

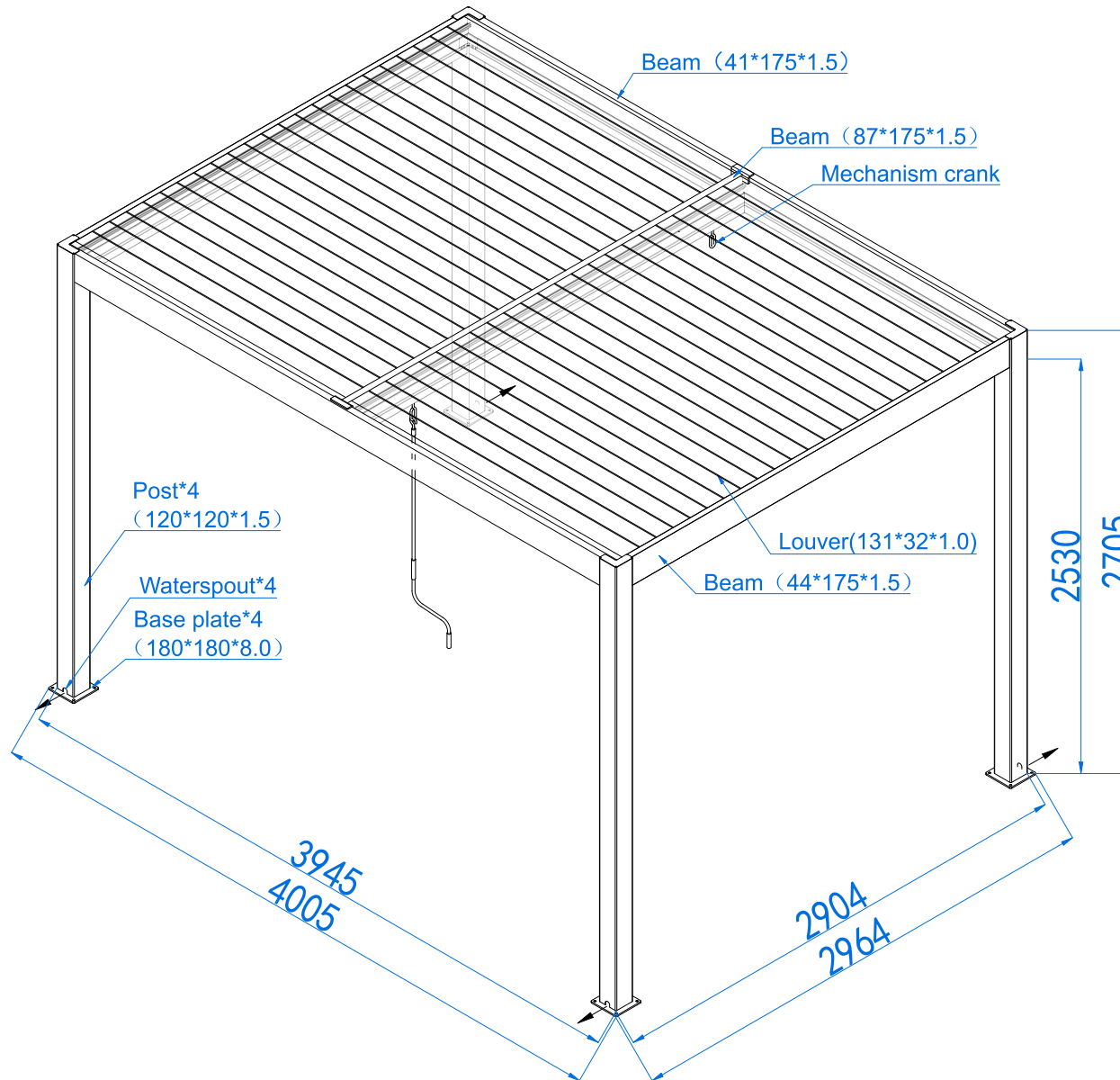
# Vortex Pergola™ 3400M



\* Conditions apply. Specifications may change without notice. Pictures may show options not available on all models.

VXPTS3400M230224

# Vortex Pergola™ 3400M



Title: 3400M Manual

Louvre Operation: 1 x Crank Handle

Control Method: Manual

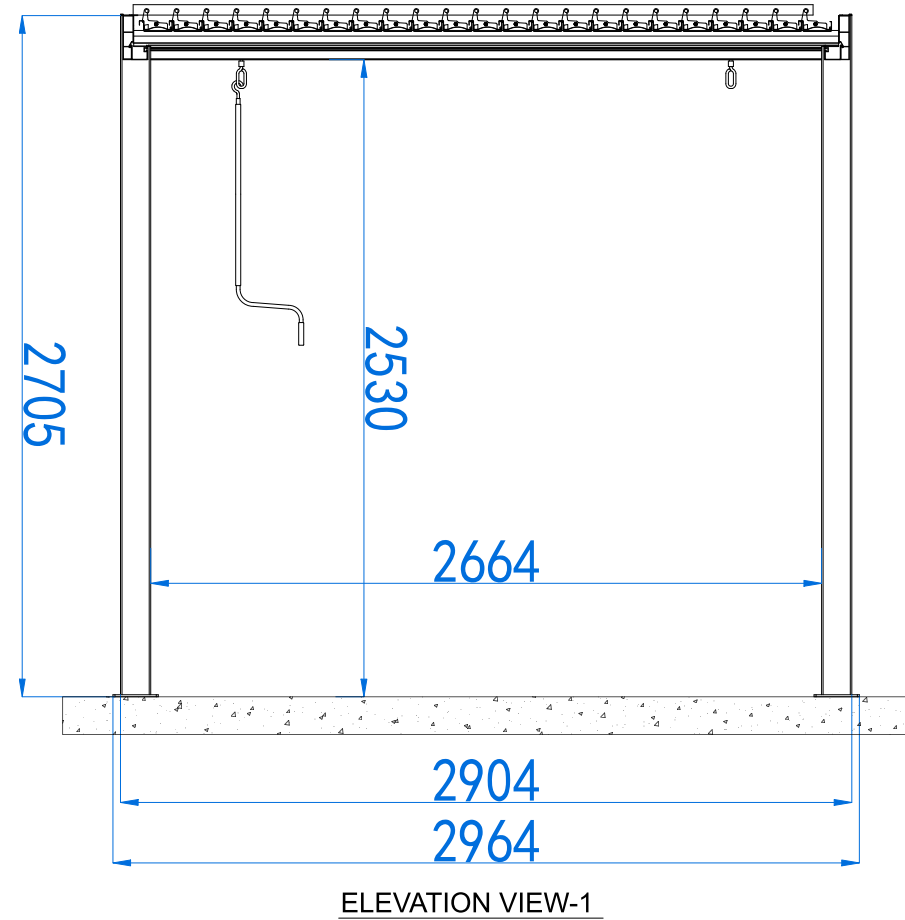
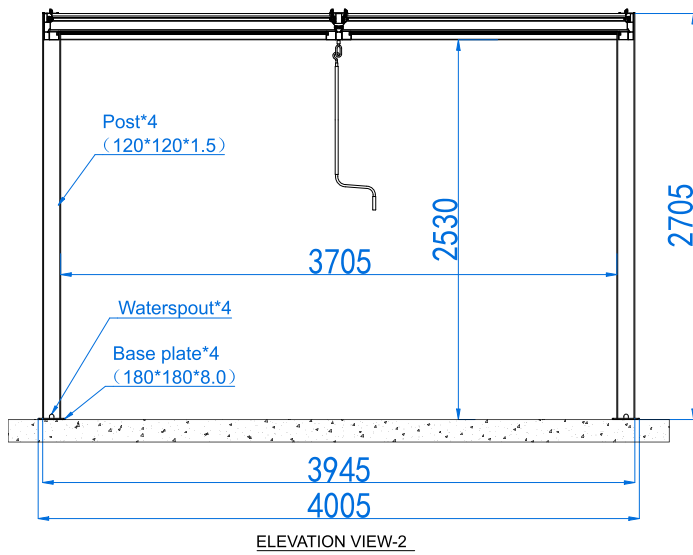
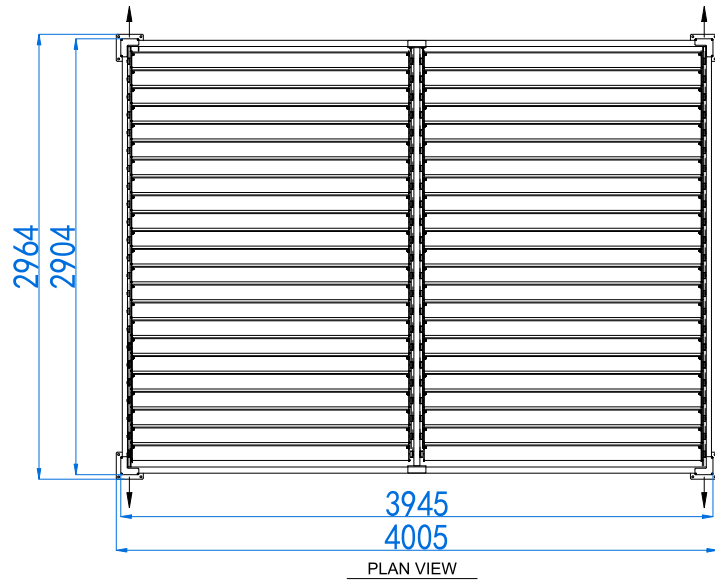
Colour: Traffic White RAL 9016  
Anthracite Grey RAL 7016

