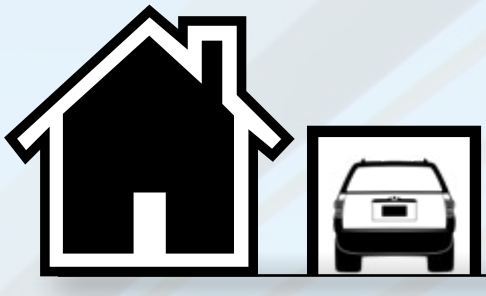
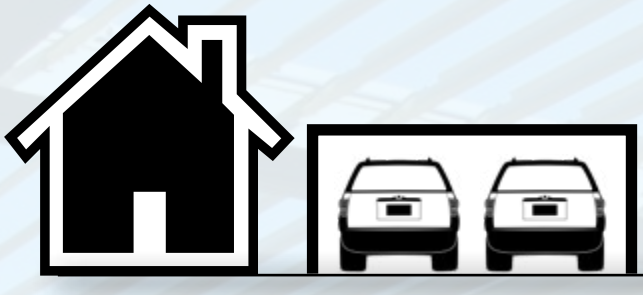
MODULE B - AWNINGS, PATIOS & CARPORTS
PRE-ENGINEERED KITS



STANDALONE
SINGLE CARPORT



STANDALONE
DOUBLE CARPORT

ATTACHED
SINGLE PATIO

Australian Made For An Australian Lifestyle

ENGINEER CERTIFICATION

Awnings, Patios and Carports, that are installed in accordance with these documents, pages 1 to 52 inclusive, issued by Delta Panels Pty Ltd are certified to be structurally adequate and accordance to relevant Australian Standards but not limited to, AS 1170.0, AS 1170.1, AS 1170.2, AS 4055, AS 1684.2, AS 1720.1, AS 2870, AS 3600, AS 3700, AS 4100, AS 4600, AS 1562.1, AS 4040.3 and will comply and meet performance requirements in accordance with NCC 2022.

J S George Meija
BE. B Com CPEng MIE Aust
Registered Professional Engineer Qld 742
Registered Builder Qld 2862
1/5 Golden Crest Place
Bellbowrie Qld 4070

Signed:

George J S Meija

Delta Panels Pty. Ltd.
ABN: 11 147 861 292
731 Boundary Road, Richlands, Qld 4077
P: +61 07 3271 2170
E: info@deltapanels.com
W: www.deltapanels.com

Document No. 180509
Version Date: 08.05.2023

PREFACE

The Delta Panels™ Engineering Manual is divided into five (5) separate modules. Each module covers a different product type and the engineering calculations specifically associated with those products.

MODULE A - AWNINGS, PATIOS & CARPORTS

The module covers roofs which are either attached to an existing building primarily a dwelling or to a seperate standalone structure. The engineering calculations encompass both single skin and insulated roofing and is divided into both DeltaSingle™ and DeltaSpan™ span tables.

MODULE B - PRE-ENGINEERED KITS

The Engineering for this series of structures is presented in kit forms covering single and double awnings, patios & carports with various options regarding footing types. This module covers engineering for DeltaSpan™ roofing in both cyclonic and noncyclonic regions. Any other configuration that is not covered by the engineering in this module would require site specific engineering calculations.

MODULE C - GABLES

The Gable Engineering module encompasses two (2) different styles of Gables, namely KingPost and KingPost-Eco. The engineering tables are presented with various options on roof pitch and the associated post, beam and fixing requirements.

MODULE D - BRACKETS AND FIXINGS

This module lists all of the associated brackets and fixings that have been tested and approved for use. These brackets and fixings are an integral part of the Delta Panels™ Engineering Manual.

MODULE E - RESIDENTIAL ROOFING

The Module E - Residential Roofing module covers the spans and permissible overhangs that Delta Panels insulated roofing products are certified for in both single & multi-span applications. These calculated spans are shown for both non-cyclonic and cyclonic zones.

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ENGINEERING NOTES

GENERAL NOTES

The information contained in this Engineering & Construction Manual is specifically designed to suit the range of freestanding and attached Delta Panels™ Awnings, Patios & Carports Kits which have been engineered with an option of either Single Skin or Insulated Roofs.

Delta Panels™ Awnings, Patios & Carports Kits is considered to be a freestanding structure unless it's attached to an existing structure for at least 50% of its shortest side.

The information contained in this Engineering manual relates specifically to products supplied by Delta Panels Pty Ltd™. Any products not approved by Delta Panels Pty Ltd™ will void Engineering Approvals and Warranties expressed or implied.

All assembly, connection and installation procedures must comply with the Delta Panels™ standards as set out in the Engineering & Construction Manual

ENGINEERING NOTES

- Standalone Carport Kits
- Minimum Roof Pitch is 3°
- Clear Height under the roof is a maximum of 2700mm
- Average awning height 'hc" = 2400mm.
- The average height of the structure to which the awning is attached to be between 3000mm and 10000mm
- Roof Sheeting to be attached to beams with 3/14g screws
- The structure is designed to carry a maintenance roof load of 0.25kPa. These deflection criteria are applied to serviceability limit state loads as per AS 1170.1, AS 1170.2
- Allowable Deflection limits are;
    - L/50 – Sheeting
    - L/125 – Beam
    - H/150 – Post

SITE SAFETY

It is the Builder/Owner's responsibility to ensure that any existing structure that the Delta Panels™ Awnings, Patios & Carports Kits is to be attached to, is adequately reinforced to accommodate all additional loads created by the new Delta Panels™ Awnings, Patios & Carports Kits.

Prior to any footings being commenced it is the Builder/Owner's responsibility to ensure that the footings will not impact on any existing underground services and facilities.

ENGINEERING NOTES

CONCRETE/FOOTINGS

For any connection to an existing slab, it is the Builder/Owner's responsibility to ensure that the slab is structurally adequate to support the additional load.

- Concrete Grade to be N25 in accordance with AS 1379-2007
- Any Piers are to be founded in natural firm to stiff clay with a minimum allowable bearing capacity of 100kPa. Contact a Geotechnical Engineer for advice if conditions vary
- If fixing to a slab, the slab is to be continuous over the area under the roof and the slab dimensions to be equal to or greater than the overall roof width and length.

STEEL COMPONENTS

All Steel structural components of the Delta Panels™ Awnings, Patios & Carports Kits systems are in accordance with the following Australian Standards:

DeltaSingle™ Steel Skin	AS 1397-2011
Delta Beam™	AS 1397-2011
Posts (Square Hollow Sections)	AS 1163-2016

The following minimum grades are required for theses steel components:

- All Posts to be Grade C350LO
- All Plates are Grade 250 U.N.O
- All External Steelwork to be Hot Dip Galvanised including Fixings
  Note: Duragal is not an adequate substitute for hot dip galvanising
- All Bolts are Grade 4.6/S & Welds SP, class 4mm continuous fillet weld U.N.O.

FIXINGS

All fixing components of the Delta Panels™ Awnings, Patios & Carports Kits systems are in accordance with these Australian Standards

Bolts shall be grade 4.6 or better	AS 1110.1-2015
Fixing Screws shall be class 3	AS 3566-2002

GLOSSARY

DeltaSpan™	A registed name covering the range of Delta Panels™ insulated roofing products, DeltaTrim™, DeltaOrb™, DeltaCorroCorro™, DeltaTrimTrim™ & DeltaTrimCorro™
DeltaSingle™	A registered name for Delta Panels™ single skin roofing sheet
DeltaTrim™	A registered name for Delta Panels™ insulated roof product with a trapezoid formed top skin
DeltaOrb™	A registered name for Delta Panels™ insulated roof product with a corrugated formed top skin
Insulated Roofing	Covers all the products listed in DeltaSpan™
Single Skin Roofing	Referrers to DeltaSingle ™
Single Span	The length between two fixing points
Multi Span	A continuous length that spans over three (3) or more fixing supports
Roof Span	Being the total span of the roof area with any overhang included
Overhang	The length that the roof sheeting overhangs the last fixing support, forming a cantilevered portion
Roof Slope	The angle of the roof from its peak to its lowest point
Cyclonic Region	Refer to Step 1 Wind Speed Determination
NonTrafficable	Not designed for direct foot traffic and requires a temporary walkway for maintenance access.
NonCyclonic Region	Refer to Step 1 Wind Speed Determination
Beam Load Widths	The width of the roof which is considered to act in loading the beam for simple awnings this is 50% of the roof sheeting plus any adjacent overhang
Uplift Loads on the Beam	Is determined by a combination of the following factors, Beam Load Width, Awning Style and the Wind Category
Post Load Widths	The width of roof which is considered to act in loading the post. For simple awnings this is 50% of the roof sheeting plus any adjacent overhang that loads the beams connecting to the post
Uplift Loads on the Post	Is a force that consists of a combination of uplift force on the beam and the load width of the post
Hold Down Capacity	The maximum uplift capacity that the foundation can resist
SHS Post	Is a commonly used term for a Square Hollow Section steel post
C-section Beam	Is a commonly used term for a rollformed cold formed C section steel beam
DeltaBeam™	A registered name for Delta Panels™ two (2) piece roll-formed beam (RFB)
Receiver Channel	A roll formed channel that is attached to an existing structure into which the roofing sheet is then fixed

PAGE INDEX

MODULE B - PRE-ENGINEERED KITS

LIST OF FIGURES

MODULE B - PRE-ENGINEERED KITS

MODULE B - PRE-ENGINEERED KITS
ENGINEERING WORKSHEET

Attached / Standalone

Wind Category: _____

Patio Type Selected: _____

Slab or Piers: _____

Kits Selected: _____

Post to Beam Connection: style _____

Post to Footing Type: style _____

STEP 1 DETERMINING CORRECT WIND SPEED

Whether you are building a stand-alone Carport or adding a Patio extension to your home, determining the correct wind rating is essential when considering the construction design and the materials that will be used.

There are 4 different factors that influence the wind classification, they are:-

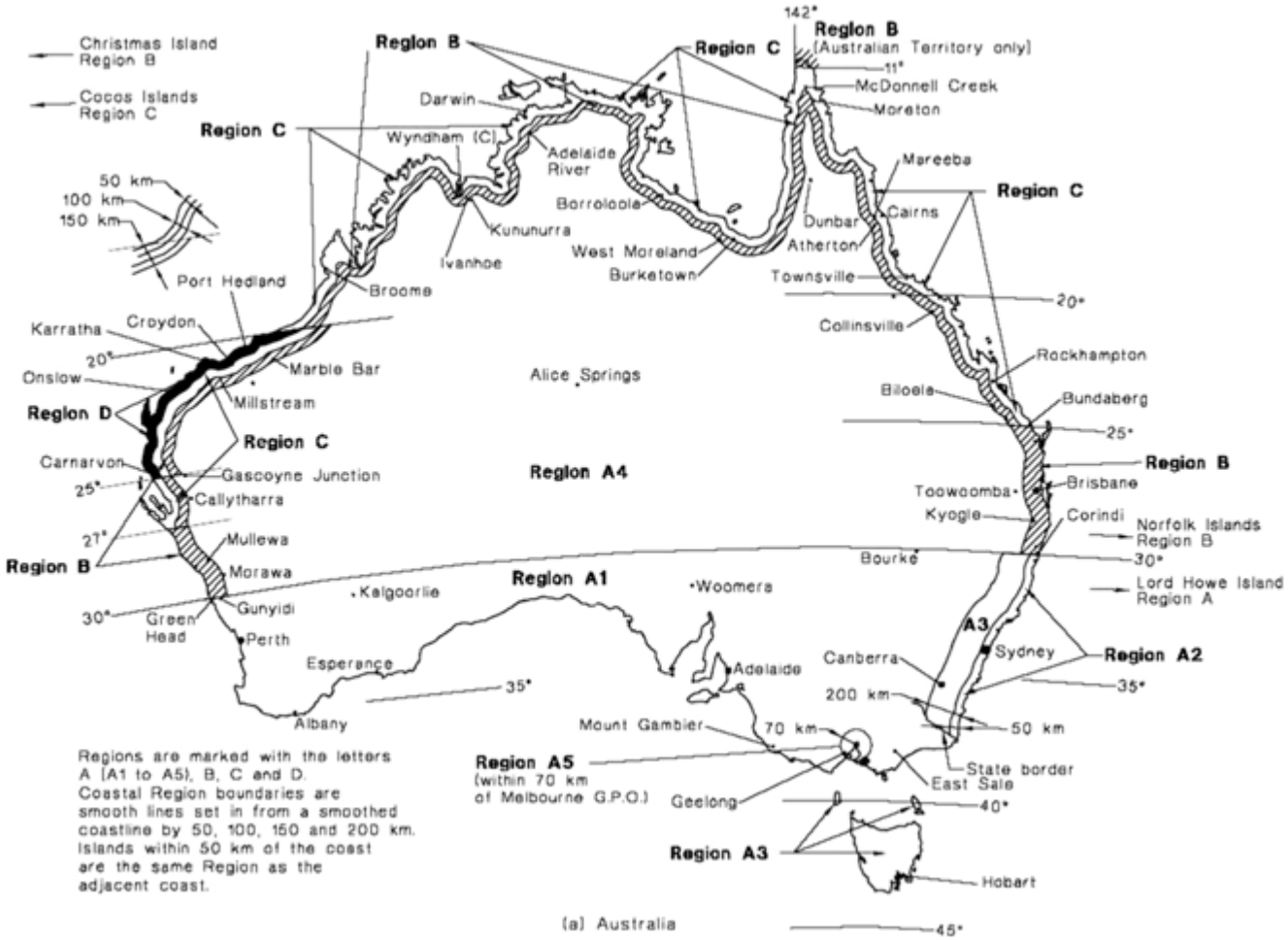
- Region
- Terrain Category
- Shielding Determination
- Topographic Effect

Please remember that this is a guide only, check with your local authority to determine your exact rating.

For a detailed analysis refer to the Australian Standard AS/NZS 1170.2:2021, the approach described here follows the AS 4055:2021 - Residential wind code method.

This approach is only suitable for structures up to 2 storeys high and no wider than 16m and 8.5m high. Outside these limitations, we recommend that you engage a structural engineer to provide advice on the approach suitable to your situation.

Step 1.1 - Region Select the Region



Step 1.2 Terrain Category

Terrain Category 1:

Exposed terrain for a 10km radius, no trees, other buildings or hills. No limited sized water ways such as, rivers, canals, lakes and enclosed bays.

Terrain Category 1.5:

Located adjacent to shoaling waves from open water ways such as, rivers, canals, lakes and large unenclosed bays on seas and oceans, extending greater than 10km in any wind direction.

Terrain Category 2:

Open terrain with few trees, surrounding buildings such as surrounding buildings such as farmland and cleared subdivisions with trees and uncut grass.

Terrain Category 2.5:

Open terrain, typical of a newly developed outer suburb housing estate, with few established trees or surrounding buildings.

Terrain Category 3:

A suburban backyard environment with numerous closely spaced houses. The minimum density of houses and trees (except in region C & D) shall be the equivalent to 10 house size obstructions per hectare. Where substantial well-established trees shall be considered as obstructions (except in region C & D).

Step 1.3 Shielding Determination

The shielding effect of established trees and established building structures will have an effect on the upward wind pressures. With the exception of regions C & D where trees are not considered a shielding element.

The 3 shielding classifications are:-

Full Shielding
FS

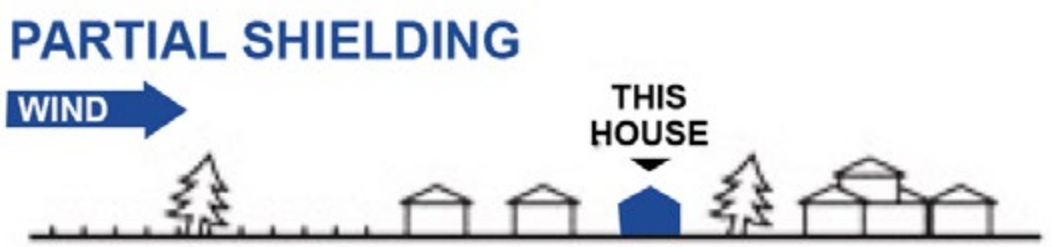
At least 2 rows of housing or similar size permanent structures surround the intended construction site. In Regions A & B, heavily timbered areas provide full shielding as long as they are within 100 metres.

Full shielding is only possible for houses within Topographical Classes T0, T1 and T2. The Full Shielding classification is only applicable to suburban developments with 10 or more houses and or similar sized structures, per hectare. The effects of roads or other open spaces within a distance of 100 metres in any direction are exempt.

Partial Shielding
PS

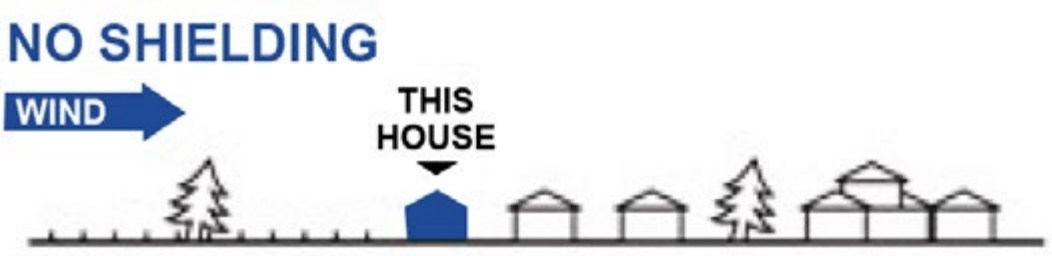
Partial shielding is only possible for houses within Topographical Classes T0, T1,T2 and T3.

To qualify there is a requirement to have at least 2.5 houses per hectare or equivalent structures situated upwind of the intended building location. This is typical of an acreage estate or housing based at the 2nd row from open water, abutting parklands or airfields.



No Shielding
NS

This would be houses located on the edge of housing estates, the side of open water, airports, sporting fields and large open parklands.



STEP 1 DETERMINING CORRECT WIND SPEED

Step 1.4 Topographic Effect

This step measures the effect of wind on a proposed structure based on its site location on a slope, ridge, mountain or escarpment, then the actual height/slope of that particular location. Topographic classifications are divided into zones T0, T1, T2, T3, T4 and T5. Use the following table to determine the applicable topographic classification of a proposed structure. If the slope, ridge, mountain or escarpment exceeds 30 metres please refer to AS 4055:2021.

