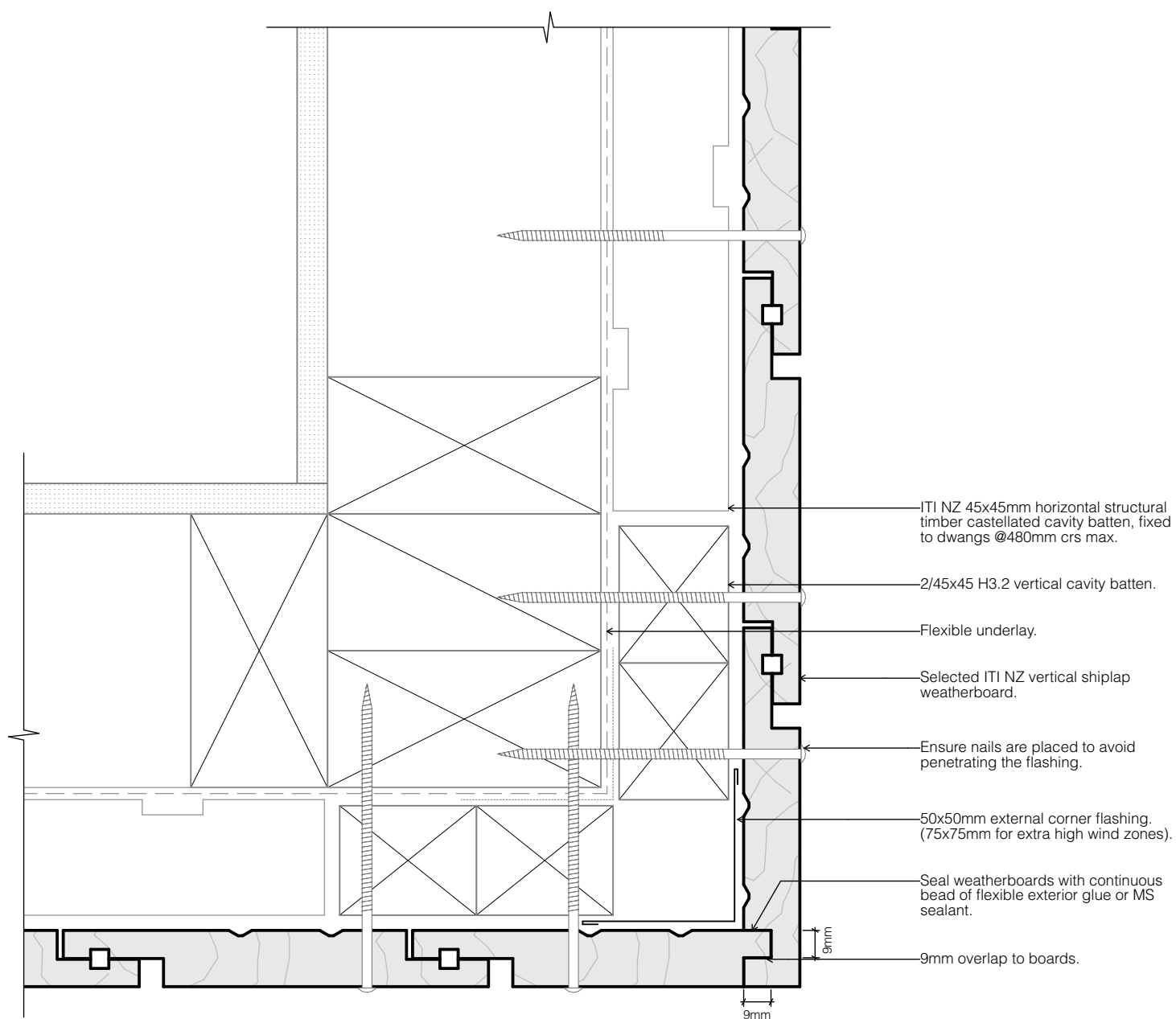
## DETAIL 13.15 – 502 EXTERNAL CORNER – P42 CORNER MOULDING



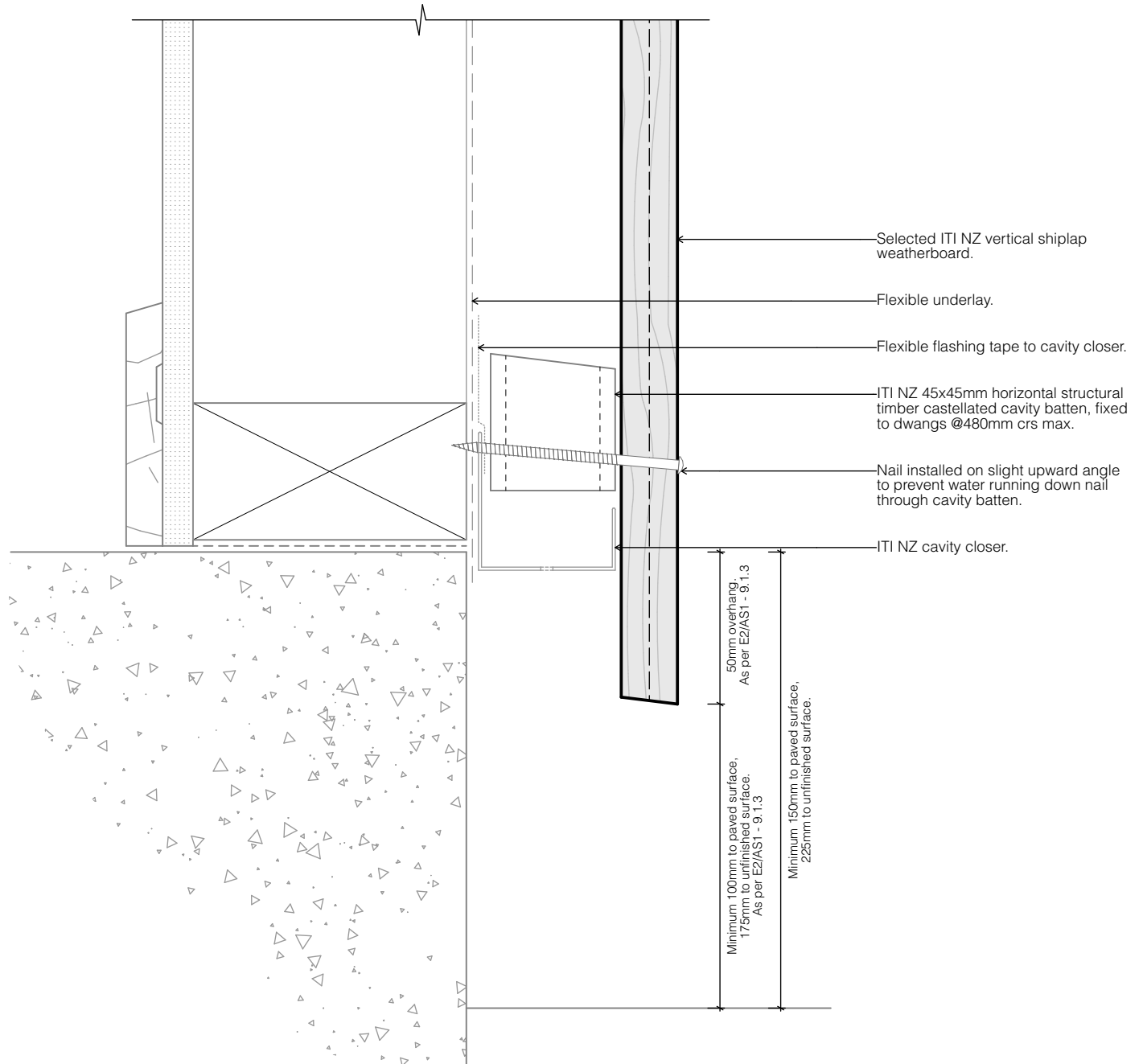
