modcell®

straw technology

technical guide

ModCell® is a sustainable, prefabricated straw wall and roof panel system; designed for use in residential, educational, retail and commercial buildings. Offering a range of thermal performances better than current UK Building Regulations requirements.

about

The entire process from sourcing to installation has been carefully refined to minimise embodied Carbon in the ModCell® panels.

Panels are either made in our manufacturing facilities of at a Flying Factory™, located within 15 miles radius of the construction site, utilising local skills and labour to assemble the panels.

Construction uses the second largest amount of resources after food production. Buildings use 46% of all the UK energy.

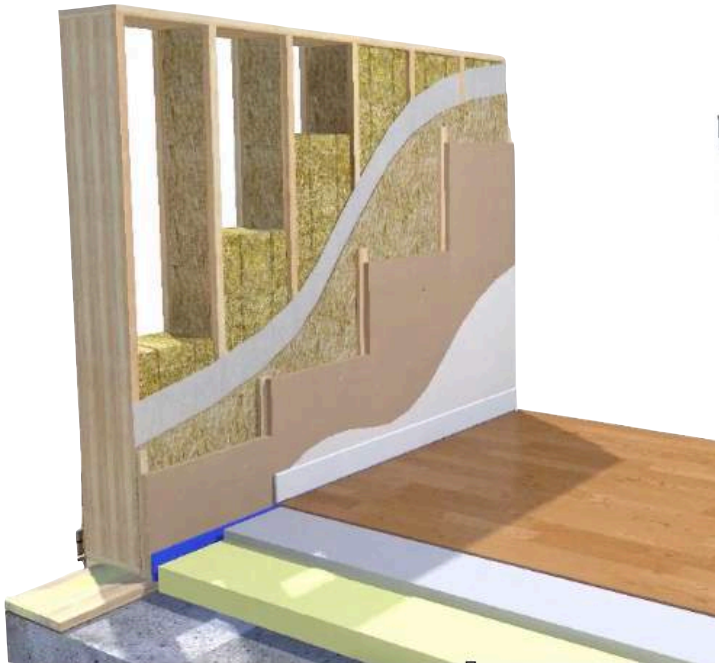
Our product takes a material perceived as “deep green” and combines it with modern methods of construction (MMC). By combining the best from both worlds, we have developed a sustainable, carbon-neutral cladding and structural system that can help meet the challenges of climate change in the 21st century.

ModCell® is a sustainable, prefabricated straw wall and roof structural panel, designed for use in residential, educational, retail and commercial buildings. The straw and timber work as a carbon bank, effectively reducing carbon content from the atmosphere and locking it up in these carbon sequestering materials. Prefabrication of the panels minimises material waste and results in a high quality product with excellent dimension tolerances.

components

A ModCell® straw panel comprises of an FSC/PEFC timber frame, straw insulation, split timber sole plate with insulation between the sole plates and where required, an opening for doors or windows. Panels can act structurally, so there is no need for lintels or base plates, possibly reducing the overall costs by negating the need for an additional structural frame.

Panels are available in a variety of depths, widths and heights. Contact us to discuss your needs.



ModCell® prefabricated straw panels are delivered to site and lifted into place.

ModCell® Core and ModCell® Traditional panels are close coupled, secured together with a zip detail and use airtight tapes to ensure air tightness.

Weathering details vary from project to project and are developed by ModCell® in conjunction with the project designer.

panel types

ModCell® panels are available in a range of widths, depths and heights, depending on the clients required u-value and needs.

The ModCell® panel can accept any number of final internal and external surface finishes.

The final look of the building is to the clients requirements.

Final surface finishes:
Timber
Render
Stone
Brick
Clays
Plasterboard
Compressed Straw Board
Etc

ModCell® Core

ModCell® Core panels are available in a number of depths. They are factory finished fully closed, dry lined panel system using breathable sheathing boards.

The standard internal finish is a sheathing board, battened (not included in stated dimensions) ready to receive a variety of internal surface finishes.

The external finish is a breathable sheathing board, breather paper, battened (depending on external finish material) ready to receive a variety of surface finish options.

panel performance*

Panel depth	Straw depth	U-value	Fire	Acoustic** $R_{W(-1, -3)}$
427mm	400mm	0.13 W/(m²K)	60 mins +	41 - 49**
377mm	350mm	0.14 W/(m²K)	60 mins +	41 - 49**
262mm	235mm	0.19 W/(m²K)	60 mins +	41 - 49**
167mm	140mm	Call us for info	30 mins +	41 - 48**

*Internal surface finish materials applied to the ModCell® panel will increase the performance levels shown above.

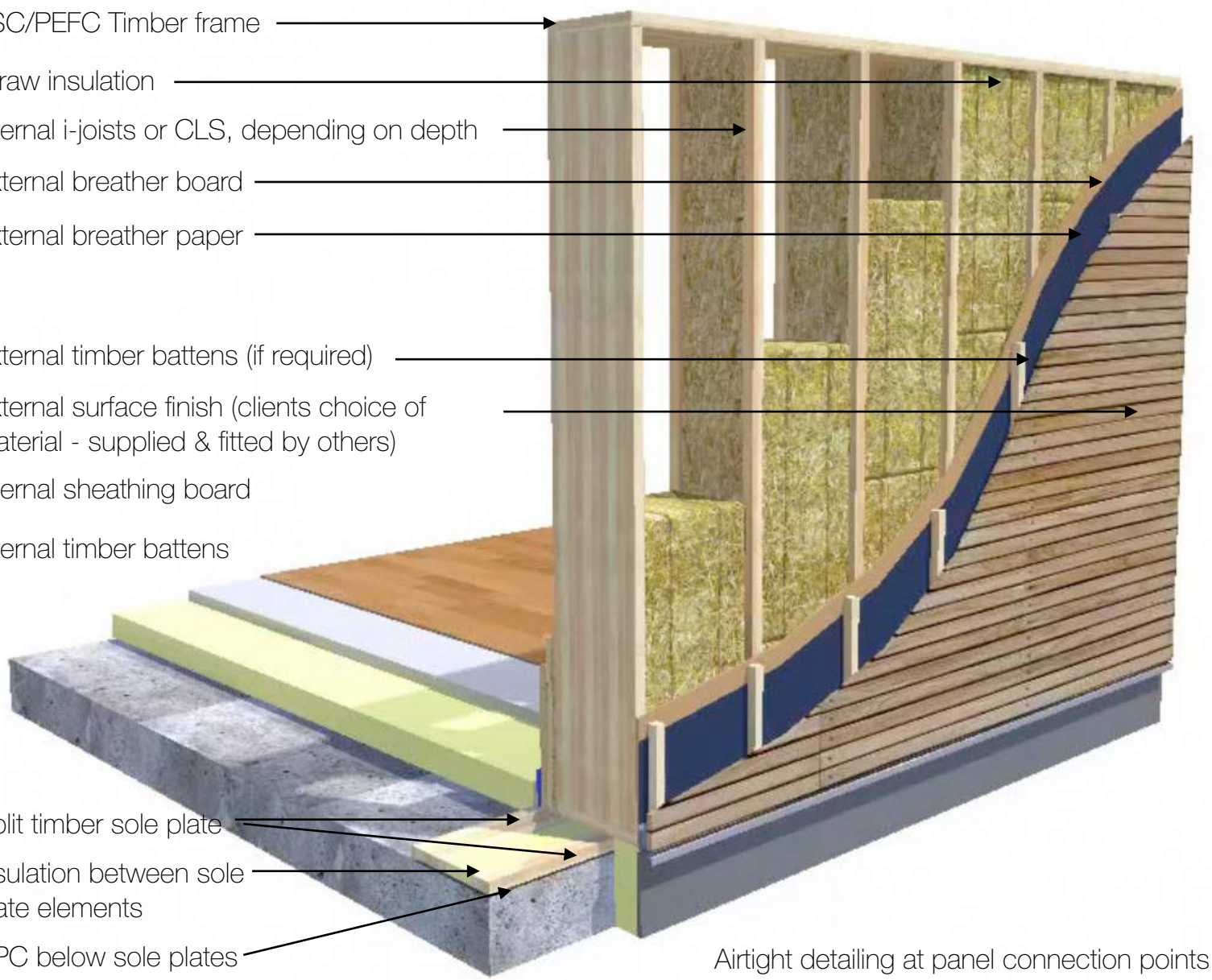
** Acoustic $R_{W(-1, -3)}$ range shown above is with & without Fermacell internal finish board fitted with 25mm service cavity.