TOPOGRAPHIC CLASSIFICATION EFFECT

SITE LOCATION ON SLOPE / MOUNTAIN / RIDGE / ESCARPMENT

MAXIMUM SLOPE OF MOUNTAIN / RIDGE / ESCARPMENT	LOWER THIRD	MID THIRD	TOP THIRD			OVER TOP
Less than 1:20 (2.9°)	T0	T0	T0	T0	T0	T0
Greater than & equal to 1:20 to Less than 1:10 (≥ 2.9° to < 5.7°)	T0	T0	T1	T1	T1	T0
Greater than & equal to 1:10 to Less than 1:7.5 (≥ 5.7° to < 7.6°)	T0	T1	T1	T2	T2	T0
Greater than & equal to 1:7.5 to Less than 1:5 (≥ 7.6° to < 11.3°)	T0	T1	T2	T2	T3	T1
Greater than & equal to 1:5 to Less than 1:3 (≥ 11.3° to < 18.4°)	T0	T2	T2	T3	T4	T2
Greater than & equal to 1:3 (18.4°)	T0	T2	T3	T4	T5	T3

STEP 1 DETERMINING CORRECT WIND SPEED

Step 1.5 Topographic Classification

By applying the results of the above 4 different factors that influence the wind classification, Region, Terrain Category, Shielding Determination & Topographic Effect to the WIND CLASSIFICATION CHART below a determination on the topographical classification can be made and then applied to the Delta Panels Engineering Charts.

WIND CLASSIFICATION FROM WIND REGION AND SITE CONDITIONS

TOPOGRAPHIC CLASSIFICATION

Region	Terrain Category	T0			T1			T2			T3		T4	T5
		FS	PS	NS	FS	PS	NS	FS	PS	NS	PS	NS	NS	NS
A	3	N1	N1	N1	N1	N2	N2	N2	N2	N2	N3	N3	N3	N4
	2.5	N1	N1	N2	N1	N2	N2	N2	N3	N3	N3	N3	N4	N4
	2	N1	N2	N2	N2	N2	N3	N2	N3	N3	N3	N3	N4	N4
	1.5	N2	N2	N2	N2	N3	N3	N3	N3	N3	N3	N4	N4	N5
	1	N2	N3	N3	N2	N3	N3	N3	N3	N4	N4	N4	N4	N5
B	3	N2	N2	N3	N2	N3	N3	N3	N3	N4	N4	N4	N4	N5
	2.5	N2	N3	N3	N3	N3	N3	N3	N4	N4	N4	N4	N5	N5
	2	N2	N3	N3	N3	N3	N4	N3	N4	N4	N4	N5	N5	N6
	1.5	N3	N3	N4	N3	N4	N4	N4	N4	N4	N5	N5	N5	N6
	1	N3	N4	N4	N4	N4	N4	N4	N5	N5	N5	N5	N6	N6
C	3	C1	C1	C2	C1	C2	C2	C2	C2	C3	C3	C3	C3	C4
	2.5	C1	C2	C2	C2	C2	C2	C2	C3	C3	C3	C3	C4	N/A
	2	C1	C2	C2	C2	C2	C3	C2	C3	C3	C3	C4	C4	N/A
	1.5	C2	C2	C3	C2	C3	C3	C3	C3	C4	C4	C4	N/A	N/A
	1	C2	C3	C3	C3	C3	C3	C3	C4	C4	C4	N/A	N/A	N/A
D	3	C2	C3	C3	C2	C3	C3	C3	C3	C4	C4	C4	N/A	N/A
	2.5	C2	C3	C3	C3	C3	C4	C3	C4	C4	C4	N/A	N/A	N/A
	2	C3	C3	C4	C3	C4	C4	C4	C4	N/A	N/A	N/A	N/A	N/A
	1.5	C3	C4	C4	C4	C4	N/A	C4	N/A	N/A	N/A	N/A	N/A	N/A
	1	C3	C4	C4	C4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Step 1.5 Wind Classification Chart

WIND CLASSIFICATION CONVERSION TABLE

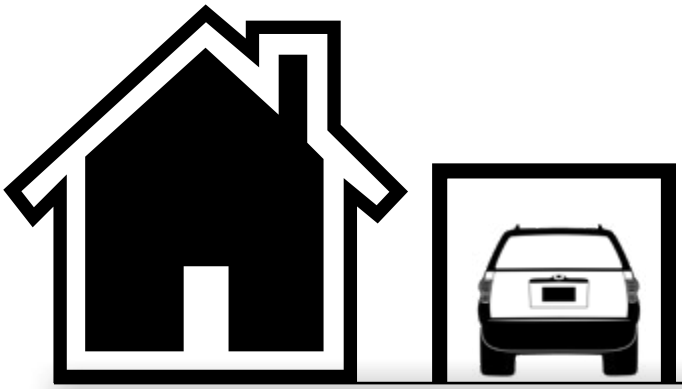
WIND CLASSIFICATION		Serviceability Limit State Gust Wind Speed metres per second	Ultimate Limit State Gust Wind Speed metres per second
Regions A and B	**Regions C and D**		
N1 (Non-Cyclonic)	N/A	W26	W34
N2 (Non-Cyclonic)	N/A	W26	W40
N3 (Non-Cyclonic)	C1 (Cyclonic)	W32	W50
N4 (Non-Cyclonic)	C2 (Cyclonic)	W39	W61
N5 (Non-Cyclonic)	C3 (Cyclonic)	W47	W74
N6 (Non-Cyclonic)	C4 (Cyclonic)	W55	W86

Please Note:

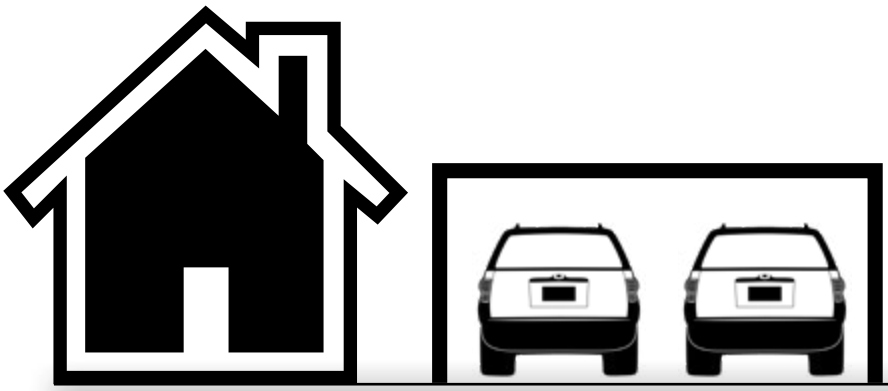
This is to be used as a guide only. Check with your local authority for your exact rating. For a complete analysis of estimating please refer to Australian Standard AS/NZS 1170.2:2021 and AS 4055:2021

Delta Panels will not accept any liability for any loss or damage suffered as a result of any errors in the misinterpretation of any information provided in this guide. It is recommended to seek the services of an independent registered Engineer to confirm any calculations.

STEP 2 DETERMINE THE AWNING TYPES



STANDALONE
SINGLE CARPORT



STANDALONE
DOUBLE CARPORT

ATTACHED
SINGLE PATIO

3.1 Standalone Single Carport - N1/N2 - Piers

3D Drawing

Post Type	B17
Footing Type	B19

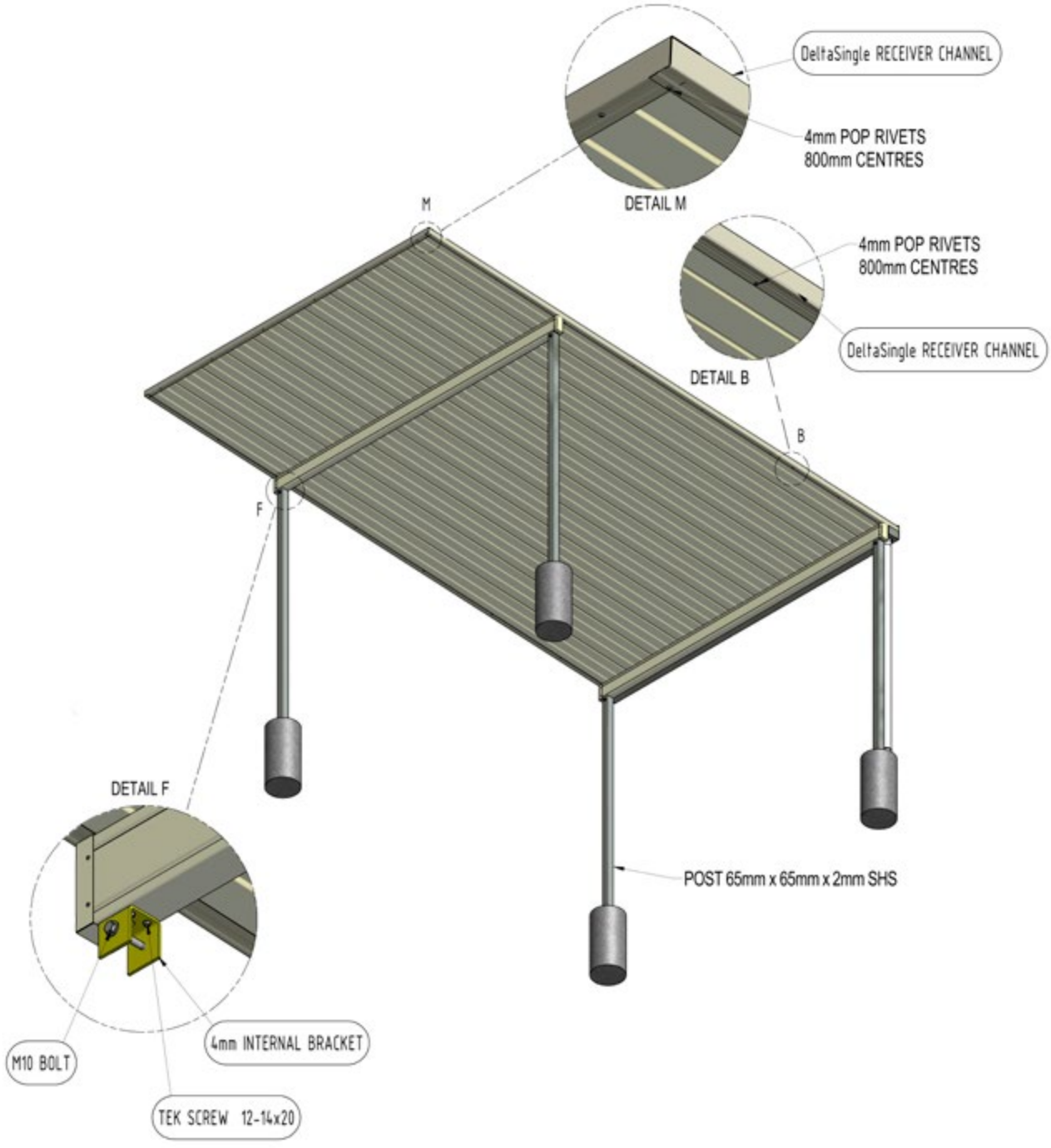


Figure B3

3.2 Standalone Single Carport - N1/N2 - Slab

3D Drawing

Post Type	B17
Footing Type	B22

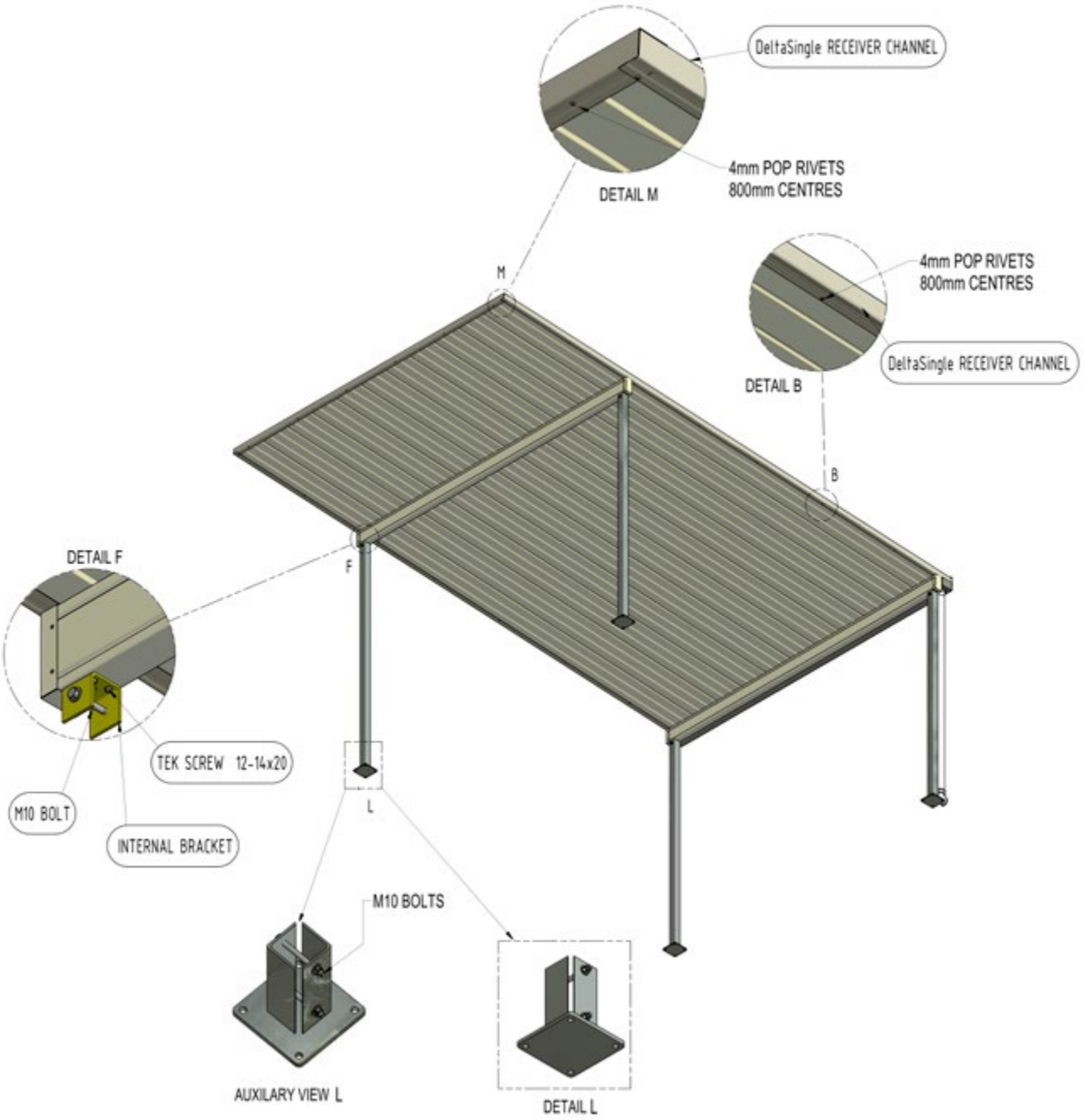


Figure B4

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3.3 Standalone Double Carport - N1/N2 - Piers