# DETAIL 13.16 – 503 EXTERNAL CORNER – P40 CORNER MOULDING



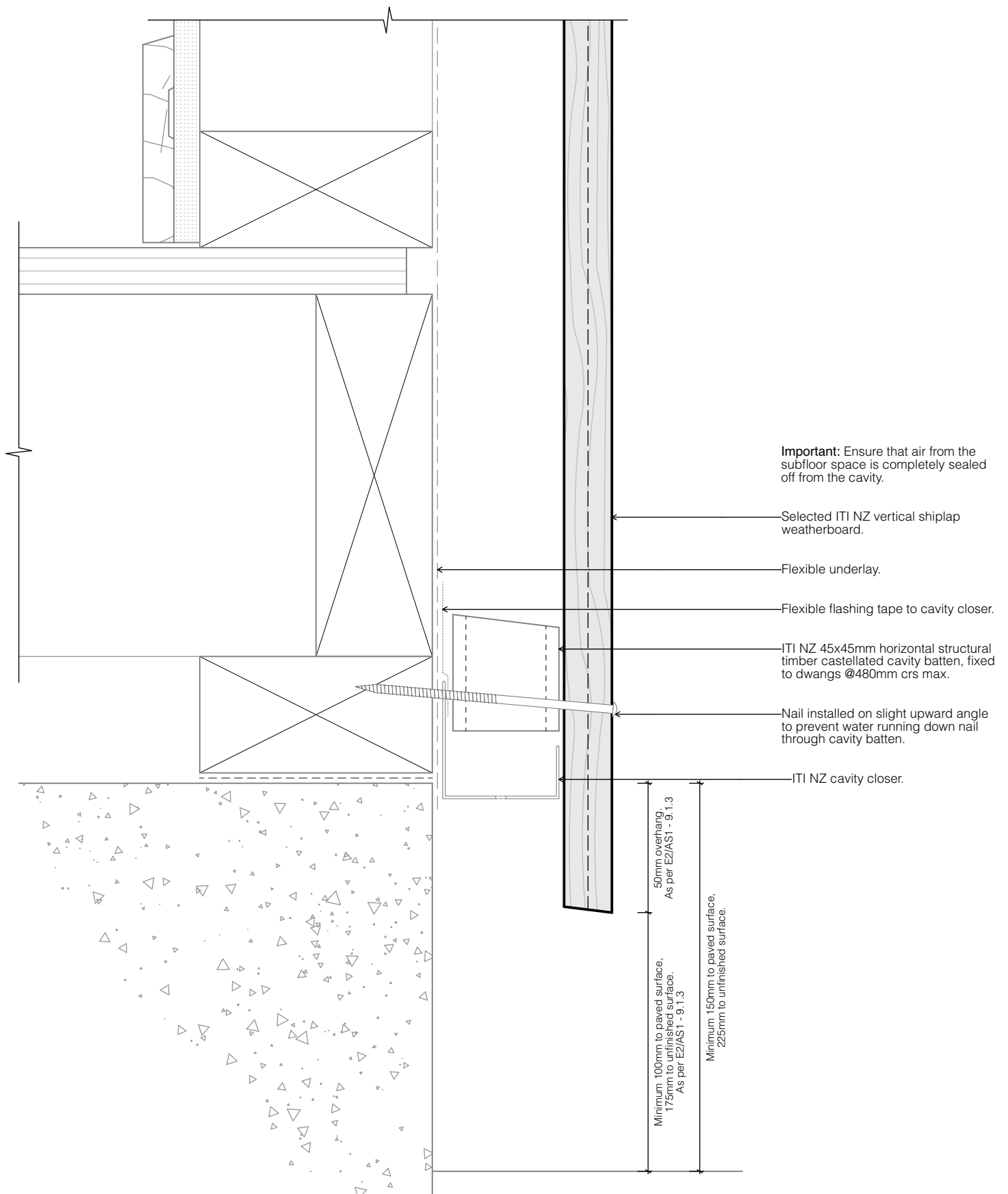
# DETAIL 13.17 – 504 