EDITION 1.0 — TBC

Forte Millboard Vertical Cladding System Design Guide

FOR USE WITH THE MILLBOARD SHADOW LINE + & BOARD & BATTEN + CLADDING BOARDS

forté

Cover image: Pukekohe Residence
Kanda Homes, Millboard Burnt Cedar

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1. Scope and Limitations of Use

1.1
SCOPE AND LIMITATIONS

The Forte Millboard Vertical Cladding system is designed for use in low-rise residential and some commercial projects.

	Scope	Limitations
Location	— In wind zones up to and including extra high as defined in NZS 3604:2011 or to a design wind pressure (ULS) of 2.1 kPa. — In all exposure zones as defined in NZS 3604:2011. — Greater than 1 m from a relevant boundary.	— For use in microclimatic conditions, as defined in NZS 3604:2011, contact — Millboard for technical advice. — Fixings must be stainless steel fixings or in accordance with Table 24 of E2/AS1.
Building	— The cladding system is designed for vertical orientation only on low-rise residential and some commercial projects. — The cladding system is designed for single board spans up to 3600mm. — In conjunction with a primary structure that complies with the NZ Building Code or existing buildings where the designer and/ or installer have satisfied themselves that the existing building is suitable for the intended building work. — On timber or lightweight steel-framing. — As an external cladding system.	— The cladding system can be used on two storey buildings with an interstorey junction. — A thermal break must be installed if the framing is lightweight steel. — The building must be within the scope of paragraph 1.1 of E2/AS1. — The building must be less than 10 m in building height. — The building must have a risk score of less than or equal to 20 when evaluated against the E2/AS1 risk matrix. — The cladding must be installed over a drained and ventilated cavity. — The cladding must be installed in conjunction with a flexible building wrap or rigid underlay in accordance with Clauses 9.1.5 to 9.1.7 of E2/AS1 that meet the requirements of Table 23 or installed with a proprietary product with a current Product Certificate. — Joinery must meet the requirements of NZS 4211. › Where FRR is required, Envello Shadow Line+ must be used and the external — Wall is subject to specific fire design.

1.2
COMPLIANCE

NZ Building Code Clauses	Compliance Statement	Basis Of Compliance Demonstrated By
B1 STRUCTURE B1.3.1, B1.3.2 B1.3.3 (a, f, h, j, q) B1.3.4	Alternative Solution	— Millboard Envello composite cladding meets or exceeds the performance of fibre cement in accordance with AS/NZS 2908: Part 2 and, therefore, meets the NZ Building Code [TBB, 05/2023]. — Dimensions –profiles are in accordance with NZS 3617:1979. Paragraph 104.1.1 of NZS 3602:2003 (cited in NZS 3604:2011, cited in Acceptable Solution B1/ AS1) and paragraph 5.1 of NZS 3617:1979 for the required dimensions of weatherboards. — Deflections at 1000 N and 600 mm centers of average 33.72 mm (Shadow Line Standard), 30.69 mm (Shadow Line+), 24.30 mm (Board & Batten) for tested samples [Millboard, n.d.].
B2 DURABILITY B2.3.1, B2.3.2 (b)	Alternative Solution	— Tested to ASTM D7032-17 for elevated temperature, moisture, freeze-thaw [element, 17/12/22]. — Tested for UV/accelerated ageing [Q-Lab, 11/12/22a,b]. — Composite material will not rot, warp, or split as it is non-porous, not extruded and has no timber content. Composite material will not support algal growth as it has no protein content and has a 2K UV resistant polyurethane coating. — Envello composite boards hare comparable performance metrics to E2/AS1 cladding materials [TBB, 05/2023].
E2 EXTERNAL MOISTURE E2.3.2, E2.3.3 E2.3.5, E2.3.7	Alternative Solution	— Profiles in accordance with NZS 3617:1979, cited in E2/AS1, paragraph 9.4.1.1. — Installation details in accordance with E2/AS1.
F2 HAZARDOUS BUILDING MATERIALS F3.2.1	Alternative Solution	— Manufactured material is inert. — Use in accordance with supplier's safety information.

1.3
FIRE RATING

Millboard Envello cladding boards are crafted with fire retardants in the board composition, they have been tested to BS EN 13501-1 and have a classification of D-s3, d0 - NZ Fire Rating Group 3For use in low rise residential & some commercial projects that are below 10m in height and are more than 1m from the boundary.

2. Product Overview

The Millboard Envello cladding range has been hand-moulded from carefully selected natural oak timber, to provide an unmistakably organic look.

The core is a blend of natural minerals, bonded with a polymer resin, with long fiber reinforcement.

The surface is coated with a Lastane elastomer, with a 2K UV stable coating

Hand moulded and coloured

Skillfully moulded by hand and authentically coloured, replicating timber in the most realistic way.

Increased thermal performance

The unique composition helps to enhance the thermal performance of buildings in both winter and summer.

Moisture resistant

Due to Envello's non-porous composition, no sealing is required, unlike other available products.

Impact and weather resistance

A durable coating and elastomeric surface ensures increased resilience against hail and natural weathering.

UV Stability

UV stabilised for better performance and fade resistance over time.

Easy to install

No specialised tools required. Envello can be cut and installed in the same way as traditional timber.

Wood Free

Envello is solid, not hollow, making it strong. This means it will not rot or warp like timber.

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Envello is solid, not hollow, making it strong. This means it will not rot or warp like timber.