3D Drawing

Post Type	B6
Footing Type	B2

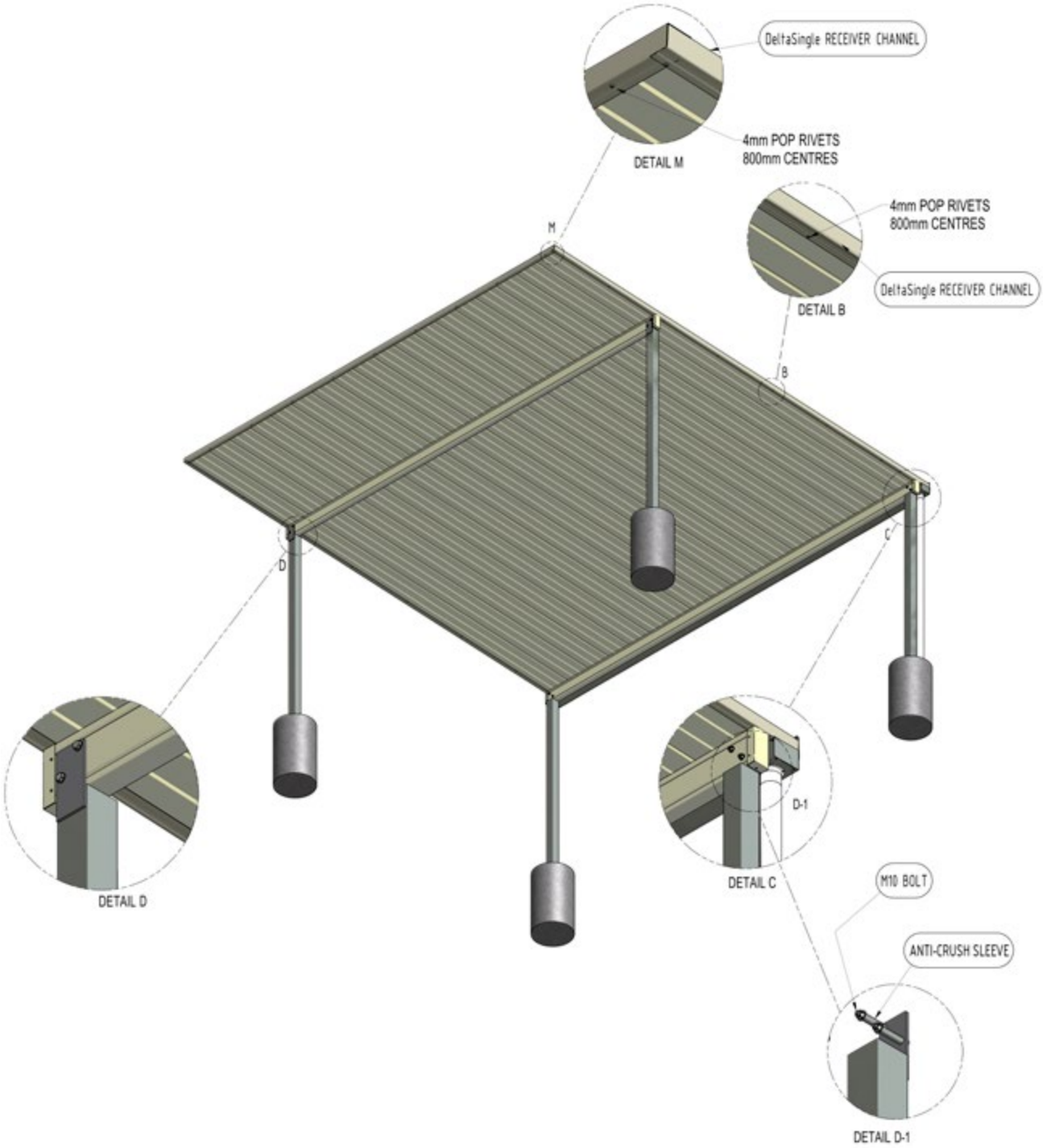

Figure B5

3.4 Standalone Double Carport - N1/N2 - Slab

3D Drawing

Post Type	B16
Footing Type	B22

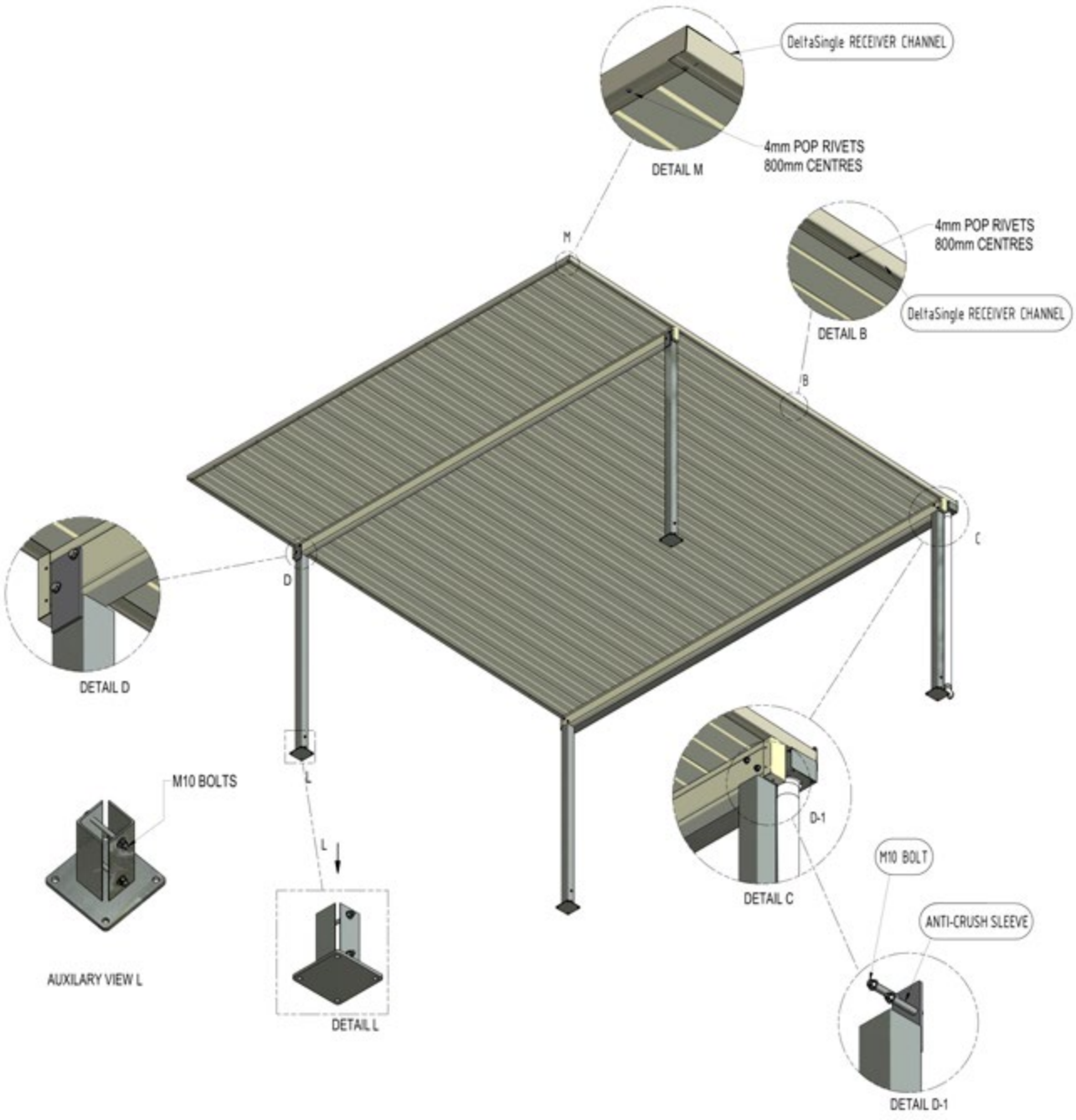

Figure B6

3.5 Standalone Single Carport - N3 - Piers

3D Drawing

Post Type	B16
Footing Type	B20

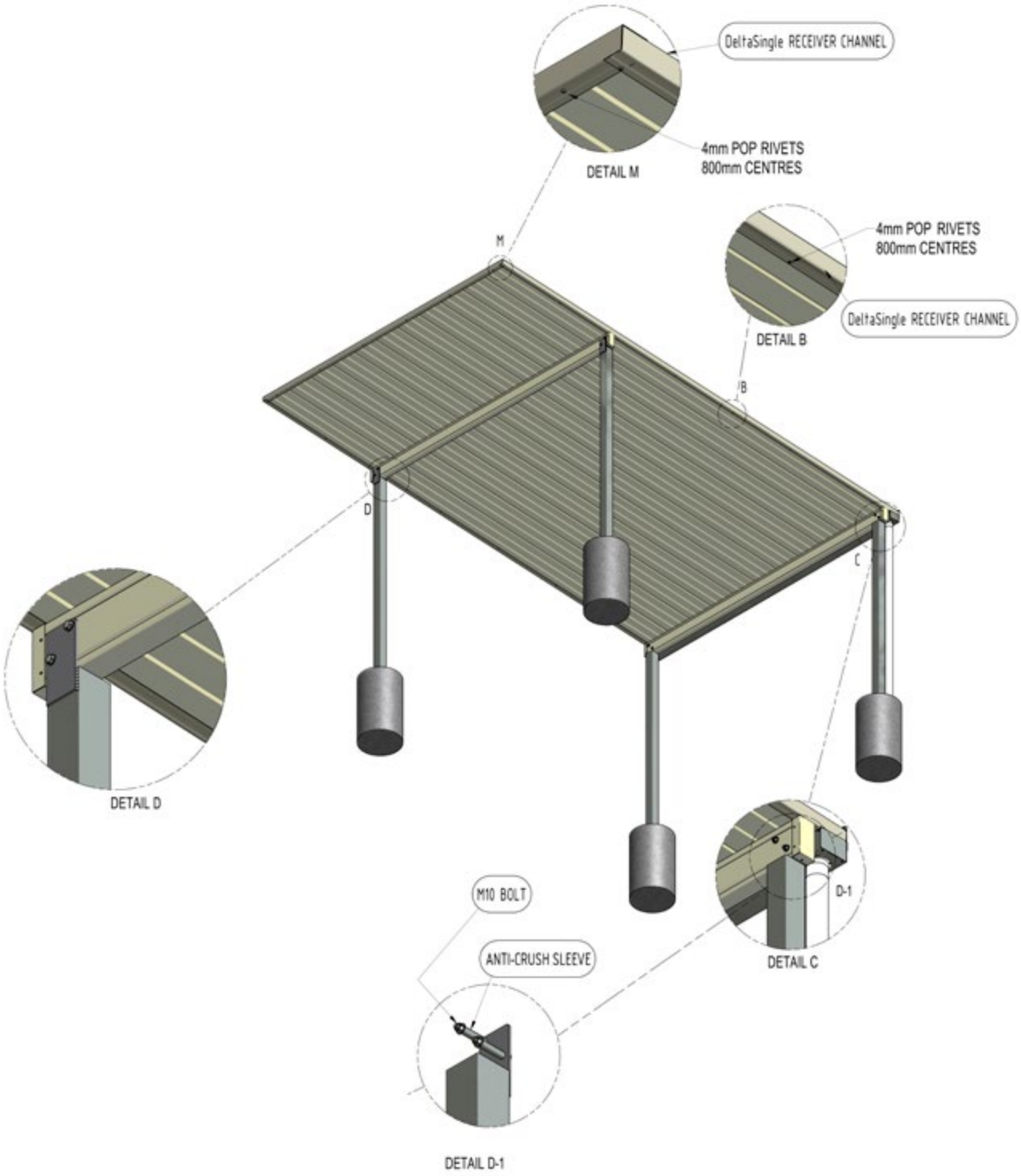

Figure B7

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3.6 Standalone Single Carport - N3 - Slab

3D Drawing

Post Type	B16
Footing Type	B22

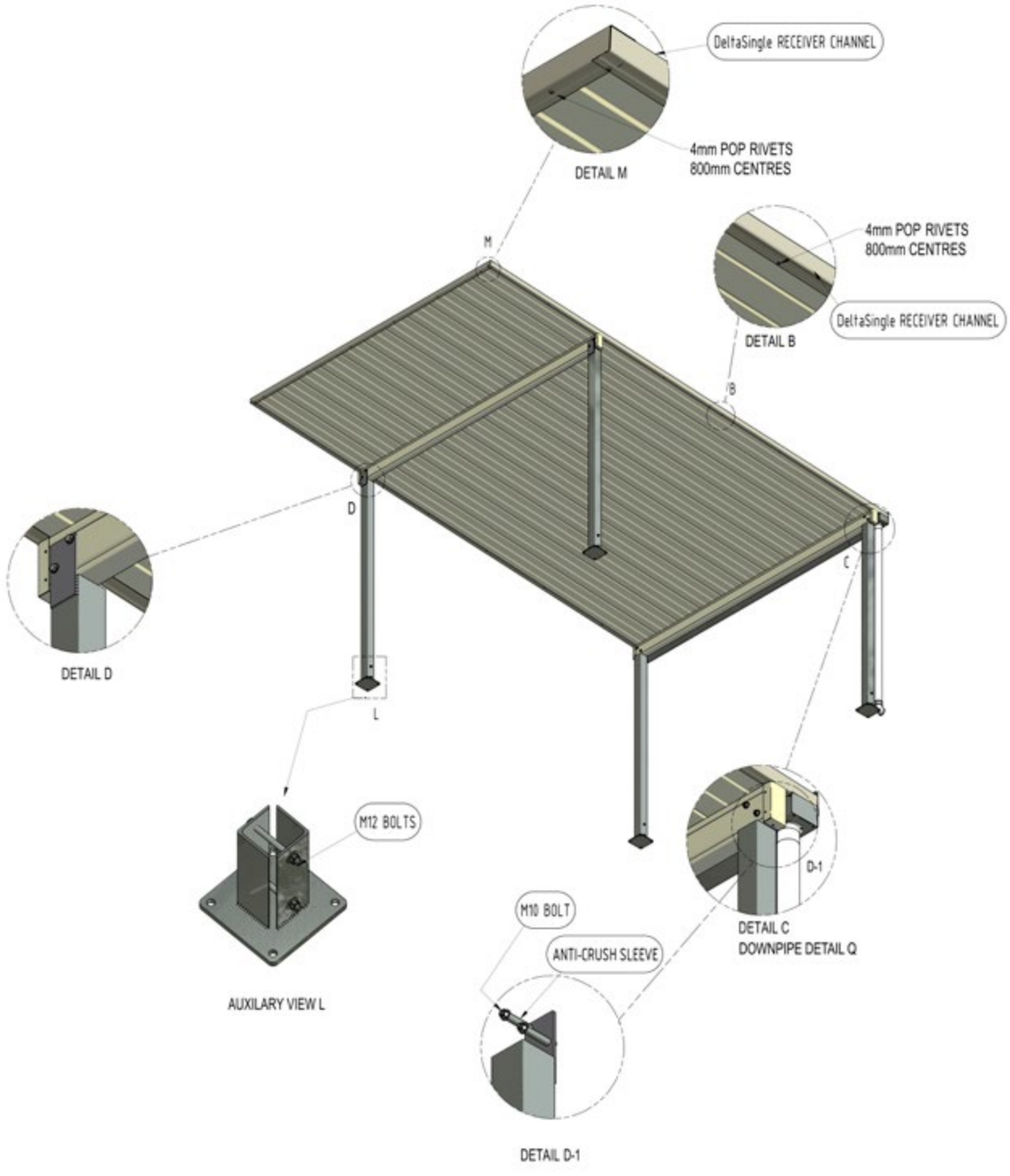

Figure B8

3.7 Standalone Double Carport - N3 - Piers

3D Drawing

Post Type	B16
Footing Type	B21

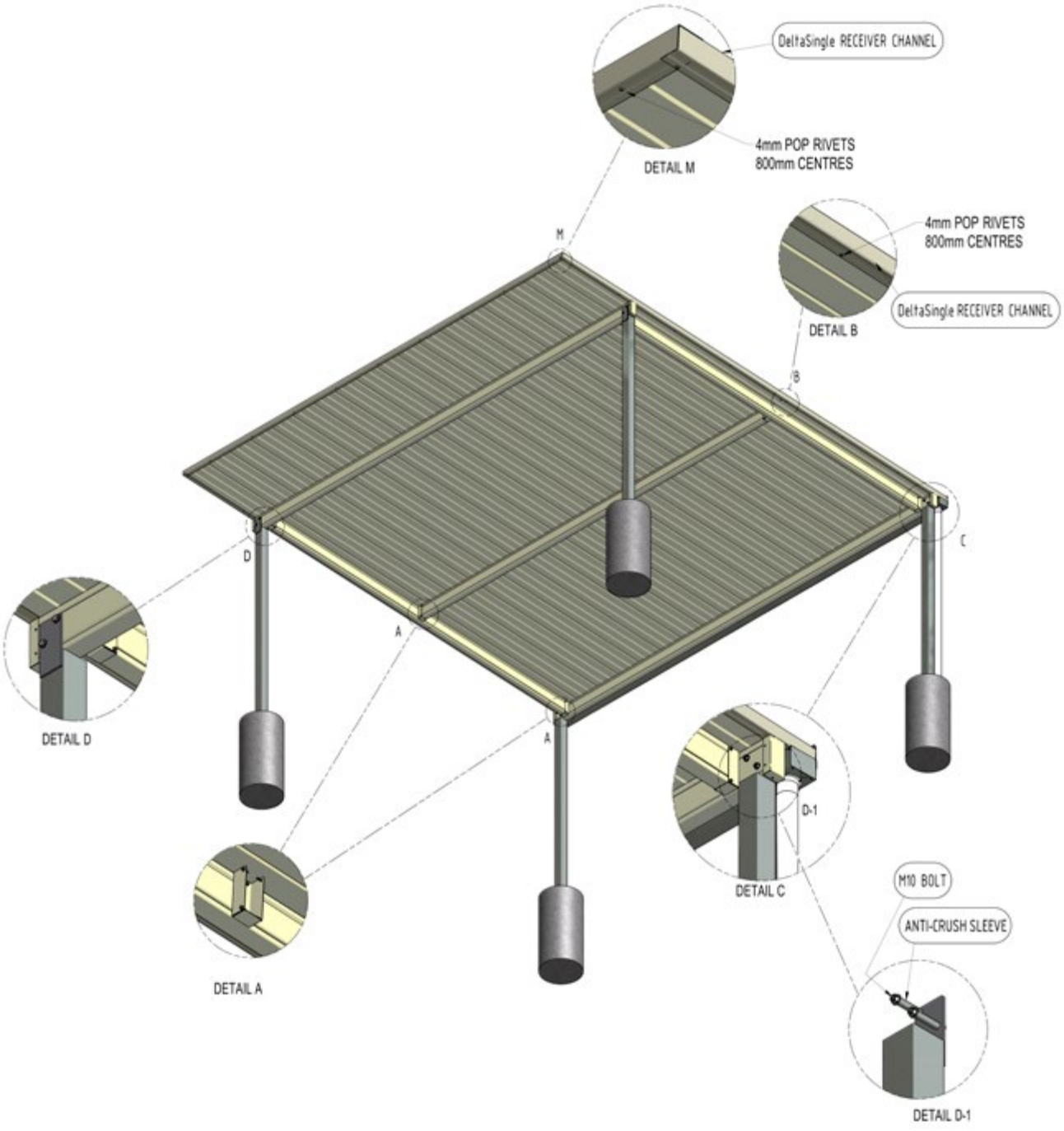

Figure B9

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3.8 Standalone Single Carport - N4 - Piers

