

A current popular design trend is for shallow roofs with box gutters and parapets. Parapet construction can be approached in a number of ways but some of the more common approaches are either for the builder to frame it on site or to have the truss fabricator deal with the issue and build them into the truss. As parapets are outside the scope of AS 1684 and AS 4440, the build-on-site option may create some issues for the builder and require an Alternative Solution. Requirements for parapet construction will be dictated by actions that may be imparted onto the parapet including live loads during construction (if they are required to act as a fall protection barrier) and lateral wind loads, which will be governed by the sites wind classification as well as height of the parapet. The higher the wind classification and parapet height, the greater the challenge. Irrespective of the methods used to form parapets, they will no doubt be required to have an engineered solution either via the truss designer or a consulting engineer.

The following provides some guidance on how parapet construction may be addressed.



TRUSS PARAPET OPTIONS

Parapet formed as part of the truss

For small parapets it may be possible to use a cantilever member (Figure 1 (a)) provided sufficient truss depth is available at the shallow end. This can also be cut and framed on site to suit width and fall of gutter. For details refer to the truss manufacturer.

This allows for standard-height wall frames and roof trusses that are easier to install.

In the absence of sufficient depth, the option (Fig 1 (b)) may be viable. The cantilever member must not be damaged during transport and handling. The fabricator may consider making the parapet piece separately as an "L" shaped frame to protect against damage during transport and handling, and fixed on site with screws to the side of the bottom chord.

Where forces dictate, an additional "L" shaped bracket can be fabricated from timber or from welded steel screwed/bolted to the bottom chord and upstand as required. See Figure 1 (c)

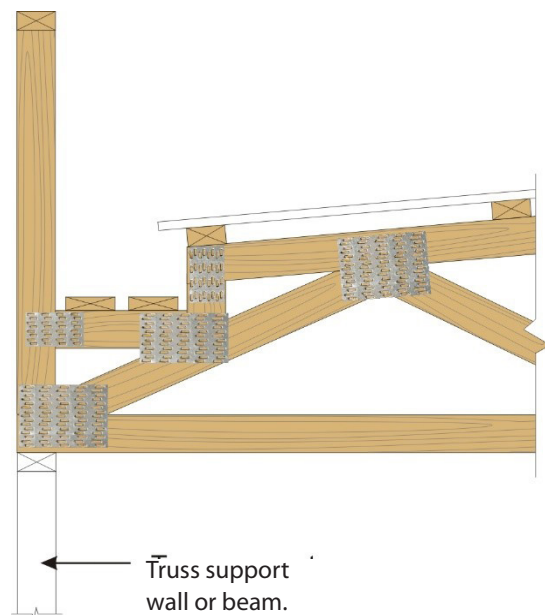


Figure 1 (a)

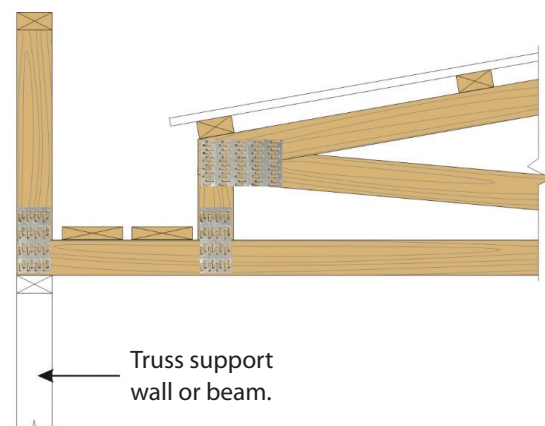


Figure 1 (b)

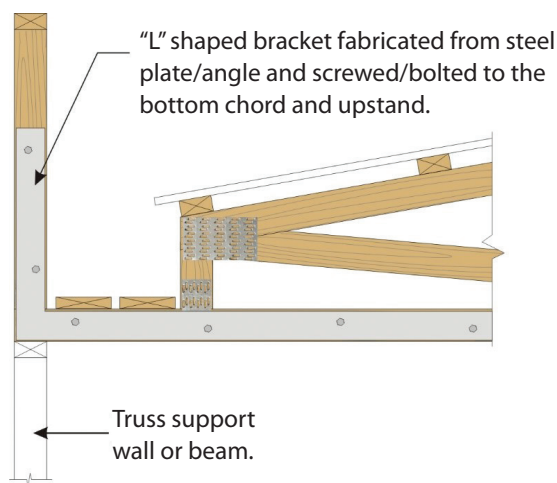


Figure 1 (c)

Parapet in the form of a parallel chord truss

Where possible, using parallel chord trusses to form parapets should be avoided as methods need to be incorporated to restrain the top chord such as 'T' stiffener capping which is easily installed. Framing may also be required to be fixed to the outside of the truss to enable fixing of cladding and maintain a straight line.

This option becomes suitable in situations where a load bearing wall is not available to support roof trusses.

Similar to a gable end truss, lateral loads on webs should be avoided. Water resistant cladding material fixed via battens is recommended, to distribute lateral loads to top and bottom chords of the parapet truss and the gap between the cladding and truss enables provision of a moisture barrier.

For typical roof trusses lateral restraint is usually provided by the roof battens or by other incoming trusses at right angles to the truss chord.

In the case of a parapet girder truss top chord there is no member(s) at right angles and often will require t-stiffeners and galvanised steel knee-braces to transfer the loads back to the main structure (See Figure 2).

The use of knee-braces can create connection details that need serious consideration in respect of maintaining a durable waterproof roof.