Tough

The unique surface layer is more resistant to scratched and is designed to better withstand demanding outdoor environments.

Enduring

The dual-tone surface layer is hand coloured using pigments designed to improve resistance to sun damage and fading.

Beautiful

Each length is hand moulded using specially selected timber masters for an unrivalled organic wood grain appearance in a composite material.

Stronger

The structual core is a blend of natural minerals bonded in a polymer resin with renewable biopolymers and fibre reinforcement for added stregth and durability.

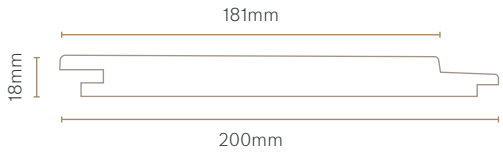
Lightweight

Our unique closed "cellular" internal structure reduces weight while maintaining strength and increasing thermal performance.

2.1
SHADOW LINE+

Shadow Line+ Shiplap cladding system prefinished in five colours with dual-tone hand finished surface layer.

Dimensions	18 T x 200 W x 3600mm L
Weight	6.3kg
Format	Board



LIMED OAK

SMOKED OAK

GOLDEN OAK

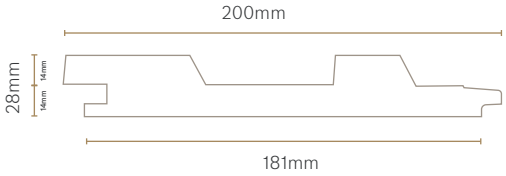
ANTIQUE OAK

BURNT CEDAR

2.2
BOARD AND BATTEN+

Millboard Board & Batten+ cladding system is pre-finished in four colours with a dual-tone hand finished surface layer

Dimensions	28 T x 200 W x 3600mm L
Weight	7.8kg
Format	Board



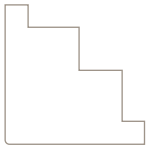
SMOKED OAK

GOLDEN OAK

ANTIQUE OAK

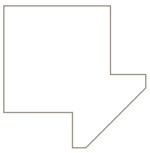
BURNT CEDAR

2.3
ACCESSORIES



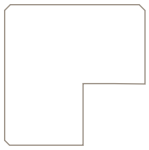
External Corner Profile

Dimensions	50mm T x 50mm W x 3050mm L
Weight	7.1kg
Format	Board



Internal Corner Profile

Dimensions	38mm T x 38mm W x 3050mm L
Weight	4.1kg
Format	Board



Square Corner Profile

Dimensions	50mm T x 50mm W x 3050mm L
Weight	4.1kg
Format	Board

Prefinished Revel Boards For Window Detailing

Dimensions	16mm T x 146mm W x 3600mm L
Weight	6.4kg
Format	Board

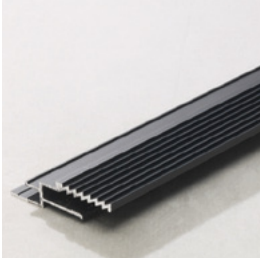
Vertical Starter Trim

Dimensions	25mm T x 13mm W x 2500mm L
Fixing	20mm Screws
Format	Board

Perforated Closure

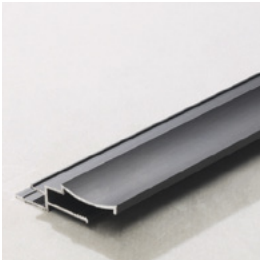
Dimensions	50mm T x 25mm W x 2500mm L
Fixing	20mm Screws
Format	Board

Decor Shutter 16mm	
Installed Width	11mm
Visible Width	16mm
Length	3600mm
Depth	16mm
Weight	1.4kg
Construction	Anodised Aluminium



Decor Shutter 32mm	
Installed Width	24mm
Visible Width	32mm
Length	3600mm
Depth	16mm
Weight	1.9kg
Construction	Anodised Aluminium

Decor Curve 16mm	
Installed Width	11mm
Visible Width	16mm
Length	3600mm
Depth	16mm
Weight	1.2kg
Construction	Anodised Aluminium



Decor Curve 32mm	
Installed Width	24mm
Visible Width	32mm
Length	3600mm
Depth	16mm
Weight	1.6kg
Construction	Anodised Aluminium

2.4
FIXINGS

30mm Fixing Screws - Cladding Boards

Dimensions 3.5mm W x 30mm L

Format Box of 250

The Millboard Envello Cladding boards should be fixed through the tongue with the 3.5x30mm cladding fixings, with one fixing per batten intersection and two per batten when joining boards.

The fixings should be inserted through the fixing guide groove on the tongue and angled towards the board slightly, the head should sit flush with the surface.

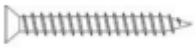


Fig. 18 - Fixing through the tongue

20mm Fixings Screws - Vertical Starter

Dimensions 3.5mm W x 20mm L

Format Box of 250

Vertical starter trim and perforated closures should be used using the 3.5x20mm fixing screw..