3D Drawing

Post Type	B16
Footing Type	B21

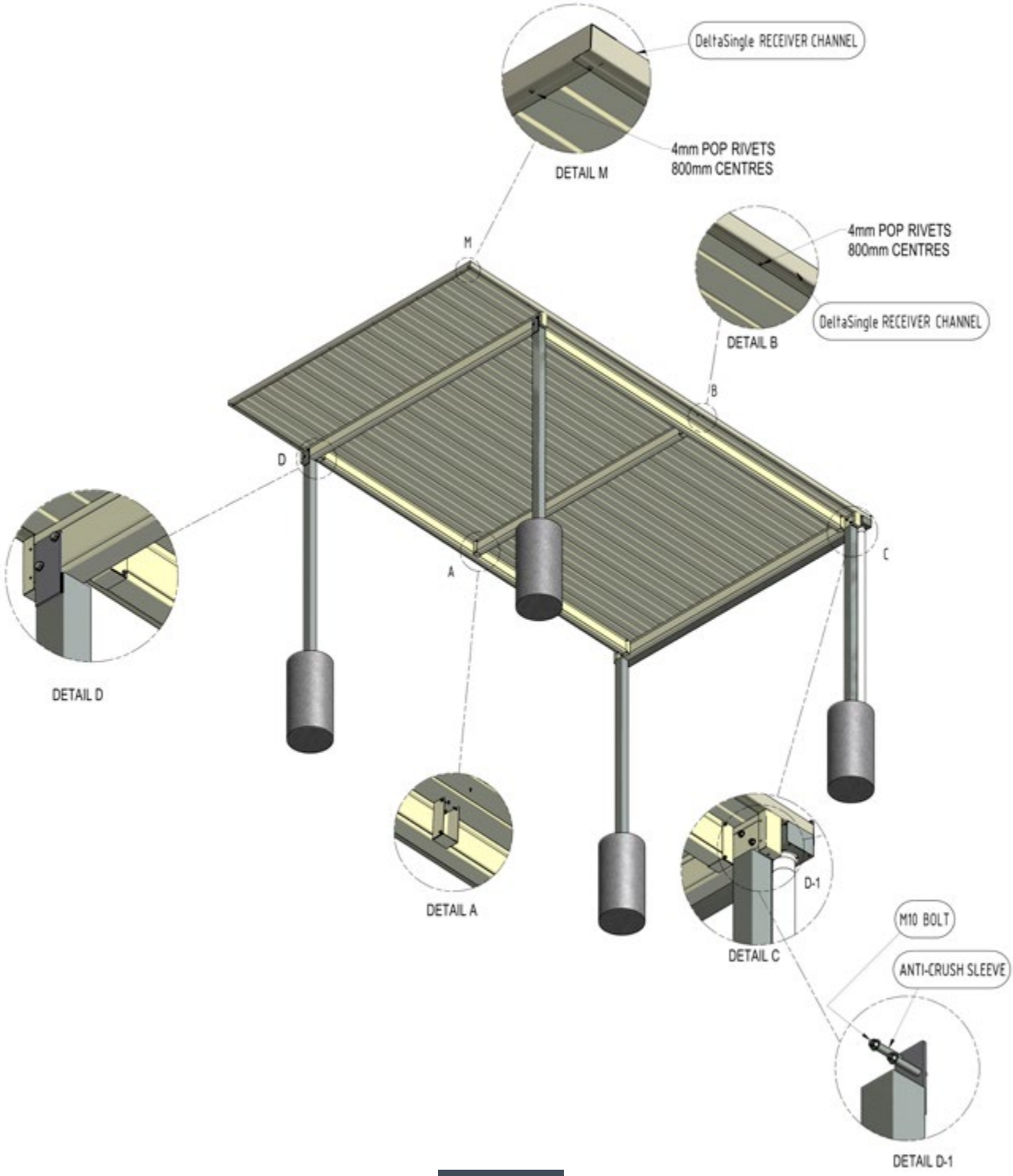

Figure B10

3.9 Standalone Double Carport - N4 - Piers

3D Drawing

Post Type	B18
Footing Type	B21

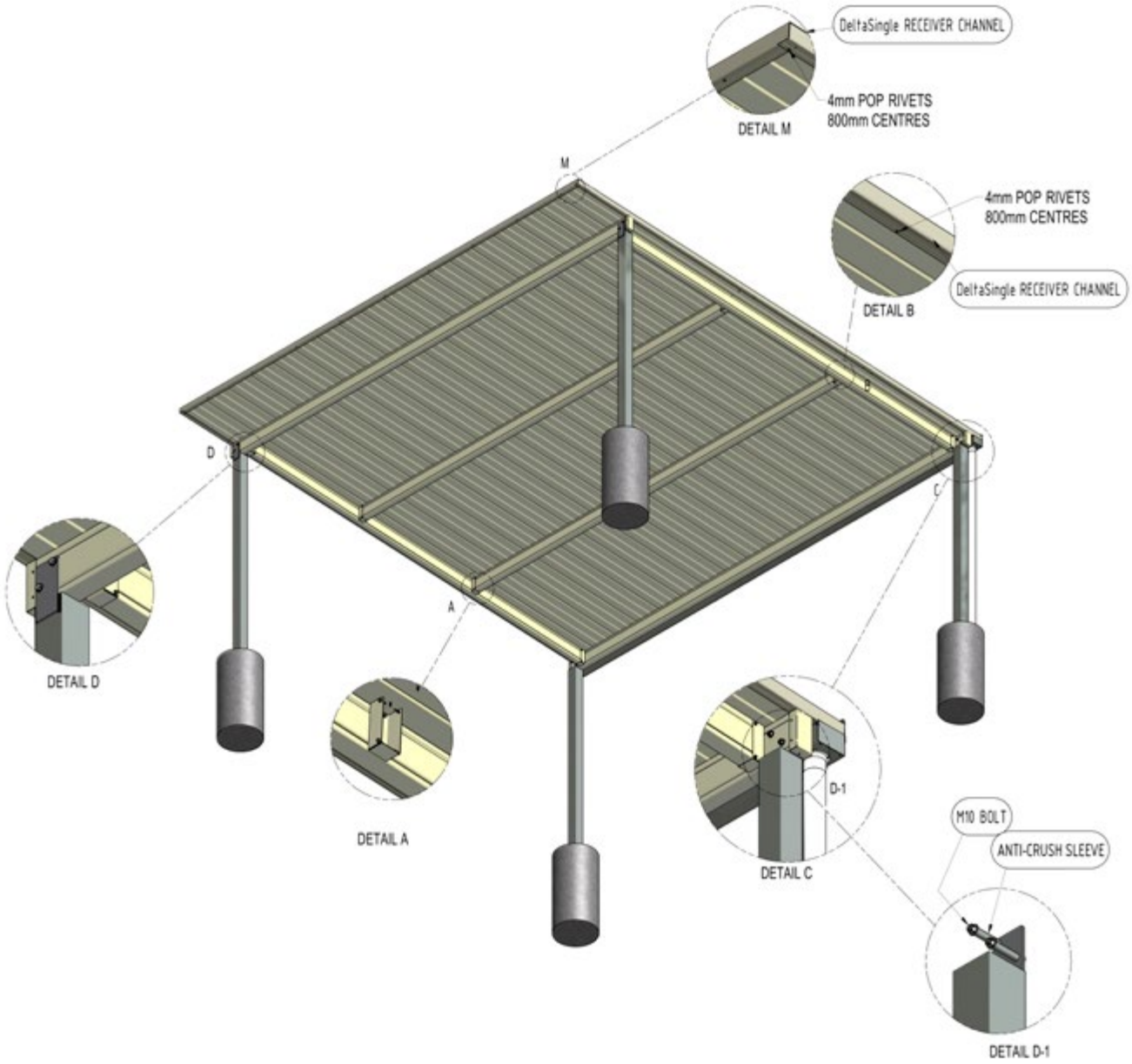

Figure B11

3.10 Attached Single Carport - N1/N2/N3 - Piers

3D Drawing

Post Type	B17
Footing Type	B23

Figure B12

3.11 Attached Single Carport - N1/N2/N3 - Slab

3D Drawing

Post Type	B17
Footing Type	B22

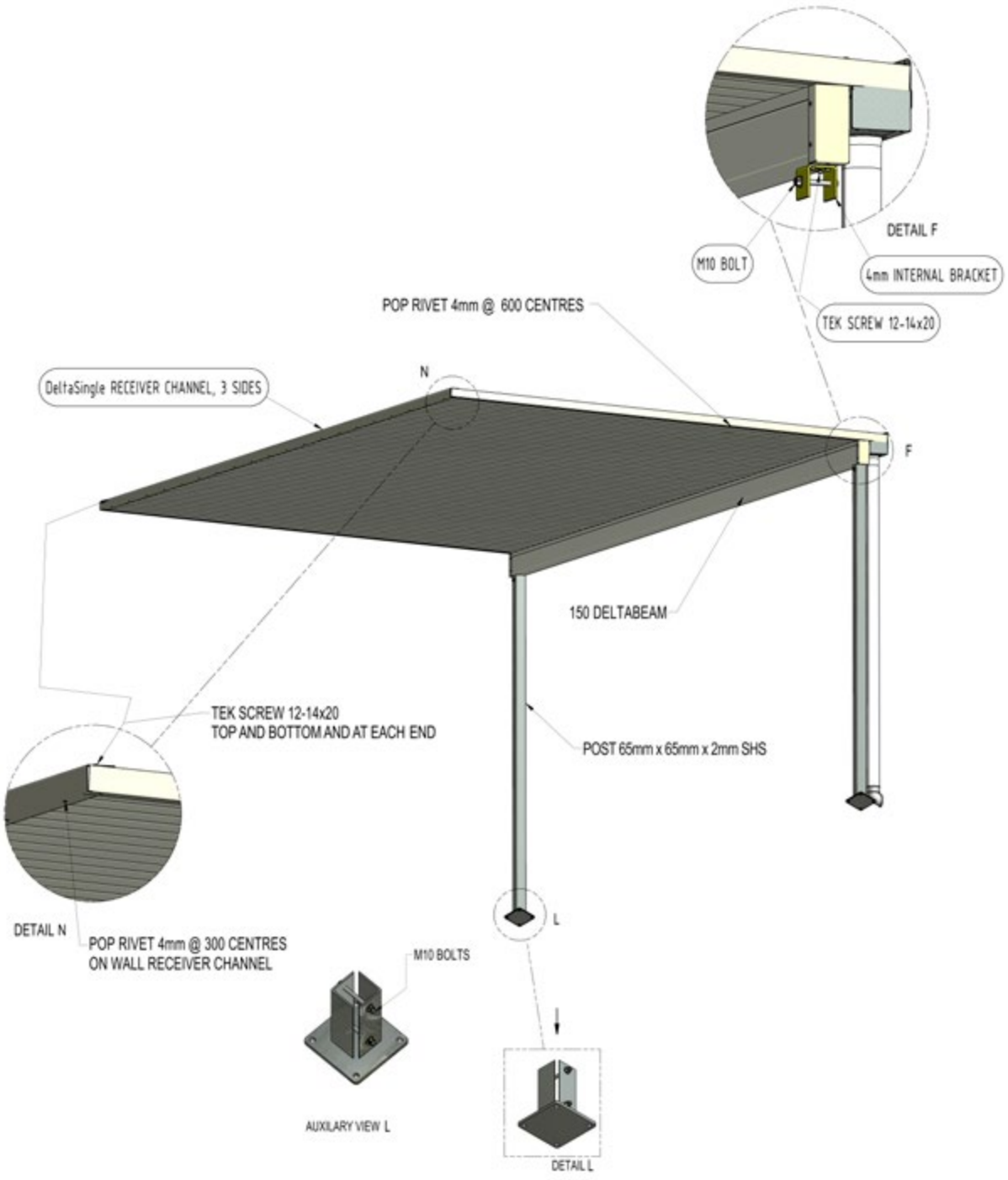

Figure B13

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3.12 Attached Single Carport - N4 - Piers