The above u-values are based on a panel build up of:

- 15mm of internal sheathing board
- straw insulation depth as indicated above
- 12mm of breather board and breather paper

The total build-up of the wall, including cavity, internal surface finish and external finish materials, will positively impact on the u-value W/(m2K) performance of the finished wall/roof.

ModCell® Core



Airtight detailing at panel connection points

*Materials may change as panel continues to be developed

build-up

- FSC/PEFC Timber frame Straw insulation
- i-joists within timber frame
- External breather board
- External breather paper
- External timber battens (if required)
- External surface finish (clients choice of material - supplied & fitted by others)
- Internal sheathing board
- Internal timber battens
- Split timber sole plate
- Insulation between sole plate elements
- DPC below sole plates
- Airtight detailing at panel connection points

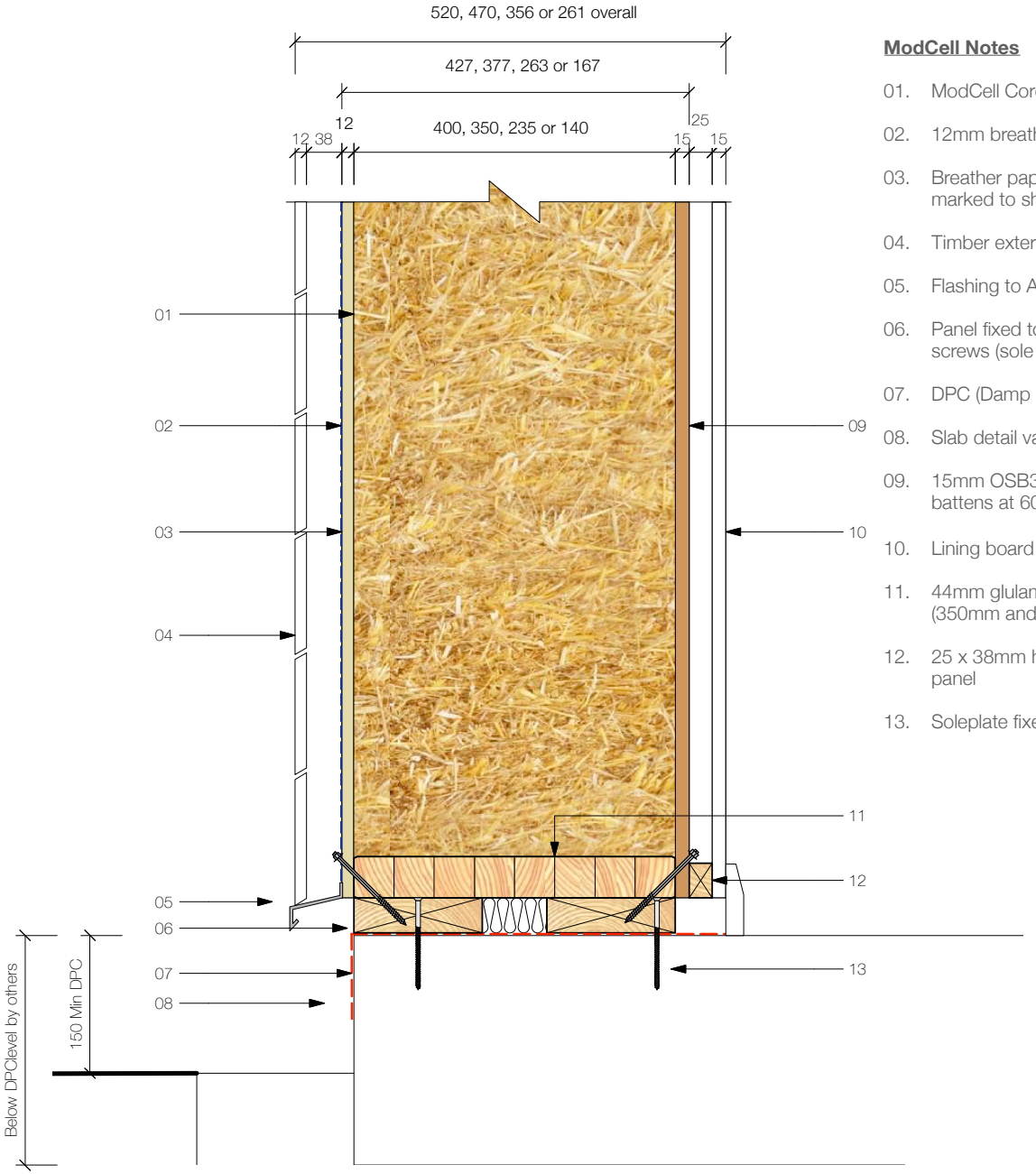
typical detail

ModCell® panels are able to accept a wide range of final internal and external surface finishes.

This detail shows the panel with timber cladding attached to the panel via timber battens. The cavity shown of 38mm is as per industry standards.

The cladding can be vertical, horizontal or any orientation required.

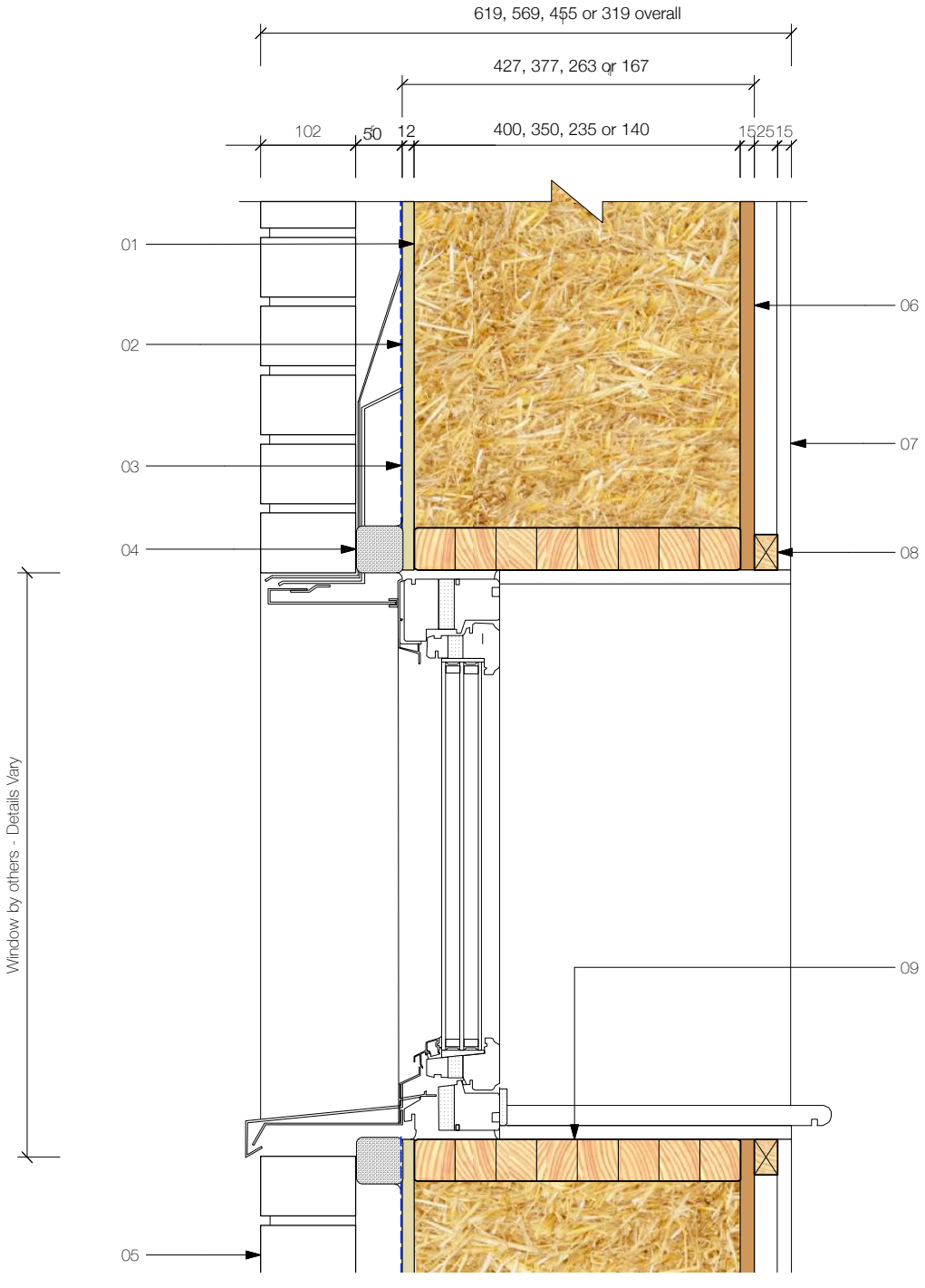
ModCell® Core - Timber clad panel foundation - typical detail