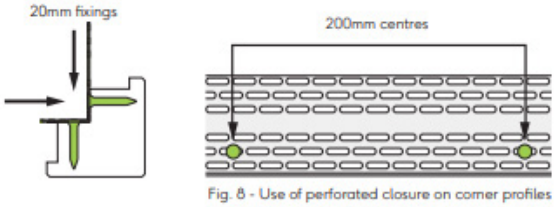
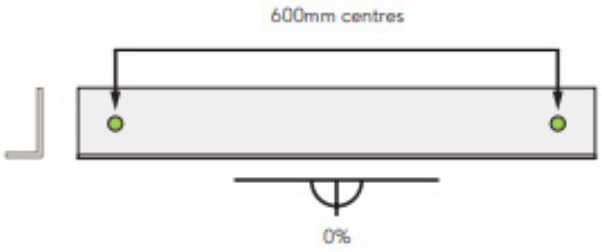


Fig. 8 - Use of perforated closure on corner profiles



Colour Head Fixing Screws

Dimensions 3.5mm W x 40mm L

Format Box of 100

Colour head screws are surface fixed through the cladding board, so the head sits flush with the top layer of the board.

3. Specifying Supstrate

3.1
WALL UNDERLAYS

Flexible Wall Underlays

- Shall comply with E2/AS1 9.1.7.1 & Table 23.
- Be run horizontally .
- Have upper sheets lapped over lower sheets to ensure that direction of laps will allow water to be shed to outside of the wall underlay.
- Be lapped not less than 75 mm at horizontal joints.
- Be lapped not less than 150 mm over studs at vertical joints, and extend 35 mm below bottom plate or bearer.
- Be restrained from bulging into a drained cavity. Refer to Paragraph 9.1.8.5.

Rigid Wall Underlays

Rigid wall underlays, in association with drained cavities (including direct fixed corrugated profiled metal), are required in Extra High wind zones. Refer to Table 3 and Table 23. Rigid underlays are also required to external walls of attached garages that are unlined. Refer Paragraphs 1.1.1 and 9.1.3.4 c).

- Are required in extra high wind zones as E2/AS1 9.1.7.2 & Table 23 & Table 3.
- Be minimum 7 mm H3 plywood, or 6 mm fiber cement sheet.
- Be installed with sheet edges fixed over solid framing.
- Be over-fixed with a flexible wall underlay from Table 23 and installed as in Paragraph 9.1.7.1.
- Have flexible underlay folded into opening reveals as in Paragraph 9.1.5.
- Have cavity battens at maximum 600 mm centers.
- Be finish flushed with underside of bottom plate or bearer.
- Alternatively, a wall underlay with a Product Certificate (CodeMark) or BRANZ Appraisal are acceptable provided the scope of use and conditions comply.

3.2
STRUCTURE AND FRAMING

Timber Framing

- The substrate to be within the framing tolerances of NZS 3604 Section 2 Table 2.1.
- Specific Requirements refer to NZS3604 Sections 6 & 11.

Steel Framing

- Steel framing in accordance with NZS3604 Steel Frames Buildings & B1/AS or by specific design.

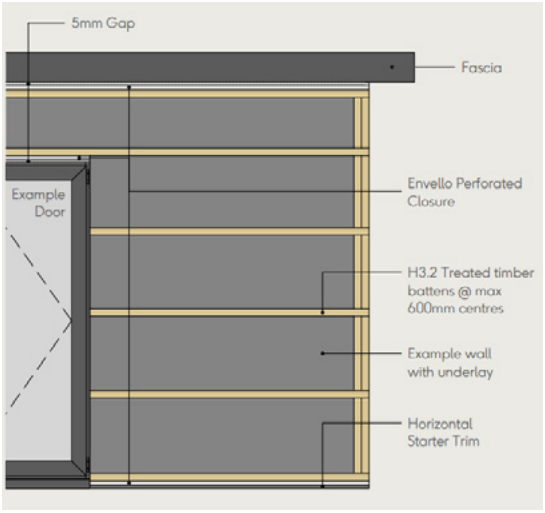
Cavity Battens

- As per E2/AS1 9.1.8.4 and be complaint with B2/AS1.
- Installed over wall underlay, either flexible of rigid compliant with E2/AS1 Table 23.
- H3.2 treated castellated cavity battens.
- Be nominal 20mm (between limits of 18mm and 25mm in thickness).
- Be a minimum 45mm wide.
- Be fixed, by the cladding fixings, through the wall underlay into the framing.
- Maximum batten spacing of 600mm.
- High wind loading areas 1.0kN/m2 reduced to 400mm centres.
- Battens structurally fixed into the main framework of the building structure.
- Gables to have battens that run up the diagonals to support both ends of the boards, ensuring that air flow isn't blocked.

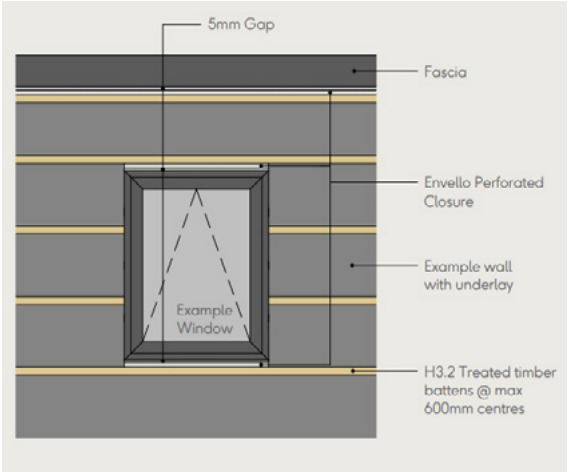
Jamb Battens

- Be nominal 20 mm (between limits of 18 mm and 25 mm in thickness), minimum 45 mm wide, and of timber complying with B2/AS1. Refer to Figure 72A.