3D Drawing

Post Type	B17
Footing Type	B24

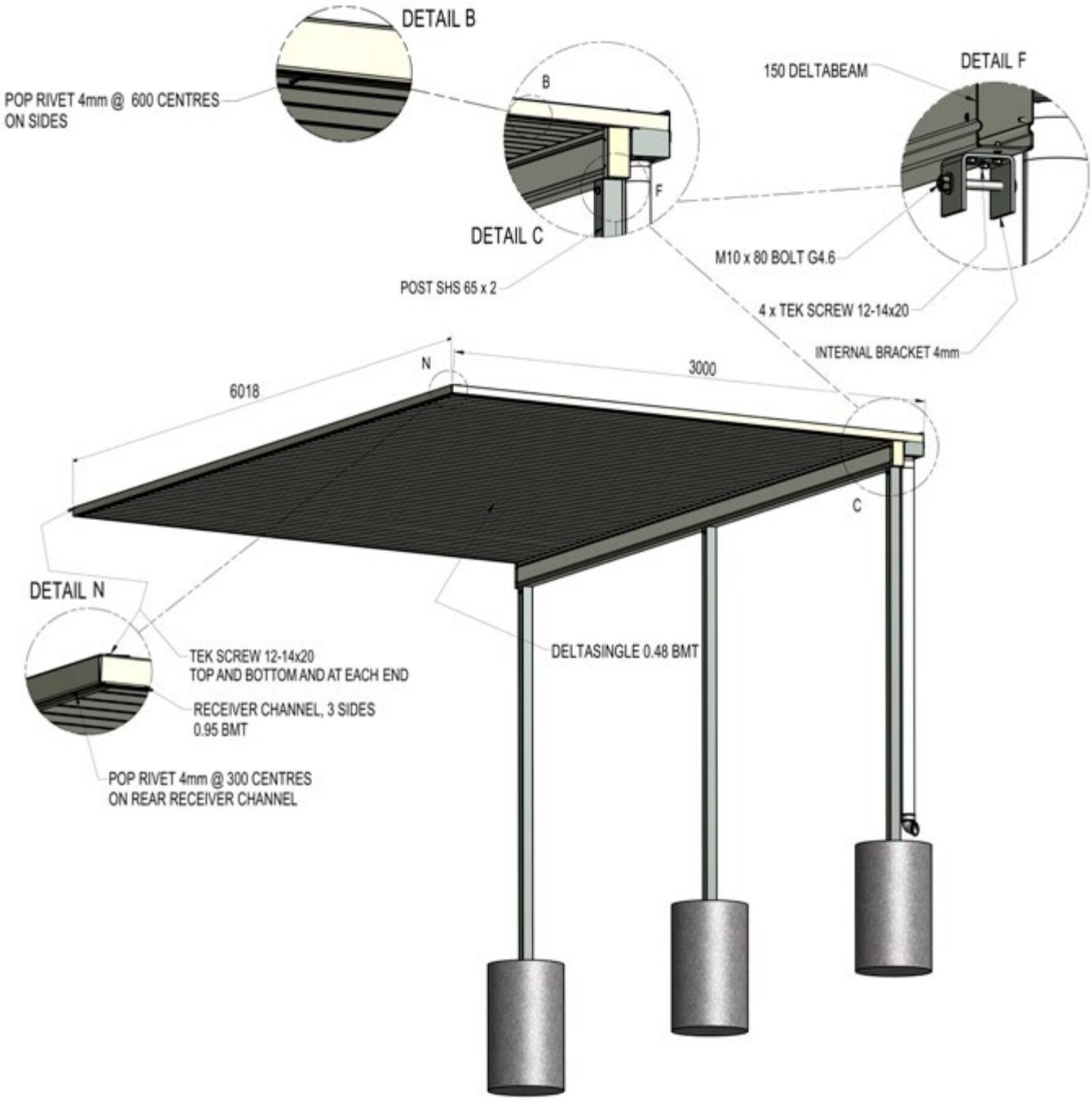

Figure B14

3.13 Attached Single Carport - N4 - Slab

3D Drawing

Post Type	B17
Footing Type	B22

Figure B15

4.1 Post Type 1/2

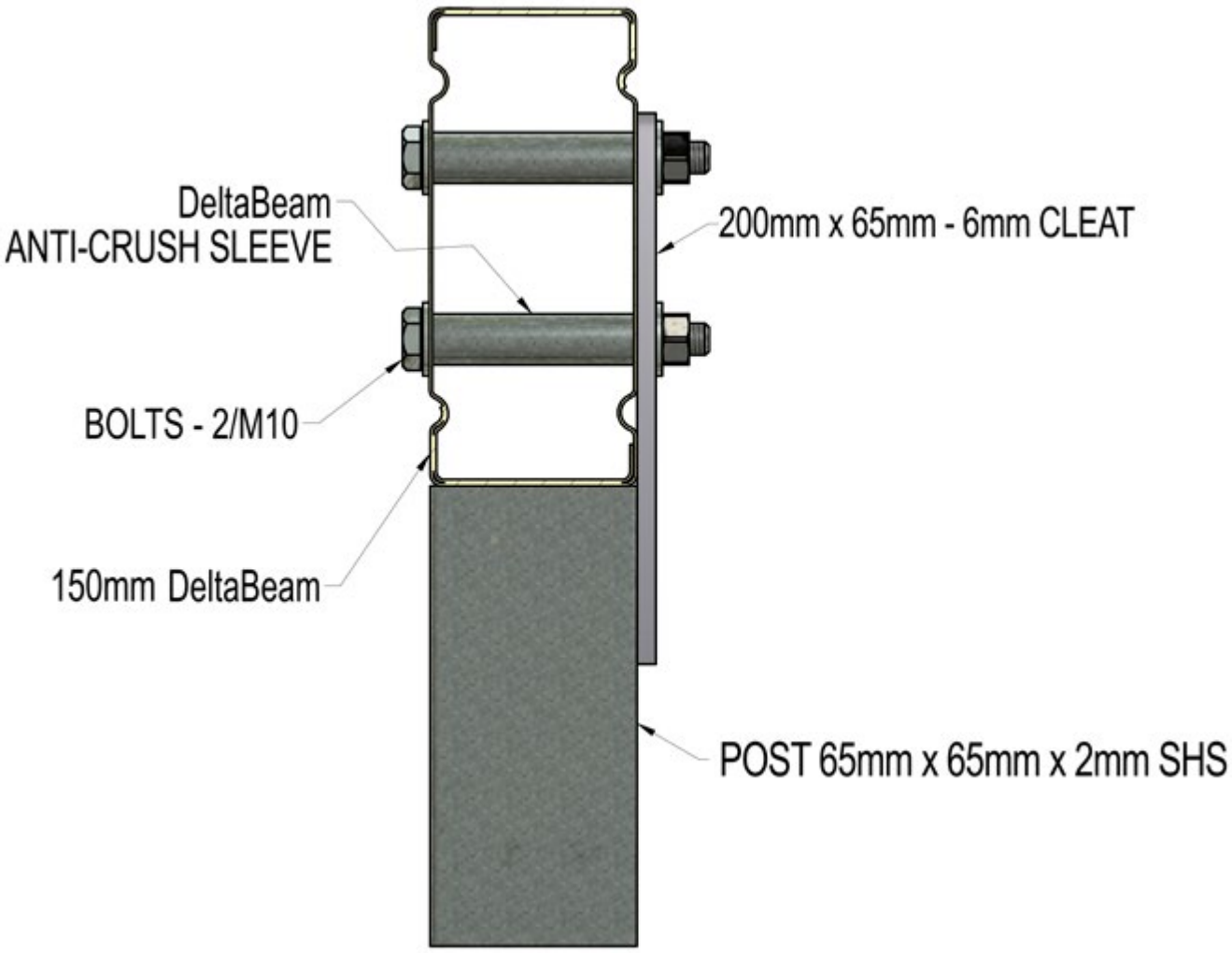

Figure B16

4.2 Alternative Post Type 1/2

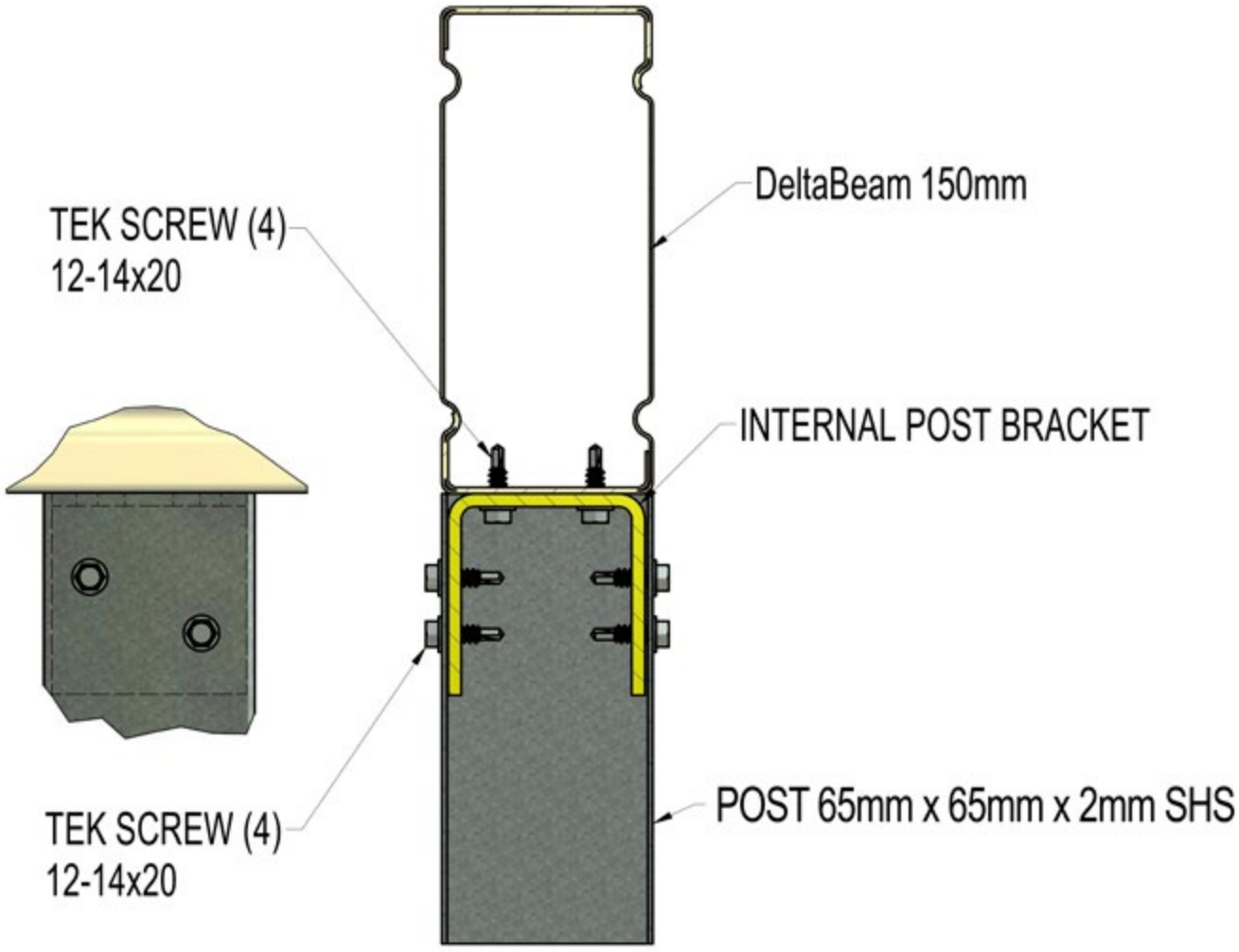

Figure B17

4.3 Post Type 3

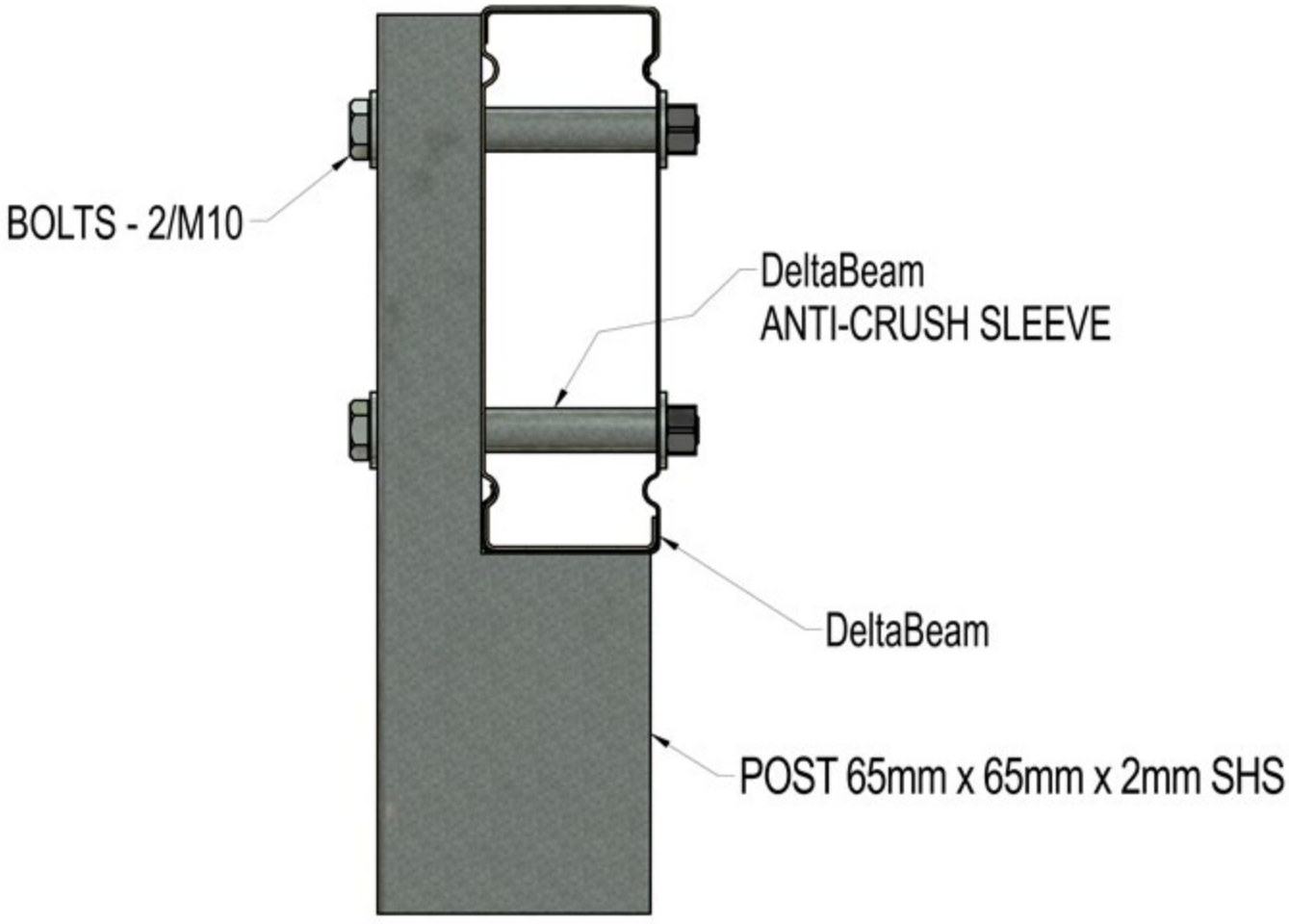

Figure B18

5.1 Footing Type 1 - Piers

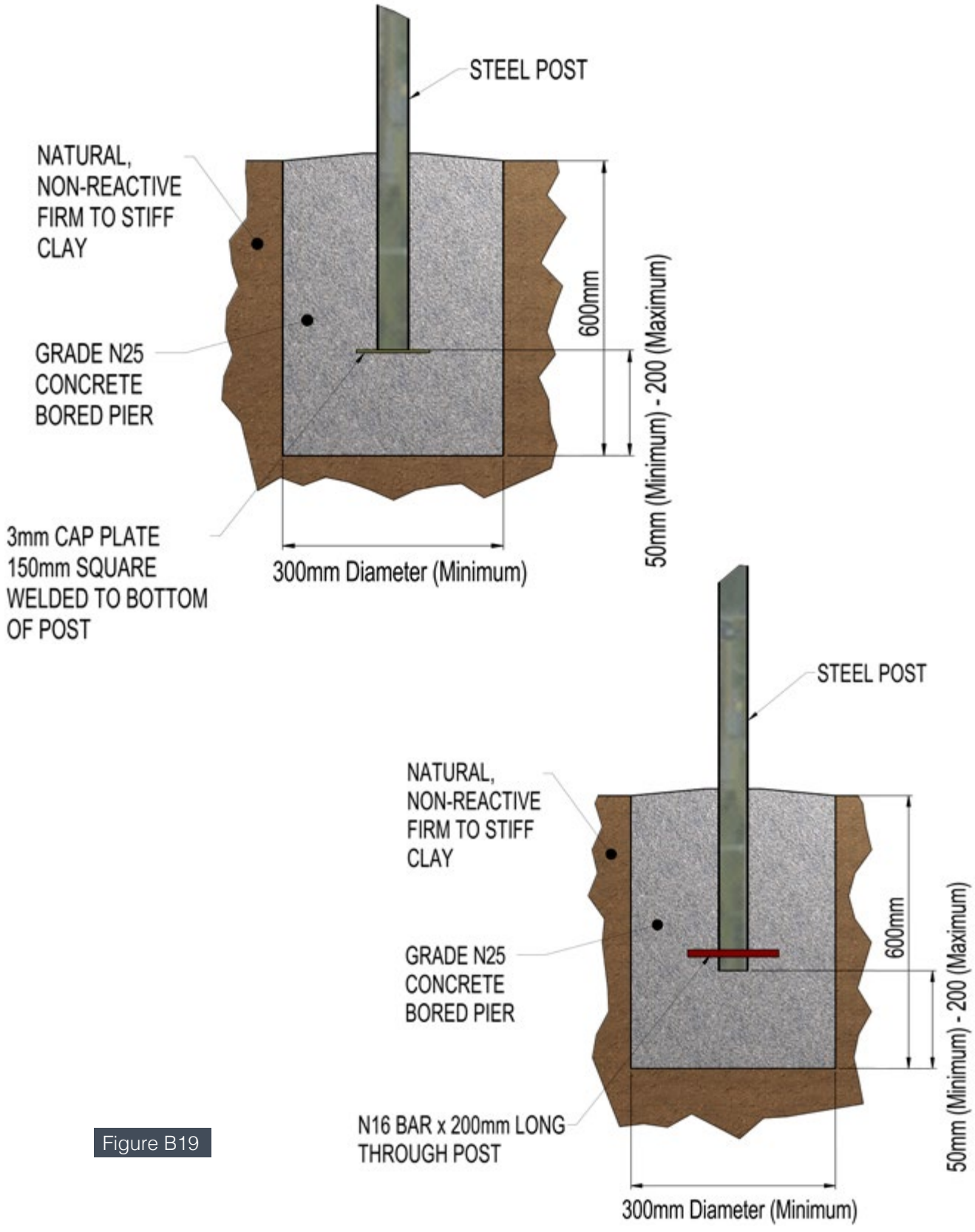

Figure B19

5.2 Footing Type 2 - Piers

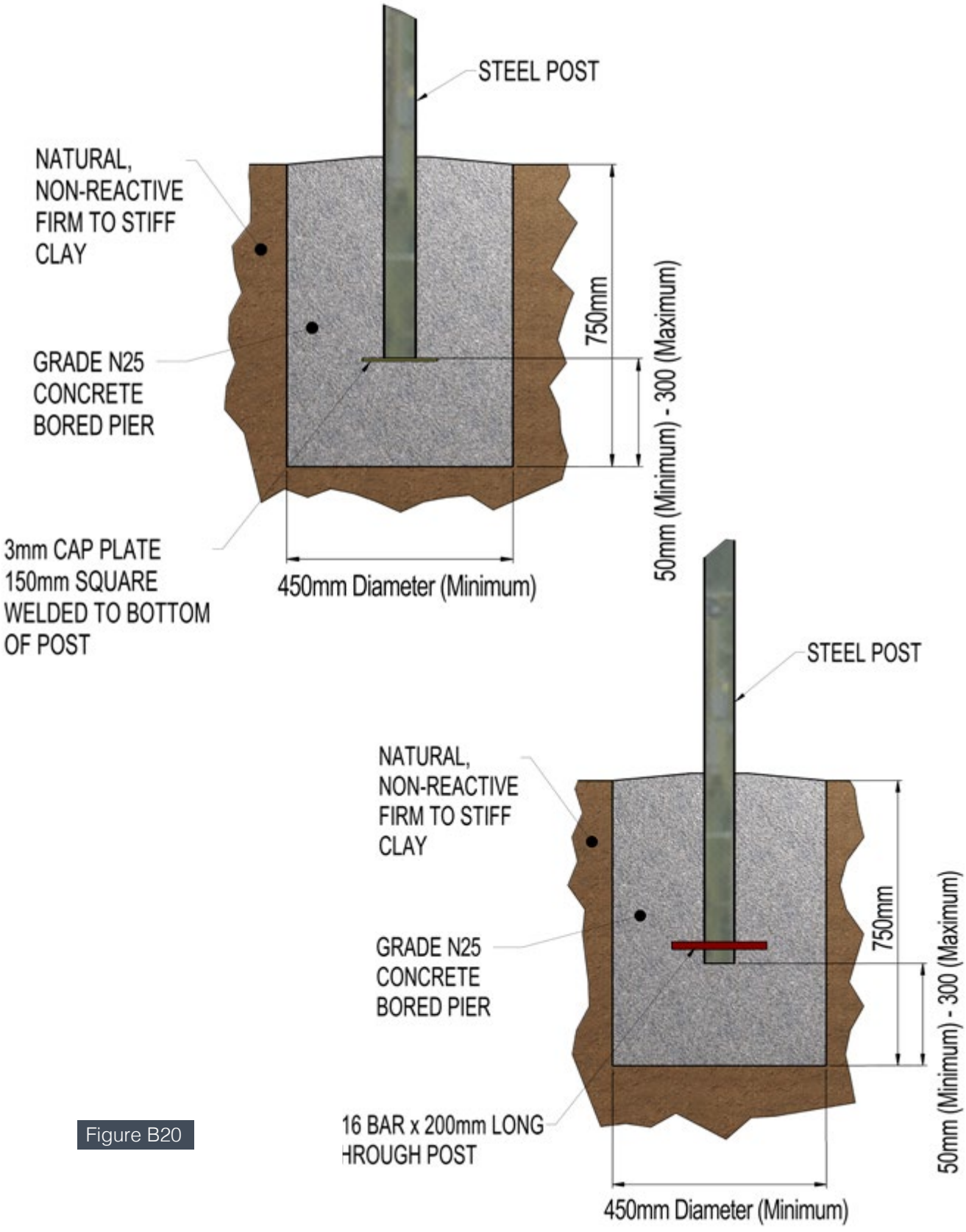

Figure B20

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5.3 Footing Type 3

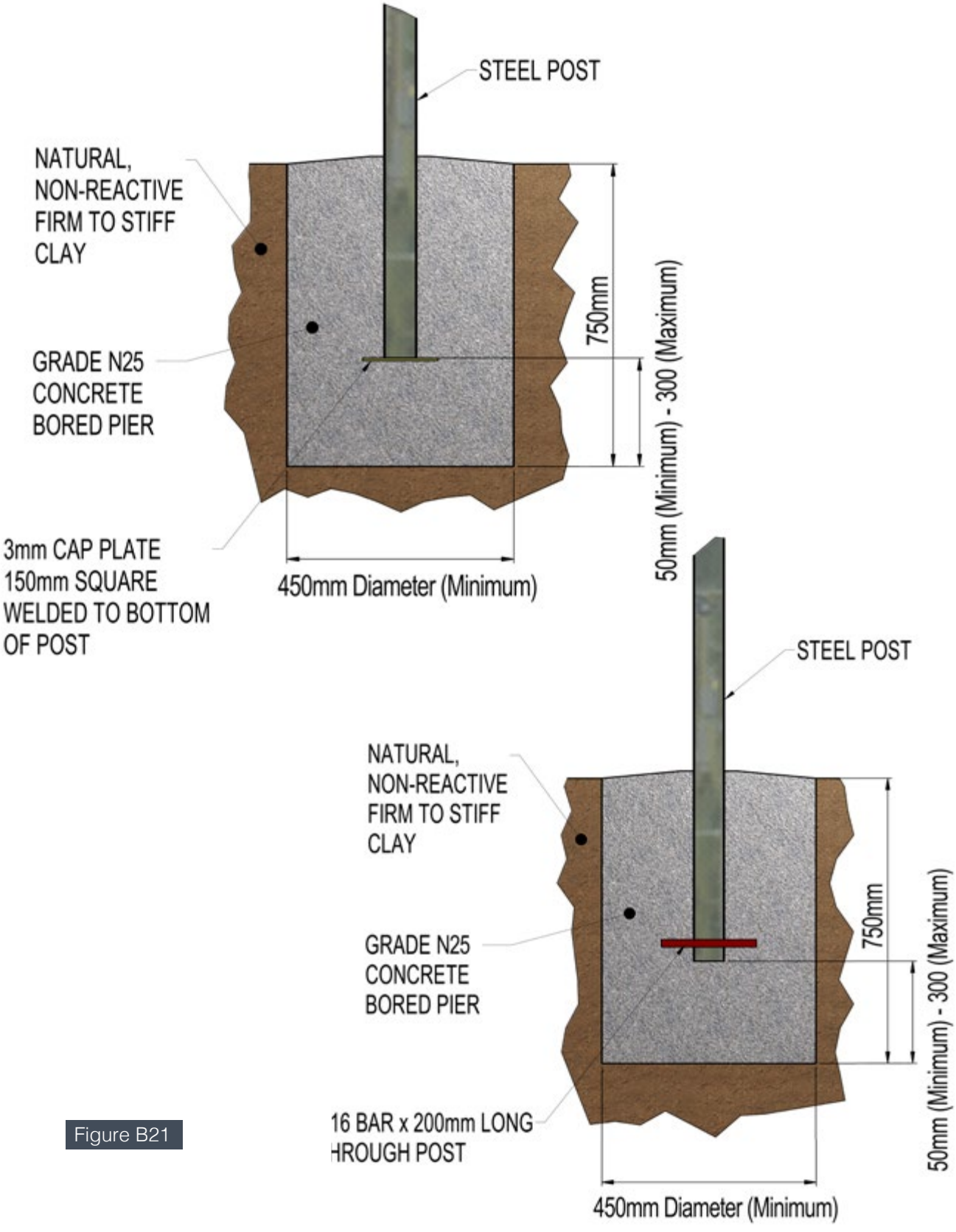


Figure B21

5.4 Footing Type 1&2 - Slab

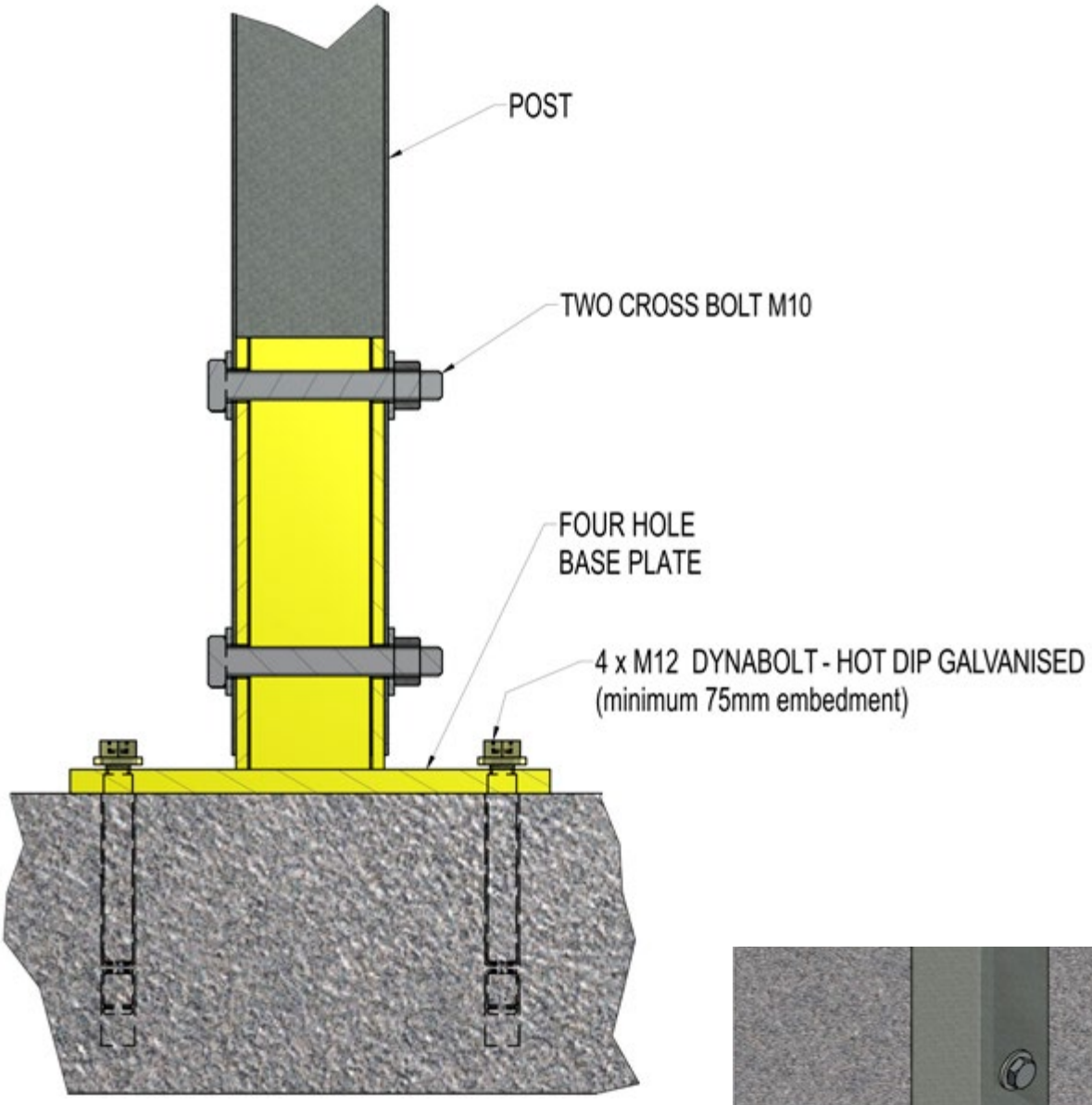
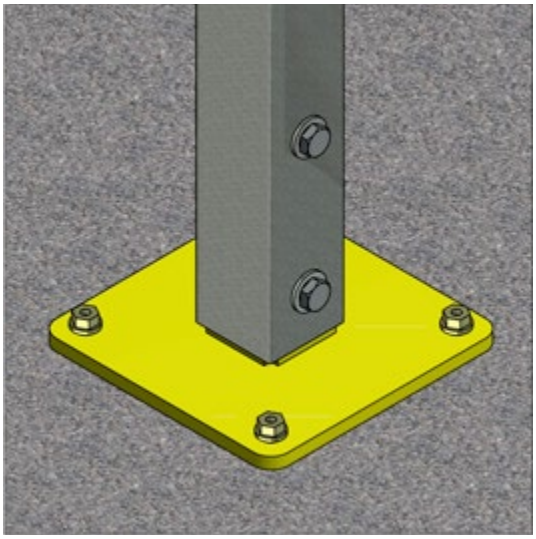


