## General Notes

| | |
|---|---|
| G01 | The Design and Details shown in these Drawings are applicable to this Project only. |
| G02 | These Drawings shall be read in conjunction with all Architectural Drawings, other Consultants' Drawings, Specifications and such other Written Instructions as may be issued during the course of the Project. Any discrepancy shall be referred to the Engineer before proceeding with the work. |
| G03 | All Materials and Workmanship shall be in accordance with the relevant and current SAA Codes and Authorities Except where varied by the Project Specifications. |
| G04 | The Structure must be maintained in a stable condition and no part must be overloaded during construction. Temporary bracing must be designed and provided by the contractor(s) to keep the building works and excavations stable at all times. |
| G05 | The Issuer of these Designs reserves the right to alter Specifications and Designs as it may see fit without prior notification or penalty. |
| G06 | The Structure has not been designed for snow loads. |
| G07 | Connections may require on-site drilling by the contractor(s). |

## Foundation Notes

| | |
|---|---|
| F01 | Foundations have been designed assuming an allowable bearing capacity of 100 kPa. |
| F02 | The Owner is advised to obtain a Geotechnical Report and/or Site Foundation Report to confirm F01 above. |
| F03 | Footings shall be located centrally under walls and columns unless noted otherwise. |
| F04 | All Footings to be founded a minimum of 400 mm into Natural Ground. Do not Found Footings in uncontrolled fill. |
| F05 | Engineer to be contacted if Foundation Conditions vary from F01 above. |

## Steelwork Notes

| | |
|---|---|
| S01 | All Workmanship and Materials shall be in accordance with AS 4100, AS/NZ 4600 and AS 1554 except where varied by the Project documentation. |
| S02 | Bolting Categories are identified on the Structural Drawings as follows:<br>4.6/S Commercial Bolts of Grade 4.6 to AS 1111 Snug Tightened<br>8.8/S High Strength Structural Bolts of Grade 8.8 to AS 1252 Snug Tightened |
| S03 | Unless noted otherwise, all M16 fasteners shall be Category 8.8/S. Standard Fixings for C100, C150, C200 and C250 Sections are M12 bolts. Standard Fixings for C300 and C350 Sections are M16 bolts. No Connection shall have less than 2 bolts. |
| S04 | All metal cladding should comply with AS/NZS 4680 G550, AZ150 (550 MPa minimum yield stress, 150 g/m2 minimum coating mass). |
| S05 | Steelwork intended to be concrete encased shall be unpainted. Encasing concrete shall be Grade N25 unless noted otherwise providing a cover adequate to suit fire rating or exposure conditions. Concrete Encasement shall be centrally reinforced with 5 mm wire to AS 4671 or 6 mm Structural Grade Bars to AS 4671 at 150 mm pitch. |
| S06 | Unless noted otherwise, all steel shall comply with the relevant Australian Standard. |

## Steel Grades

| | |
|---|---|
| 300 PLUS | Universal Beams & Columns, Parallel Flange Channels, Large Angles to AS/NZS3679.1 |
| 250 | Flats, Small Angles, Taper Flange Beams & Columns to AS/NZS3679.1 |
| 300 | Welded Sections to AS/NZS3679.2 |
| 250 | Hot Rolled Plates, Floor Plates & Slabs to AS/NZS3678 |
| 250 | Hollow Sections to AS1163. Circular Sections less than 165mm Outside Diameter. Sections other than the above |
| G450-G550 | Cold Form AS4600. Unless noted otherwise, all purlins, plates & brackets are G450. |
| G500 | Slab mesh and deformed reinforcement bars. |
| G2070 | AS2841. Galvanized Steel Wire Strand. Unless noted otherwise, all Cable Bracing is G2070. |

## Australian Standard™ & Australian/New Zealand Standard™ Adopted

| | |
|---|---|
| AS 1111.1 | ISO Metric Hexagon Bolts and Screws – Product Grade C Part 1: Bolts |
| AS/NZS 1163 | Cold-formed Structural Steel Hollow Sections |
| AS/NZS 1170.0 | Structural Design Actions - Part 0: General Principles |
| AS/NZS 1170.1 | Structural Design Actions - Part 1: Permanent, Imposed & Other Actions |
| AS/NZS 1170.2 | Structural Design Actions - Part 2: Structural Design, Wind Actions |
| AS/NZS 1170.4 | Structural Design Actions - Part 4: Earthquake Actions in Australia |
| AS 1252 | Structural Assemblies |
| AS/NZS 1554 | Structural Steel Welding |
| AS 4100 | Steel Structures |
| AS/NZS 4600 | Cold-formed Steel Structures |
| AS/NZS 4671 | Steel Reinforcing Materials |
| AS/NZS 4680 | Hot-dip Galvanized (Zinc) Coatings on Fabricated Ferrous Articles |

## Region & Site Details

This is a freestanding roof only structure. It is assumed that cars, goods or materials stored under the roof block less than 50 percentage of the cross section exposed to the wind.

Suitable for Regions A1-5 & B1. TC2.5 without Shielding: Terrain with some trees or isolated obstructions, terrain in developing outer urban areas with scattered houses, or large acreage developments with more than two and less than 10 buildings per hectare. The site is not on the slope or crest of a hill, ridge or escarpment.

$V_{design} = V_R \times M_c \times M_d \times (M_{z,Cat} \times M_s \times M_t)$

$V_{design} = 57 \times 1 \times 0.95 \times (0.87 \times 1 \times 1) = 47.11$ m/s

Foundations have been designed assuming an allowable bearing capacity of 100 kPa, undrained cohesion $C_u = 50$ kPa. Concrete Strength = 25 MPa.

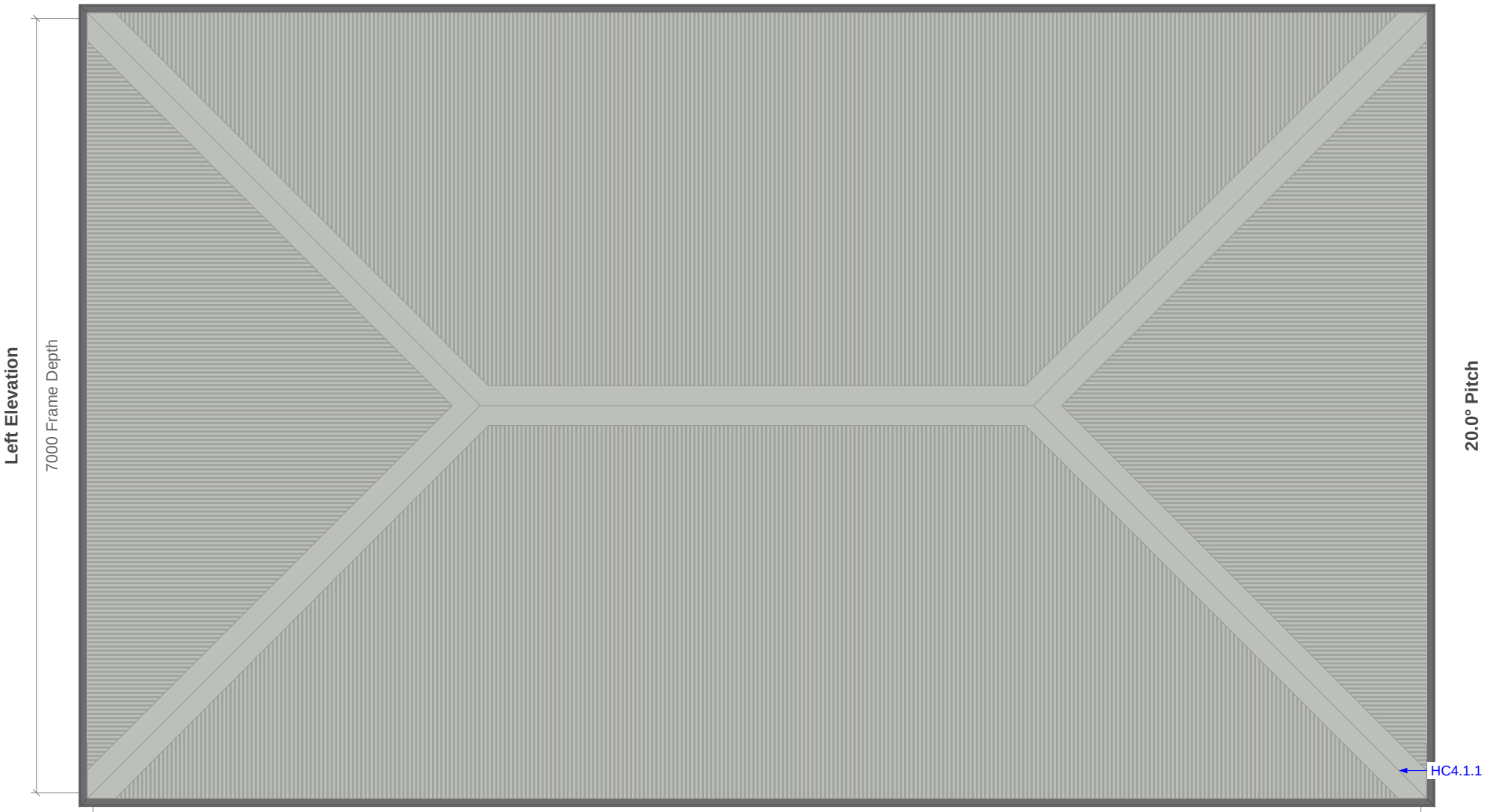
## Design Notes & Structural Members

| | |
|---|---|
| Dimensions | 7000 x 12000 x 2400 |
| Building Class | 10a |
| Design Wind Speed | 47.11 m/s |
| Columns C | See Post & Footing Layout |
| Rafters R | See Rafter Layout |
| Purlins P | TH6110 G550 |
| Fascia Beam FB | See Fascia Beam Layout |
| Bridging | TH22x0.40 G550 |
| Footings | Cast In |
| All Brackets | 3.0 mm G450 |
| Technical Data | Page 26 |

Your Logo Here

| | | | | | |
|---|---|---|---|---|---|
| PROJECT: Example 7000 x 12000 x 2400 Region B1 Hip Carport | PROJECT NUMBER: 6461 |  | | | |
| CLIENT: Example Customer | DRAWN BY: dm3 Solutions |  | | | |
| ADDRESS: Example Street, Suburb NT 0820 | DRAWN DATE: 2022-09-28 | ISSUE: 1 | SIZE: A4 | SCALE: NTS | DRAWING NUMBER 1 of 27 |

## Roof View




Note: Roof structure is light foot trafficable for maintenance purposes.

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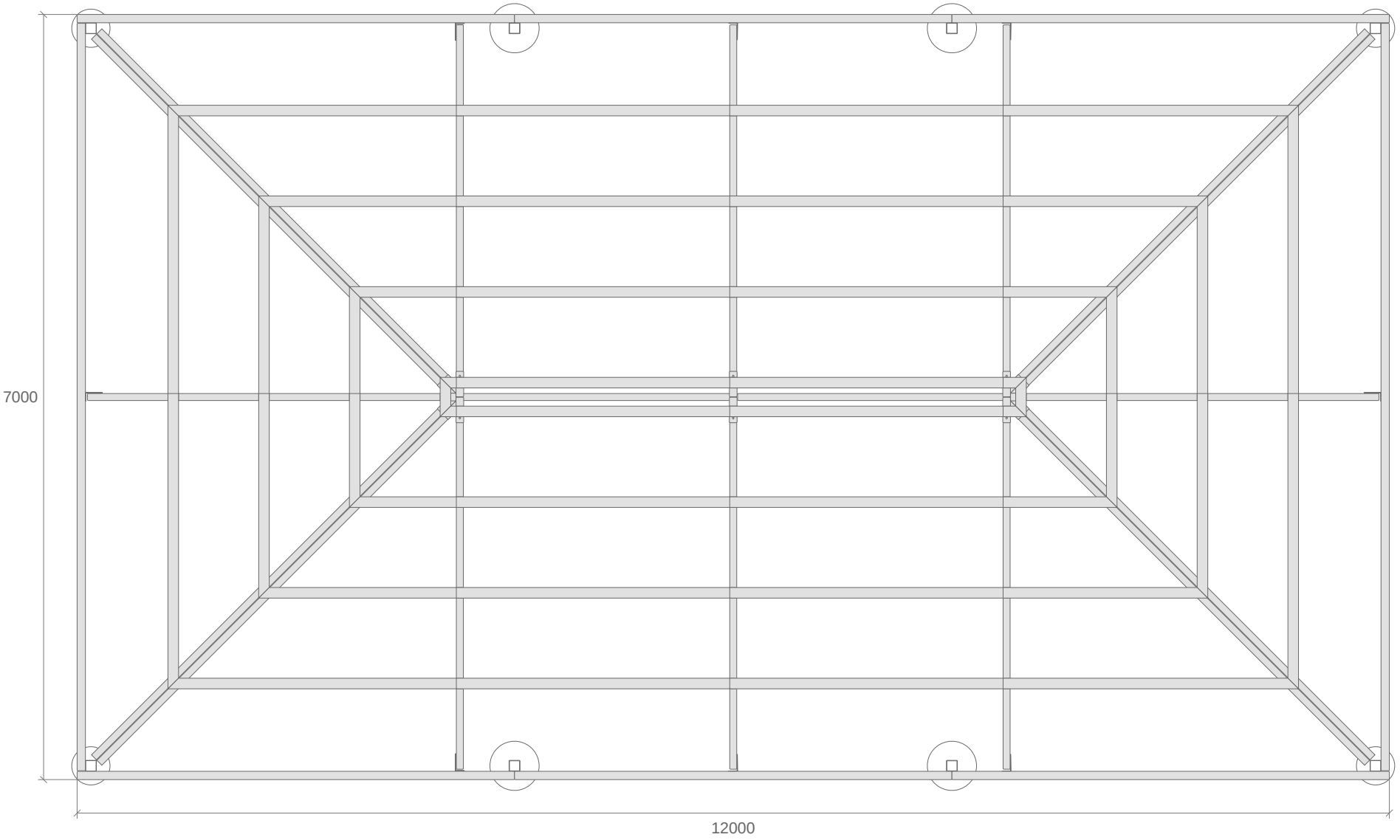
| | | | | | |
|---|---|---|---|---|---|
| PROJECT: Example 7000 x 12000 x 2400 Region B1 Hip Carport | PROJECT NUMBER: 6461 |  | | | |
| CLIENT: Example Customer | DRAWN BY: dm3 Solutions | Powered by dm3Solutions.com | | | |
| ADDRESS: Example Street, Suburb NT 0820 | DRAWN DATE: 2022-09-28 | ISSUE: 1 | SIZE: A4 | SCALE: NTS | DRAWING NUMBER 2 of 27 |

## Plan View

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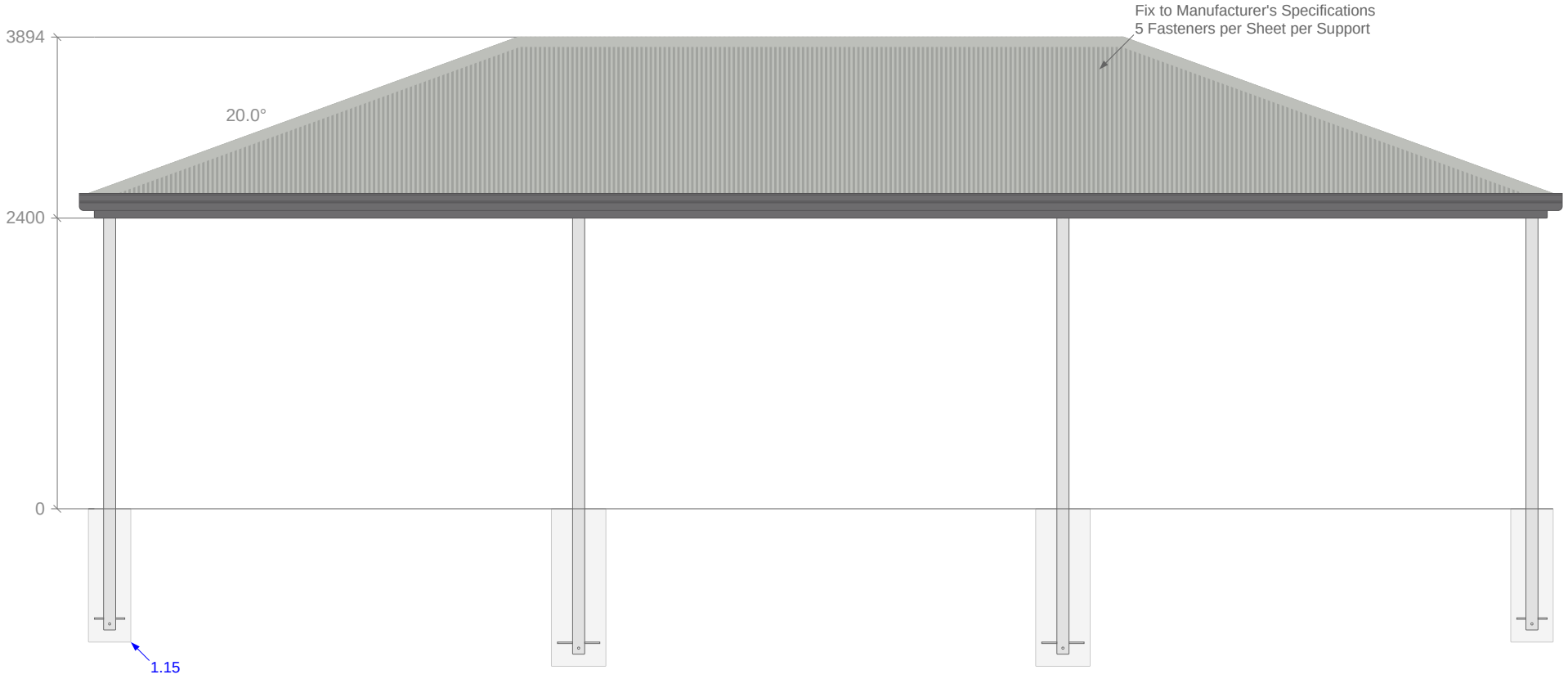
| | | | | | |
|---|---|---|---|---|---|
| PROJECT: Example 7000 x 12000 x 2400 Region B1 Hip Carport | | PROJECT NUMBER: 6461 |  | | |
| CLIENT: Example Customer | | DRAWN BY: dm3 Solutions |  | | |
| ADDRESS: Example Street, Suburb NT 0820 | DRAWN DATE: 2022-09-28 | ISSUE: 1 | SIZE: A4 | SCALE: NTS | DRAWING NUMBER 3 of 27 |