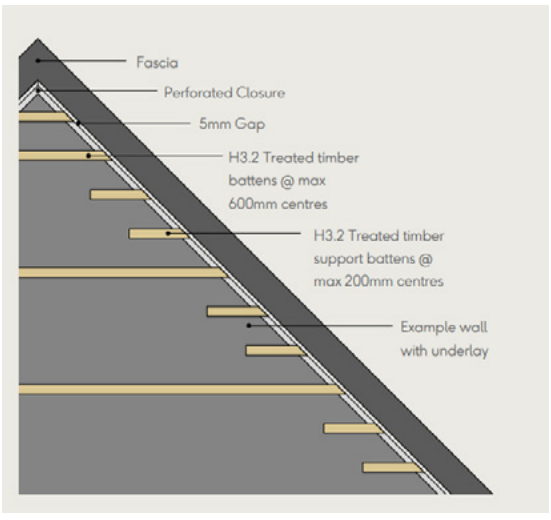
BATTEN LAYOUT



BATTEN LAYOUT AROUND OPENING



BATTEN LAYOUT AT GABLE END

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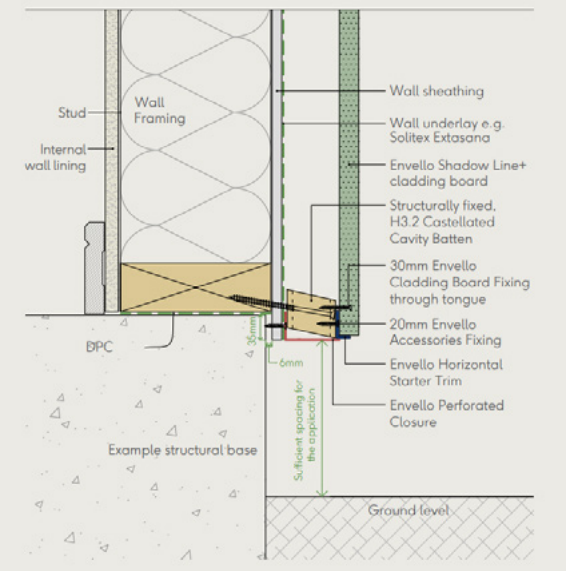
4. Finishing Detailing

4.1
GROUND CLEARANCE

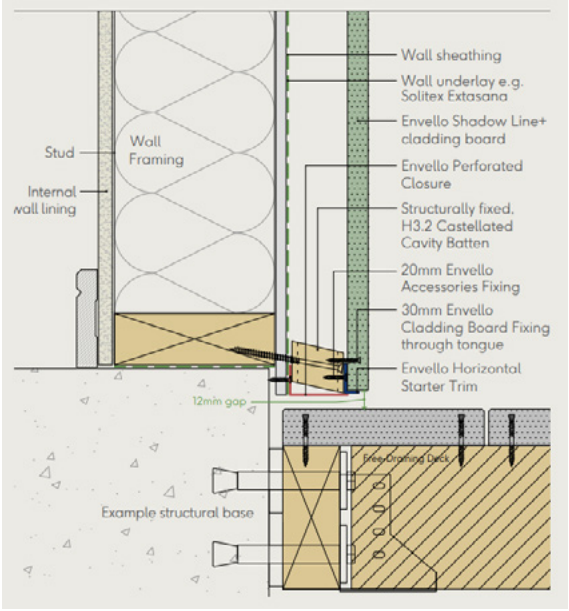
Clearance is required to create separation between the cladding and ground surface.

- As per E2/AS1 Paragraph 9.1.3 & Figure 66
- Extend past the bottom plate by 50mm
- Finish 35mm from bottom of cladding to highest point of decking
- Finish a minimum of 175mm above unpaved ground
- Finish a minimum of 100mm above paved ground

BASE TO WALL



BASE TO DECK



4.2
PERFORATED CLOSURES

Perforated closures are required to allow airflow and drainage of the cavity

- As per E2/AS1 Paragraph 9.1.3 & Figure 66
- Install Perforated closure at the base & top of all walls, open horizontal/raking junctions and over window, meter etc openings
- Widths and length of perforated closure are to
- suit the cavity

4.3
VERTICAL STARTER TRIMS

Vertical starter trims are to be used to located the cladding boards and determine the height from the ground

- Aluminium trim used to start the cladding at the bottom

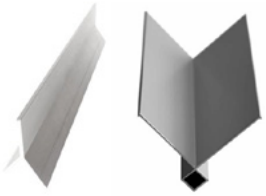
4.4
CORNER DETAILING

Corner detailing can be achieved by using Millboards prefinished inter/external corner trims, or using folded aluminium flashing to create a weather tight junction.

Shadowline ⁺ internal corners can be detailed with Millboards prefinished internal corner profile.

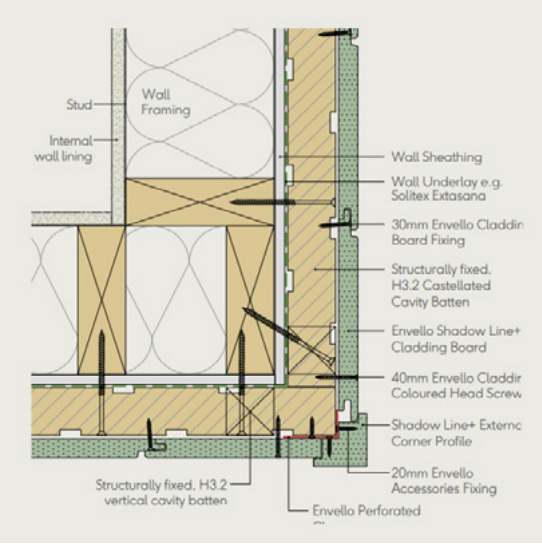
Board & Batten⁺ corners can be detailed with Millboards prefinished square corner trim profile.