Figure B22



5.5 Footing Type 1 - Square Footing

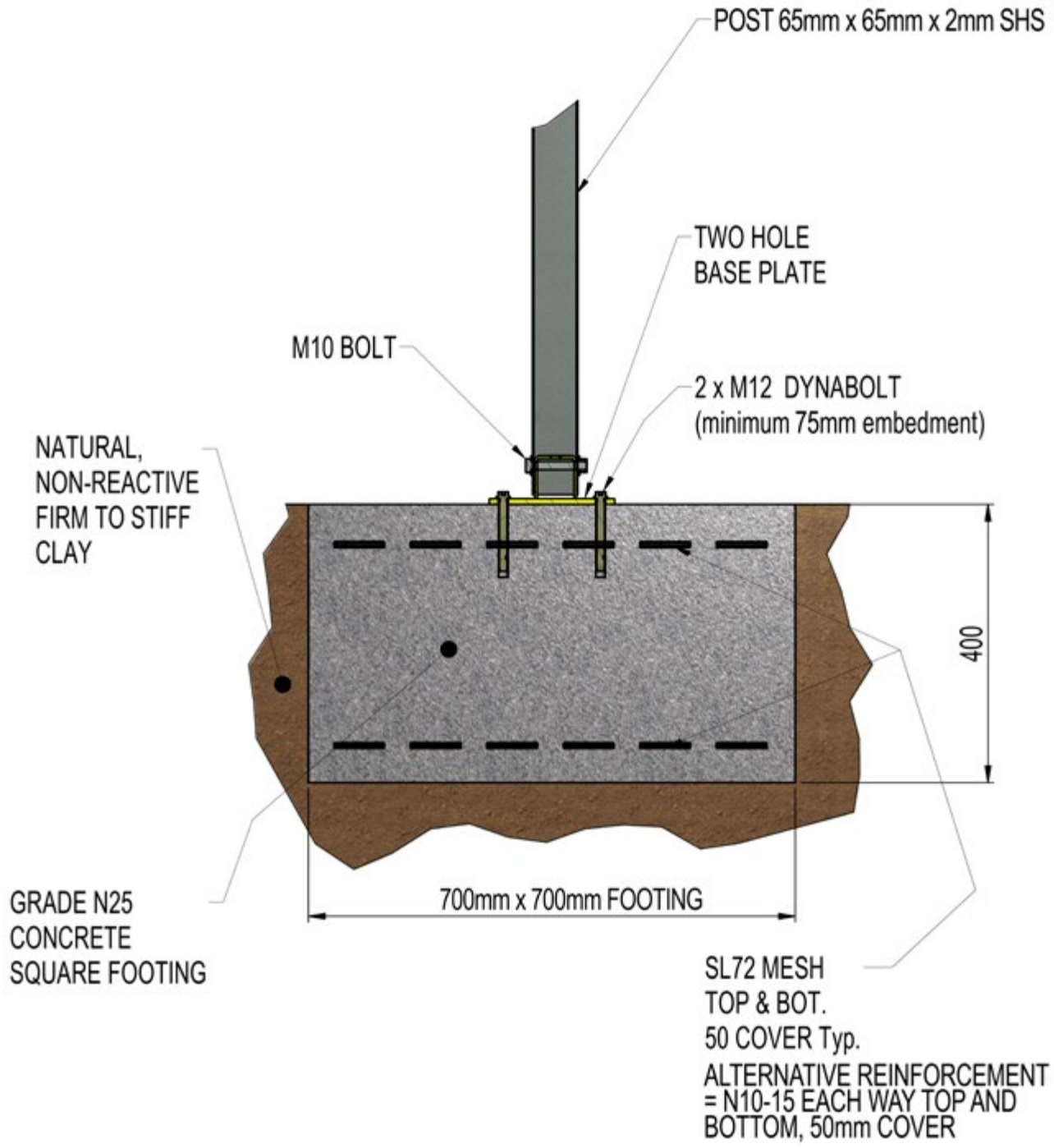


Figure B23

5.6 Footing Type 2 - Square Footing

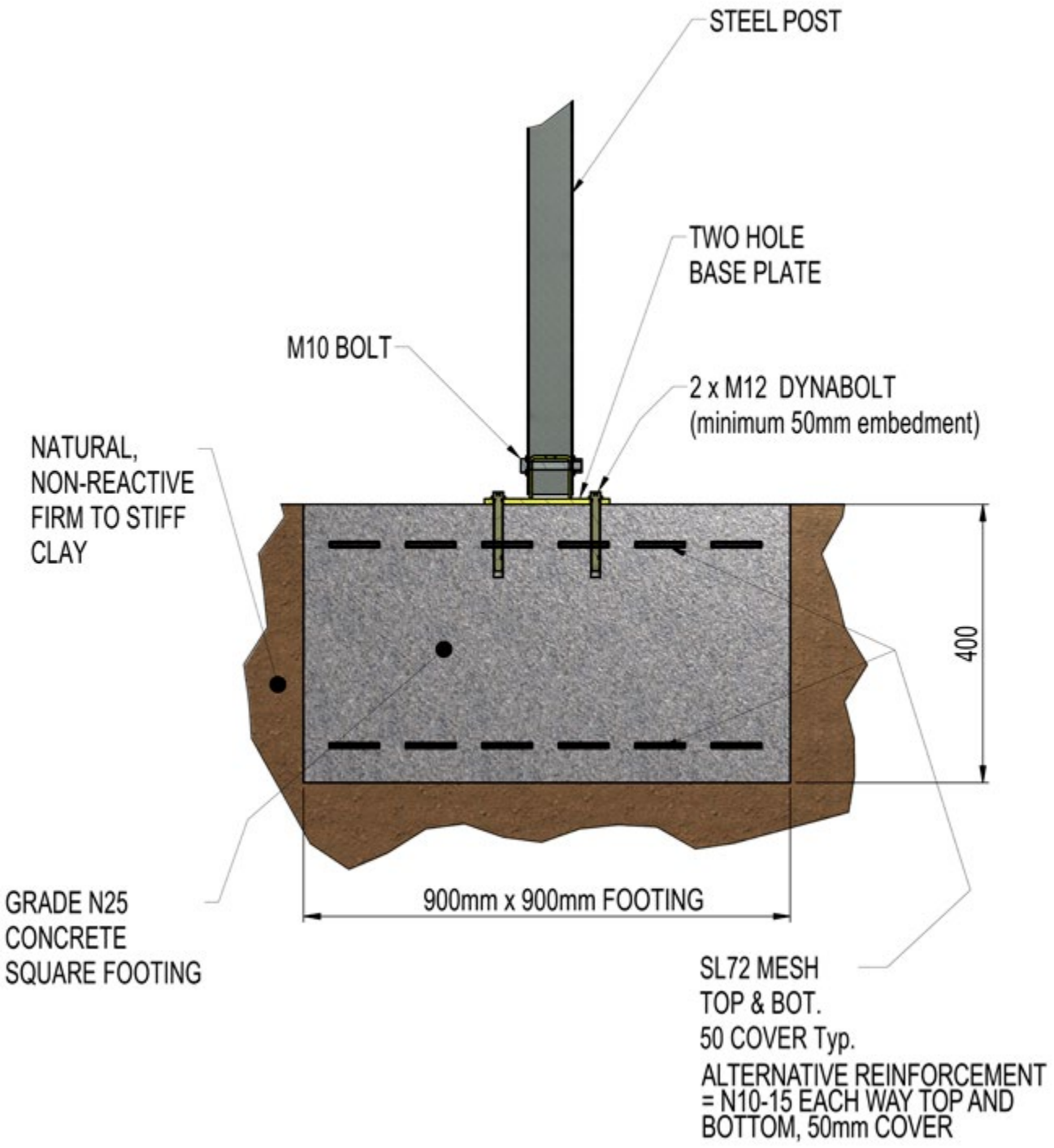


Figure B24

6.1 Standalone Single

Layout Drawing

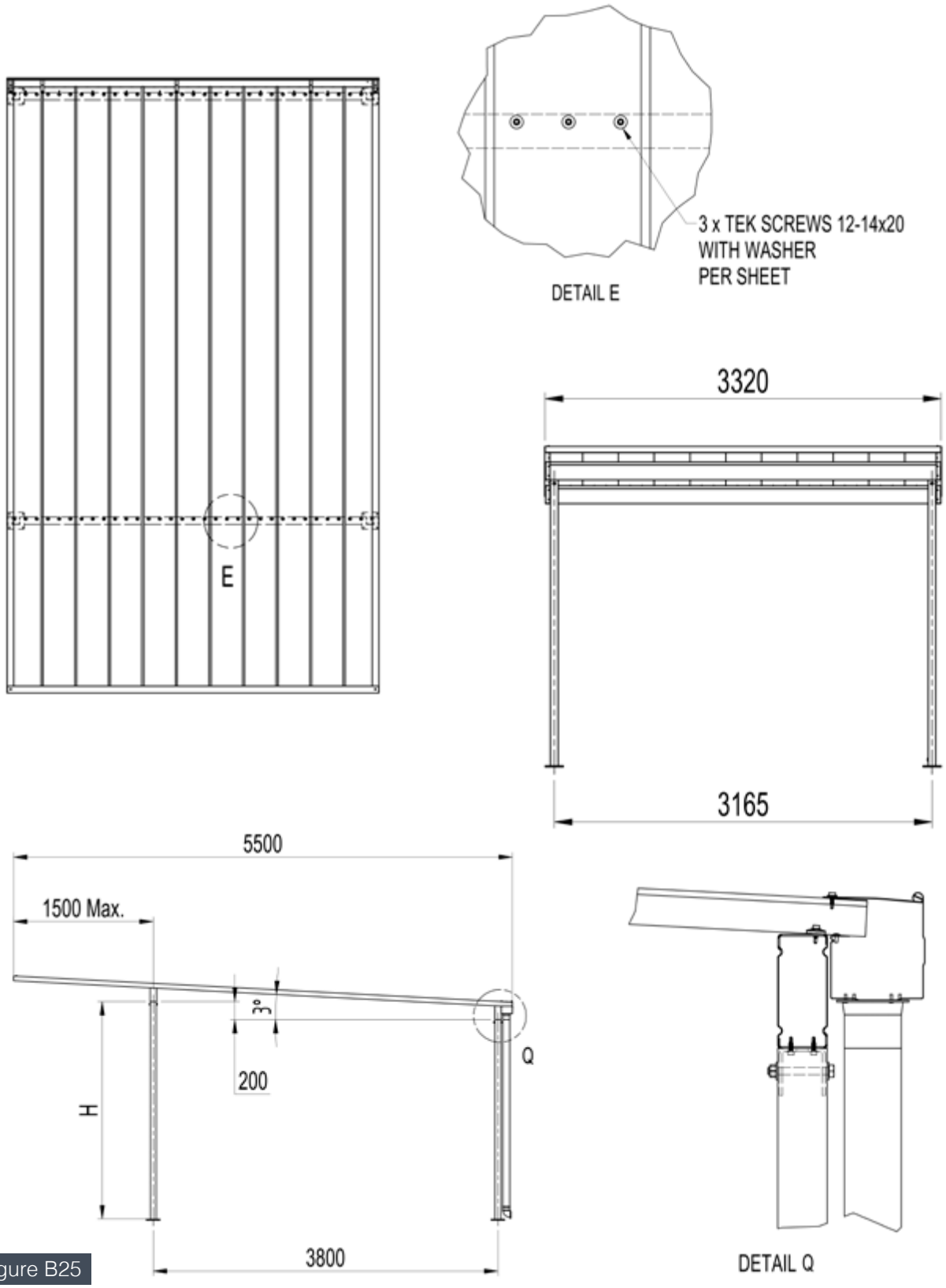


Figure B25

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6.2 Standalone Double

Layout Drawing

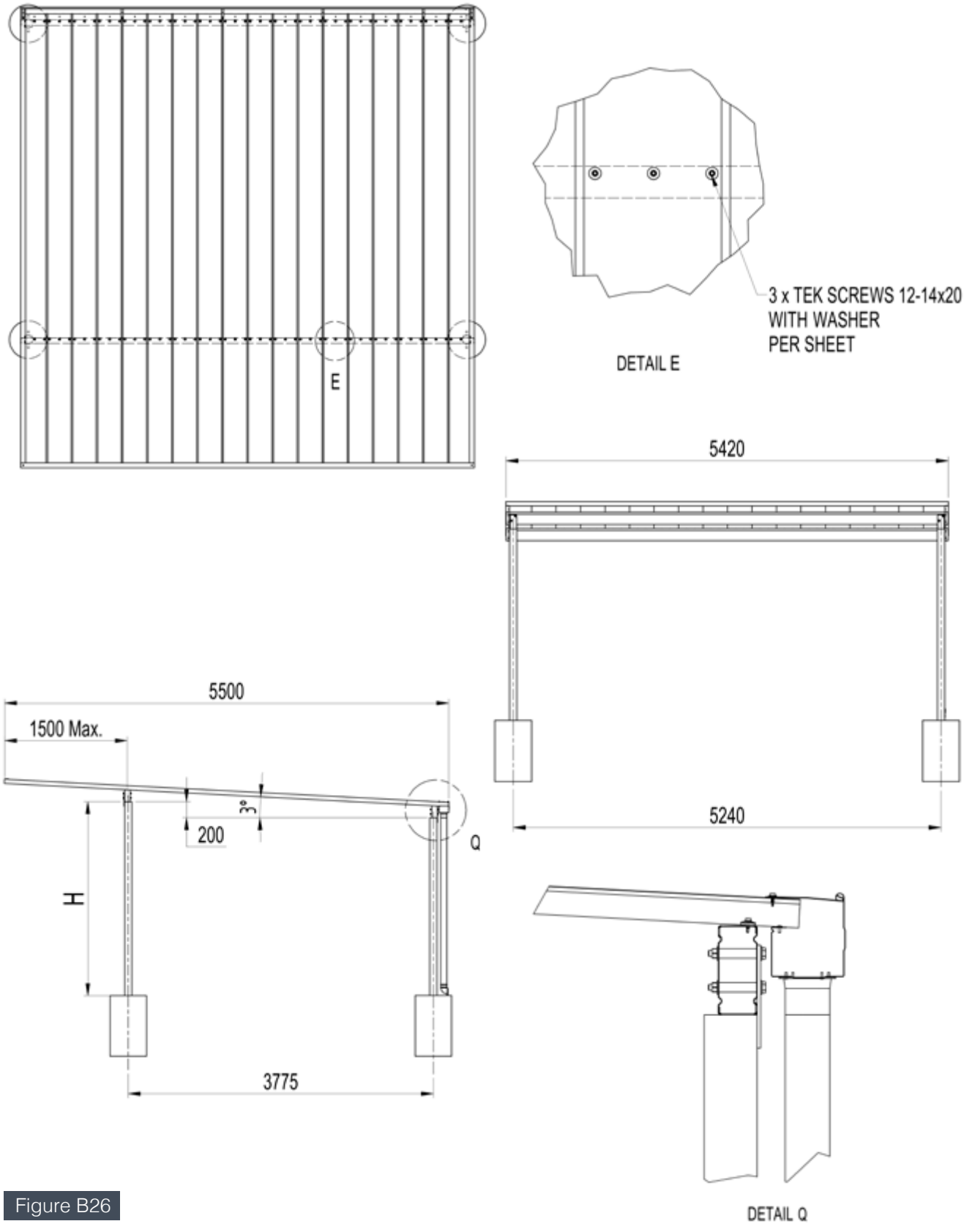

Figure B26

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6.3 Attached Single

Layout Drawing

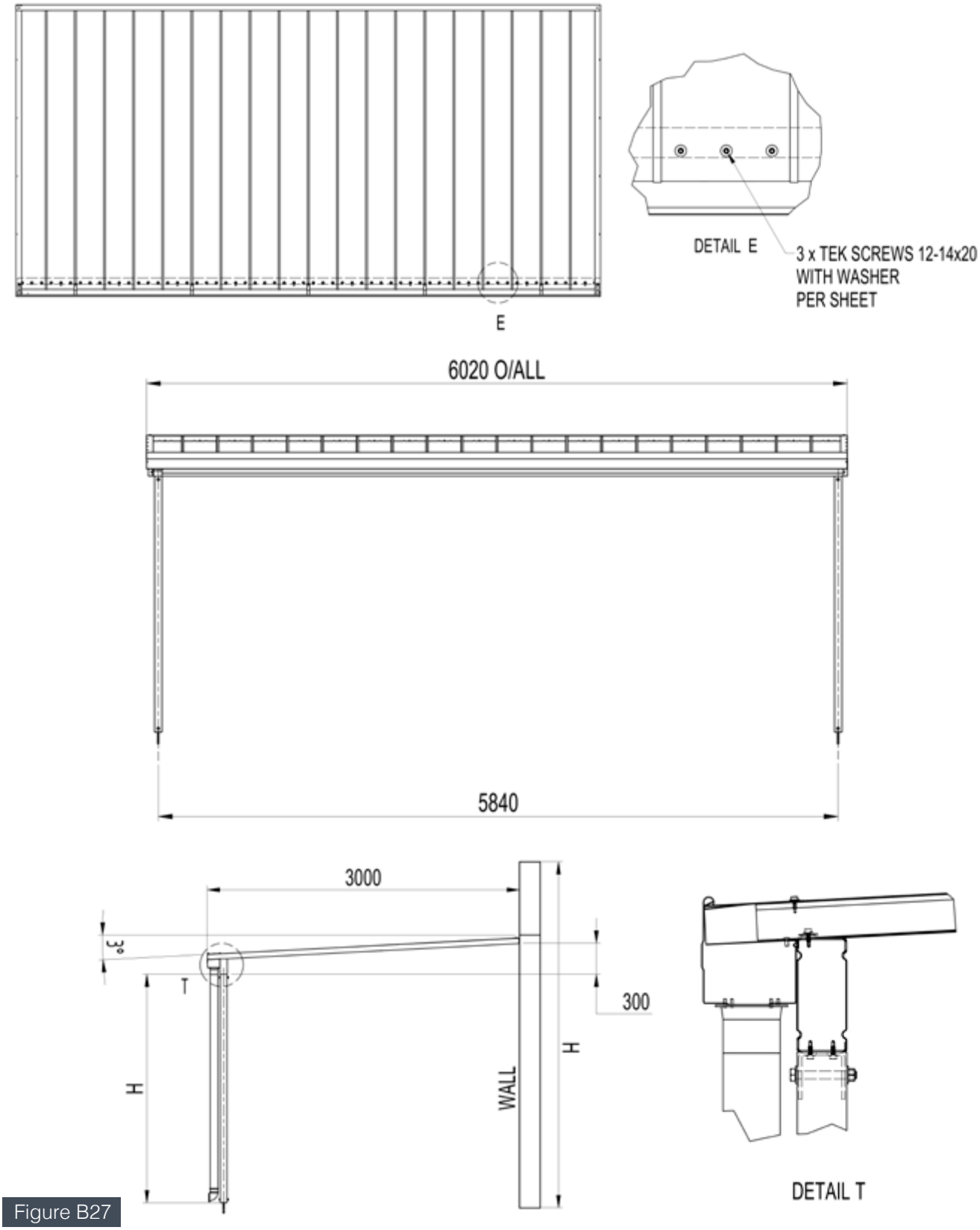
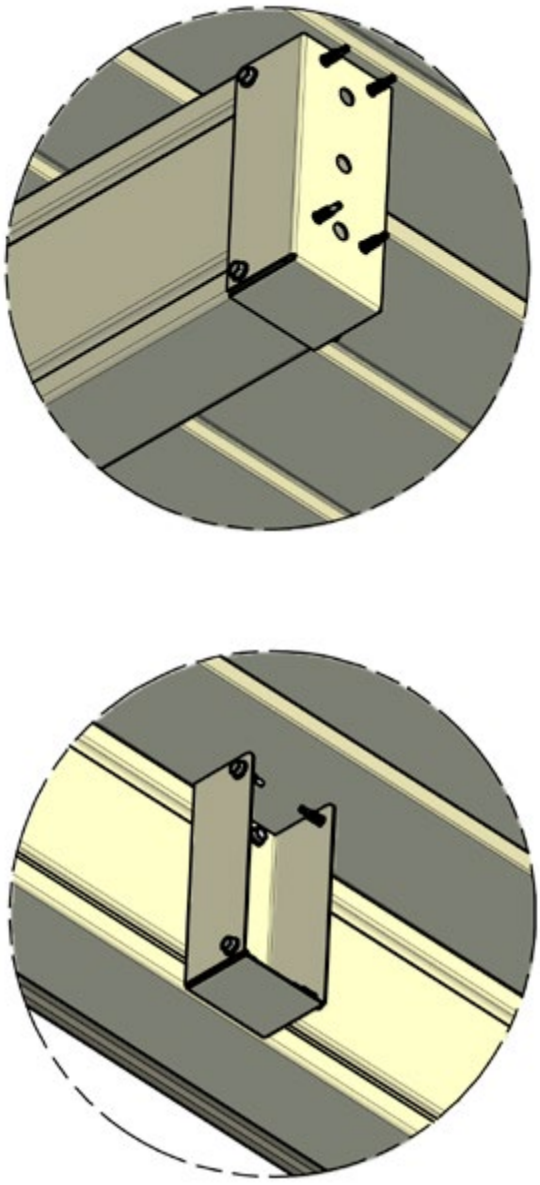


Figure B27