EXTERNAL CORNER – NOTCHED & LAPPED



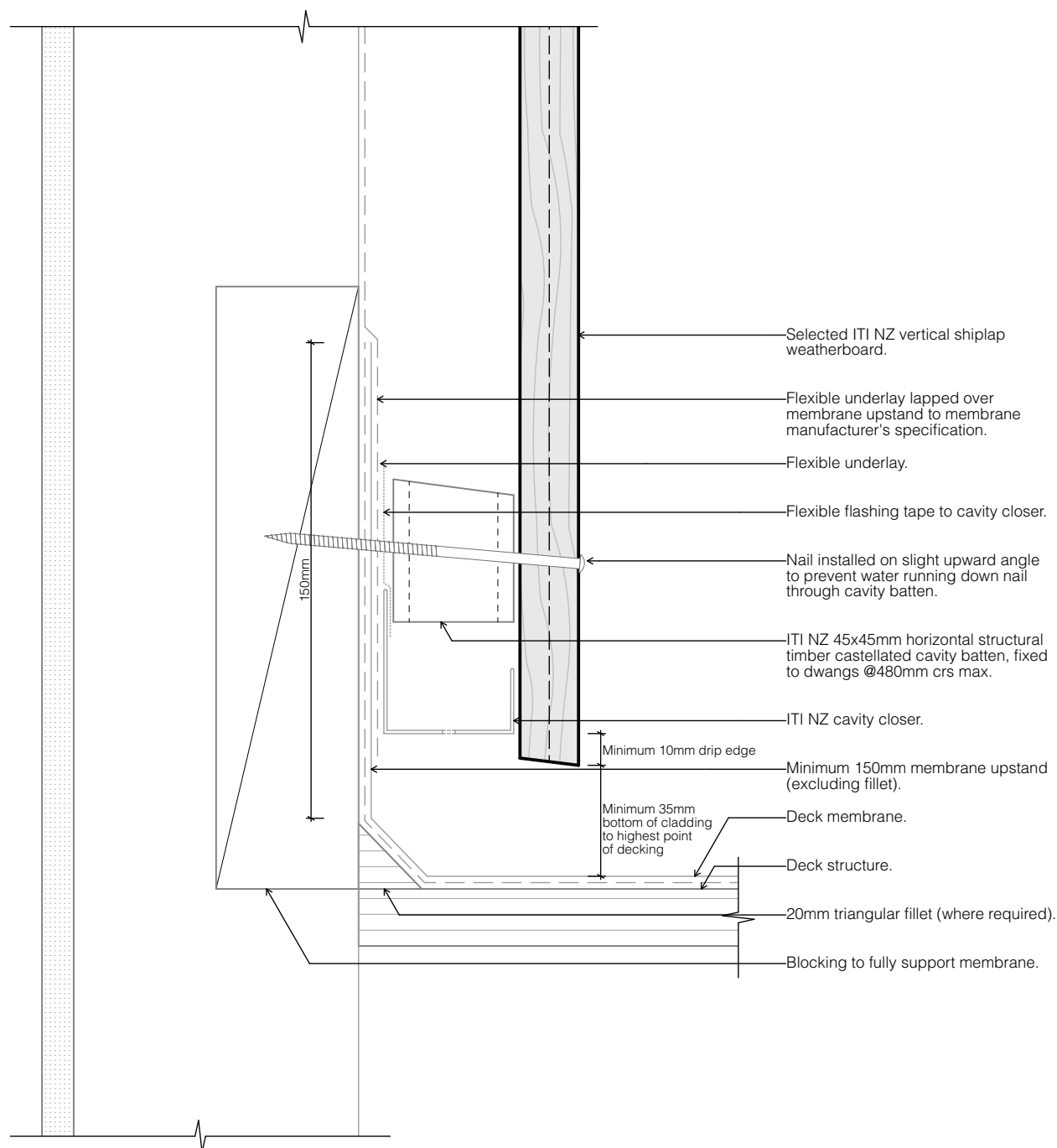
## DETAIL 13.18 – 601 BASE – CONCRETE SLAB ON GROUND



