How do you build a brick wall?

by Peter Minnis

A Thought Piece

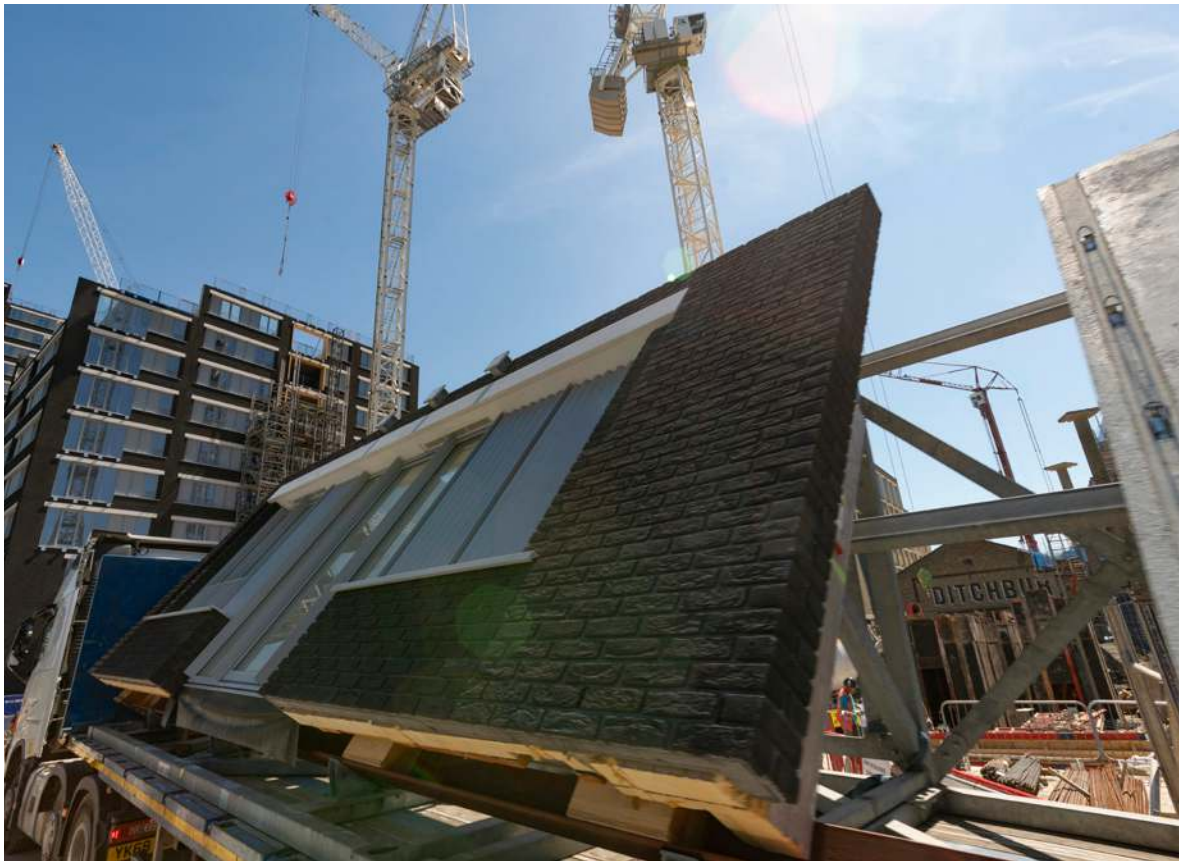
TODD



Royal Wharf, London

How do you build a brick wall?

Our experiences with construction methodologies for multi-storey residential developments.



It wasn't that long ago when there was basically one accepted solution to construction brick facade on a multi-storey buildng...you erected either an insitu concrete or steel frame, set a blockwork inner leaf on the floor slab edge, adhered an insulation board, formed a cavity and supported the external brickwork off shelf angles.

There are now a plethora of differing methodogies that can be adopted with and which have gained experience in over recent years.

