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Flights

JOINING STRINGERS

Depending on the overall length of the stair, stringers may need to be produced in two or more sections - to be joined on site. Joint stringers are pre-cut in the factory, with holes drilled to house the metal joiners (supplied with the stair).

- Step 1:** Glue the joining edges of the stringers with construction adhesive
- Step 2:** Insert the metal joiner and then tighten using a 10mm spanner.
- Step 3:** Place the supplied MDF gusset over the stringer join - 20mm below the tread rebate and 5mm behind the riser rebate.
- Step 4:** Glue and screw the gusset into place (Refer Figure 1)

Important: Joints in stringers cannot be left unsupported. Either prop temporarily until the supporting wall has been built or if the stair is to be left open underneath, refer to '**Sub-Stringers**' for method of support.

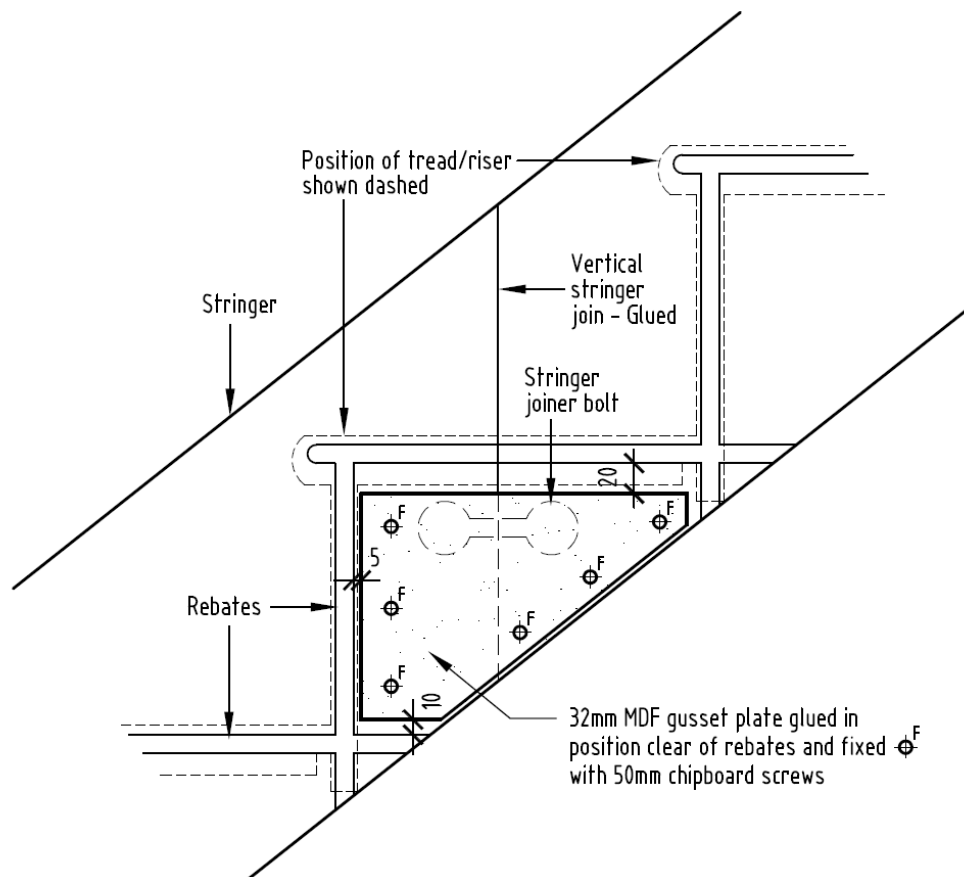


Figure 1
Stringer Joint Detail

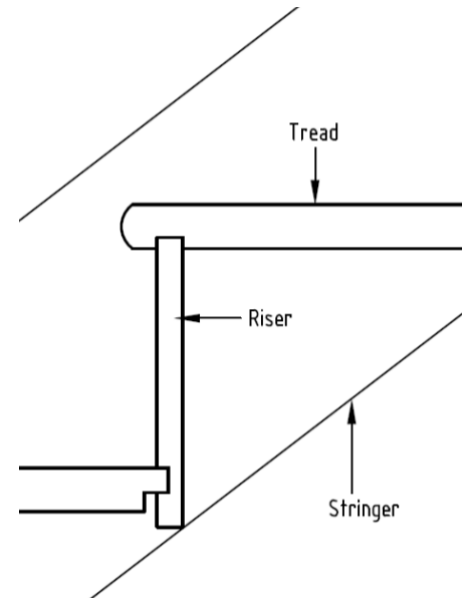
FLIGHT ASSEMBLY

Method 1: Assembled In Place

This is the preferred method of installation when the flights are either long or if there is insufficient room to maneuver the assembled flight into position.

FIRST: Partially assemble the flight

- 1) Place the stringers on the floor with the top edge down and the dovetail rebates facing each other, ensure parallel.
- 2) Add glue and insert the top nosing, top tread and top riser into their respective rebates.
- 3) Screw through the back of the top riser into the stringer, at a slight angle.
- 4) Screw down through the top of the nosing into the riser, to stop the nosing from sliding forward.
- 5) Insert the lowest tread of the flight and push this all the way forward. This will prevent the riser from locating in the rebate in the underside of the tread.
- 6) Place the bottom riser into dovetail rebates and push up to the underside of the tread.



NEXT: Lift the partially assembled flight into position (with assistance if necessary)

- 7) Once in position, screw through the top riser into the floor joist to hold the flight in place.

THEN: Insert the remaining treads and risers

- 8) Apply a thick bead of construction adhesive within the rebate of each tread.
- 9) Insert all treads into the stringers making sure that they are pushed in parallel, careful not to damage the dovetails. Using a rubber mallet, tap into position. Ensure that the treads are pushed all the way forward or the risers will not locate into their respective rebates.
- 10) Apply a thick bead of construction adhesive within the rebate and along the top edge of each riser (where it will recess into the corresponding tread rebate above).
- 11) Insert the risers into the stringers starting from the top, working down. Make sure riser #1 is installed in the correct position.
- 12) Using a rubber mallet tap the riser into the rebate of the tread above, then tap the lower tread into the rebate on the face of the riser.
- 13) Continue down the flight until complete.
- 14) Before tapping tread #1 back into place ensure that riser #1 does not locate into the rebate until a bead of glue has been applied to the top edge of the riser.
- 15) Before fixing the stringers to the wall, sight up the top edge of the stringers to ensure that they have not sagged. If they have, cut in a temporary prop under the flight to remove the sag.

FINALLY: Fix the stringers to each stud using 100mm batten screws (Refer Figure 2)

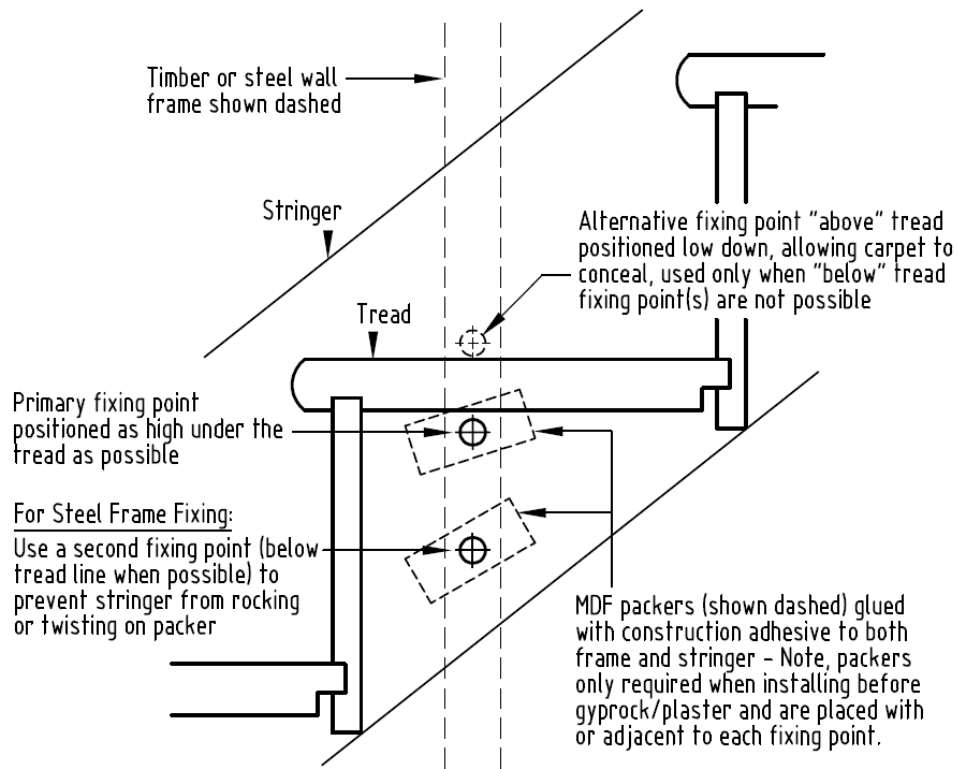


Figure 2
Stringer Fixing at Wall

Method 2: Assembled On The Floor

A method used for small flights and when there is sufficient room to maneuver an assembled flight into position.

FIRST: Assemble the flight

- 1) Place stringers on the floor with the leading edge down and dovetail rebates facing each other, ensure parallel.
- 2) Insert all treads between stringers ensuring parallel. Using a rubber mallet, tap each tread all the way forward.
- 3) Apply a thick bead of construction adhesive to both rebates within the risers and the treads.
- 4) Insert the risers into the stringers starting from the top, working down. Make sure that riser #1 is installed in the correct position.
- 5) Turn the flight onto one stringer face, preferably the wall side. Proceed to tap the treads and risers together as previously mentioned in steps 8-14 **Assembled In Place**
- 6) Now install the top riser and nosing as described in steps 2-4 **Assembled In Place**

THEN: Lift the assembled flight into position (with assistance if necessary)

Note: When a flight runs down from either a mid-landing or set of winders ...

- The top nosing will not be required since the landing or first winder platform will form the nosing.
- The top riser has been reduced by 9mm in height as the landings and/or winder platforms do not have rebates.

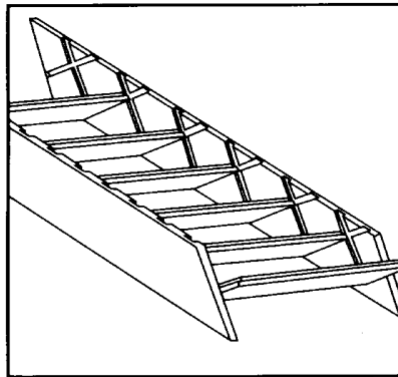
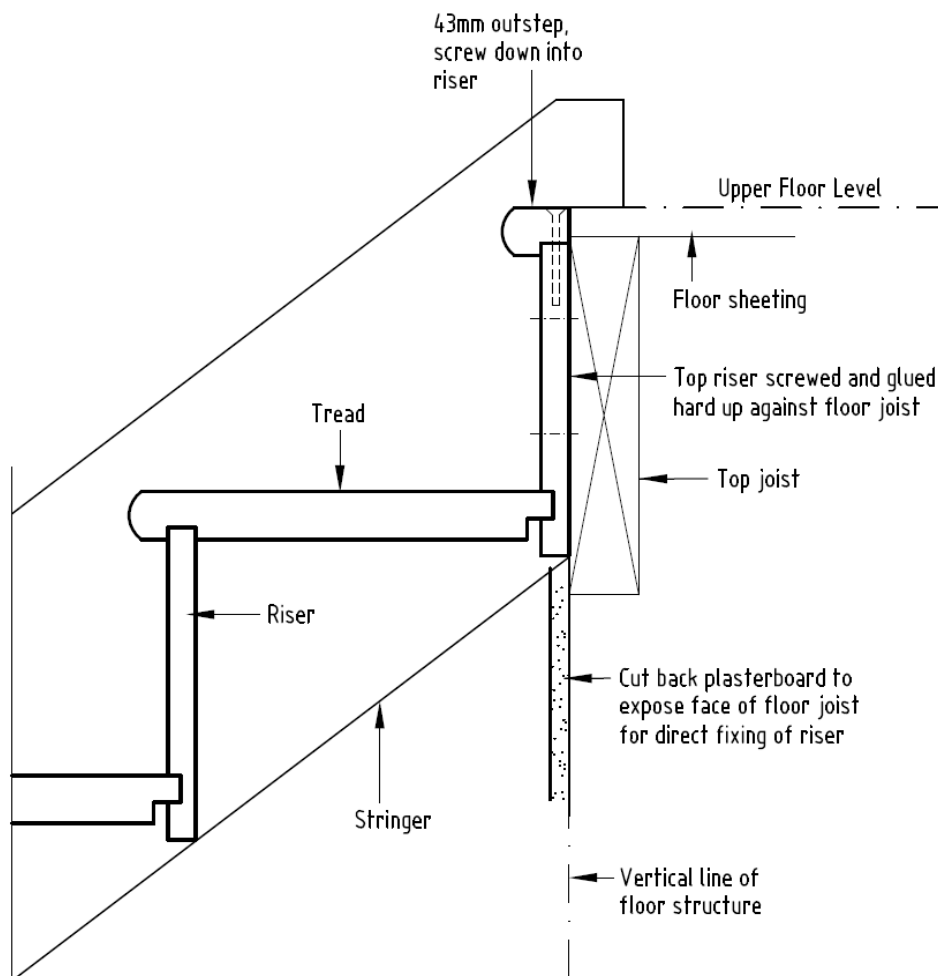


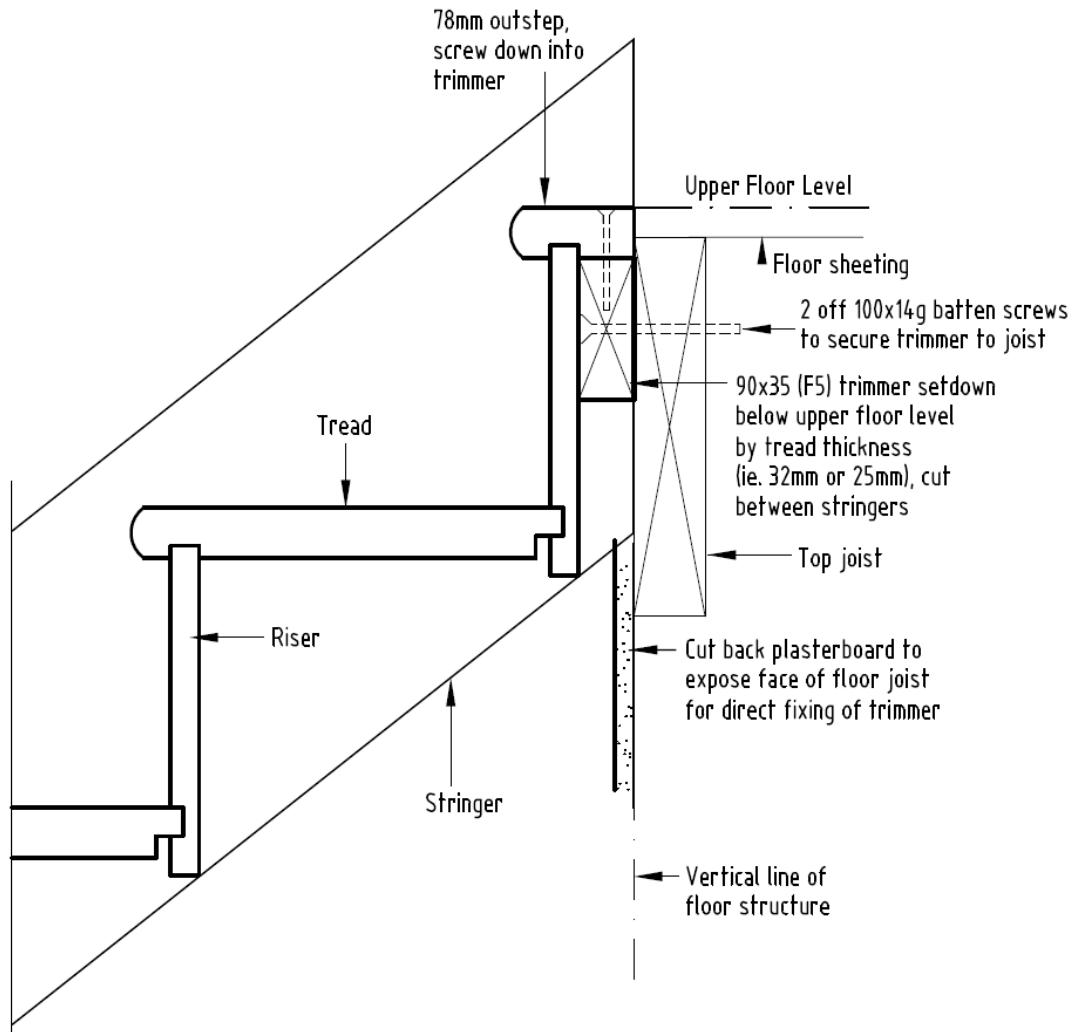
Figure 3
Flight upside down, ready for the risers to be inserted

TOP NOSINGS (OUTSTEPS)

- **43mm Outstep:** Standard in most cases, positions the back of the top riser hard against the upper floor joist. This also leaves 15mm for carpet wrap when a post is fitted.