## DETAIL 13.19 – 602 BASE – TIMBER FLOOR

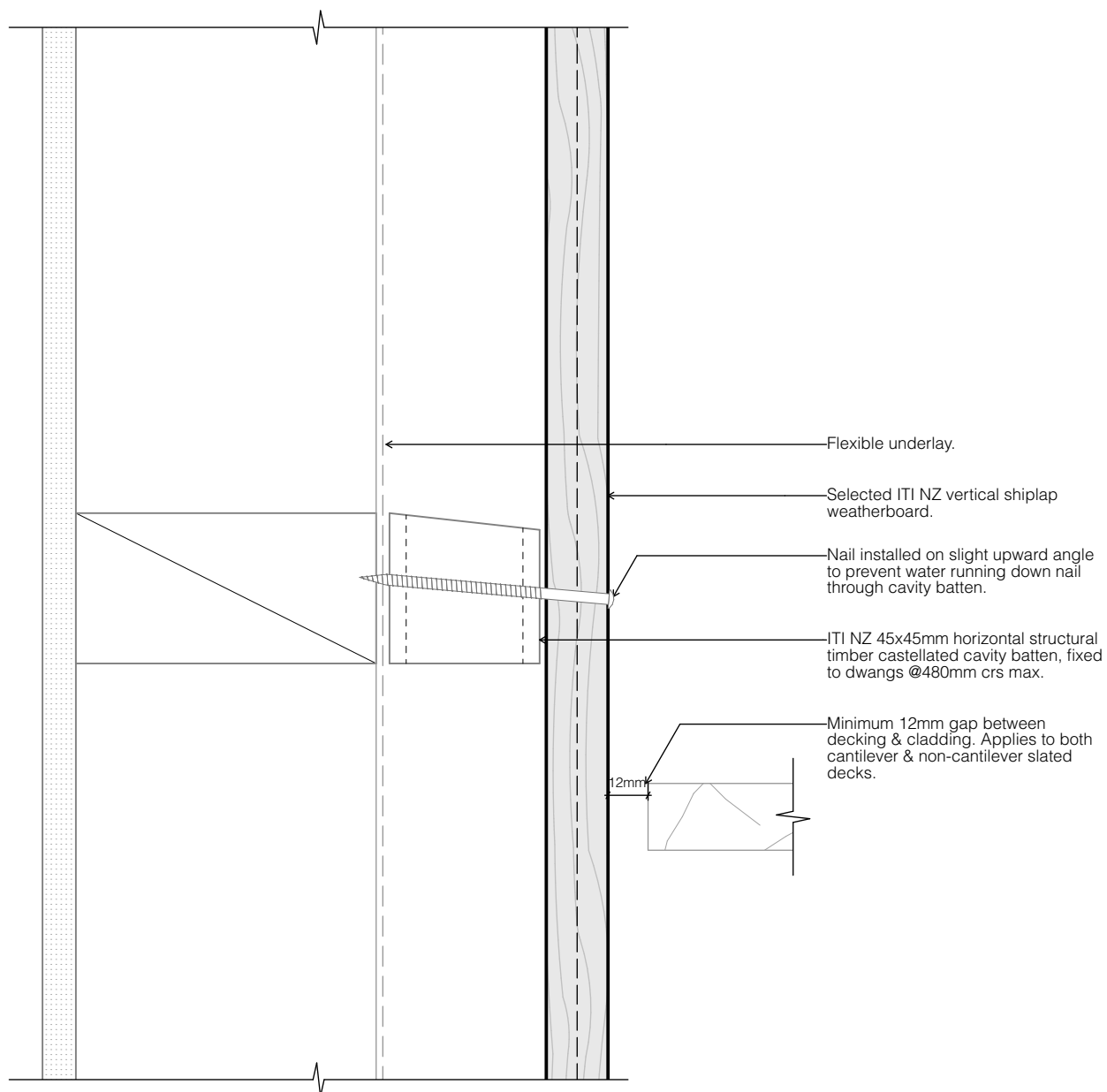


## DETAIL 13.20 – 603 BASE – CLADDING FINISH ABOVE MEMBRANE DECK

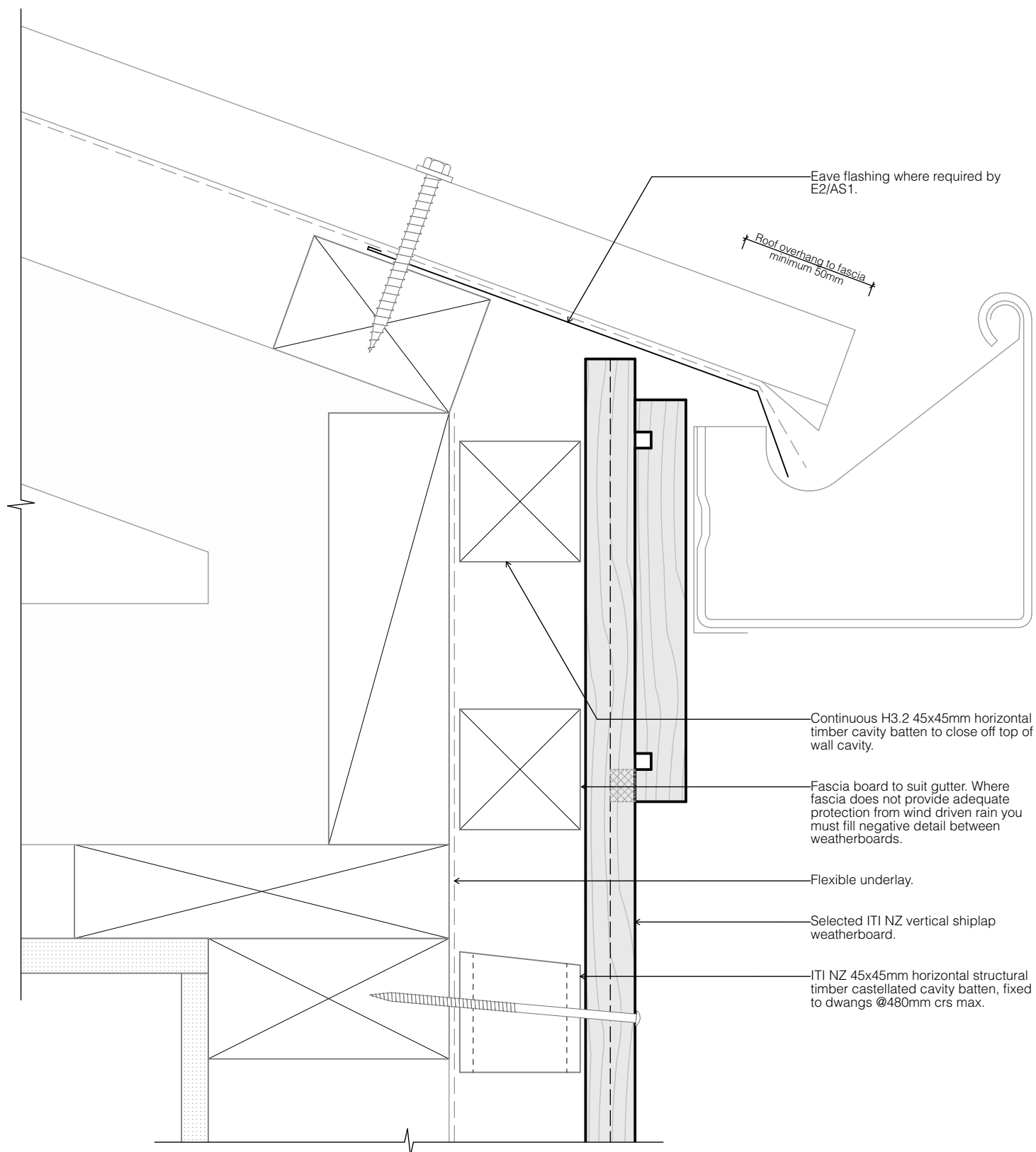