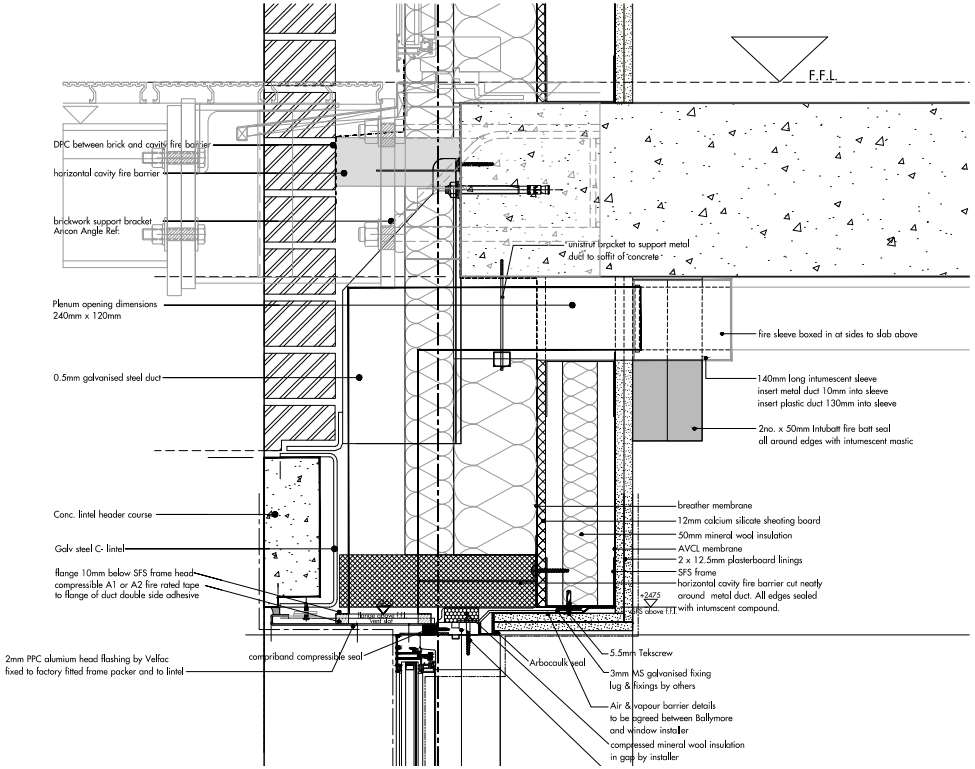
SFS reducing weight + ***speeding*** up construction.

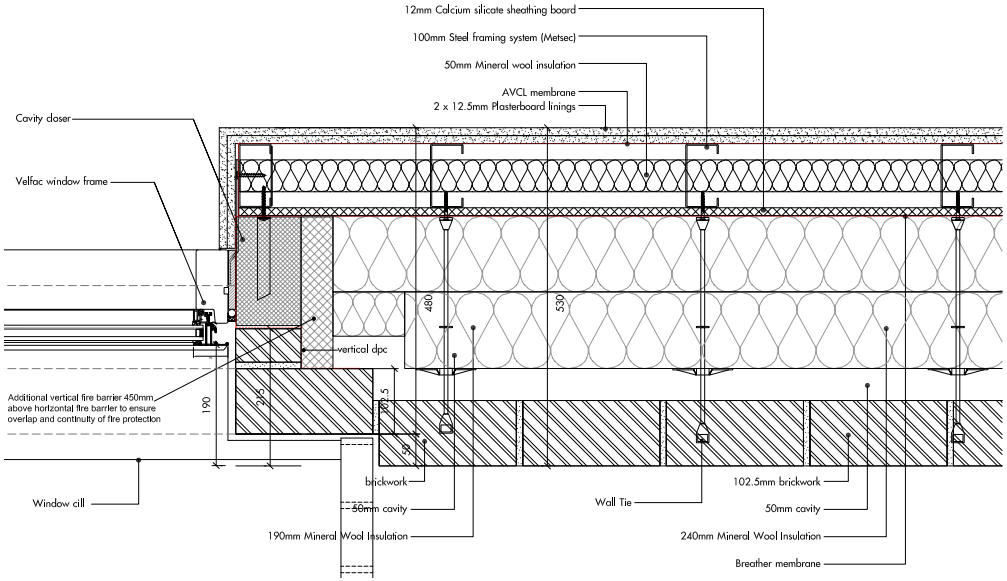
The approach described above is still regularly adopted, but with the inner leaf now more commonly replaced by a “Steel Framing System” or SFS, manufactured by the likes of Metsec and Kingspan.