- **78mm Outstep:** Utilizes a single 90 x 35mm trimmer, placed behind the top riser and nosing, set down by the thickness of tread.



- **133mm Outstep:** May be used to make up extra length in the stairwell.

When installing a flight using a 133mm nosing (78mm is similar), fix to the timber joist as follows:

- 1) Remove any plaster or plasterboard from the face of the floor joist.
- 2) Cut two lengths of 90 x 45mm (F5) Pine, slightly shorter than the inside measurement between stringers. Fix the first trimmer to the floor joist using 100 x 14g batten screws

Ensure that this is tread thickness (ie:32mm, 28mm or 25mm) down from floor level so that the top of nosing will finish flush with the floor. Screw the second trimmer into the first.

- 3) Once the flight is in position, screw through the nosing into the trimmers (Refer Figure 4).

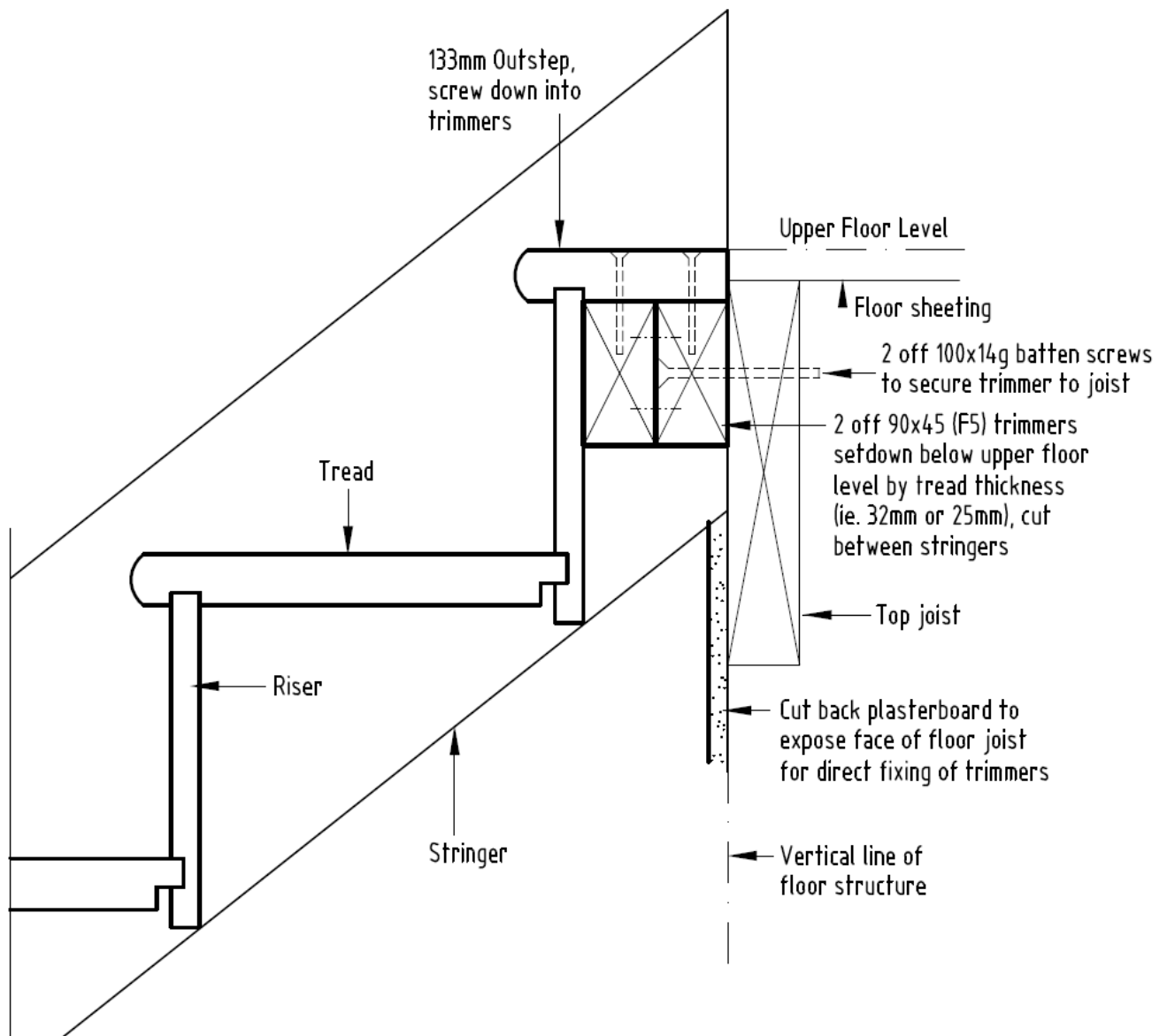




Figure 4
133mm Outstep Detail

GLUE BLOCKING

GLUE BLOCKS are required on EVERY Stair Lock MDF and American OAK staircase.

Glue block stock comes in lengths of approximately 1200mm, which are then cut to size on-site into 120mm lengths. The length and position of the glue blocks MUST remain consistent and aligned throughout so as to not detract from the finish of the staircase when viewed from underneath. Approximately 8 lengths of stock will be required for an average straight flight staircase.

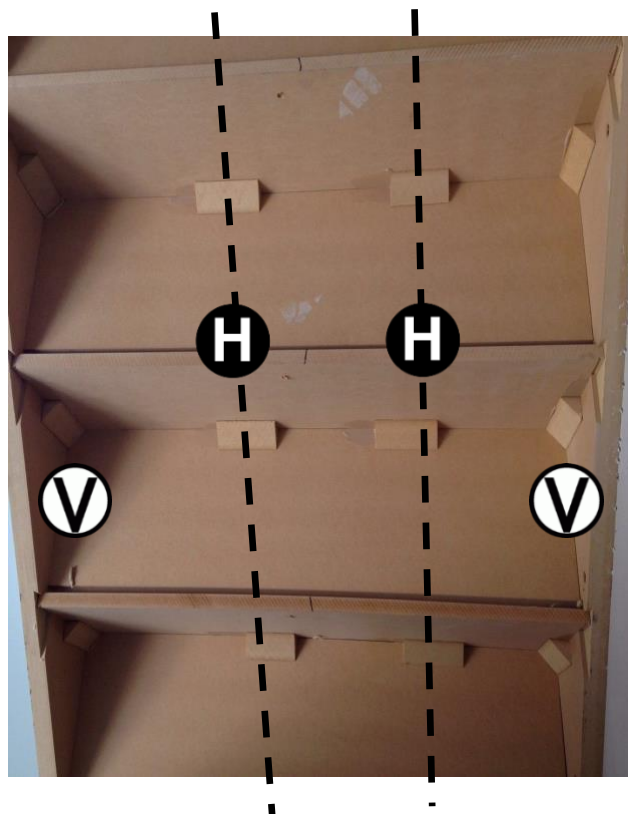
FIXING: Glue blocks are to be fixed using construction adhesive ONLY and then rubbed into place. DO NOT use fixing guns to nail the glue blocks.

The critical glue blocks are those located VERTICALLY  glued up the back of the riser and glued to the underside of the tread above (see photo) - The stair width will determine how many are glued HORIZONTALLY  behind the nosing line as explained in the following,

MDF STAIRS: Up to 1m wide (or about) require two (2) horizontal glue blocks placed directly behind each nosing 1/3 in from each stringer. ** Wider stairs require 3 horizontal glue blocks.

OAK STAIRS: Glue block as for MDF except directly behind the winder risers as well - This allows the oak winders to be nailed instead of 'drilled and plugged', unless screwing is required to eliminate bowing.

MDF CUT STRINGERS: With NO NOSING, glue blocks are not required since the treads are screwed from above.



Glue blocks aligned and even

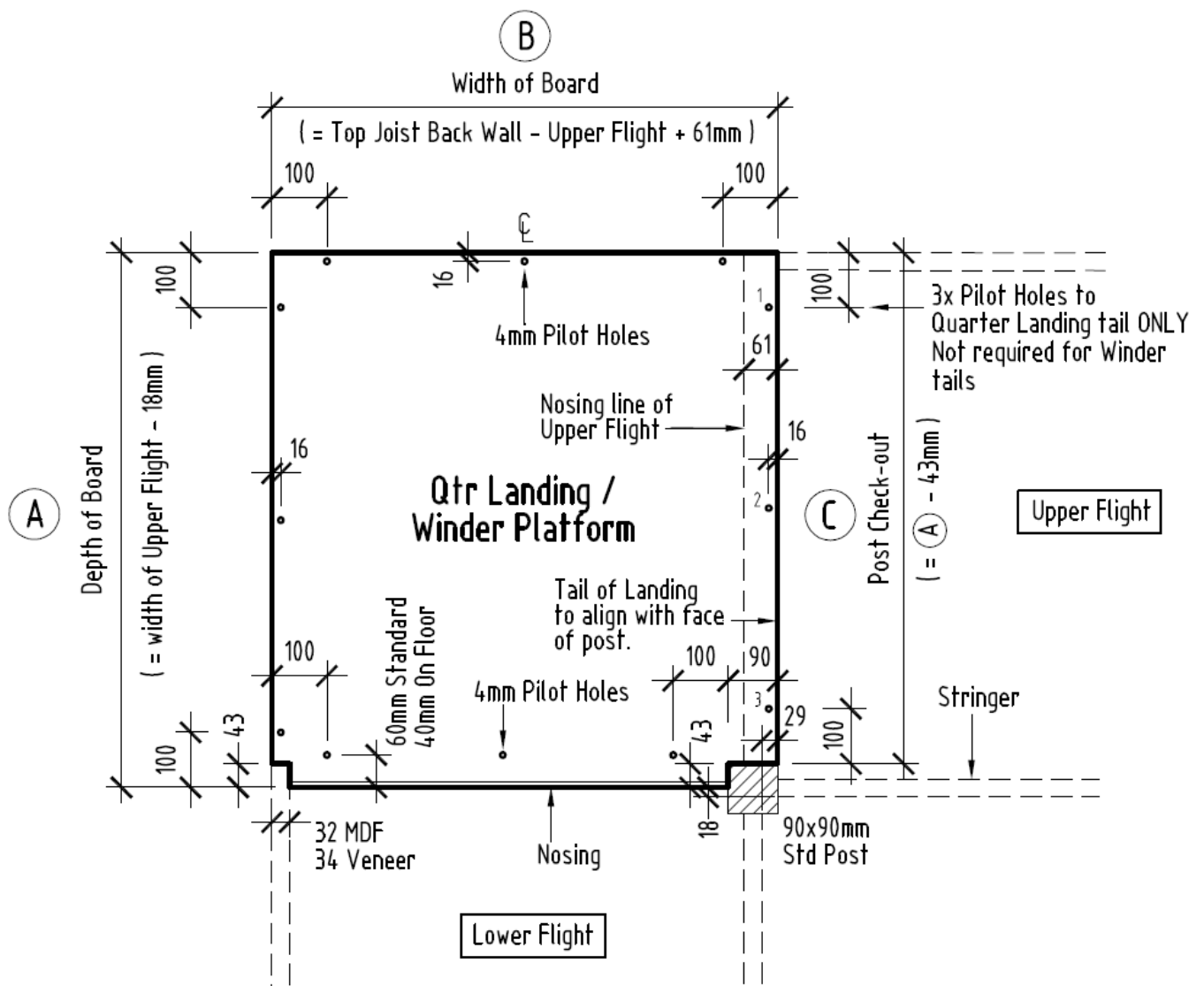
Landings & Winders

QUARTER LANDINGS

- **Cut-outs applicable for non MDF Stairs (ie. American Oak)**
- **Please Note:** MDF Stairs will have pre-machined components

Referring to the shop drawing, proceed to mark out the landing for cut-outs to suit the centre post (if applicable) and the lower flight stringer.

- 1) Centre Post Cut-out – From the nosing, measure in from the wall side and mark the overall width of the lower flight. From this point, measure inside the line by 61mm and then 43mm back from the nosing. Square these two lines through until they intersect. Proceed to cut them out.
- 2) Stringer Cut-out - From the nosing, measure out from the wall side by 32mm (34mm for veneer) and then 43mm back from the nosing. Square these lines through until they intersect. Proceed to cut them out.



- **Trimmers**

- 3) Cut a 90 x 35mm trimmer to fit between the above cut-outs. Apply construction adhesive to one edge and position the trimmer 43mm back from the nosing line. Screw through the top of the landing into the trimmer.
- 4) Calculate the height of the landing by multiplying the tread number by the individual rise. For example, if the landing is tread #10 with a rise of 185mm, then $10 \times 185\text{mm} = 1850\text{mm}$.
- 5) Mark this height on the wall and then deduct tread thickness (ie: 32mm, 28mm or 25mm) for the thickness of the landing material. Level this line around the wall where the landing will run. At this point, cut a length of timber to this height to act as a temporary prop.
- 6) Cut two 90 x 35mm trimmers using the landing as a guide for length. Ensure the trimmer does not foul the 32 x 43mm cut-out in the nosing.
- 7) Glue and screw these trimmers to wall using 100mm x 14g batten screws (if timber frame).
- 8) Apply a bead of glue to the top of the trimmers; using the prop, sit the landing in place and screw to the trimmers using 65mm screws. Do not install the centre post at this time.