ModCell Notes

01. ModCell Core Panel as described on typical panel detail
02. 12mm breather board
03. Breather paper pre-fitted to external face of panel and marked to show 60mm centre studs
04. Timber exterior leaf (by others)
05. Flashing to Architects detail
06. Panel fixed to 38 x 140mm sole plate with 45 degree skew screws (sole plate either one elements or two elements?
07. DPC (Damp Proof Course)
08. Slab detail varies, cold bridging prevention to be agreed
09. 15mm OSB3 sheathing board and fitted with 25mm deep battens at 60mm centres
10. Lining board by others
11. 44mm glulam or 45mm CLS depending on depth of panel (350mm and above = glulam, 235mm and below = CLS)
12. 25 x 38mm horizontal batten fitted on site, bottom of GF panel
13. Soleplate fixed to GF

ModCell® Core - Brick clad panel window - typical detail



ModCell Notes

01. ModCell Core Panel as described on typical panel detail
02. 12mm breather board
03. Breather paper pre-fitted to external face of panel
04. 65 x 65mm Flexy firestop fitted along window head tight against window frame
05. Masonry exterior leaf (by others)
06. 15mm sheathing board
07. Lining board (by others)
08. 25 x 38mm horizontal batten fitted on site
09. 44mm glulam or 45mm CLS depending on depth of panel - (350mm and above = glulam, 235mm and below = CLS)

typical detail

ModCell® panels are able to accept a wide range of final internal and external surface finishes.

This detail shows the panel with brick attached to the panel via aluminium ties. (this could also be stone work. The cavity shown of 50mm is as per industry standards.

Panels can be clad with a number of surface finishes, at the same time, to create a unique look.

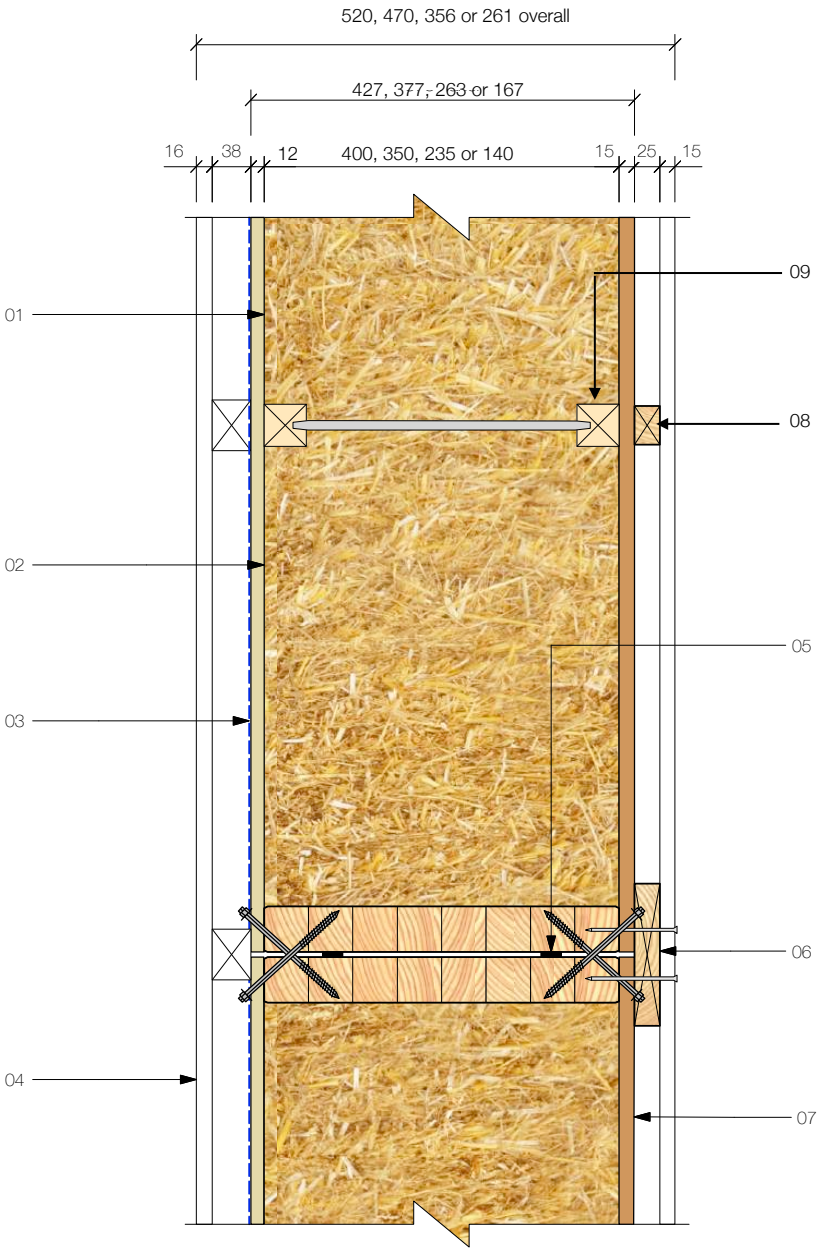
typical detail

ModCell® panels are able to accept a wide range of final internal and external surface finishes.

The cavity shown of 38mm is as per industry standards.

Clients have chosen to either render the panels all the same colour and also mixed with other cladding finishes.