Shadowline ⁺ External corners can be detailed with Millboards prefinished External corner profile.

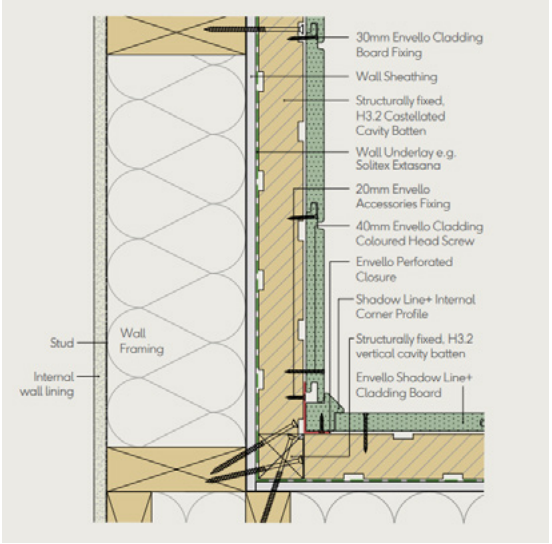


Aluminium corner flashings both internal and external can also be used to create a mitred corner (supplied by others) in accordance with NZBC E2/AS1 Tables 20,21 & 22.

EXTERNAL CORNER



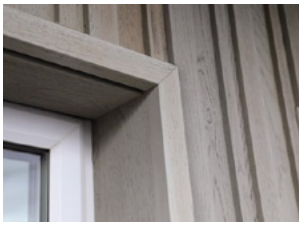
INTERNAL CORNER



4.5
WINDOW DETAILING

Window detailing be achieved using a range of Millboard profiles, depending on the style of your window joinery to be used in the project.

Recessed window details can be created using the Millboard Revel Board measuring 146mm wide and 16mm thick.

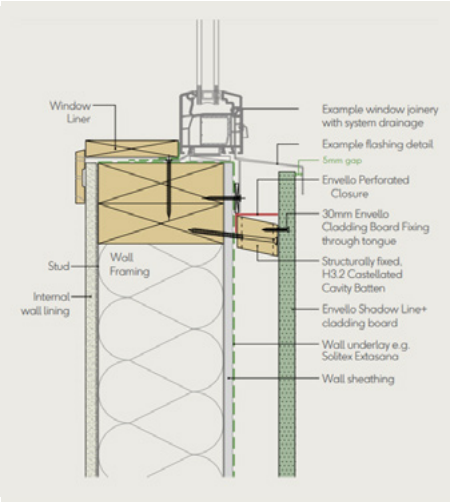


Boarder window details can be created using the Millboard Square edge profile measuring 55mm wide and 33mm thick.

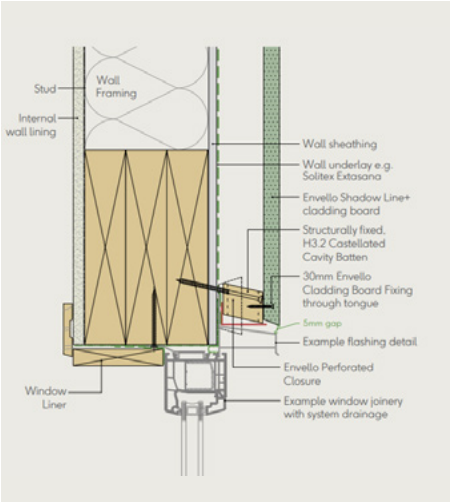
Window detailing can be created using the Millboard Square Edge Profile, Revel Boards & Bullnose Boards 150mm wide and 32mm thick.

Flush window detailing is achieved by running the cladding behind the window joinery frame.

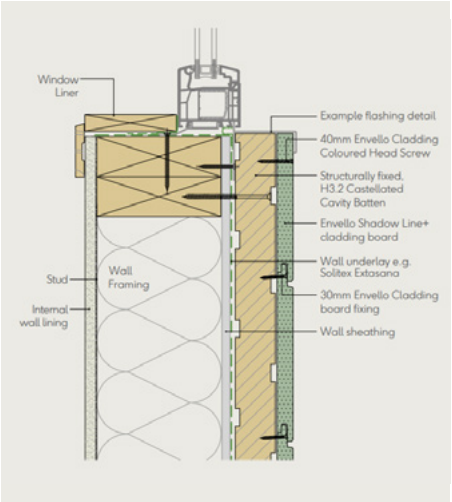
WINDOW SILL



WINDOW HEAD



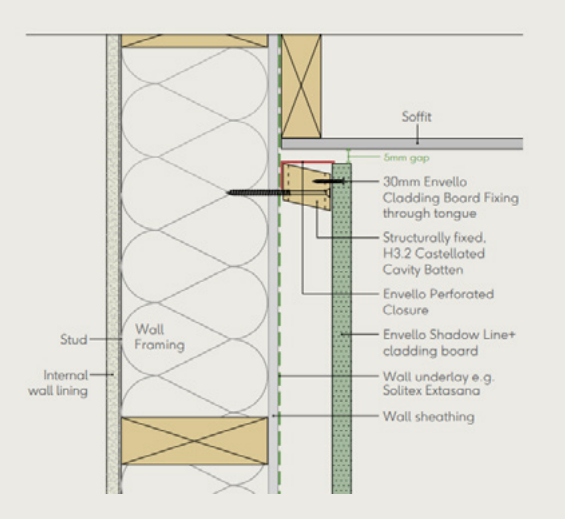
WINDOW JAMB



4.6
WALL HEAD

As Per E2/AS1 5.3 & Figure 8A
Square edge section can be used as a trim, with a minimum 6mm Chamfer to the internal corner