## Front View

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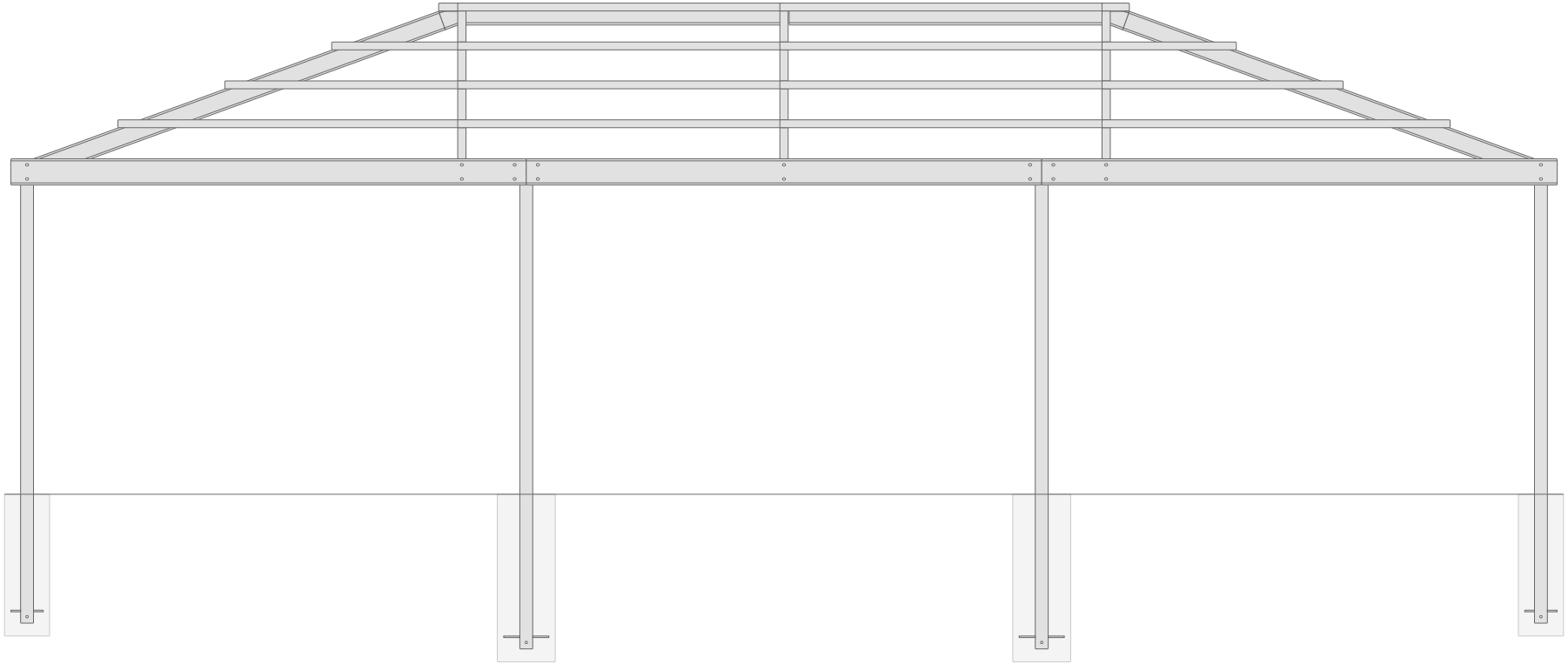
| | | | | | |
|---|---|---|---|---|---|
| PROJECT: Example 7000 x 12000 x 2400 Region B1 Hip Carport | | PROJECT NUMBER: 6461 |  | | |
| CLIENT: Example Customer | | DRAWN BY: dm3 Solutions |  | | |
| ADDRESS: Example Street, Suburb NT 0820 | DRAWN DATE: 2022-09-28 | ISSUE: 1 | SIZE: A4 | SCALE: NTS | DRAWING NUMBER 4 of 27 |

## Front Elevation



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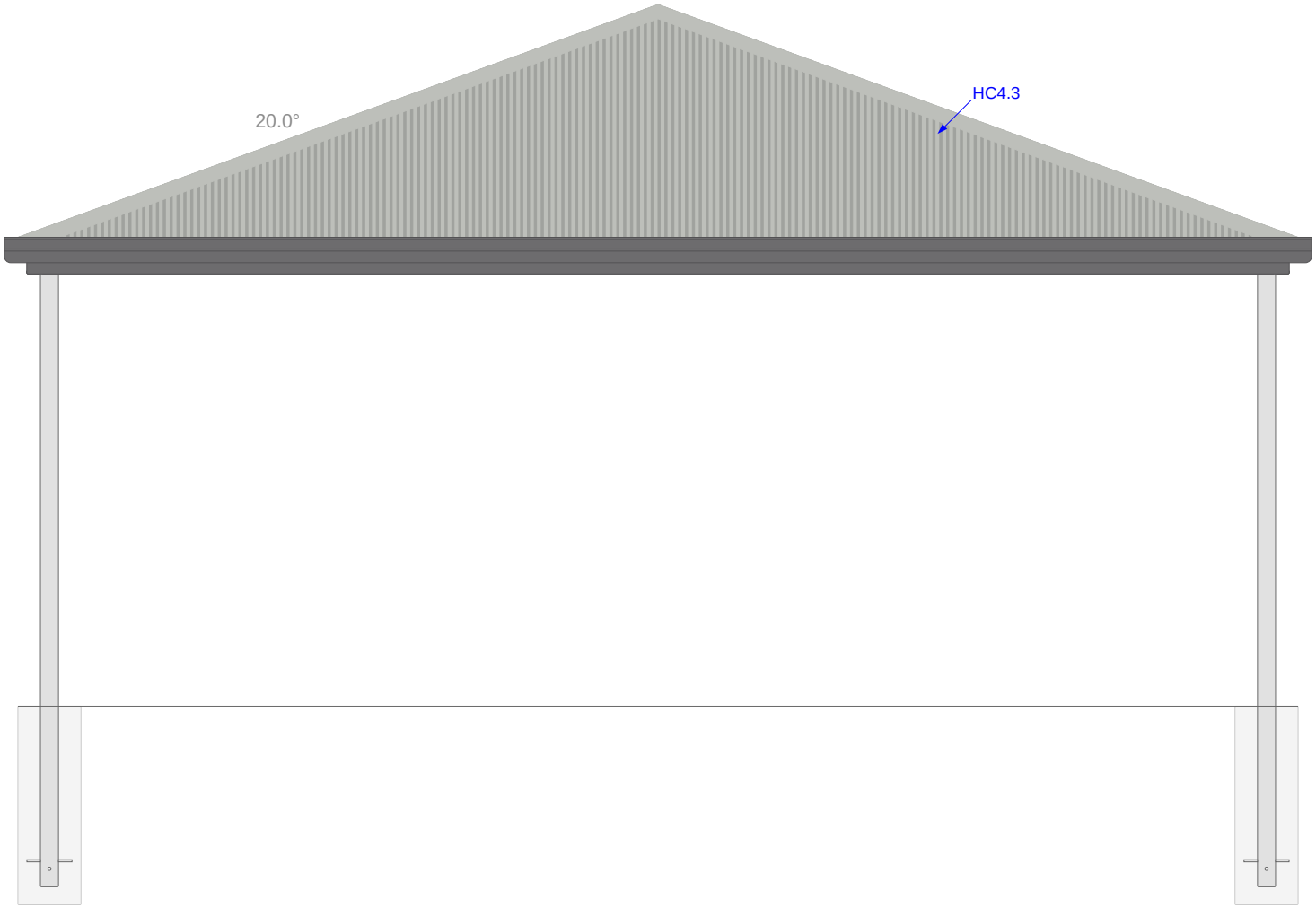
| | | | | | |
|---|---|---|---|---|---|
| PROJECT: Example 7000 x 12000 x 2400 Region B1 Hip Carport | | PROJECT NUMBER: 6461 |  | | |
| CLIENT: Example Customer | | DRAWN BY: dm3 Solutions |  | | |
| ADDRESS: Example Street, Suburb NT 0820 | DRAWN DATE: 2022-09-28 | ISSUE: 1 | SIZE: A4 | SCALE: NTS | DRAWING NUMBER 5 of 27 |

## Left View

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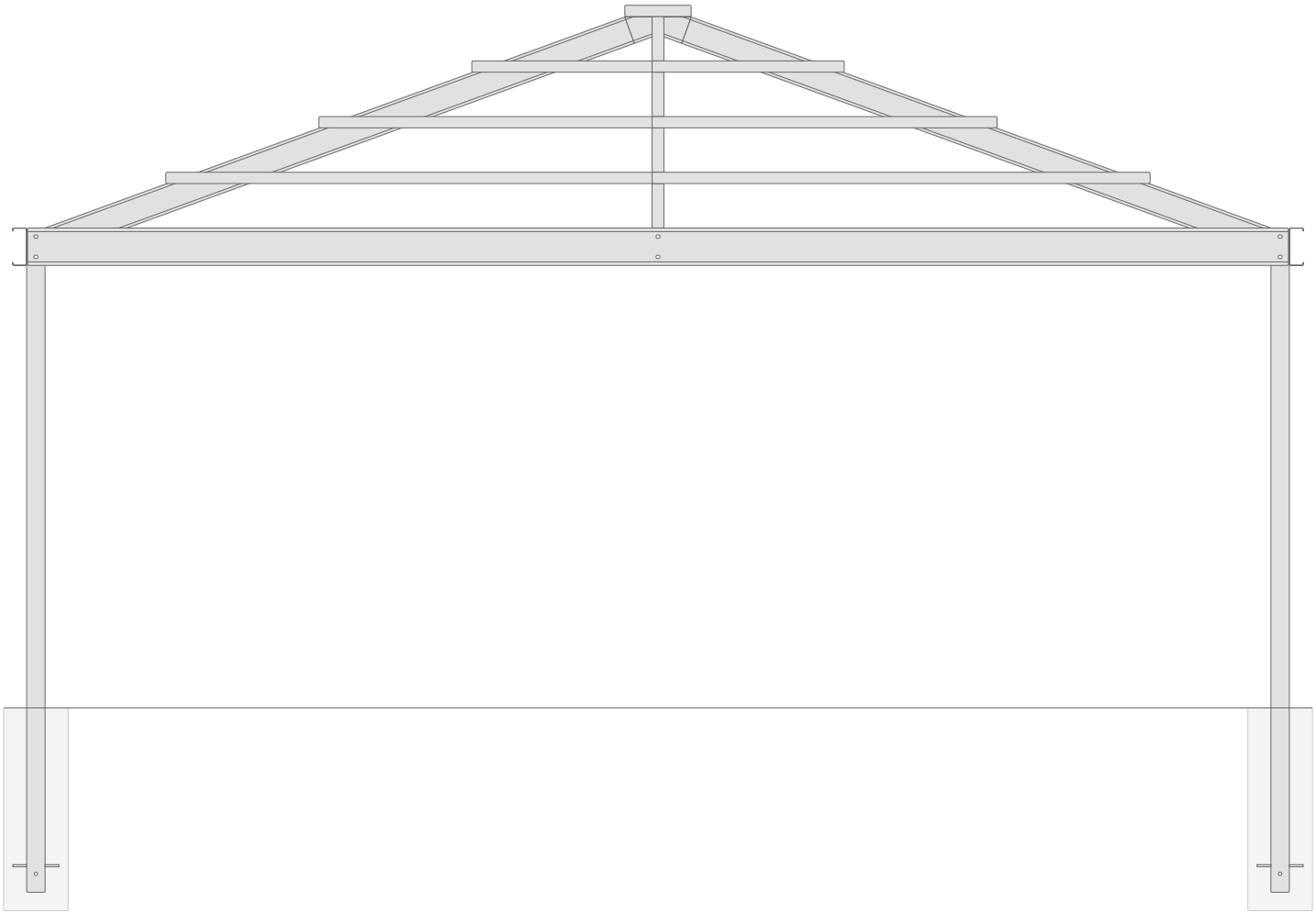
| | | | | | |
|---|---|---|---|---|---|
| PROJECT: Example 7000 x 12000 x 2400 Region B1 Hip Carport | | PROJECT NUMBER: 6461 |  | | |
| CLIENT: Example Customer | | DRAWN BY: dm3 Solutions |  | | |
| ADDRESS: Example Street, Suburb NT 0820 | DRAWN DATE: 2022-09-28 | ISSUE: 1 | SIZE: A4 | SCALE: NTS | DRAWING NUMBER 6 of 27 |

## Left Elevation



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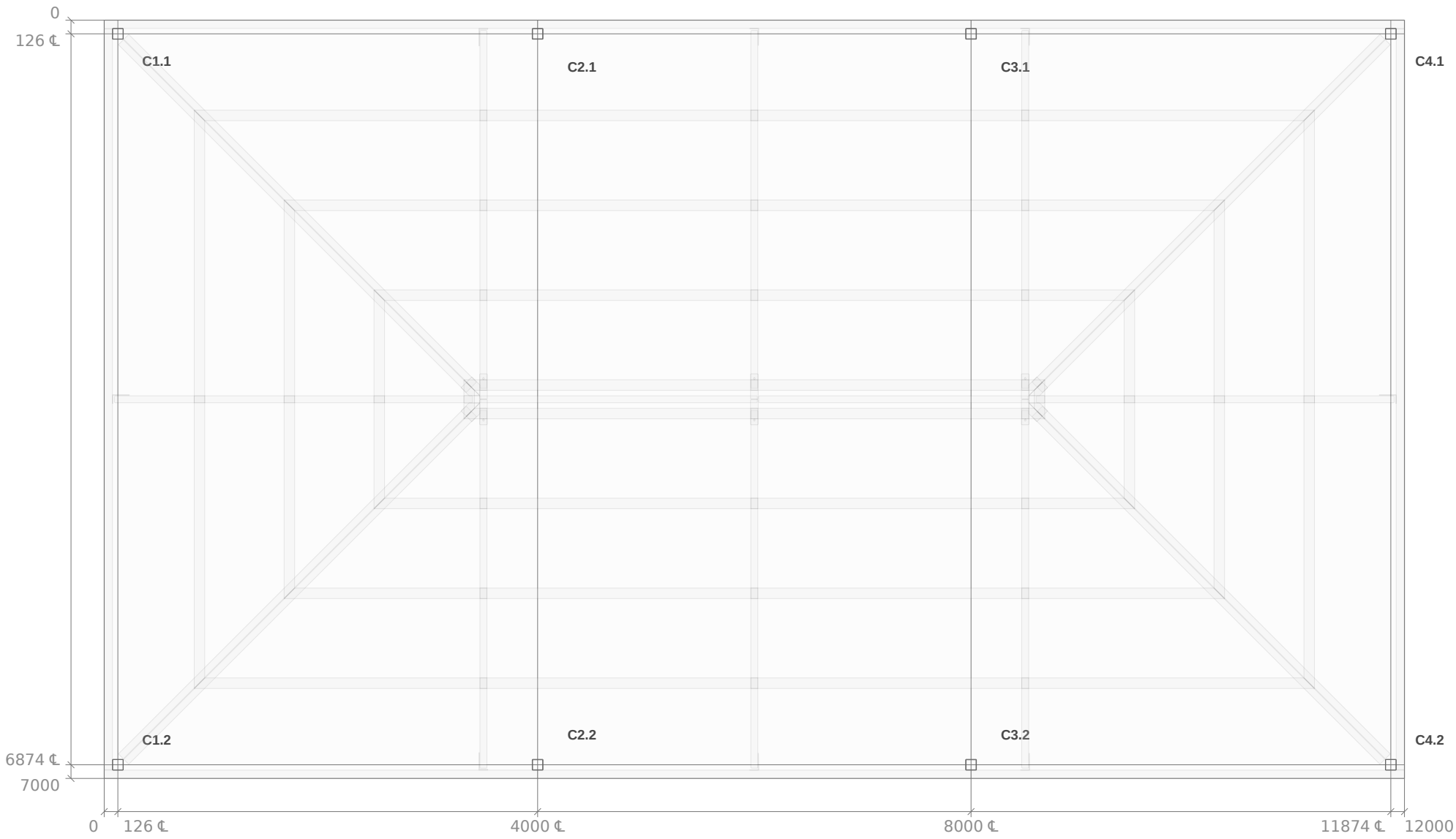
| | | | | | |
|---|---|---|---|---|---|
| PROJECT: Example 7000 x 12000 x 2400 Region B1 Hip Carport | | PROJECT NUMBER: 6461 |  | | |
| CLIENT: Example Customer | | DRAWN BY: dm3 Solutions |  | | |
| ADDRESS: Example Street, Suburb NT 0820 | DRAWN DATE: 2022-09-28 | ISSUE: 1 | SIZE: A4 | SCALE: NTS | DRAWING NUMBER 7 of 27 |