This system of cold formed steel sections and mineral fibre infill insulation sections, encapsulated with lining boards, brings the benefit of reducing structural weight with the associated cost benefits, negates wet trades, hence speeding up construction programmes and when covered with an appropriate vapour control membrane, can produce a largely weathertight enclosure allowing internal fit-out to proceed in advance of the external walling being complete.

Many of the blocks within the £250m Goodluck Hope residential led mixed use development we are completing for contractor Ballymore in London, utilise this approach.







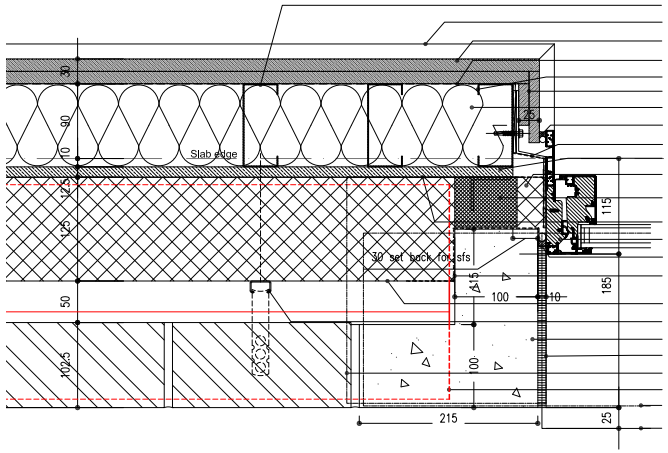


Goodluck Hope, London

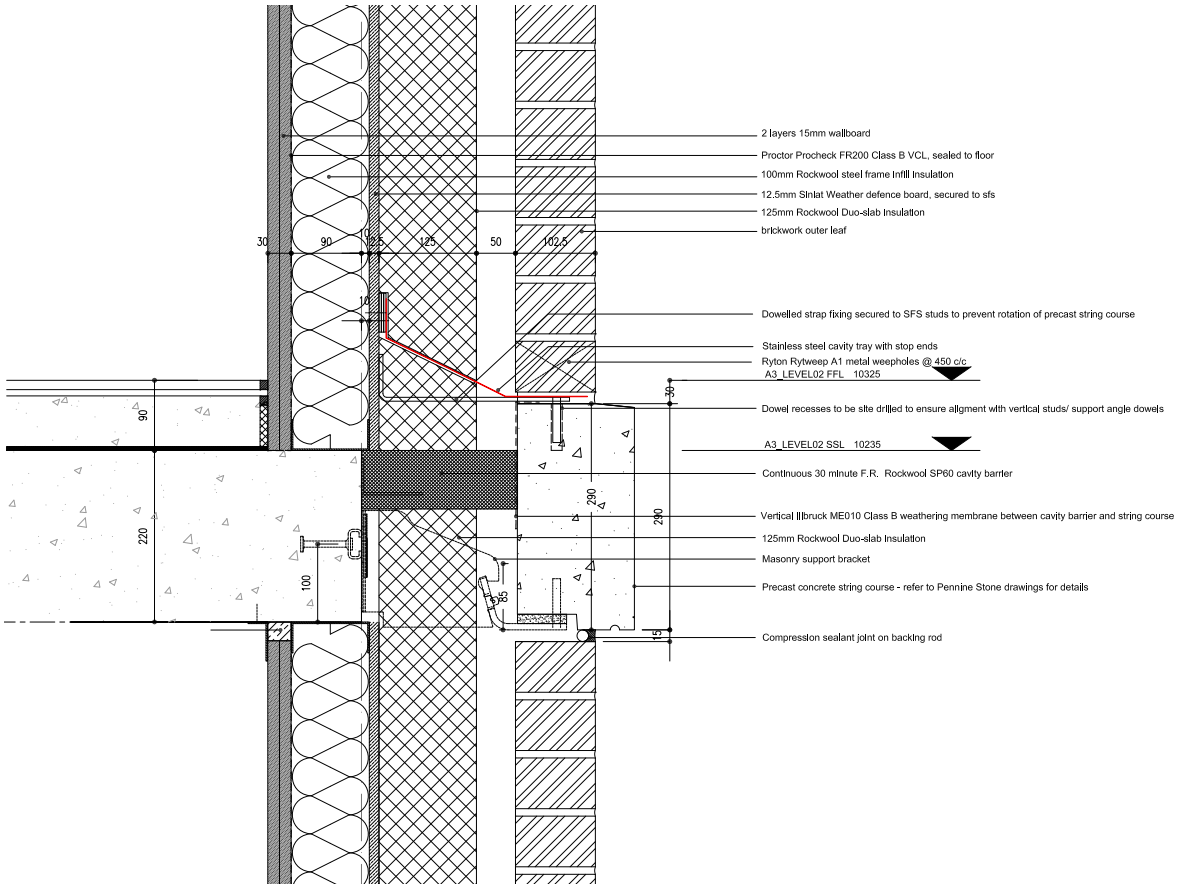
Lessons learnt from the Grenfell tragedy demand a focus on ***non-combustible*** façades.