WINDOW SILL



4.7
BOARD JOINS

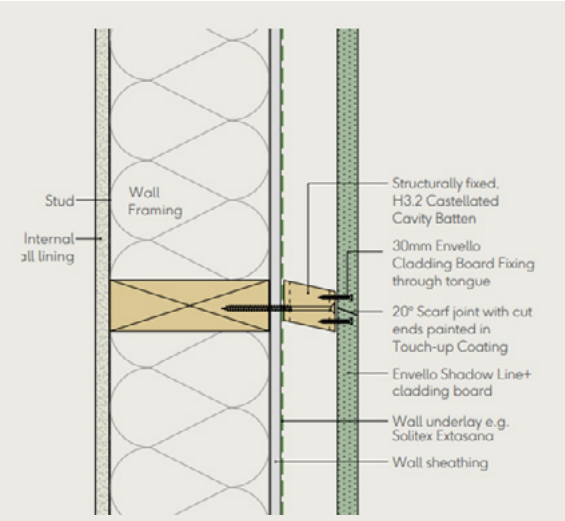
Where boards are to be end to end joined, a batten is to be located behind to ensure that both ends of the boards are supported.

Boards are to be joined with a 20 degree scarf joint, with one overlapping the other

The cut end of the board is to be painted with touch up coating, to create a constant colour finish (purely for aesthetics)

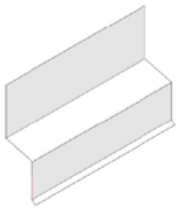
Board joints are to be staggered to create a random stagger look.

WINDOW SILL



4.8
FLASHINGS

Flashings are designed to drain or deflect water back outside the cladding system • As per E2/AS1 Section 4

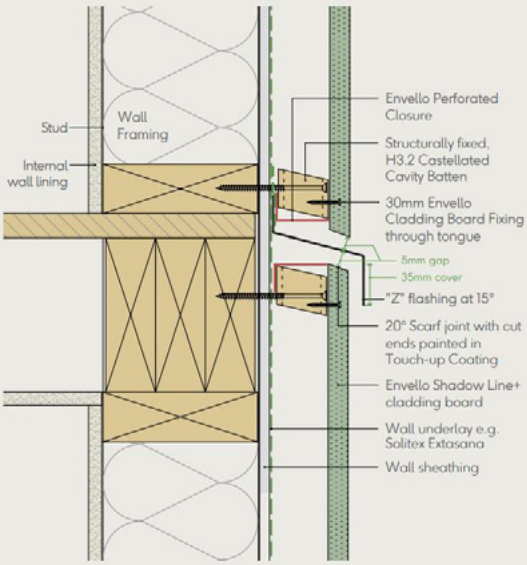


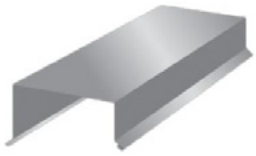
Inter-storey Junctions

Where a horizontal joint between cladding areas is required, a flashing is to be detailed to allow for building movement without effecting the cladding boards .

- As per E2/AS1 9.1.9.4 paragraph Figure 70
- Up to maximum of two storeys or 7m in height

INTER-STOREY JUNCTION





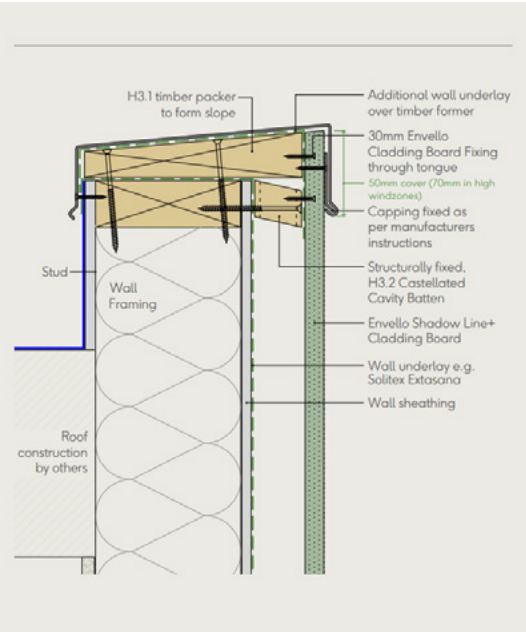
Parapet Flashings

Where there is a parapet wall, a flashing is to be detailed to allow for sufficient water run-off and to be sealed.

The flashing needs to sufficiently cover the cladding for the wind zone requirements of the property.

- As per E2/AS1 6.4 & Figure 10
- Parapet to wall junctions are to be flashed to direct water clear of the outside of face of the cladding

PARAPET FLASHING



4.9
CLADDING PENETRATIONS

Penetrations through the cladding shall be made weathertight by using foam backing rod and silicone sealant

Where possible, pipe penetrations, meter boxes and other penetrations should be located in sheltered areas if the building allows.