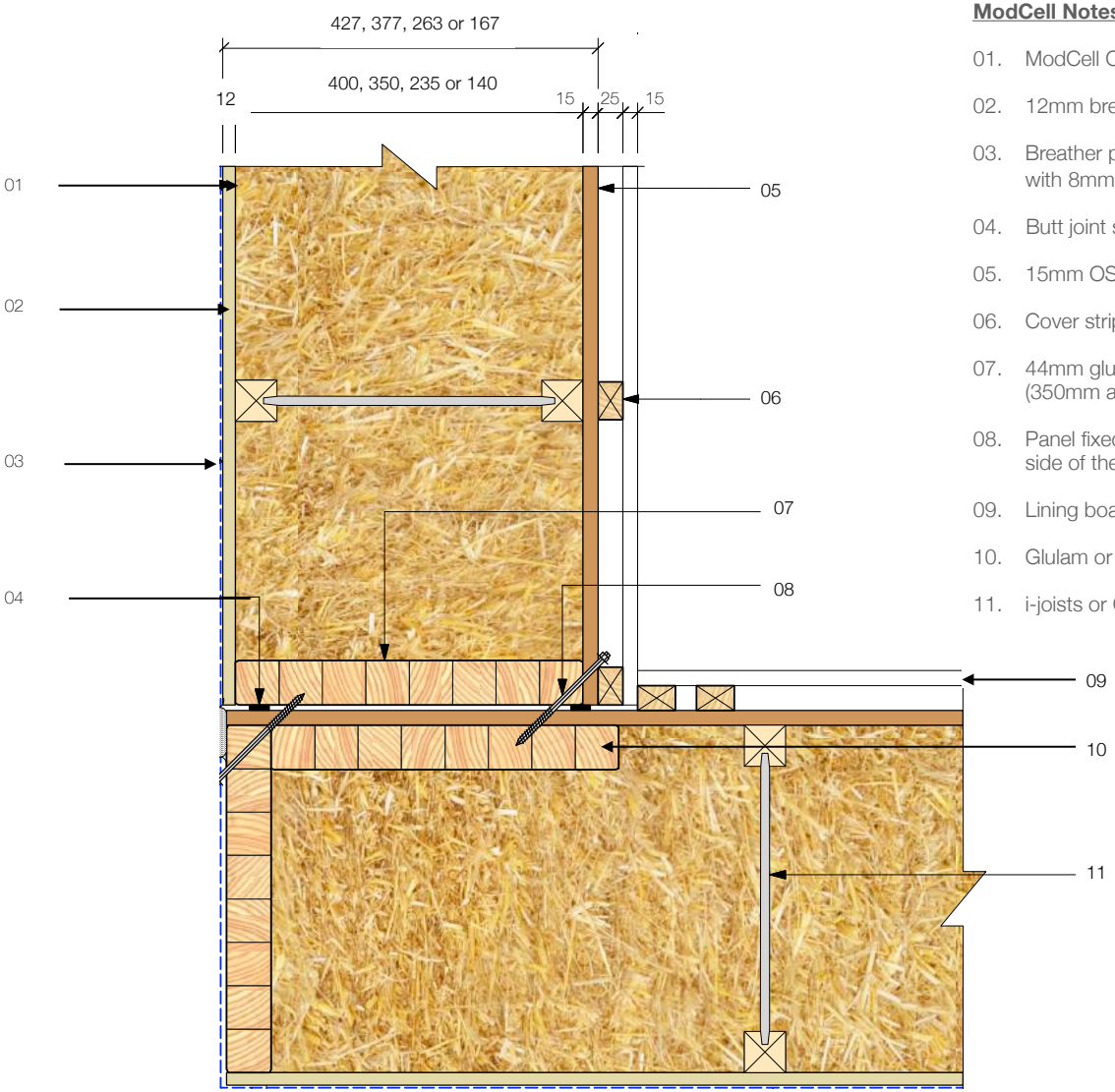
ModCell® Core - Panel connection - typical detail



ModCell Notes

01. ModCell Core Panel as described on typical panel detail
02. 12mm breather board
03. Breather paper pre-fitted to external face of panel and marked to show 60mm centre studs
04. Timber exterior leaf (by others)
05. Butt joint sealed with foam tape or airtightness tape
06. Cover strip over fitted panel junction on site
07. 15mm OSB3 sheathing board
08. 25mm deep battens at 60mm centres attached to internal i-joists or CLS
09. i-joists or CLS depending on panel depth
10. Lining board by others

ModCell® Core - External corner wall - typical detail



ModCell Notes

01. ModCell Core Panel as described on typical panel detail
02. 12mm breather board
03. Breather paper overlap end of panel by 600mm and stapled with 8mm stainless steel staples at 159=0mm c/c
04. Butt joint sealed with foam tape / airtightness tape
05. 15mm OSB3 sheathing board
06. Cover strip over fitted panel junction on site
07. 44mm glulam or 45mm CLS depending on depth of panel (350mm and above = glulam, 235mm and below = CLS)
08. Panel fixed together with 45 degree skew screws from each side of the panel junction
09. Lining board by others
10. Glulam or CLS to allow skew screws to connect panels
11. i-joists or CLS depending on panel depth

typical detail

ModCell® panels are able to accept a wide range of final internal and external surface finishes.

This detail shows an external corner wall detail. A cavity between the panel and the external surface finish would vary depending on finish chosen.

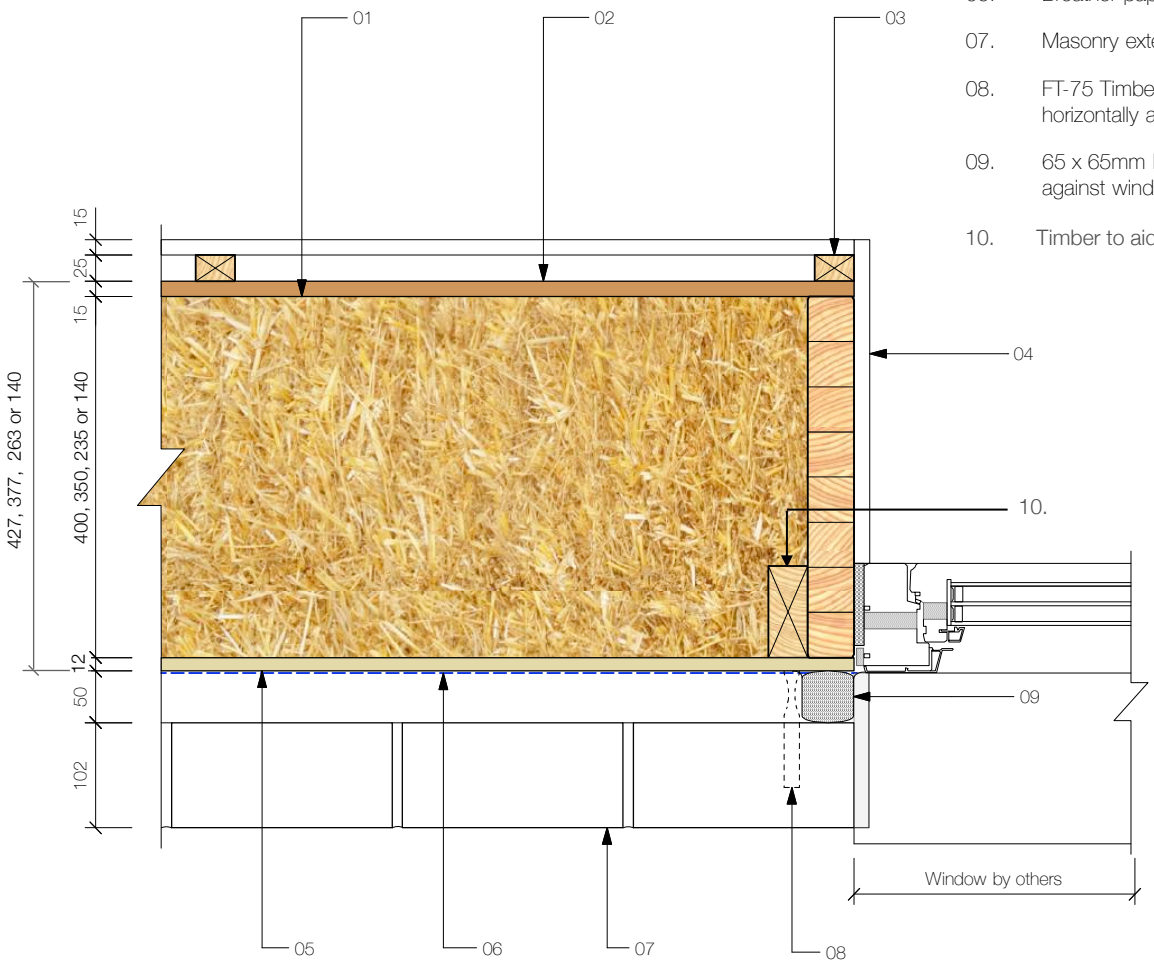
typical detail

ModCell® panel shows a plan section typical detail of a window fitted in the wall.

It is better to fit the window to the outside edge of the panel.

ModCell® can accept a range of windows and doors.