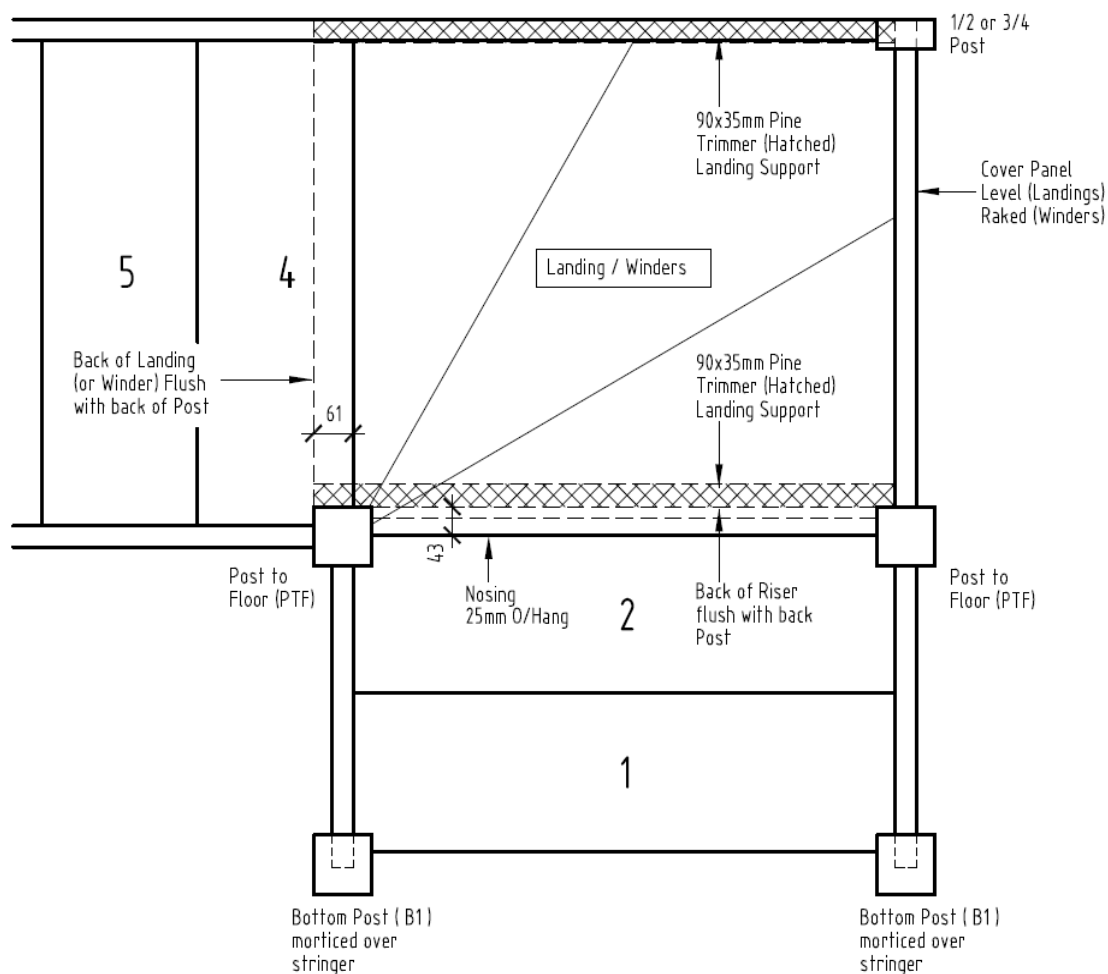


Figure 5
Trimmers for L-Shape Winders with Cover Panel

- **Lower Flight**

- 9) At this point, the lower flight can be moved into position (ensure that the top pre-cut riser of the flight has been used, ie 9mm narrower than flight risers). Screw through the face of the top riser into the landing trimmer behind. Leave the “centre post” stringer (if applicable) slightly long at this stage.

- **Upper Flight**

- 10) The upper flight can also be moved into position, once again leaving the “centre post” stringer (if applicable) slightly long.

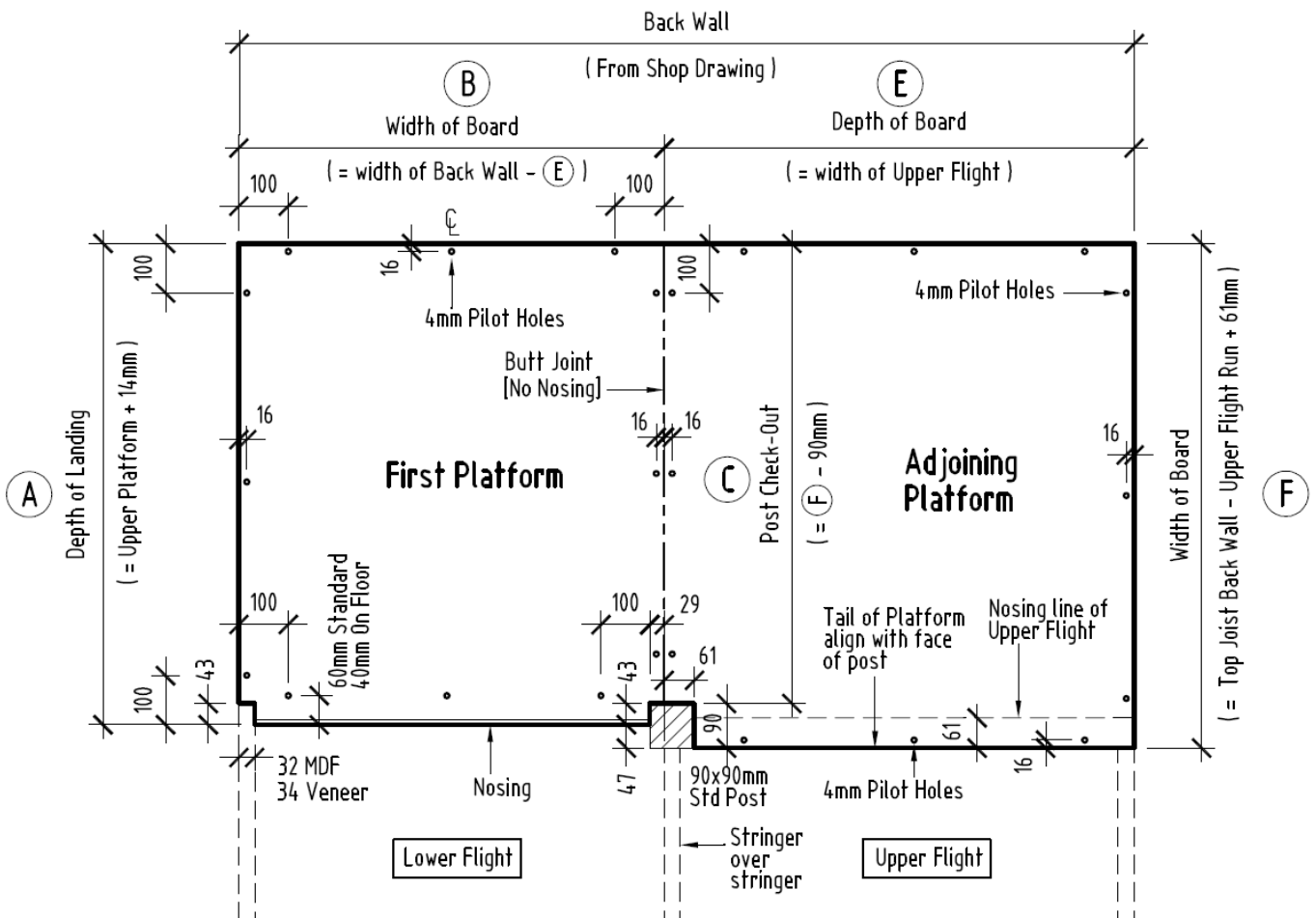
Note: The landing is supplied with a 61mm tail on the back edge to provide bearing for the top flight. Therefore, do not remove or trim back unless necessary.

- **Centre Post**

- 11) Using the cut-out for the centre post, measure back 90mm for the depth of the post. Plumb this line up the face of the stringer and remove the off cut. With the “centre post” stringer now plumbed to length, you will also need to cut 29mm out of the back of the adjacent tread to allow the centre post to slide down into position.

HALF LANDINGS

Half (180 degree) landings are installed using the same method as quarter landings, but in two sections. In addition, use a 90x35mm trimmer to run the full length of the join.

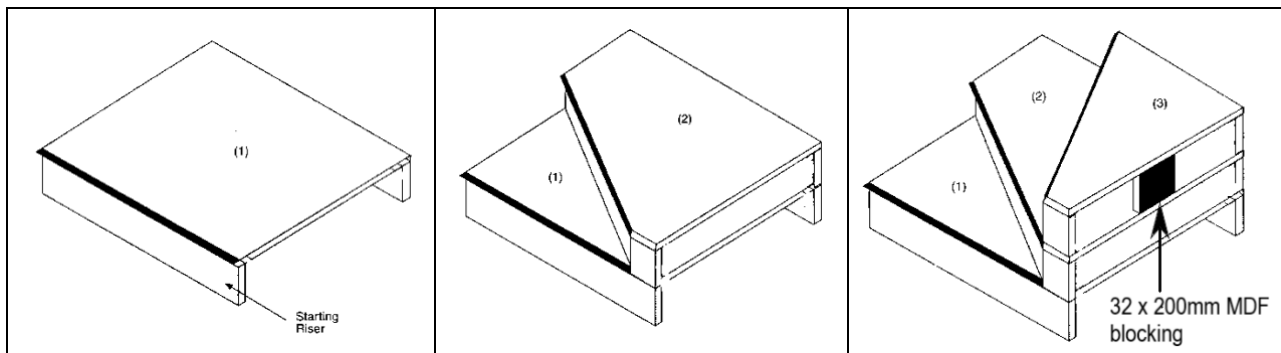


SPLIT HALF LANDINGS

“Split” half landings are quarter landings separated by one rise. Split landings are installed using the same method as quarter landings. In addition, a 32mm MDF riser runs from the back wall to the centre post (if applicable).

WINDERS

The following diagrams show how Stair Lock’s winder system is built up in stages.



- **Cut-outs applicable for non MDF Stairs (ie. American Oak)**
- **Please Note:** MDF Stairs will have pre-machined components

Start by marking out the “first winder” platform as detailed in **QUARTER LANDINGS**. However, continue the marks down the front edge of the winder. **Do not cut at this stage.**

- 1) Lay the remaining winders for this block on top, making sure that the outside edges align. Clamp the winder block together in at least two places.
- 2) Using a square, scribe the nosing line of each winder to the winder below. Transfer the “centre post” set out marks on winder #1 to the other winders above.
- 3) Drill four 4mm holes, located 40mm behind the nosing line of each winder. Continue these holes through to the winder below. These holes are for the screws to secure the winders to the risers.
- 4) Drill several 4mm holes around the outside of the winders. These holes are for the screws to secure the winders to the trimmers and risers.
- 5) Remove the clamps and remove the “centre post” cut-out on each winder as marked.
- 6) Starting with the ‘first winder’ platform, measure 25mm back from the nosing lines scribed earlier and cut a 32mm winder riser to this length. Cut a second winder riser to length to run along the wall.
- 7) Glue and screw these risers into place where the pilot holes have been drilled.
- 8) Repeat this step for the next winder above (if applicable).
- 9) Glue and screw the trimmers to the wall as detailed in **QUARTER LANDINGS**.
- 10) Place the first winder platform into position (with assistance if necessary), then glue and screw to the trimmers. Continue to fix the winders in succession.
- 11) To finish, install a 32mm x 200mm wide (approx.) MDF block to the underside of top winder as shown above.

**** TIP:** To ensure that the winders are a good fit, temporarily install the centre post, and pull the winders hard against the post before screwing them down.

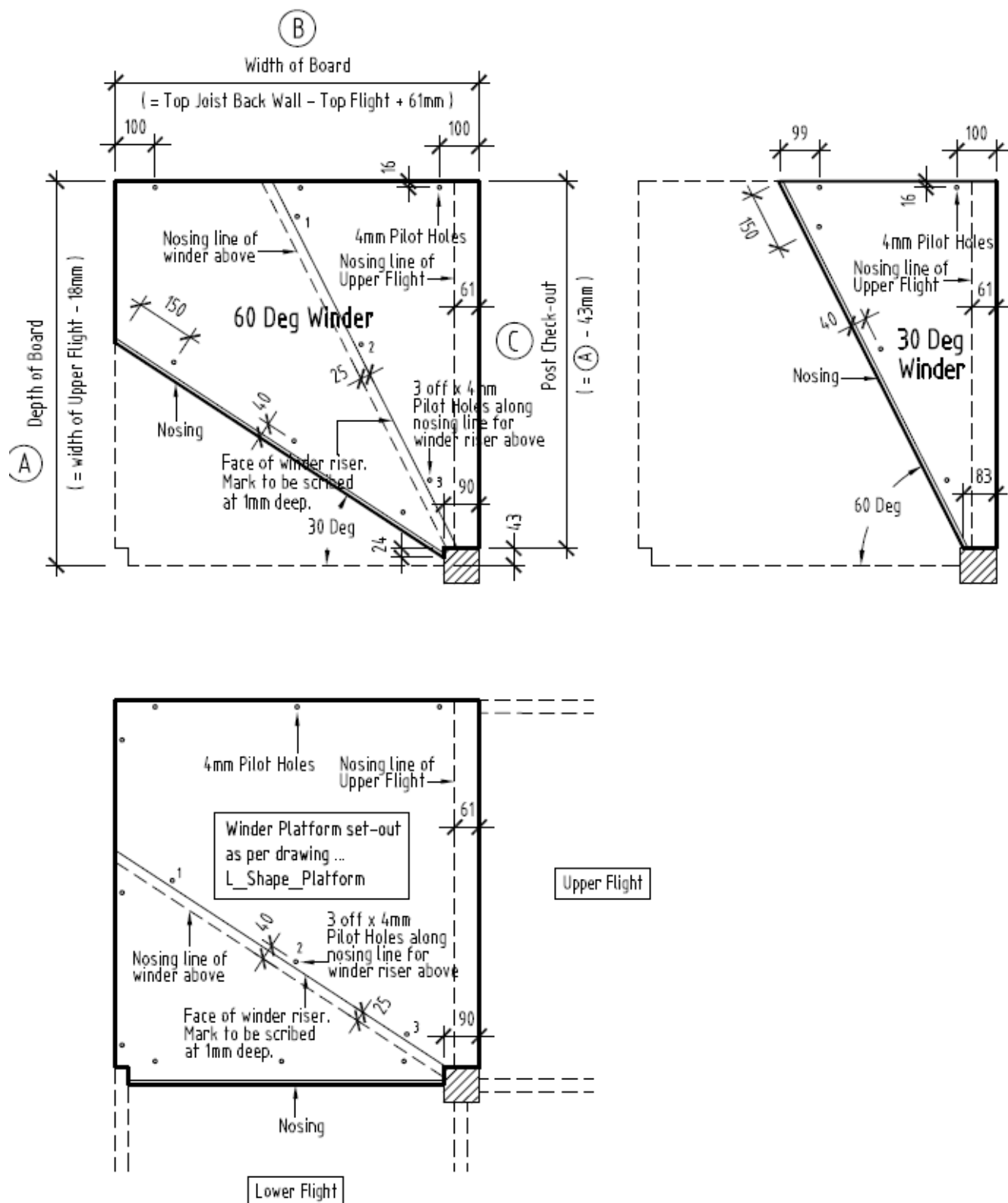


Figure 6
3 Tread Winder Set-Out (L-Shape Stair)

Bullnose Treads

ASSEMBLY

- 1) With the tread upside down, position the curved riser block 25mm back from the nosing.
- 2) Trace the riser block to the underside of the tread. Drill several 4mm pilot holes through the tread, then glue and screw the riser block to the tread
- 3) Cut the 32mm risers to length and fix one to each side of the tread.