6.4 Detail A - Beam to Beam Connector



DETAIL A

Figure B28

6.5 Detail B - Edge Channelling

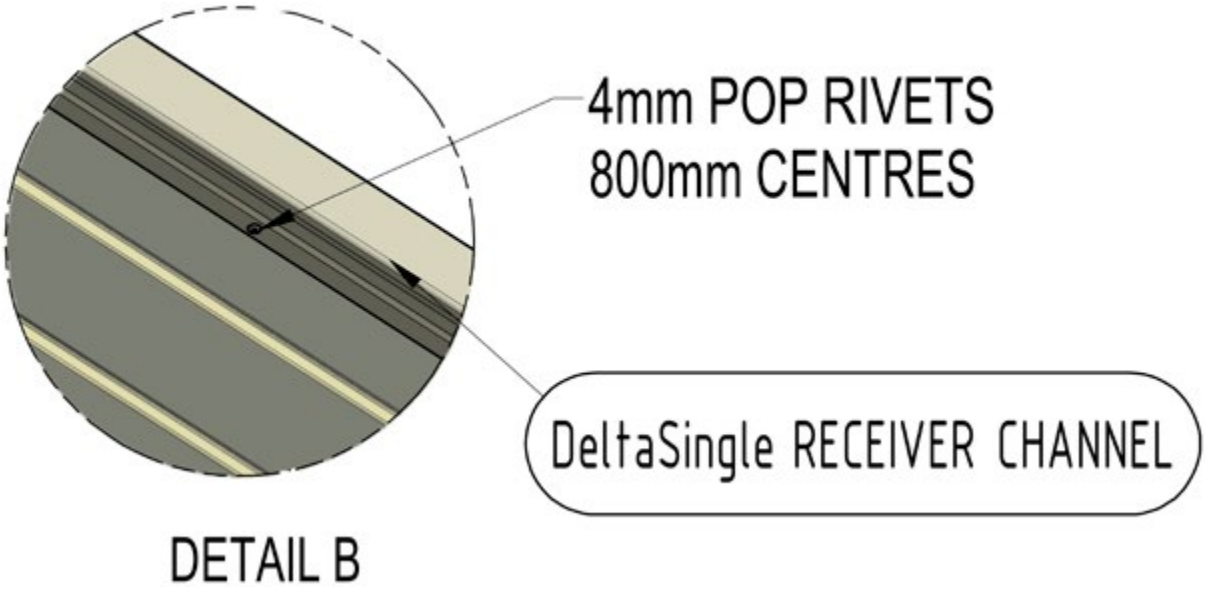


Figure B29

6.6 Detail C - Gutter End Assembly

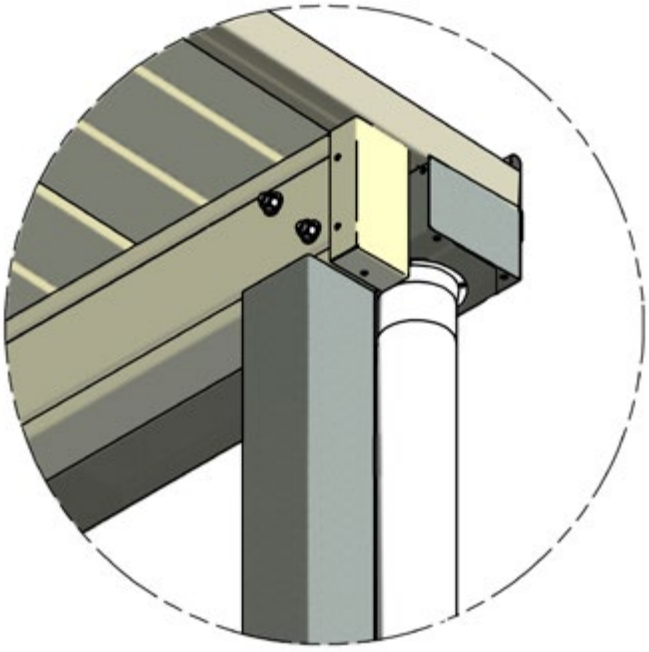
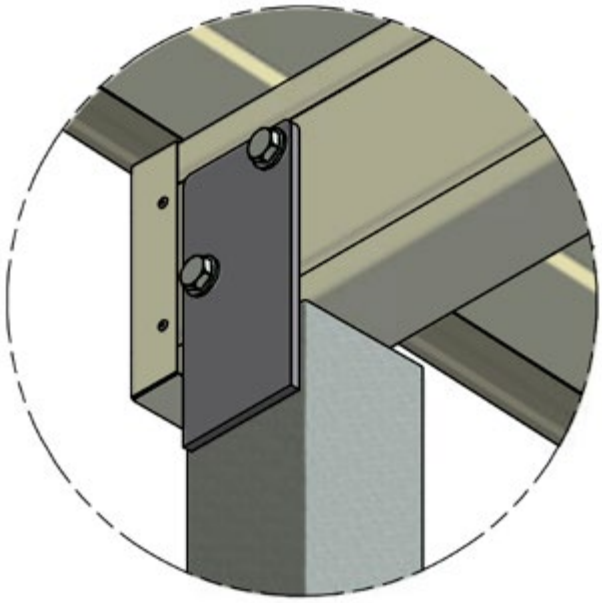
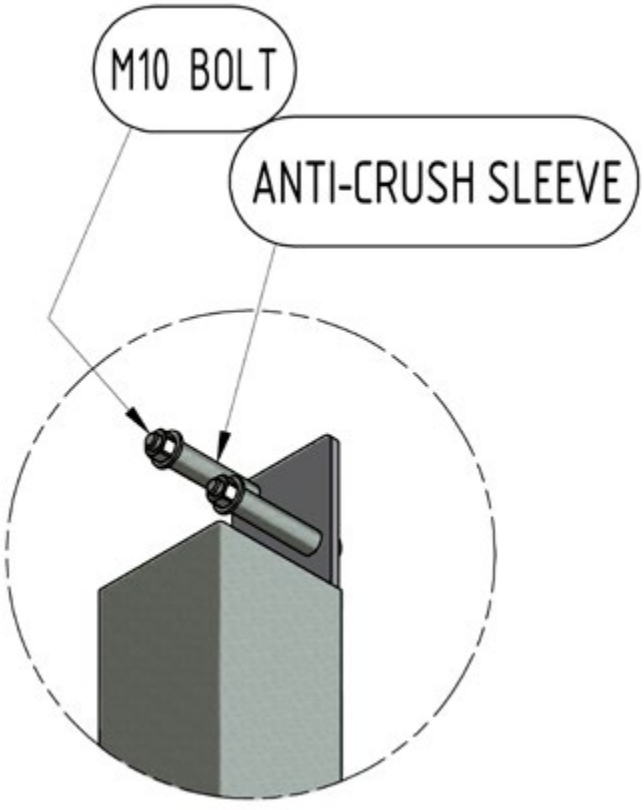


Figure B30

6.7 Detail D - Post to Beam Connector



DETAIL D-1
FINISHED ASSEMBLY



DETAIL D-1
POST CONNECTION

Figure B31

6.8 Detail E - Sheeting Fixing

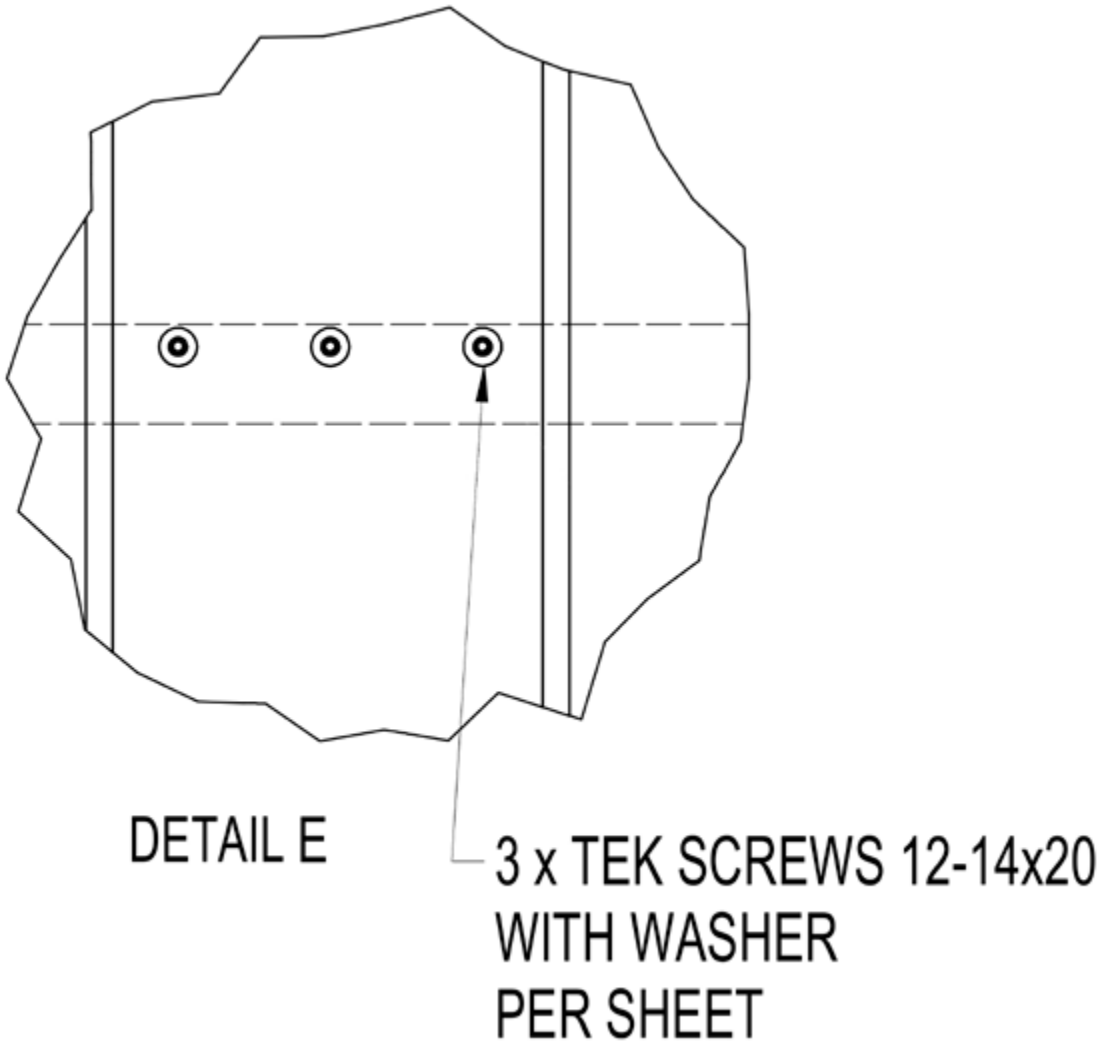


Figure B32

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6.9 Detail F - Post to Beam Bracket