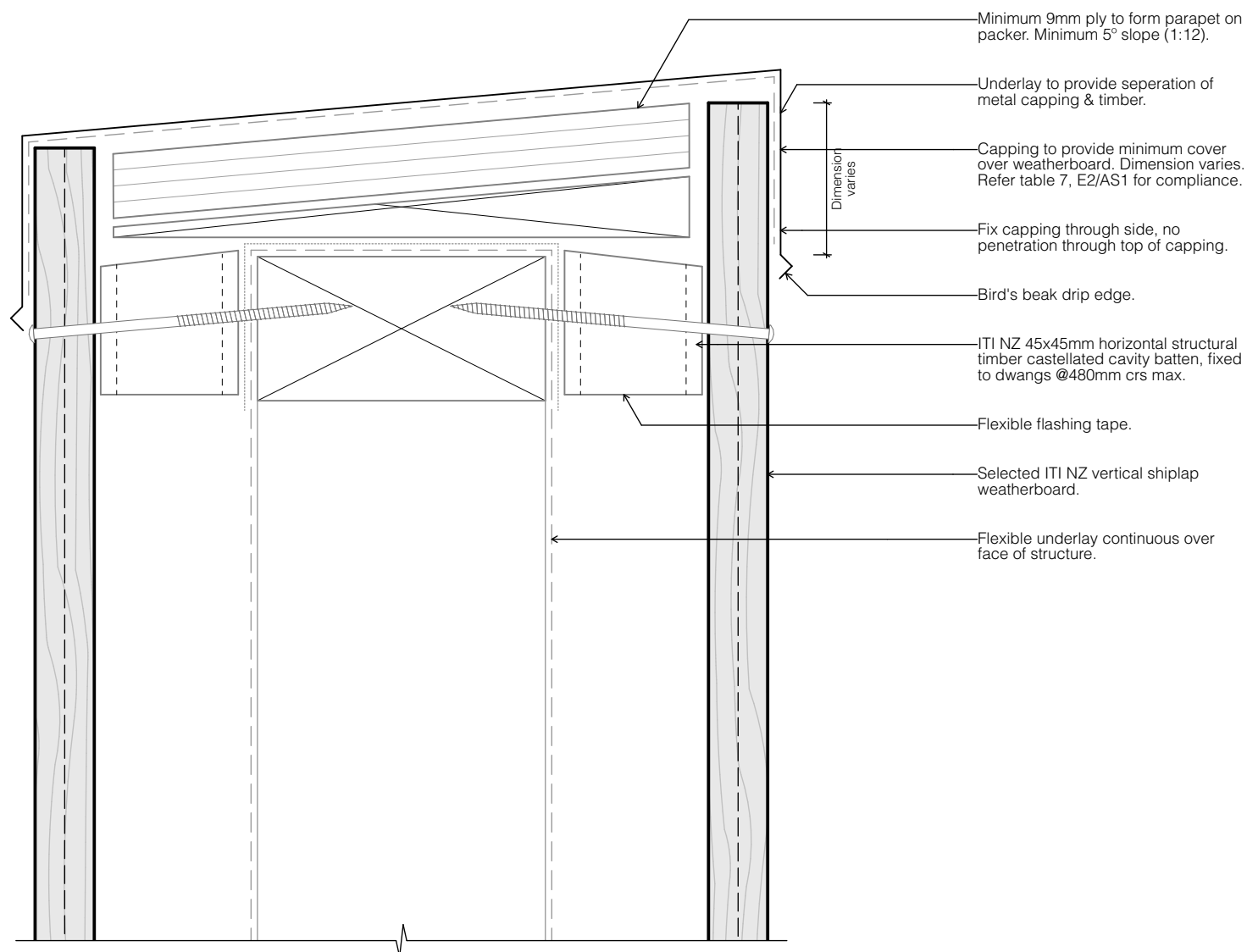
## DETAIL 13.21 – 604 BASE – DECK FINISH ADJACENT TO CLADDING



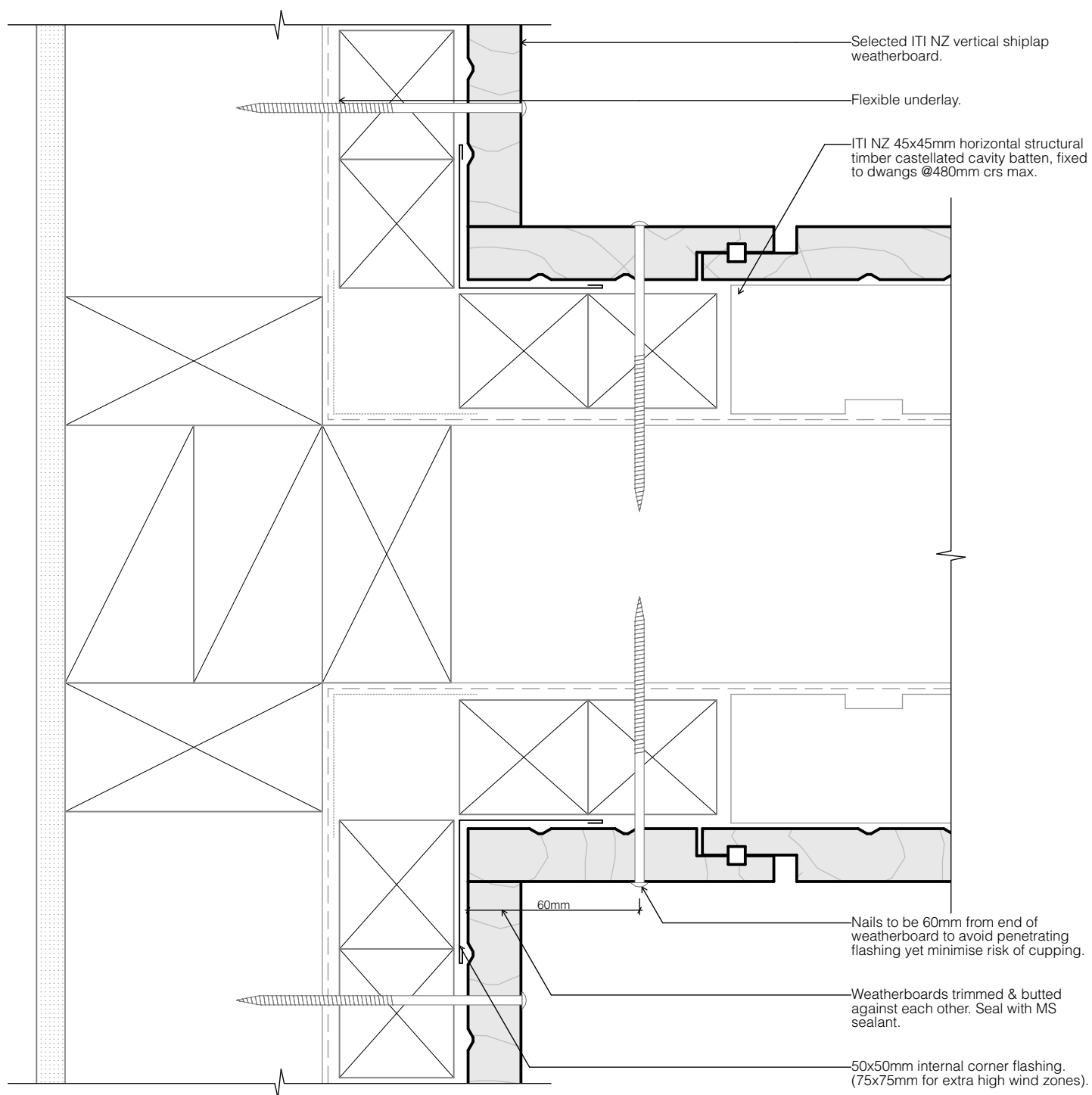
## DETAIL 13.22 – 701 ROOF / WALL – FLAT SOFFIT