Material: Powder Coated Aluminium

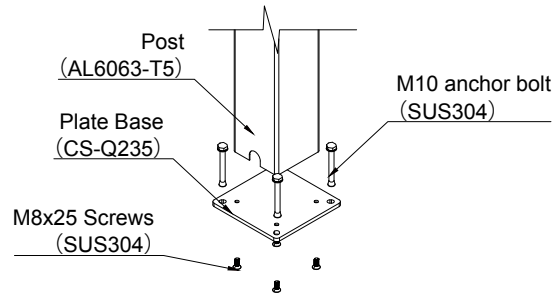
Recommended Foundation: Concrete\*  
\*Check with your local council

This pergola is intended as a semi-permanent structure - Please contact your local council for semi-permanent structure approval requirements.

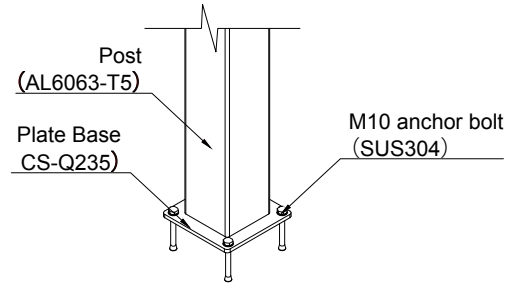
# Vortex Pergola™ 3400M



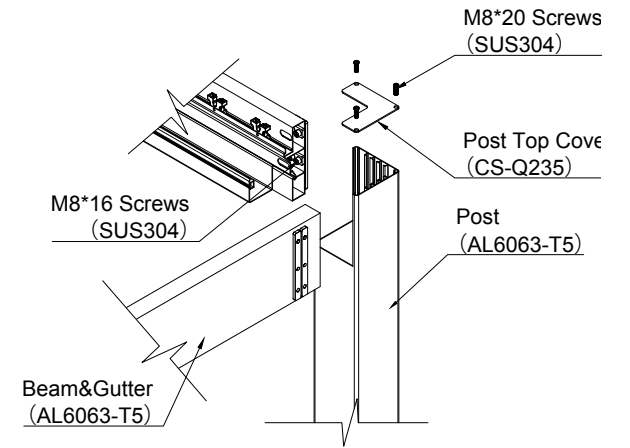
# Vortex Pergola™ 3400M



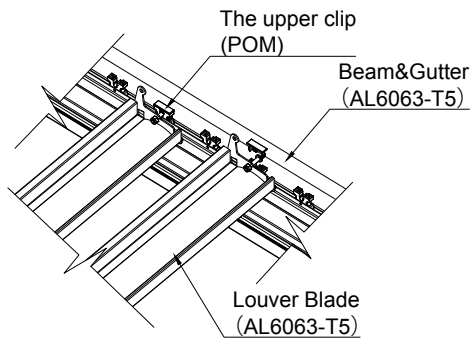
1  
5 Connection of Post and Plate base



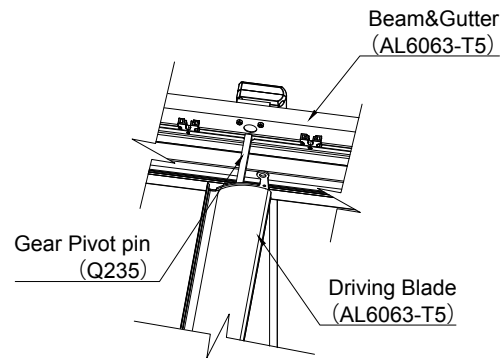
2  
5 The connection between the base and the ground



3  
5 Connection of Post and Beam

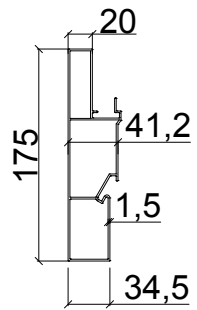


4  
5 Connection of blade and beam

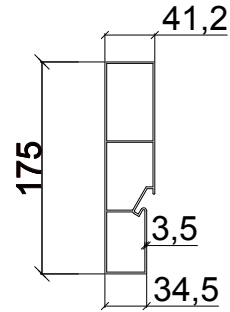


5  
5 Connection of blade and Crank Mechanism

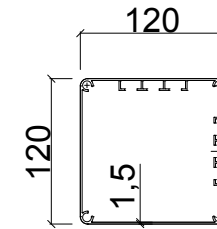
# Vortex Pergola™ 3400M



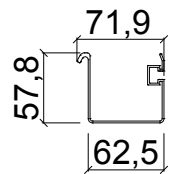
Main beam



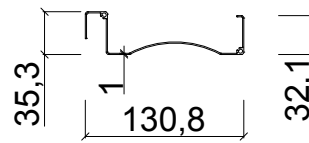
Side beam



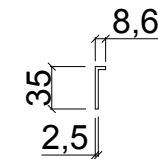
Corner post



Gutter

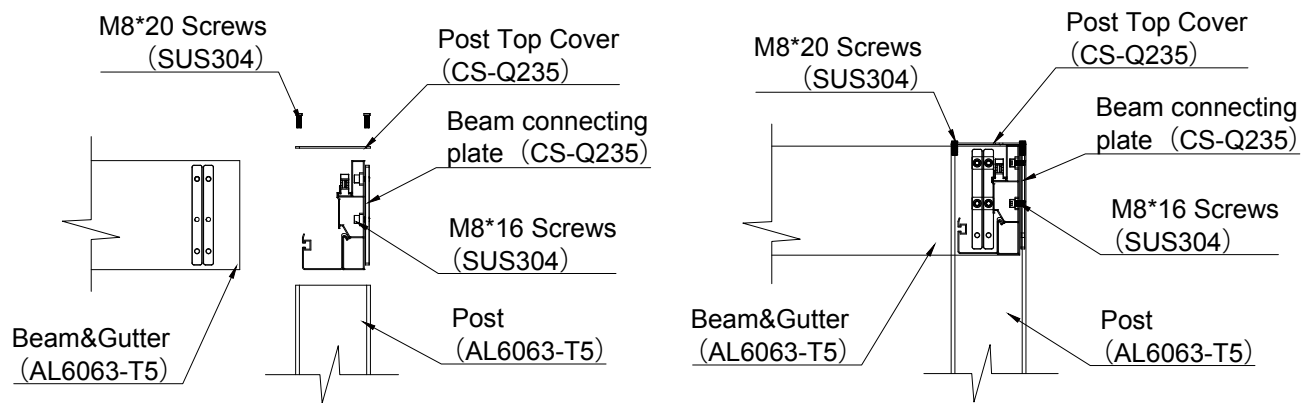
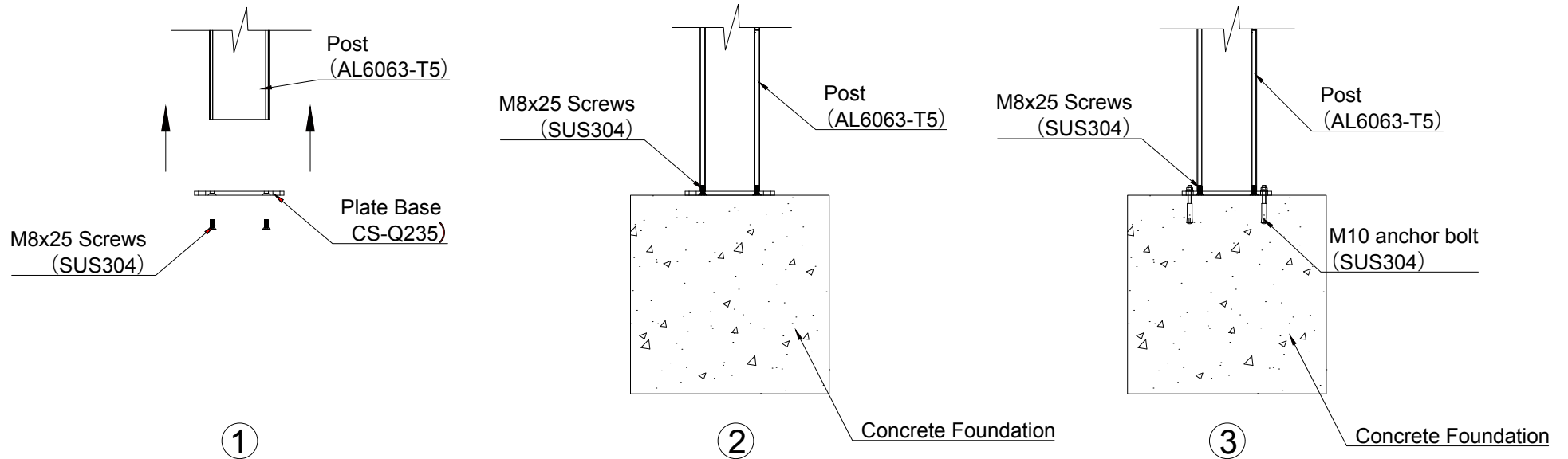