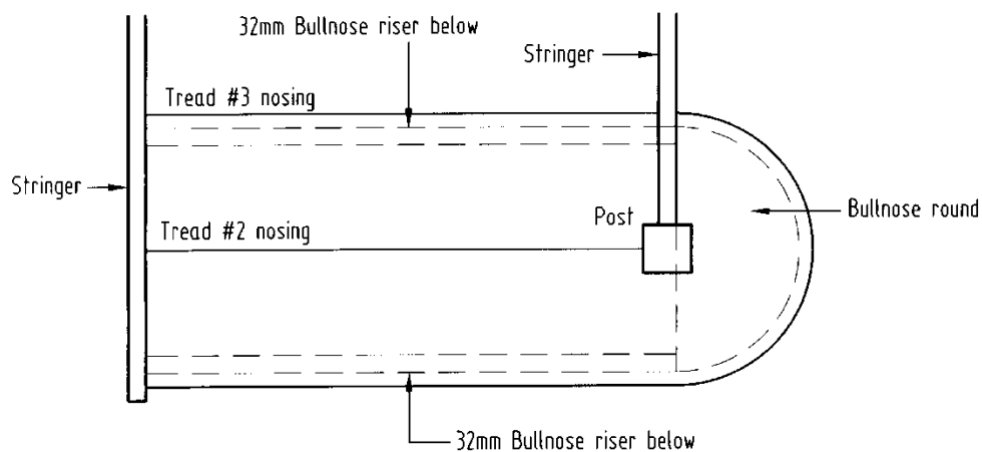


Figure 7
240mm Radius Bullnose Tread

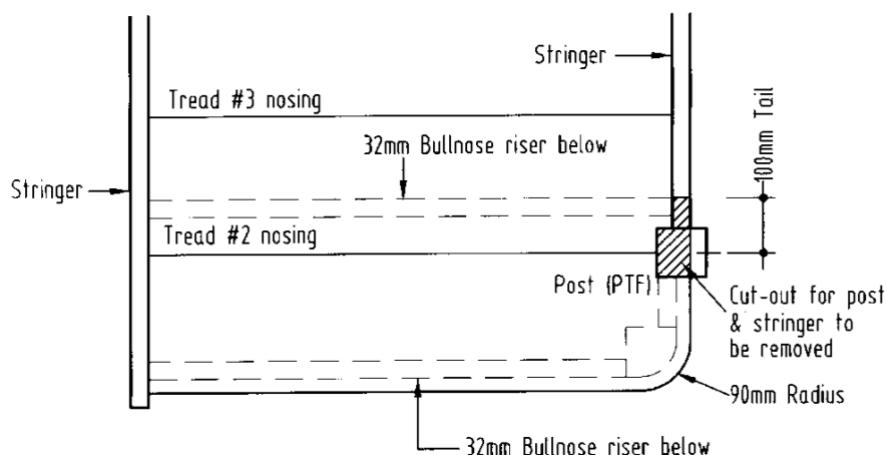
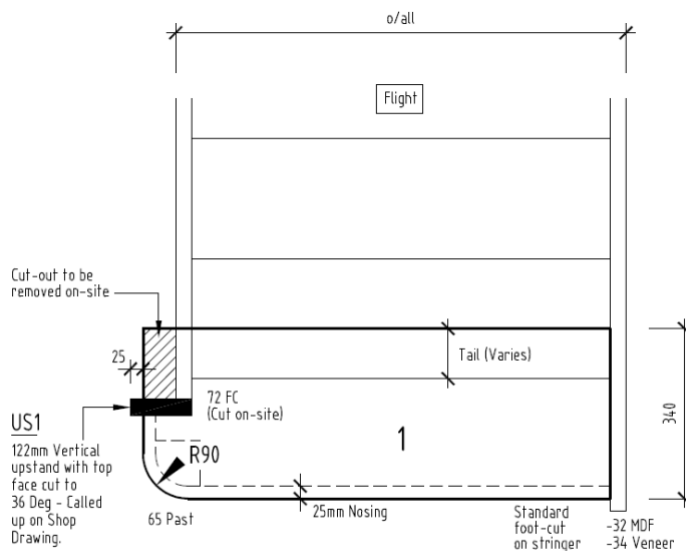
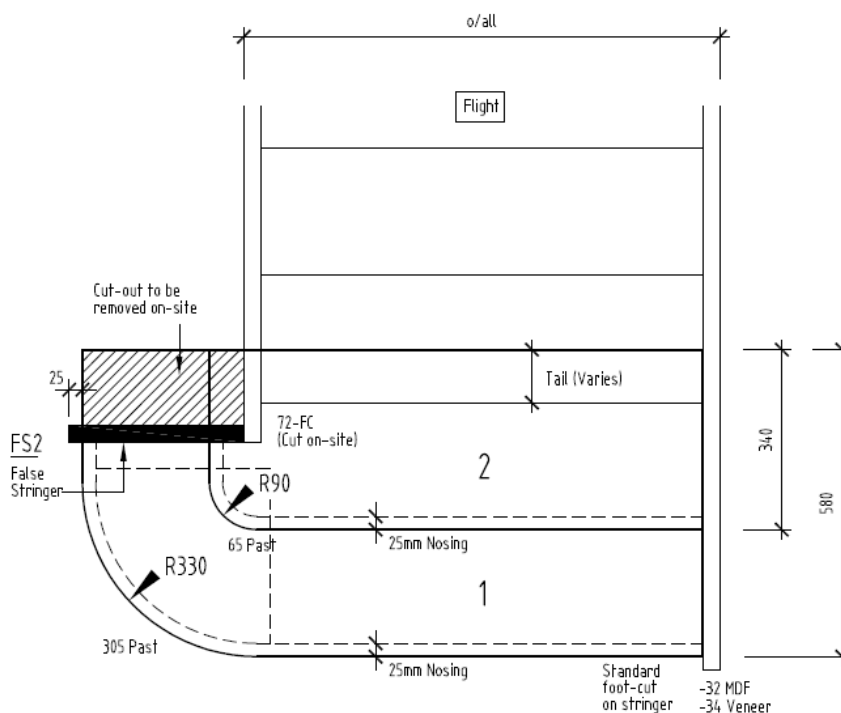


Figure 8
90mm Radius Bullnose Tread

EXAMPLES

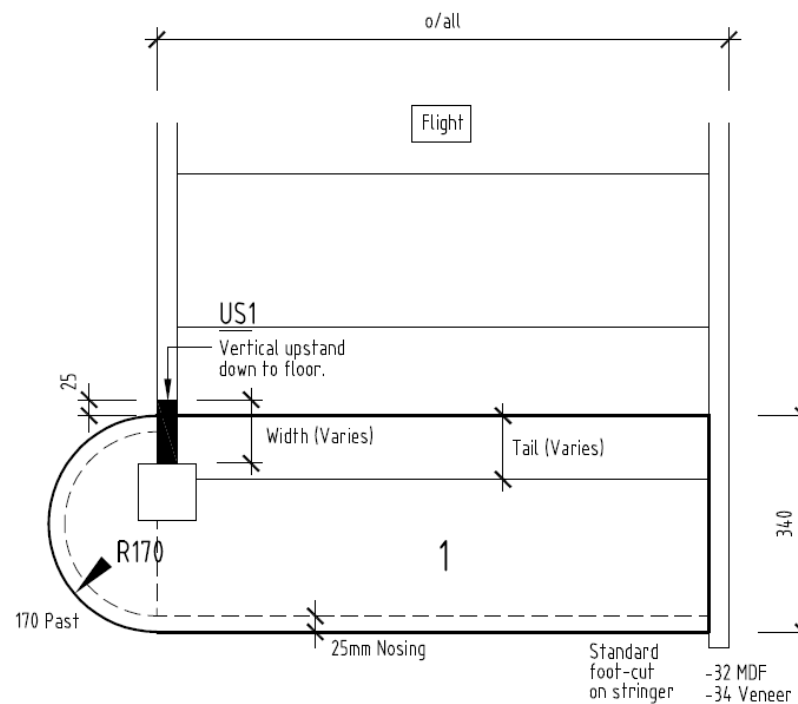


Tread #1
 (= Flight + 65mm - 32mm)
 - 34mm



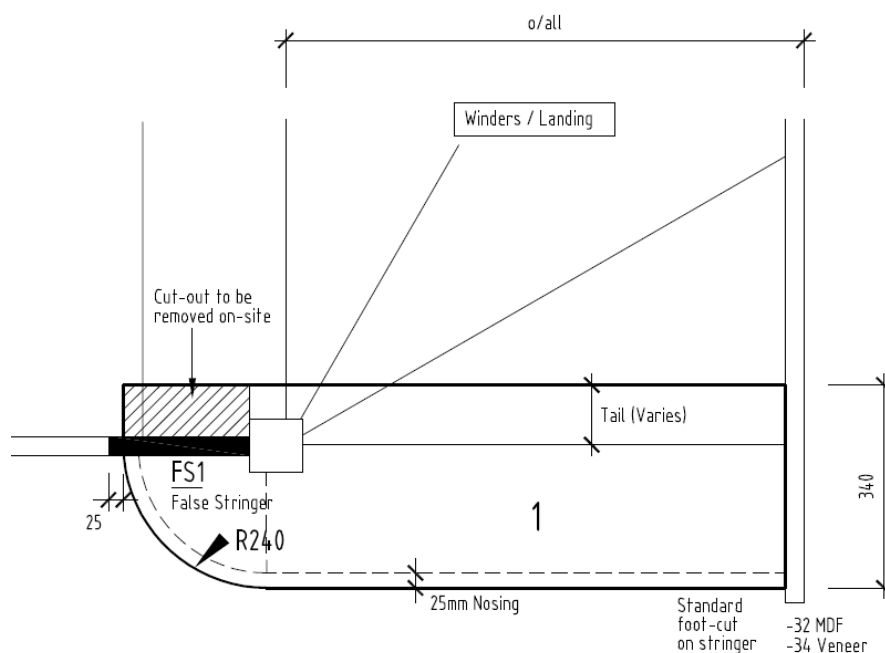
Tread #2
 (= Flight + 65mm - 32mm)
 - 34mm

Tread #1
 (= Flight + 305mm - 32mm)
 - 34mm



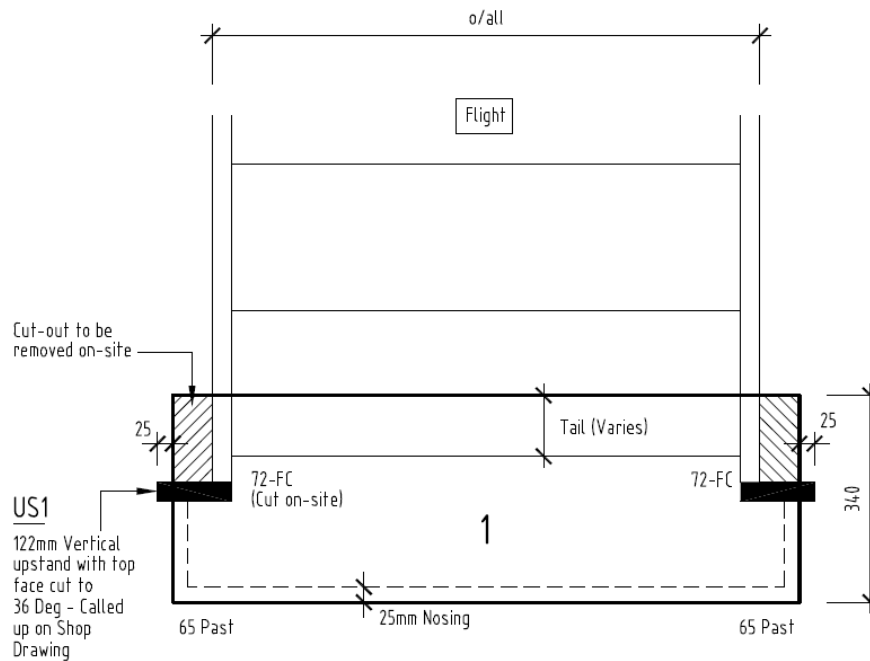
Tread #1

$$(\text{= Flight} + 170\text{mm} - 32\text{mm}) - 34\text{mm}$$



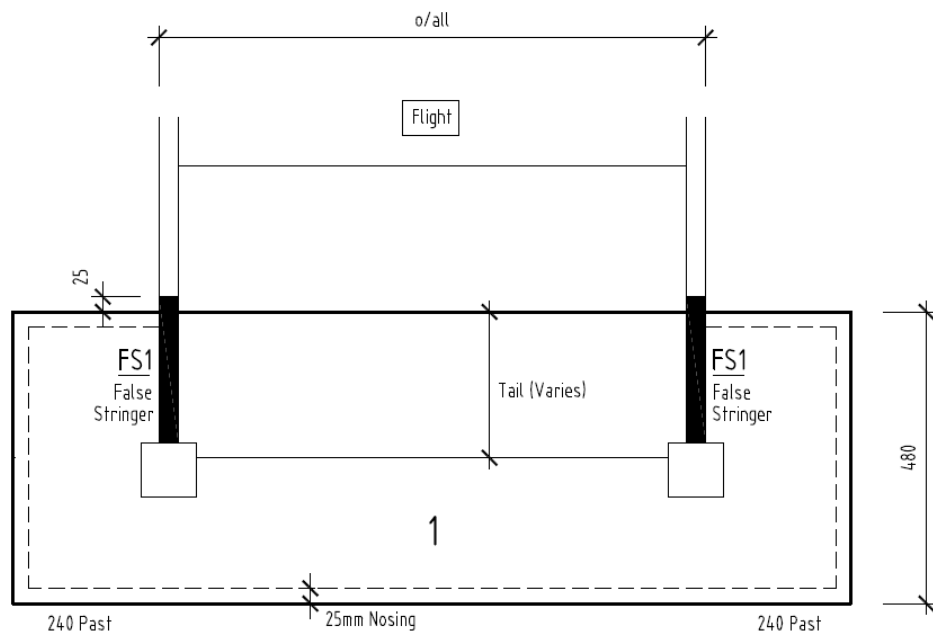
Tread #1

$$(\text{= Winders} + 32\text{mm} + 240\text{mm} - 32\text{mm}) - 34\text{mm}$$



Tread #1

(= Flight + 65mm + 65mm)



Tread #1

(= Flight + 240mm + 240mm)

Upstands

EXAMPLES

The Stair Lock Stairway System uses a series of UPSTANDS to help finish landings, winders, bottom treads and stringers around walls and openings. Depending on the stair configuration, upstands may be supplied in 32mm MDF (or 33mm for veneered) to match stringer and skirting thicknesses or in a 90mm post material.

The following drawings are some typical examples of where and how upstands are used.