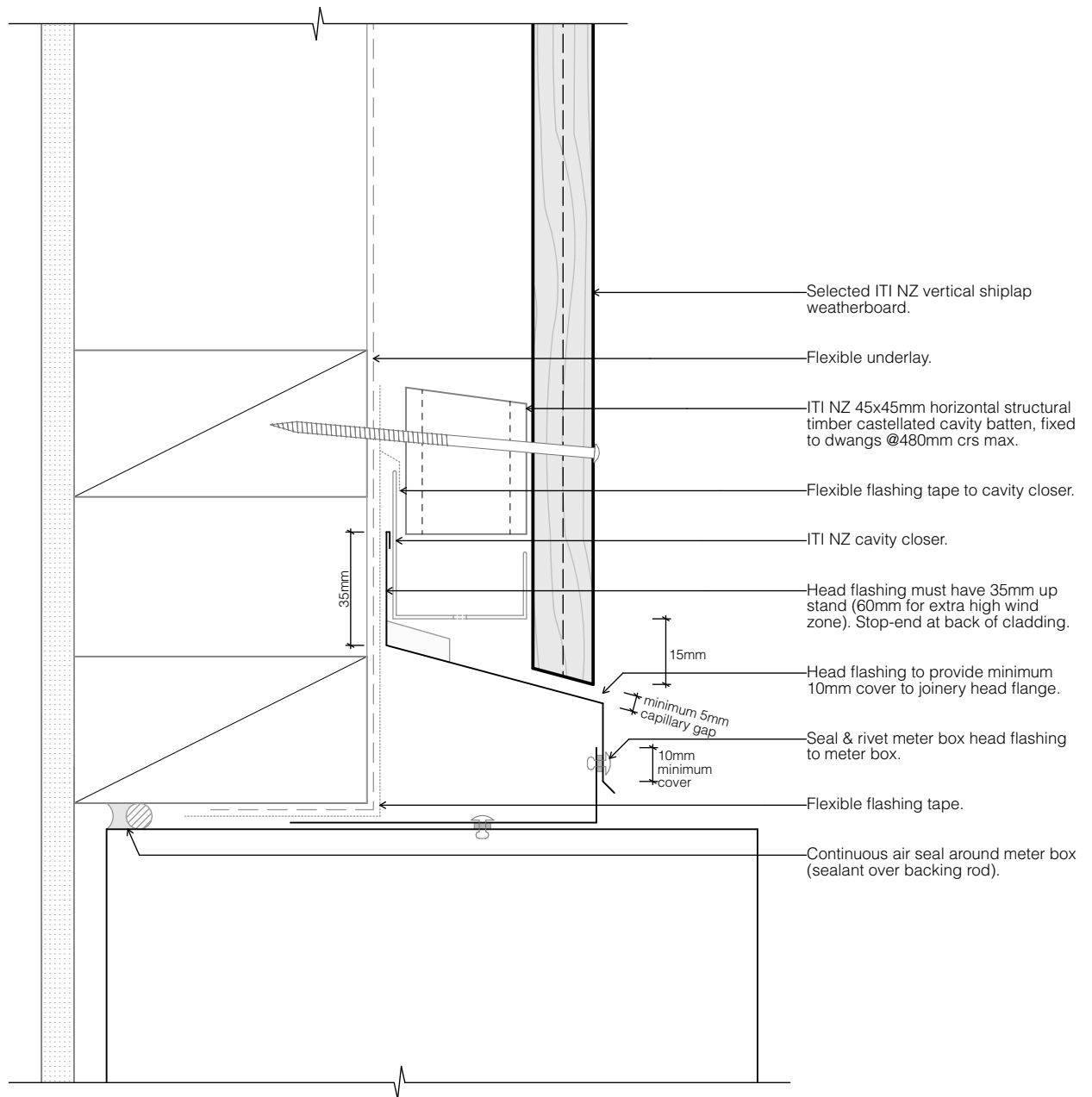
## DETAIL 13.23 – 702 ROOF / WALL – GUTTER & FASCIA