Blade



Control rod

# Vortex Pergola™ 3400M



# Vortex Pergola™ 3400M



## Packaging Info.

**Crated** - All cartons are delivered in one crate. Hiab is required.

Crate Dimensions (mm)			Crate Total weight incl package (kgs)	Internal Carton Dimensions (mm)				Carton weight (kgs)	Description
Width	Length	Height		Width	Length	Height	Carton Qty		
800	4040	805	342	460	3980	210	1	70	Main Beam/Gutters
				360	2010	410	1	29	Louvre Blade (Contains Driving Blade)
				360	2010	410	1	32	Louvre Blade
				360	2010	410	1	32	Louvre Blade
				370	2950	270	1	52	Post/Accessories
<b>Optional Pergola Privacy Blinds Packaging</b>				220	3840	140	1	40.6	Guided Zip Track Blind

The included anchors are for the standard concrete foundation design detailed in this document and certified by independent Engineers. Any other foundation type, including a wood deck, will require you to seek advice from an Engineer, which will stipulate the fasteners that are required.

# Vortex Pergola™ 3400M

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## Crate Packaging FAQs

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### **How will the Pergola crate be removed from the delivery truck?**

The crate will be removed from the delivery truck using a HiAb crane to safely lift the large crate off the truck.

---

### **Will the delivery team place the Pergola crate in my backyard?**

The delivery team will transport the crate to the kerbside or driveway as long as it can be safely reached using the HiAb crane.

---

### **Where will the delivery team place the Pergola crate?**

The delivery team will safely place the crate at the roadside or your driveway using a HiAb crane.

---

### **Will the delivery team remove the Pergola packaging?**

We do not offer a packaging disposal service and you will be responsible for removing any packaging material.

---

### **How do I dispose of the Pergola packaging?**

To dispose of the packaging, we suggest breaking it down into smaller parts and loading them onto a ute or into a trailer. Alternatively, you can consider hiring a service to pick up the packaging from your location.

### **What size of vehicle do I need if I want to pick up the pergola myself?**

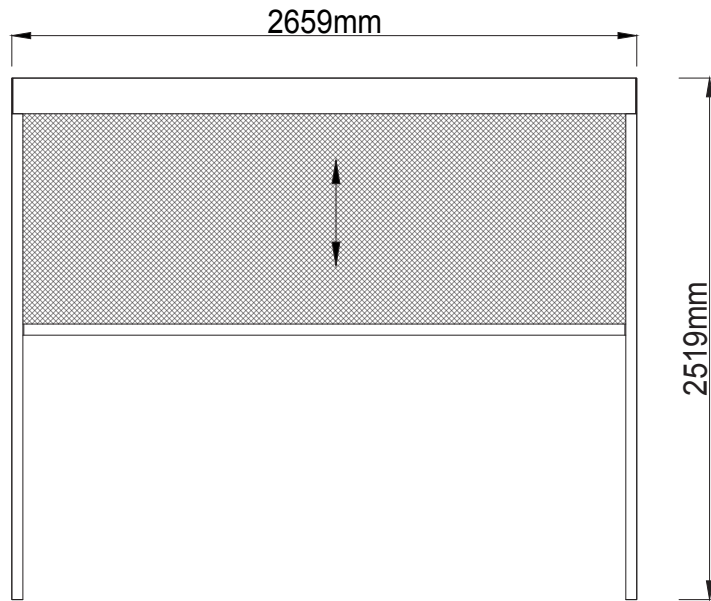
The size of the vehicle you would need for a self pick-up will depend on the crate packaging, dimensions, and weight of the pergola. Vortex™ Pergolas come in various sizes, so it is important to know the specific dimensions of the one you want to pick up. Once you have the dimensions, you can then determine the appropriate size of the vehicle, such as a pick-up truck or a larger van, that can accommodate the pergola without any overhang or safety concerns. Please refer to the packaging page earlier in this document for weights and dimensions.



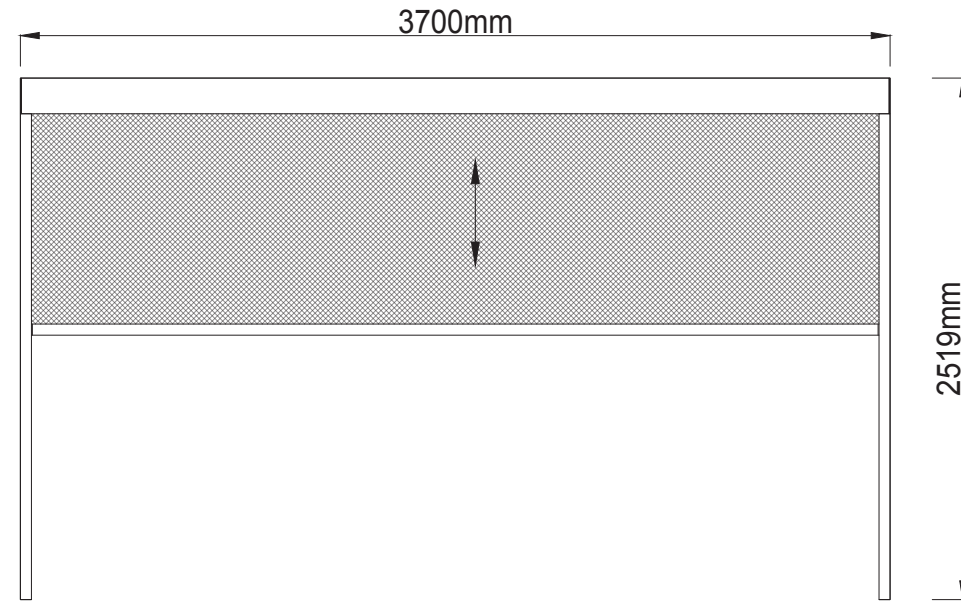
# Optional Pergola Privacy blinds



## Vortex Pergola™ 3400M



Side screen facade view



Side screen facade view

## **NOTICE**

### **Equipotential Bonding Compliance Obligation**

This product is subject to Equipotential Bonding compliance in accordance with the Australian and New Zealand Standards (AS/NZS 3000: 2018 Electrical Installations) otherwise known as the Wiring Rules. If this product is installed within arms reach of a body of water including spa, swim spa or pool, then Equipotential Bonding **MUST** be performed by a licensed electrical person prior to the product being used. This is a mandatory requirement. As the purchaser of this product, you are responsible for ensuring compliance with this requirement at your own expense.

# Vortex Pergola™ 3400M

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## Drainage around your pergola

In most cases, you will need to install drainage around your pergola or gazebo if the roof is fully closed or can be closed. We always recommend checking local council regulations before you purchase or install a pergola.