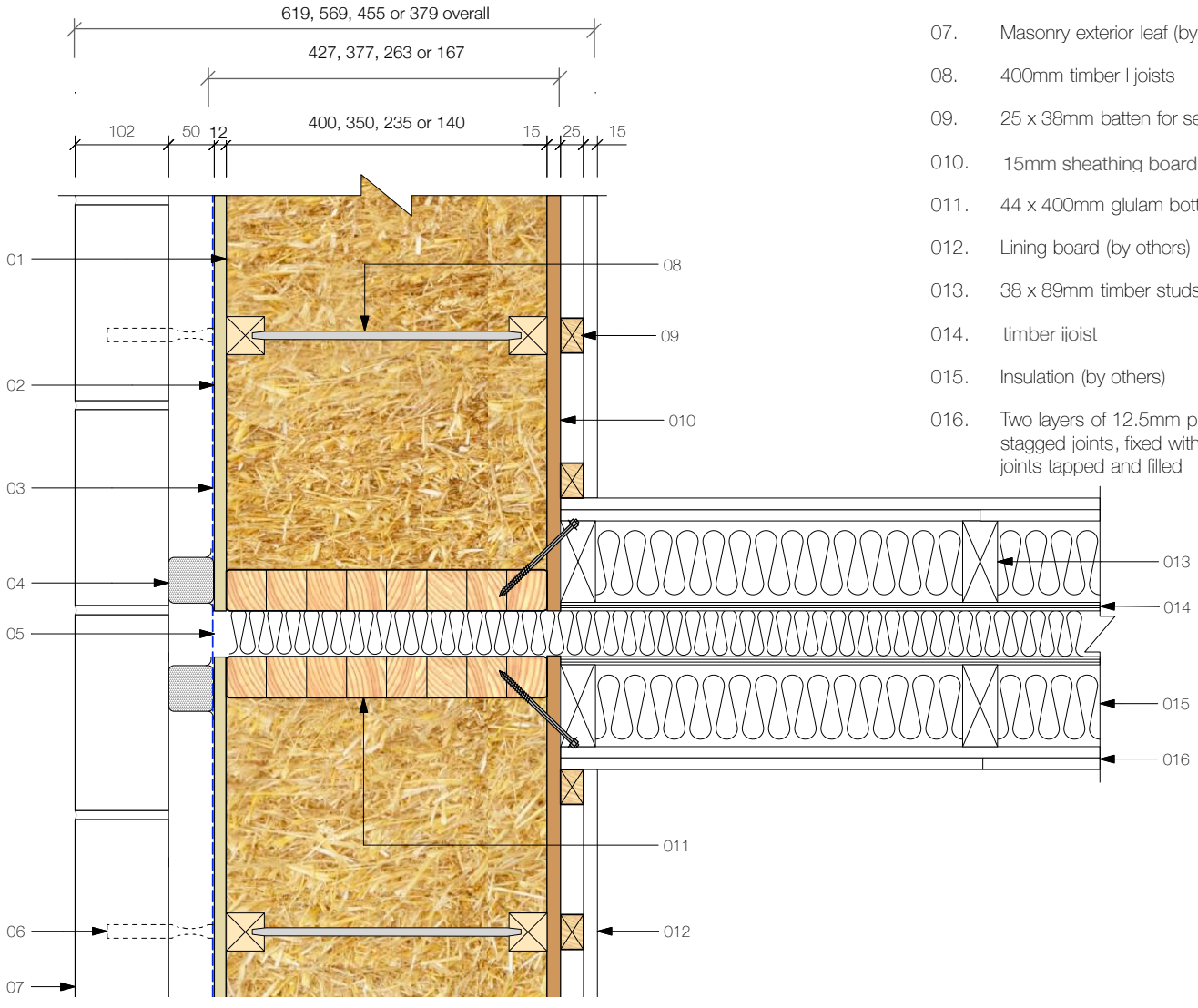
ModCell® Core - Standard window plan view - typical detail



ModCell Notes

01. ModCell Core Panel as described on typical panel detail
02. 12mm breather board
03. Internal batterns at 600mm c/c to form service void
04. Lining board (by others)
05. 15mm sheathing board
06. Breather paper pre-fitted to external face of panel
07. Masonry exterior leaf (by others)
08. FT-75 Timber to brick wallties @ max 600mm c/c horizontally and max 450mm c/c vertically
09. 65 x 65mm Flexy firestop fitted along window head tight against window frame
10. Timber to aid window fitting

ModCell® Core - Party wall plan section - typical detail



ModCell Notes

01. ModCell Core Panel as described on typical panel detail
02. 12mm breather board
03. Breather paper pre-fitted to external face of panel
04. 65 x 65mm Flexy firestop fitted to wall panel (by others)
05. 300mm lap of breather paper folded over end of the part wall panel from both sides and fixed with 8mm stainless steel staples at 150mm c/c
06. FT-75 Timber to brick wall ties @ max 600mm c/c horizontally and max 450mm c/c vertically
07. Masonry exterior leaf (by others)
08. 400mm timber I joists
09. 25 x 38mm batten for service zone
010. 15mm sheathing board
011. 44 x 400mm glulam bottom rail of wall panel
012. Lining board (by others)
013. 38 x 89mm timber studs at max 600mm c/c
014. timber iioist
015. Insulation (by others)
016. Two layers of 12.5mm plaster boards to be laid with stagged joints, fixed with plaster board screws and all joints tapped and filled

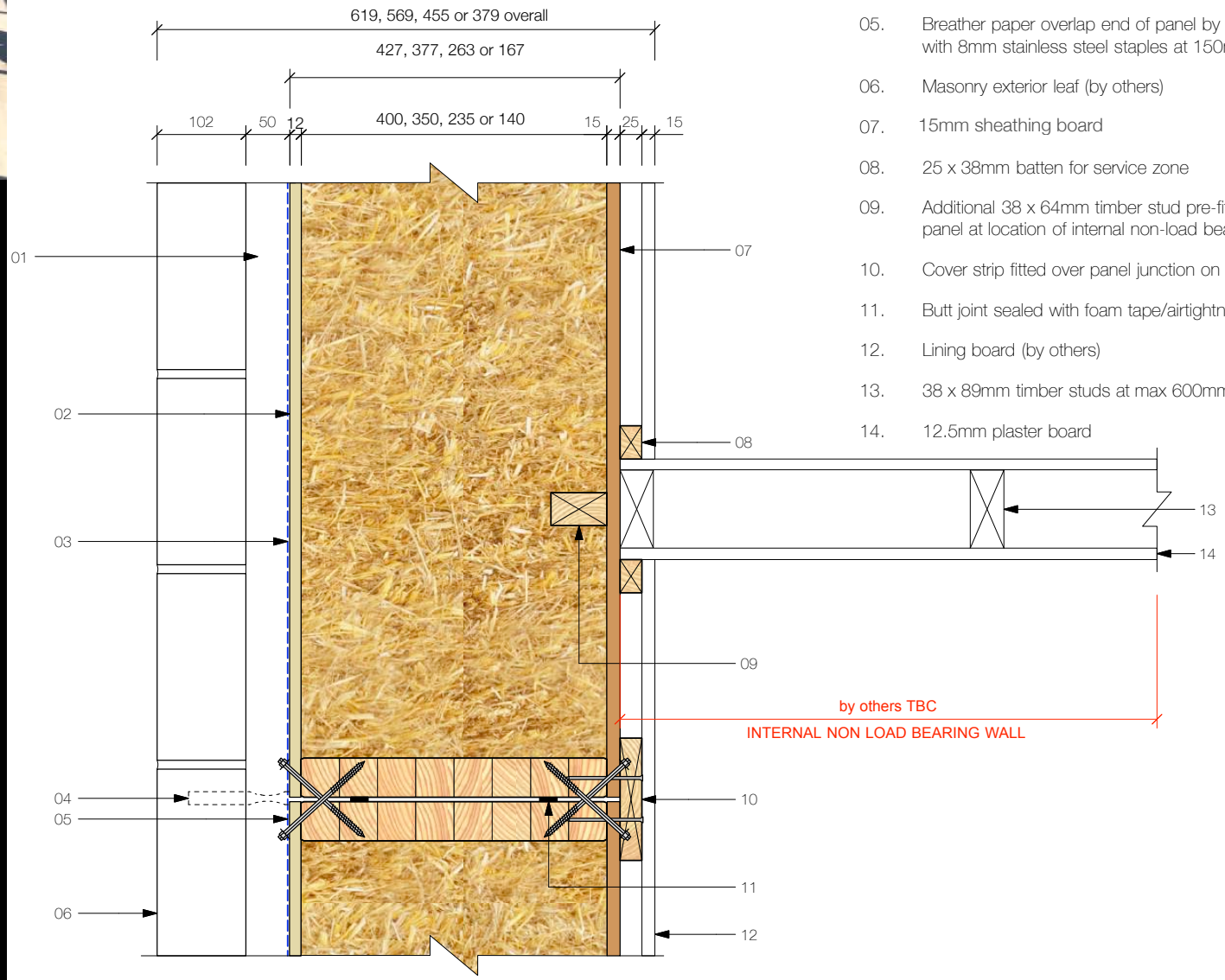
typical detail

ModCell® panel shows a plan typical detail of a party wall connecting to ModCell® panel.

typical detail

ModCell® panel shows a plan typical detail of a non-loadbearing wall connected to panel.