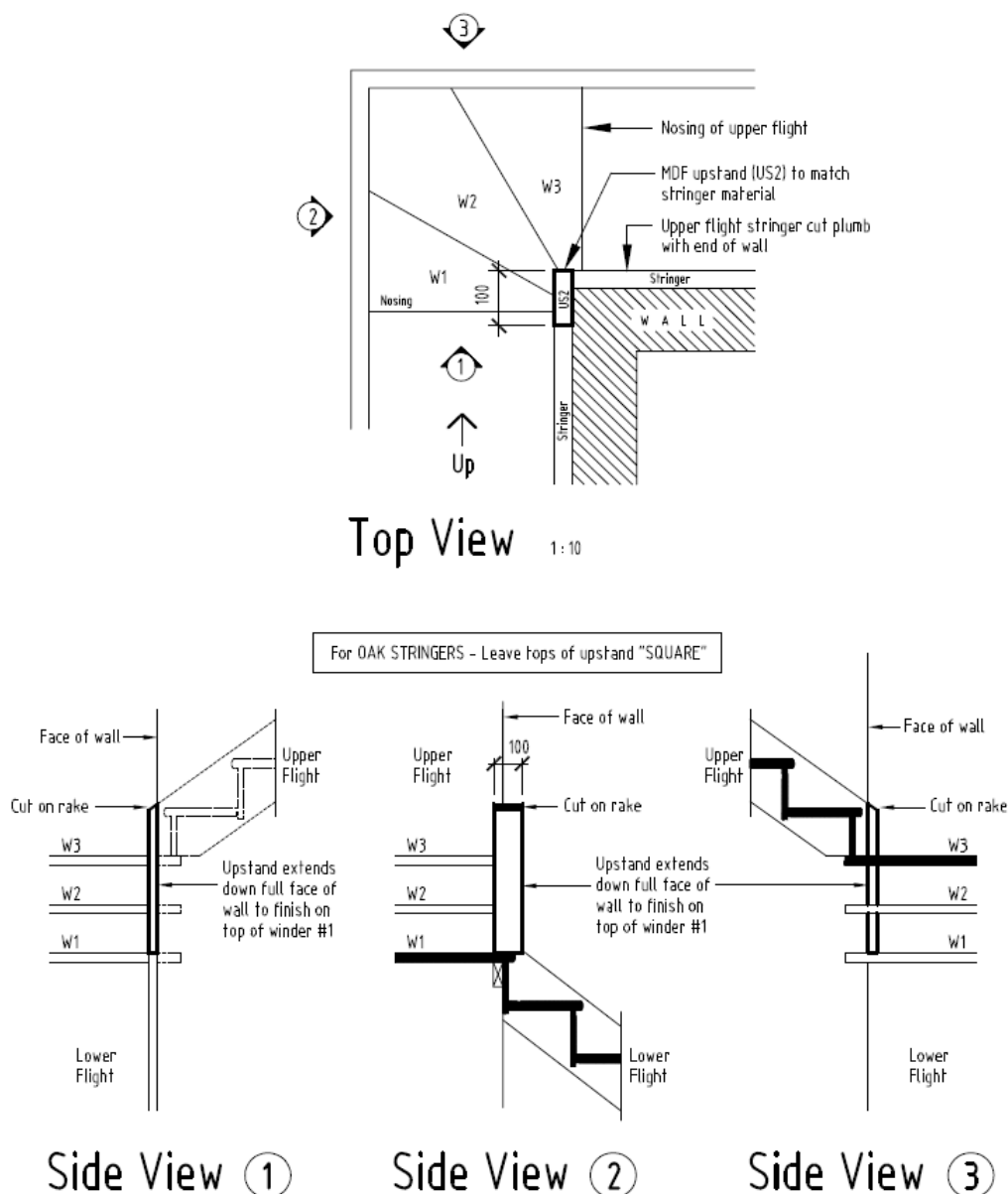
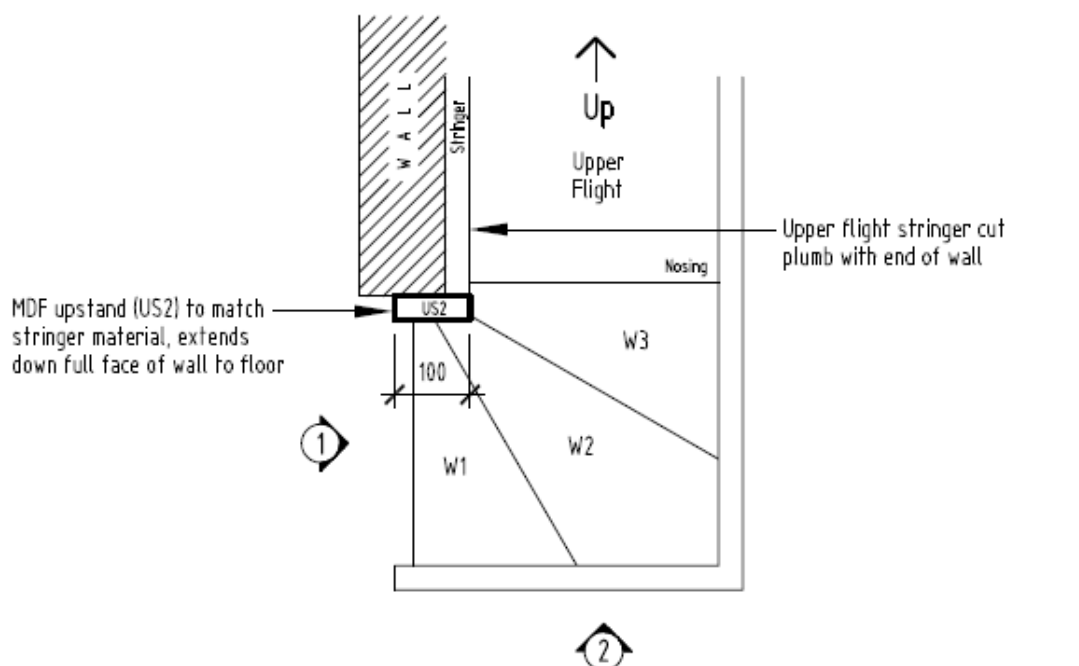
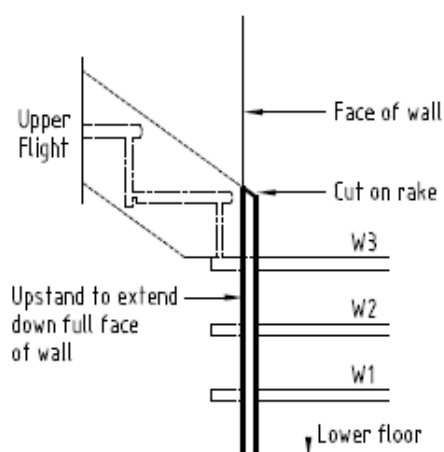


Figure 9
L-Shape Stair with Winders around Wall

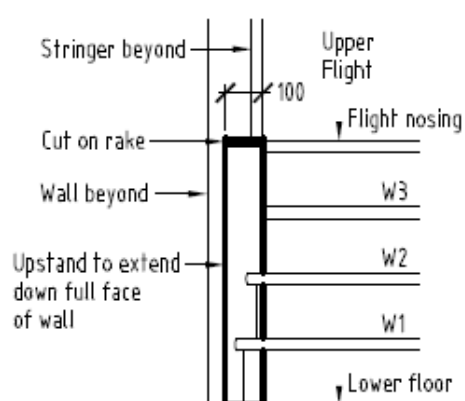


Top View 1 : 10

For OAK STRINGERS – Leave tops of upstand "SQUARE"



Front View 1



Side View 2

Figure 10
Straight Flight with Lower Winders around Wall

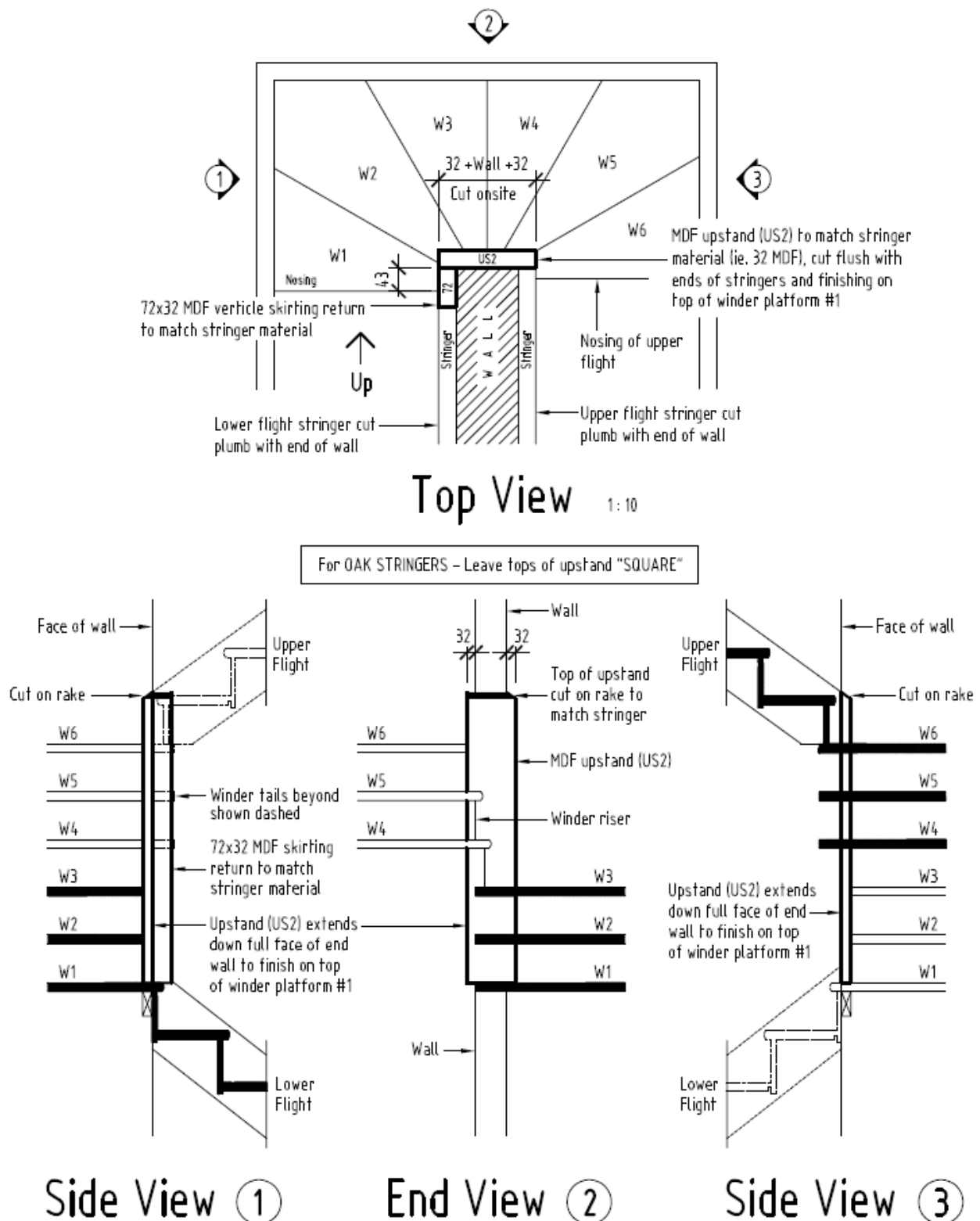


Figure 11
U-Shape Stair with Winders around Wall

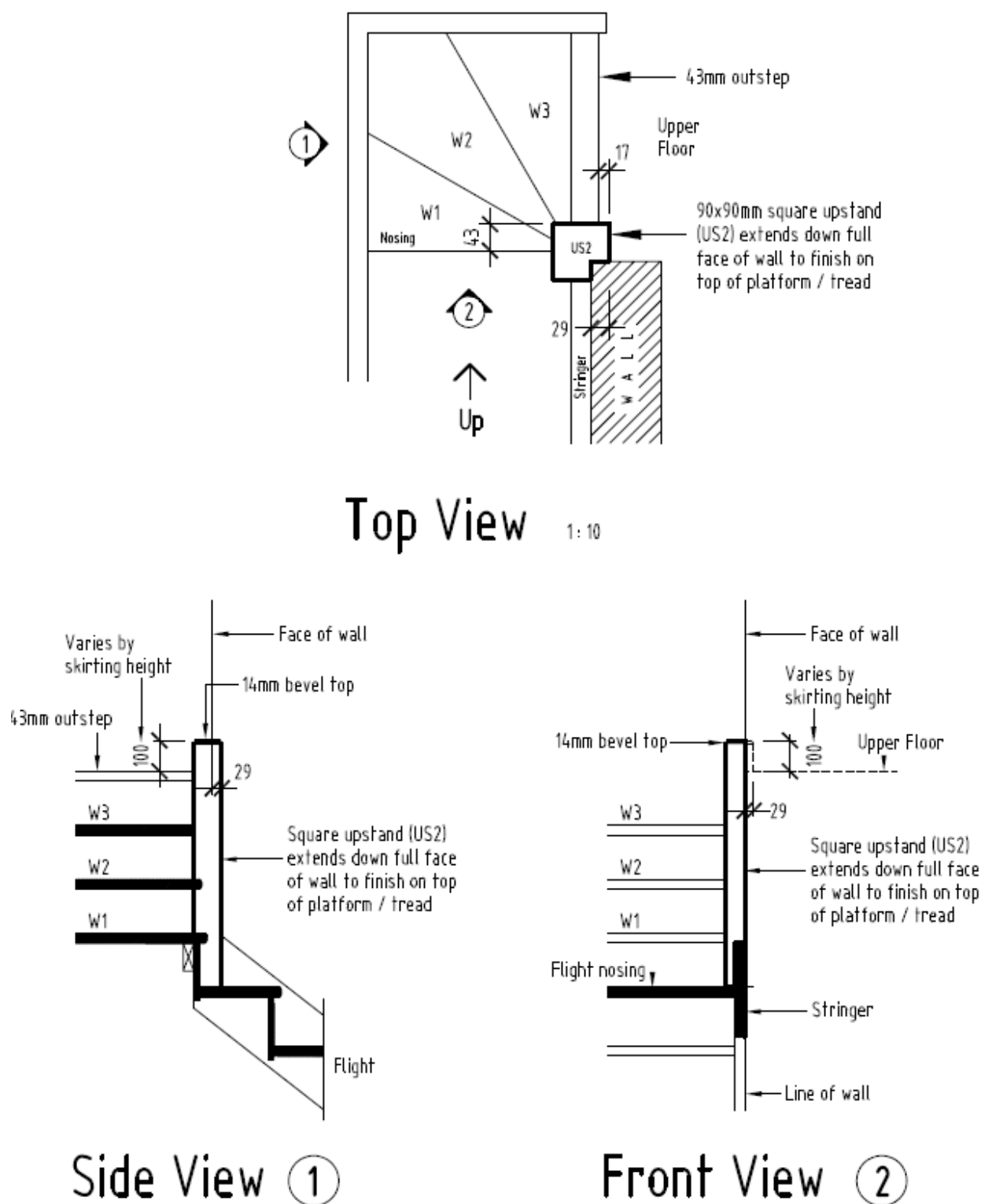


Figure 12
Straight Flight with Upper Winders around Wall

Panels, Skirtings & Sub-Stringers

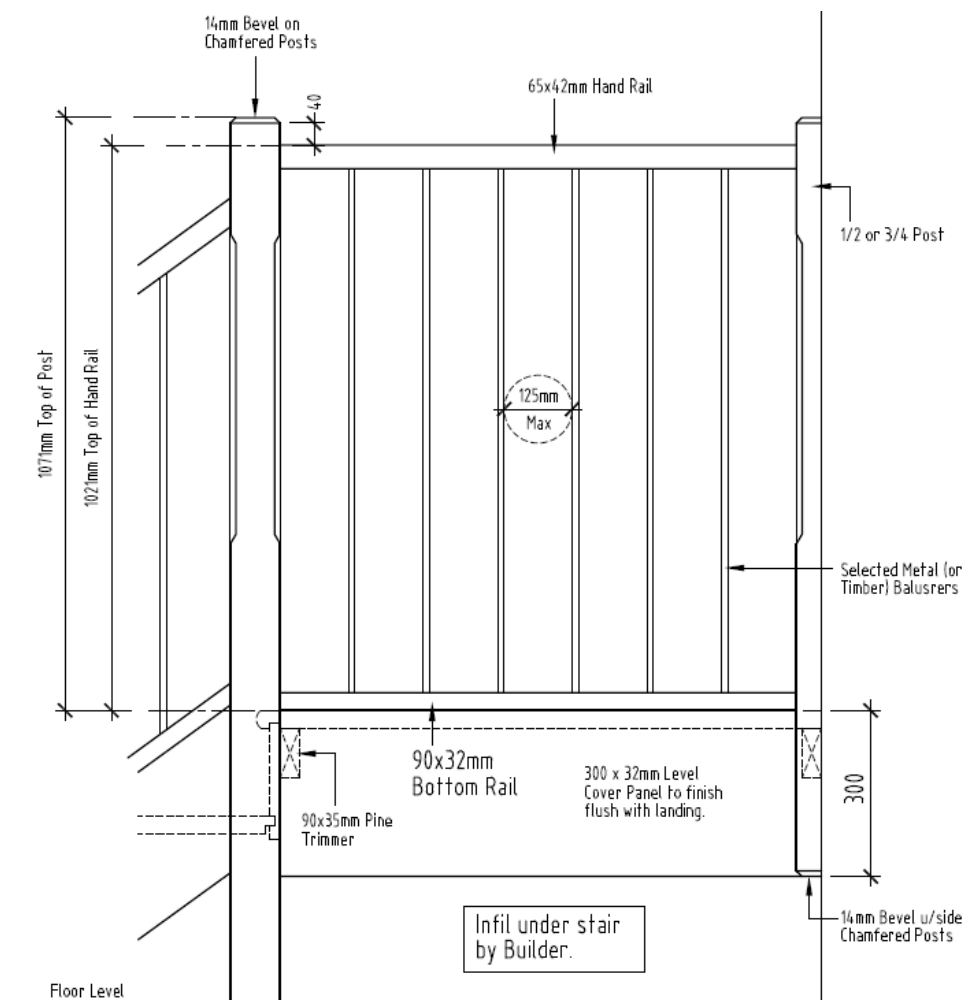
COVER PANELS

There are 3 common sizes (in height) for cover panels used with the Stair Lock System, produced with a thickness to match the stringer material: These can be installed in a “LEVEL” or “RAKED” situation.

