



TECHNICAL INSTALLATION MANUAL

FOR

ECO Block Insulated Concrete Walls



ECO Block Pty Ltd

INTRODUCTION

1. Read this disclaimer (“Disclaimer”) carefully before using the Eco Block Pty Ltd Technical and Installation Manual for Eco Block Insulated Concrete Forms (“manual”). This version of the manual was published on 30/06/2023, and changes to this manual may occur without notice, and users should contact Eco Block Pty Ltd for the most current version.
2. It is the and the Builders responsibility to always use the most current and up to date version of the manual when installing Eco Block Insulating Concrete Forms.
3. This manual is designed to be used as a reference guide only. The manual is not to be used as a replacement or substitute for the actual training by an experienced Eco Block trained professional. Eco Block Pty Ltd believes that all of the information and details in this manual is for educational and information purposes. It is not intended as a substitute for professional advice.
4. Eco Block Pty Ltd assumes no responsibility regarding the use of our products or any other third party products referred to in the manual. The user’s total commitment is to comply with all applicable regulations and the National Construction Code (NCC) or State and Territory NCC adaptations of the NCC concerning the Eco Block Insulating Concrete Formwork and any other product outlined in the manual. It is the user and the Builder’s responsibility to research and understand safe work methods and handling for these products.
5. We reserve the right to change this manual at any given time. If you want to make sure that the manual is current, we advise that you contact Eco Block Pty Ltd.

CONTENT

1) About this manual National Construction Code, Deemed to Satisfy	5
2) Where and when can ECO BLOCK formwork be used.....	6
3) Thermal values	7
4) Product specifications & components	10
5) System Components and how to assemble Eco Block formwork	15
6) How to place vertical rebar in slab and footings guidelines?	17
7) Water proof and Termite controls.....	20
8) Install: The First Course	22
9) Install: Second Course	34
10) Adjust Heights and Levels walls.....	35
11) Install Windows & Door Formwork	37
12) Install brace and scaffold after the 2 nd or 3 rd course.	40
13) Install and Brace T-Walls	44
14) Wall Inserts	47
15) Pre-placement checklist	49
17) What to look for in your mix design	51
18) Lintels	51
19) Engineers Specification	51
20) Check, to ensure enough concrete mix has been calculated	52
21) Internal Compaction and Correct Concrete Mix Design	53
22) Concrete Placement	53
23) Internal Vibrators and External Vibrators	54
25) Connect Eco Block to an existing block wall (Detail).....	56
26) Connect to an existing concrete wall (Detail)	57
27) Attach internal timber or steel frame partition walls (Detail).....	58
28) Embedded joist connection timber joist.....	60
29) Embedded hanger joist Connection with "I" joist.....	61
30) Attach internal plasterboard or other linings.....	62
31) Waterproof External below-grade walls and retaining walls where required.....	63
32) Apply Cladding or render to the exterior wall.....	67

ECO BLOCK AUSTRALIA PTY LTD

INSULATING CONCRETE FORMS

When researching for a "forever home", choose ICF construction for several reasons. It's tough, energy-efficient and should last a lifetime with minimal upkeep. We at Eco Block Pty Ltd aspire to deliver the best living environment for you and your family or employees.



Simpler, Faster, Better

ECO BLOCK INSULATED FORMWORK MANUAL



1) About this manual

National Construction Code, Deemed to Satisfy

National Code of Compliance

National Construction Code (NCC) Compliance

Eco Block ICF Formwork is Deemed to Satisfy with the following clauses of the NFC 2022:

	Volume One	Volume Two
	Structural reliability and resistance	
Performance requirements	B1P1(1),(2)(a)(b)(c)	H1P1(1),(2)(a)(b)(c)
Deemed-to-Satisfy Requirements	Type of construction required	Fire separation of external walls
	C2D2(2)	H3D3
	Construction in bushfire prone areas	
	G3D3	H7D4
	Walls and glazing (Thermal)	
	J4D6	H6D2
	Sound insulation rating of walls	
F7D6	Not applicable for Volume Two	

Class And Type

Class 1, 1a & 1b Residential / Town House Construction

Class 10a Private garage, carport shed etC

Class 2, 3 & 5 - Type C Construction

Bushfire Attack Levels (BAL)

Eco block ICF Formwork complies with BAL-12.5, BAL-29, BAL-40 & BAL-FZ

2) Where and when can ECO BLOCK formwork be used

- » Home Construction
- » Multi-Unit Construction / Internal Firewalls
- » Building with difficult sites
- » Commercial Construction
- » Retaining Wall
- » In-ground tanks
- » Swimming Pools
- » Curved walls
- » Concrete Footings

Building with Eco Block is fast, cost-effective and energy-efficient. Eco Block Form Work removes six existing steps used in conventional construction into one straightforward system providing:

- » Structure
- » Insulation
- » Vapor barriers
- » Sound barriers
- » Firewalls
- » Battens/Fastening strips for internal and external fixings

The EcoBlock System offers a versatile solution for all building classes in the National Construction Code Volume One and Two, wherever a fire-rated wall does not meet the requirements of non-combustibility in accordance with AS 1530.1.

With its innovative design and construction, the Eco Block system provides a reliable and sustainable option for various building applications. Its use can effectively meet the requirements for fire resistance, while providing flexibility in material choices. The Eco Block system presents an opportunity for builders and designers to enhance energy efficiency and reduce environmental impact without compromising on safety or compliance with the national construction code.

3a) Thermal Values/R Values

	Total Thermal Resistance	
	230 Series Wall	
	Winter	Summer
Rt (M²k/w)	3.29	3.12

	Total Thermal Resistance	
	250 Series Wall	
	Winter	Summer
Rt (M²k/w)	3.32	3.15

	Total Thermal Resistance	
	330 Series Wall	
	Winter	Summer
Rt (M²k/w)	3.35	3.19

3b) Structural Compliance - Certificate Newport Consulting Engineers



10th May, 2023

Structural Certification: Cladding connections to Eco-Block Wall

Newport Consulting Engineers hereby certify that connections between external cladding and the Eco-Block wall system, when fixed in accordance with the specifications below, are structurally adequate for the following wind loadings.

Wind loadings, derived from design wind classifications N1 to N5 as well as C1 to C3 (in accordance with AS 4055 -2012)

and

Design Ultimate Wind Pressures (as derived from AS 1170.2) of 7.18 kPa or less.

Fixing specifications are

- 10 gauge screws, (grade 3)
- Screws must be sufficient length so as to penetrate through the external cladding, as well as the Eco-Block expanded polystyrene foam outer-shell and into the vertical stud channel.
- Screws to be fixed to every second vertical stud channel (i.e. approximately 400mm horizontal centres.)
- Screws to be spaced at maximum 400mm vertical centres.

Compliance is based on

- Load testing results as described in Eco Block LLC Technical Bulletin "Fibre Cement Siding Attachment" (refer attached)
- Load testing results as described in Advanced Materials Testing Services "Load Test Report" dated 8 April 2019 (refer attached.)

The connection hereby meets the requirements of NCC Vol 1 and Vol 2 2022 and its Performance Requirements of Part B1P1 and H1P1.

Please don't hesitate to contact us if you have any further questions in relation to this report.

Yours faithfully,

A handwritten signature in black ink, appearing to read "Matthew Yourell", is positioned above the printed name.

MATTHEW YOURELL RPEQ

NO 8295

M.I.E. (AUST)

Newport Consulting Engineers ABN 50 785 271 128
Ground Floor, 349 Coronation Drive, Milton QLD 4064
PO Box 1437, Toowong DC QLD 4066

Telephone 07 3252 9822
Facsimile 07 3252 9844
Email info@newportengineers.com.au

Eco Block Engineers © Designer Manual and Tables 2023.

Newport Consulting Engineers
Phone: 07 3252 9822 Email: myourell@newportengineers.com.au

Estimating Labour

To achieve optimum efficiency when building with ECO-Block, an ideal and experienced trained crew consists of a minimum of three. One skilled person (who understands level, plumb and square) and two laborers (Carpenters, block layer, formwork).

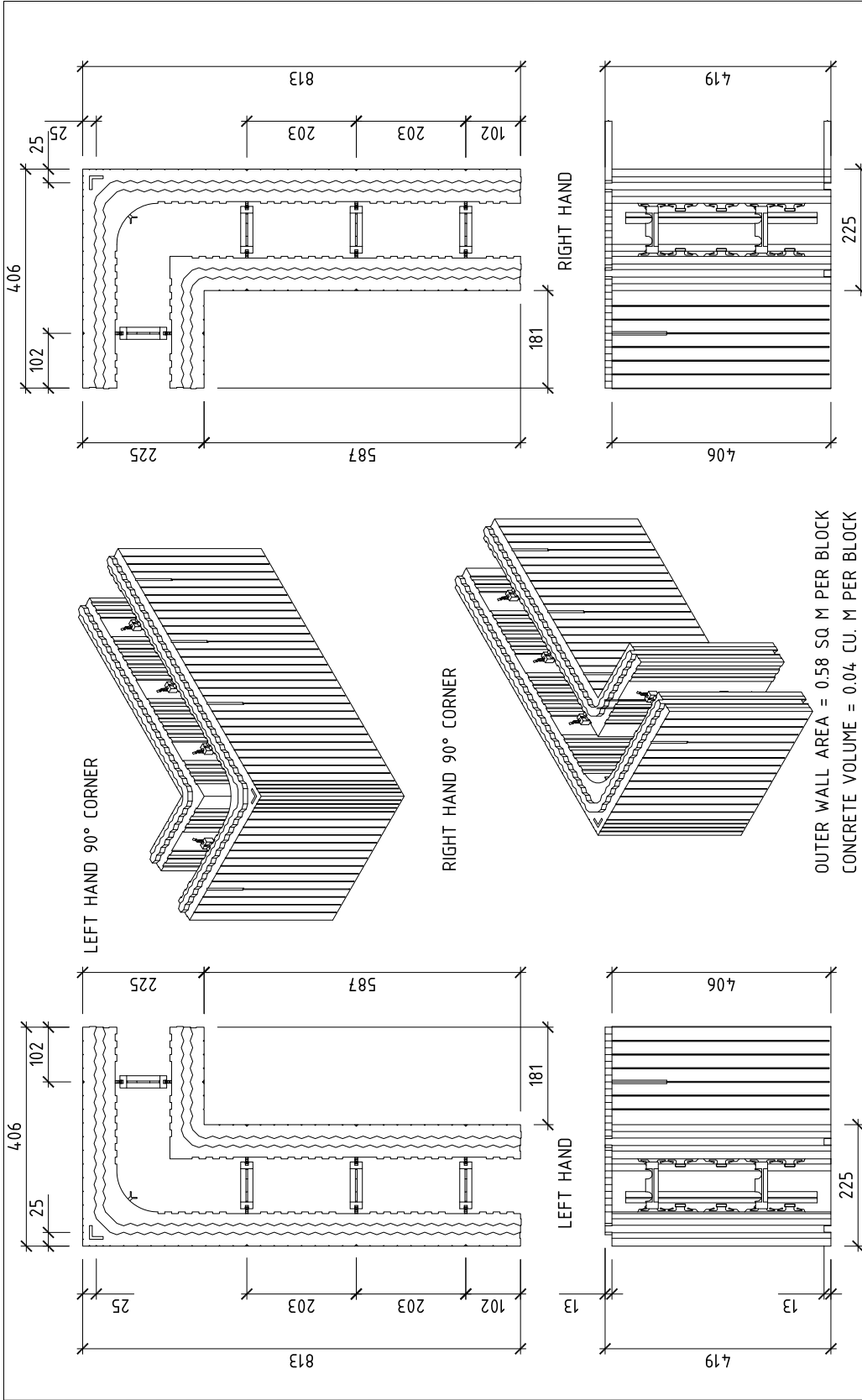
We are happy to provide estimates for quantities for your projects; these will also offer a guide to Materials Supplied by others, i.e. concrete volume, steel, and an indicative labor rate based on your projects' specific detail, i.e. corners, t- joints, door and window openings.



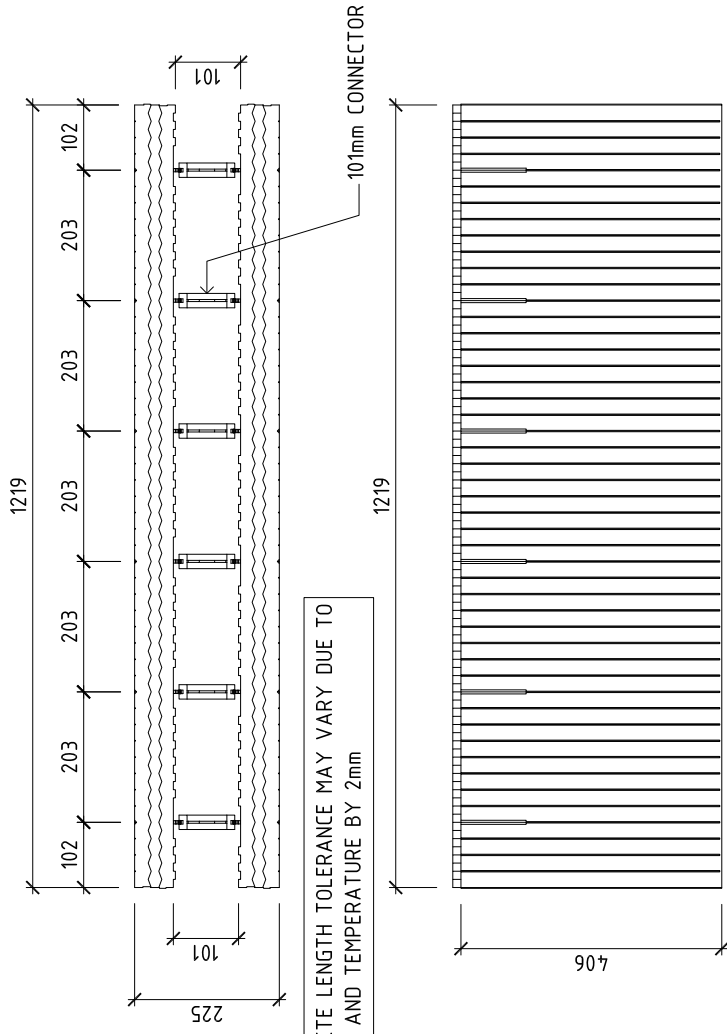
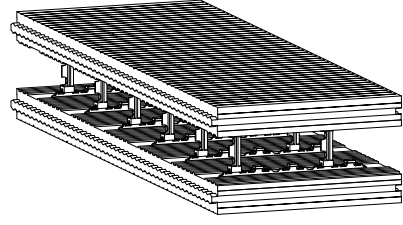
4) Product specifications & components

	101mm Cavity Block	152mm Cavity Block	203mm Cavity Block
Block Dimensions (Standard Block)	1219 x 406 x 229 mm	1219 x 406 x 279 mm	1219 x 406 x 330 mm
Concrete Thickness	102 mm	152 mm	203 mm
Concrete Volume per block	0.05 m ³	0.07 m ³	0.1 m ³
EPS Thickness (total)	127 mm	127 mm	127 mm
Wall Surface Area per block	0.5 m ²	0.5 m ²	0.5 m ²
Fire Rating	90 mins	3 hours	4 hours
Sound Insulation Dntw+ctr=RW	45 51	51 ≥ 50	51+ ≥ 50
Thermal Insulation	R 3.29	R 3.32	R 3.35
Block Dimensions (90 deg corner) *Concrete-filled	Long side: 813 mm Short side: 406 mm	Long side: 813 mm Short side: 406 mm	Long side: 813 mm Short side: 406 mm

230 Series 100mm	Divide by 20	One cubic meter fills 20 blocks
280 Series 150mm	Divide by 14	One cubic meter fills 14 blocks
300 Series 200mm	Divide by 10	One cubic meter fills ten blocks



DATE: 5/2009	
SCALE: 1:10	
REVISION: 1	
DRAWING NUMBER:	
M-10-005	
<p>ECO-BLOCK 230 SERIES 90° CORNERS 101mm CORE</p>	
<p>ECO-Block, Pty Ltd INSULATING CONCRETE FORMS <i>"... SAVING AUSTRALIAN ENERGY"</i>[™]</p> <p>34 Gracemere St. Newmarket QLD 4051 www.eco-blockaustralia.com.au</p>	

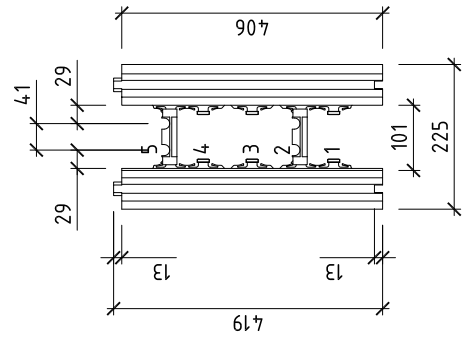


CONCRETE LENGTH TOLERANCE MAY VARY DUE TO CURING AND TEMPERATURE BY 2mm

BLOCK SHOWN HAS CONNECTORS ARRANGED FOR UPPER COURSES. FOR FIRST COURSE PLACE A ROW OF CONNECTORS AT THE 1, 3, AND 5 TEE LOCATIONS

WALL SURFACE AREA = 0.5 SQ. M PER BLOCK
 CONCRETE VOLUME = 0.05 CU. M PER BLOCK


NOTE:
 IT IS THE RESPONSIBILITY OF THE DESIGNER / END USER TO VERIFY THAT STRUCTURES BUILT WITH ECO-BLOCK HAVE BEEN DESIGNED, ENGINEERED, AND CONSTRUCTED IN ACCORDANCE WITH ALL APPLICABLE BUILDING CODES AND REGULATIONS



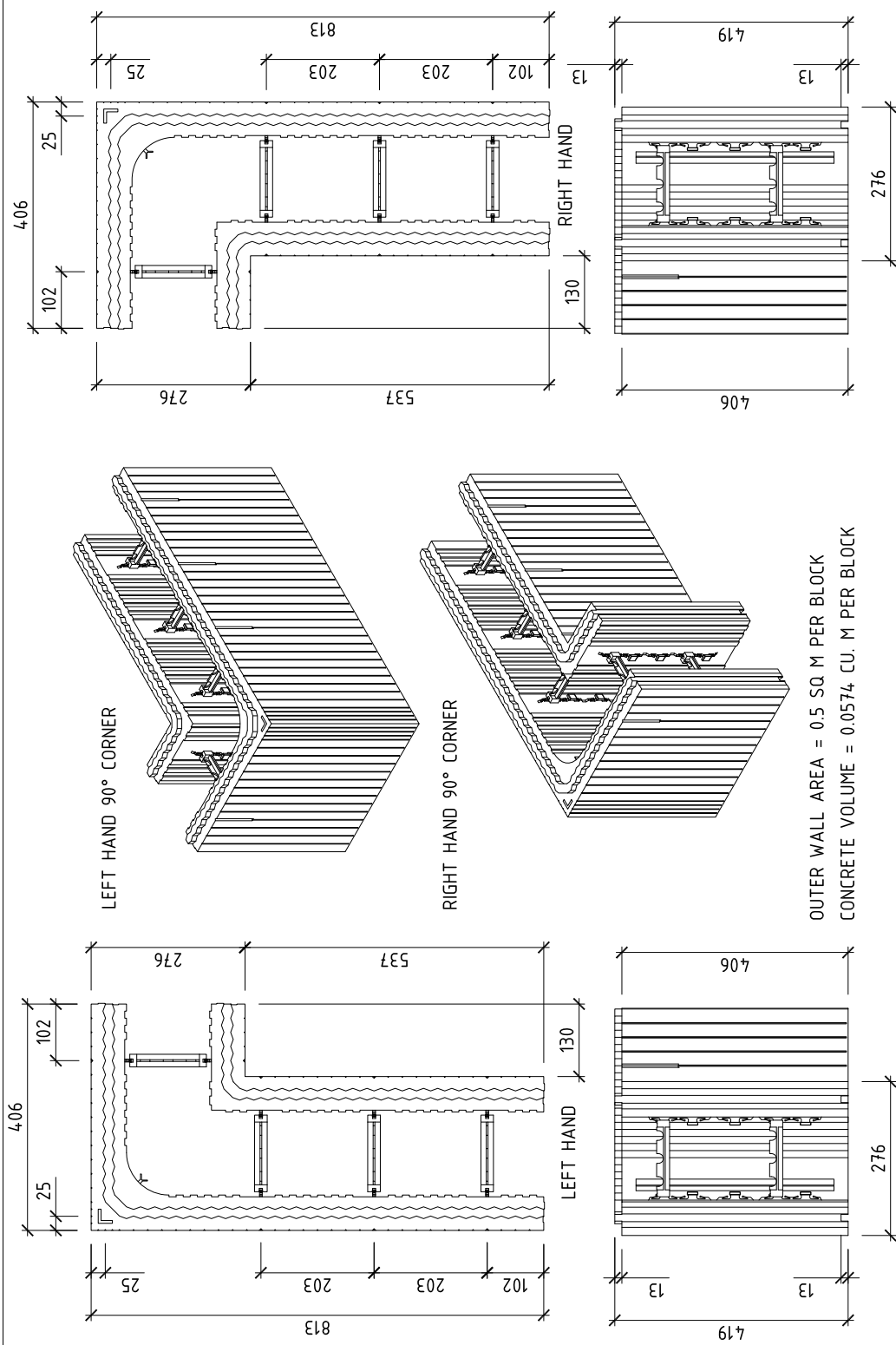
DATE:	5/2009
SCALE:	1:10
REVISION:	-
DRAWING NUMBER:	M-10-001