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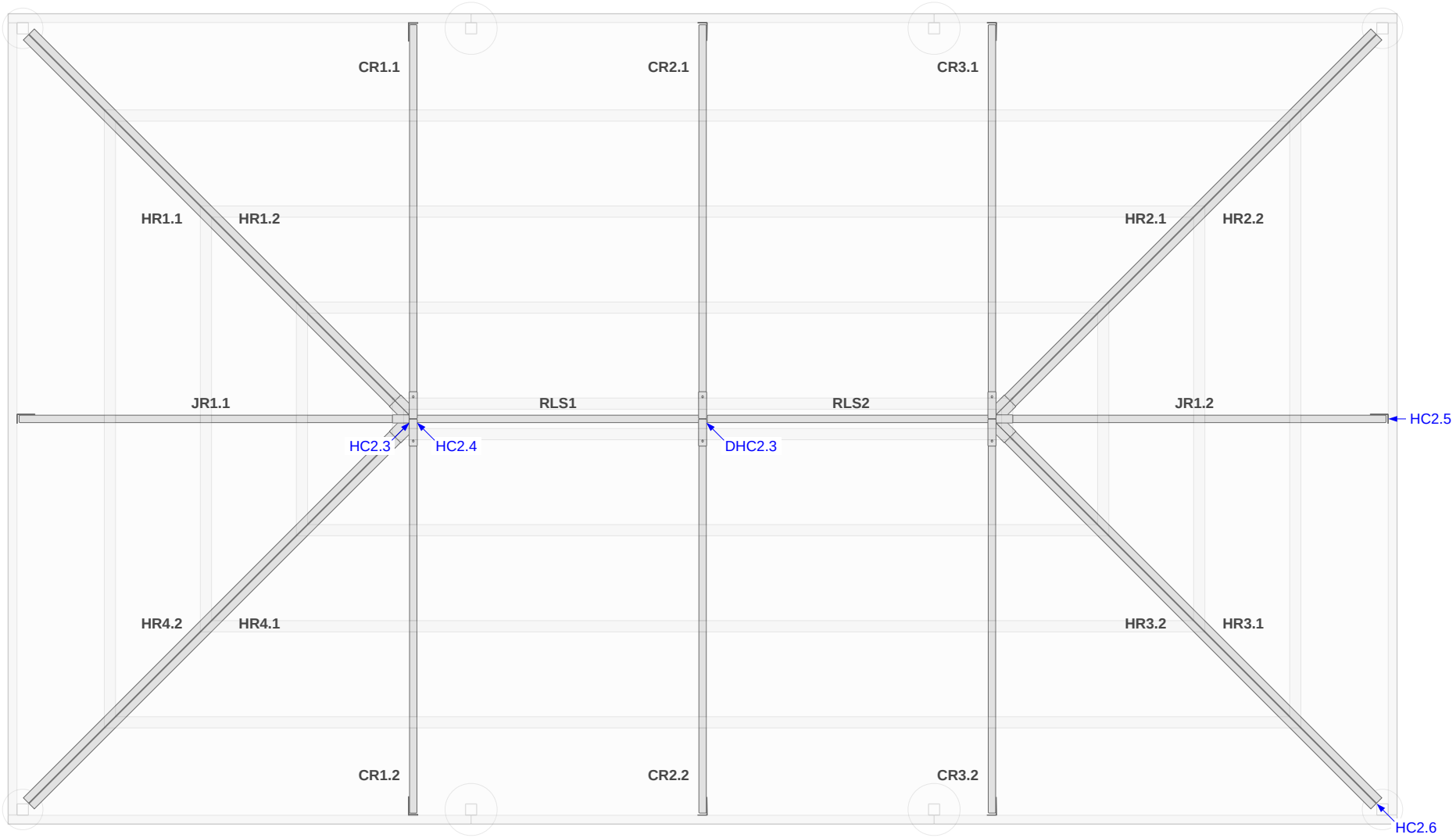
| | | | | | |
|---|---|---|---|---|---|
| PROJECT: Example 7000 x 12000 x 2400 Region B1 Hip Carport | PROJECT NUMBER: 6461 |  | | | |
| CLIENT: Example Customer | DRAWN BY: dm3 Solutions |  | | | |
| ADDRESS: Example Street, Suburb NT 0820 | DRAWN DATE: 2022-09-28 | ISSUE: 1 | SIZE: A4 | SCALE: NTS | DRAWING NUMBER 8 of 27 |




CR = Common Rafter · C15024 JR = Jack Rafter · C15012 Note: All Rafter to Fascia Connections
HR = Hip Rafter · C15012 RLS = Ridge Line Strut · C15024 Use Detail HC2.5 Above

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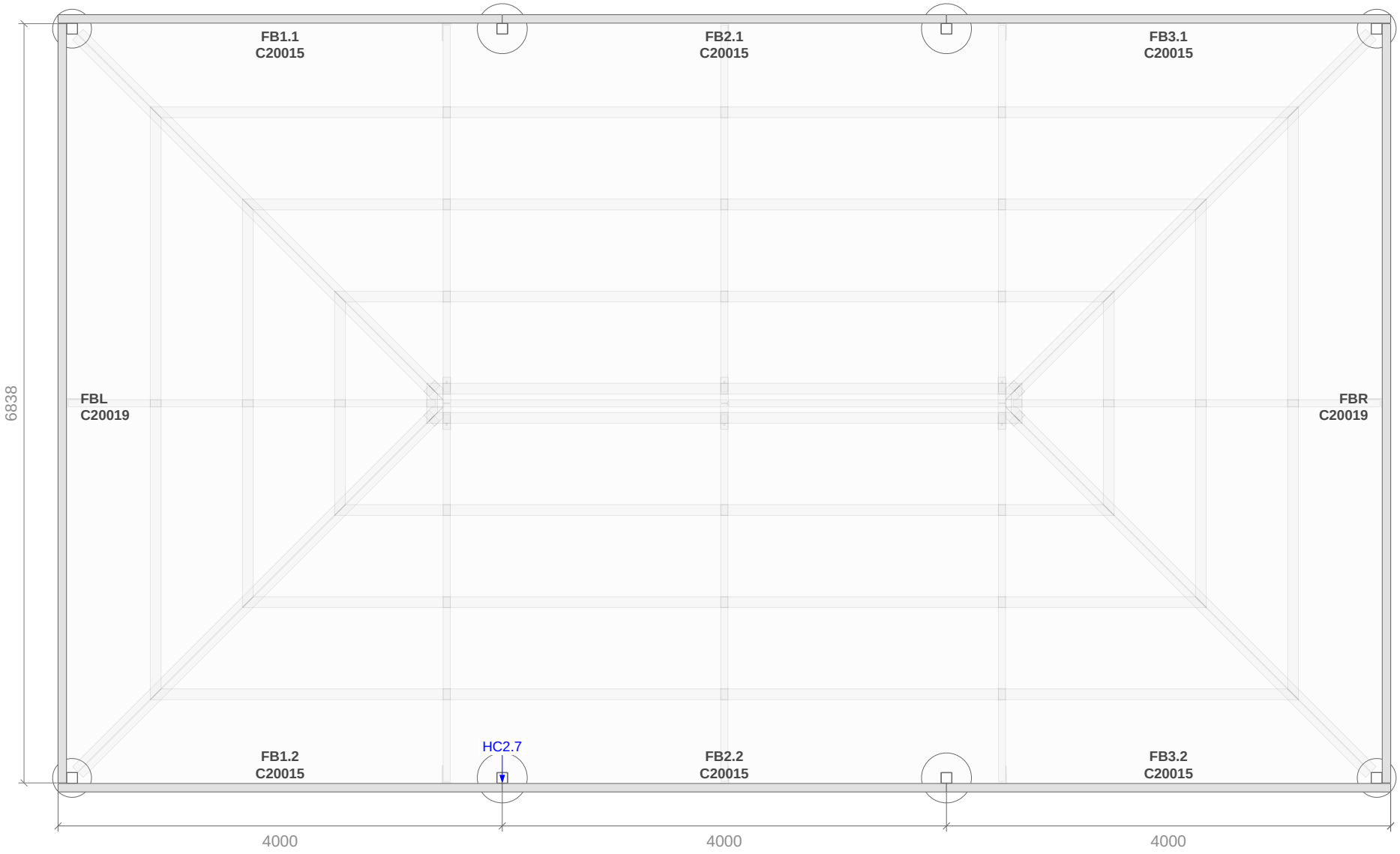
| | | | | | |
|---|---|---|---|---|---|
| PROJECT: Example 7000 x 12000 x 2400 Region B1 Hip Carport | PROJECT NUMBER: 6461 |  | | | |
| CLIENT: Example Customer | DRAWN BY: dm3 Solutions |  | | | |
| ADDRESS: Example Street, Suburb NT 0820 | DRAWN DATE: 2022-09-28 | ISSUE: 1 | SIZE: A4 | SCALE: NTS | DRAWING NUMBER 9 of 27 |

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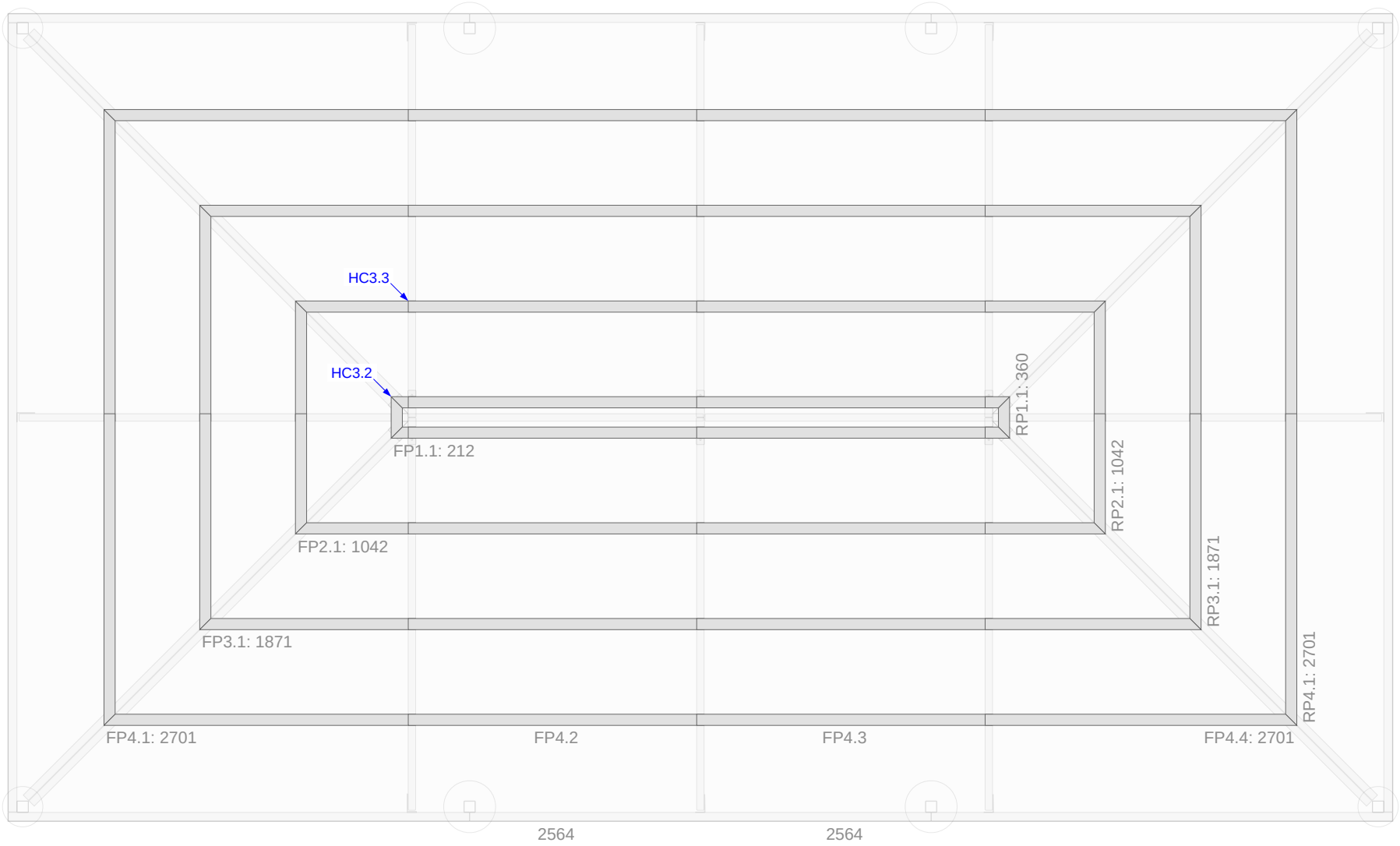
| | | | | | |
|---|---|---|---|---|---|
| PROJECT: Example 7000 x 12000 x 2400 Region B1 Hip Carport | | PROJECT NUMBER: 6461 |  | | |
| CLIENT: Example Customer | | DRAWN BY: dm3 Solutions |  | | |
| ADDRESS: Example Street, Suburb NT 0820 | DRAWN DATE: 2022-09-28 | ISSUE: 1 | SIZE: A4 | SCALE: NTS | DRAWING NUMBER 10 of 27 |