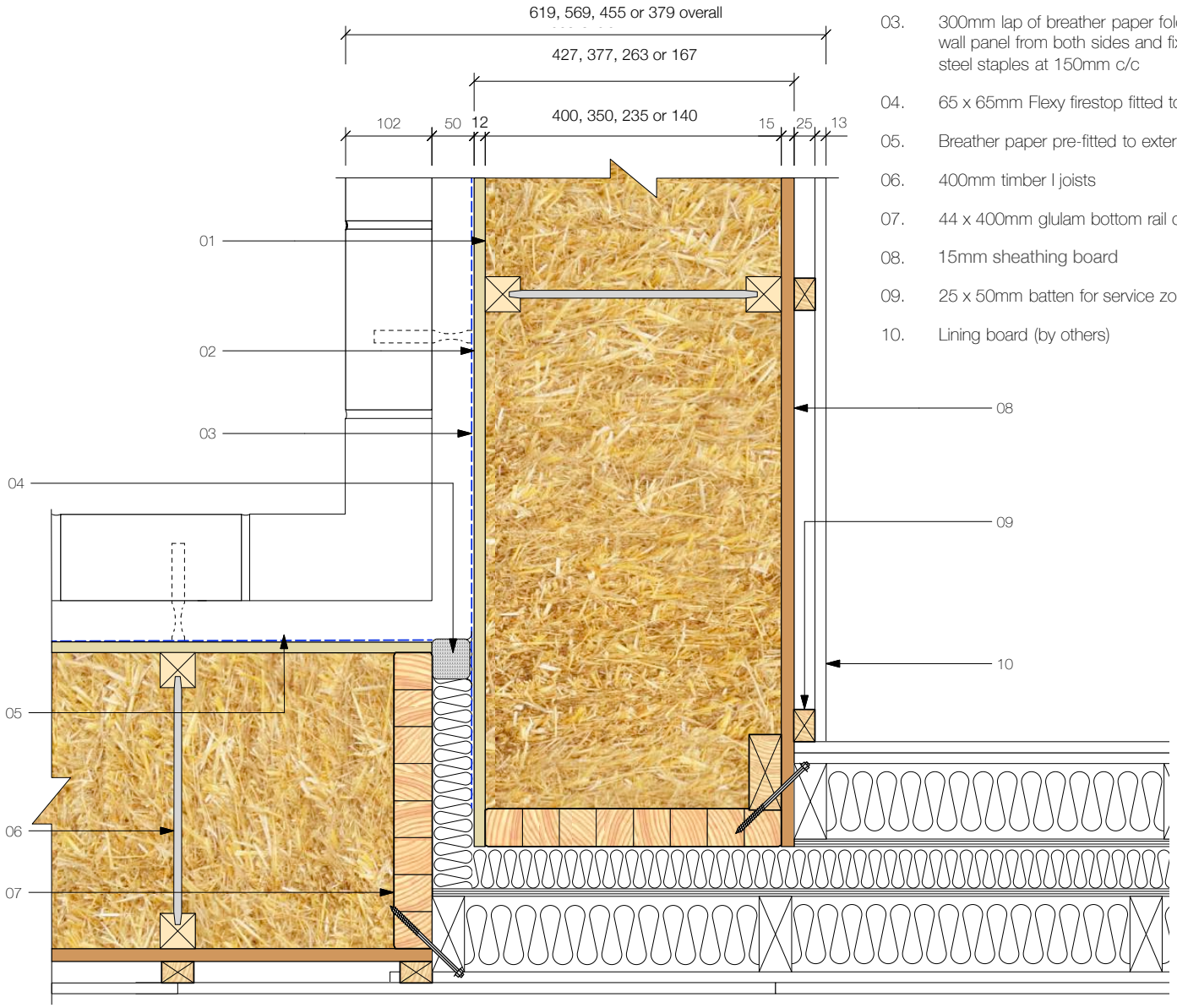
ModCell® Core - Non-load bearing wall connection - typical detail



ModCell Notes

01. ModCell Core Panel as described on typical panel detail
02. 12mm breather board
03. Breather paper pre-fitted to external face of panel
04. FT-75 Timber to brick wall ties @ max 600mm c/c horizontally and max 450mm c/c vertically
05. Breather paper overlap end of panel by 600mm and stapled with 8mm stainless steel staples at 150mm c/c
06. Masonry exterior leaf (by others)
07. 15mm sheathing board
08. 25 x 38mm batten for service zone
09. Additional 38 x 64mm timber stud pre-fitted to external wall panel at location of internal non-load bearing wall panel
10. Cover strip fitted over panel junction on site
11. Butt joint sealed with foam tape/airtightness tape
12. Lining board (by others)
13. 38 x 89mm timber studs at max 600mm c/c
14. 12.5mm plaster board

ModCell® Core - Non-load bearing wall connection - typical detail



ModCell Notes

01. ModCell Core Panel as described on typical panel detail
02. 12mm breather board
03. 300mm lap of breather paper folded over end of the part wall panel from both sides and fixed with 8mm stainless steel staples at 150mm c/c
04. 65 x 65mm Flexy firestop fitted to wall panel (by others)
05. Breather paper pre-fitted to external face of panel
06. 400mm timber I joists
07. 44 x 400mm glulam bottom rail of wall panel
08. 15mm sheathing board
09. 25 x 50mm batten for service zone
10. Lining board (by others)

typical detail

ModCell® standard party wall plan typical detail.