- Your council may require you to install drainage around a pergola with fully closing louvres to catch the rainwater that flows across the louvres and down through the posts.
- Your council may also require water to be redirected to the household stormwater system, such as the downpipe system from your house.

Depending on your local regulations, you may not be allowed to let the water come out of the water spouts at the bottom of the pergola posts and onto the ground without drainage to catch and redirect it to the household stormwater system.

If you are installing your spa on an existing or new pad, you should consult with a building certifier before any installation to determine the requirements.

## Frequently Asked Questions

This section is designed to provide a simplified overview of current regulations in reference to Vortex Pergolas™. It is not state specific and therefore is not a complete guide. We advise you to seek independent advice for your individual site requirements.

---

### Do I need council consent to install a pergola?

This depends on the state you live in and the value of your complete project. Please contact your local council for the complete details.

---

### Can I install my pergola onto a deck?

Yes, however, the engineering that has been done is based on a concrete footing. If you wish to put the pergola on a deck, you must have the foundation certified by an engineer.

---

### Do I need engineering for my pergola?

We provide engineering documents on the following pages. The engineering is based on standard concrete foundations. Any variation from the standard foundation will require re-engineered certification.

---

### Do I need an Electrician for the installation of my pergola?

Yes, if you require exponential bonding.

---

### How far do the louvres open?

Roughly 90°.

---

### How long does it take to install a pergola?

Each installation will vary based on many factors including, location, foundations, workers availability and experience etc. As a guide, a pergola can take 4-6 hours with 3 people.

---

### Do Vortex Pergolas have a wind rating/classification?

Yes, you can find that on the following pages.

---

### What grade of aluminium is used in the Vortex Pergolas?

6063-T5. (Detailed information available in the following pages)

---

### Are the pergolas available in a lower height model?

Unfortunately, we cannot provide custom sizes.

---

### Am I able to attach the pergola to an existing structure, such as a house?

We recommend that you discuss this option with your builder/ engineer.

---

### Do the Louvres automatically close when it rains?

No, you must crank the handle to close.

---

### Do we offer an installation service for Pergolas?

Unfortunately, we are unable to offer an installation service. Please talk with your sales consultant and they can provide installation contractor options.

---

### How do I get the pergola from the curbside delivery point to the final location?

We suggested to unpackaged the individual cartons and transport them to the final place. Note, the weight of each carton from this sheet. Use the correct number of people and safe lifting practices.

# Vortex Pergolas™ Limited Warranty

Vortex Leisure Pty Ltd owns the Vortex Pergolas™ brand

## 15-year structural warranty

Vortex Leisure Pty Ltd warrants the structural integrity of the pergola frame against defects in workmanship and materials for 15 years subject to the limitations, conditions and exclusions expressed in this warranty.

## 5-year powder coat warranty

Vortex Leisure Pty Ltd warrants the powder coat for a period of 5 year from the date of delivery. Fading and peeling may naturally occur over time and will not be covered under warranty. Damage caused to the powder coat due to improper use or handling not be covered under warranty. Disposal of any component replaced under warranty will be the owners responsibility.

## 2-year lighting warranty

Vortex Leisure Pty Ltd warrants against any defects in the LED lighting supplied by Vortex Leisure Pty Ltd for a period of 2 year from date of delivery. This warranty does not cover damage to the lights caused by incorrect use.

## 3-year motor warranty

Vortex Leisure Pty Ltd warrants the motor against defects in materials and workmanship for a period of 3 year from date of delivery. This warranty does not cover damage to the motor caused by incorrect use or installation.

## 1-year electronic components warranty

Vortex Leisure Pty Ltd warrants electronic control systems against defects in materials and workmanship for a period of 1 year from date of delivery.

## 1-year louvre roof warranty

Vortex Leisure Pty Ltd warrants the louvre roof and its components against defects in materials and workmanship for a period of 1 year from date of delivery. Fading and weathering of the surface may occur naturally over time, and are not considered defects.

## 1-year pergola blinds tracks, structure and mechanism warranty

Vortex Leisure Pty Ltd warrants the pergola blinds tracks, structure and mechanism against defects in materials and workmanship for a period of 1 year from date of delivery. The blinds must remain retracted when not in use. High winds can damage the blinds and this damage will not be covered under warranty. Fading and weathering of the surface will occur naturally over time, and are not considered defects and will not be covered under warranty.

## 3-year pergola blinds fabric warranty

Vortex Leisure Pty Ltd warrants against any defects in the fabric for a period of 3 years from the date of delivery. Fading and weathering of the surface will occur naturally over time, and are not considered defects and will not be covered under warranty. The blinds must remain retracted when not in use. High winds can damage the blinds and this damage will not be covered under warranty. Fading and weathering of the surface will occur naturally over time, and are not considered defects and will not be covered under warranty.

## Warranty coverage

Warranty coverage begins at the delivery date. Vortex Leisure Pty Ltd only extends this warranty to the original purchaser and only if the pergola has been purchased through an authorised Vortex Leisure Pty Ltd reseller. Written notice of the defect and proof of purchase must be provided to Vortex Leisure Pty Ltd or it's nominated representative within 14 days of the defect occurring. If the pergola is required to be returned to Vortex Leisure Pty Ltd for rectification all freight costs shall be pre-paid by the customer. Repair or replacement of any defective product is at the sole discretion of Vortex Leisure Pty Ltd. To action warranty service contact the authorised Vortex Leisure Pty Ltd reseller you purchased from. If you are unable to obtain satisfactory service from your reseller written notification must be provided to Vortex Leisure Pty Ltd within 14 days of the defect occurring.

## Pergola Installation

We recommend that the pergola is installed by qualified builder.

## Electrical connection

Any required electrical work must be carried out by a licensed electrician. Vortex Leisure Pty Ltd reserve the right to ask for proof that the pergola has been installed by a qualified electrician.

## Warranty exclusions

1. Damage resulting from improper maintenance.
2. Damage caused to the pergola by improper use and natural fading from sunlight.
3. Acts of God including but not limited to weather events.
4. Damage cause by corrosion
5. Issues arising from incorrect installation including the Pergola being built on an uneven/unlevel surface.
6. Damage caused by incorrect electrical installation, brownouts, voltage spikes or operating pergola out of +/- 10% of voltage range.
7. Commercial use reduces all warranties to maximum 6 months.
8. Damage caused by relocation of the pergola from its original installed location.
9. Damage caused by third party carriers.
10. Drain or gutter leakage.
11. Remote batteries are excluded from the warranty.
12. Any rust on ground attachment anchors.

## Limitations

This warranty is the only warranty offered by Vortex Leisure Pty Ltd and excludes any other implied or oral undertakings. Except as described above, this warranty does not cover defects or damage due to normal wear and tear, improper installation, alteration without Vortex Leisure Pty Ltd prior written consent, accident, acts of God, misuse, abuse, commercial or industrial use, use of an accessory not approved by Vortex Leisure Pty Ltd, failure to follow Vortex Pergolas™ or Owner's Manual, or repairs made or attempted by anyone other than an authorised representative of Vortex Leisure Pty Ltd. Vortex Leisure Pty Ltd or its agents will not be liable for any incidental or consequential loss or injury. Vortex Leisure Pty Ltd will not be liable for costs associated with but not limited to building alterations, removal costs, delivery costs or labour costs associated with the replacement or repair of pergola and parts.

**Building Act 1993**  
*Section 238(1)(a)*  
**Building Regulations 2018**  
*Regulation 126*

**CERTIFICATE OF COMPLIANCE FOR PROPOSED BUILDING WORK**

**This certificate is issued to**

The Relevant Building Surveyor

**This certificate is issued in relation to the proposed building work at:**

TBC

**Nature of proposed building work**

Construction of Proposed 3400 / 3400M Louvre Pergola

**Building classification**

Part of building: Pergola                      BCA Classification 10a

**Prescribed class of building work for which this certificate is issued:**

Design or part of the design of building work relating to Structural matter

**Documents setting out the design that is certified by this certificate**

<b>Document no.</b>	<b>Document date</b>	<b>Type of document (e.g. drawings, computations, specifications, calculations etc.)</b>	<b>Prepared by</b>
2402054	07/02/2024	<b>Structural Drawings – Rev. A</b> <i>As Nominated on the Sheet Index, Drawing Sheet S000</i>	Barrason's Group
2402054	07/02/2024	<b>Engineering Computations</b>	Barrason's Group

**Other documents relied on in preparation of the design that is certified by this certificate**

<b>Document no.</b>	<b>Document date</b>	<b>Type of document (e.g. drawings, computations, specifications, calculations etc.)</b>	<b>Prepared by</b>
-	-	<b>Owner's Manual</b>	Vortex Leisure



The design certified by this certificate complies with the following provisions of Building Act 1993, Building Regulations 2018 or National Construction Code

Act, Regulation or NCC	Section, Regulation, Part, Performance Requirement or other provision
<b>BCA/NCC 2022 – Volum 2</b>	Part 2.1, 3.0, 3.2, 3.4 of the NCC Vol. 2-2022 amendment 1 including relevant Australian Standards: AS1170.0, AS/NZ1170.1-2002, AS/NZ1170.2-2011, AS1684.2 AS1684.4, AS1720.1, AS2870, AS3959, AS3600, AS3700, AS3850, AS4100, AS4055, AS4671, AS4773.1

I certify that the design set out in the documents listed above complies with the provisions set out above.