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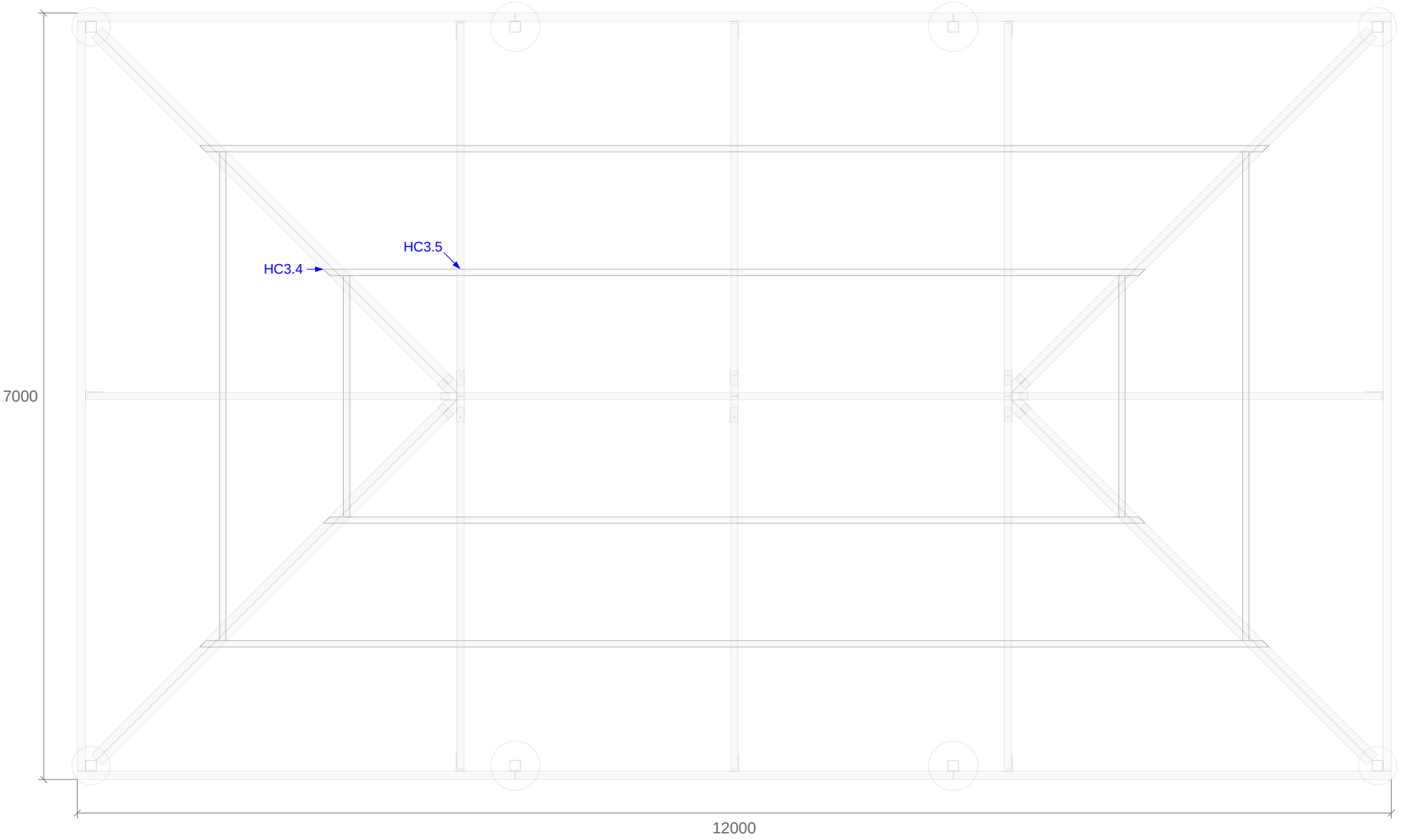
|---|---|---|---|---|---|
| PROJECT: Example 7000 x 12000 x 2400 Region B1 Hip Carport | PROJECT NUMBER: 6461 |  | | | |
| CLIENT: Example Customer | DRAWN BY: dm3 Solutions |  | | | |
| ADDRESS: Example Street, Suburb NT 0820 | DRAWN DATE: 2022-09-28 | ISSUE: 1 | SIZE: A4 | SCALE: NTS | DRAWING NUMBER 11 of 27 |

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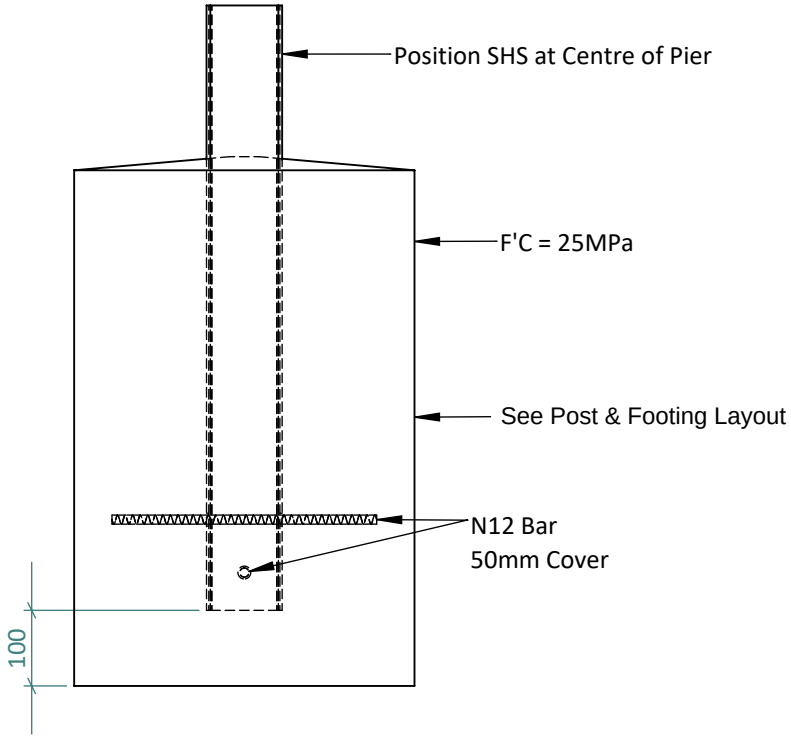
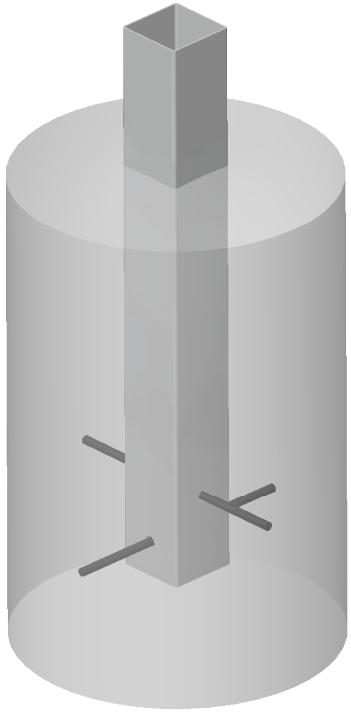
| | | | | | |
|---|---|---|---|---|---|
| PROJECT: Example 7000 x 12000 x 2400 Region B1 Hip Carport | | PROJECT NUMBER: 6461 |  | | |
| CLIENT: Example Customer | | DRAWN BY: dm3 Solutions |  | | |
| ADDRESS: Example Street, Suburb NT 0820 | DRAWN DATE: 2022-09-28 | ISSUE: 1 | SIZE: A4 | SCALE: NTS | DRAWING NUMBER 12 of 27 |

Video: Scan or Right-Click




**ELEVATION**



**ISOMETRIC**

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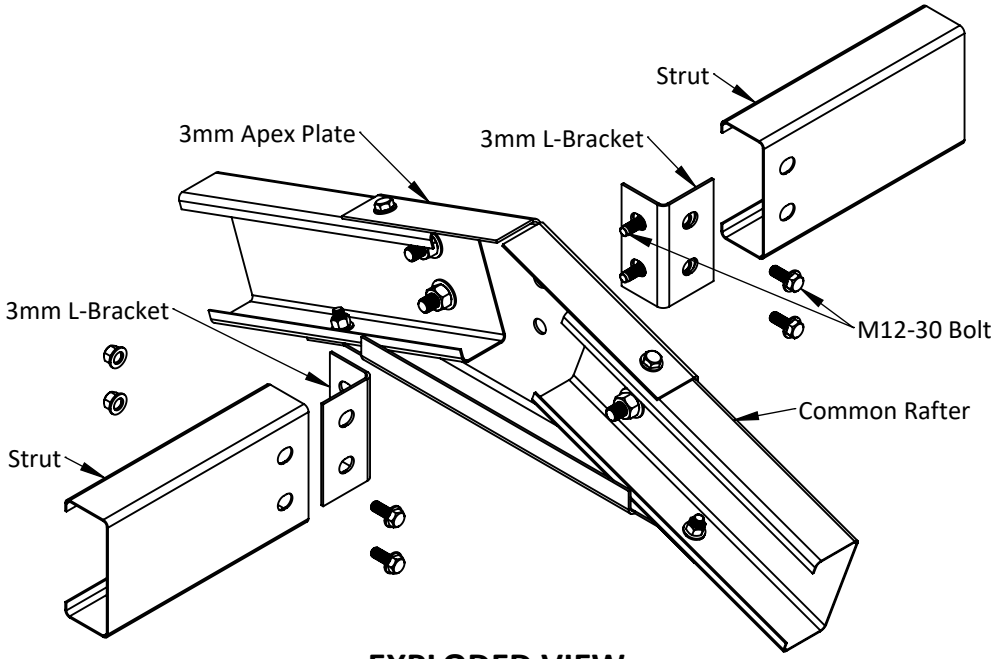
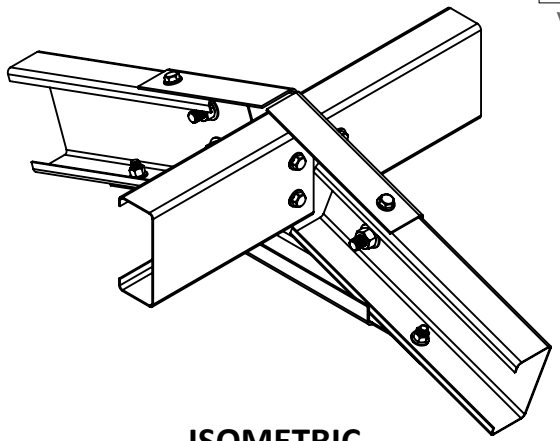
| | | | | | |
|---|---|---|---|---|---|
| PROJECT: Example 7000 x 12000 x 2400 Region B1 Hip Carport | PROJECT NUMBER: 6461 |  | | | |
| CLIENT: Example Customer | DRAWN BY: dm3 Solutions | Powered by dm3Solutions.com | | | |
| ADDRESS: Example Street, Suburb NT 0820 | DRAWN DATE: 2022-09-28 | ISSUE: 1 | SIZE: A4 | SCALE: NTS | DRAWING NUMBER 13 of 27 |

« **Detail DHC2.3**: Ridge Line Strut Apex Connection Detail

Video: Scan or Right-Click




**EXPLODED VIEW**



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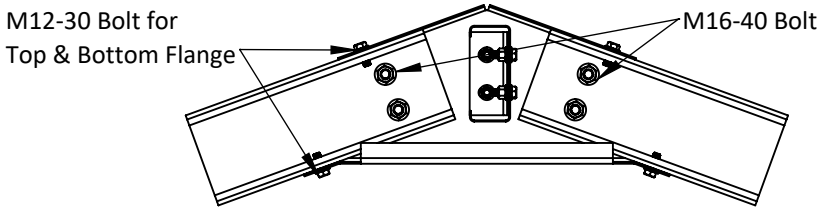


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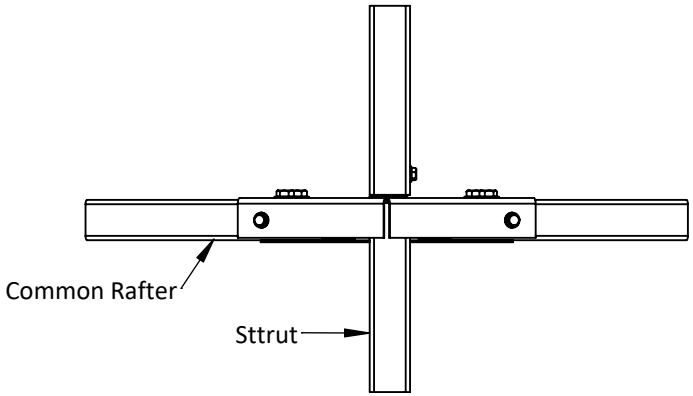
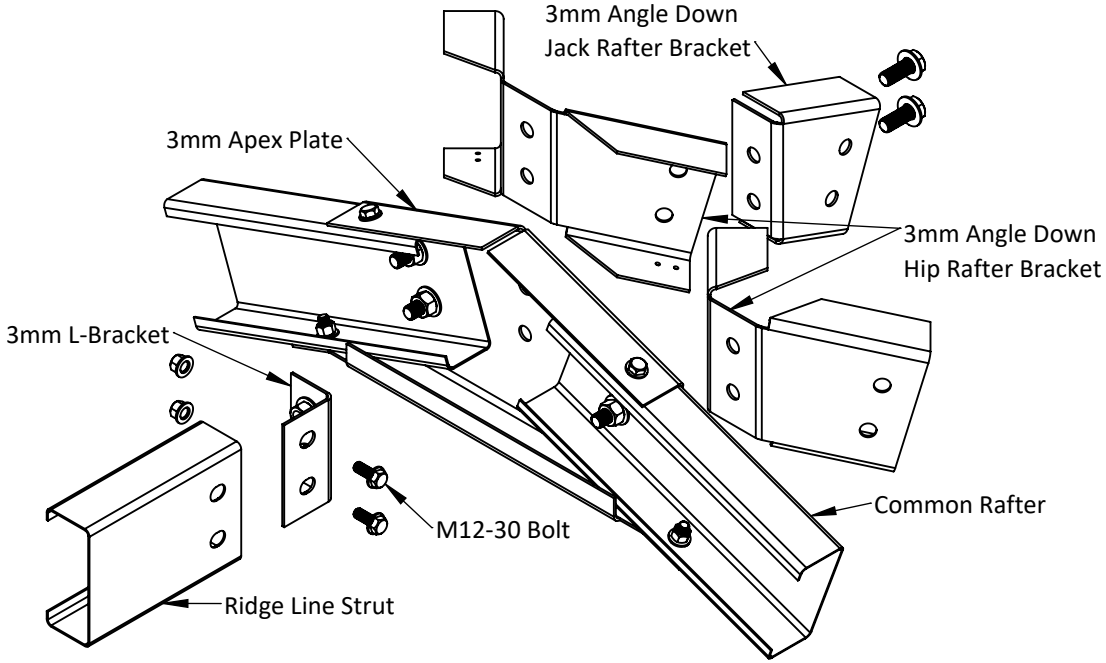



**PLAN**

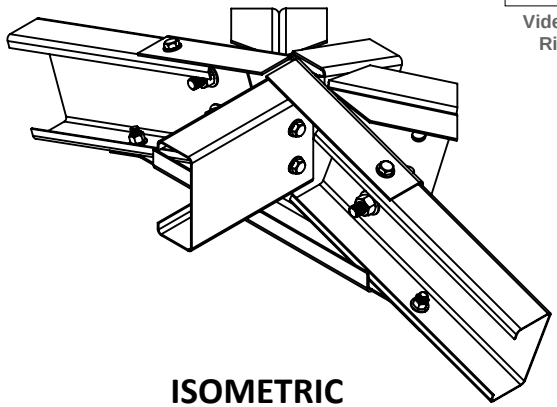
| | | | | | | |
|---|---|---|---|---|---|---|
| Your Logo Here | PROJECT: Example 7000 x 12000 x 2400 Region B1 Hip Carport | PROJECT NUMBER: 6461 |  | | | |
| | CLIENT: Example Customer | DRAWN BY: dm3 Solutions | Powered by dm3Solutions.com | | | |
| | ADDRESS: Example Street, Suburb NT 0820 | DRAWN DATE: 2022-09-28 | ISSUE: 1 | SIZE: A4 | SCALE: NTS | DRAWING NUMBER 14 of 27 |

« Detail HC2.3: Common Rafter Apex Connection Detail




**EXPLODED VIEW**

Video: Scan or Right-Click



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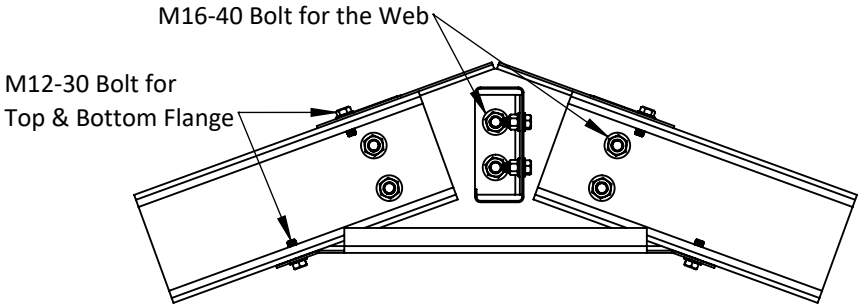


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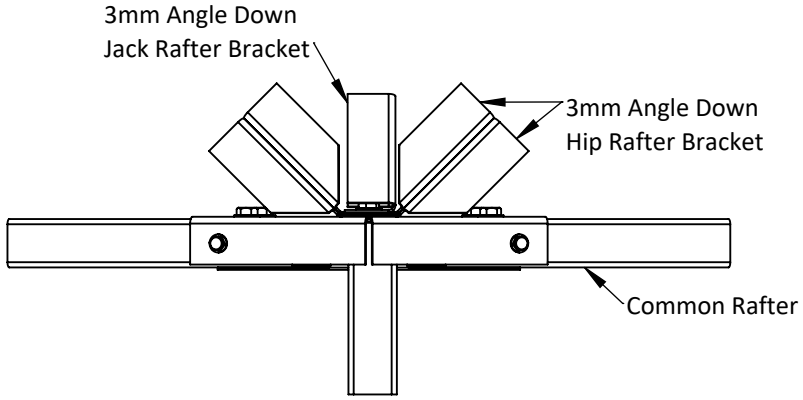