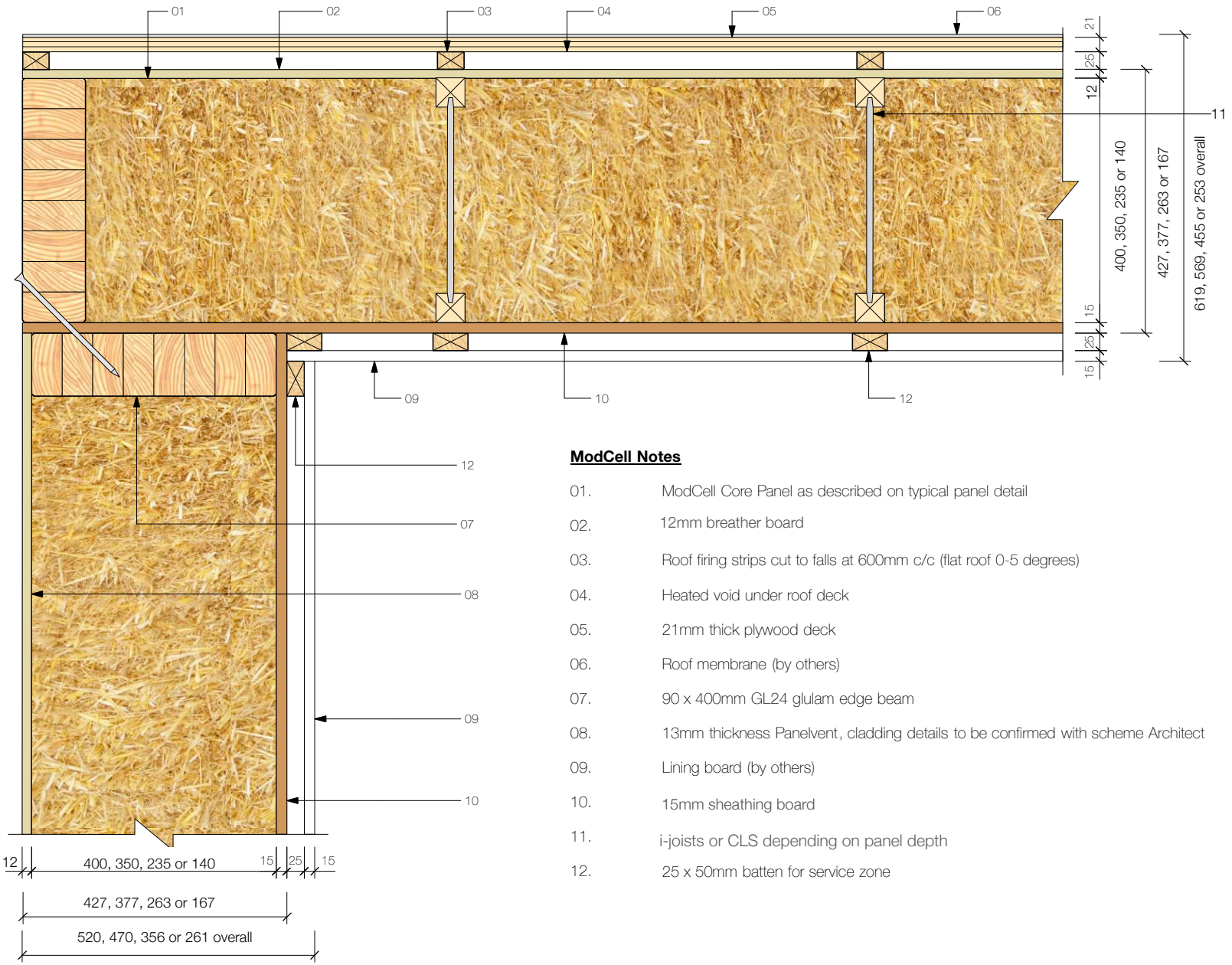
typical detail

ModCell® standard flat roof typical detail.

ModCell® straw insulated flat roof panels can also be supplied with a parapet , as well as firrings to form an angle to allow water to shed water off the roof.

The roof panels can be engineered to support Photovoltaics and green roof systems.

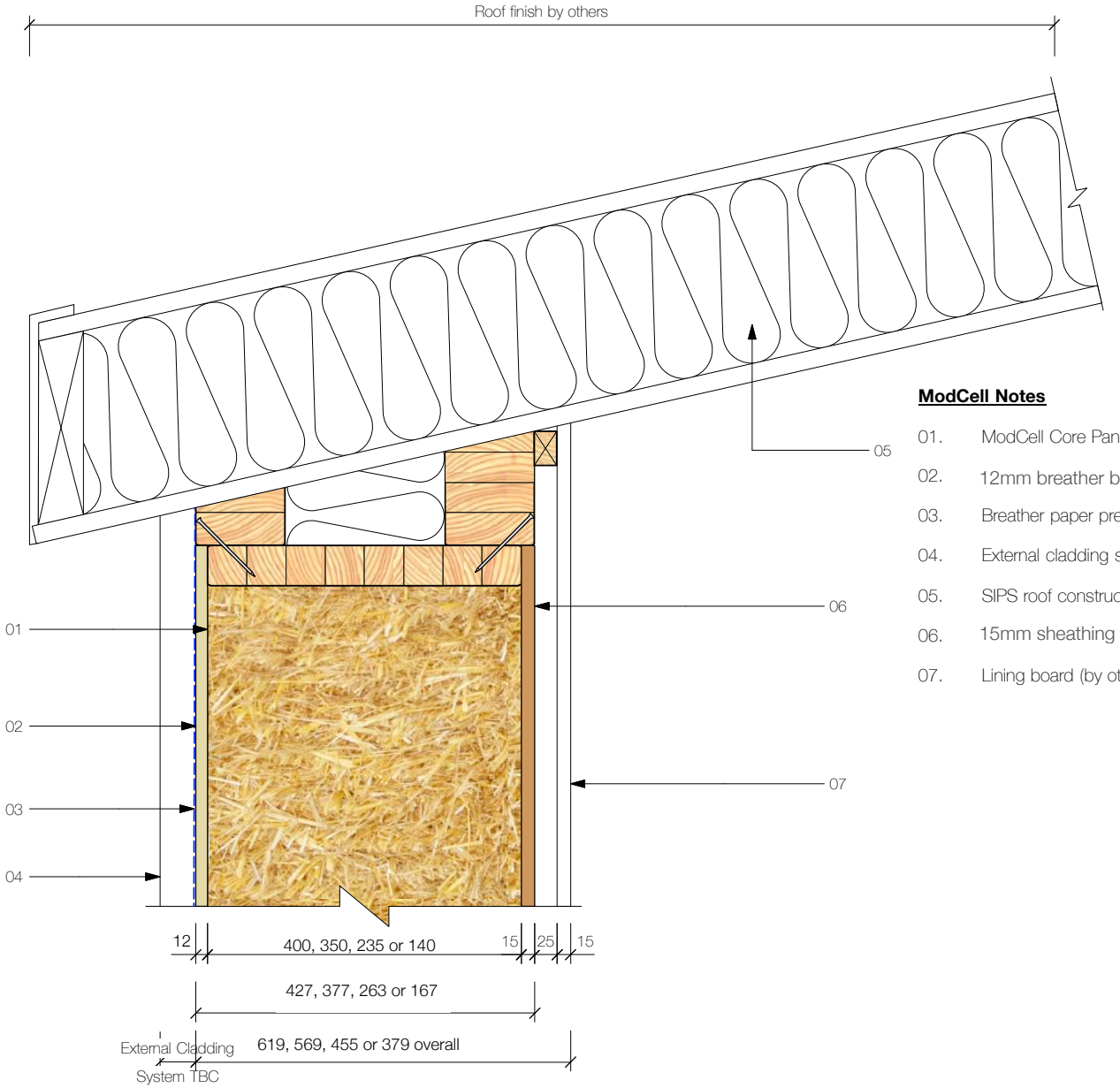
ModCell® Core - Standard flat roof - typical detail



ModCell Notes

01.	ModCell Core Panel as described on typical panel detail
02.	12mm breather board
03.	Roof firing strips cut to falls at 600mm c/c (flat roof 0-5 degrees)
04.	Heated void under roof deck
05.	21mm thick plywood deck
06.	Roof membrane (by others)
07.	90 x 400mm GL24 glulam edge beam
08.	13mm thickness Panelvent, cladding details to be confirmed with scheme Architect
09.	Lining board (by others)
10.	15mm sheathing board
11.	i-joists or CLS depending on panel depth
12.	25 x 50mm batten for service zone

ModCell® Core - Standard SIPS roof - typical detail



ModCell Notes

01. ModCell Core Panel as described on typical panel detail
02. 12mm breather board
03. Breather paper pre-fitted to external face of panel
04. External cladding system (by others)
05. SIPS roof construction (by others)
06. 15mm sheathing board
07. Lining board (by others)

typical detail

ModCell® standard SIPs roof typical detail.