The cut end of the board is to be painted with touch up coating, to create a constant colour finish (purely for aesthetics).

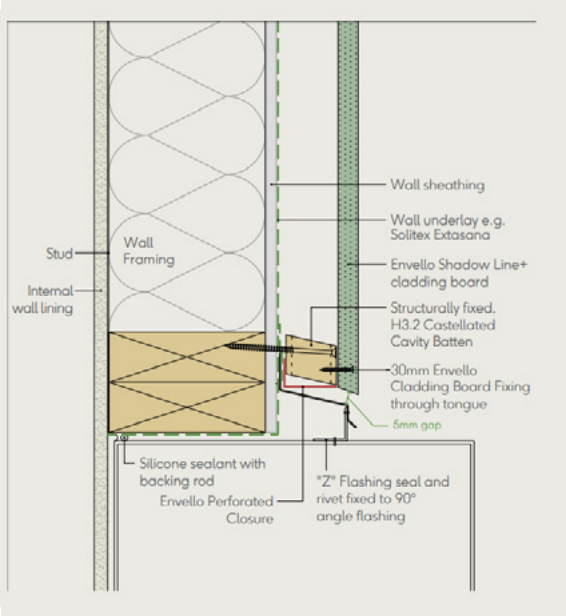
Meter Box

— As per E2/AS1 9.1.9.1 & Figure 69 are to be sealed using foam backing rod and sealant.

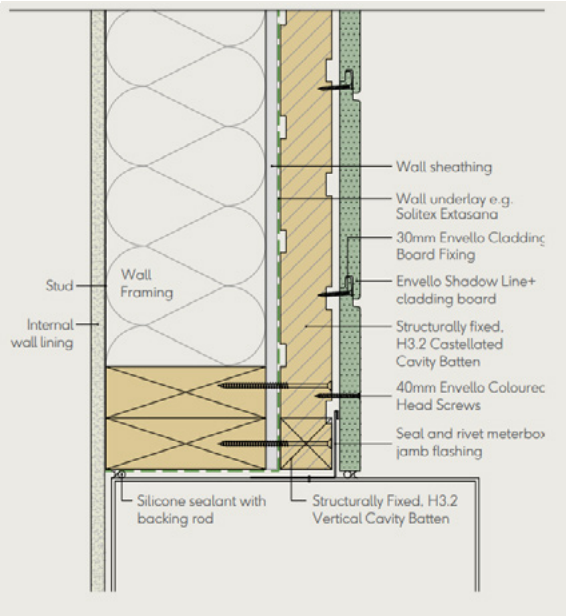
Pipe Penetrations

— As per E2/AS1 9.1.9.3 & Figure 68 are to be sealed using foam backing rod and sealant.

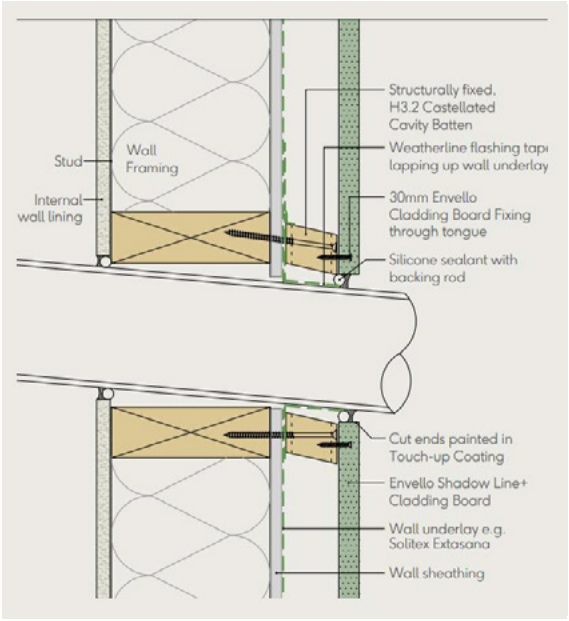
METER BOX HEAD



METER BOX JAMB



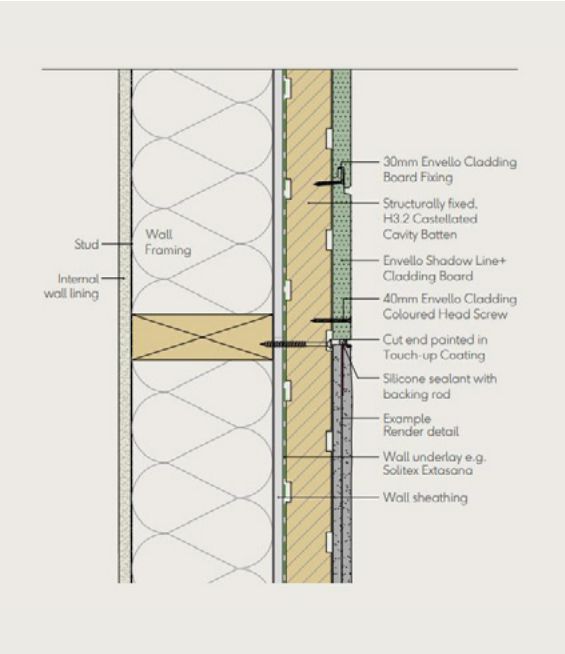
PIPE PENETRATIONS



4.10
TRANSITION TO BRICK/MONLITHIC

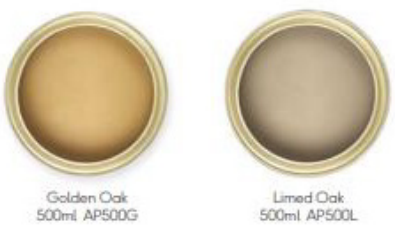
When transitioning to brick or monolithic cladding, a 5mm gap between the Millboard Envello cladding is to be left to allow for backing rod and silicone sealant to be used to seal the gap.