ECO-BLOCK 230 SERIES
STRAIGHT PANEL
101mm CORE

ECO-Block, Pty Ltd
 INSULATING CONCRETE FORMS
 "... SAVING AUSTRALIAN ENERGY "™




34 Gracemere St.
 Newmarket QLD 4051
www.eco-blockaustralia.com.au

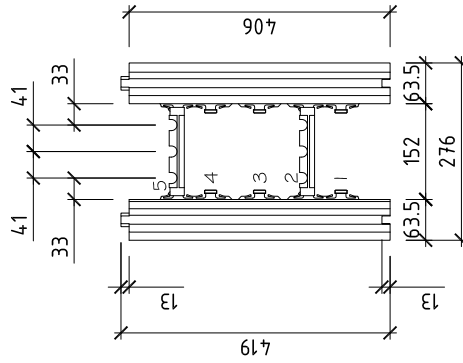
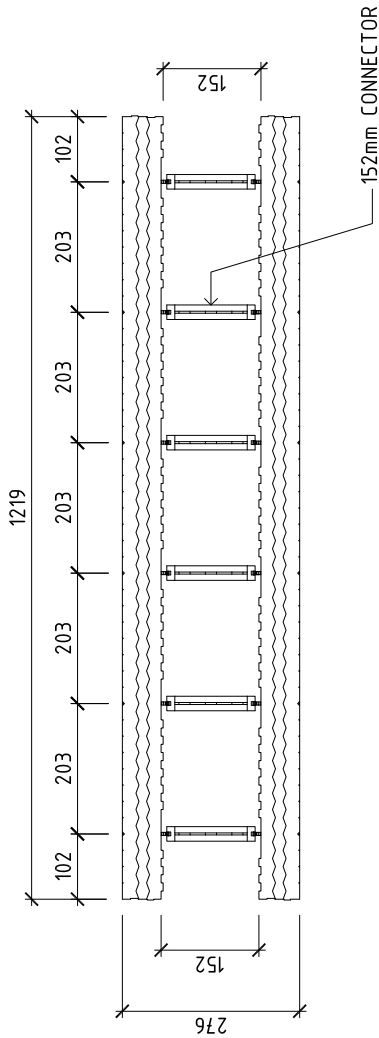
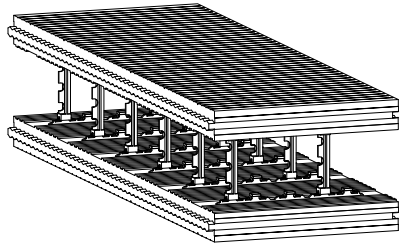


LEFT HAND 90° CORNER

RIGHT HAND 90° CORNER

OUTER WALL AREA = 0.5 SQ. M PER BLOCK
 CONCRETE VOLUME = 0.0574 CU. M PER BLOCK

DATE: 5/2009	
SCALE: 1:10	
REVISION: -	
DRAWING NUMBER:	
M-10-006	
ECO-BLOCK 280 SERIES 90° CORNERS 152mm CORE	
ECO-Block, Pty Ltd INSULATING CONCRETE FORMS "... SAVING AUSTRALIAN ENERGY "™  34 Gracemere St. Newmarket QLD 4051 www.eco-blockaustralia.com.au	



BLOCK SHOWN HAS CONNECTORS ARRANGED FOR UPPER COURSES. FOR FIRST COURSE PLACE A ROW OF CONNECTORS AT THE 1, 3, AND 5 TEE LOCATIONS.

WALL SURFACE AREA = 0.5 SQ M PER BLOCK
 CONCRETE VOLUME = 0.07 CU M PER BLOCK

CONCRETE LENGTH TOLERANCE MAY VARY DUE TO CURING AND TEMPERATURE BY 2mm

NOTE:
 IT IS THE RESPONSIBILITY OF THE DESIGNER / END USER TO VERIFY THAT STRUCTURES BUILT WITH ECO-BLOCK HAVE BEEN DESIGNED, ENGINEERED, AND CONSTRUCTED IN ACCORDANCE WITH ALL APPLICABLE BUILDING CODES AND REGULATIONS

ECO-Block, Pty Ltd

INSULATING CONCRETE FORMS
 "... SAVING AUSTRALIAN ENERGY "™



34 Gracemere St.
 Newmarket QLD 4051
www.eco-blockaustralia.com.au

DATE: 5/2009

SCALE: 1:10

REVISION: 2

DRAWING NUMBER:

M-10-002

**ECO-BLOCK 280 SERIES
 STRAIGHT PANEL
 152mm CORE**

5) System Components and how to assemble Eco Block formwork



300 series connector

a) 200 mm of concrete thickness wall

280 series connector

b) 150 mm of concrete thickness wall

230 series connector

c) 100 mm of concrete thickness wall



Use a splice connector to increase wall widths

Chop and change connectors some examples;

a) 200 mm connector + 100 mm
= 300 mm concrete

b) 150 mm connector + 100 mm = 250 mm



Fixing battens are moulded in the formwork panels.

There is a fixing batten every 200mm along the panel.

The connectors are used to assemble the formwork.

Connectors slide onto the web lock mechanism. There are five web locations per web to fix your connectors. When inserting the connector use the top, middle and bottom web lock.



Example of a connector inserted onto the web lock.



Example of webs with steel fixing.

EPS formwork removed to show how the Webs and connector components clip together.

INSTALLATION GUIDE

Note that this manual is a guide. If you have concerns regarding your project, you should seek clarification from your Eco Block Representative.

6) How to place vertical rebar in slab and footings guidelines?

Your Engineer will design the footings and concrete slab; you must follow the Engineers plans and steel placement.

Use the grid aid on page 15 and 16 (230 series and 280 series) and you will save time and money with the placement of the vertical steel rebar.

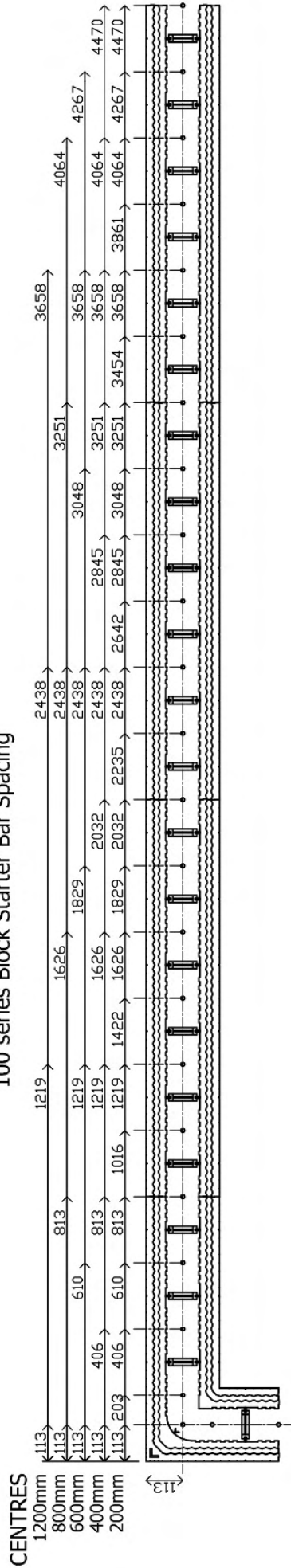
A level footing or slab will save you time installing the first course of the Eco Block Formwork.

A level footing or slab will eliminate the need to shave the bottom of the block to achieve a level wall.





100 series Block Starter Bar Spacing



NOTE:
IT IS THE RESPONSIBILITY OF THE DESIGNER / END USER TO VERIFY THAT STRUCTURES BUILT WITH ECO-BLOCK HAVE BEEN DESIGNED, ENGINEERED, AND CONSTRUCTED IN ACCORDANCE WITH ALL APPLICABLE BUILDING CODES AND REGULATIONS



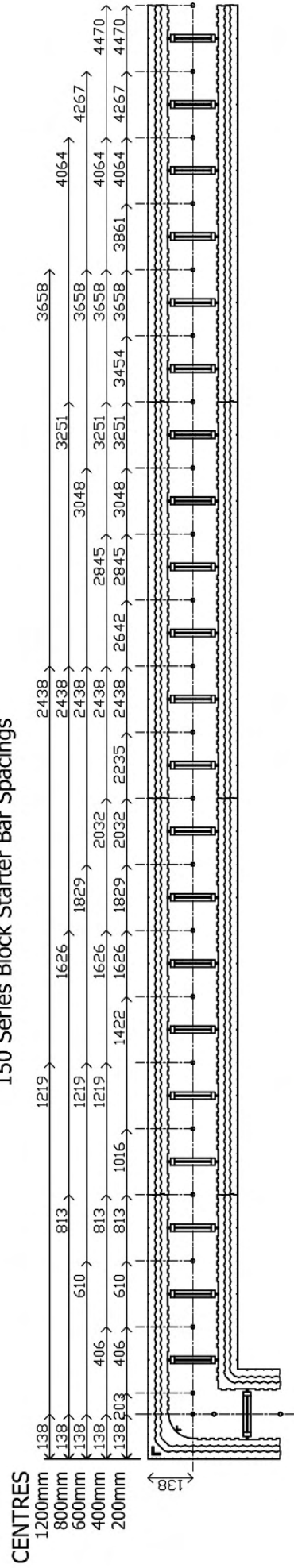
ECO-Block Pty Ltd
INSULATING CONCRETE FORMS
"... SAVING AUSTRALIAN ENERGY"[™]
ecoblock.net.au

TITLE:

STARTER BAR PLACEMENT

DATE:	17.11.2011
SCALE:	1:20
SHEET	1 OF 1
DRAWING NO:	001.01

150 Series Block Starter Bar Spacings



NOTE:

IT IS THE RESPONSIBILITY OF THE DESIGNER / END USER TO VERIFY THAT STRUCTURES BUILT WITH ECO-BLOCK HAVE BEEN DESIGNED, ENGINEERED, AND CONSTRUCTED IN ACCORDANCE WITH ALL APPLICABLE BUILDING CODES AND REGULATIONS

TITLE:

STARTER BAR PLACEMENT

ECO-Block Pty Ltd
INSULATING CONCRETE FORMS
"... SAVING AUSTRALIAN ENERGY"TM
ecoblock.net.au



© ECO-Block Pty Ltd

DATE: 17.11.2011

SCALE: 1:20

SHEET 1 OF 1

DRAWING NO:

001.01

7) Water proof and Termite controls



Paint a waterproofing membrane around the perimeter of the footing to protect against rising damp.



Termite barriers must be applied directly to the concrete slab, or a reticulation system can be used can also be installed.

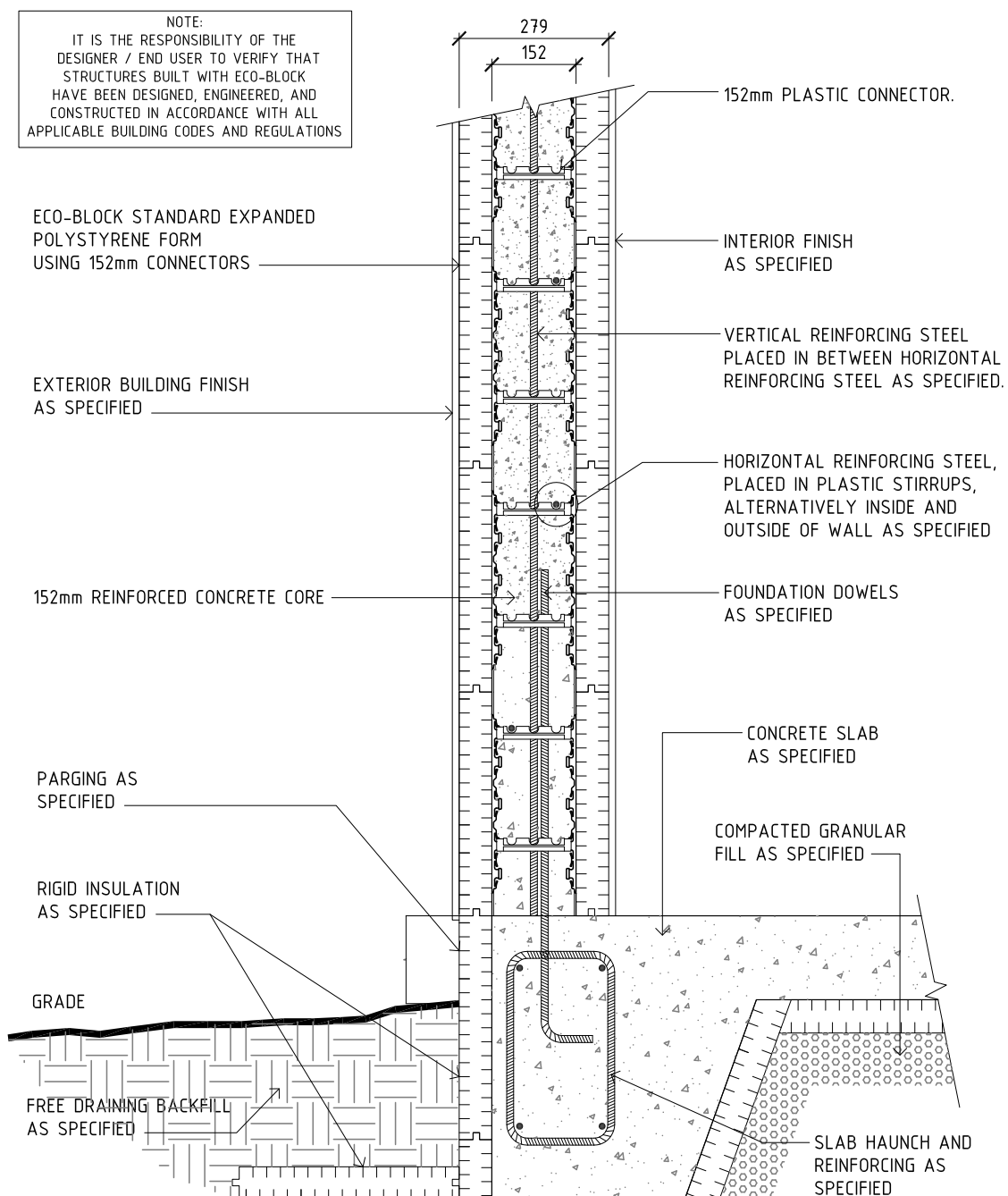
(We acknowledge Term-Seal™ for their support)

These pipe penetrations, like every penetration through a slab, are fitted with termite protection. These collars are TERM-seal™'s Penetration-Lock collars, installed with TERM-seal™ Sealant to make it waterproof as well as termite-proof.

TERMSEAL has developed several methods for penetration protection, with the Penetration-Lock collars, the preferred method.

You will notice the red line on the diagram below.

This is the appropriate location to install PRM capping strip. It is placed on top of the cured slab, before the wall panels are installed. The strip is 110mm wide and should just be visible externally, once the wall panel is placed. This may mean that the edge of the sheet will be quite visible before the render or textured-finish is applied. The inspection zone is created by leaving a minimum of 75mm free under the sheet, externally. The location is prepared with an application of TERM-seal PrimeCoat which will take approximately 15 minutes to dry. A 5mm bead of TERM-seal Sealant is applied before placing the capping strip.



8) Install: The First Course

1. Check that Footing and Slab are clean, level and square.
2. Check that Chalk lines are accurate and complete; Chalk lines must be on the slab where the inside face of the wall finishes. (Refer Illustration on page 20)
3. Fix "C" Channel guide to the concrete slab, to keep the Eco Block formwork in place and in a straight line.

(Steel Track Inside wall fixed to footing or slab 64mm x 3meters, .5BMT)



C Channel

4. Mark out all window and door openings on the chalk line/ work surface, on the slab.

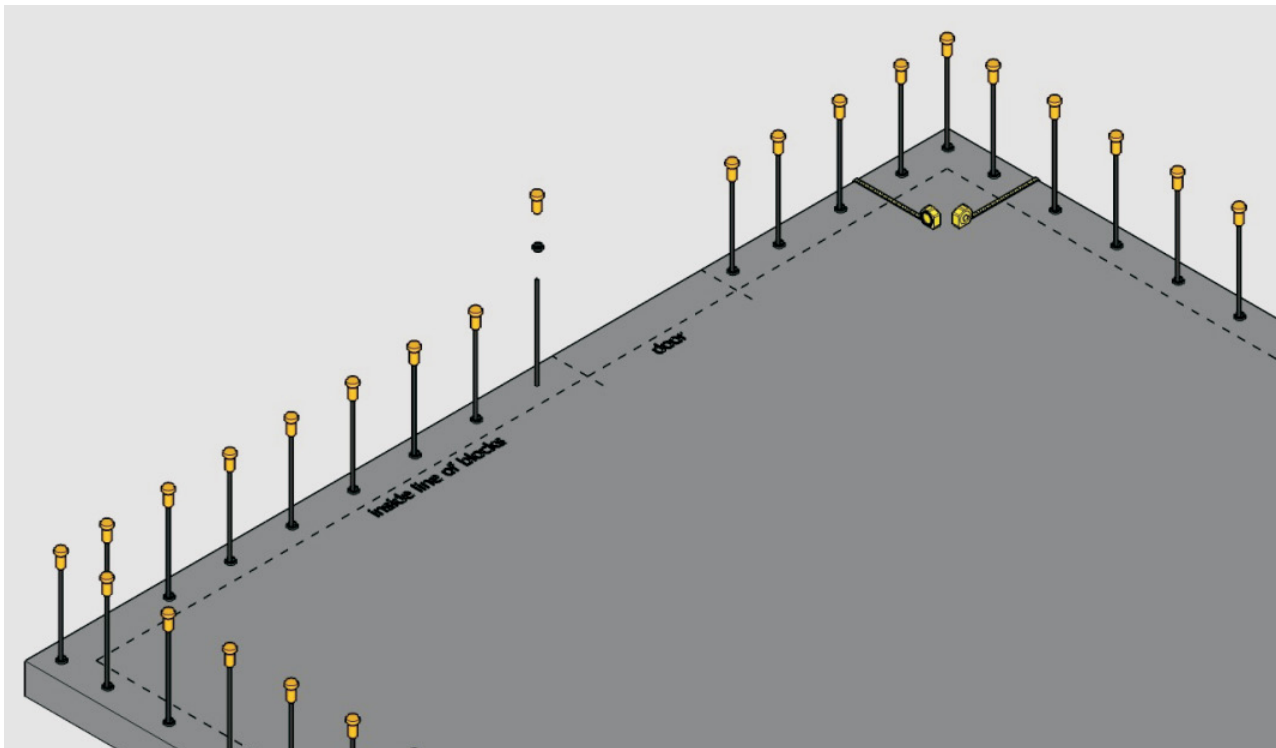
LOCATE WALLS AND OPENINGS

Measure and mark the exact location of the **inside** of all your walls.

Chalk a line the full length of the inside of all your walls.

Locate **door ways** and other openings and mark their location.

Before placing any blocks it is a good idea to place plastic rings over the starter bars to hold the vertical reinforcing steel close to it.