- 1) **CP-1** - 300mm
- 2) **CP-2** - 600mm
- 3) **CP-3** - 900mm

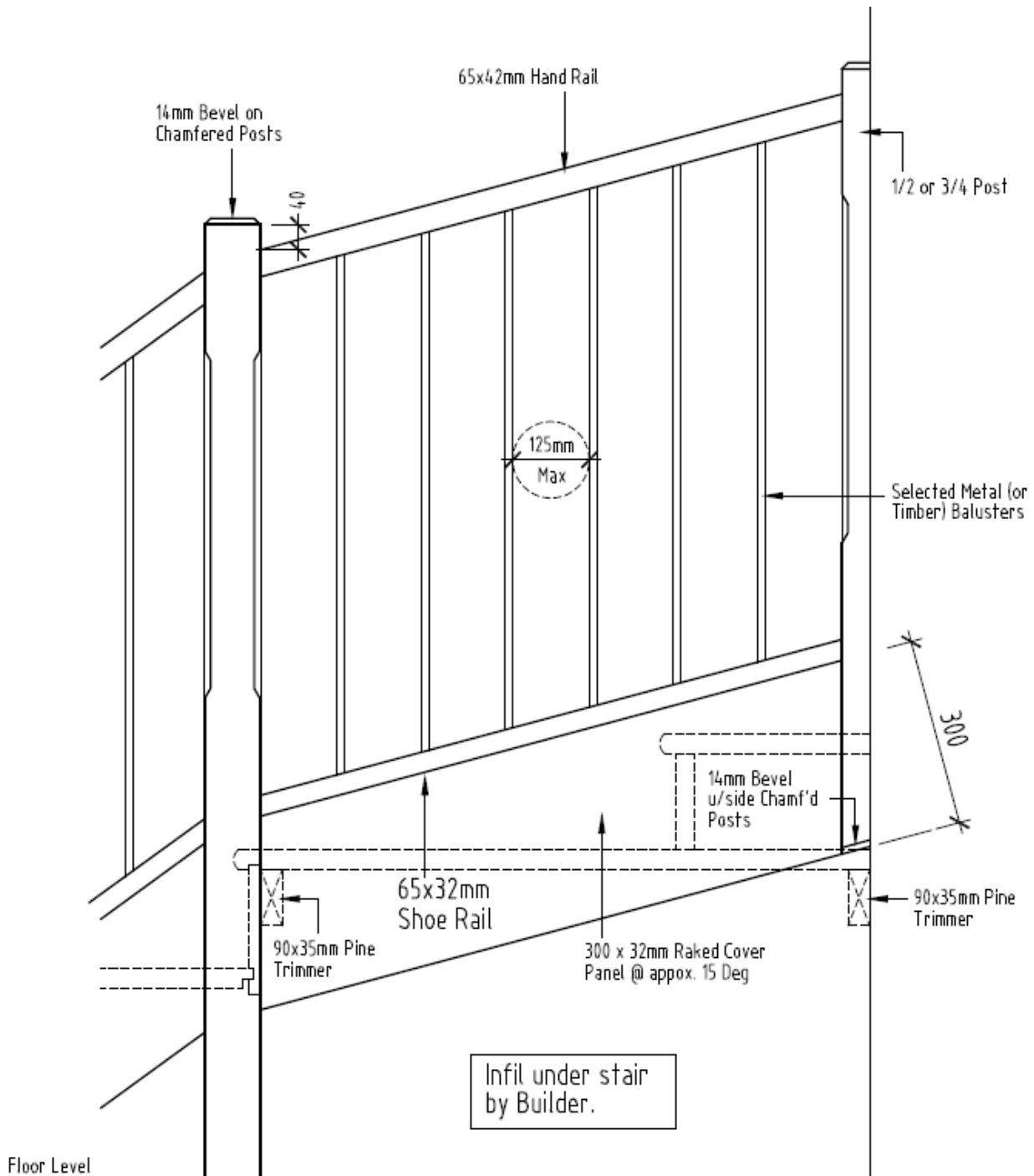
LEVEL: COVER PANELS

Level cover panels are generally used on a landing, in line with the stringer. The top of panel is set flush with the top of landing. The balustrade centres on top of the panel with a 90 x 32mm bottom rail and a hand rail that is set at the same height as level rail (measured 1021mm from landing height).



RAKED: COVER PANELS

Raked cover panels are generally used on winder applications. Cut to the required length and angle (approximately 15 degrees). They must be custom fitted to maintain sufficient carpet wrap around the winder nosing.



SKIRTINGS

The skirting material supplied is 72 x 32mm (or 34mm for veneer). Skirting should be cut around the winders and landings to continue the “appearance” of the stringers.

Installing skirting

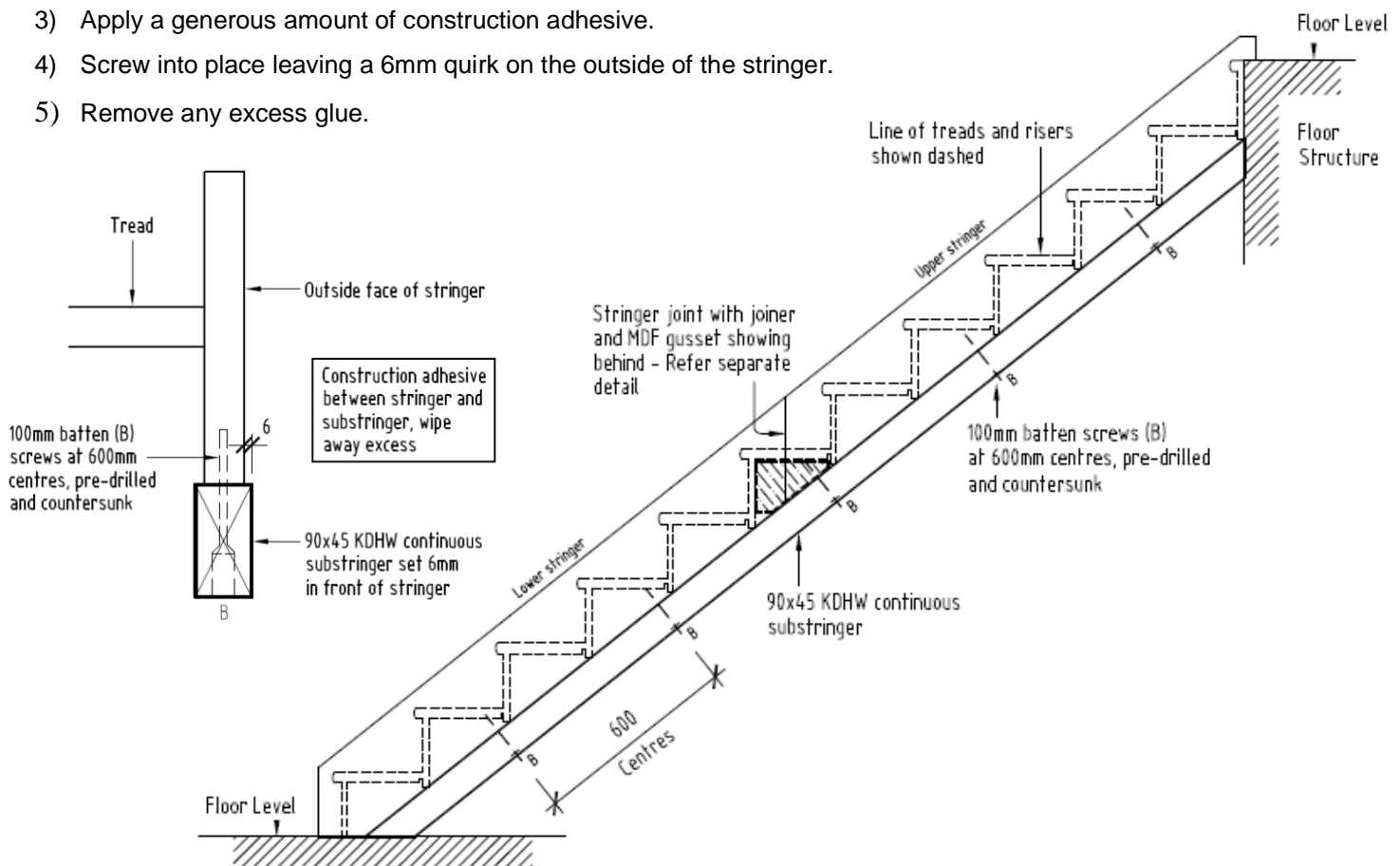
- 1) Notch the nosing on winders or landings by 32mm (to the face of riser) or 34mm for veneer to suit the skirting.
- 2) Install the skirting on the face of the risers first.
- 3) Starting from the top, work down the stair cutting each skirting over the tread.
- 4) Glue the skirting to the winders or landings and the wall.

SUB-STRINGERS

Sub-stringers are supplied in 90 x 42mm KDHW and are used to stiffen a flight of stairs if the stair is open on 1 or more sides or if the stair has long flights with no support underneath.

Installing a Sub-Stringer

- 1) Scribe sub-stringer to suit between posts, and then cut to length.
- 2) Drill holes to counter sink 100mm batten screws @ 600mm centres.
- 3) Apply a generous amount of construction adhesive.
- 4) Screw into place leaving a 6mm quirk on the outside of the stringer.
- 5) Remove any excess glue.



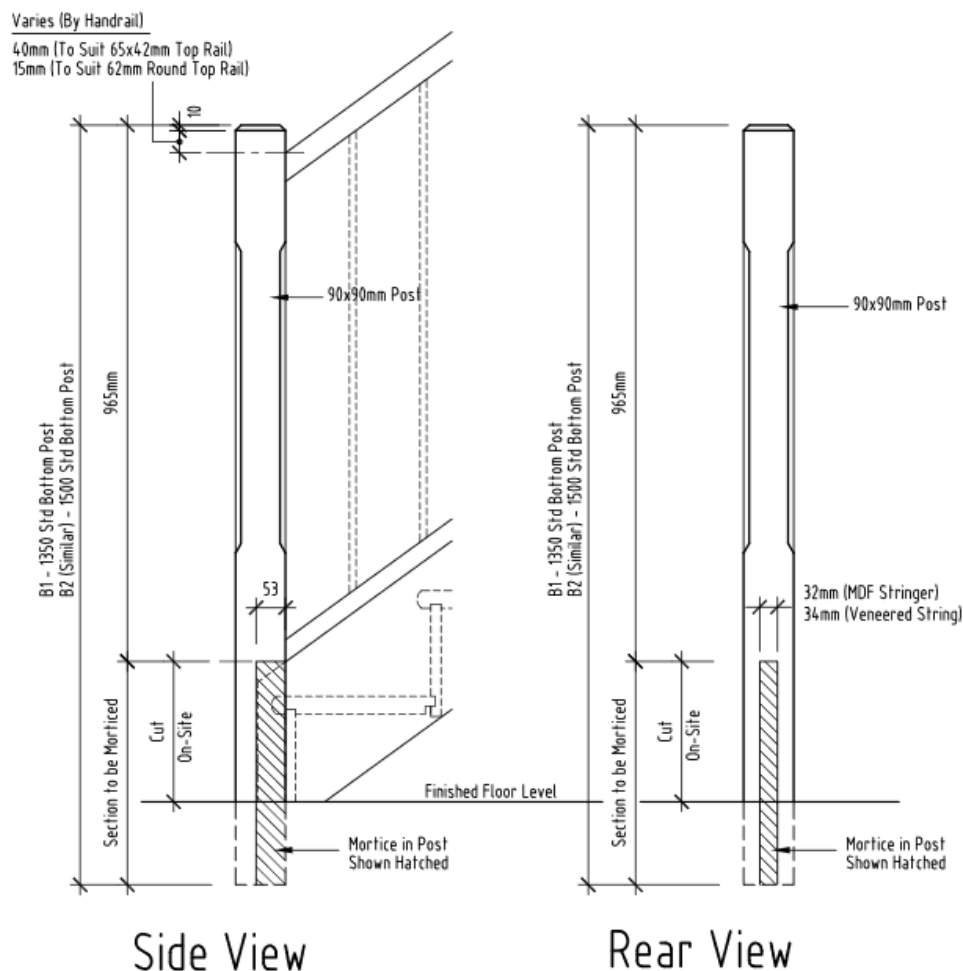
Posts & Balustrade

BOTTOM POSTS

The bottom post (B1 or B2) is fitted to the stringer using a mortice joint. Pre-machined with a 53mm deep by 32mm wide (or 34mm for veneered stringers) mortice into centre of the post. The top of the post is set 965mm above the top of the stringer and fixed using the following method.

- 1) 2 x 16mm flush plugs and 120mm x 8g screws
- 2) 65mm chipboard screws into floor (assumes timber)
- 3) Construction adhesive

Cut a 29mm wide section out of the nosing of tread #1, flush with the face of riser #1. This cut out will allow the post to sit hard against the riser.