I believe that I hold the required skills, experience and knowledge to issue this certificate and can demonstrate this if requested to do so.

**Engineer:**

**Full Name:** Andrew Barraclough

**Registrations:** FIEAUST, CPEng, NER, RBP

**Qualifications:** BEng MEng PhD

**Address:** Lvl 2, 2 Pacific Promenade, Pakenham, VIC 3810

**Email:** [admin@barrasons.com.au](mailto:admin@barrasons.com.au)

**Endorsed building engineer area of engineering:** Structural

**Endorsed building engineer registration no.:** PE0000600, RPEQ 22822

Signed:

*Andrew Barraclough*

Date of issue of certificate: 07/02/2024

This form is the approved form that must be used in accordance with section 10 of the *Building Act 1975* and sections 73 and 77 of the *Building Regulation 2021* (Design-specification certificate) stating that an aspect of building work or specification will, if installed or carried out as stated in this form, comply with the building assessment provisions.

Additional explanatory information is included in the Appendix at the end of this form.

<p><b>1. Property description</b></p> <p>This section need only be completed if details of street address and property description are applicable.</p> <p>E.g. in the case of (standard/generic) pool design/shell manufacture and/or patio and carport systems this section may not be applicable.</p> <p>Where applicable, the description must identify all land the subject of the application.</p> <p>The lot and plan details (e.g. SP/RP) are shown on title documents or a rates notice.</p> <p>If the plan is not registered by title, provide previous lot and plan details.</p>	<p>Street address <i>(include number, street, suburb/locality and postcode)</i></p> <p>.....</p> <p>..... State ..... Postcode .....</p> <p>Lot and plan details <i>(attach list if necessary)</i></p> <p>.....</p> <p>Local government area the land is situated in</p> <p>.....</p>
<p><b>2. Description of aspect/s certified</b></p> <p>Clearly describe the extent of work covered by this certificate, e.g. all structural aspects of the steel roof beams.</p>	
<p><b>3. Basis of certification</b></p> <p>Detail the basis for giving the certificate and the extent to which tests, specifications, rules, standards, codes of practice and other publications were relied upon.</p>	



<p><b>4. Reference documentation</b></p> <p>Clearly identify any relevant documentation, e.g. numbered structural engineering plans.</p>	
--	--

<p><b>5. Building certifier reference number and building development application number</b></p>	<p>Building certifier reference number</p> <p>.....</p> <p>Building development application number <i>(if available)</i></p> <p>.....</p>
--	---

<p><b>6. Appointed competent person details</b></p> <p>Under Part 6 of the Building Regulation 2021 a person must be assessed as a competent for the type of work (design-specification) by the relevant building certifier.</p>	<p>Name <i>(in full)</i></p> <p>.....</p> <p>Company name <i>(if applicable)</i> <span style="float: right;">Contact person</span></p> <p>.....</p> <p>Business phone number <span style="float: right;">Mobile number</span></p> <p>.....</p> <p>Email address</p> <p>.....</p> <p>Postal address</p> <p>.....</p> <p>..... State ..... Postcode .....</p> <p>Licence class or registration type <i>(if applicable)</i></p> <p>.....</p> <p>Licence or registration number <i>(if applicable)</i></p> <p>.....</p>
--	---

<p><b>7. Signature of appointed competent person</b></p> <p>This certificate must be signed by the individual assessed and appointed by the building certifier as competent to give design-specification help.</p>	<p>Signature <span style="float: right;">Date</span></p> <p style="text-align: center;"><i>Andrew Barraclough</i></p> <p>.....</p>
--	--

**LOCAL GOVERNMENT USE ONLY**

<b>Date received</b>		<b>Reference number/s</b>	
----------------------	--	---------------------------	--

## Appendix – explanatory information

**IMPORTANT NOTE:** it is an offence for a competent person to give a building certifier a document, including this form, that the person knows or reasonably suspects, is false or misleading.

**Who can complete this certificate?** (section 10 of the *Building Act 1975* (Building Act) and sections 73 and 77 of Building Regulation 2021 (BR 2021))

A building certifier can accept from a competent person (design-specification) a certificate stating that the competent person has assessed the building design or specification for the aspect of building work, and it will, if installed or carried out under the certificate, comply with the building assessment provisions, including any relevant standards and codes.

Schedule 10 of the BR 2021 defines *building design or specification* as any material, system, method of building or other thing related to the design of or specifications for building work.

When completing the certificate, a competent person is required under section 77 of the BR 2021 to include the basis for giving the certificate and state the extent to which the competent person has relied on tests, specifications, rules, standards, codes of practice or other publications.

**What is the purpose of this form?** (section 10 of the Building Act and sections 73 and 77 of the BR 2021)

The information in this form informs the building certifier's decision making when they are assessing a building development application, issuing the building development approval for the building work the subject of the certificate (form) and when amending the building development approval due to the receipt of updated aspect information such as glazing or truss specifications or revised excavation drawings.

**Can a manufacturer or supplier give this Form 15?**

A building certifier can accept this form from a manufacturer or supplier who the certifier has decided is a competent person (design-specification).

A manufacturer or supplier of building materials can give this form if they have undertaken the design component for the product. For example a window manufacturer who designs, constructs and supplies the windows to industry could give this form.

**Competent person** (section 10 of the Building Act 1975 and Part 6 of the BR 2021)

A building certifier must assess and decide to appoint an individual as a competent person before they can accept design-specification help.

When deciding whether a person can be a competent person, the building certifier must assess the person having regard to their experience, qualifications and skills and ensure the person holds a licence or registration if required.

The building certifier is required to keep detailed records about what was considered when appointing a competent person.

For further information about assessment of someone as a competent person refer to the **Guideline for the assessment of competent persons**.

**What is required if a manufacturer or supplier did not do the design work for the product?**

A manufacturer or supplier who is not part of the design process may give the construction contractor, builder, competent person or the building certifier evidence of suitability such as a product technical statement under Part A5 of the Building Code of Australia (BCA), for an aspect or material stating that it is compliant with the relevant reference documents in the BCA i.e. the applicable Australian Standard/s.

**What if there is not enough space for all the supporting material/documents?**

Items 2, 3 and 4 requires the competent person to clearly identify the extent of the assessment that was undertaken for aspect/s of work identified in this form.

For instance, there is provision for material such as specifications, standards, codes or other relevant publications to be referenced in the form. However, if the space in the form is not sufficient to accommodate all of this material, you can create and refer to additional material in an addendum or attachment to the form.

The form is also available in a Microsoft Word version, that you can download and edit to include additional material in the relevant parts of the form. Note that editing the form in the Microsoft Word version may cause the relevant boxes to expand and increase the length of the document. This is acceptable and does not change the approved form, provided the section text (description on the left-hand side of the page) is not altered.

**Appointed competent person (design or specification)** – (sections 34 and 36 of the BR 2021)

A building certifier must assess and decide to appoint an individual as a competent person before they can, as a competent person, give design-specification help. The building certifier is required to keep detailed records about what was considered when appointing a competent person.

A building certifier must be satisfied that an individual is competent to give the type of help having regard to the individual's experience, qualifications and skills and if required by law to hold a licence or registration, that the individual is appropriately registered or licensed.

An individual is appointed as competent to give design-specification help on or from a particular day.

For further information about assessment of someone as a competent person refer to the **Guideline for the assessment of competent persons**.