We adopted a broadly similar strategy in our delivery of 380 homes that form the social / affordable component of the £8bn Battersea Power Station development. In the light of lessons being learnt from the Grenfell tragedy and in advance of legislation being introduced, our contractor client Ardmore placed particular emphasis on constructing non-combustible façades.

This presented particular challenges in sourcing materials that would satisfy fire safety requirements (bespoke designed metal cavity trays for example replacing polyethylene) and in construction methodologies, where for example spandrel panels above windows had to be physically separated from window framing below and detailed to ensure non-combustibility.









Battersea Powerstation Phase 4a, London

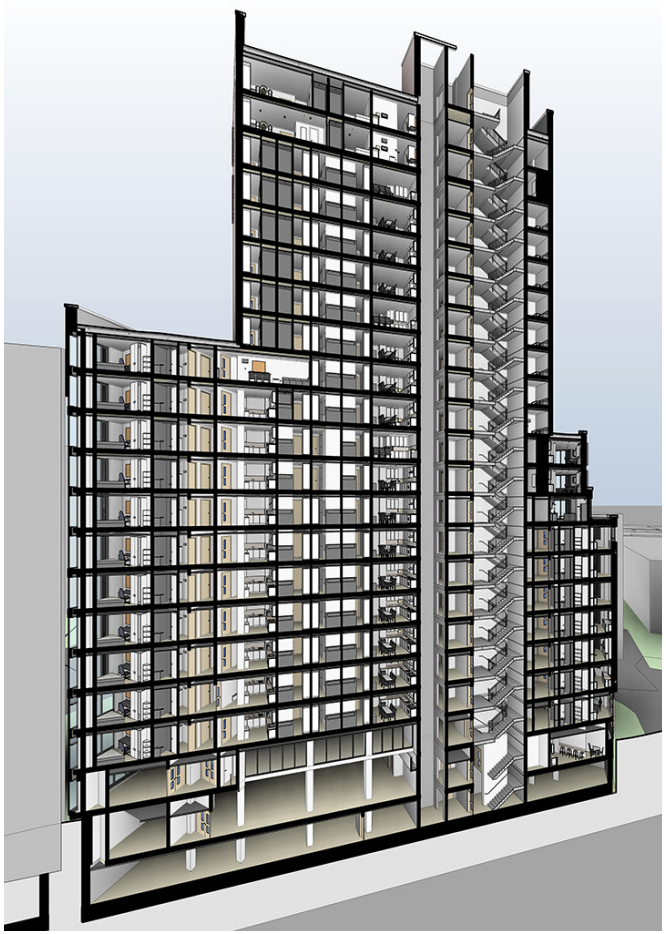
Utilising ***brick tile cladding systems*** reduces structural weight and can bring programming benefits.

There are occasions when reducing the weight of an external façade can be a critical consideration and necessitate looking to solutions that don't require a full brick skin.