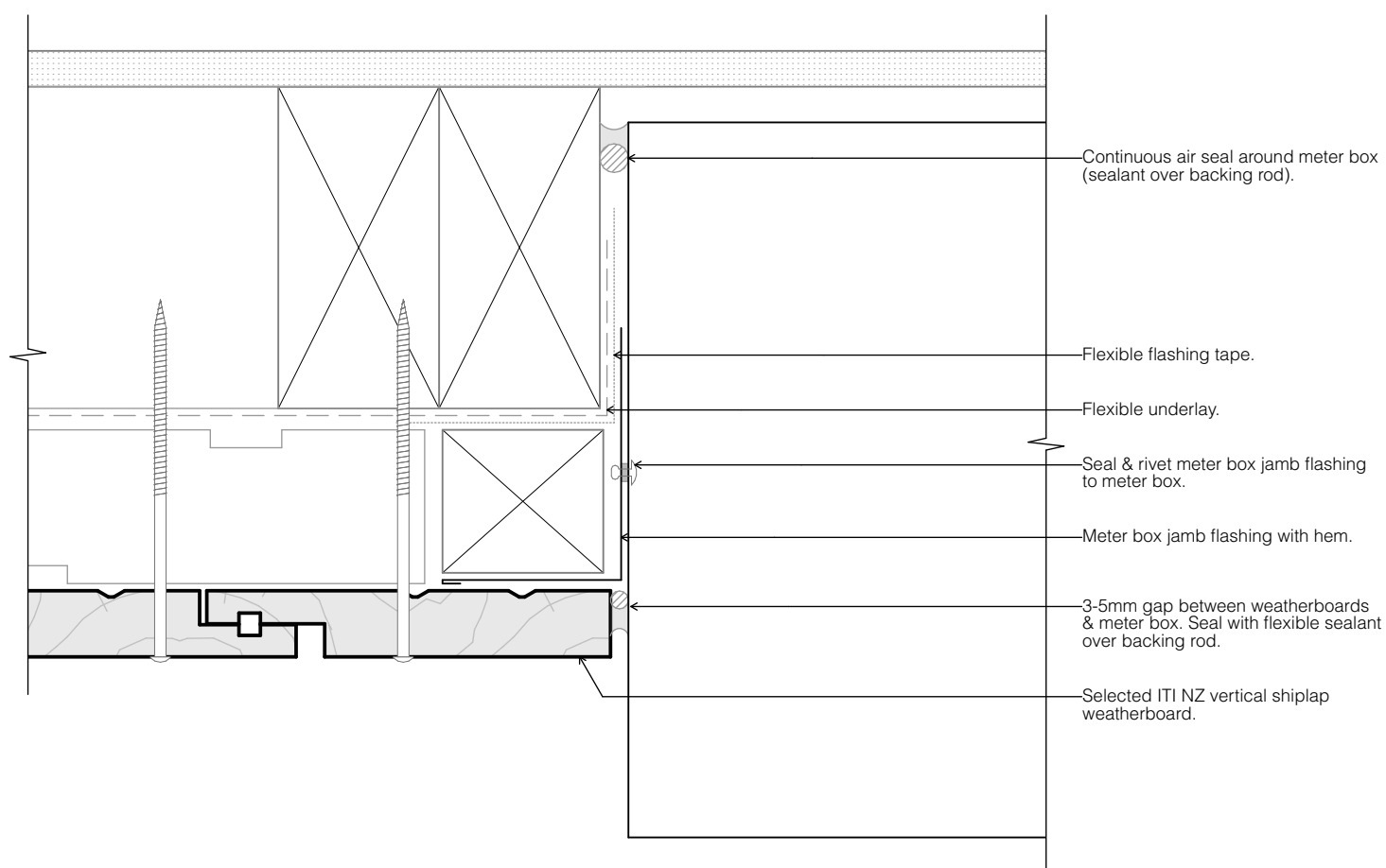
## DETAIL 13.24 – 801 PARAPET – CAPPING



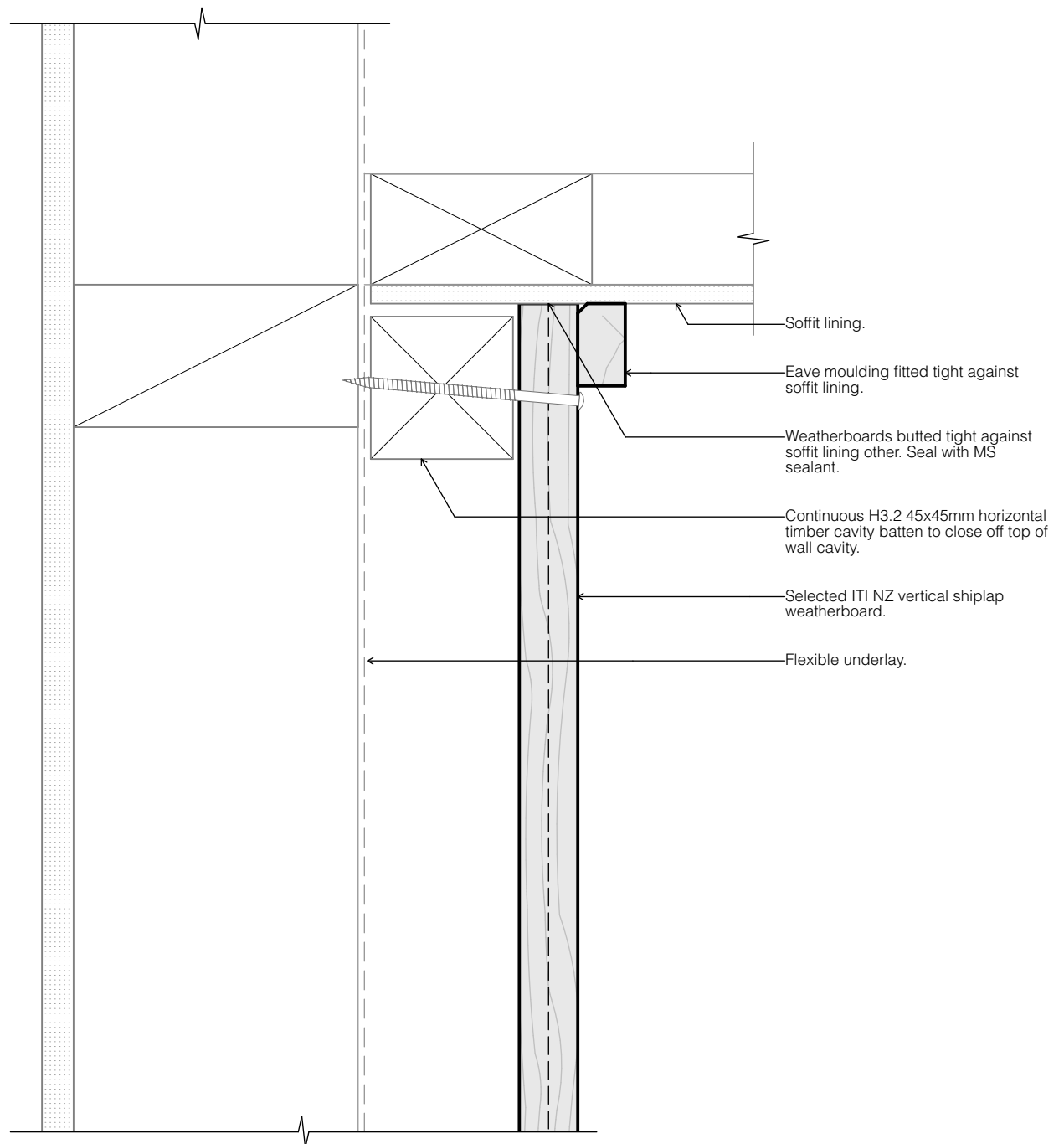
## DETAIL 13.25 – 802 PARAPET – INTERSECTION WITH WALL