**PLAN**

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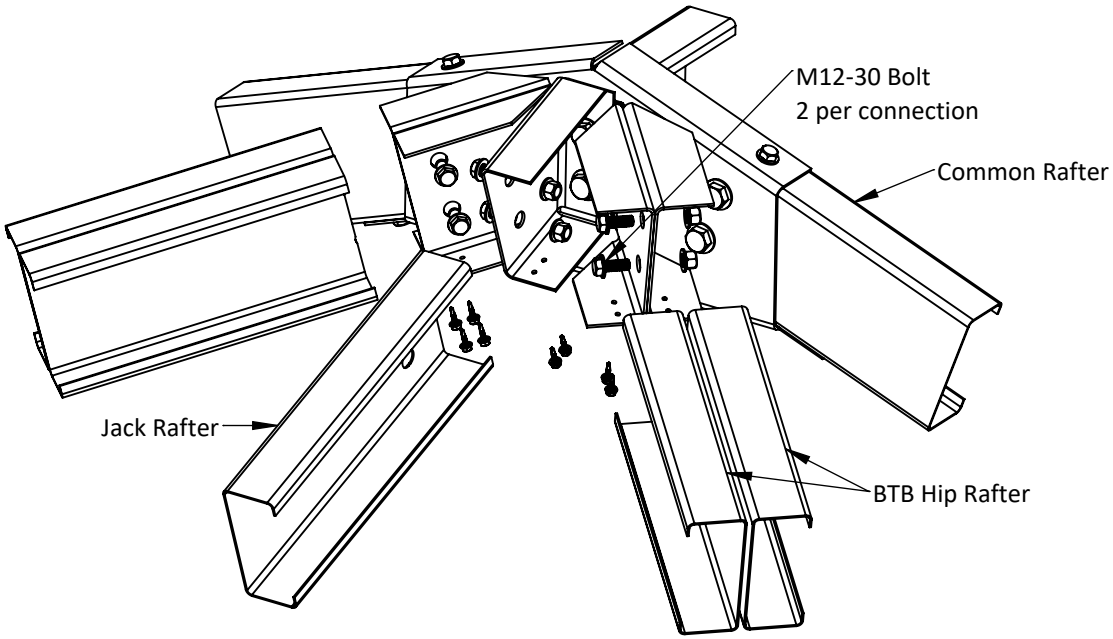
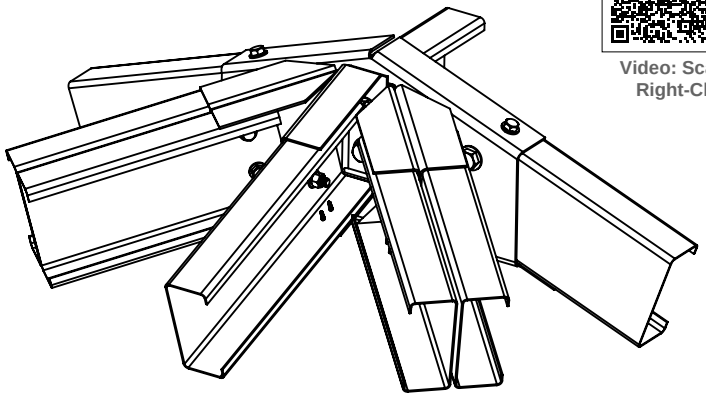
|---|---|---|---|---|---|
| PROJECT: Example 7000 x 12000 x 2400 Region B1 Hip Carport | PROJECT NUMBER: 6461 |  | | | |
| CLIENT: Example Customer | DRAWN BY: dm3 Solutions | Powered by dm3Solutions.com | | | |
| ADDRESS: Example Street, Suburb NT 0820 | DRAWN DATE: 2022-09-28 | ISSUE: 1 | SIZE: A4 | SCALE: NTS | DRAWING NUMBER 15 of 27 |

« Detail HC2.4: Jack Rafter Apex Connection Detail




**EXPLODED VIEW**

Video: Scan or Right-Click



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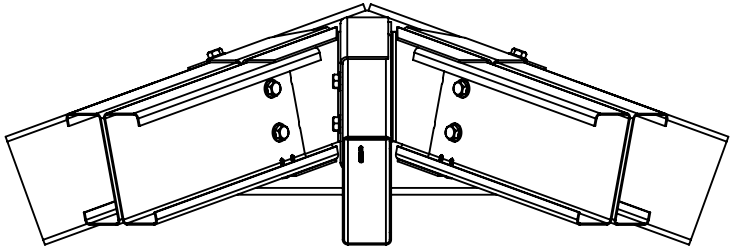

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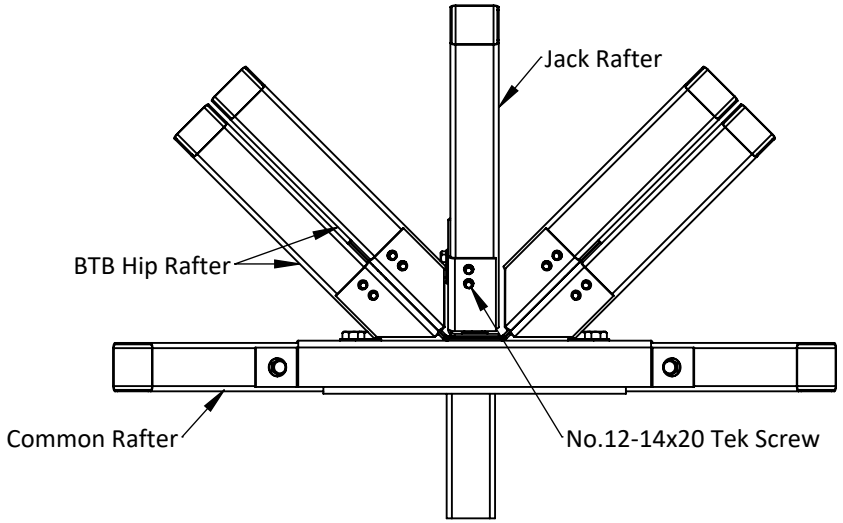


**PLAN**
**(View from underneath of the frames)**

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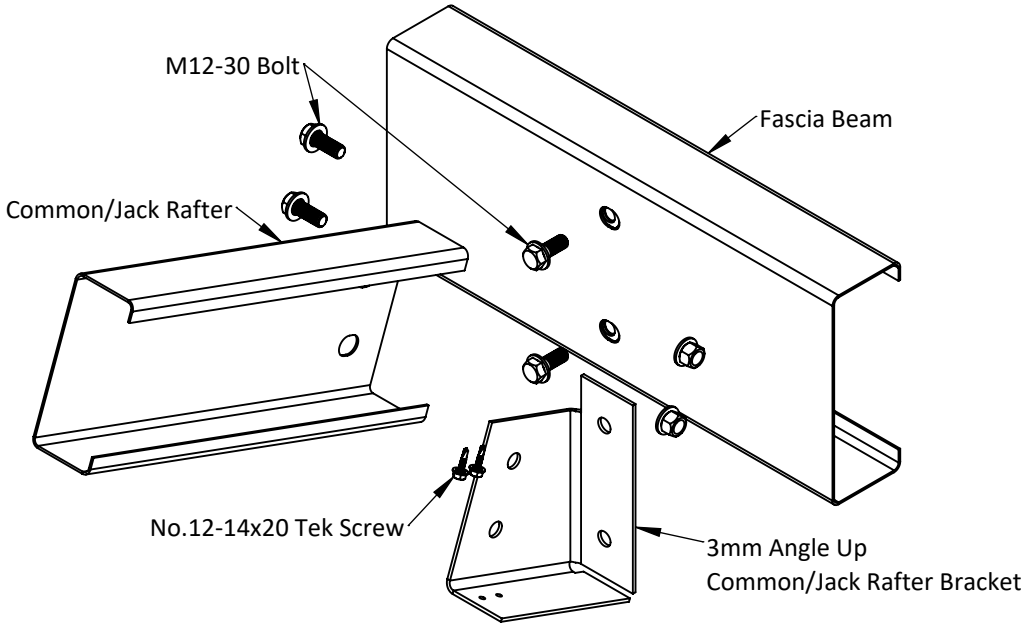
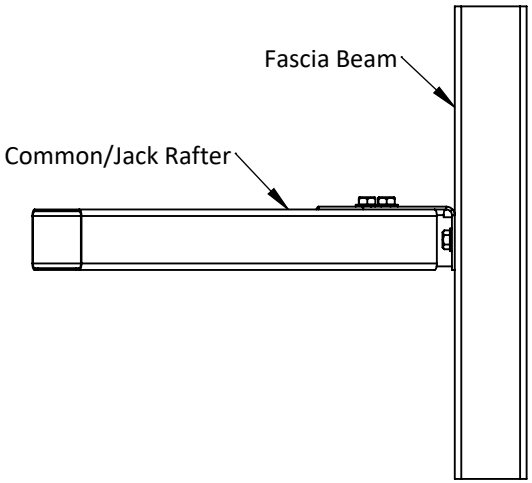
| | | | | | |
|---|---|---|---|---|---|
| PROJECT: Example 7000 x 12000 x 2400 Region B1 Hip Carport | PROJECT NUMBER: 6461 |  | | | |
| CLIENT: Example Customer | DRAWN BY: dm3 Solutions | Powered by dm3Solutions.com | | | |
| ADDRESS: Example Street, Suburb NT 0820 | DRAWN DATE: 2022-09-28 | ISSUE: 1 | SIZE: A4 | SCALE: NTS | DRAWING NUMBER 16 of 27 |

« Detail HC2.5: Common or Jack Rafter to Fascia Beam Connection Detail

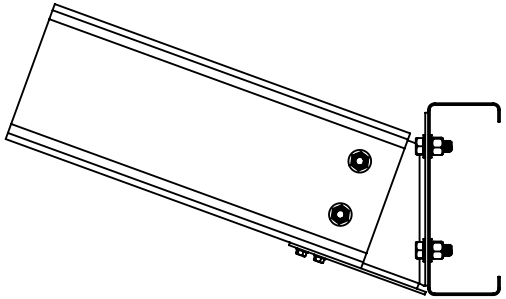
Video: Scan or Right-Click



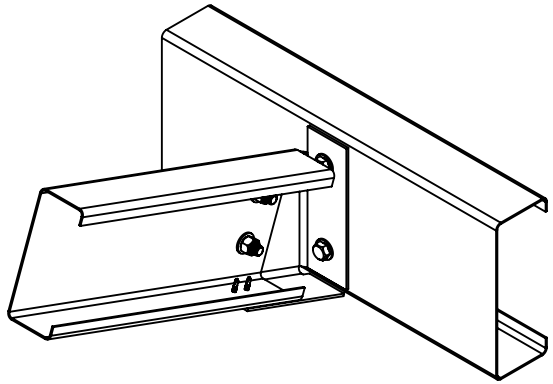

EXPLODED VIEW




PLAN



ELEVATION



ISOMETRIC

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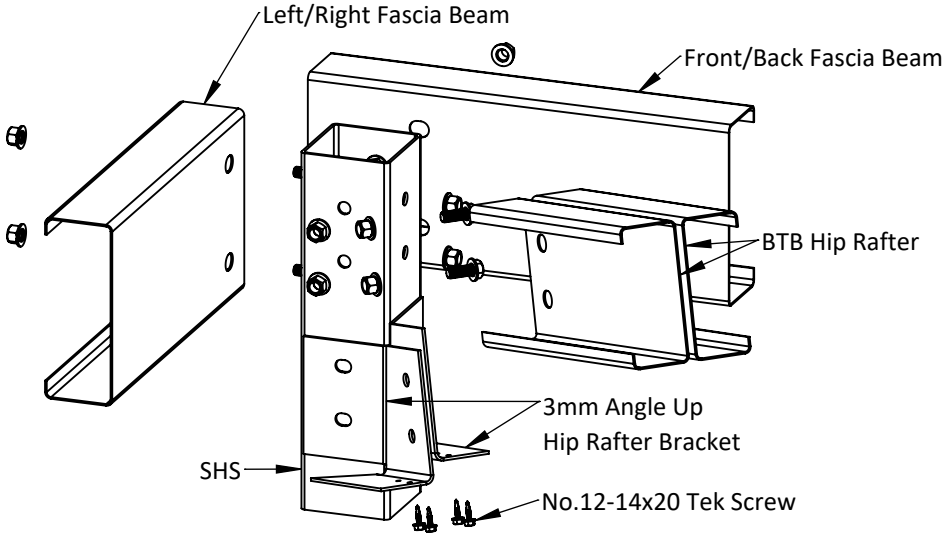
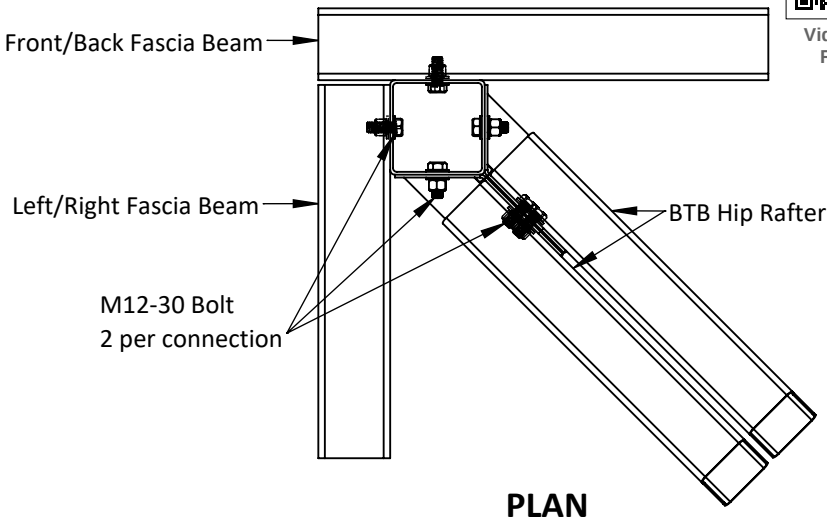
|---|---|---|---|---|---|
| PROJECT: Example 7000 x 12000 x 2400 Region B1 Hip Carport | PROJECT NUMBER: 6461 |  | | | |
| CLIENT: Example Customer | DRAWN BY: dm3 Solutions | Powered by dm3Solutions.com | | | |
| ADDRESS: Example Street, Suburb NT 0820 | DRAWN DATE: 2022-09-28 | ISSUE: 1 | SIZE: A4 | SCALE: NTS | DRAWING NUMBER 17 of 27 |

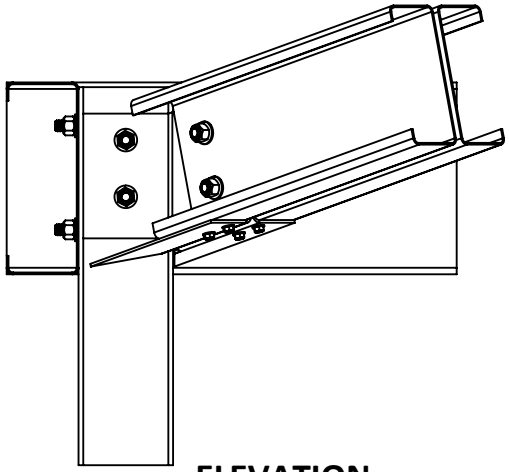
Video: Scan or Right-Click



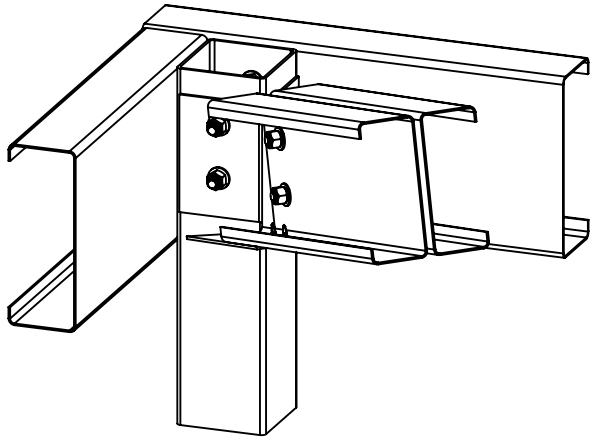

## EXPLODED VIEW




## PLAN



## ELEVATION



## ISOMETRIC

| | | | | | | |
|---|---|---|---|---|---|---|
| Your Logo Here | PROJECT: Example 7000 x 12000 x 2400 Region B1 Hip Carport | PROJECT NUMBER: 6461 |  | | | | |
| | CLIENT: Example Customer | DRAWN BY: dm3 Solutions |  | | | |
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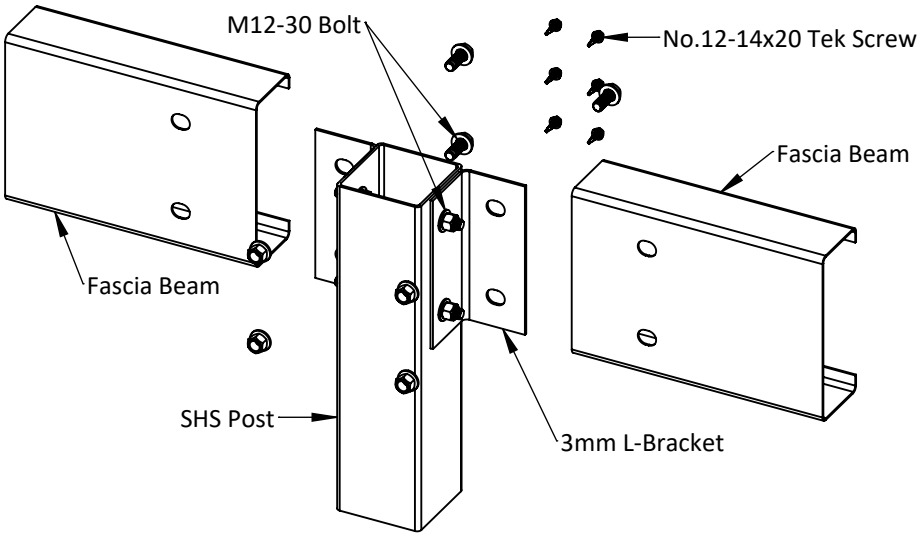
Video: Scan or Right-Click