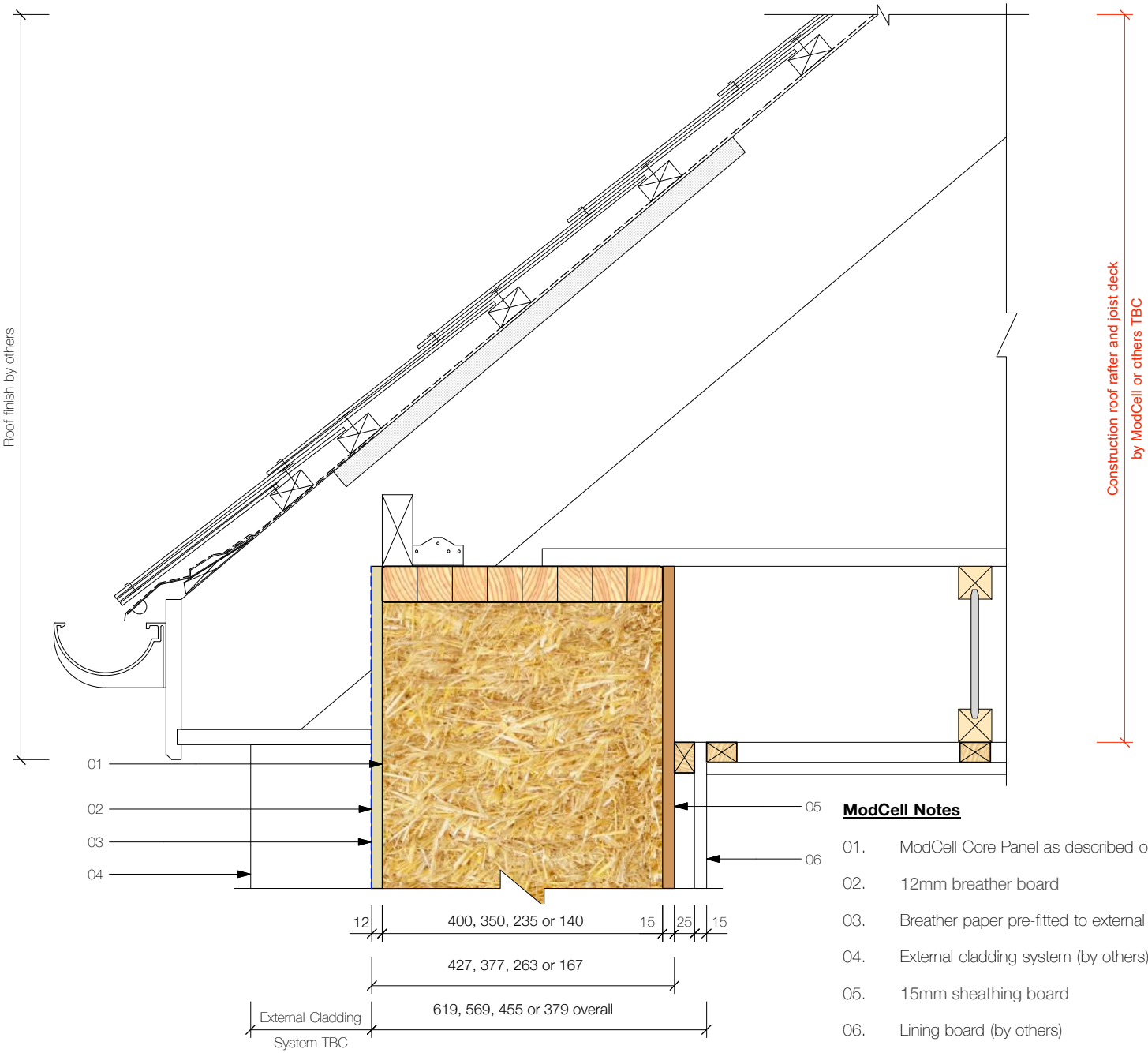
ModCell® can be detailed to accept other roof systems sitting on the head detail of the panel, as well as a pitched roof panel (see flat rood detail showing ModCell® panel). Build up and connection detail would be the same using ModCell® as for the SIP system on this page.

typical detail

ModCell® standard pitched roof typical detail.

ModCell® can be detailed to accept other roof systems sitting on the head detail of the panel, as well as a pitched roof panel (see flat roof detail showing ModCell® panel).

ModCell® Core - Standard pitched roof - typical detail



ModCell Notes

01. ModCell Core Panel as described on typical panel detail
02. 12mm breather board
03. Breather paper pre-fitted to external face of panel
04. External cladding system (by others)
05. 15mm sheathing board
06. Lining board (by others)

ModCell® Core - Structural performance and services

structural performance

On ModCell® Core panels vertical loads are supported by the internal studs and panels are designed for the specific loads required for each project and can be designed for horizontal loads in accordance with standard sheathing board design.

ModCell® can be structural up to 3.5 floors high for both commercial and residential buildings. Over 3.5 floors progressive collapse design requires an independent frame into which ModCell® infill panels can be secured

services

On ModCell® Core panels any services can be installed by taking advantage of the space created between the sheathing board, the battens and the final internal surface material specified by the client.

Where required, a 'breakout' access area through the panel, can be created to allow for vents, cables, piping, ducting etc can be made within in the panel. This 'breakout' area (box), would not be insulated with straw but can be insulated with other materials.

we offer

Our experienced team offers a range of services, from supply to full design and build services.

Our design services draw on our award winning design and consultation skills and can apply passive design principles to maximise site potential and minimise energy demands.

We are also happy to arrange a meeting to discuss your project in detail, establishing how ModCell® can best be utilised to save costs, reduce CO_2 and shorten construction times.

structural & services offered

The structural timber frame is 'infilled' with straw.

The straw is pre-compressed to prevent settlement. The panel is then closed to ensure the straw stays in place and is protected from the elements.

All services are installed in the void created between sheathing board and final surface finish.

manufacturing

The panels comprise straw, timber, sheathing board, breather board, i-joists, breather paper.

They are precision-engineered using modern methods of construction (MMC).

The structural timber frame is ‘infilled’ with straw, which is poured to form a wall, compressed for stability and to avoid settlement. The panel is then internally and externally finished, by others, to the clients choice of surface materials.

ModCell® Core - Manufacturing and install process

A

Straw bales are chopped to predetermined size and act as the insulation material.

B

Engineered timber arrives ‘flat packed’ to flying factory minimising the embodied carbon resulting from transportation.

C

Panel frames are assembled in a flying factory.

D

Panel frames are assembled.

E

Panel assembled and closed to one side prior to being flipped over to have straw installed

F

Straw is installed into panel

G

Panels are closed and uniquely marked as part of ISO 9001 2017 quality management system

H

Panel are delivered to site ready for installation

I

Panels are located onto a sole plate. This also assists when creating an air-tight seal between the base of the panel

J

Panels are joined together to create an air-tight detail and maximise the integrity of the overall structure.

K

Panel now installed and await final internal and external finish surfaces.

L

Panels can act structurally or connected to other structural elements, depending on the clients

M

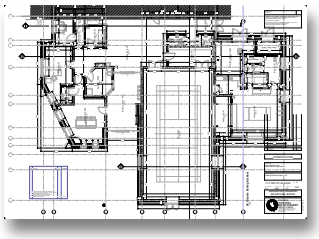
The completed Ysgol Rhyd Y Llan Primary school on Anglesey

N

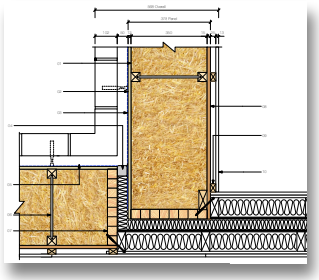
Finishing details can be applied after the installation of the core structure, resulting in a beautiful, affordable, sustainable building.

O

ModCell® Core - Design and ordering process

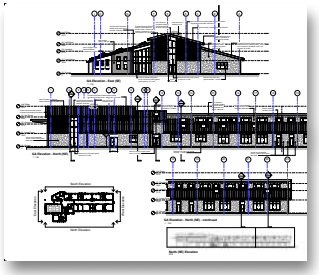


ModCell® consulted at design stage. We can provide initial costing and advice to the client, architect and quantity surveyor.

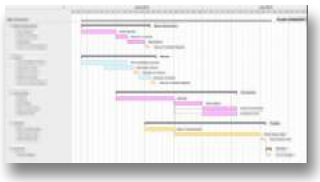


ModCell® provides standard connection details. We can also arrange a CPD event.

Continued design discussion with ModCell® ensures the system will work alongside other building elements.



ModCell® provided with detail design drawings, usually RIBA stage D-J and will provide a revised price quotation.



Meeting with main contractors established soon after appointment to agree appropriate lead times and installation dates.

ModCell® manufactures panels

ModCell® delivers and installs panels onsite

ModCell® building completed and signed off

design ordering process

ModCell® experienced team offers a range of services from supply to full design and build.

We can provide tailored CPD sessions.

If you are interested in our full design and build services please contact us to find out more.

Our design services draw on our award winning design and consultation skills and apply passive design principles to maximise site potential and minimise energy demands.

technical guide

modcell®
straw technology

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