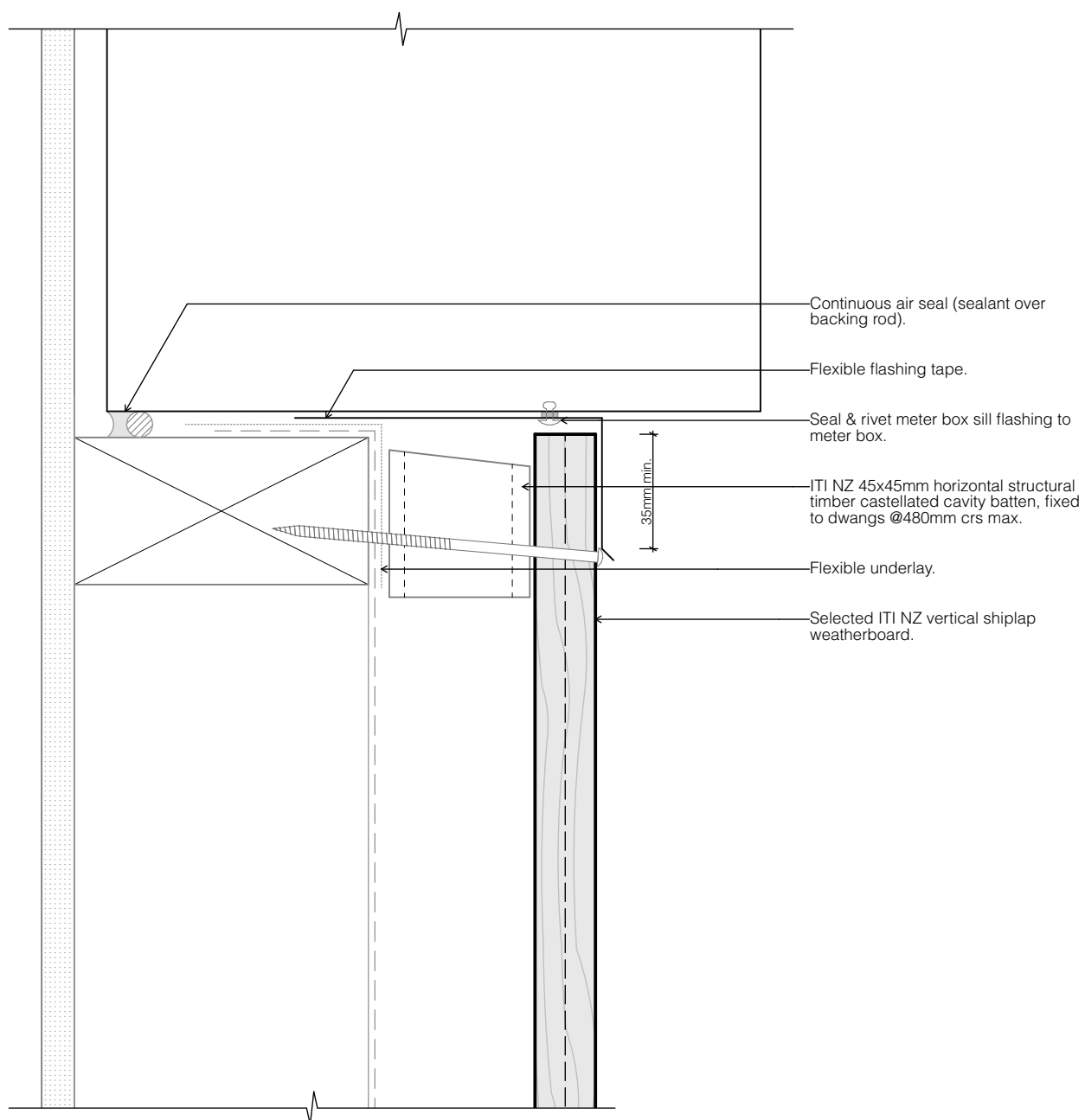
## DETAIL 13.26 – 901 METER BOX - HEAD



## DETAIL 13.27 – 902 METER BOX - JAMB

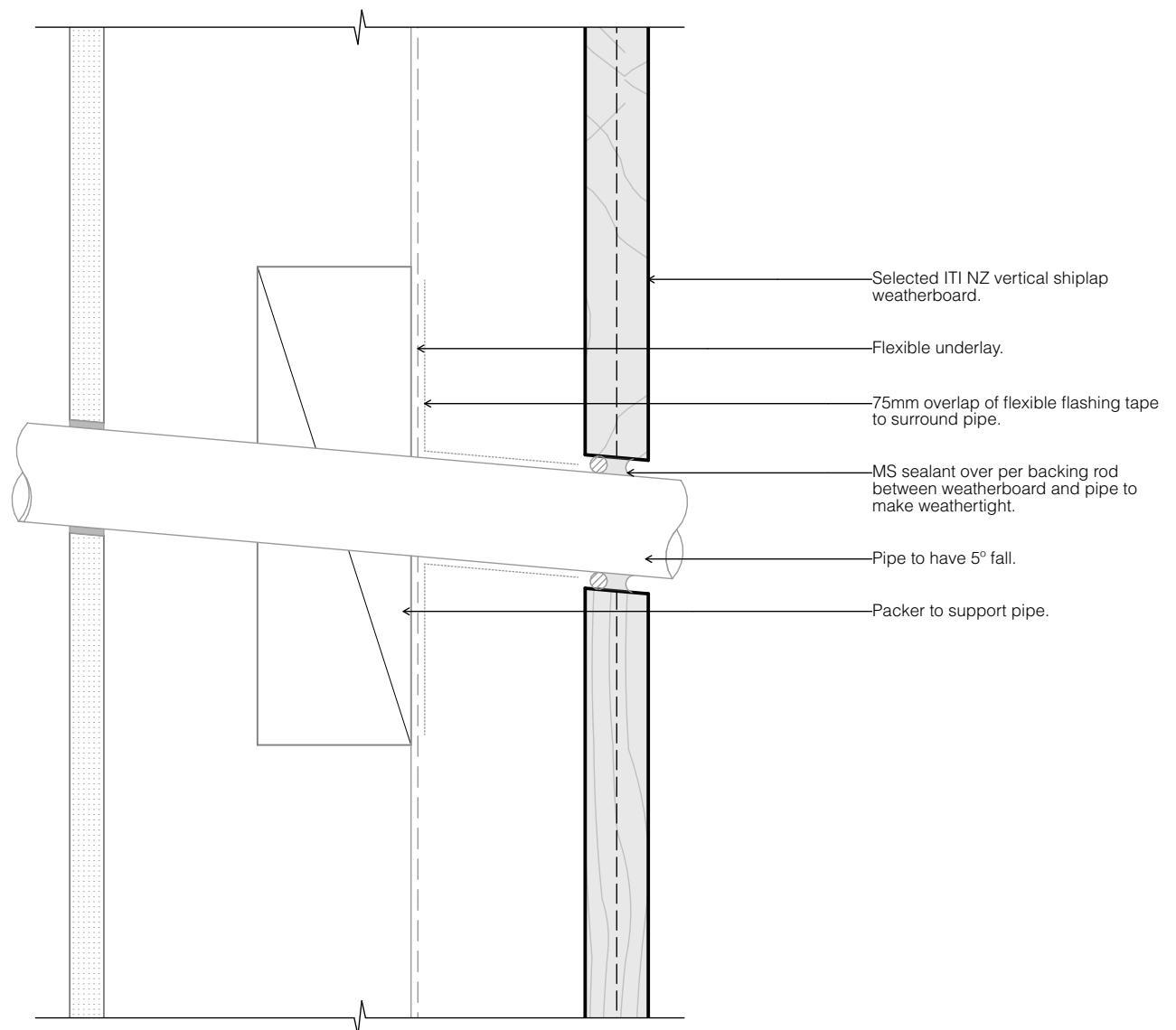


## DETAIL 13.28 – 903 METER BOX - SILL





## DETAIL 13.29 – 904 PIPE PENETRATION DETAIL



# 14 CONTACT

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