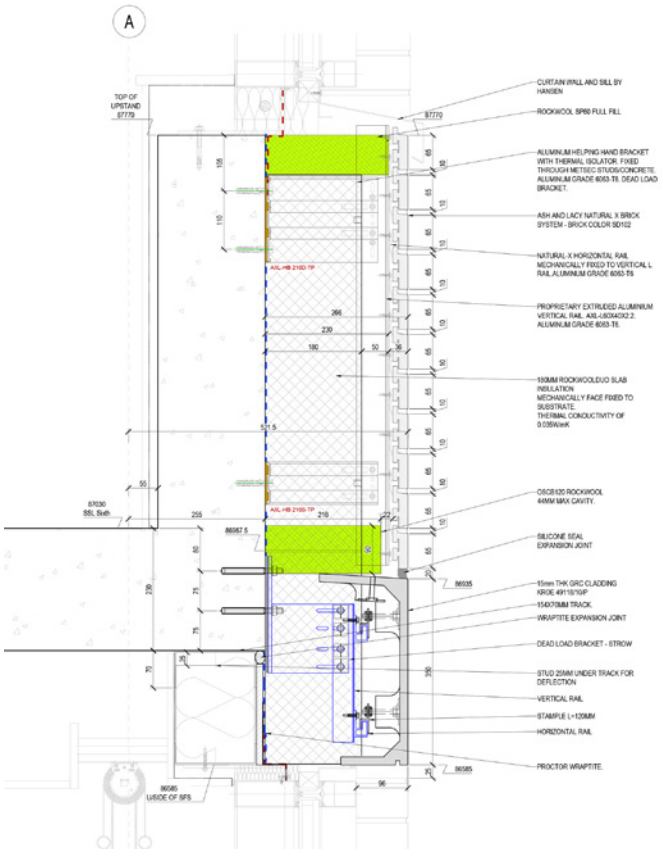
Our 20 storey PBSA development, The Gate in central Sheffield is a great example, where sub-structure issues demanded that the super-structure had to be kept as light as possible, but with a planning permission that dictated the use of clay facing brick on the principal facades.

A range of solutions were explored with contractor, McAleer & Rushe and advice from a number of specialists including fire and façade engineers, before adopting a proprietary brick tile cladding system of extruded brick tiles mechanically fixed to an aluminium support framework (Natural X, manufactured by Ash & Lacy), fixed back to an SFS internal wall build up.

This solution effectively turned traditional construction sequencing on its head, where the SFS walls were weatherproofed to allow the internal fit-out to be progressed, before the brickwork installation was brought forward at great speed towards the end of the construction process.









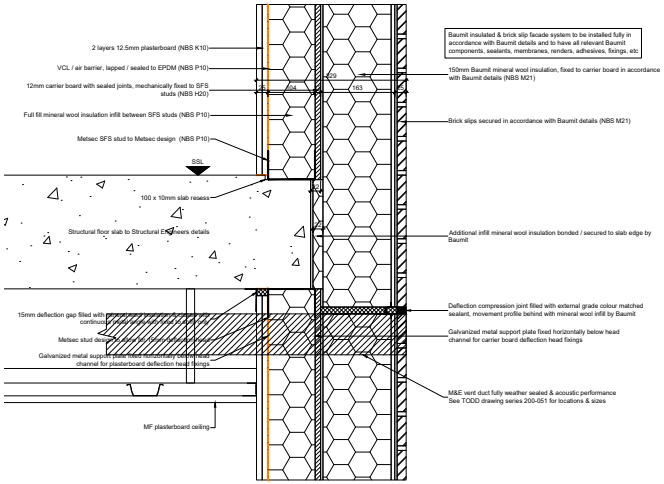


The Gate, Sheffield

Panelised cladding systems with brick slip facings can be ***cost effective*** solutions and speed up construction.

Other lightweight approaches include panelised insulating board cladding systems with brick slip facings. These can be cost effective solutions and bring a simplicity in erection and speed of construction. They do however require particularly close attention in respect of fire safety certification and appropriate as-installed product warranties, where there use in building's over 18m is becoming increasingly challenging. We recently worked very successfully with a system manufactured by Baumit on a 109 unit residential development at Swiss Cottage in North Dublin.