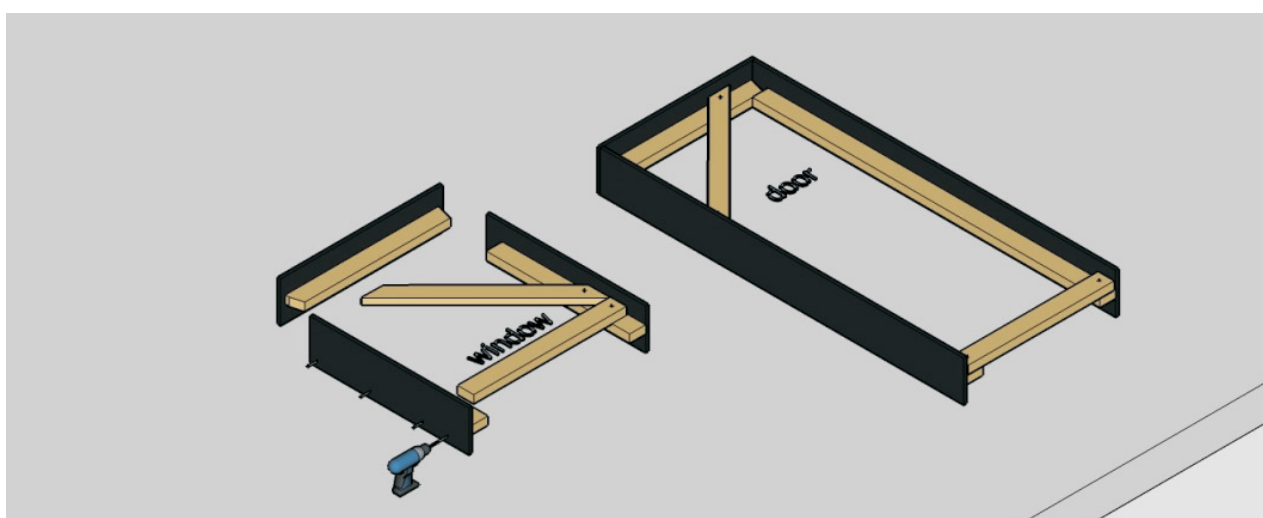
HINT: 25mm thin walled irrigation pipe cut into 20mm lengths make good rings for locating the vertical reinforcing to the starter bars.

5. **Window and Door Formwork** needs to be ready before you start laying blocks. Begin to build the formwork for the doors & windows and other openings. Below are several different methods.

METHOD 1

1) construct (or hire) timber formwork

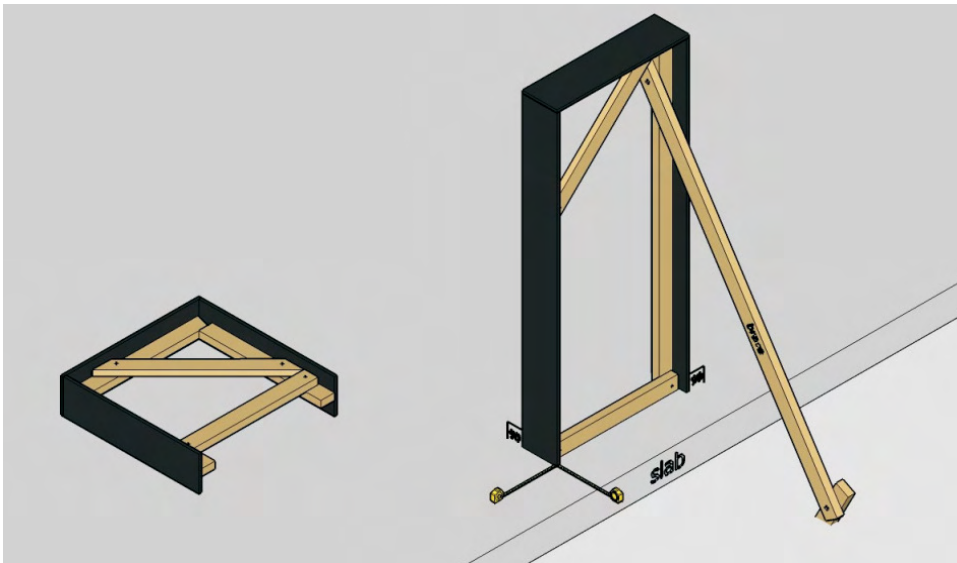
Use **formply** for easy removal/stripping and re-use. Make head board **full width** of opening. Make jambs to fit under head board. Brace across the bottom. Square the frame and brace diagonally.



HINT: Use nails to assemble formwork for easier stripping. Position window bottom brace approx 150mm above the bottom to allow concrete to pass through the top of the blocks.

2) locate door formwork and brace it

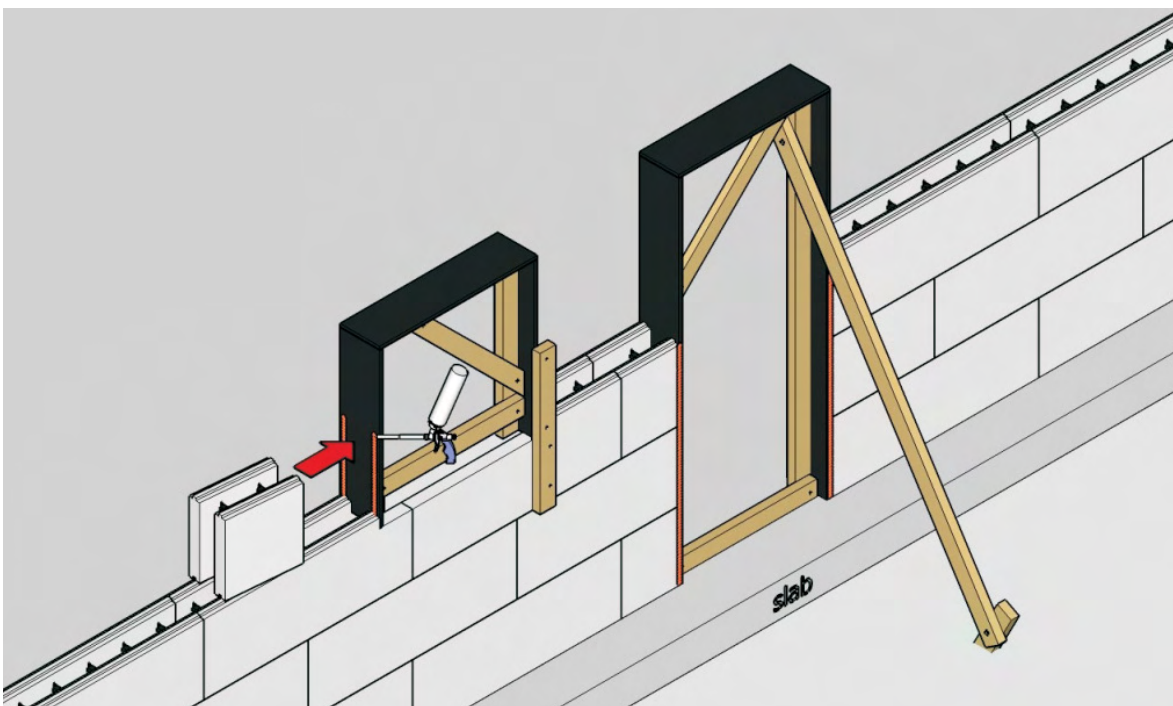
Locate the door formwork on slab, **plumb and square it**, then brace it so you can build the walls up to it.



3) builds walls to formwork & locate windows

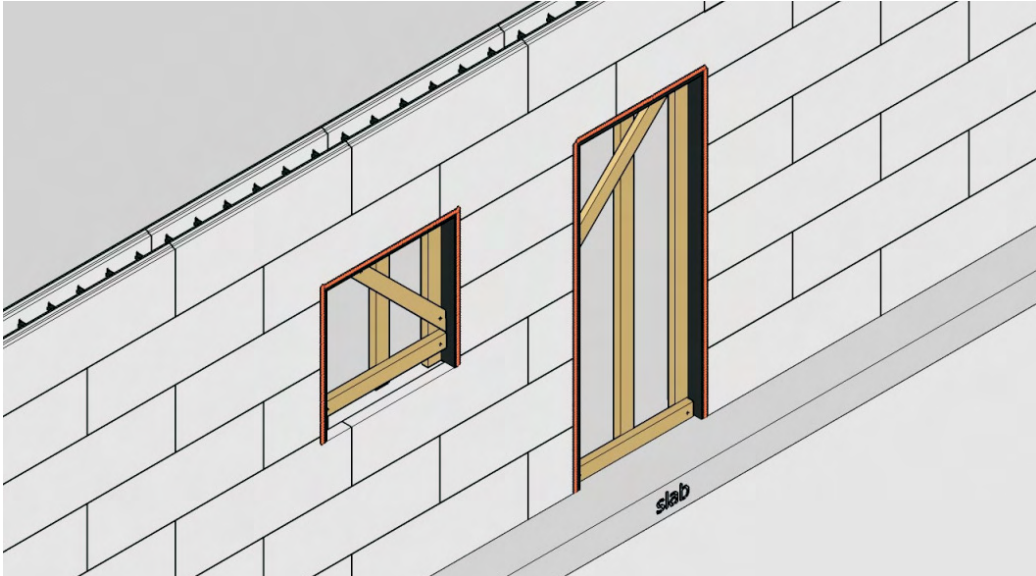
Glue blocks to the formwork with **expanding foam** as you build the walls. When the walls reach sill height locate the window formwork and glue it to the blocks with **expanding foam**.

HINT: If required (eg. on a windy day) window formwork can be temporarily held vertical with a piece of timber screwed to the formwork and the walls below.



4) prop formwork and remove bracing

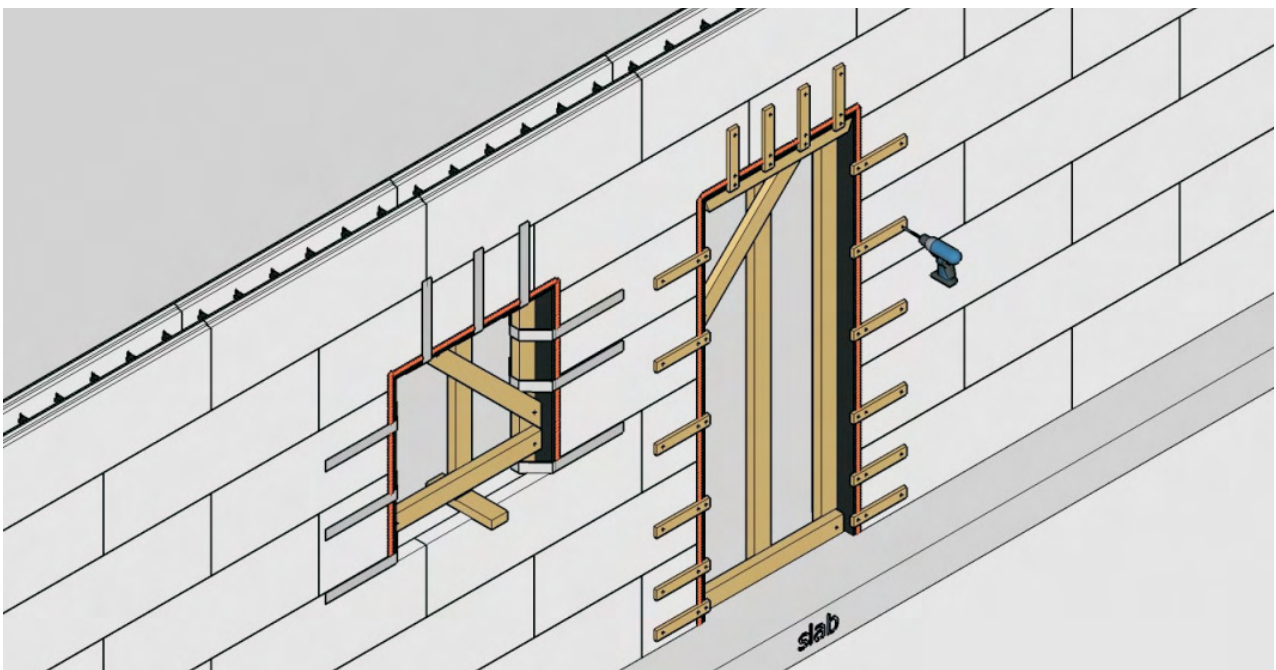
Remove temporary bracing and prop the heads every **600mm** min.



5) strap formwork

Strap formwork to walls with **fiberglass tape**, **steel strapping** or **plywood** on every block.

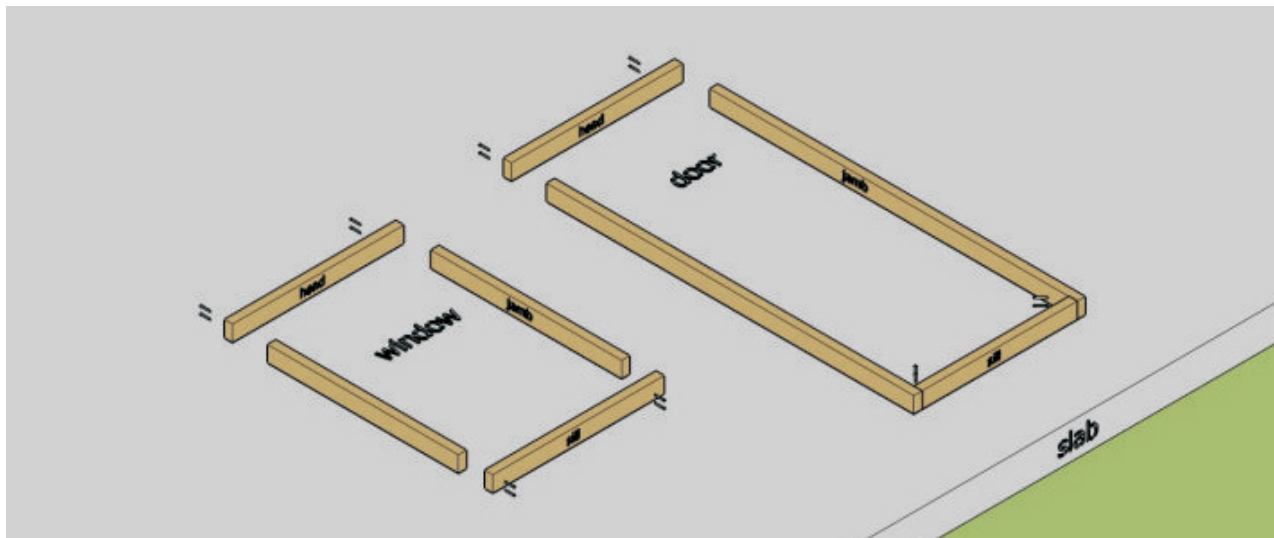
Use **two rows** of strapping on the bottom blocks. Strapping must be long enough to reach at least **2 webs** along each block or approx 500mm.



METHOD 2

1) construct timber formwork frames

Use **90 x 45mm** timber



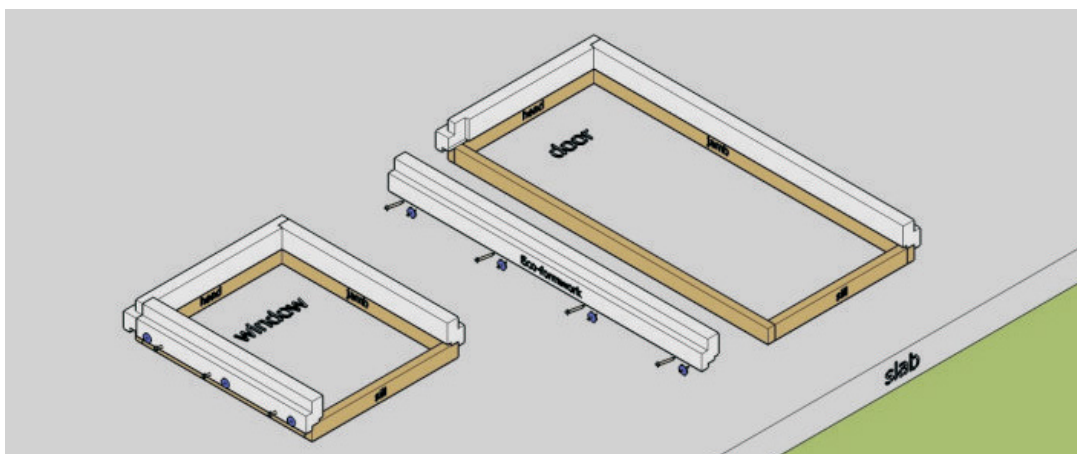
HINT: Screw fix doors sills from the inside for easy removal after concrete placement.

2) attach eco-formwork to timber frame

Fix Eco-formwork to timber frame with **6g x 65mm (min) screws** and **flat plastic washers** at approx 600mm centres along head and jambs but not the sill.

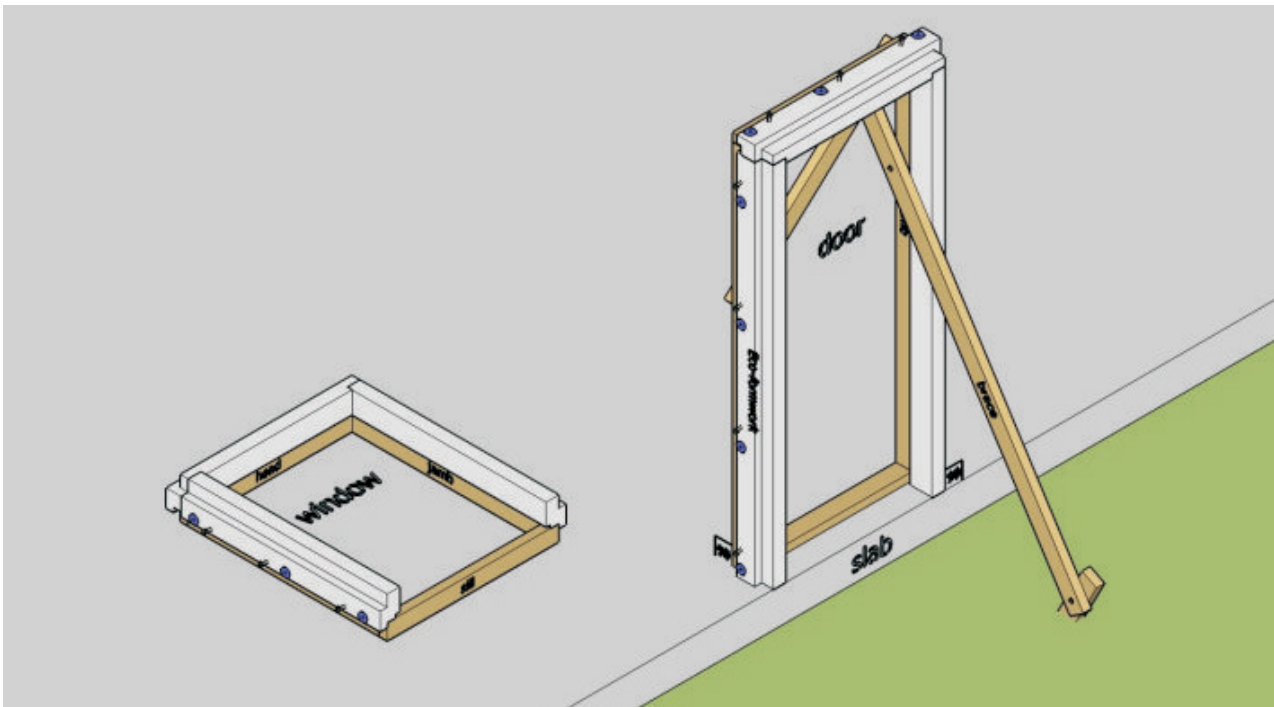
Fix **125mm (min) galvanised batten screws** through the Eco-formwork into the timber at approx 600mm centres.

These will hold the timber frame to the concrete. Do not screw them all the way in! The head **MUST** stick out into the concrete cavity.



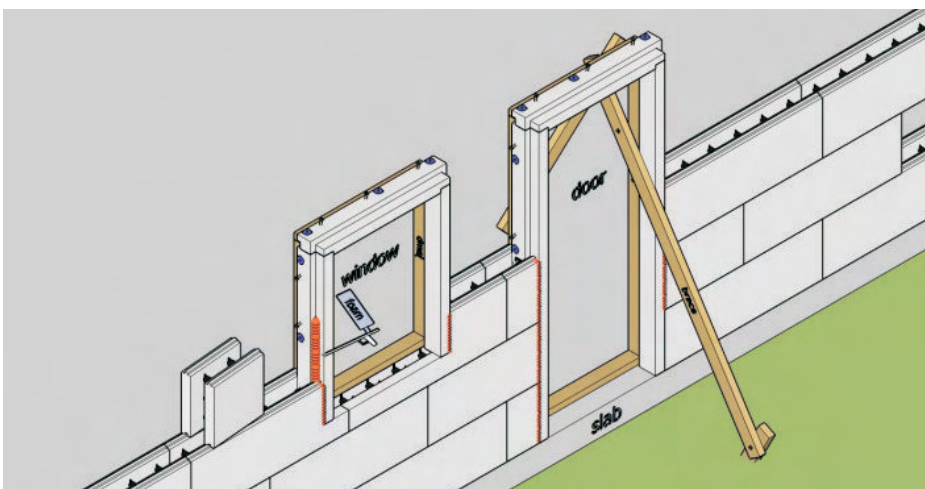
3) locate door formwork and brace it

Locate the door Eco-formwork on slab, **plumb and square it**, then brace it so you can build the walls up to it.