**PRIVACY NOTICE**

The Department of Energy and Public Works is collecting personal information as required under the *Building Act 1975*. This information may be stored by the Department, and will be used for administration, compliance, statistical research and evaluation of building laws. Your personal information will be disclosed to other government agencies, local government authorities and third parties for purposes relating to administering and monitoring compliance with the *Building Act 1975*. Personal information will otherwise only be disclosed to third parties with your consent or unless authorised or required by law.

# PERGOLA STRUCTURAL DRAWINGS

## 3400 / 3400M LOUVRE PERGOLA

### Sheet Index

Layout ID	Layout Name
S000	Title Sheet
S001	General Notes 1
S002	General Notes 2
S101	Pergola Isometric View
S111	Structural Details -1
S112	Structural Details -2
S113	Structural Details -3
S114	Structural Details -4

REV	STATUS	DRAWN	CHECKED	DATE
A	FOR CONSTRUCTION	F.N.	B.E.	07.02.24



TITLE:  
TITLE SHEET

PROJECT :  
PERGOLA STRUCTURAL DRAWINGS  
3400 / 3400M LOUVRE PERGOLA

JOB No: 2402054  
CLIENT: VORTEX LEISURE  
SCALE: NTS (A3)

DATE: 07.02.2024  
DRAWN: F.N.  
CHECKED: B.E.

DWG No: S000  
REVISION: REV A

**FOR  
CONSTRUCTION**

**GENERAL:**

- G1. ALL CONSTRUCTION WORK AND MATERIALS TO CONFORM WITH THE ENGINEER SPECIFICATION, AND CURRENT BUILDING CODE OF AUSTRALIA AND AUSTRALIAN STANDARDS.
- G2. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL MANUFACTURER'S SPECIFICATIONS AND INSTRUCTIONS.
- G3. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS, AND LEVELS SHOWN ARE A.H.D.(AUSTRALIAN HT. DATUM)
- G4. DRAWINGS ARE NOT TO BE SCALED.RELEVANT DIMENSIONS TO BE CONFIRMED ON SITE BY BUILDER BEFORE COMMENCEMENT OF WORKS.
- G5. ANY DISCREPANCIES OR QUERIES SHOULD BE REFERRED TO THE BARRASONS ENGINEERS FOR CLARIFICATIONS PRIOR TO COMMENCEMENT OF WORKS.
- G6. THE CONTRACTOR SHALL LIAISE WITH ANY BUILDING/PROPERTY OWNERS AS REQUIRED TO ENSURE MINIMAL DISRUPTIONS TO SERVICES.AND THAT SPECIAL REQUIREMENTS OF THE OWNERS ARE ADHERED TO.

- b. ROLLED FILL CONSISTS OF MATERIAL COMPACTED IN LAYERS BY REPEATED ROLLING WITH AN EXCAVATOR. ROLLED FILL SHALL NOT EXCEED 0.6m COMPACTED IN LAYERS NOT MORE THAN 0.3m THICK FOR SAND OR 0.3m COMPACTED IN LAYERS NOT MORE THAN 0.15m THICK FOR OTHER MATERIAL
- c. THE EXTENT OF CONTROLLED FILL AND ROLLED FILL REQUIRED SHALL BE DETERMINED ON SITE IN ACCORDANCE WITH SECTION 6 OF AS2870 AND SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR & BUILDER.
- F8. WHERE DEPTH OF CONTROLLED FILL IS THICKER THAN THAT SPECIFIED ABOVE, FILL MATERIAL SHALL BE SPREAD AND COMPACTED IN UNIFORM LAYERS NOT EXCEEDING 0.15m THICK. TOP SURFACE LAYER SHALL BE COMPACTED TO MINIMUM 98% STANDARD DRY DENSITY DETERMINED BY METHODS IN ACCORDANCE WITH AS1289. LOWER LAYERS SHALL BE COMPACTED TO 95% STANDARD DRY DENSITY. THE MOISTURE CONTENT OF THE FILL MATERIAL SHALL BE ADJUSTED TO WITHIN 2% OF THE OPTIMUM MOISTURE CONTENT DURING COMPACTION TO ENSURE THAT THE SPECIFIED COMPACTION IS OBTAINED. COMPACTION TESTS SHALL BE CARRIED OUT AT A RATE OF ONE TEST PER LAYER PER 100 SQUARE METRES OF FILL. TESTS ARE TO BE CARRIED OUT BY INDEPENDENT NATA REGISTERED LABORATORIES. SUBMIT REPORT TO THIS OFFICE FOR APPROVAL.

**FOOTINGS AND SLAB ON GROUND**

- F1. ALL WORK AND MATERIALS TO COMPLY WITH AS2870.
- F2. ALL FOOTINGS SHALL BE FOUNDED ON FIRMED SOIL. PRIOR TO COMMENCING WORK, THE BUILDER IS TO FAMILARISE THE CONTENT OF THE SOIL REPORT PREPARED BY: ...  
REPORT No.: ... DATED: ...  
FOOTING DEPTHS SPECIFIED ON THE DRAWINGS ARE MINIMUM DIMENSIONS ONLY. IF NOT SHOWN, REFER TO THE SOIL REPORT FOR THE REQUIRED FOUNDING DEPTH.
- F3. THE SITE HAS BEEN CLASSIFIED AS CLASS- ' IN ACCORDANCE WITH AS 2870.
- F4. STRIP / PAD FOOTINGS ARE TO BE FOUNDED ON ORIGINAL UNDISTURBED GROUND WITH AN ALLOWABLE BEARING CAPACITY OF - kPa.
- F5. EDGE BEAMS AND LOAD BEARING RIBS SHALL BE FOUNDED ON UNDISTURBED GROUND WITH AN ALLOWABLE BEARING CAPACITY OF - kPa. THE INTERNAL SLAB & NON-LOAD BEARING RIBS SHALL BE FOUNDED ON SOIL WITH MINIMUM BEARING CAPACITY OF - kPa.
- F6. ALL ORGANIC MATERIAL SHALL BE REMOVED FROM THE AREA BENEATH THE SLABS ON GROUND. THE GROUND SHALL BE PROOF ROLLED WITH A 3 TONNE ROLLER PRIOR TO PLACING COMPACTED FILL. ANY SOFT SPOTS SHALL BE DUG OUT AND REPLACED WITH COMPACTED CRUSHED ROCK OR 15MPa BLINDING CONCRETE. IN ACCORDANCE WITH AS2870 AND AS3798.
- F7. UNLESS OTHERWISE SPECIFIED IN THE SOIL REPORT, FILLING USED IN THE CONSTRUCTION OF THE SLAB EXCEPT WHERE THE SLAB IS SUSPENDED SHALL CONSIST OF CONTROLLED FILL OR ROLLED FILL AS FOLLOWS:  
a. CONTROLLED FILL IS MATERIAL THAT HAS BEEN PLACED AND COMPACTED IN LAYERS BY COMPACTION EQUIPMENT WITHIN DEFINED DENSITY REQUIREMENT. EXCEPT AS PROVIDED BELOW, CONTROLLED FILL SHALL BE PLACED IN ACCORDANCE WITH AS 3798.  
SAND FILL UP TO 0.8m DEEP, WELL COMPACTED IN NOT MORE THAN 0.3m THICK LAYERS BY A VIBRATING PLATE OR VIBRATING ROLLER, SHALL BE DEEMED TO COMPLY WITH THIS REQUIREMENT. A SATISFACTORY TEST FOR SAND FILL NOT CONTAINING GRAVEL SIZED MATERIAL IS THE ACHIEVEMENT OF A BLOW COUNT OF 7 OR MORE PER 0.3m USING THE PENETROMETER TEST DESCRIBED IN AS 1289.6.3.3.  
NON-SAND FILL UP TO 0.4m DEEP, WELL COMPACTED IN NOT MORE THAN 0.15m LAYERS BY A MECHANICAL ROLLER SHALL BE DEEMED TO COMPLY WITH THIS REQUIREMENT. CLAY FILL SHALL BE MOIST DURING COMPACTION.