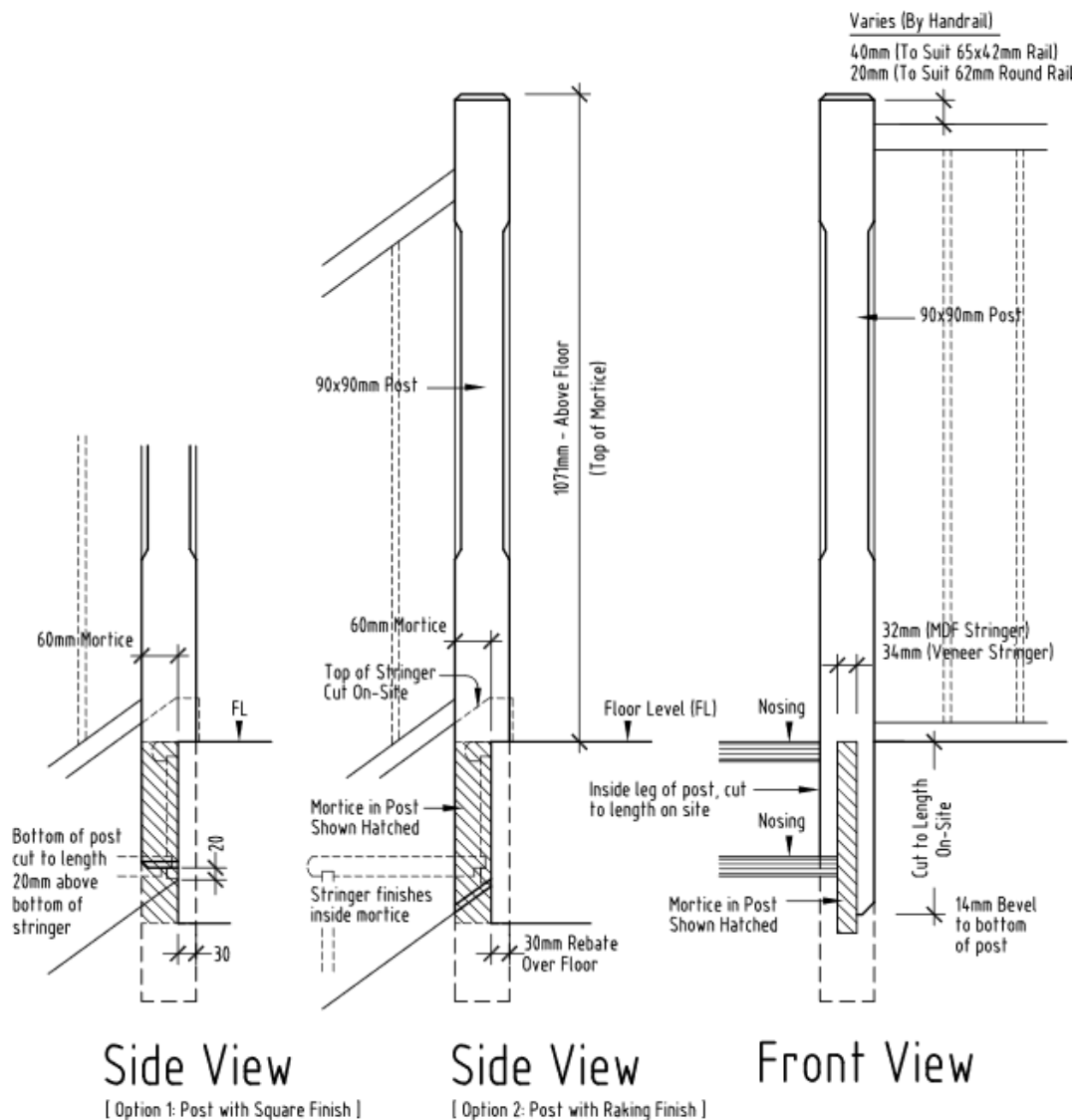
Type - B1 (B2 Similar)

1350 & 1500 Std Bottom Posts - Morticed

TOP POSTS

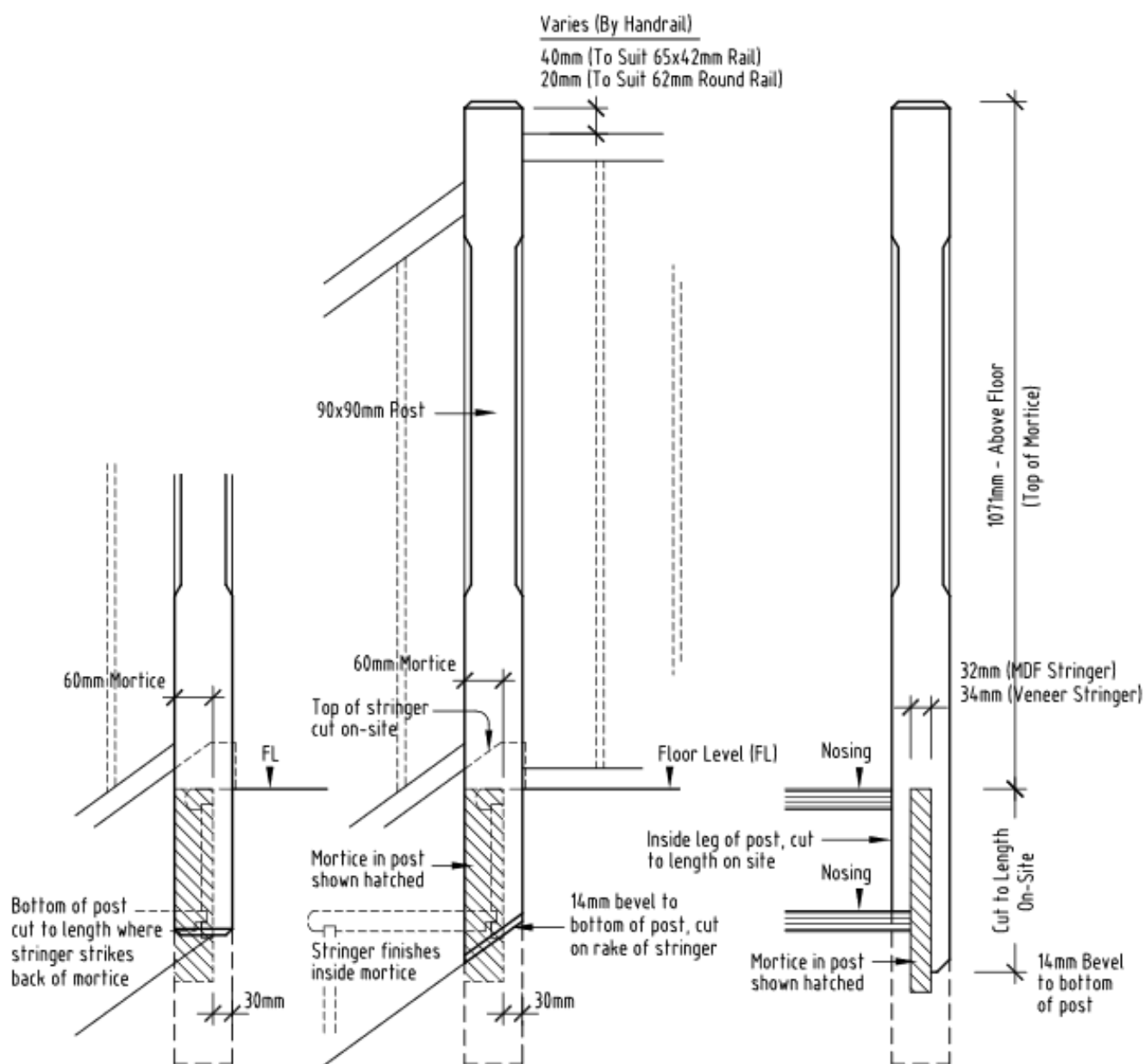
The top post (T1 or T2) is pre-machined and slips over the top of the stringer and down on to the last tread.

- 1) Mark the upper floor level on the post (1071mm down from top of post)
- 2) The top horn of the stringer will need to be cut level with the floor, but no further than the front face of the post.
- 3) The top post must sit on the floor by 30mm to maintain both carpet wrap and the correct flight rail strike point.
- 4) The inside face of the post needs to be cut level with the last tread (one riser down from the floor).
- 5) The outside face of the post needs to be cut in line with the bottom of the stringer and then chamfered to match the top of the post.
- 6) Fix through either side of the top post into the stringer.



Type - T1

1500 Std Top Post - Morticed & Rebated



Side View

[Option 1: Post with Square Finish]

Side View

[Option 2: Post with Raking Finish]

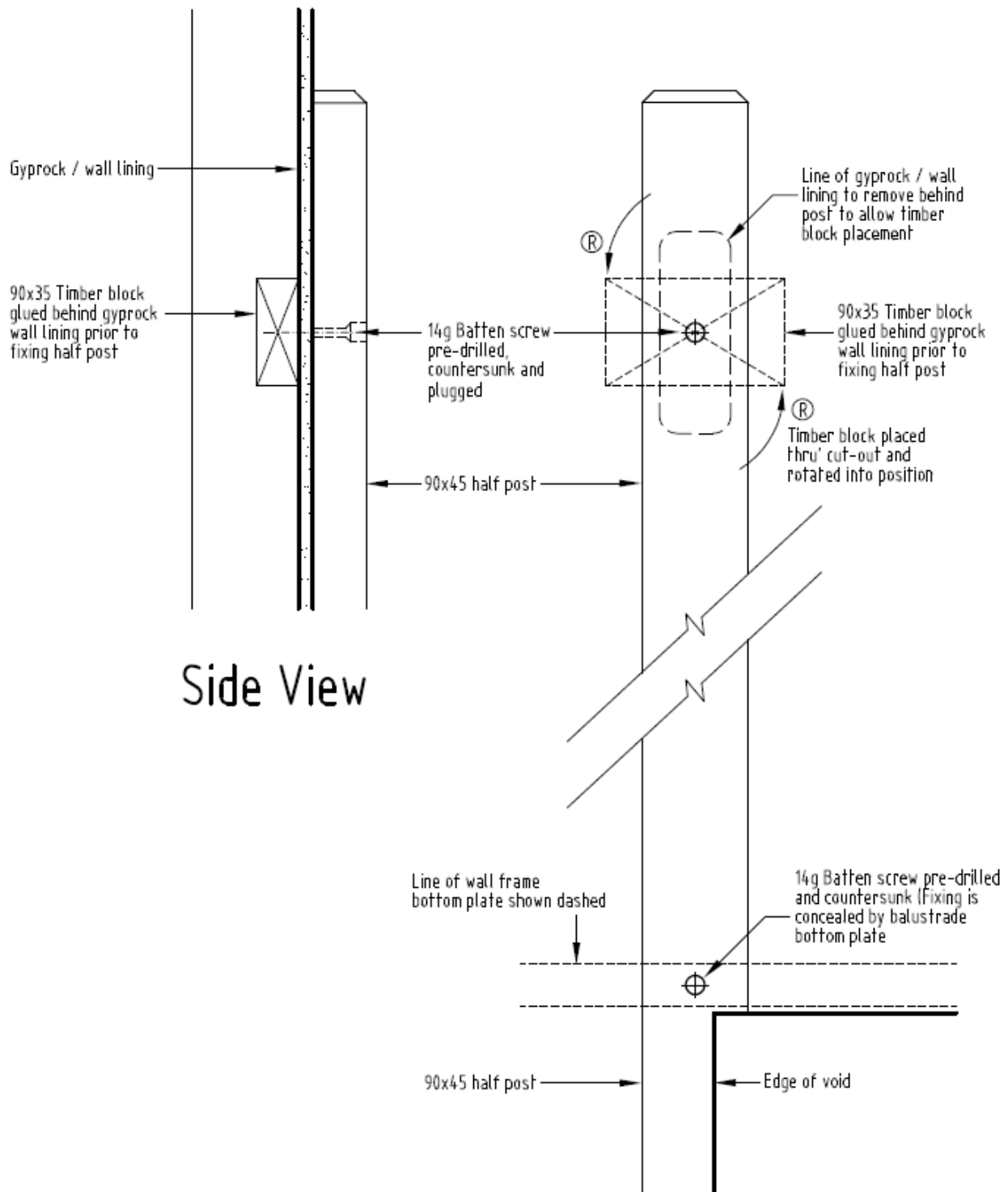
Front View

Type - T2

1500 Std Top Post - Morticed Only

HALF POSTS

The following fixing method is used when there is no wall frame directly behind the half post fixing point



PINS & EXTENSION POSTS

For 'turned' style balustrade, pins are required to prevent the flight rails from striking the posts in the turned section. The pins are fitted into an extension post by using the dowel supplied.

PIN NAME	TOTAL LENGTH	TOP SQUARE
Quarter Landing	750mm	400mm
2 Tread Winder	750mm	2 x 200mm
Standard	750mm	200mm
3 Tread Winder	550mm	200mm

All extension posts are pre-drilled to accept the dowel. The pins are fixed into the extension posts using construction adhesive and 65mm screws through the dowel. The finished height of the extension post and pin needs to be calculated in the same manner as the bottom post.