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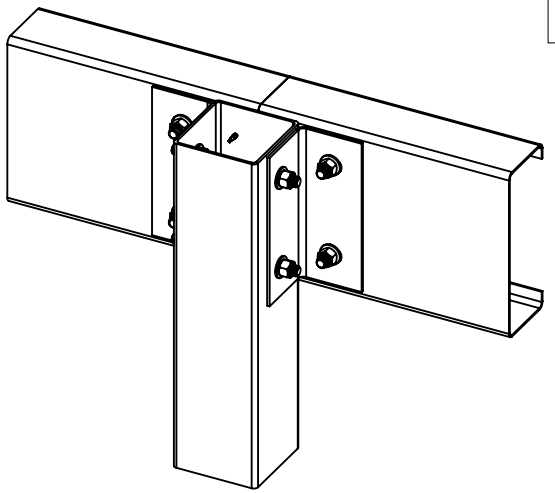

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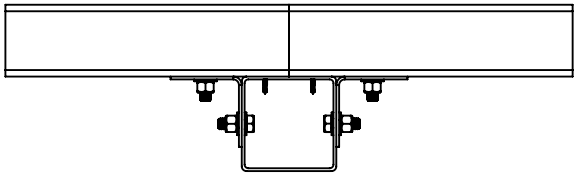
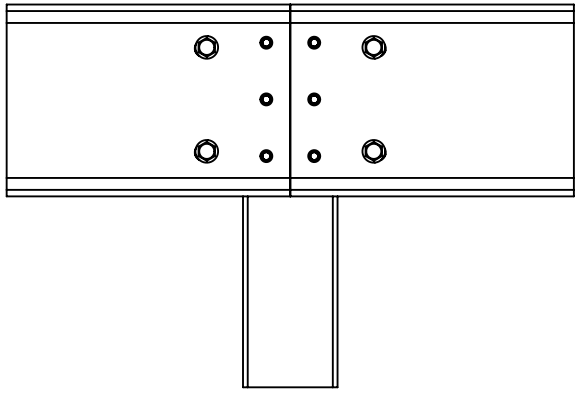


## PLAN



## ELEVATION

| | | | | | | |
|---|---|---|---|---|---|---|
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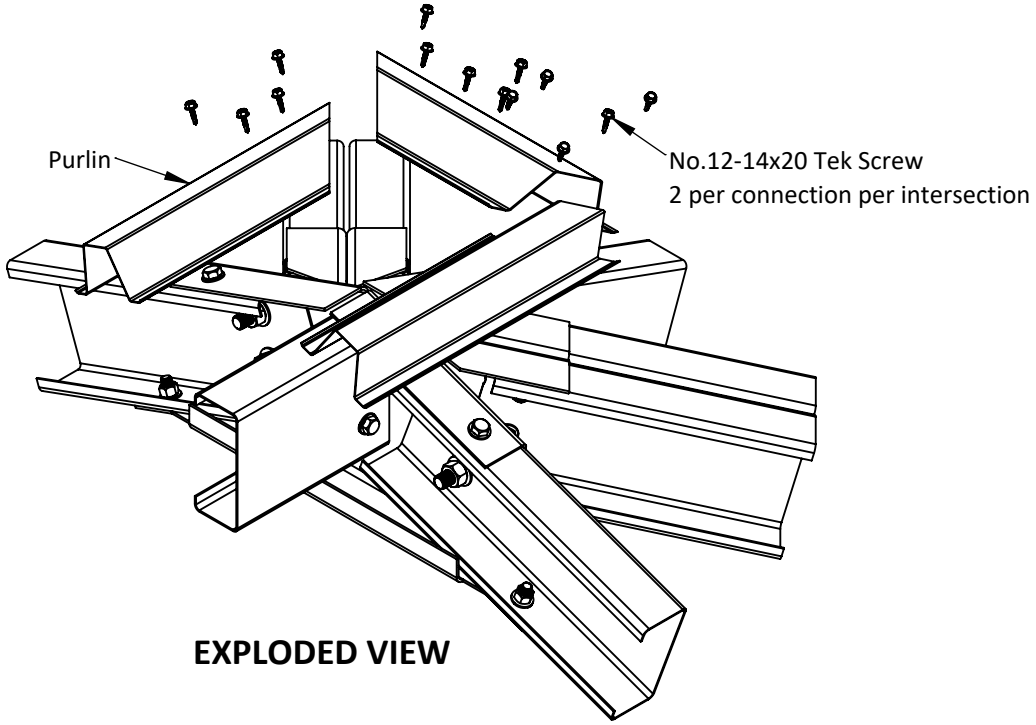
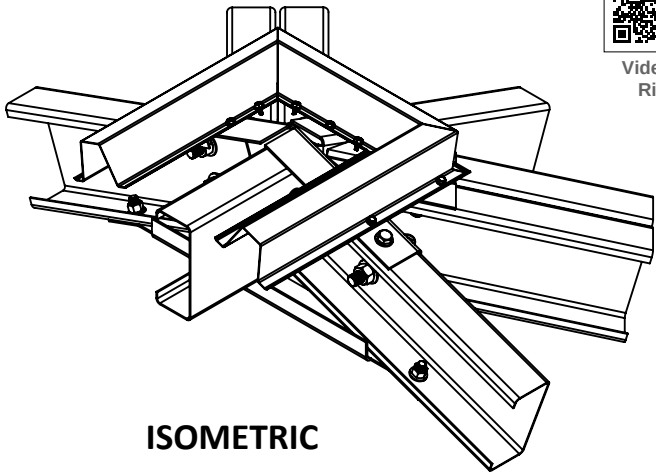
| | CLIENT: Example Customer | DRAWN BY: dm3 Solutions |  | | | |
| | ADDRESS: Example Street, Suburb NT 0820 | DRAWN DATE: 2022-09-28 | ISSUE: 1 | SIZE: A4 | SCALE: NTS | DRAWING NUMBER 19 of 27 |

« Detail HC3.2: Apex Purlin Connection Detail

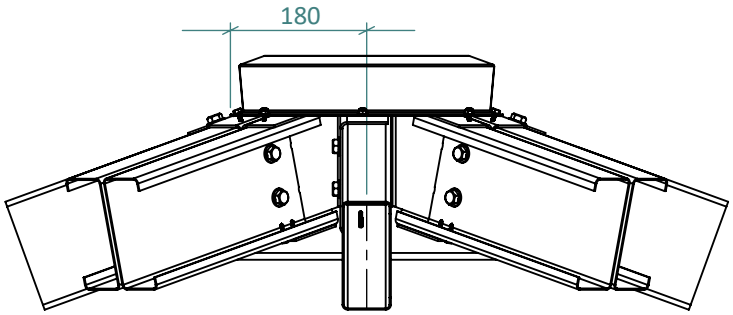
Video: Scan or Right-Click



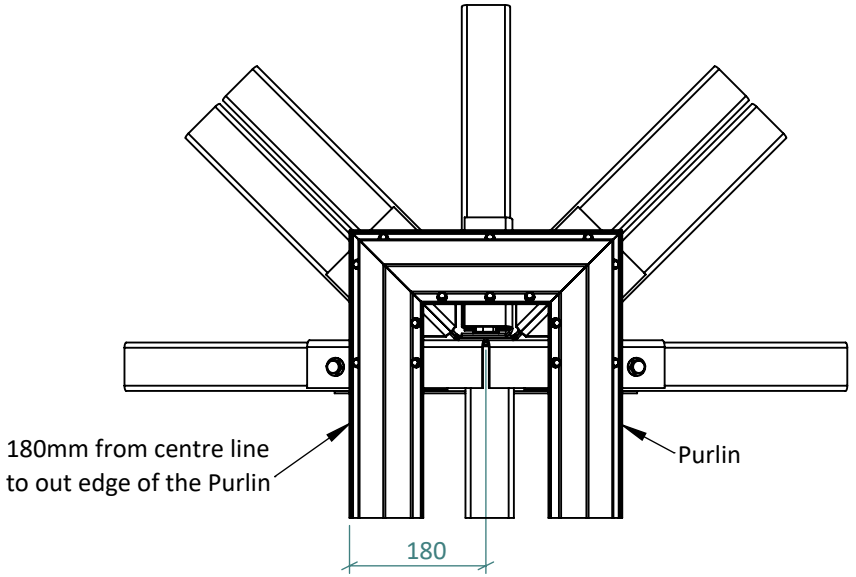

EXPLODED VIEW



ISOMETRIC




ELEVATION




PLAN

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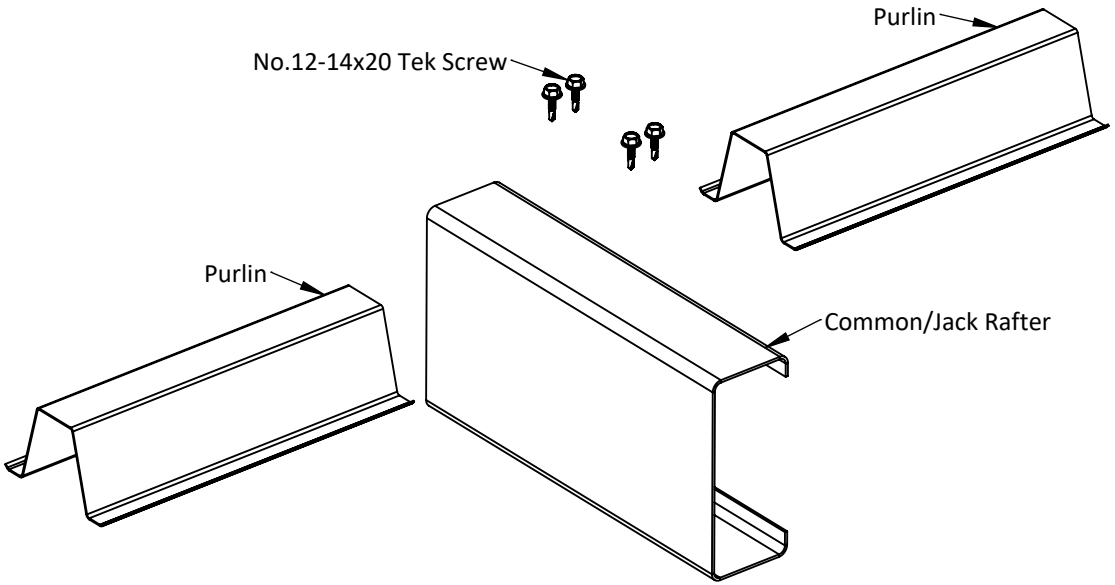
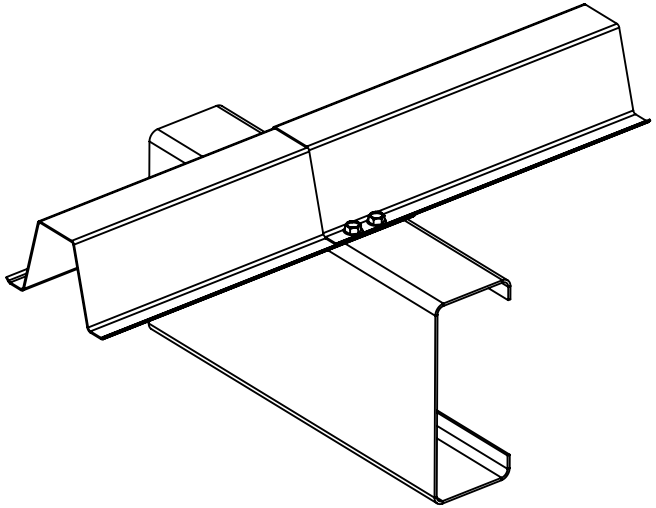
|---|---|---|---|---|---|---|
| Your Logo Here | PROJECT: Example 7000 x 12000 x 2400 Region B1 Hip Carport | PROJECT NUMBER: 6461 |  | | | | |
| | CLIENT: Example Customer | DRAWN BY: dm3 Solutions | Powered by dm3Solutions.com | | | |
| | ADDRESS: Example Street, Suburb NT 0820 | DRAWN DATE: 2022-09-28 | ISSUE: 1 | SIZE: A4 | SCALE: NTS | DRAWING NUMBER 20 of 27 |