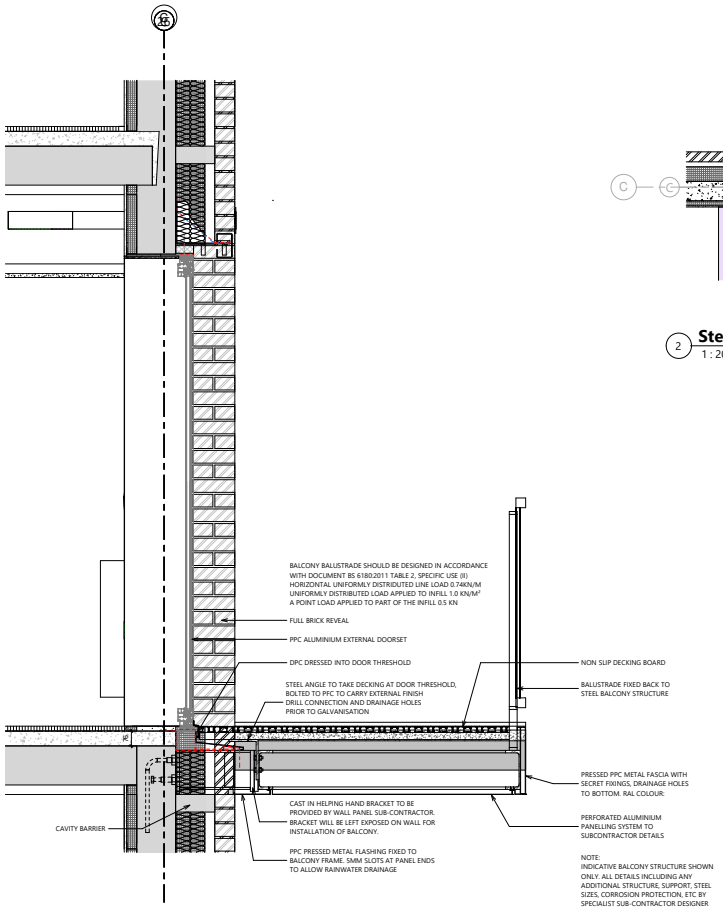


Precast concrete has become an increasingly ***popular*** choice in multi-storey construction over recent years.

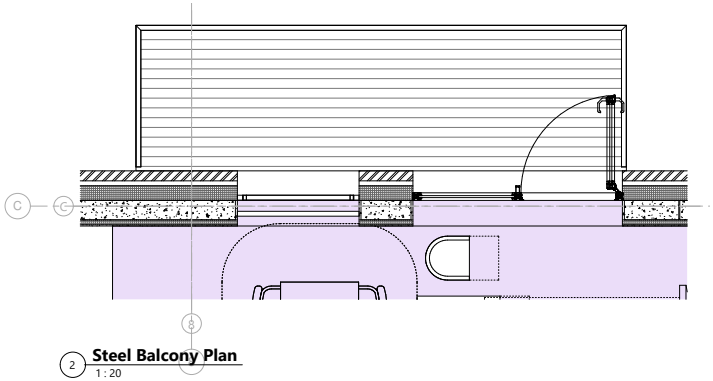
Utilisation of precast concrete has become an increasingly popular choice in multi-storey construction over recent years, being particularly prevalent in the Irish market where there are a number of experienced manufacturers, and now extending across the GB market.

It can be incorporated and utilised in a variety of manners. Manufacturers such as O'Reilly, Creagh and F.P. McCann offer structural wall / flooring systems, replacing an insitu frame and where the inner leaf of the external wall is formed in precast concrete panels with brickwork hung from it, in a similar manner to the 'traditional' approach described above. We are presently adopting this methodology with the London Building Company on the delivery of 106 social / affordable apartments in Purley, south London.