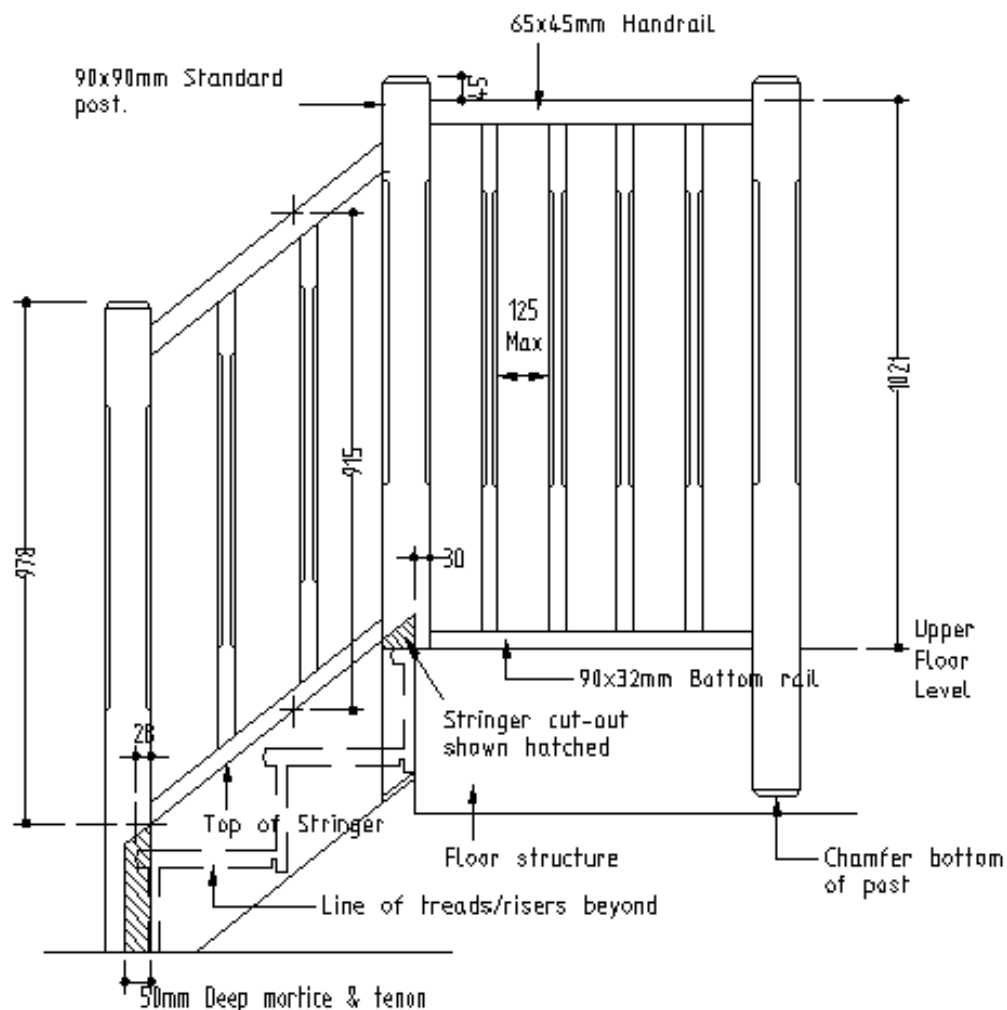
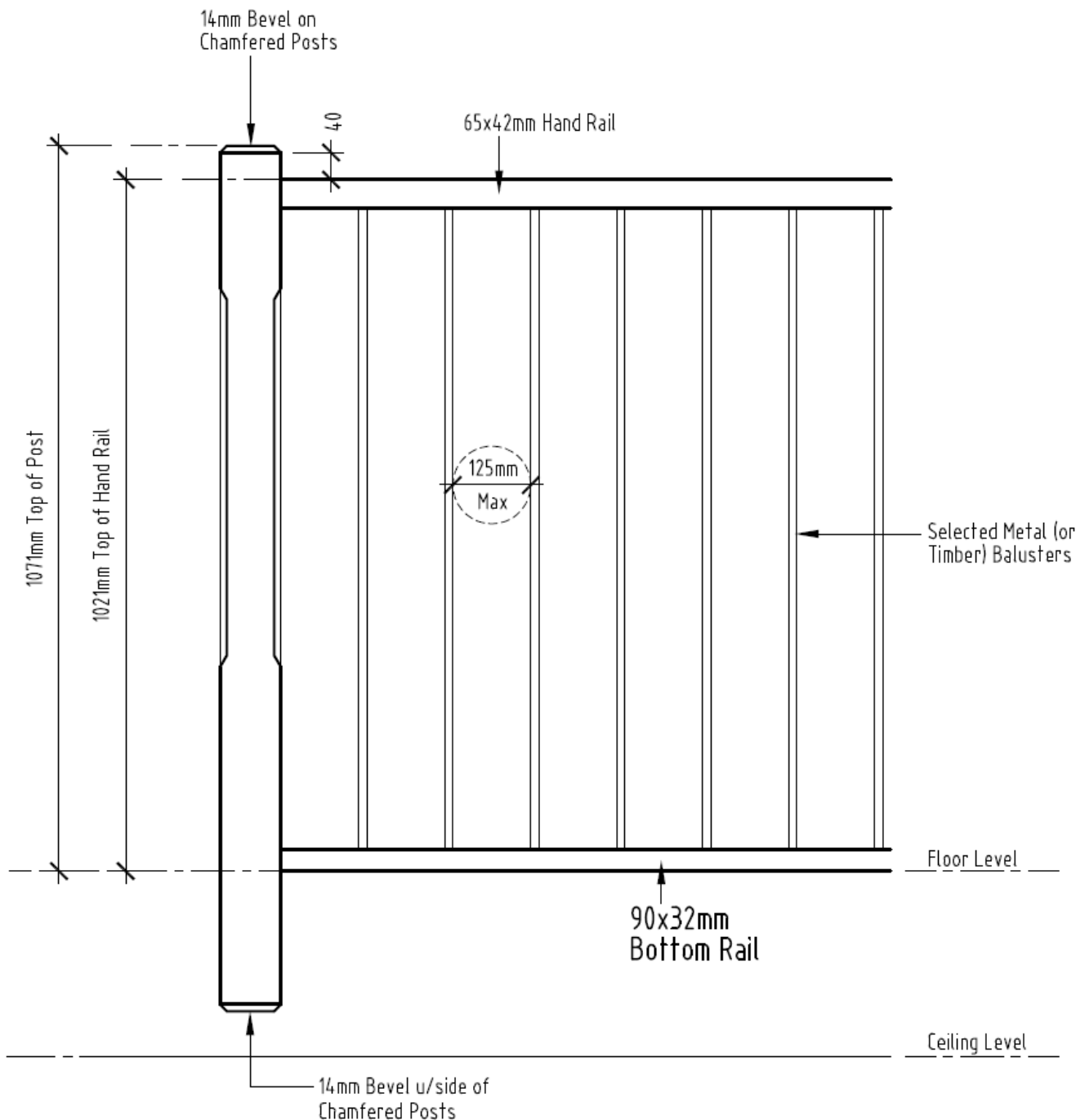


Figure 13
Typical Section detail - "Chamfered" Style

LEVEL RAILS & POSTS

The level rail finishes 1021mm above floor level and 50mm below the top of post. Therefore, the post height for level (balcony) balustrade is 1071mm above floor level.

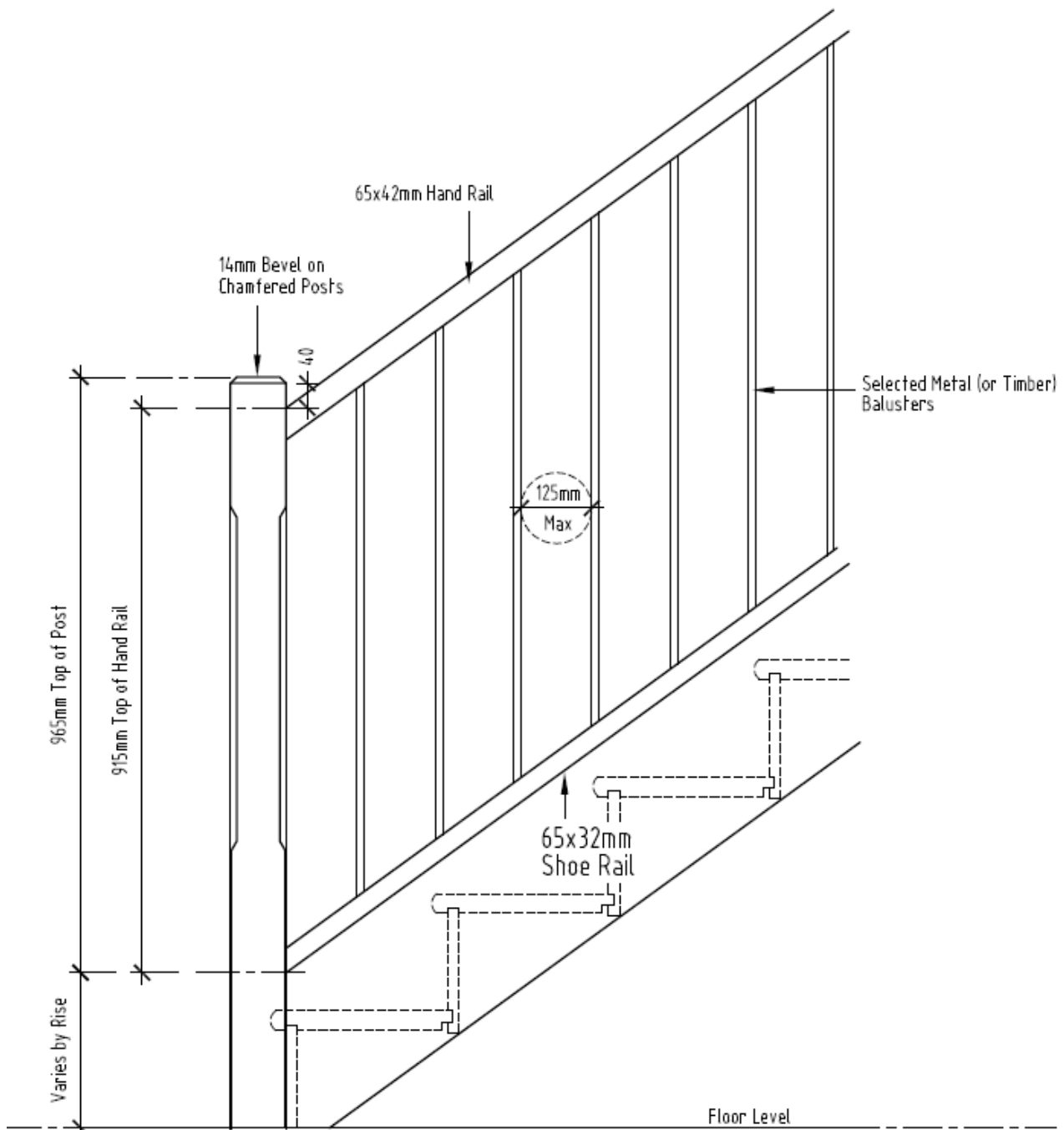
Cut the post to suit the overhang of the balustrade (normally 30mm). Fix of these posts where they run past the face of the floor joist.



BALUSTRADE HEIGHTS

Stair Lock's balustrade system has been designed to suit the following balustrade heights:

- Flight Rail: Measured 915mm plumb above the top of stringer.
- Level Rail: Measured 1021mm above floor level.



HAND RAILS (TOP RAILS)

When using a post with a square top, the level rail may be rested on top of the posts and scribed from the underside. Before cutting the bottom rail, lay it down in front of the posts and measure to length.

When installing the flight hand rail, use a baluster at either end for support and screw the handrail to the post from the underside.

BALUSTER SPACING

The most accurate method of determining baluster spacing is as follows.

- Step 1:** Measure the distance between posts.
- Step 2:** Decide how many balusters are required in the section and multiply by the baluster width.
- Step 3:** Deduct this measurement from the total distance between posts.
- Step 4:** Divide the remainder by the number of balusters plus 1 to close.

Example: *Level balustrade section 2350mm long using 12mm metal balusters*

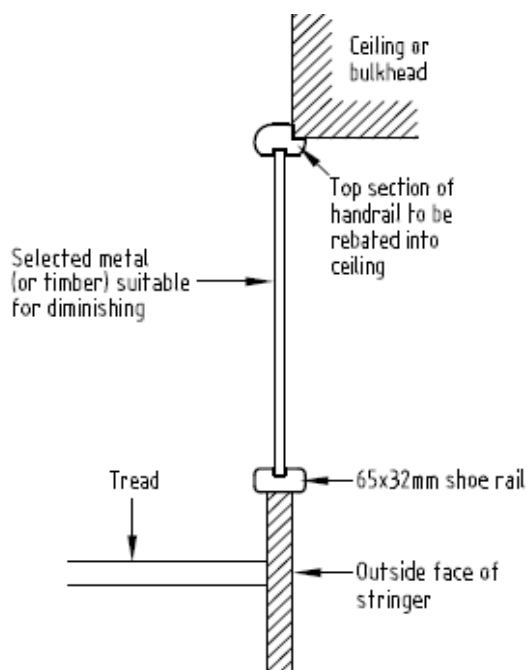
- 17 x 12mm metal balusters = 204mm
- 2350mm – 204mm = 2146mm
- 2146mm divided by (17+1) = 119.2mm

Therefore, 17 balusters and 18 fillets @ 119.2mm long are required

DIMINISHING BALUSTRADE

Diminishing balustrade occurs as the balustrade strikes the ceiling before landing on the upper floor.

- 1) Rebate the handrail over the bulkhead.
- 2) Mitre the intersecting handrails at the ceiling line.
- 3) Continue the bottom rail up the flight and mitre into the underside of the handrail.
- 4) Reduce the balusters (square or chamfered) to length to suit the diminished section.



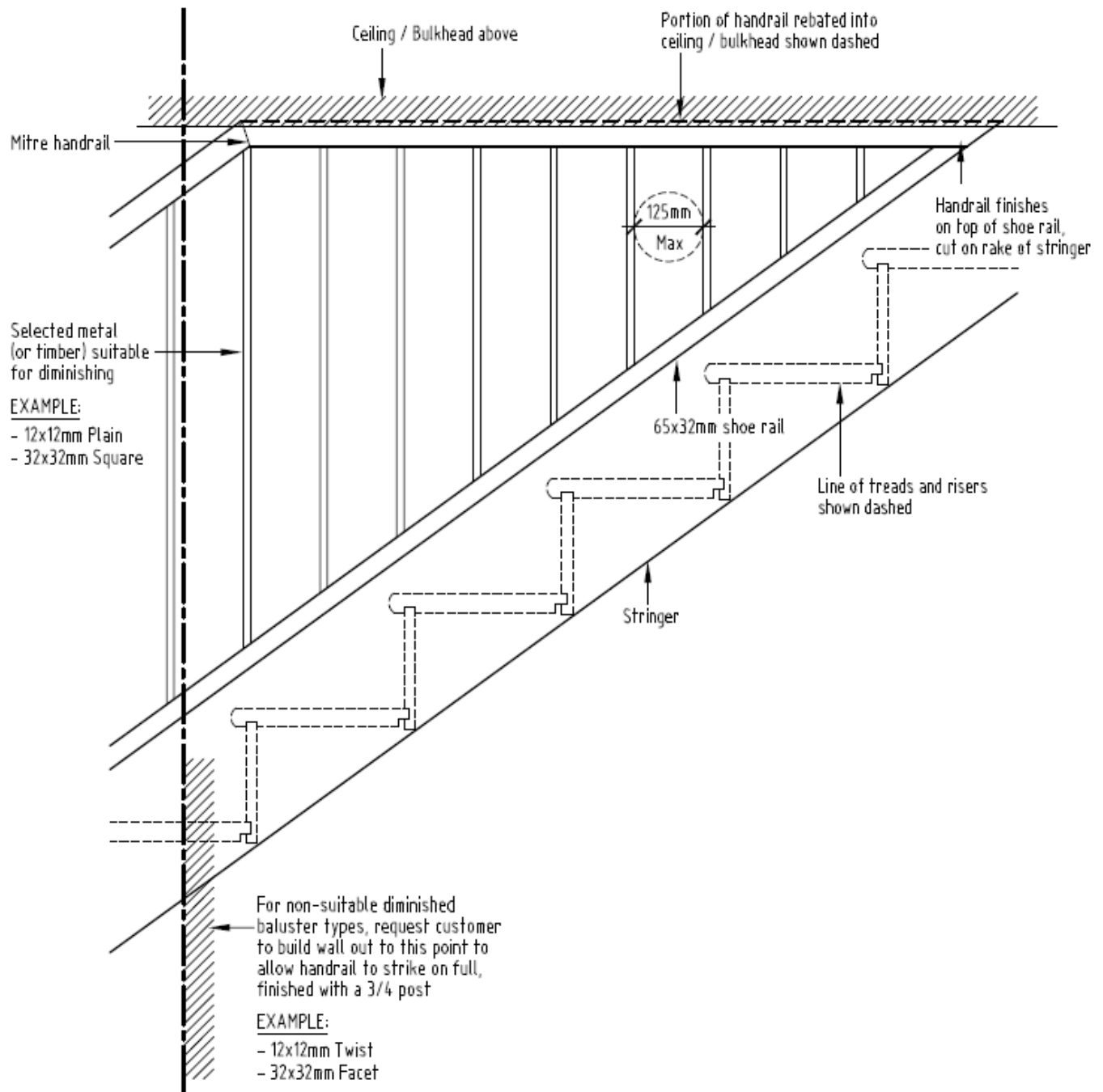


Figure 14
Diminishing Balustrade – Side View

WALL RAILS

Install the wall rail at the same height as the flight rail (915mm plumb above the top of stringer).

- 1) Mark the centre of the lag screw on the wall, 800mm above the top of the stringer.
- 2) For framed walls, locate the studs along this line - Line up the lag screw and pre-drill.
- 3) Plumb cut the wall rail to length (usually 38 degrees and the same length as the stringers).
- 4) Mount the brackets and fix the wall rail, inserting the screws when the angle is correct.
- 5) Ensure the wall rail is straight - check by sighting the rail