« Detail HC3.3: Purlin Connection Detail

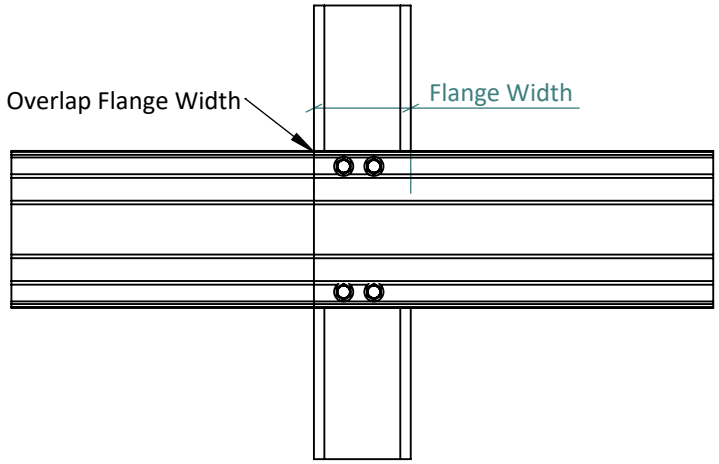
Video: Scan or Right-Click




EXPLODED VIEW



ISOMETRIC




PLAN

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|---|---|---|---|---|---|---|
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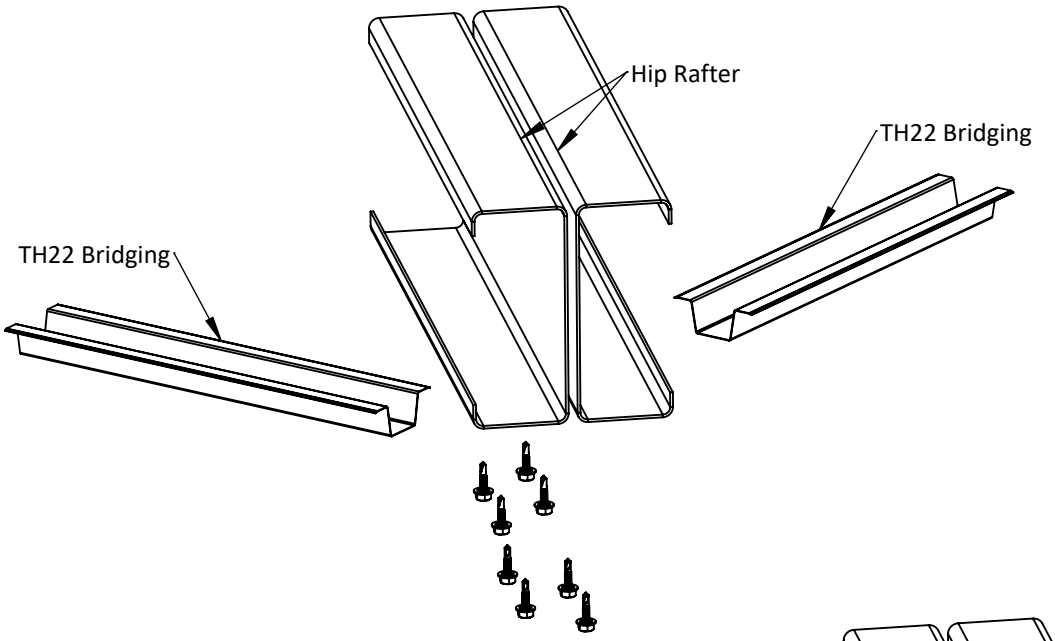
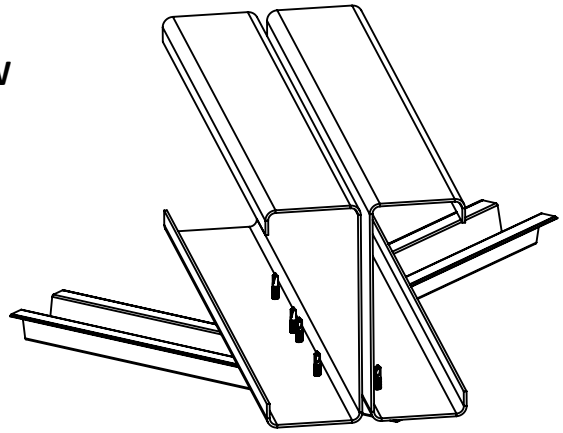
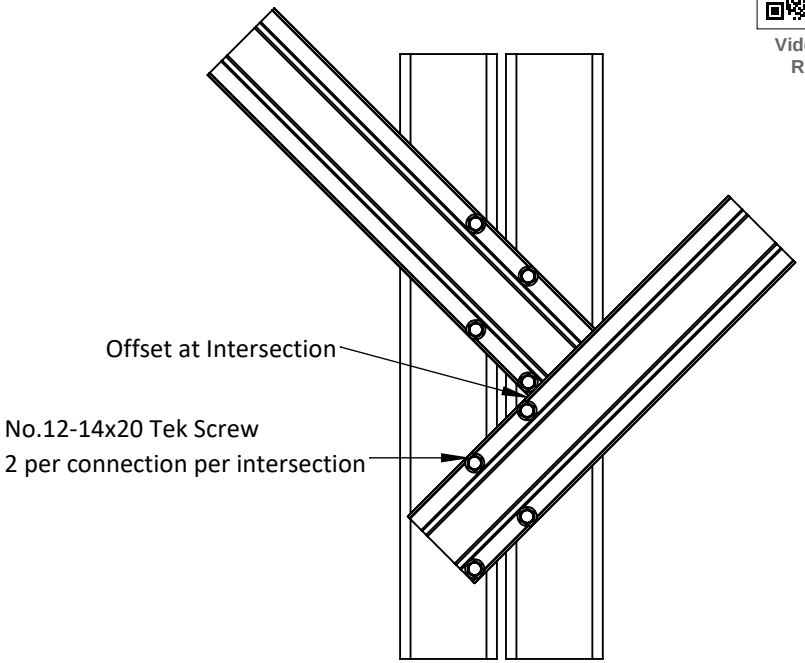
Video: Scan or Right-Click




**EXPLODED VIEW**



**ISOMETRIC**




**PLAN**
**(View from underneath of the frames)**

Your Logo Here

| | | | | | |
|---|---|---|---|---|---|
| PROJECT: Example 7000 x 12000 x 2400 Region B1 Hip Carport | PROJECT NUMBER: 6461 |  | | | |
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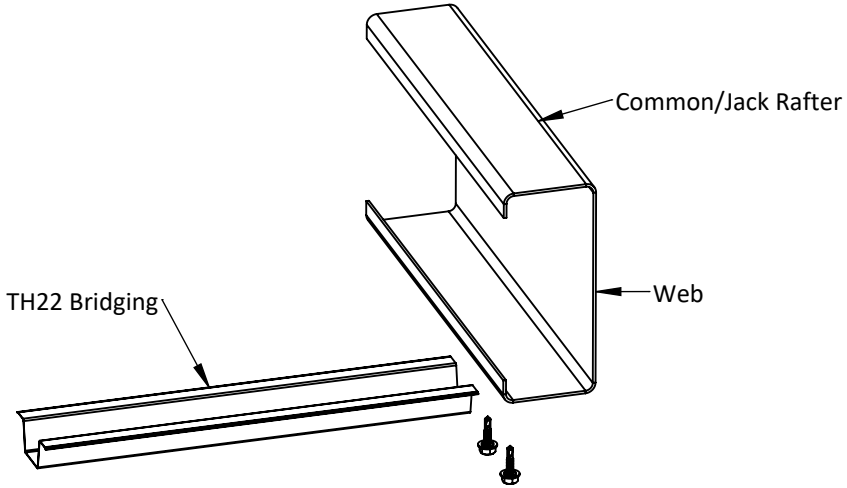
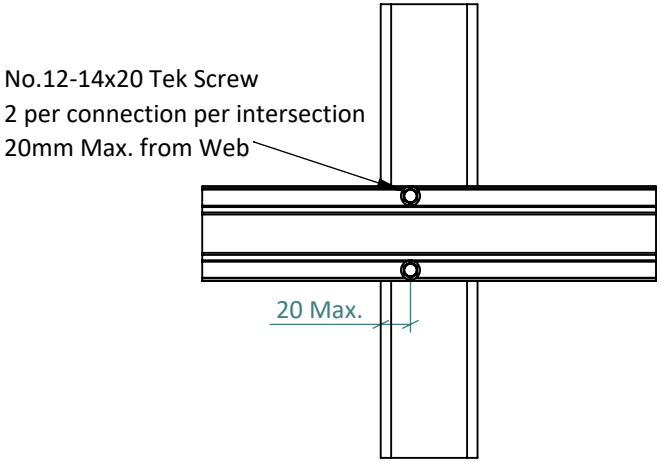
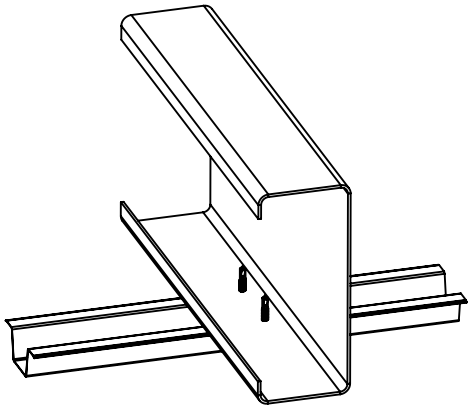
Video: Scan or Right-Click




**EXPLODED VIEW**




**PLAN**
**(View from underneath of the frames)**



**ISOMETRIC**

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|---|---|---|---|---|---|---|
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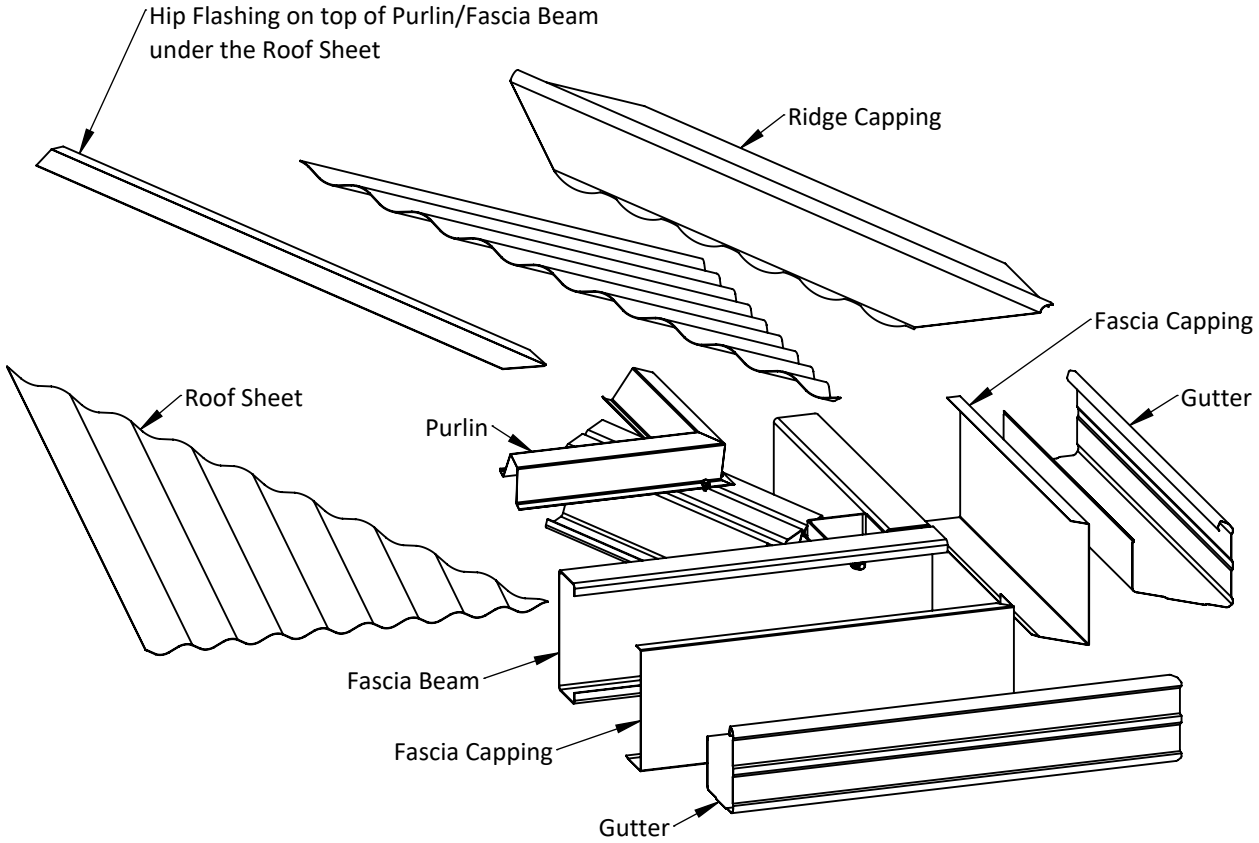
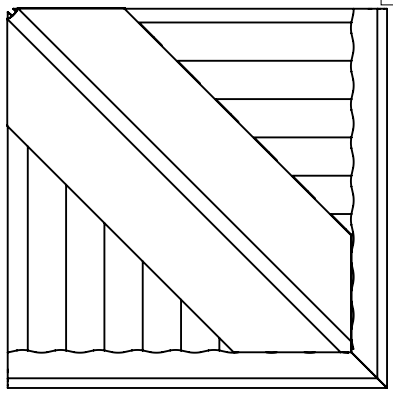
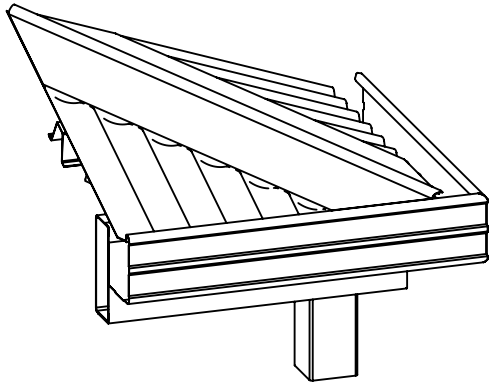



**EXPLODED VIEW**

Video: Scan or Right-Click



**PLAN**



**ISOMETRIC**

Your Logo Here

| | | | | | |
|---|---|---|---|---|---|
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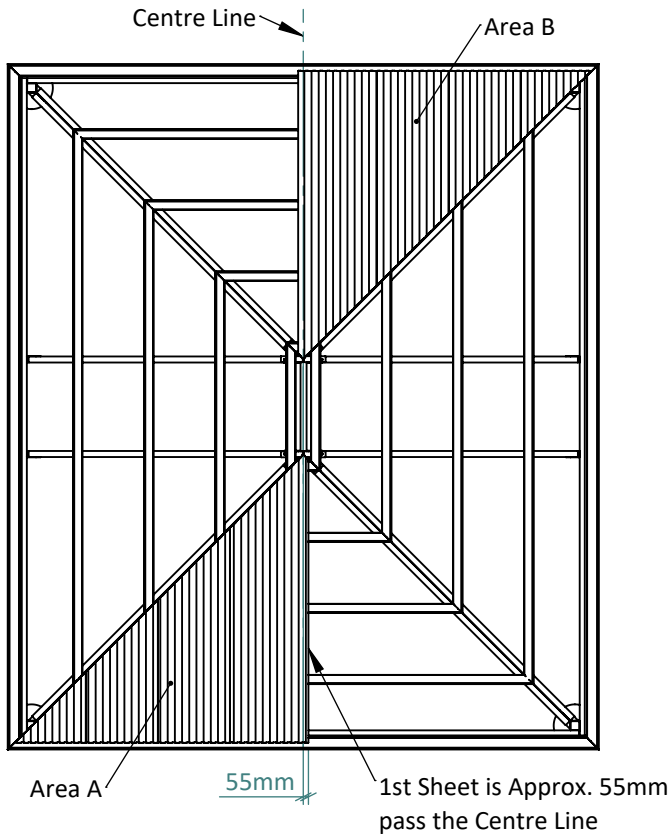


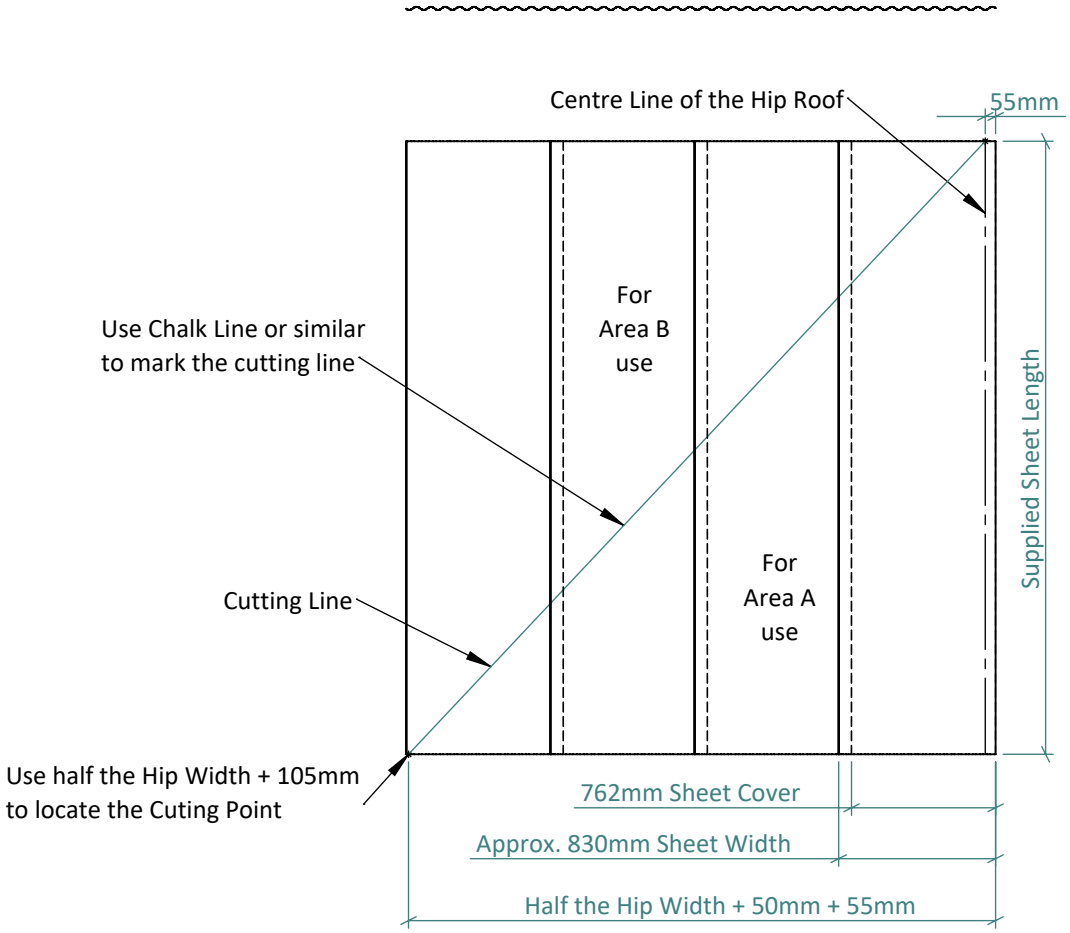


**A TYPICAL 6000 x 7000**
**HIP ROOF**

| | | | | | | |
|---|---|---|---|---|---|---|
| Your Logo Here | PROJECT: Example 7000 x 12000 x 2400 Region B1 Hip Carport | PROJECT NUMBER: 6461 |  | | | |
| | CLIENT: Example Customer | DRAWN BY: dm3 Solutions |  | | | |
| | ADDRESS: Example Street, Suburb NT 0820 | DRAWN DATE: 2022-09-28 | ISSUE: 1 | SIZE: A4 | SCALE: NTS | DRAWING NUMBER 25 of 27 |