4) build walls to formwork and locate window

Glue blocks to the Eco-formwork with expanding foam as you build the walls. When the walls are to sill height, locate the window formwork and glue it to the blocks with expanding foam.



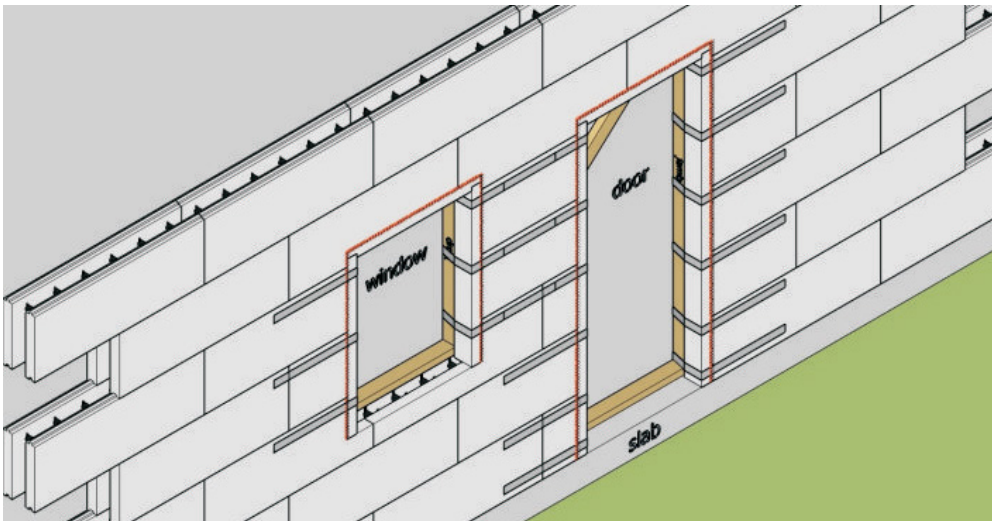
HINT: If required (eg. on a windy day) window formwork can be temporarily held vertical with a piece of timber, screwed to the formwork and the walls below.

5) remove bracing and strap formwork

Strap formwork to walls with **fibreglass tape** or steel strapping on every block.

Use two rows of strapping on the bottom blocks.

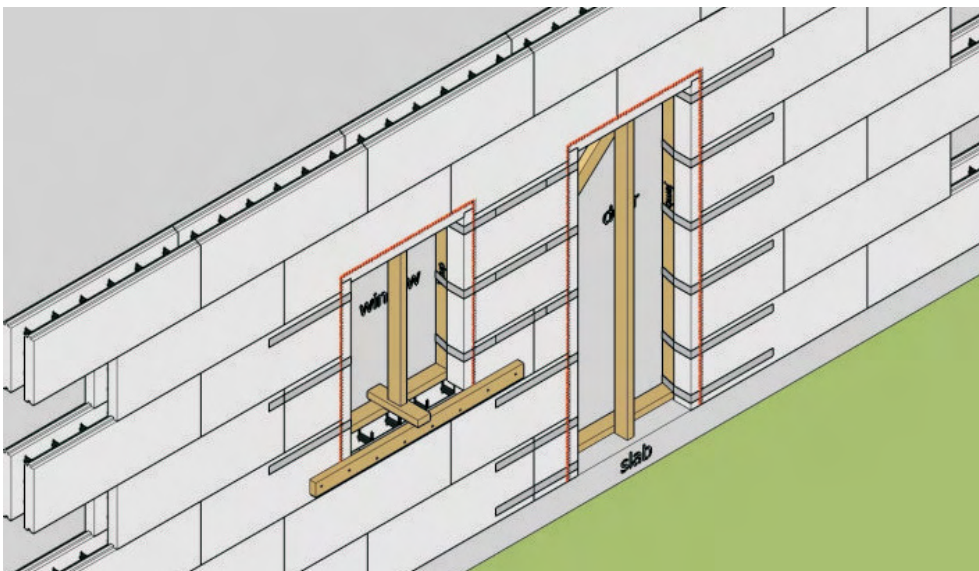
Strapping must be long enough to reach at least **2 webs** along each block or approx 500mm.

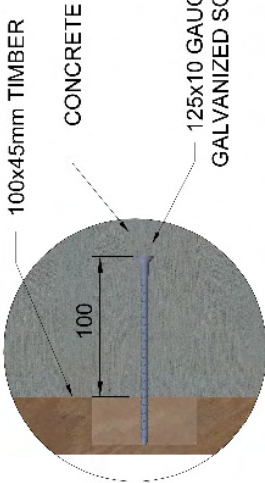
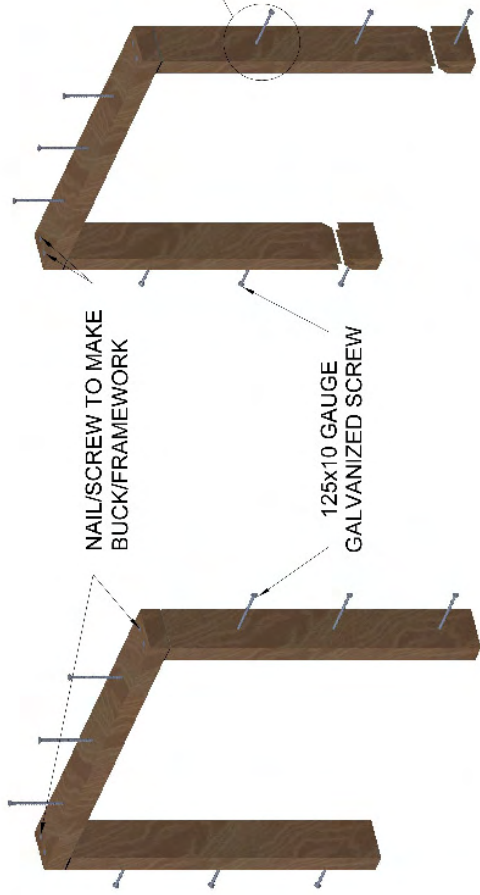


6) form window sills and shore lintels

Form window sills to desired shape.

Shore lintels with a full width **head plate** and vertical props at 600mm centres.





SCREW INTO THE TIMBER APPROX. 25mm WITH 100mm OF THE HEAD OUT FOR THE CONCRETE TO MOULD AROUND THE SCREW.

READY WINDOW BUCK TO INSTALL

READY DOOR BUCK TO INSTALL

NOTE:

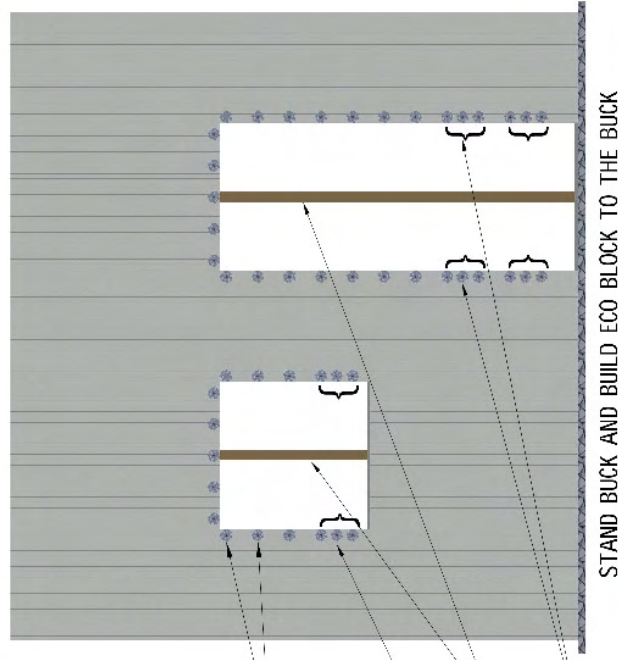
- 1) USE 100x45mm PINE N3 GRADE
- 2) SUPPORT BUCK PRIOR TO CONCRETE PLACEMENT.
- 3) CUT TIMBER INTO LENGTH TO FIT DOOR/WINDOW OPENING
- 4) NAIL/SCREW TIMBER TOGETHER TO MAKE BUCK FRAMEWORK.
- 5) SCREW A MINIMUM OF 3 (THREE) 125x10g GALVANIZED SCREWS TO RUN DOWN THE SIDE/HEADER OF THE BUCK.

EPS WASHER WITH 100MM X 10 GAUGE SCREW EVERY 150MM OR THREE PER BLOCK

THREE BUTTON BLOCKS

TEMPORARY SUPPORT

THREE BUTTON BLOCKS (2 BLOCKS)



ECO-Block, Pty Ltd

INSULATING CONCRETE FORMS
"... SAVING AUSTRALIAN ENERGY"™

34 Gracemere St.
Newmarket QLD 4051
www.eco-blockaustralia.com.au

DATE: 4/2017

SCALE: NTS

REVISION: -

DRAWING NUMBER:

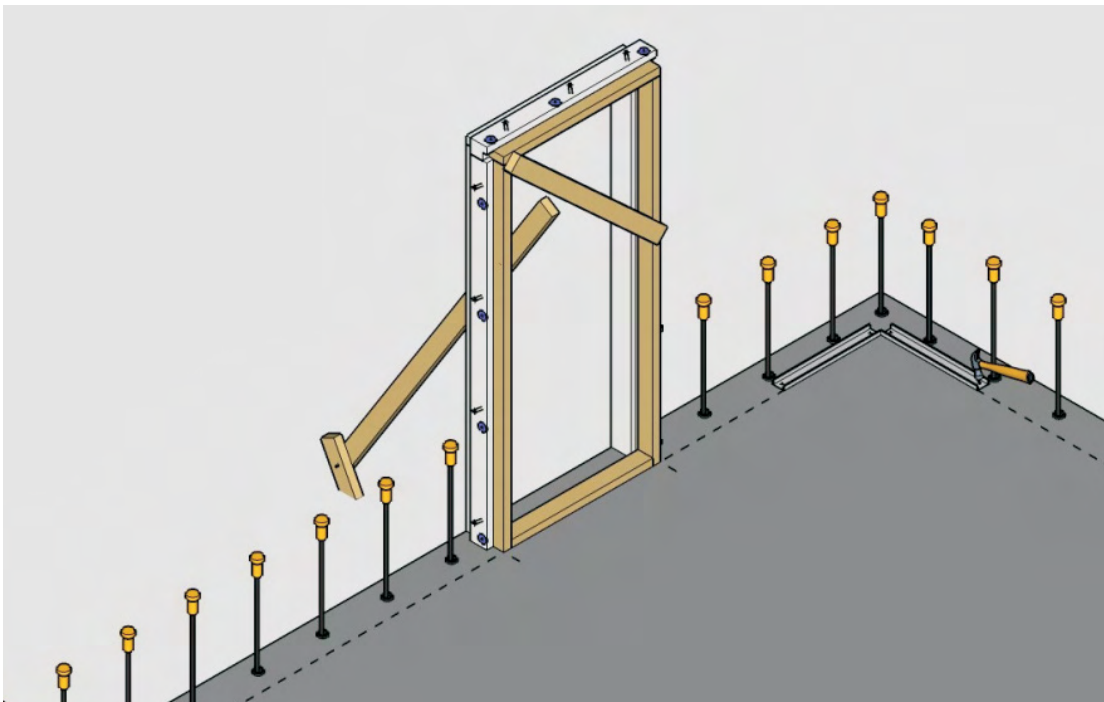
M-20-1003

MAKEUP TIMBER FRAMEWORK FOR WINDOWS AND DOORS
PERMANENT/STAY-IN PLACE
230 SERIES BLOCK

6. Formwork can be pre-built and delivered to site. Having the formwork ready and available will ensure a faster and accurate installation.
7. Assemble the Eco Block and stack on their side as per the example below. Stacking on their side protects the forms from being blown over or away by strong winds.
8. Start by placing the Eco Block corner blocks first (left or right) into the "C" channel.
9. Place corners first.
10. Work from each corner to the center of each wall.

HOW TO STAND FORMWORK BUCKS

Stand formwork in place. Fix Base channel to concrete at inside of all the corners.



HINT: Temporarily screw the forwork to the slab so it doesn't move while te walls are being built.

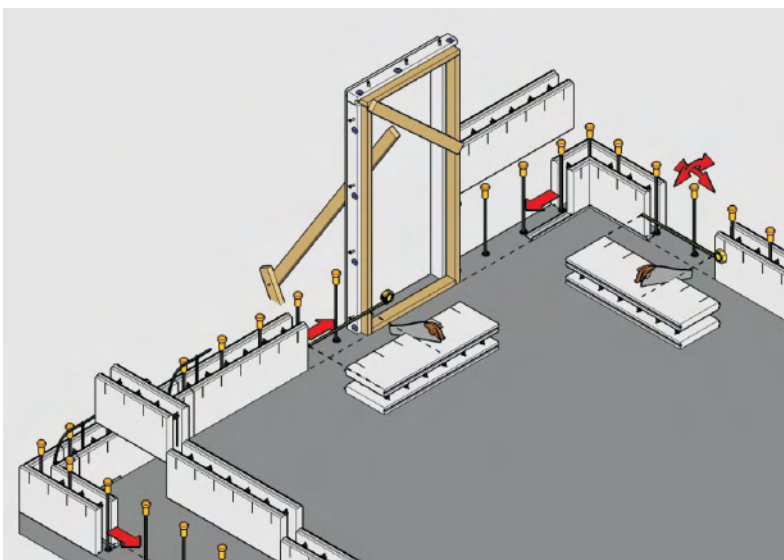
11. From the corner blocks, begin to place straight blocks and join each Eco Block Formwork tightly together with a wire tie or a plastic zip tie.



LAY FIRST ROW OF BLOCKS AFTER PLACING CORNERS

Starting with the corner blocks, lay the first row. Cut blocks to align the cut ends with openings and wall ends where possible. Otherwise make a staggered joint in the middle of a wall.

IMPORTANT: Zip-ties or wire the bottom row of blocks together.



HINTS: The starter bars may need adjusting. A piece of metal pipe is handy for this. When cutting blocks, don't make them too tight to fit. Leave a little space for foaming later.

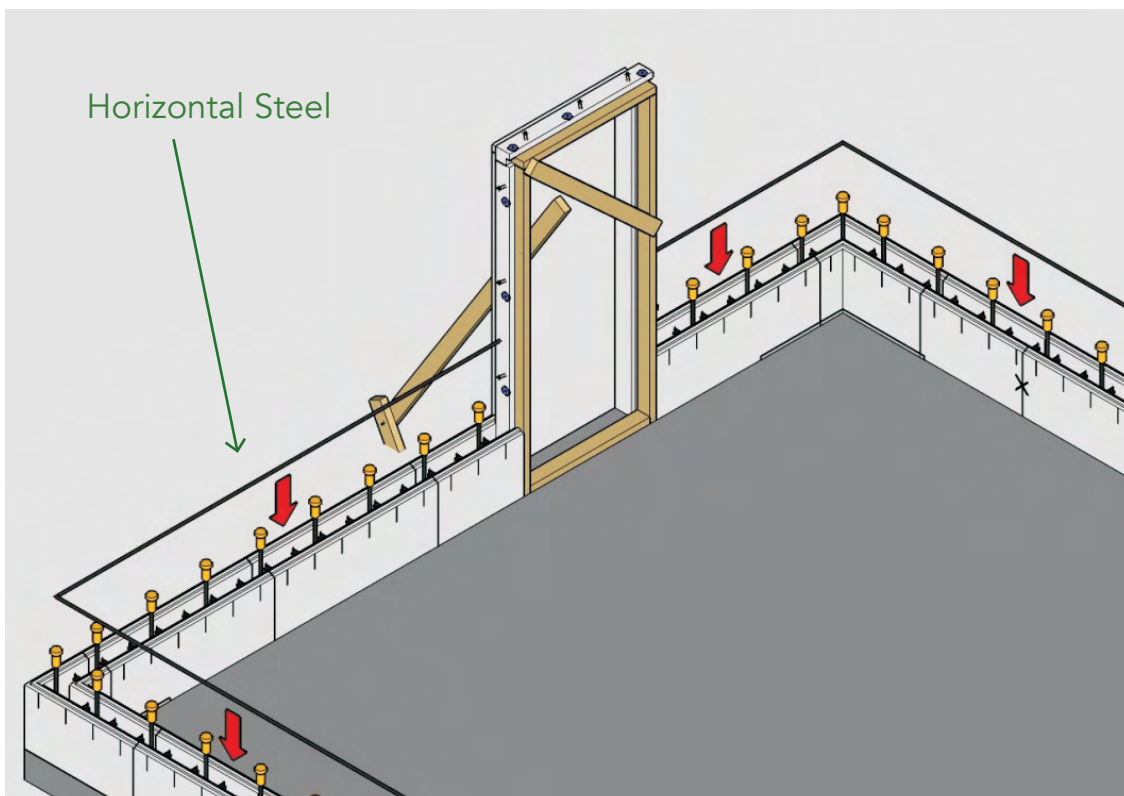
12. Once the first row is complete, install horizontal rebar as per engineering specification.

PLACE HORIZONTAL STEEL

Place the horizontal steel if and as specified by your engineer.

Tie the steel to at least one connector on every block using zip-ties or wire.

IMPORTANT: Observe the position of the horizontal steel as specified by your engineer.



HINT: mark every cut joint with a marker pen to find them easily when foaming later.

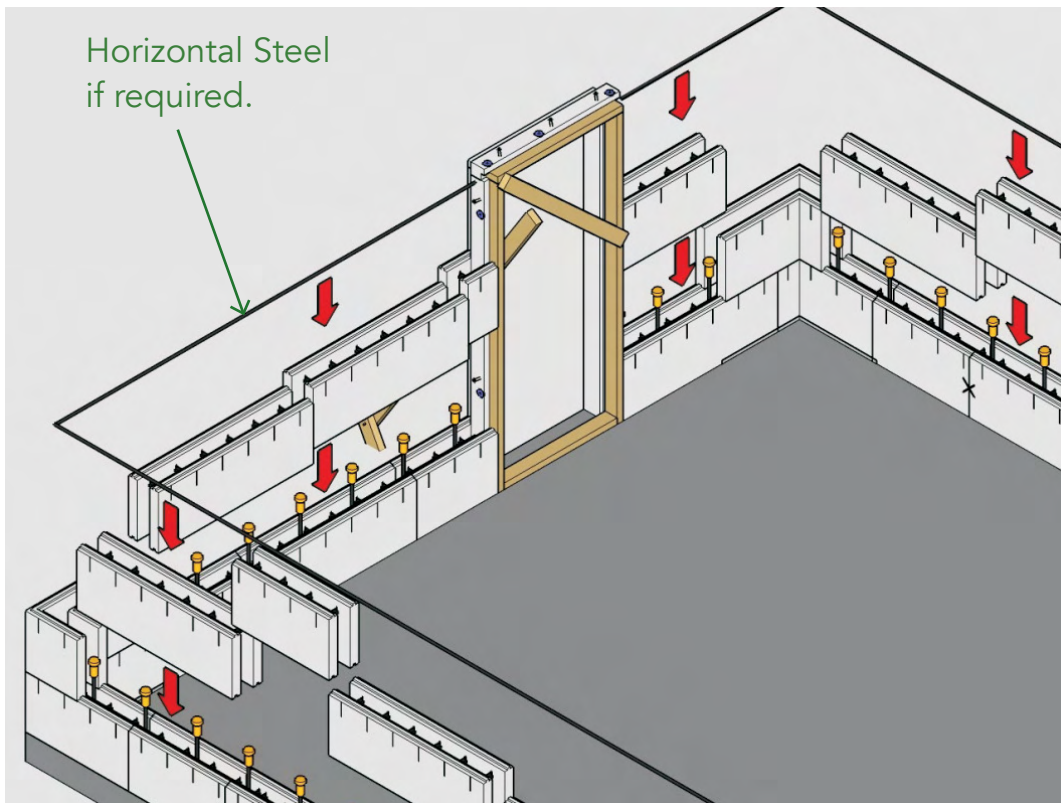
13. Contact your Engineer if you are unsure how and how often you need to place horizontal rebar.

9) Install: Second Course

1. Start row 2 at the same corners that you started with row 1, alternate the corner block you began with on row one on row two. (They should be in pairs one left and one right to stagger the joints)

LAY SECOND ROW OF BLOCKS AND PLACE STEEL

Start from the corner using opposite handed corner blocks to the ones below. Work your way towards the openings, ends or joints. Place horizontal steel. Tie it to each block with zip-ties or wire.



2. Then place the panels in line with the corner block, the webs should line up.
3. Once the second row is complete, install the horizontal rebar as per plan or engineers report.
4. Check the top of the second course to confirm level footings. Shim and trim to level as needed.