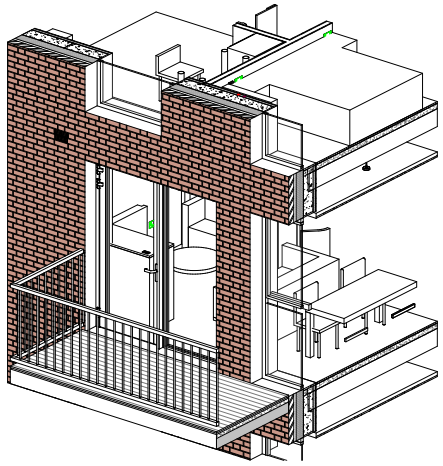




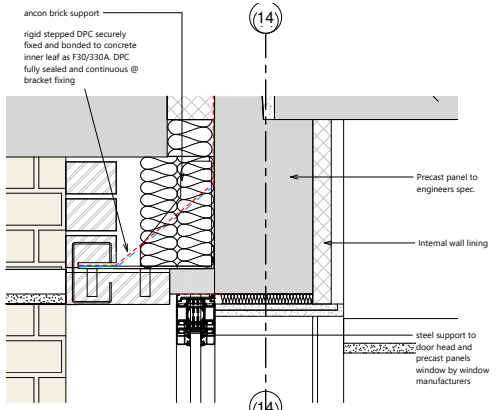
1 **Steel Balcony Section**
1 : 10



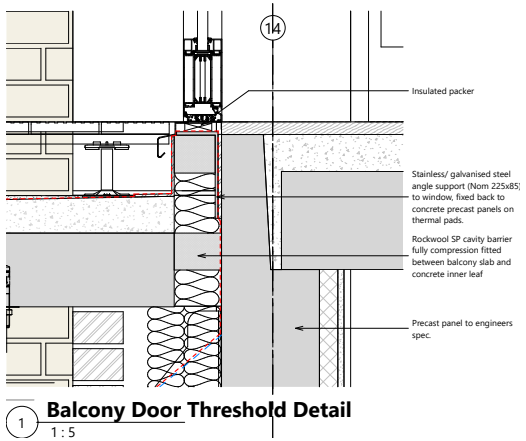
2 **Steel Balcony Plan**
1 : 20



3 **Projected Steel Balcony Section 3D**

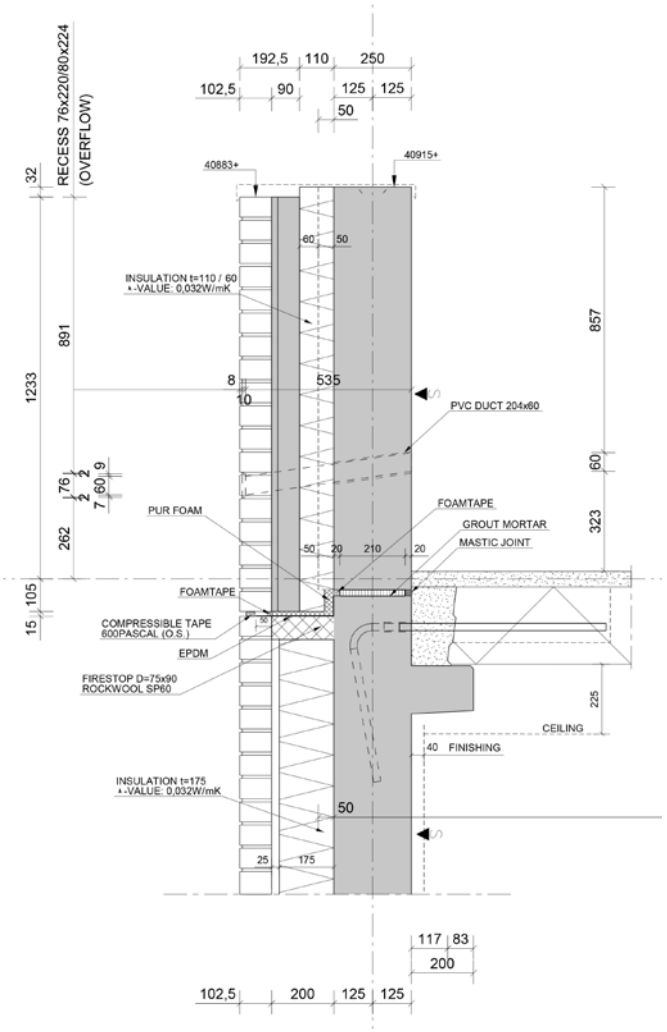


3 **Door Head Detail**
1 : 5



1 **Balcony Door Threshold Detail**
1 : 5

Off-site fabrication is improving quality and reducing contract periods.