- F9. FOUNDATIONS SHALL BE INSPECTED AND APPROVED BY THE ENGINEER OR BUILDING INSPECTOR BEFORE LAYING MEMBRANES AND POURING CONCRETE. IF AN UNUSUAL GROUND CONDITION IS ENCOUNTERED DURING THE SITE EXCAVATION, REPORT TO THIS OFFICE FOR RESOLUTION.
- F10. NO EXCAVATION IS TO BE TAKEN BELOW THE BASE OF ADJACENT / EXISTING FOOTINGS. IF IT IS UNAVOIDABLE, FOR THE CASE OF NEW FOOTINGS, BLINDING CONCRETE GRADE 15MPa SHALL BE PROVIDED BENEATH THE NEW FOOTING AND FOUNDING BELOW ANGLE OF REPOSE. FOR THE CASE OF EXISTING FOOTINGS, UNDERPINNING IS REQUIRED. REFER TO THIS OFFICE FOR DETAILS.
- F11. ALL FOUNDATIONS ARE TO BE FREE OF WATER AND LOOSE MATERIAL
- F12. OVER EXCAVATION IS TO BE FILLED TO THE UNDERSIDE OF FOOTINGS WITH 15MPa BLINDING CONCRETE
- F13. TERMITES PROTECTION SHALL BE PROVIDED AS REQUIRED BY AUSTRALIAN STANDARD AND THE LOCAL STATUTORY AUTHORITY.
- F14. A 0.2mm POLYTHENE MEMBRANE SHALL BE CONTINUOUS UNDER SLAB AND RIBS LAPPED 200mm MINIMUM WHERE REQUIRED AND TAPED AT ALL SERVICE PENETRATIONS, LAPS AND PUNCTURES. THE MEMBRANE IS TO EXTEND UNDER AND TO THE SIDES OF SLABS, BEAMS AND THICKENINGS.
- F15. EXCAVATIONS NEAR THE BUILDING EDGE SHALL BE BACKFILLED IN SUCH A MANNER TO PREVENT READY ACCESS OF WATER TO THE FOUNDATIONS
- F16. SYMBOLS ON THE DRAWING FOR REINFORCEMENT ARE AS FOLLOWS :  
Y GRADE 400MPa DEFORMED REINFORCING BARS TO AS 1302.  
N GRADE 500MPa DEFORMED REINFORCING BARS, DUCTILITY CLASS N TO AS 4671  
R GRADE 250MPa PLAIN REINFORCING BARS TO AS 1302  
TM HARD-DRAWN STEEL TRENCH MESH, GRADE 500 DUCTILITY CLASS L TO AS 4671  
RL RECTANGULAR RIB MESH GRADE 500 DUCTILITY CLASS L TO AS 4671  
SL SQUARE RIB MESH GRADE 500 DUCTILITY CLASS L TO AS 4671
- F17. FABRIC SHALL BE PLACED NEAR THE TOP OF THE SLAB AND SHALL HAVE A NOMINAL COVER OF 25mm U.N.O.

- F18. REINFORCEMENT FABRIC SHALL BE LAPPED SO THAT EACH PAIR OF TRANSVERSE WIRES AT THE EDGE OF ONE SHEET OVERLAPS EACH CORRESPONDING PAIR OF TRANSVERSE WIRES OF THE SHEET BEING LAPPED. REINFORCEMENT SHALL BE SUPPORTED IN POSITION PRIOR TO CONCRETING COMMENCING ON DENSE PRECAST CONCRETE SPACER BLOCKS OR BAR CHAIRS ON GALVANIZED STEEL DISHES (EITHER OF WHICH MUST NOT DAMAGE THE MEMBRANE) AT 900mm MAXIMUM CENTRES EACH WAY TRAMPING IN FABRIC IS NOT PERMITTED
- F19. BEAM AND STRIP FOOTING REINFORCEMENT SHALL HAVE A NOMINAL COVER OF 50mm.
- F20. TRENCH MESH SHALL BE LAID CONTINUOUSLY AND SHALL BE SPLICED WHERE NECESSARY WITH A MINIMUM LAP OF 500mm
- F21. TRENCH MESH SHALL BE OVERLAPPED BY THE WIDTH OF FABRIC AT CORNERS AND INTERSECTIONS. THE ENDS OF TRENCH MESH SHALL TERMINATE WITH A CROSSBAR.
- F22. PROVIDE 2N12 x 1200 BARS OR EQUIVALENT TRENCH MESH x 2000 LONG DIAGONALLY ACROSS RE-ENTRANT CORNERS OF SLAB AND TIED TO UNDERSIDE OF TOP FABRIC.
- F23. CONCRETE STRENGTH IS TO BE  $f_c = 25\text{MPa}$ , WITH 65 MAX. SLUMP, COMPACTED USING MECHANICAL VIBRATION. SLAB & RIBS ARE TO BE CAST IN ONE CONTINUOUS POUR AND THE SLAB IS TO BE STEEL-FLOAT FINISHED
- F24. ALL CONCRETE IS TO BE CONTINUOUSLY WET-CURED FOR 7 DAYS.
- F25. THE GROUND SURROUNDING SLABS SHALL HAVE THE SURFACE AT LEAST 150mm LOWER THAN THE SLAB AND BE SLOPED AWAY FROM THE SLAB EDGE SO THAT WATER WILL DISCHARGE TO SUITABLE DRAINAGE POINTS AND NOT FLOOD THE SLAB SURFACE.
- F26. HOT WATER HEATING PIPES MAY BE EMBEDDED IN THE SLAB PROVIDED THAT THE SLAB THICKNESS IS INCREASED BY 25mm AND LAID ON ADDITIONAL SL52 MESH.

C11 MINIMUM COVER TO ALL REINFORCEMENT INCLUDING FITMENTS SHALL BE AS FOLLOWS, U.N.O:

ELEMENT	FORMED AND NOT EXPOSED TO WEATHER	FORMED ON GROUND & EXPOSED TO WEATHER	NOT FORMED. CAST AGAINST GROUND
INSITU COLUMN & PEDESTALS	40	50	75
INSITU BEAMS	40	50	65
FOOTINGS	-	50	75
PIERS	-	50	75
SLABS ON GROUND	20	30	65
SUSPENDED SLABS	20	30	65
INSITU WALLS	25	30	65
PRECAST WALLS	25	30	65
UNDERPINNING	-	50	75

- C12 REINFORCEMENT IS SHOWN DIAGRAMMATICALLY AND NOT IN TRUE PROJECTION.
- C13 SYMBOLS ON THE DRAWING FOR REINFORCEMENT ARE AS FOLLOWS:  
Y GRADE 400MPa DEFORMED REINFORCING BARS TO AS1302  
N GRADE 500MPa DEFORMED REINFORCING BARS, DUCTILITY CLASS N TO AS 4671  
R GRADE 250MPa PLAIN REINFORCING BARS TO AS1302  
W HARD-DRAWN STEEL REINFORCING WIRE, GRADE 500 DUCTILITY CLASS L TO AS 4671  
TM HARD-DRAWN STEEL TRENCH MESH, GRADE 500 DUCTILITY CLASS L TO AS 4671  
RL RECTANGULAR RIB MESH GRADE 500 DUCTILITY CLASS L TO AS 4671  
SL SQUARE RIB MESH GRADE 500 DUCTILITY CLASS L TO AS 4671
- C14 ALL REINFORCEMENT AND INSERTS SHALL BE SUPPORTED AND HELD IN THE DESIGN LOCATION BY APPROVED BAR CHAIRS, SPACERS OR TIES. BAR CHAIRS SHALL BE PLACED AT MINIMUM 1000 CENTRES IN TWO DIRECTIONS U.N.O.
- C15 WELDING AND THREADING OF REINFORCEMENT IS NOT PERMITTED WITHOUT THE APPROVAL OF THE ENGINEER.
- C16 REINFORCEMENT SHALL BE EVENLY DISTRIBUTED OVER THE WIDTHS SHOWN U.N.O.
- C17 PROVIDE 2-N12 x 1200 BARS DIAGONALLY ACROSS RE-ENTRANT CORNERS OF SLABS, TIED UNDER THE TOP FABRIC. U.N.O.
- C18 AT SLAB EDGES INCLUDING CONSTRUCTION AND OTHER JOINTS, AT LEAST ONE REINFORCING BAR OR FABRIC WIRE SHALL BE LOCATED PARALLEL TO AND WITHIN 75mm OF THE SLAB EDGE.
- C19 CONSTRUCTION JOINTS SHALL BE PROPERLY FORMED AND USED ONLY WHERE APPROVED OR PERMITTED BY THE ENGINEER.
- C20 SAWN JOINTS SHALL BE MADE AT A TIME APPROPRIATE TO THE CONCRETE MIX AND CLIMATIC CONDITIONS, GENERALLY BETWEEN 10 AND 20 HOURS OF PLACING THE CONCRETE.
- C21 STRIPPING OF FORMS AND REMOVAL OF FORMWORK SHALL TAKE PLACE IN ACCORDANCE WITH A PROCEDURE AGREED TO BY THE ENGINEER.
- C22 CONCRETE MUST BE SEPARATED FROM SUPPORTING MASONRY WORK BY TWO LAYERS OF A SUITABLE DE-BONDING MEMBRANE.
- C23 SUSPENDED SLABS SHALL BE GIVEN AN UPWARD MID-SPAN CAMBER OF 3mm PER 1000mm U.N.O. BEAMS SHALL BE AS SHOWN ON DRAWINGS.
- C24 SPLICES IN REINFORCEMENT SHALL BE MADE IN THE POSITIONS SHOWN ON THE DRAWINGS OR AS OTHERWISE APPROVED BY THE ENGINEER.
- C25 HOLDING-DOWN BOLTS SHALL BE SUPPLIED TO THE CONCRETOR FOR CASTING INTO THE CONCRETE AND SHALL BE INSTALLED IN ACCORDANCE WITH THE STEEL HOLDING-DOWN BOLT PLAN.