10) Adjust Heights and Levels walls

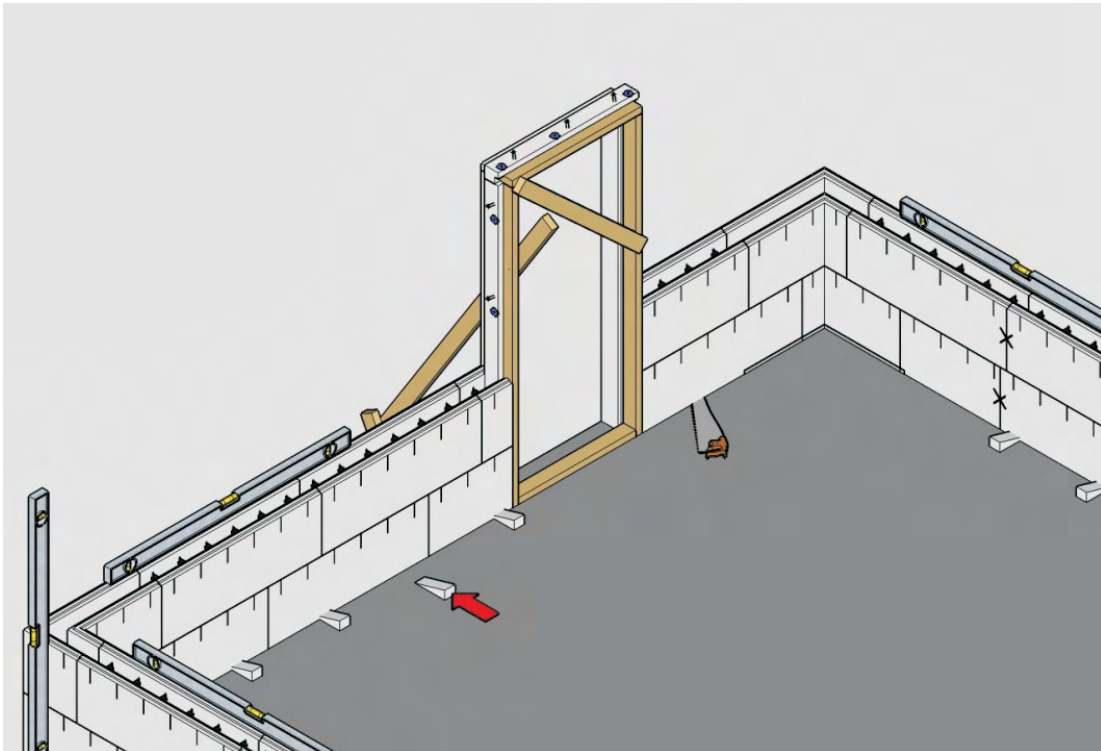
1. When you have finished the second course and the rebar placed, it is time to adjust the wall if the footing is not level. If it is accurate and level, that's great!
2. **TOO HIGH** – trim the bottom of the first-course block with a keyhole saw and fill the void with low expansion foam adhesive
3. **TOO LOW**
 - 1) Cut EPS wedges/shims from scrap block and use to level wall. Use low expansion foam to fill voids
 - 2) Use an EPS shim on the opposite side
 - 3) Use low expansion foam adhesive to fill voids
 - 4) **NOTE:** USE LOW EXPANSION FOAM. ADHESIVE FOR VOIDS UNDER FORMS. As this prevents concrete from leaking during the pour.

LEVEL WALL

No slab or footing is perfectly level. Check wall for level.

Pack under wall with wedges where required to raise.

Shave under wall with an old saw if required to drop a little. Not too much. It's easier to pack up than shave down.



HINT: ECO_Block off cuts make good wedges.

6) Remember that course 1,3,5,7 and courses 2,4,6,8 are all the same pattern for stacking. Once you have the first two courses stacked, this becomes the blueprint for each level.

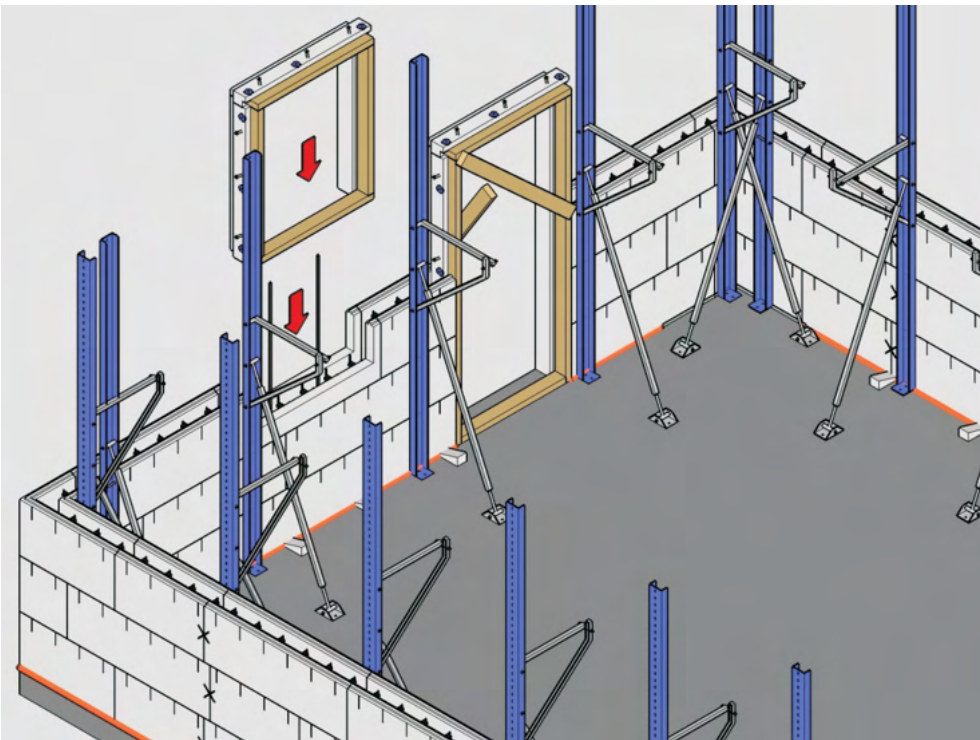
11) Install Windows & Door Formwork

1. Measure the bottom from floor level to bottom of window opening.
2. Cut the block to accept the formwork
3. Install horizontal rebar into space under the formwork (If required)
4. Build window formwork with access points at the bottom of window to allow for concrete to be placed through the formwork into the wall.
5. Secure window and door formwork (Refer Illustrations 2, a, b and c above).

CONTINUE BUILDING & PLACE FORMWORK FOR WINDOWS & DOORS

Cut blocks to receive window bucks.

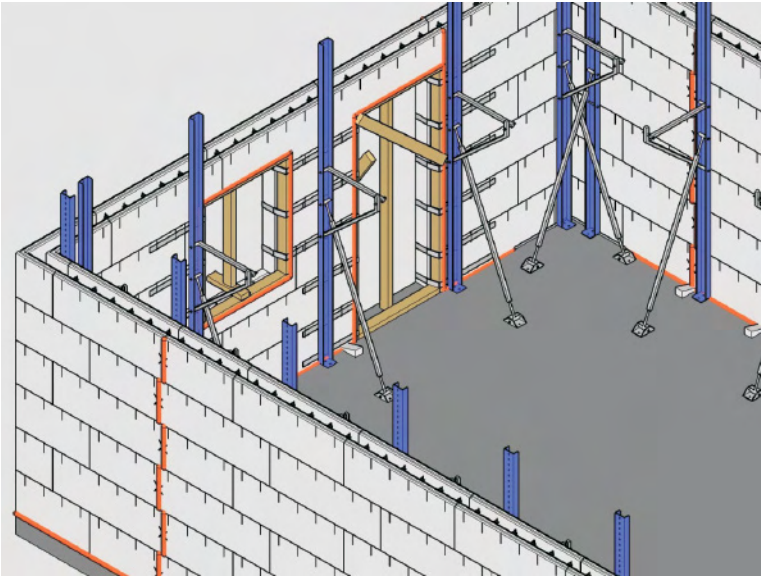
Place steel in walls before you place the bucks!



HINT: If required, (eg. on a windy day) window formwork can be temporarily held vertical with a piece of timber, screwed to the formwork and the walls below.

STRAP AND PROP OPENINGS

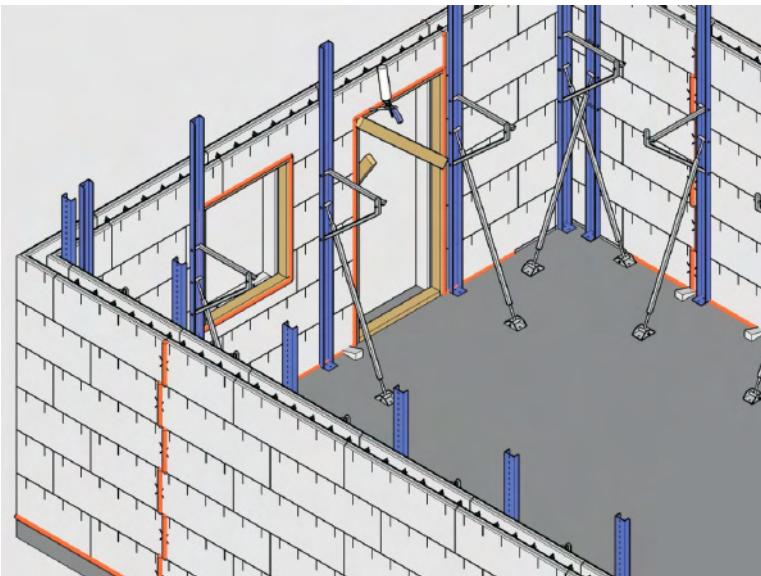
Strap formwork to walls with fibreglass tape, steel strapping or plywood on **every block**.



IMPORTANT: Prop all lintels every **1000mm** minimum.

FOAM ALL CUT JOIN OPENINGS

Foam all cut joints and around window and door opening.



IMPORTANT: This step is critical as it stops leaks and strengthens the joints.



Formwork doors and windows secure

12) Install brace and scaffold after the 2nd or 3rd course.

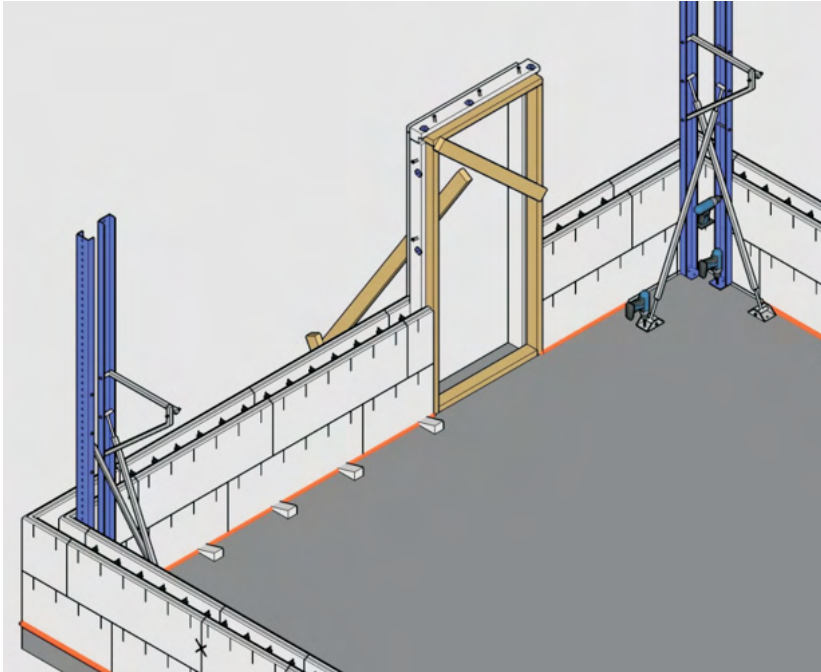
- 1. When laying the bracing out ready to install, keep in mind how it will need to support scaffold planks safely.**
- 2. On each inside corner, you should have at least one brace. Approx.400 off the corner / lining up with webs**
- 3. Attach strong backs to the wall using #10 gauge screws through the slots' top into the webs, one screw to each row of Eco Blocks. Keep the screws loose enough to slide in the space. Do not use tapping screws. The strong backs should line up plumb with cut lines on the forms to ensure they will line up with top row webs.**
- 4. Attach one turnbuckle and scaffold bracket to each strong back and check to ensure that it is high enough to support the concrete placement. If not, try another set of holes in the strong back.**
- 5. Install all turnbuckles at the same height.**
- 6. Attach the diagonal brace and turnbuckles to ground slab or floor (not less than 45 degrees, extend the brace if needed)**
- 7. Install all scaffold brackets.**
- 8. Place planking and secure in place.**
- 9. Install guard rails as required, sign hazards at head height to prevent accidents**

INSTALL CORNER BRACE

Place two braces in each corner of the walls.

Make sure they are located so the props don't clash and can be adjusted easily.

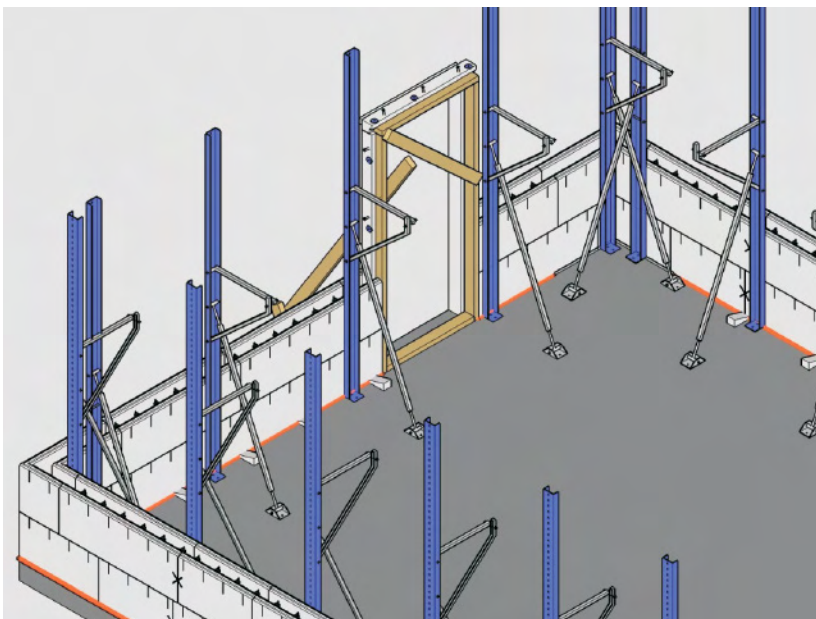
Screw them to every block and the concrete.



HINT: Concrete screw-bolts are re-usable. Hex head screws are easier for fixing the braces to the blocks than Phillips or slotted heads.

INSTALL REMAINING BRACE

Install 1 brace approximately every **1200mm** or every block. Place braces close to openings and over big lintels.



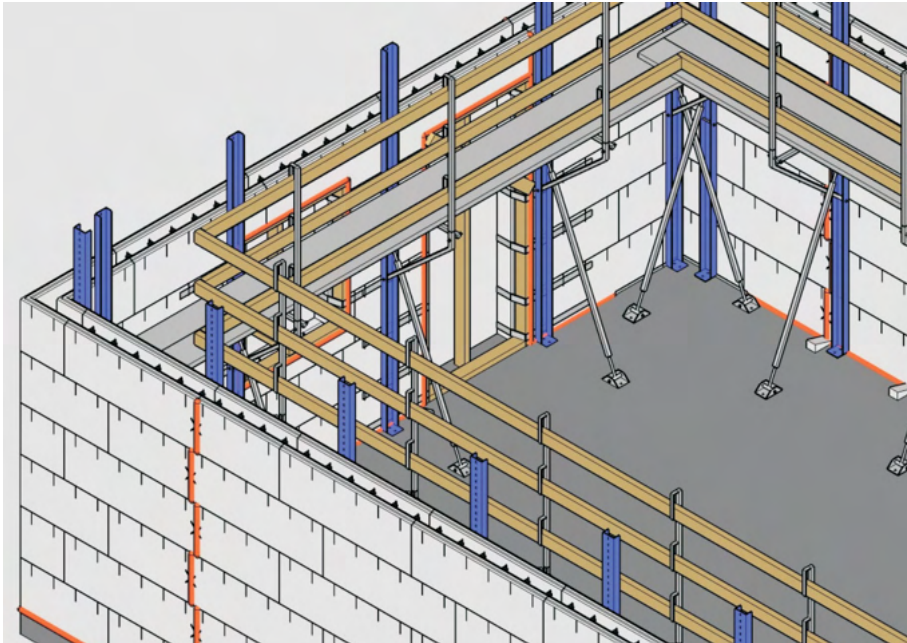
BUILD WORK PLATFORM AND EDGE PROTECTION

Place planks on braces.

Insert handrail posts.

Insert handrails.

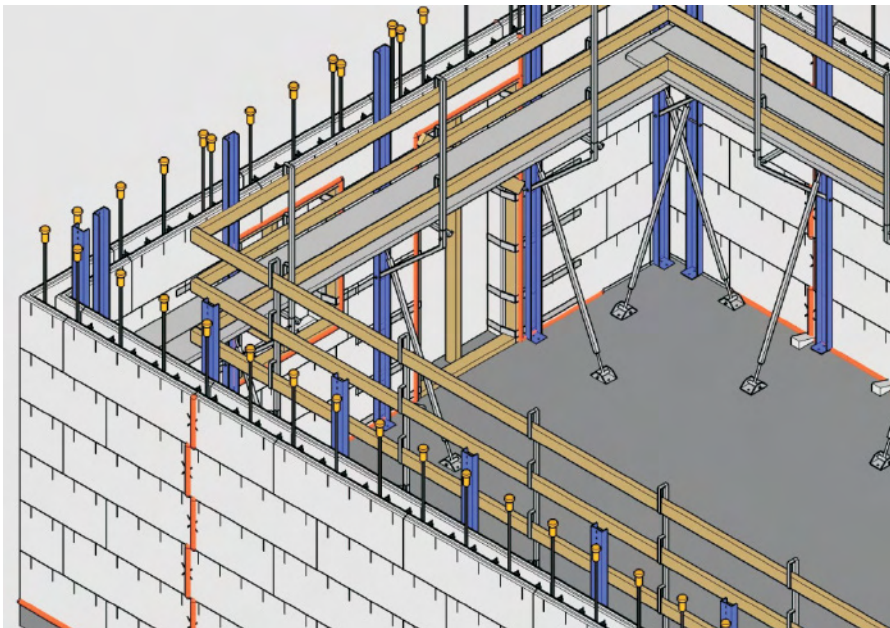
Work safely.



PLACE VERTICAL STEEL REINFORCING.

Place vertical steel reinforcing as specified by your engineer.

Place it in the rings over the starter bars.



Eco Block wall brace system with scaffold.

An example boxing for windows, doors etc.



13) Install and Brace T-Walls

Every course of the "T" wall must have a continuous horizontal 1-meter length of rebar at the proposed Tee. Insert pre-bent 90-degree rebar is required for each course.

- 1. Complete the first course of the "T" continuous wall.**
- 2. Use a felt-tip marker to mark the through-wall where the Tee wall will butt against it.**
- 3. Remove the foam from the "T" wall where the Tee intersects but only to the concrete core's thickness and then butt the Tee's first course up against the wall.**
- 4. Tie the first Tee wall web to the rebar in the "T wall" using a zip tie or a wire tie.**

Additional exterior support with ply and braces should be installed as required on every course including on the exterior as in the example

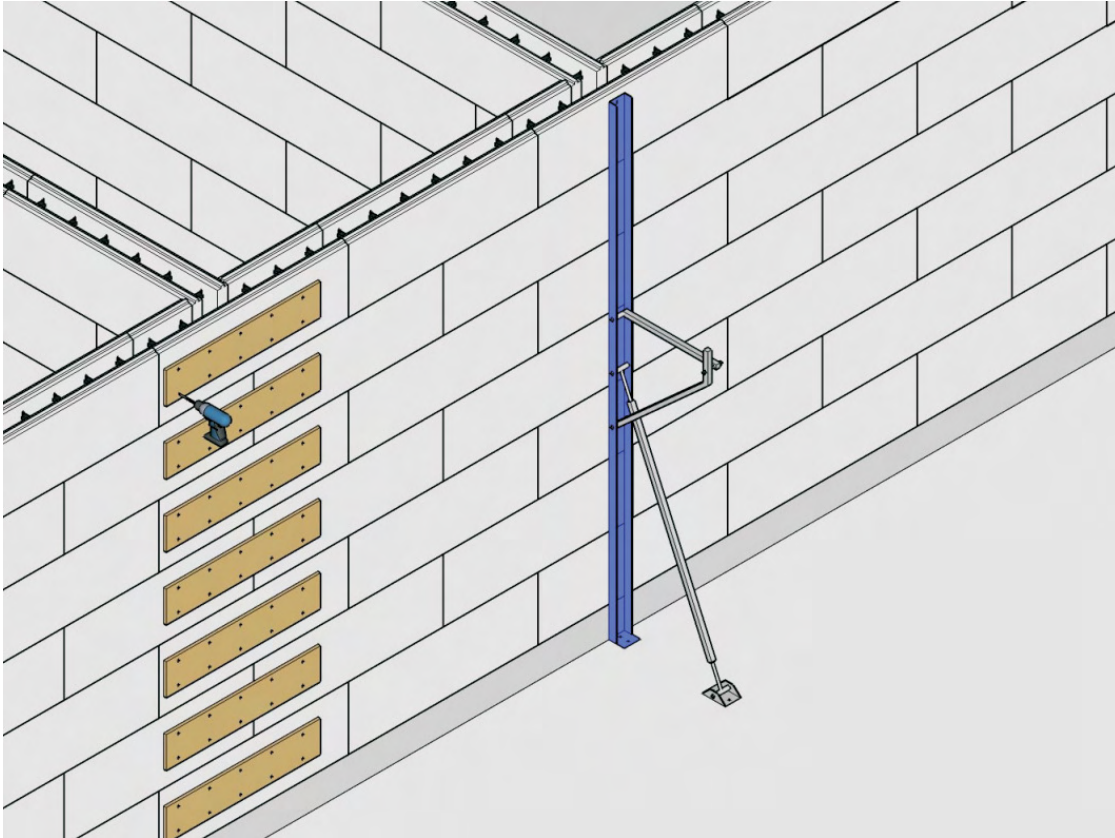
Continue to build the wall following these steps on every course.