At a somewhat more sophisticated (and costly!) level, manufacturers such as Blydis in Holland have developed very innovative solutions where the precast system extends to fully off-site manufactured external walling panels, comprising an internal leaf of precast concrete, a filter membrane, insulation and brickwork, c/w glazed opening and bracketry for projecting balconies. The system incorporates these panels with precast internal wall elements, and is effectively tied together with reinforcement that links the wall panels to the floor slab above.

Being manufactured off-site the workmanship quality of these panels is extremely high, and of course the system brings major programming benefits, where external walling to a typical apartment block floor can be completed in just seven days, and with temporary weather proofing every four floors, allowing internal fit-outs to proceed whilst the system installation proceeds above.

Like all precast solutions, early coordination of structure, services and fabric is crucial and we have found the use of Revit software / BIM modelling to be invaluable tools in this regard.
Ballymore look to this solution on the majority of their developments in London, utilising it when apartments vertically "stack" in a straightforward manner and using more traditional construction elsewhere. Both the Goodluck Hope and Royal Wharf developments, where we have / are delivering over 1400 apartments for them, and are using this methodology in the majority of the individual blocks (one of which rises to over 30 storeys), above an insitu concrete transfer slab at first floor level.









Goodluck Hope, London

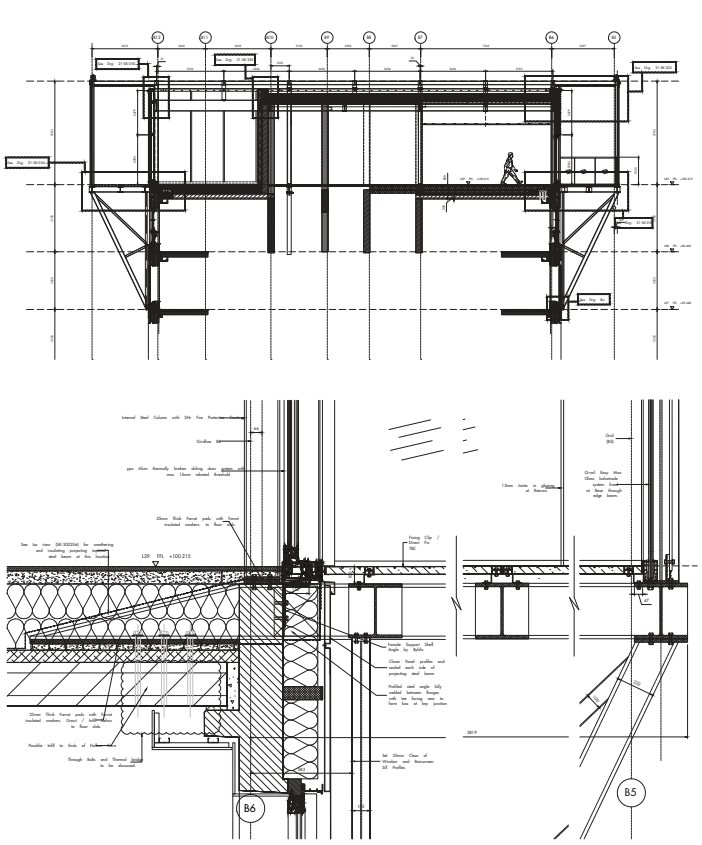
Where might things move, and ***how we might help***.

Each approach described has benefits and disadvantages which have been touched upon and given the experience the practice now holds across the differing methodologies, we can assist clients and contractors in determining the most appropriate choice for a particular contract.

It will be interesting over the next few years to see what impact "full" modularisation might have on the sector.

There are already examples emerging and we have been engaged with leading manufacturer in the field, The McAvoy Group on a concept for lower rise residential developments, that could be taken into the multi-storey arena.

Our advice is further strengthened by our ability to offer a façade engineering service through James Hanna and his team, who bring invaluable knowledge from the fields of curtain walling and cladding system manufacture and fabrication.



Goodluck Hope tower detailing



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