## Technical Data

| | |
|---|---|
| Region | **B1** · Regional Wind Speed 57 m/s |
| Terrain Category | **2.5** |
| Shielding | **No** |
| $V_{design}$ | **47.11 m/s** |
| $Q_u$ | **1.332 kPa** |
| Inward Load | **0.826 kPa** · max(0.495, 0.826, 0.12) |
| Outward Load | **0.616 kPa** · max(0.31, 0.616) |

## Roof, Rafter & Post Area Calculations

| | |
|---|---|
| Fascia to Apex | **3725 mm** |
| Left Elevation Area | **13.038 m²** |
| Front Elevation Area | **31.663 m²** |
| Post RF Load Area | **5.277 m²** · RF = Raking Force |
| Int Post RF Load Area | **10.554 m²** · Int = Internal |
| Post Uplift Area | **7.450 m²** |
| Int Post Uplift Area | **14.900 m²** |

## Post Calculations

| | |
|---|---|
| Base Connection | **Cast In** |
| Min Yield Stress | **450 MPa** · Min = Minimum |
| **Uplift** · End Post · Inward | **6.154 kN** |
| Outward | **4.589 kN** |
| Int Post · Inward | **12.308 kN** |
| Outward | **9.179 kN** |
| **RF** · End Post · Req | **4.212 kN** · Req = Required |
| Int Post · Req | **8.425 kN** |
| **ØM** · End Post · Req | **10.109 kNm** |
| ØM | **10.600 kNm · 100x100x2.5**<br>Source: OneSteel® DuraGal® Hollow Sections |
| Int Post · ØM Req | **20.220 kNm** |
| ØM | **21.000 kNm · 100x100x4**<br>Source: OneSteel® DuraGal® Hollow Sections |

## Hip Rafter · HR · Calculations

| | |
|---|---|
| **Details** · Member | **C15012** with 2 rows of Bridging |
| Min Yield Stress · Grade · $I_x$ | **500 MPa · G500 · 1.29 x $10^6$mm⁴** |
| Gov Span · Load Width | **4607 mm · 1167 mm** · Gov = Governing |
| **Capacity** · Inward Req | **0.964 kN/m** |
| Outward Req | **0.719 kN/m** |
| Member Capacity | **1.620 kN/m** · min(Inward, Outward)<br>Source: Lysaght® & Stramit® Span Tables |
| **ØM** · Inward Req | **2.558 kNm** |
| Inward ØM | **5.310 kNm** · $L_{ex}$ 4607 · $L_{ey}$ 883 · $L_{ez}$ 1536 |
| Outward Req | **1.908 kNm** |
| Outward ØM | **5.310 kNm** · $L_{ex}$ 4607 · $L_{ey}$ 1536 · $L_{ez}$ 1536 |
| **CF** · Inward Req | **12.345 kN** · CF = Compression Force |
| Member L Compression | **25.56 kN** · $L_{ex}$ 4607 · $L_{ey}$ 883 · $L_{ez}$ 1536 |
| **CF** & **ØM** | Ratio must be <= 1.0 · AS4600 S3.5 |
| Combined Ratio | **0.965** |
| **Deflection** | **2.7 mm** · 15.4 mm Permitted |

## Ridge Line Strut · RLS · Calculations

| | |
|---|---|
| **Details** · Member | **C15024** |
| Min Yield Stress · Grade · $I_x$ | **450 MPa · G450 · 2.54 x $10^6$mm⁴** |
| Gov Span | **2484 mm** |
| **CF** · Req | **33.816 kN** |
| Member L Compression | **56.268 kN** · $L_{ex}$ 2484 · $L_{ey}$ 2484 · $L_{ez}$ 2484 |

## Common Rafter · CR · Calculations

| | |
|---|---|
| **Details** · Member | **C15024** with 2 rows of Bridging |
| Min Yield Stress · Grade · $I_x$ | **450 MPa · G450 · 2.54 x $10^6$mm⁴** |
| Gov Span · Load Width | **6680 mm · 2417 mm** |
| **Capacity** · Inward Req | **1.996 kN/m** |
| Outward Req | **1.489 kN/m** |
| Member Capacity | **7.520 kN/m** · min(Inward, Outward)<br>Source: Lysaght® & Stramit® Span Tables |
| **ØM** · Inward Req | **8.255 kNm** |
| Inward ØM | **12.434 kNm** · $L_{ex}$ 3395 · $L_{ey}$ 883 · $L_{ez}$ 1132 |
| Outward Req | **6.158 kNm** |
| Outward ØM | **12.434 kNm** · $L_{ex}$ 3395 · $L_{ey}$ 1132 · $L_{ez}$ 1132 |
| **Deflection** | **12.1 mm** · 22.3 mm Permitted |

## Internal Common Rafter · ICR · Calculations

| | |
|---|---|
| **Details** · Member | **C15024** with 2 rows of Bridging |
| Min Yield Stress · Grade · $I_x$ | **450 MPa · G450 · 2.54 x $10^6$mm⁴** |
| Gov Span · Load Width | **6680 mm · 2500 mm** |
| **Capacity** · Inward Req | **2.065 kN/m** |
| Outward Req | **1.540 kN/m** |
| Member Capacity | **7.520 kN/m** · min(Inward, Outward)<br>Source: Lysaght® & Stramit® Span Tables |
| **ØM** · Inward Req | **11.518 kNm** |
| Inward ØM | **12.434 kNm** · $L_{ex}$ 3395 · $L_{ey}$ 883 · $L_{ez}$ 1132 |
| Outward Req | **8.590 kNm** |
| Outward ØM | **12.434 kNm** · $L_{ex}$ 3395 · $L_{ey}$ 1132 · $L_{ez}$ 1132 |
| **Deflection** | **12.8 mm** · 22.3 Permitted |

## Jack Rafter · JR · Calculations

| | |
|---|---|
| **Details** · Member | **C15012** with 2 rows of Bridging |
| Min Yield Stress · Grade · $I_x$ | **500 MPa · G500 · 1.29 x $10^6$mm⁴** |
| Gov Span · Load Width | **3415 mm · 1167 mm** |
| **Capacity** · Inward Req | **0.964 kN/m** |
| Outward Req | **0.719 kN/m** |
| Member Capacity | **2.880 kN/m** · min(Inward, Outward)<br>Source: Lysaght® & Stramit® Span Tables |
| **ØM** · Inward Req | **1.405 kNm** |
| Inward ØM | **5.310 kNm** · $L_{ex}$ 3415 · $L_{ey}$ 883 · $L_{ez}$ 1138 |
| Outward Req | **1.048 kNm** |
| Outward ØM | **5.310 kNm** · $L_{ex}$ 3415 · $L_{ey}$ 1138 · $L_{ez}$ 1138 |
| **Deflection** | **0.8 mm** · 11.4 Permitted |

## Governing Purlin Calculations

| | |
|---|---|
| **Details** · Member | **TH6110** |
| Min Yield Stress · Grade · $I_x$ | **550 MPa · G550 · 0.16 x $10^6$mm⁴** |
| Gov Span · Load Width | **2639 mm · 883 mm** |
| **Capacity** · Inward Req | **1.094 kN/m** |
| Inward Capacity | **1.550 kN/m** · Single Span @ 3000mm<br>Source: Lysaght® & Stramit® Span Tables |
| Outward Req | **0.816 kN/m** |
| Outward Capacity | **1.380 kN/m** · Single Span @ 3000 mm · Minimum Support Thickness of 1.2 mm BMT · 2 x No. 12 Tek Screws<br>Source: Lysaght® & Stramit® Span Tables |
| **Deflection** | **1.8 mm** · 8.8 mm Permitted |

## Hip End Fascia Beam Calculations

| | |
|---|---|
| Member | **C20019** |
| Min Yield Stress · Grade · $I_x$ | **450 MPa · G450 · 4.51 x $10^6$mm⁴** |
| Gov Span | **6748 mm** |
| Concentrated Load | **One Point Load at 3374 mm** |
| **Capacity** · Inward Req | **0.488 kN/m** |
| Outward Req | **0.364 kN/m** |
| Member Capacity | **1.460 kN/m** · 1 row of Bridging · Span @ 6900 mm<br>Source: Lysaght® and Stramit® Span Tables |
| **ØM** · Inward Req | **2.777 kNm** |
| Outward Req | **2.072 kNm** |
| ØM | **8.977 kNm** · $L_{ex}$ 6748 · $L_{ey}$ 3374 · $L_{ez}$ 3374 |
| **CF** · Outward Req | **13.019 kN** |
| Member L Compression | **27.747 kN** · $L_{ex}$ 6748 · $L_{ey}$ 3374 · $L_{ez}$ 3374 |
| **CF** & **ØM** | Ratio must be <= 1.0 · AS4600 S3.5 |
| Combined Ratio | **0.7** |
| **Deflection** | **2.8 mm** · 22.5 mm Permitted |

## Fascia Beam Calculations for FB1.1 & FB1.2

| | |
|---|---|
| **Details** · Member | **C20015** with 1 row of Bridging |
| Min Yield Stress · Grade · $I_x$ | **450 MPa · G450 · 3.53 x $10^6$mm⁴** |
| Gov Span | **3784 mm** |
| Concentrated Load | **1 Point Load at 3374 mm** |
| **Capacity** · Inward Req | **1.362 kN/m** |
| Outward Req | **1.016 kN/m** |
| Member Capacity | **4.370 kN/m** · 1 row of Bridging · Span @ 3900 mm<br>Source: Lysaght® & Stramit® Span Tables |
| **ØM** · Inward Req | **2.437 kNm** |
| Outward Req | **1.818 kNm** |
| ØM | **6.487 kNm** · $L_{ex}$ 3784 · $L_{ey}$ 3374 · $L_{ez}$ 3374 |
| **CF** · Outward Req | **13.019 kN** |
| Member L Compression | **18.870 kN** · $L_{ex}$ 3784 · $L_{ey}$ 3374 · $L_{ez}$ 3374 |
| **CF** & **ØM** | Ratio must be <= 1.0 · AS4600 S3.5 |
| Combined Ratio | **0.970** |
| **Deflection** | **0.8 mm** · 12.6 mm Permitted |

## Fascia Beam Calculations for FB2.1 & FB2.2

| | |
|---|---|
| **Details** · Member | **C20015** with 1 row of Bridging |
| Min Yield Stress · Grade · $I_x$ | **450 MPa · G450 · 3.53 x $10^6$mm⁴** |
| Gov Span | **3820 mm** |
| Concentrated Load | **1 Point Load at 1910 mm** |
| **Capacity** · Inward Req | **3.611 kN/m** |
| Outward Req | **2.693 kN/m** |
| Member Capacity | **4.370 kN/m** · 1 row of Bridging · Span @ 3900 mm<br>Source: Lysaght® & Stramit® Span Tables |
| **ØM** · Inward Req | **6.587 kNm** |
| Outward Req | **4.913 kNm** |
| ØM | **9.761 kNm** · $L_{ex}$ 3820 · $L_{ey}$ 1910 · $L_{ez}$ 1910 |
| **CF** · Outward Req | **13.019 kN** |

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|---|---|---|---|---|---|
| PROJECT: Example 7000 x 12000 x 2400 Region B1 Hip Carport | PROJECT NUMBER: 6461 | © 2022 dm3 Solutions. The Information contained herein is Proprietary, Confidential and the Sole Property of dm3 Solutions. Reproduction in part or in whole is Prohibited without written approval. Unless specified otherwise, dimensions are in millimetres & drawings are not to scale. | | | |
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| | |
|---|---|
| Member L Compression | **48.621 kN** · $L_{ex}$ 3820 · $L_{ey}$ 1910 · $L_{ez}$ 1910 |
| **CF** & **ØM** | Ratio must be <= 1.0 · AS4600 S3.5 |
| Combined Ratio | **0.771** |
| **Deflection** | **2.7 mm** · 12.7 mm Permitted |

## Fascia Beam Calculations for FB3.1 & FB3.2

| | |
|---|---|
| **Details** · Member | **C20015** with 1 row of Bridging |
| Min Yield Stress · Grade · $I_x$ | **450 MPa · G450 · 3.53 x $10^6$mm$^4$** |
| Gov Span | **3784 mm** |
| Concentrated Load | **1 Point Load at 410 mm** |
| **Capacity** · Inward Req | **1.362 kN/m** |
| Outward Req | **1.016 kN/m** |
| Member Capacity | **4.370 kN/m** · 1 row of Bridging · Span @ 3900 mm<br>Source: Lysaght® & Stramit® Span Tables |
| **ØM** · Inward Req | **2.437 kNm** |
| Outward Req | **1.818 kNm** |
| ØM | **6.487 kNm** · $L_{ex}$ 3784 · $L_{ey}$ 3374 · $L_{ez}$ 3374 |
| **CF** · Outward Req | **13.019 kN** |
| Member L Compression | **18.870 kN** · $L_{ex}$ 3784 · $L_{ey}$ 3374 · $L_{ez}$ 3374 |
| **CF** & **ØM** | Ratio must be <= 1.0 · AS4600 S3.5 |
| Combined Ratio | **0.970** |
| **Deflection** | **0.8 mm** · 12.6 mm Permitted |

## Cladding Details

| | |
|---|---|
| Product | **BlueScope® Colorbond®** |
| Min Yield Stress · Grade | **550 MPa · G550** |
| Profile | **CustomOrb®** |
| BMT | **0.42 mm** |

## End Posts Bored Piers

| | |
|---|---|
| **ØM** · $M_u$ | **10.109 kNm** |
| **Uplift** · $V_u$ | **4.589 kN** |
| **Shear** · $H_u$ | **4.212 kN** |
| **Dimensions** | **350 mm diameter x 1100 mm deep** |

## Internal Posts Bored Piers

| | |
|---|---|
| **ØM** · $M_u$ | **20.220 kNm** |
| **Uplift** · $V_u$ | **9.179 kN** |
| **Shear** · $H_u$ | **8.425 kN** |
| **Dimensions** | **450 mm diameter x 1300 mm deep** |

## Connection Calculations

| | |
|---|---|
| **Connection Type** | **Hip Rafter to Post** |
| Components | **2 x M12 4.6/S Bolts** |
| Capacity Req | **4.441 kN** |
| Capacity | **30.2 kN** · 2 x M12 4.6/S Shear Capacity |
| **Connection Type** | **Common Rafter to Fascia** |
| Components | **2 x M12 4.6/S Bolts** |
| Capacity Req | **8.313 kN** |
| Capacity | **30.2 kN** · 2 x M12 4.6/S Shear Capacity |
| **Connection Type** | **Internal Common Rafter to Fascia** |
| Components | **2 x M12 4.6/S Bolts** |
| Capacity Req | **6.897 kN** |
| Capacity | **30.2 kN** · 2 x M12 4.6/S Shear Capacity |
| **Connection Type** | **L/R Fascia Beam to Post** |
| Components | **2 x M12 4.6/S Bolts** |
| Capacity Req | **1.647 kN** |
| Capacity | **30.2 kN** · 2 x M12 4.6/S Shear Capacity |
| **Connection Type** | **FB1.1 & FB1.2 to Post** |
| Components | **2 x M12 4.6/S Bolts** |
| Capacity Req | **2.577 kN** |
| Capacity | **30.2 kN** · 2 x M12 4.6/S Shear Capacity |
| **Connection Type** | **FB2.1 & FB2.2 to Post** |
| Components | **2 x M12 4.6/S Bolts** |
| Capacity Req | **6.897 kN** |
| Capacity | **30.2 kN** · 2 x M12 4.6/S Shear Capacity |
| **Connection Type** | **FB3.1 & FB3.2 to Post** |
| Components | **2 x M12 4.6/S Bolts** |
| Capacity Req | **2.577 kN** |
| Capacity | **30.2 kN** · 2 x M12 4.6/S Shear Capacity |
| **1 x M12 4.6/S Bolt** | **Web Bearing Capacity** |
| | **24.883 kN** · 1.5 mm Gauge C-Section |
| | **31.519 kN** · 1.9 mm Gauge C-Section |
| | **39.813 kN** · 2.4 mm Gauge C-Section |
| | **Plate Bearing Capacity** |
| | **49.766 kN** · 3.0 mm Gauge Plate |
| **1 x M16 8.8/S Bolt** | **Web Bearing Capacity** |
| | **53.084 kN** · 2.4 mm Gauge C-Section |
| | **66.355 kN** · 3.0 mm Gauge C-Section |
| | **Plate Bearing Capacity** |
| | **66.355 kN** · 3.0 mm Gauge Plate |
| **Plates** | **Tear Out Capacities** |
| Minimum · Top Bolt | **51.840 kN** |
| Minimum · Bottom Bolt | **77.760 kN** |

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