Checked the walls for plumb and square, apply foam adhesive to butt joint.

(Refer T – Wall detail on page 44)

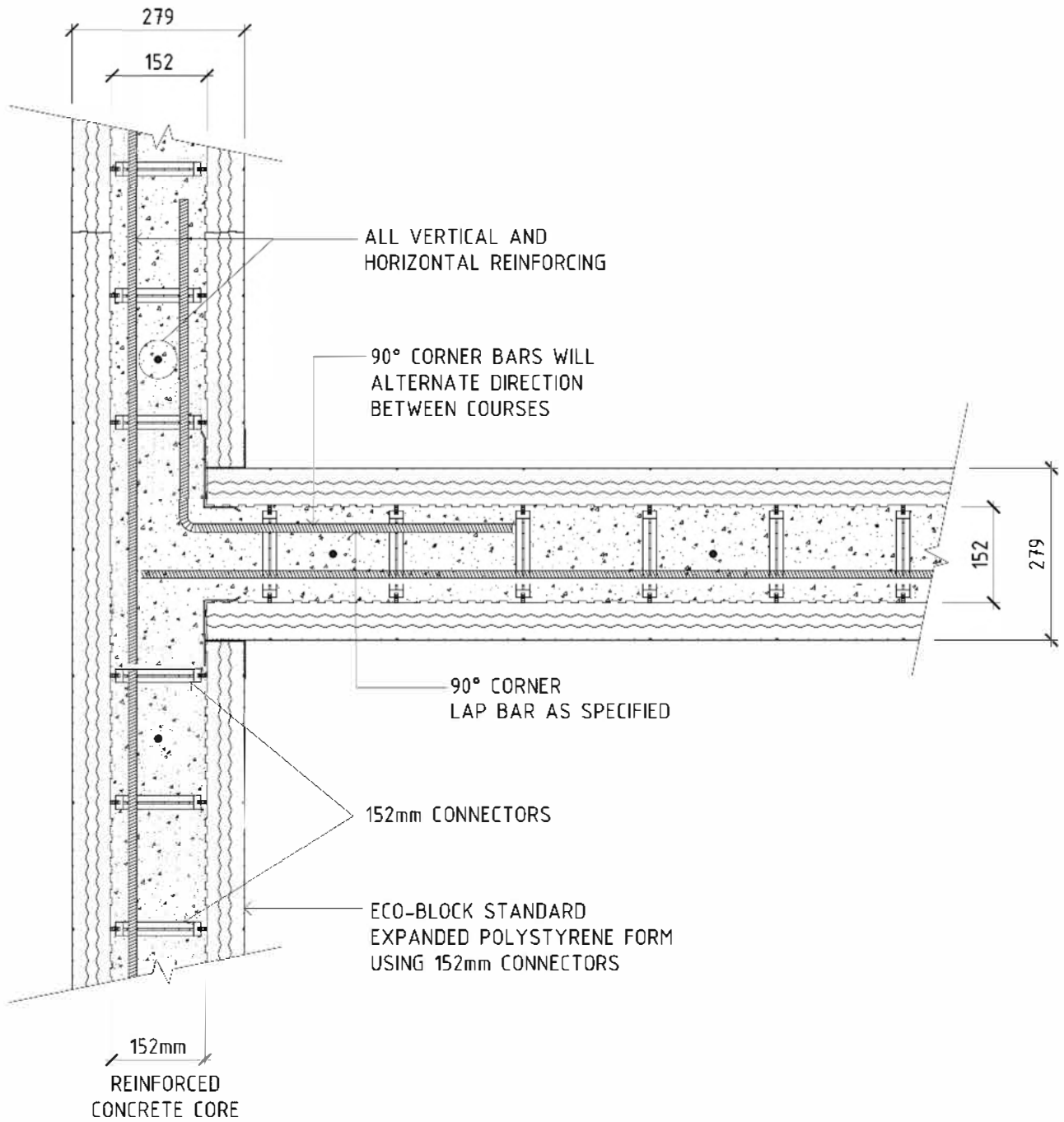
"T" WALL BRACING

Brace all "T" Walls with plywood on every block, screwed to every web, spanning min 2 webs either side of "T" or use a wall brace.



Strong back used to secure T Wall





NOTE:
 IT IS THE RESPONSIBILITY OF THE DESIGNER / END USER TO VERIFY THAT STRUCTURES BUILT WITH ECO-BLOCK HAVE BEEN DESIGNED, ENGINEERED, AND CONSTRUCTED IN ACCORDANCE WITH ALL APPLICABLE BUILDING CODES AND REGULATIONS

DIMENSIONS SHOWN ARE IN MILIMETERS (mm)

ECO-Block, Pty Ltd
 INSULATING CONCRETE FORMS
 "... SAVING AUSTRALIAN ENERGY "™



34 Gracemere St.
 Newmarket QLD 4051
www.eco-blockaustralia.com.au

**TEE WALL
 INTERSECTION
 152mm CORE**

DATE: 5/2009
SCALE: 1:10
REVISION: 1
DRAWING NUMBER: M-10-0021

14) Wall Inserts

Penetrations for utilities installed after the full wall height has been built and before the concrete is poured. Generally, all wiring and plumbing are run inside the walls by cutting channels and embedding in the EPS. Refer to illustration six below.

Penetrations are required for the following;

- » Exterior electrical fittings
- » Exterior electrical outlets
- » Entrances or exits for high voltage electrical wiring
- » Low voltage wiring such as phone, NBN, alarm systems, gate controls etc
- » Dryer and Rangehood vents.
- » Air conditioning ducts.

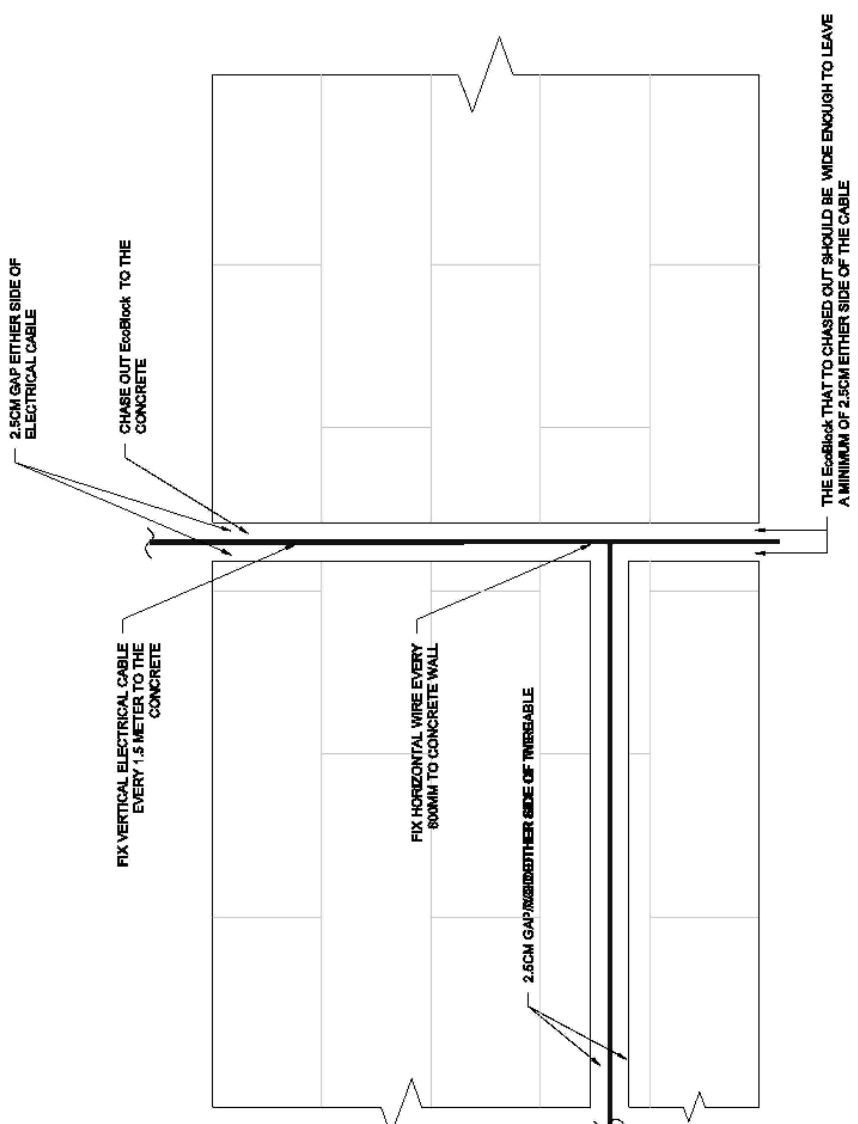
Use a length of PVC pipe longer than the width of the wall for easy placement. The diameter of the hole for the PVC pipe should be slightly larger than what will be placed through it, use a hole saw for this. Glue the tube in place using low expansion foam.

Fix a piece of temporary ply over the ends of the sleeve, by screwing into the webs in the blocks.

(Refer page 46 for more details)



Electrical box fitted in walls before the concrete pour.



NOTE:

1. CHASE OUT EcoBlock TO THE DEPTH OF CONCRETE.
2. CHASE OUT ENOUGH WIDTH TO ENSURE THERE IS A 2.5CM GAP BETWEEN THE ELECTRICAL WIRE AND EcoBlock ON BOTH SIDES.
3. FIX CABLES HORIZONTALLY (EVERY 600MM) SO THAT CABLE DOES NOT SAG OR SIT ON TO THE EPS.
4. USE CORRECT CABLE SIZE FOR THE:
 - a) LENGTH OF THE RUN
 - b) ELECTRICAL LOAD
 - c) ANTICIPATED CABLE TEMP.

ALTERNATIVELY

5. USE CONDUIT
6. CONSIDER USING MIGRATION RESISTANT CABLE

* IF STILL IN DOUBT SPEAK WITH YOUR SUPPLIER ABOUT THE CORRECT TYPE OF CABLE YOU SHOULD USE FOR THE JOB.

ELECTRICAL CABLE IN EcoBlock (EPS)

ECO-Block, Pty Ltd
 INSULATING CONCRETE FORMS
 "... SAVING AUSTRALIAN ENERGY "™
 34 Gracemere St.
 Newmarket QLD 4051
 www.eco-blockaustralia.com.au

ELECTRICAL CABLE IN ECOBLOCK

DATE:	12/2017
SCALE:	NTS
REVISION:	-
DRAWING NUMBER:	M-20-1006

15) Pre-placement checklist

Check off all of the details on this Pre Placement checklist before the commencement of the concrete placement into the wall cavity.

ITEM	DONE
Pre Placement checklist	
Does the layout match the plan everywhere?	
Is the walls plumb everywhere?	
Are the walls square?	
Do you have a concrete vibrator with a 2,5mm head ready to go?	
Have all the planks been secured to the brace? There must be enough planks to allow the boom pump operator to walk around the whole building without getting down. (This may not always be possible)	
Is all window/door formwork in place, level, plumb and square?	
Polystyrene formwork must all be glued in with low expansion foam, has it been checked?	
Is all window/door formwork diagonally braced against racking?	
Have all cuts and potential weak spots been reinforced? Use strips of form ply and screw to webs.	
Are all penetration sleeves in place and glued securely?	
Are all anchor bolts for interior walls fixed in place?	

ITEM	DONE
Are all vertical bars in position and tied securely?	
Are all beam pockets installed?	
Is the ledger or ledger connections (if any) in place and securely fastened?	
Do you have enough anchor bolts or straps on hand for the top of the wall?	
Do you have enough anchor bolts or straps on hand for the top of the wall?	
Have you planned out the anchor bolts' position or straps (if any) at the top of the wall? Have you marked the spots for the anchor bolts?	
Do you have enough squares of plywood or scrap 19mm form ply to screw over the wall to reinforce weak spots and bulges?	
Are all vertical bars in position?	
Are all lintels properly reinforced and propped from below?	
Has your Engineer inspected the wall and given his approval?	
Is the job site clean for the concrete truck's operation, pump (if any) and the crew that will be on the ground?	
Has the concrete been ordered and quantity verified?	
Has the pump (if any) been ordered?	
Is there adequate access for the pump truck and concrete truck?	
Check and make sure that there are no overhead power lines.	

16) Correct Concrete Mix Design

A common problem associated with concrete placement is an improper mix design. In general, people look at cost before quality when evaluating mix designs, without the understanding that a small extra charge in mix design can reduce your labour cost on-site. Working closely with your concrete supplier will result in a mix design that will work well.

ECO Block cannot provide this mix design because the concrete ingredients will vary from region to region throughout Australia. Still, it is not uncommon to see a proper mix design provide time/labor savings, and result in better walls with less concern for compaction.

17) What to look for in your mix design

Important

Wall concrete thickness of 101mm and 152mm

160 to 180 concrete slump

Wall concrete thickness of 203mm or greater

90 to 100 concrete slump. Use plasticizers to assist the mix to flow.

Using the ideal slump of concrete is the best way to ensure that your wall is free of voids. Tests conducted by the Portland Cement Association demonstrate that a 160 to 180 slump, 25 mpa and using an internal mechanical vibrator can be used to provide adequate compaction/consolidation (PCA R&D Serial No.2656).

Aggregate size of **ten millimeters or less is appropriate.**

18) Lintels

Due to the high rebar congestion in lintels, it is best to use internal vibration to ensure minimal voids in this sensitive area to get the best compaction.

19) Engineers Specification

You must follow the concrete specification as set by the Engineer.

20) Check, to ensure enough concrete mix has been calculated

CONCRETE VOLUME CALCULATION

When the wall is constructed and ready to pour, re-estimate the amount of concrete you need. Do not rely on the original estimate. The layout may have changed. A quick way to re-estimate the number of cubic meters of concrete needed is to count up the number of blocks in the wall and divide:

230 Series 100mm con core	Divide by 20	One cubic meter fills 20 blocks
280 Series 150mm con core	Divide by 14	One cubic meter fills 14 blocks
300 Series 200mm con core	Divide by 10	One cubic meter fills ten blocks

You can also use the Eco Block estimator on our website:

www.eco-blockaustralia.com.au to confirm your calculations Above-grade and below-grade pours require lifting equipment like a boom pump because of its easy maneuverability. Order your boom pump with a line reduction to 90mm hose and with two ninety-degree angles near the end (forming an "S") or a loop attachment as both of these slow down the flow of the concrete. Line pumps are smaller and often less expensive—order one of these with a 90mm line or less. You will need 1-2 workers on the ground during the pour to help move the line.

21) Internal Compaction and Correct Concrete Mix Design

All concrete placed in Eco Block formwork needs to be compacted. That is, it needs to fill every part of the wall to ensure there are no voids.

External vibration

Internal vibration

The two methods are acceptable with the appropriate concrete mix.

22) Concrete Placement

1. **Establish** your crew and give clear directions as to who is responsible for what;
 - » One person to place concrete (pump operator)
 - » Two people to consolidate concrete
 - » One or two people to level the wall
2. **Tell** the operator how many lifts you will be doing and what slump concrete you want. Lifts of 1 to 1.2 meters are moderate and allow 20 minutes per pour approx.
3. **Place** the concrete at least 400mm from a corner (never into a corner as it could move the wall). Flow the concrete through the corner.
4. **Create** a lift of concrete on either side of the corner before filling the corner—the lifts on either side of the corner act as an anchor holding the corner in place.
5. **Windows** filled from one side and let the concrete flow under the window formwork. Stop the pump and move to the opposite side of the window and continue. Some windows may require extra concrete placed into the opening at the bottom of the formwork

6. **Consolidate** concrete during each lift.
7. **Monitor** walls during and after concrete placement and then adjust turnbuckles to level the walls.
8. **Install** anchor bolts if required for roof truss fixing.
9. **Ensure** concrete placement at windows and doors is consolidated by hitting the formwork's face with a hammer or slap with a 100/50 piece of timber.
10. **Clean** all concrete off footings, slab, walls and tools.
11. **Before** you leave, check to ensure your walls are straight and plumb

23) Internal Vibrators and External Vibrators

Internal vibrators come in different shapes and sizes.

In most cases inserting your internal vibrator between every two webs will do an excellent job, but watch your mix. If the concrete begins to stiffen, you may need to vibrate every web internally.

Recommended Concrete Placement and Compaction as follows:

1. **Place the first lift of concrete (lifts can be anywhere from 1m to 1.2m)**
2. **Compact the first lift of concrete**
3. **Place the second lift of concrete**
4. **Consolidate second lift of concrete (insert an internal vibrator, so it breaks into the previous lift)**
5. **Repeat this process until the wall is complete**

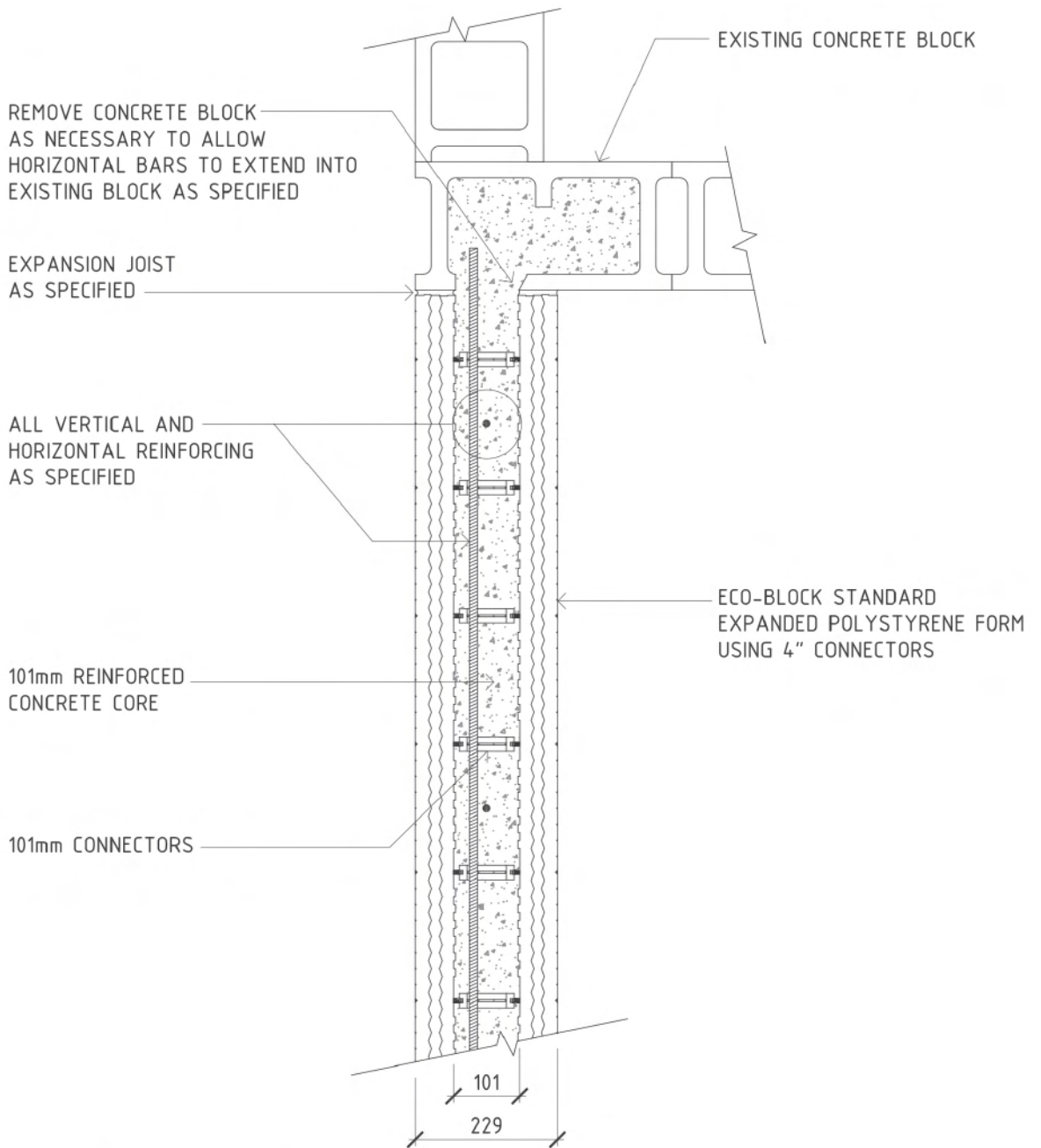
Remember, it is up to the person placing concrete to recognize when concrete is of a proper slump and at what height the lifts should be.