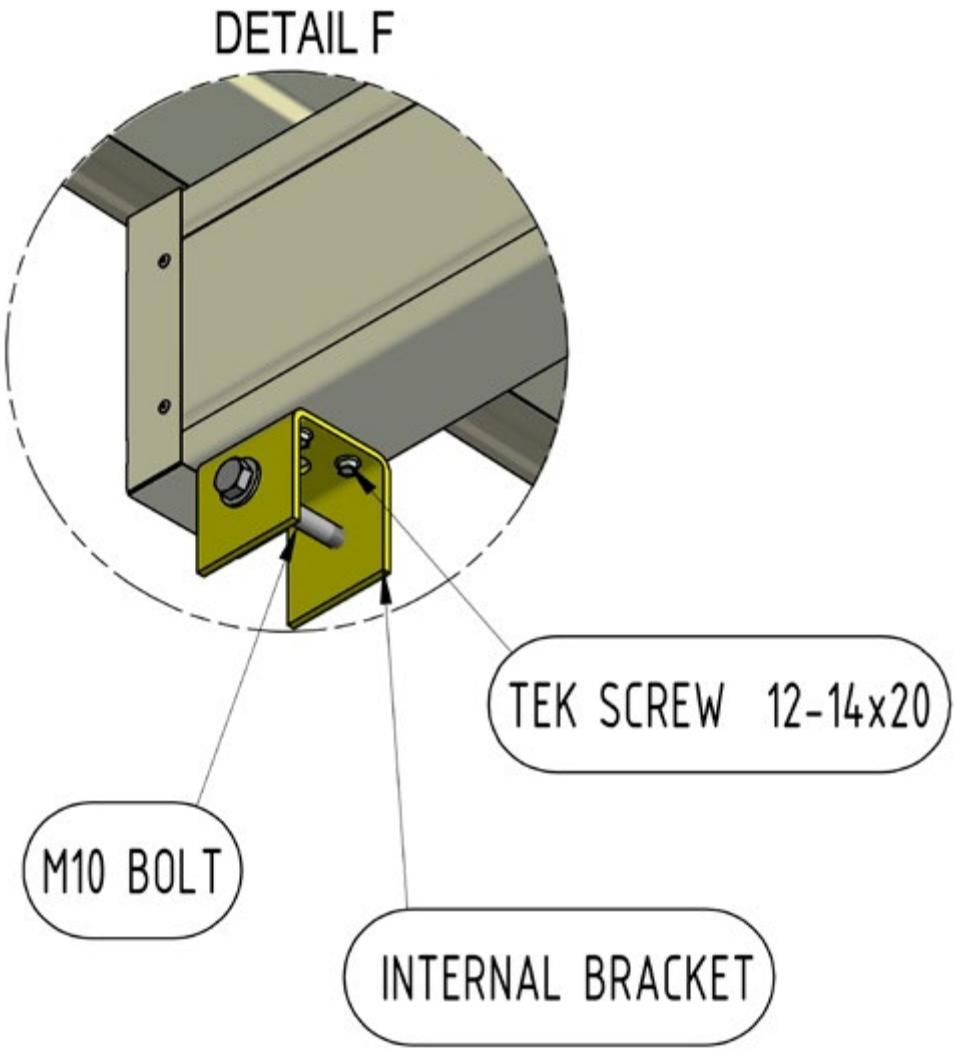

Figure B33

6.10 Detail L - Post to Slab Bracket

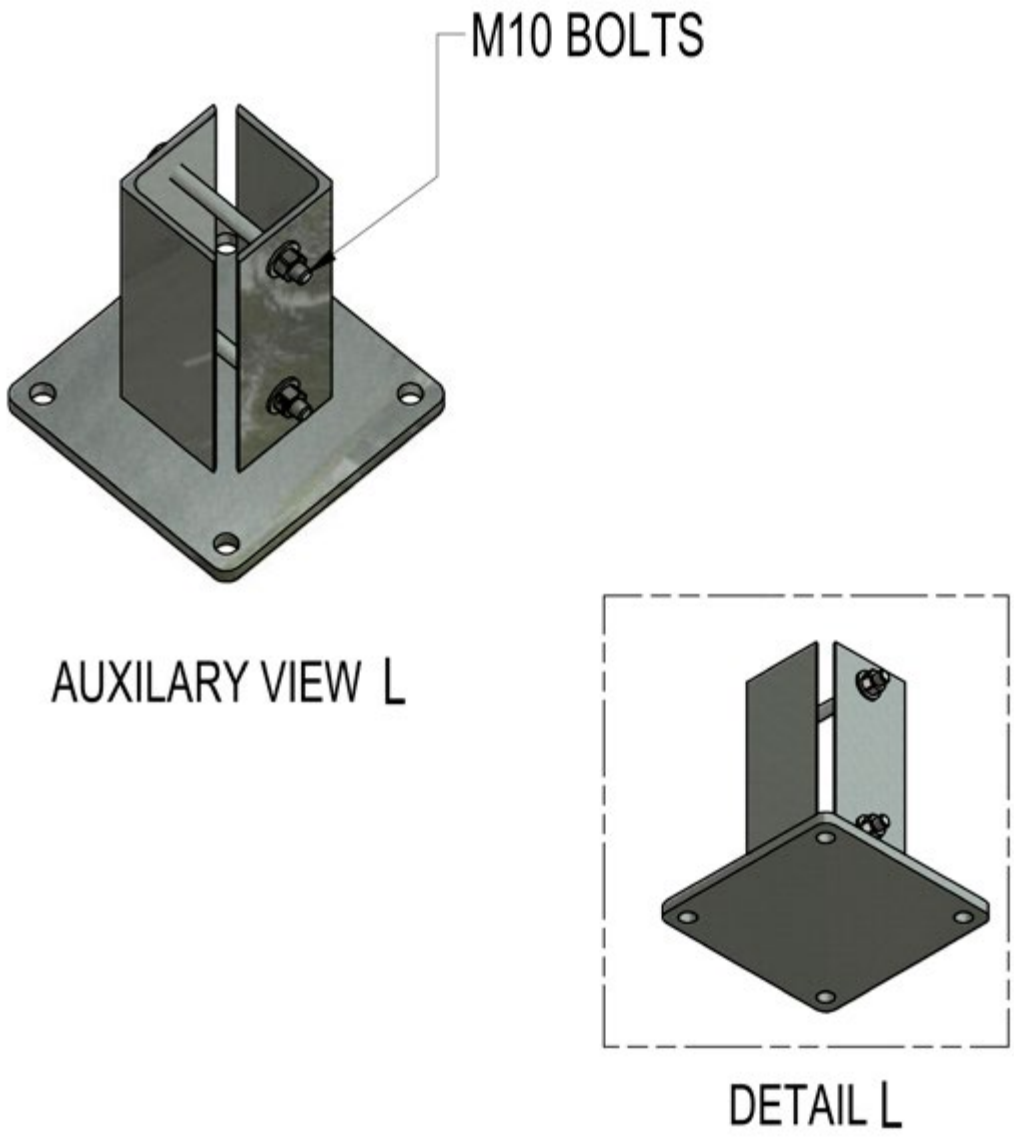

Figure B34

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6.11 Detail M - Channel Edging

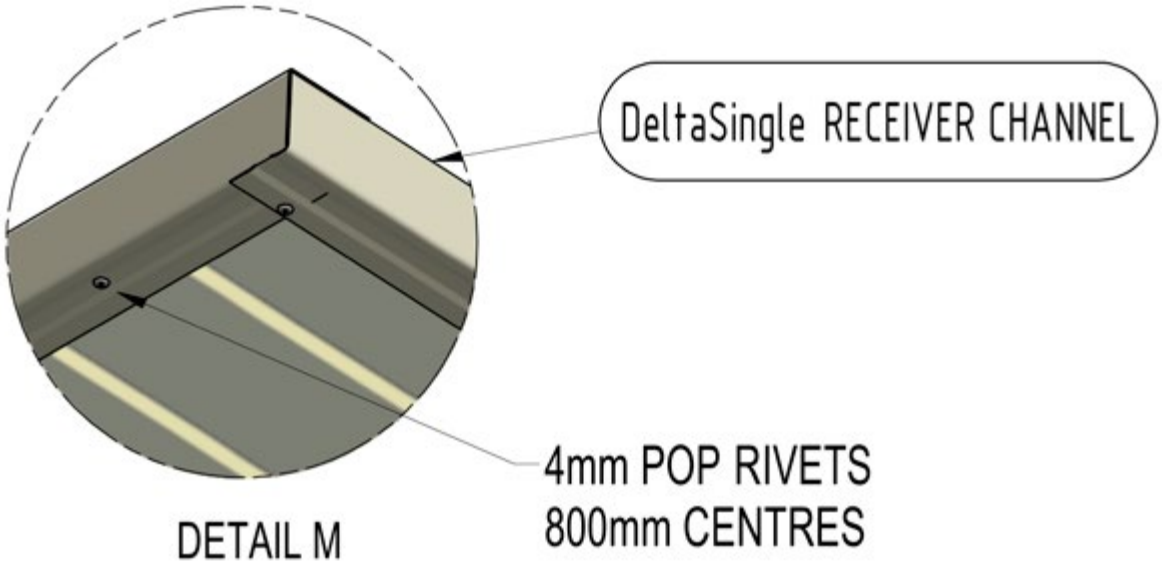

Figure B35

6.12 Detail N - Receiver Channel

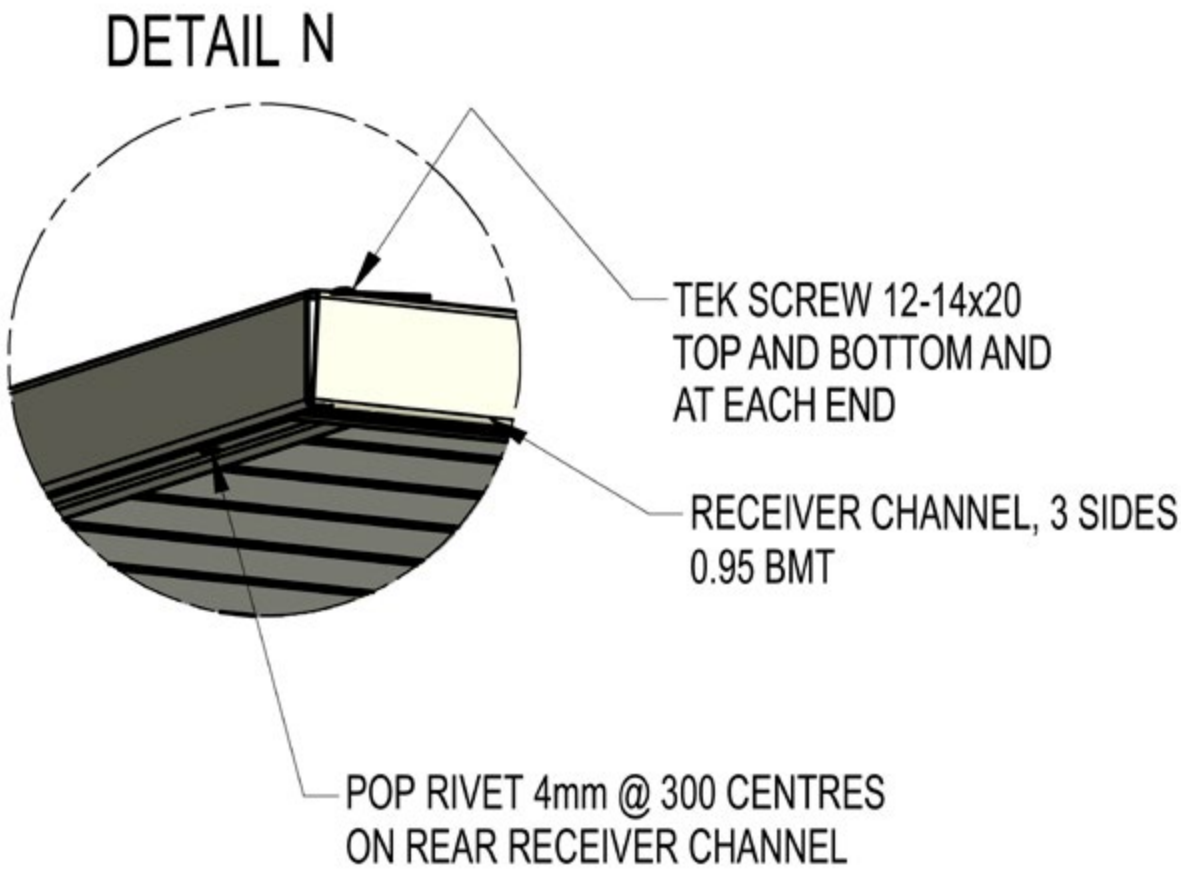

Figure B36

6.13 Detail Q - Left Side View Gutter End

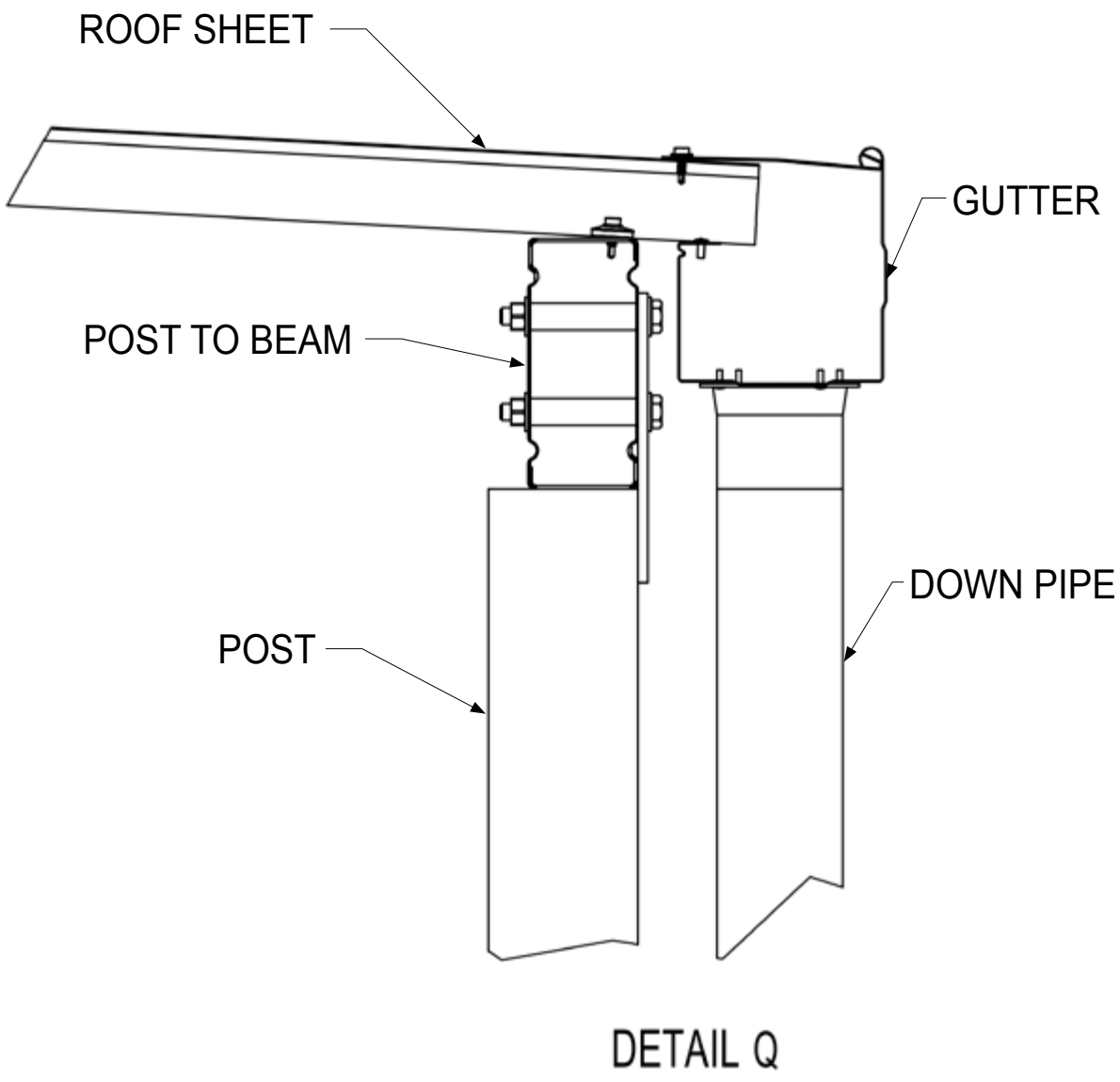

Figure B37

6.14 Detail T - Right Side View Gutter End

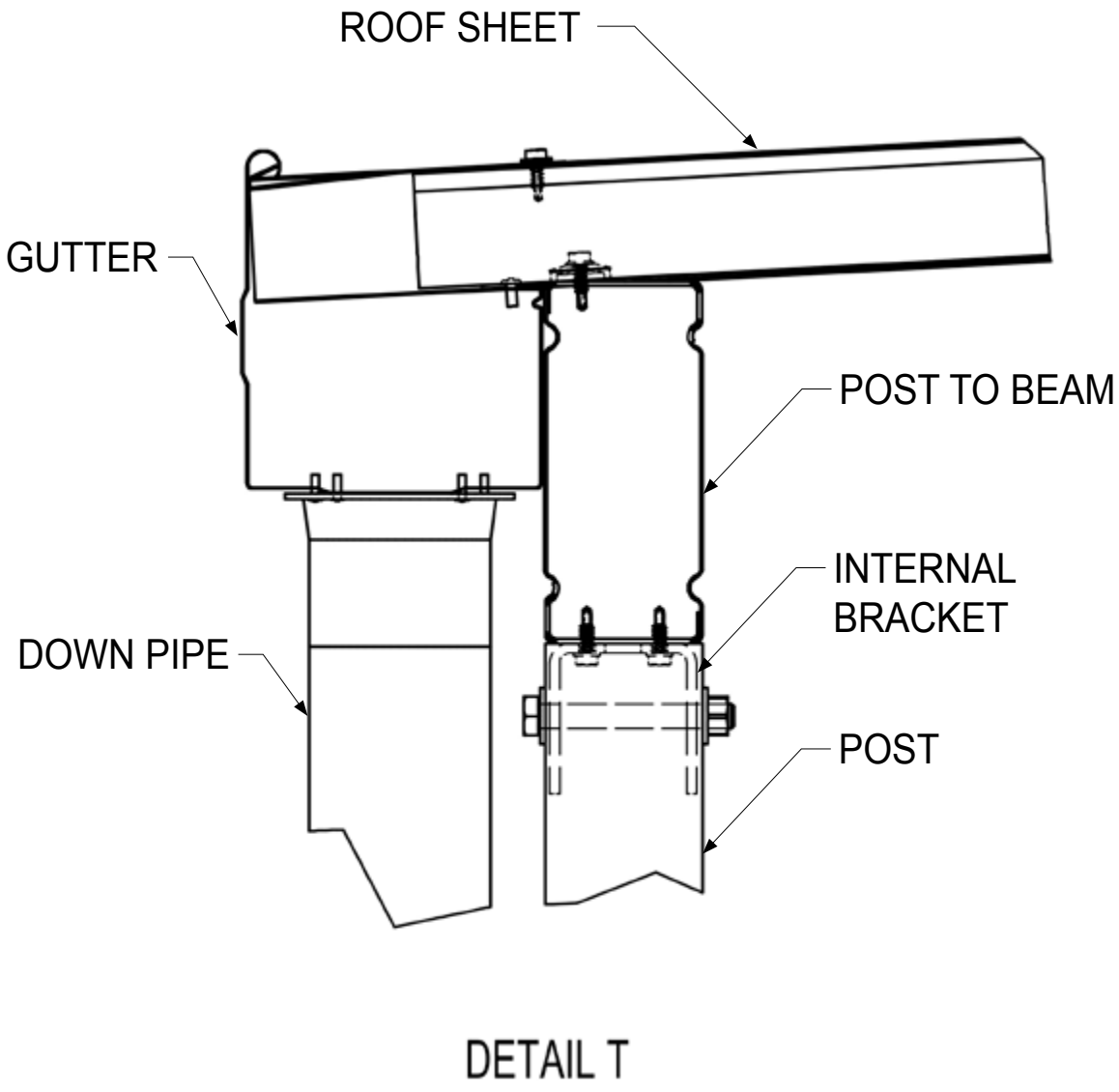

Figure B38