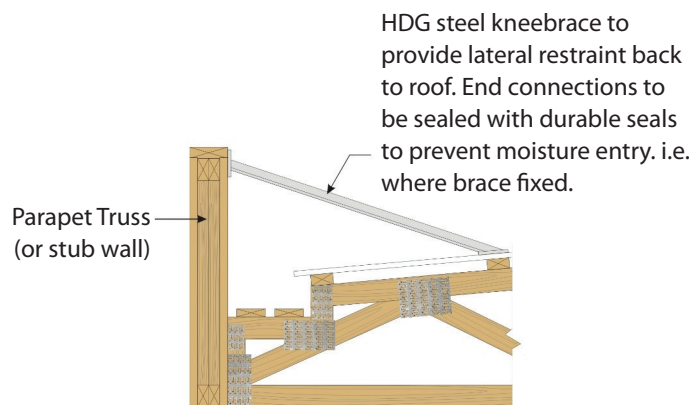


Figure 2

WALL PARAPET OPTIONS

Parapet formed by cantilevering wall frame

One way to construct a parapet is to extend the height of external wall studs creating a cantilever and fix the roof trusses to the wall using a pole plate. This is usually easily achieved for small span trusses that do not impart significant loads to the pole plate and to ensure lateral stability of the wall frame is maintained. These higher wall frames however, can often be difficult to manufacture and transport (See Figure 3).

Like the parallel chord girder option, the cantilevering studs must be designed by an engineer as they are not included within the scope of AS1684. As a guide, a maximum cantilever length of approximately 25% of the restrained normal stud height should be achievable.

The studs must be directly fixed to truss bottom chords with tension straps or similar at regular intervals.

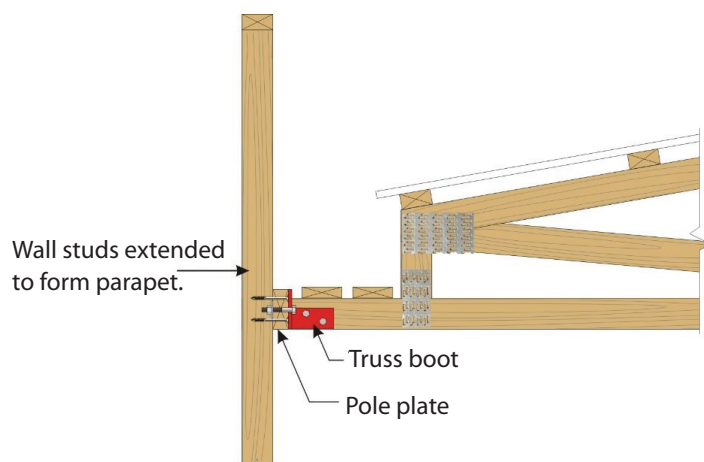


Figure 3

Parapet formed by stub walls

The use of a stub wall to form the parapet requires specific fixing details, at both bottom and top of the wall, to maintain lateral stability. Although fixing at the bottom can be easily provided, it may not be sufficient to achieve adequate moment restraint and it is often impractical to achieve a connection at the top to ensure the wall to ensure it is stable against face wind loads or lateral loads applied by a worker on the roof. A wind beam may also be required at the top of the parapet.

The parapet would need to be strutted back to the roof structure to maintain its stability. This is usually not desirable, as it often requires a penetration through the roof sheeting and an exposed galvanised steel strut above the roof. (See Figure 2).

Gable/skillion end parapets

Gable and skillion end parapets can be formed similar to boxed gables (where overhangs required) or in line with the outside wall as shown in Figure 4.

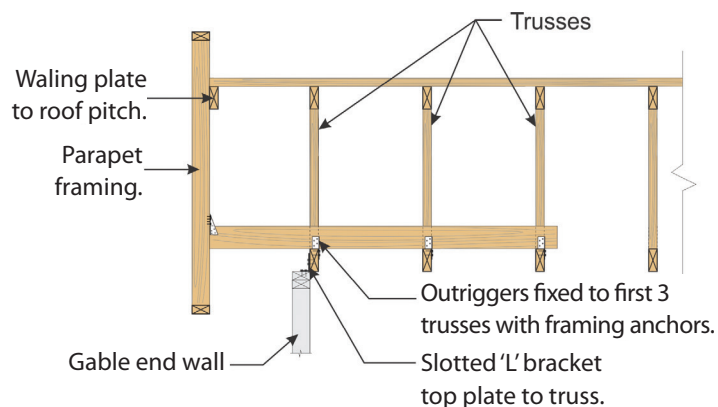


Figure 4

CONCLUSION

Next time you have a project with parapets, remember that extra care needs to be taken to ensure that the trusses and or wall frames are designed, manufactured and installed correctly. Truss fabricators and their supportive nail plate suppliers will be able to provide appropriate design and construction details, alternatively seek advice from a consulting engineer.



Parapet with HDG steel knee-brace back to main roof



Fabricated steel 'L' brackets were retro fitted to this parapet prior to completion.

ACKNOWLEDGEMENTS

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SAFE WORKING

Working with timber produces dust particles. Protection of the eyes, nose and mouth when sanding, sawing and planing is highly recommended. Refer to tool manufacturers for safe working recommendations for particular items of equipment.

DISPOSAL OF OFFCUTS AND WASTE

For any treated timber, do not burn offcuts or sawdust.

Preservative treated offcuts and sawdust should be disposed of by approved local authority methods.



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