If, the Engineer or architect on the job specifies another mix design, follow their specifications.



- 6. Adjust the braces as you pour the concrete to ensure the wall is straight.**
- 7. When the concrete pour is finished, check the wall for plumb and adjust braces.**

25) Connect Eco Block to an existing block wall (Detail)



NOTE:
 IT IS THE RESPONSIBILITY OF THE DESIGNER / END USER TO VERIFY THAT STRUCTURES BUILT WITH ECO-BLOCK HAVE BEEN DESIGNED, ENGINEERED, AND CONSTRUCTED IN ACCORDANCE WITH ALL APPLICABLE BUILDING CODES AND REGULATIONS

ECO-Block, Pty Ltd

INSULATING CONCRETE FORMS
 "... SAVING AUSTRALIAN ENERGY "™



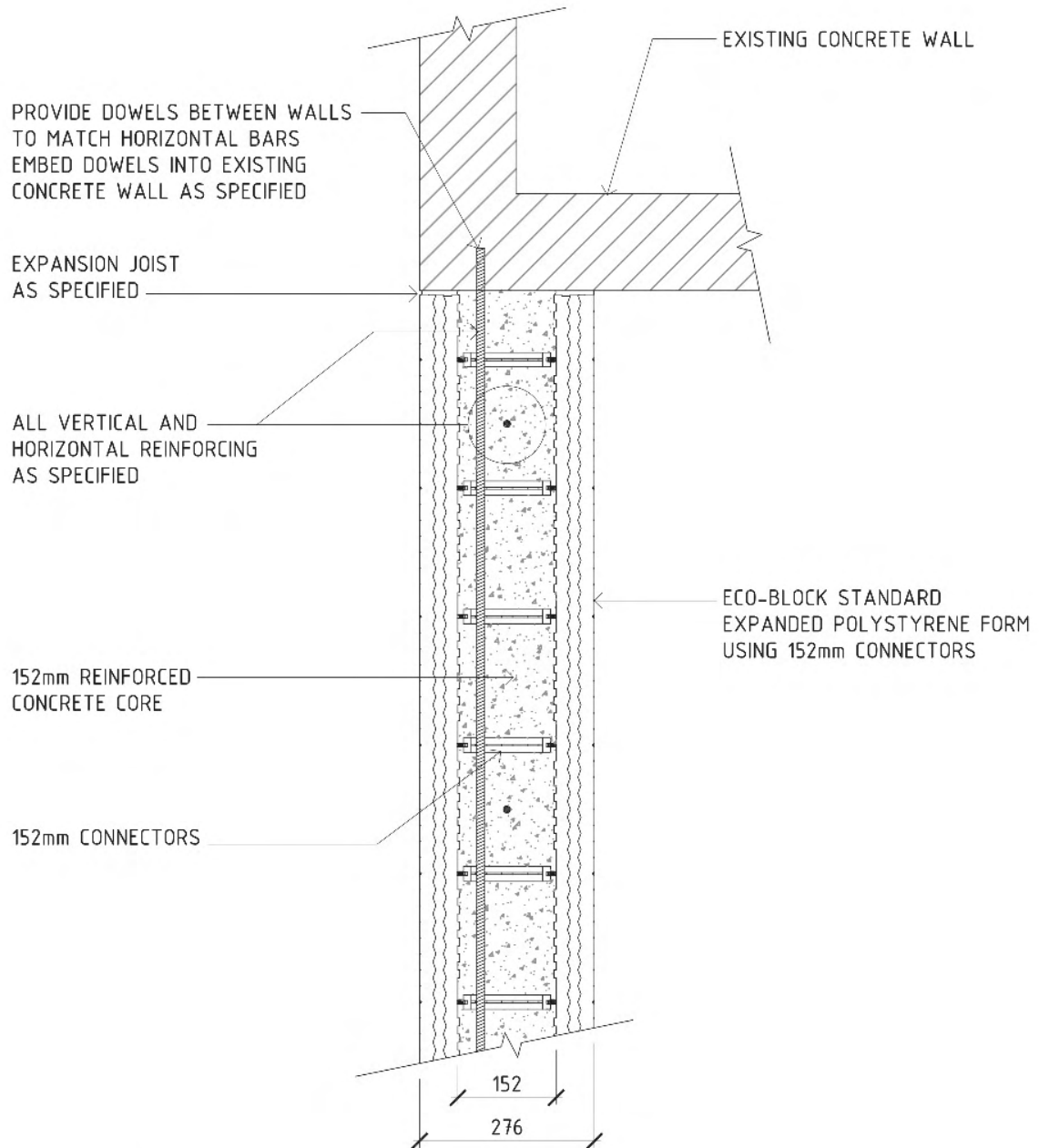
34 Gracemere St.
 Newmarket QLD 4051
www.eco-blockaustralia.com.au

ATTACHMENT TO EXISTING
 CONCRETE BLOCK WALL
 101mm FORM
 (ECO-Block 230 Series)

DATE: 5/2009
SCALE: 1:10
REVISION: 1
DRAWING NUMBER:

M-70-0005

26) Connect to an existing concrete wall (Detail)



NOTE:
IT IS THE RESPONSIBILITY OF THE DESIGNER / END USER TO VERIFY THAT STRUCTURES BUILT WITH ECO-BLOCK HAVE BEEN DESIGNED, ENGINEERED, AND CONSTRUCTED IN ACCORDANCE WITH ALL APPLICABLE BUILDING CODES AND REGULATIONS

ECO-Block, Pty Ltd

INSULATING CONCRETE FORMS
"... SAVING AUSTRALIAN ENERGY "™



34 Gracemere St.
Newmarket QLD 4051
www.eco-blockaustralia.com.au

ATTACHMENT TO EXISTING
CONCRETE WALL
152mm FORM PARAPET
(ECO-Block 280 Series)

DATE: 5/2009

SCALE: 1:10

REVISION: 1

DRAWING NUMBER:

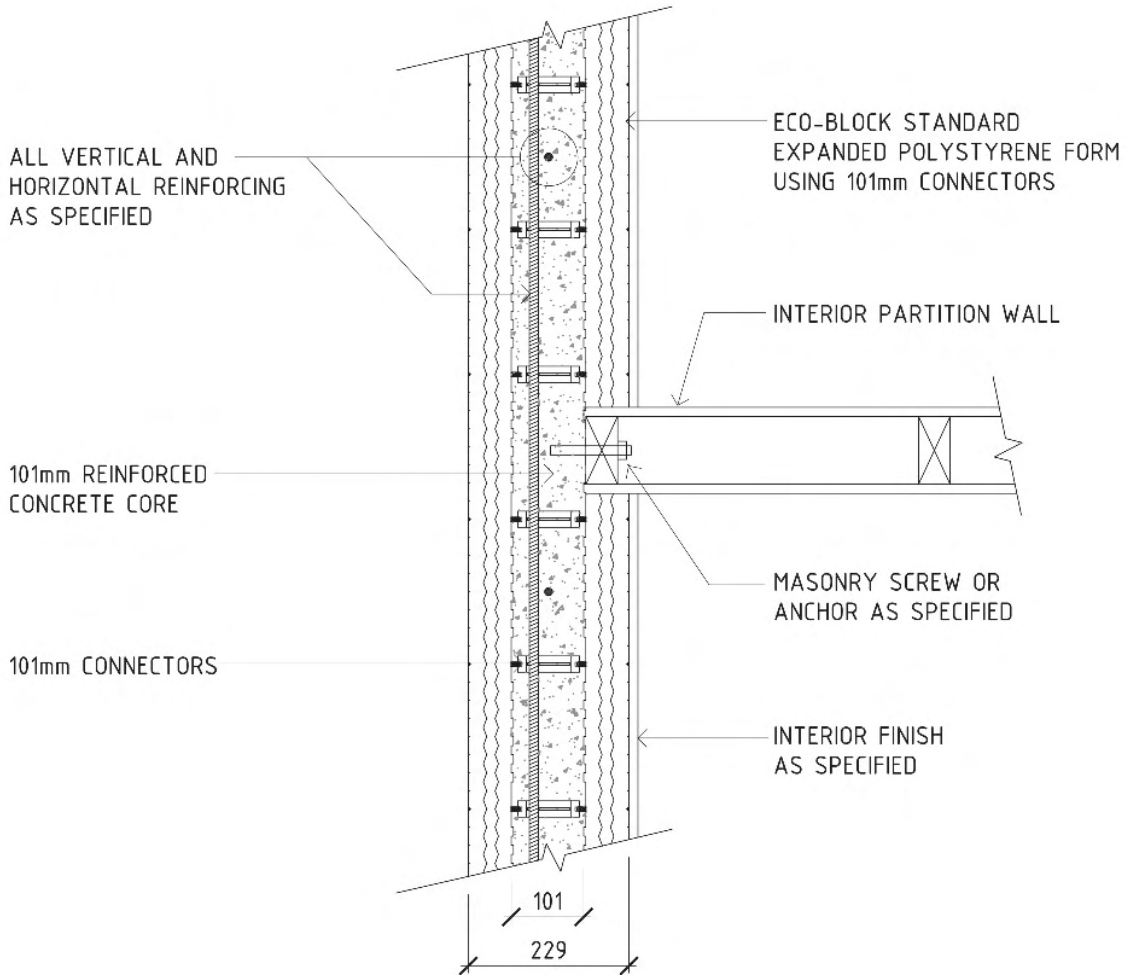
M-70-0002

27) Attach internal timber or steel frame partition walls (Detail)

Attaching interior frame walls to the interior Eco Block Formwork can be accomplished in many ways.

METHOD 1:

Before concrete placement, locate the interior walls. Insert the appropriate anchors through the foam and into the concrete core.



NOTE:
IT IS THE RESPONSIBILITY OF THE DESIGNER / END USER TO VERIFY THAT STRUCTURES BUILT WITH ECO-BLOCK HAVE BEEN DESIGNED, ENGINEERED, AND CONSTRUCTED IN ACCORDANCE WITH ALL APPLICABLE BUILDING CODES AND REGULATIONS

ECO-Block, Pty Ltd

INSULATING CONCRETE FORMS
"... SAVING AUSTRALIAN ENERGY "™



34 Gracemere St.
Newmarket QLD 4051
www.eco-blockaustralia.com.au

INTERIOR PARTITION
WALL CONNECTION
DIRECT TO CONCRETE
101mm FORMS
(ECO-Block 230 Series)

DATE: 5/2009

SCALE: 1:10

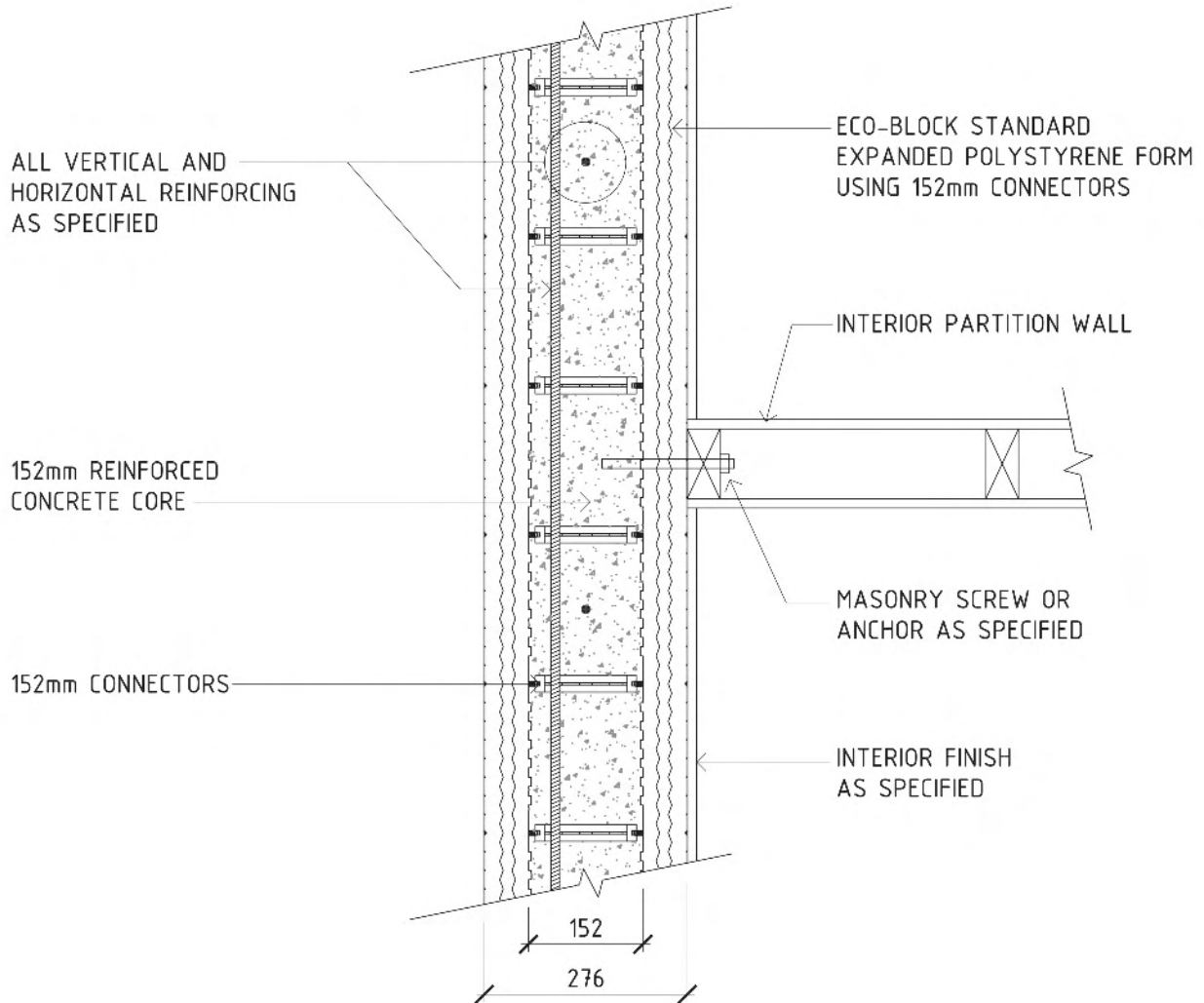
REVISION: 1

DRAWING NUMBER:

M-70-0018

METHOD 2:

If the interior walls fall in line with one batten located every 200mm centres, screw the stud to the web with a coarse thread screw.



NOTE:

IT IS THE RESPONSIBILITY OF THE DESIGNER / END USER TO VERIFY THAT STRUCTURES BUILT WITH ECO-BLOCK HAVE BEEN DESIGNED, ENGINEERED, AND CONSTRUCTED IN ACCORDANCE WITH ALL APPLICABLE BUILDING CODES AND REGULATIONS

ECO-Block, Pty Ltd

INSULATING CONCRETE FORMS
 "... SAVING AUSTRALIAN ENERGY "™



34 Gracemere St.
 Newmarket QLD 4051
www.eco-blockaustralia.com.au

**INTERIOR PARTITION
 WALL CONNECTION
 152mm FORMS
 (ECO-Block 280 Series)**

DATE: 5/2009

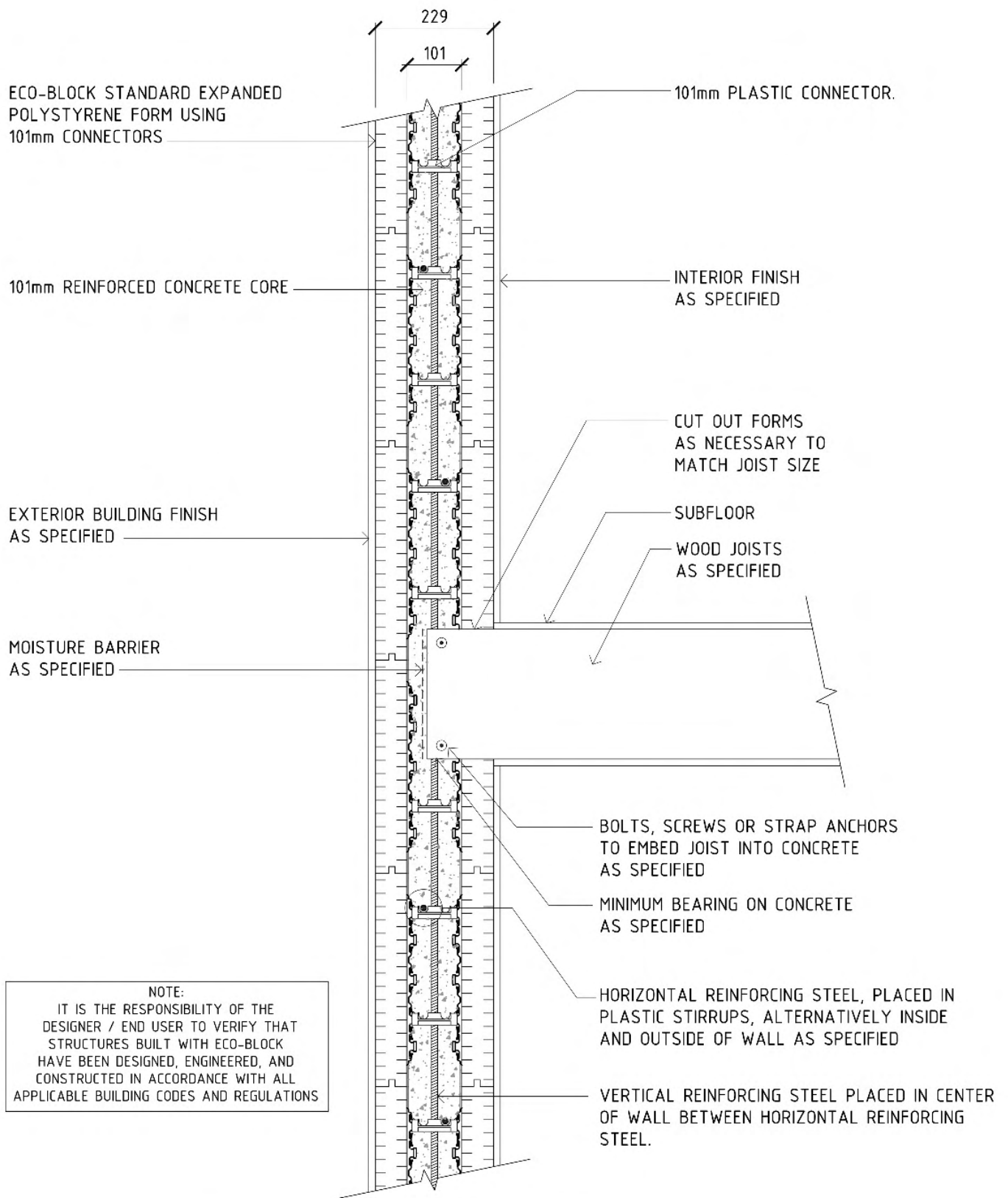
SCALE: 1:10

REVISION: 1

DRAWING NUMBER:

M-70-0019

28) Embedded joist connection timber joist



ECO-Block, Pty Ltd

INSULATING CONCRETE FORMS
"... SAVING AUSTRALIAN ENERGY "™



34 Gracemere St.
Newmarket QLD 4051
www.eco-blockaustralia.com.au

**EMBEDDED JOIST
CONNECTION, TIMBER JOIST
PERP. TO WALL - 101mm FORMS**

DATE: 5/2009

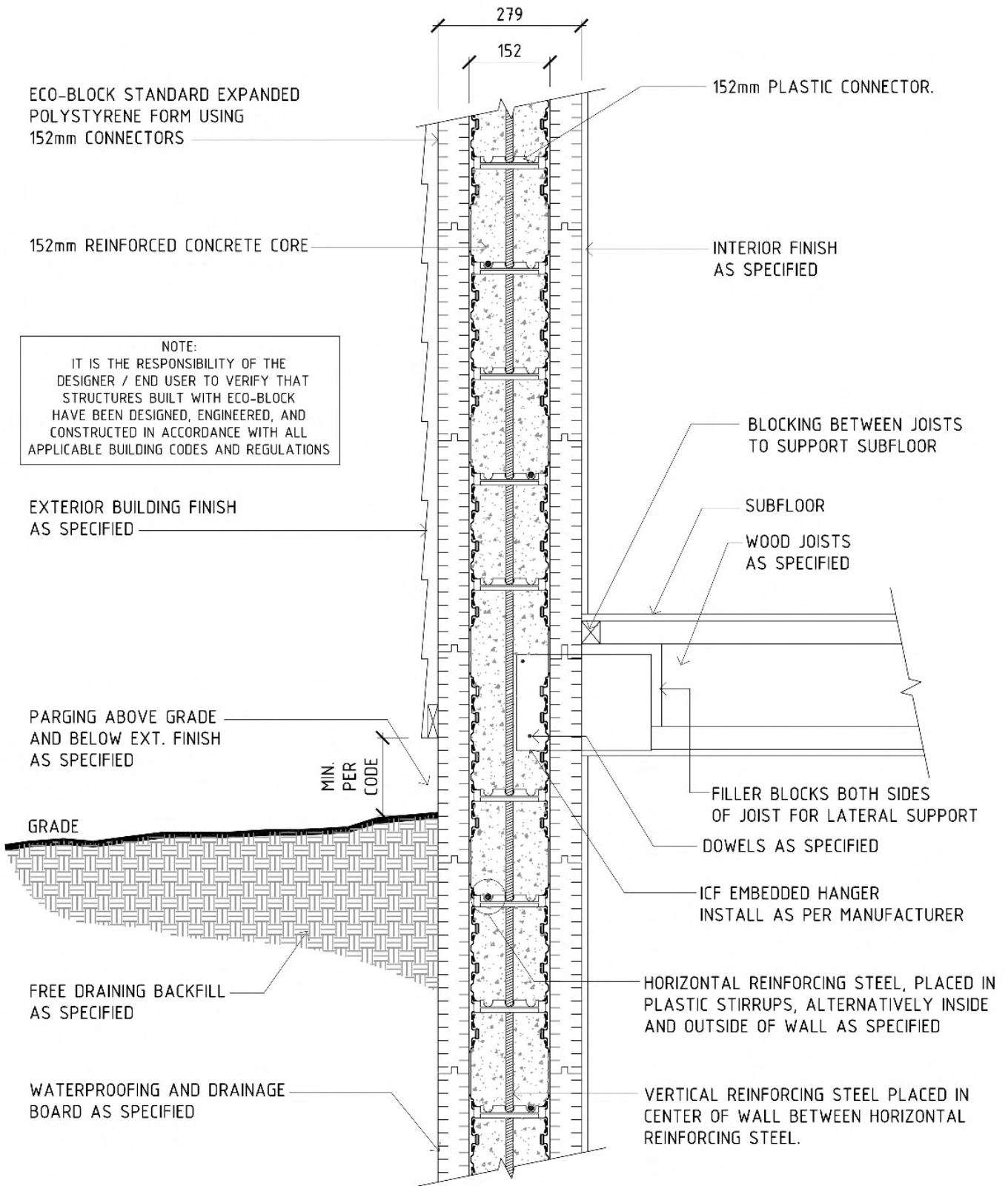
SCALE: 1:10

REVISION: 1

DRAWING NUMBER:

M-30-0005

29) Embedded hanger joist Connection with "I" joist



ECO-Block, Pty Ltd

INSULATING CONCRETE FORMS
"... SAVING AUSTRALIAN ENERGY "™



34 Gracemere St.
Newmarket QLD 4051
www.eco-blockaustralia.com.au

**EMBEDDED HANGER CONN.
WOOD "I" JOISTS
PERP. TO WALL - 152mm FORMS**

DATE: 5/2009

SCALE: 1:10

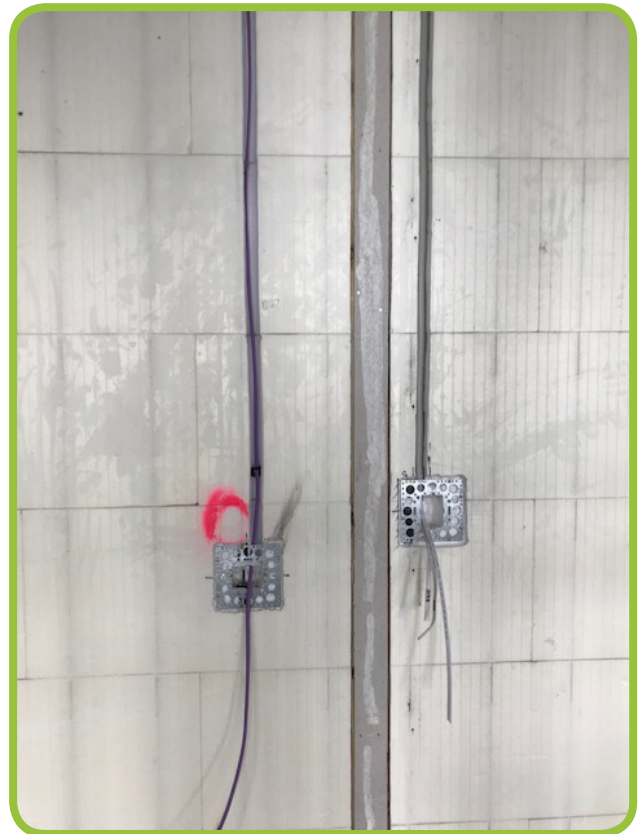
REVISION: 1

DRAWING NUMBER:

M-30-0038

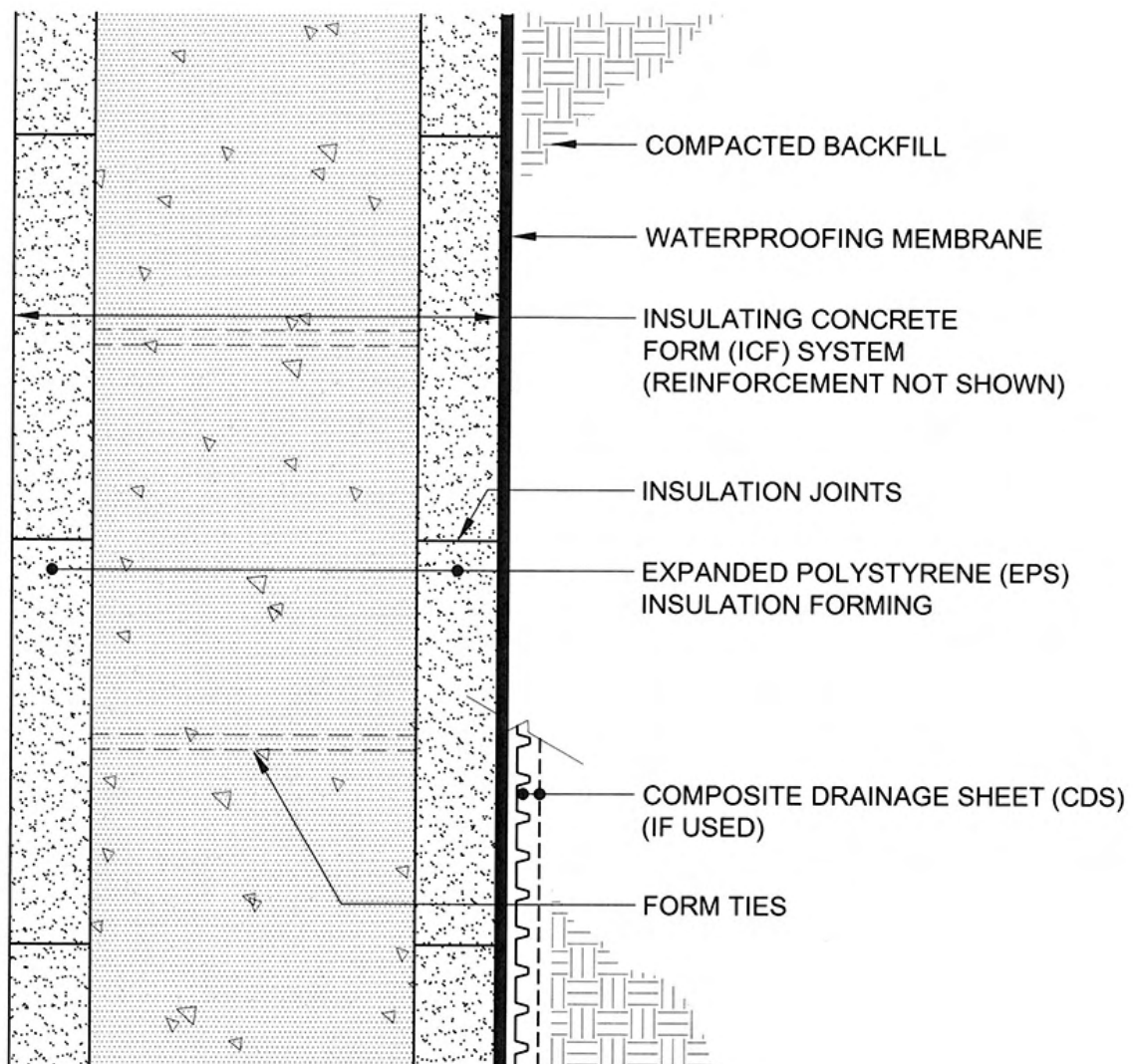
30) Attach internal plasterboard or other linings

- » Plasterboard is glued and fixed directly to the Eco Block ICF formwork.
- » As is the practice with timber frames the walls may need to be checked for plum and the ICF can be lightly sanded.
- » Plaster board fasteners are screwed directly to the embedded webs every 400 mm. The same as fixing to a timber frame.
- » The best type of glues to use must be acrylic polymer base. No solvents are to be used.



31) Waterproof External below-grade walls and retaining walls where required

Many waterproofing products can be used for basement, lower floors that are also retaining walls and car parks.



Waterproofing Eco Block ICF formwork is a multi-step application.

- » **Solvent based waterproofing materials should not be used; these types of products will degrade the EPS formwork.**

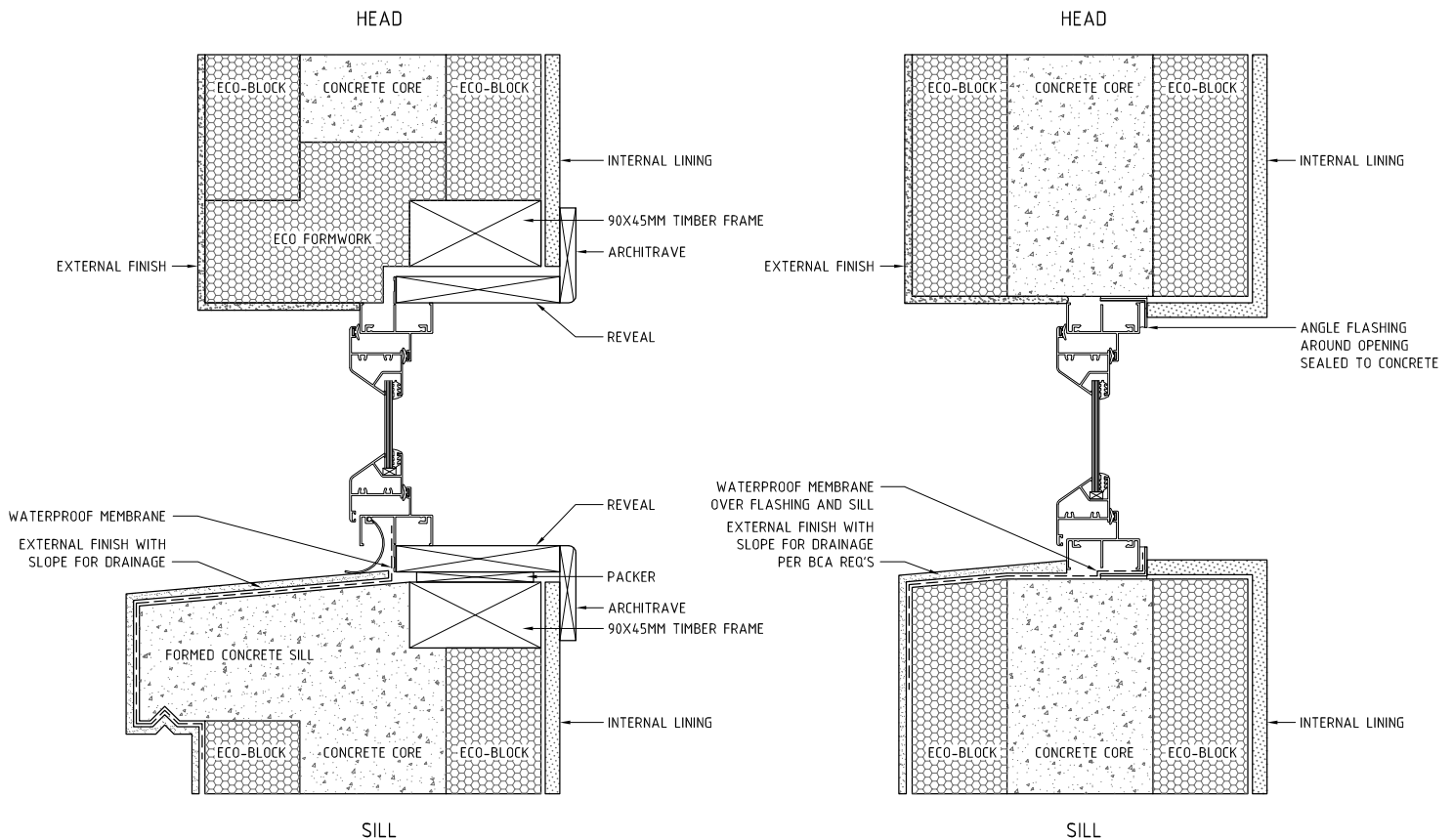
General Eco Block ICF Formwork waterproofing options are not limited to those listed below.

- » Self-adhesive membrane. These are typically 60mm in thickness and used in conjunction with an air-gap or dimpled membrane that protects the membrane from backfill and provides additional hydrostatic pressure relief.
- » Eco Block ICF compatible spray-on or roll-on membrane. (Do not use a petroleum based paint or primer. These products will dissolve the EPS foam)
- » A one step dimpled plastic mat type protection that provides an air gap between the Eco Block ICF Formwork and the ground.
- » Additives which are mixed into the concrete provide a crystalline waterproofing. These additives are available from a number of suppliers.

Always be guided by your waterproofing contractor and or the supplier of the product. The illustrations and photos below are examples of the various types of products available.

Waterproofing controls around windows and doors

- » Formwork is the process of using a wood, steel, concrete or EPS forming material to create openings in an ICF wall.
- » The various types of formwork act as anchors or attachment points for windows and doors.
- » Waterproofing the openings typically consists of applying external flashing or a waterproof membrane covering the formwork materials.



ECO-FORWORK OPENING
(SHOWN WITH A FORMED SILL)

FORMPLY FORMWORK OPENING
(SHOWN WITH A SQUARE SET SILL)

NOTE:
IT IS THE RESPONSIBILITY OF THE DESIGNER / END USER TO VERIFY THAT STRUCTURES BUILT WITH ECO-BLOCK HAVE BEEN DESIGNED, ENGINEERED, AND CONSTRUCTED IN ACCORDANCE WITH ALL APPLICABLE BUILDING CODES AND REGULATIONS



© ECO-Block Pty Ltd

ECO-Block Pty Ltd
INSULATING CONCRETE FORMS
"... SAVING AUSTRALIAN ENERGY "™
ecoblock.net.au

TITLE:
TYPICAL WINDOW INSTALLATION
DETAILS

DATE: 22.11.2010

SCALE: 1:5

SHEET 1 OF 1

DRAWING NO:

001.01

ASSOCIATED PRODUCTS

Plasterboard adhesive's

Selleys Instant Nails Fast Grab	Purchase from most Hardware stores.
Quickwall Building Systems – Plasterboard adhesive	Sales: 1800 775 573 Tech support: 0414 882 423 www.quickwall.com.au

*There are many other suppliers for plasterboard adhesive. You must make sure that you confirm with the manufacturer that their product is not solvent based.

Render solutions

Quickwall Australia Pty Ltd	Sales: 1800 775 573 Tech support : 0414 882 423 www.quickwall.com.au
Dulux Acratex	Please contact your local Dulux vendor for application specifics.
Rockcote	www.rockcote.com.au

*Note there are many more suppliers of external render products, it is the user and or the builder's responsibility to ensure the product is fit for purpose and not solvent based.

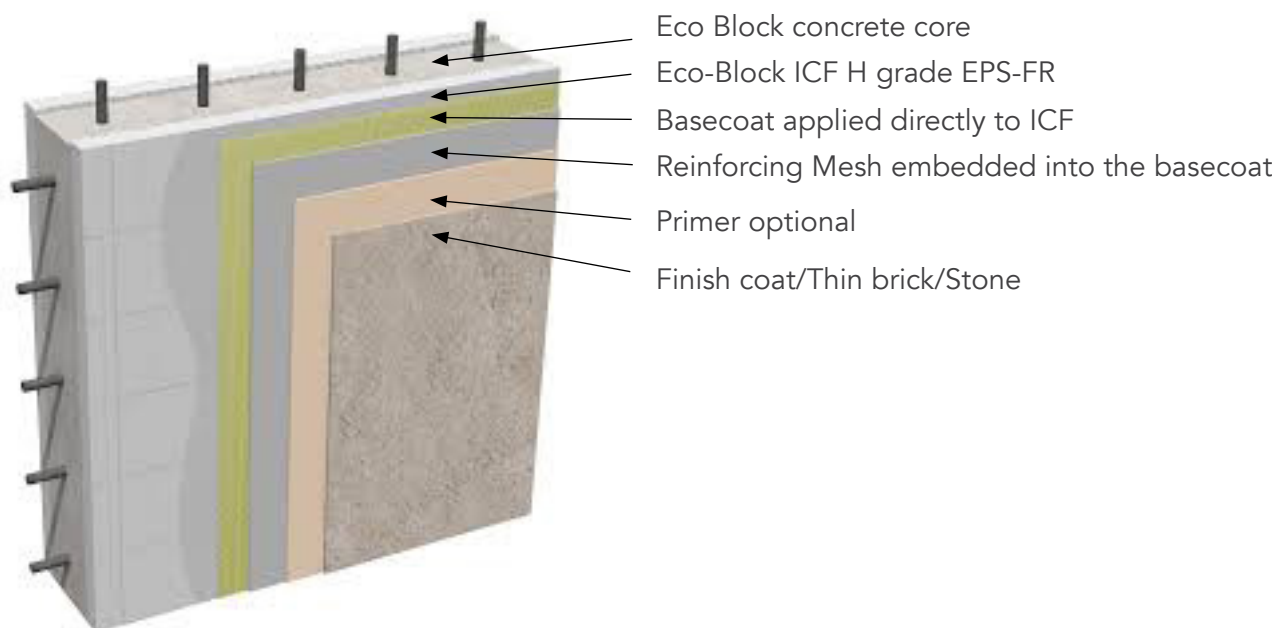
Waterproofing solutions

There are many waterproofing solutions that can be used on Eco Block ICF Formwork, for below ground and above ground. Note it is critical that you do not use a solvent based solution. Note it is the user and or the builder's responsibility to ensure that the product is fit for purpose.

32) Apply Cladding or render to the exterior wall

- » Eco Block ICF Formwork is a stay in place, Insulating Concrete Forming system (ICF)
- » Cementitious materials can be applied directly to the Eco Block surface.
- » The ICF surface can be lightly rasped to provide an even surface to accept the render base coat.
- » The reinforcing mesh is embedded into the base coat or can be attached directly to the embedded webs in the ICF.
- » The finish material such as thin bricks, acrylic render or thin veneer can then be applied to the base coat according to the respective manufacturer's installation instructions
- » The attachment of Fiber Cement cladding materials to Eco Block ICF Formwork is permitted.
- » Please refer to the below Structural Certification: Cladding connection to Eco Block Walls.
- » You must confirm with the Manufacturer of the Cladding for their install procedure and application.

Please refer to the certification below.



CUSTOMER SERVICE: 1800 669 696
TECHNICAL SUPPORT: 1800 669 696
WEB: WWW.ECO-BLOCK.COM.AU