The cut end of the board is to be painted with touch up coating, to create a constant colour finish (purely for aesthetics).



4.11
CUT END COLOURING MATCHING

When cutting Millboard or leaving an exposed edge, touch up coating can be applied to colour match the surface layer of the cladding board, this is purely for aesthetic purposes as Millboard cladding doesn't require the end gain to be sealed

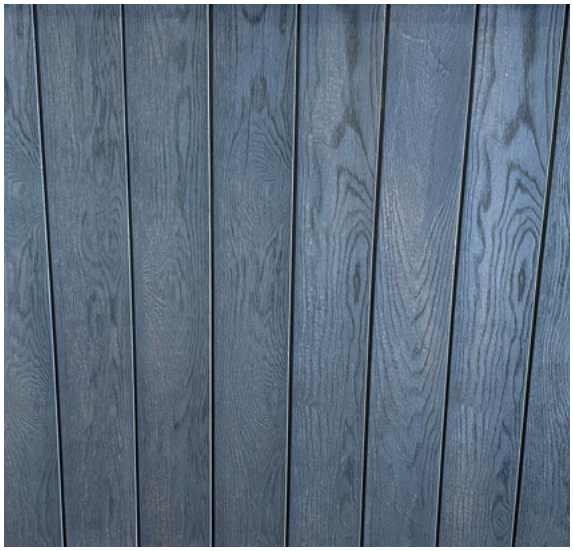


TOUCH UP COATING

5. Design Considerations

5.1
COLOR CHARACTERISTICS

Millboard Envello cladding has been designed to replicate the natural variances of timber and is manufactured to have tonal variance in the colour Attention to tone and grain variance insures a natural look

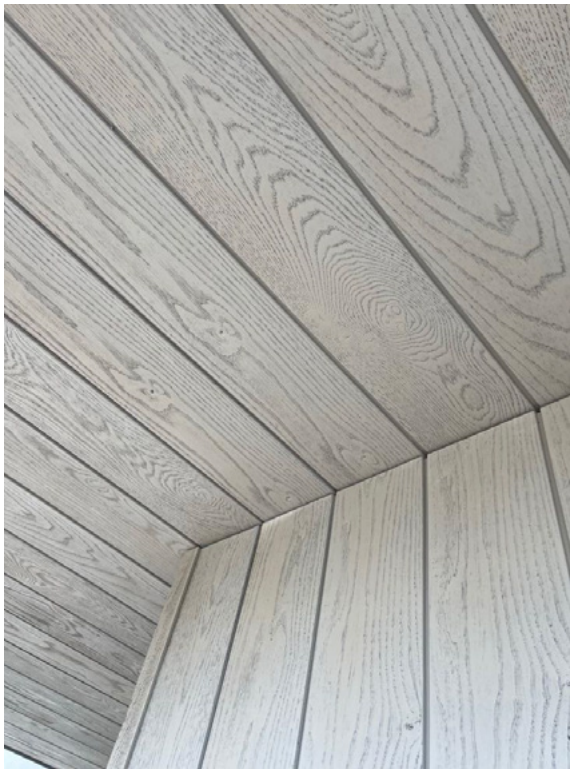


Antique Oak boasts more tonal variation per induvial board than the other colours in the Millboard range.

5.2
SOFFIT DETAILING

Millboard Envello can also be used to line soffits, to create a seamless transition from the vertical plane to the horizontal.

Millboards light weight construction makes it the perfect solution.



5.3
CEILING DETAILING

Creating ceiling detailing that continues from the interior to the exterior living spaces, create indoor outdoor flow and a seamless transition.

5.4
GARAGE DOOR DETAILING

Creating texture by cladding garage doors as a design feature or creating a hidden garage door that blends into the exterior of the building façade is possible due to the lightweight construction of Envello.

5.5
INTERIOR DETAILING

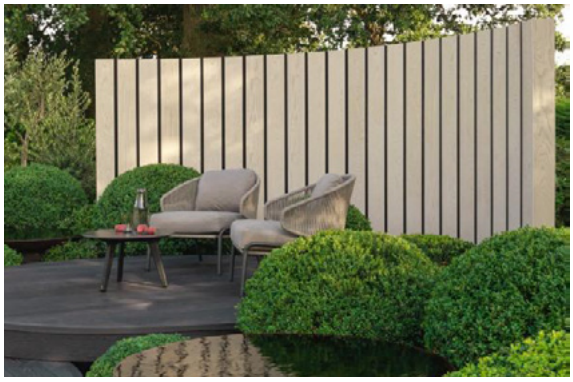
Bring the warmth of timber into the home, integrating the exterior aesthetics into the interior design to create feature statement pieces.

Millboard's versatile lightweight construction, makes it easily adaptable into interior spaces.

5.6
NEGATIVE DETAILING

Create a negative detail and add texture, or use colour to create a contrast.

The Décor trim panels give you the freedom to create your own board layout and look



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