**CONCRETE:**

- C1 ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH AS3600.
- C2 UNLESS OTHERWISE SHOWN THE MINIMUM 28 DAY COMPRESSIVE STRENGTH OF CONCRETE SHALL BE AS FOLLOWS:

ELEMENT	CONC. STRENGTH (f <sub>c</sub> ) MPa	SLUMP mm
FOOTINGS	25	75
SLAB-ON-GROUND	32	65
COLUMNS	32	80
WALLS	40	85
SUSPENDED SLABS & BEAMS	32	80
MASS CONCRETE	15	-

- C3 CONCRETE SHALL BE CURED BY AN APPROVED METHOD FOR AT LEAST 7 DAYS AFTER PLACEMENT.
- C4 CONCRETE SHALL BE COMPACTED USING MECHANICAL VIBRATION.
- C5 VIBRATION OF FORMS IS NOT ACCEPTABLE AND CONCRETE SHALL NOT BE SPREAD BY VIBRATING.
- C6 CONCRETE SECTIONS SHOWN ARE MINIMUM SIZES AND DO NOT INCLUDE FINISHES. SIZES SHALL NOT BE REDUCED IN ANY WAY OR HOLES FORMED OR MADE IN DEPTH OF BEAMS ARE GIVEN FIRST AND INCLUDE SLAB THICKNESS
- C7 SLABS AND BEAMS ARE TO BE POURED CONCURRENTLY U.N.O. AND FINISHED WITH A STEEL FLOAT.
- C8 POOL PAVERS CONCRETE AND MASONRY PAVERS SURROUNDING POOLS TO BE CONSTRUCTED TO REQUIREMENTS OF AS3727.1-2016, PAVEMENTS, PART 1: RESIDENTIAL.
- C9 RECOMMENDED CONCRETE SLAB TO BE 150MM THICK, CONCRETE GRADE N32, SL82 REINFORCEMENT WITH 30MM COVER TO THE TOP SURFACE AND 40MM SIDE COVER.MINIMUM SOIL ALLOWABLE BEARING CAPACITY TO BE 100KPA.

REV	STATUS	DRAWN	CHECKED	DATE
A	FOR CONSTRUCTION	F.N.	B.E.	07.02.24



TITLE:  
**GENERAL NOTES-1**

PROJECT :  
**PERGOLA STRUCTURAL DRAWINGS  
3400 / 3400M LOUVRE PERGOLA**

JOB No: **2402054**  
DATE: **07.02.2024**  
CLIENT: **VORTEX LEISURE**  
DRAWN: **F.N.**  
SCALE: **NTS (A3)**  
CHECKED: **B.E.**

DWG No: **S001**  
REVISION: **REV A**

**FOR CONSTRUCTION**

## STRUCTURAL STEELWORK:

- S1 ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH AS 4100.
- S2 ALL STEEL SHALL BE NEW AND FREE FROM WELDS AND BLEMISHES UNLESS APPROVED BY THE ENGINEER.
- S3 FABRICATION AND ERECTION SHALL BE IN ACCORDANCE WITH AS 4100 AND SAA/SNZ HB62.
- S4 HOT-ROLLED AND WELDED PRODUCTS SHALL BE BHP-300PLUS AND PLATE SHALL BE GRADE 250 U.N.O.
- S5 ALL WELDING SHALL BE IN ACCORDANCE WITH AS 1554.
- S6 WELD TYPES ARE DESIGNATED AS FOLLOWS  
CFW - CONTINUOUS FILLET WELD  
FPBW - FULL PENETRATION BUTT WELD  
PPBW - PARTIAL PENETRATION BUTT WELD
- S7 ALL WELDS SHALL BE 6mm CONTINUOUS FILLET, CATEGORY GP, USING E41XX/W40X CONSUMABLES U.N.O.
- S8 WELDING SHALL BE PERFORMED BY AN EXPERIENCED OPERATOR IN ACCORDANCE WITH AS 1554 INSPECTED & CERTIFIED BY QUALIFIED PERSONNEL IN ACCORDANCE WITH AS2214
- S9 ALL HIGH-STRENGTH STRUCTURAL BOLTS SHALL BE M20 GRADE 8.8/S U.N.O. IN ACCORDANCE WITH AS 1252
- S10 HOLDING-DOWN BOLTS SHALL BE M20 GRADE 4.6/S, GALVANISED U.N.O
- S11 BOLTS MUST BE OF SUFFICIENT LENGTH TO HAVE AT LEAST ONE FULL THREAD EXPOSED AFTER TIGHTENING
- S12 BOLTS IN OVERSIZE OR SLOTTED HOLES ARE TO HAVE SUITABLE LARGER SIZE WASHERS
- S13 CONNECTIONS NOT SPECIFICALLY DETAILED SHALL BE IN ACCORDANCE WITH THE APPROPRIATE CONNECTION AS DETAILED IN THE AISC STANDARDISED STRUCTURAL CONNECTIONS MANUAL.
- S14 UNLESS NOTED OTHERWISE CONNECTIONS BETWEEN 2 STRUCTURAL STEEL MEMBERS ARE TO HAVE MINIMUM 2M20 8.8/S BOLTS IN 220mm HOLES
- S15 BOLT TYPES AND BOLTING PROCEDURE ARE DESIGNATED AS FOLLOWS  
4.6/S - COMMERCIAL BOLTS TO AS 1111, SNUG TIGHTENED  
8.8/S - HIGH STRENGTH STRUCTURAL BOLTS, NUTS AND HARDENED WASHERS TO AS 1252, SNUG TIGHTENED  
8.8/TB - HIGH STRENGTH STRUCTURAL BOLTS AS ABOVE, FULLY TENSIONED TO AS 1511 IN A BEARING TYPE JOINT  
8.8/TF - HIGH STRENGTH STRUCTURAL BOLTS AS ABOVE, FULLY TENSIONED TO AS 1511 IN A FRICTION TYPE JOINT
- S16 FULLY TENSIONED BOLTS ARE TO BE INITIALLY SNUG TIGHTENED, CONNECTING PLATES ADJUSTED TO FULL CONTACT, THEN TIGHTEN BOLTS TO AN ADDITIONAL HALF TURN IN ACCORDANCE WITH AS 4100  
ALTERNATIVELY PROVIDE LOAD INDICATING WASHERS AND INSTALL CONNECTIONS IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS AND AS 4100
- S17 ALL CLEAT PLATES AND STIFFENERS SHALL BE 10mm THICK U.N.O.
- S18 THE ENDS OF ALL TUBULAR MEMBERS SHALL BE SEALED WITH A 3mm PLATE U.N.O.
- S19 TUBULAR MEMBERS TO BE GALVANISED SHALL BE ADEQUATELY VENTED.
- S20 PURLINS AND GIRTS INCLUDING LATERAL AND BUCKLING RESTRAINING MEMBERS SUCH AS BRIDGING, STRUTS AND TIE RODS SHALL BE IN ACCORDANCE WITH AS/NZS 4600, GALVANISED AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS
- S21 BEFORE COMMENCING FABRICATION 3 COPIES OF THE SHOP DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW. THIS REVIEW DOES NOT INCLUDE CHECKING OF DIMENSIONS.
- S22 CAMBER SHALL BE AS NOTED ON THE DRAWINGS.
- S23 STRUCTURAL STEEL TO BE CONCRETE ENCASED SHALL BE WRAPPED WITH F41 MESH. THE GAP BETWEEN THE STRUCTURAL STEEL AND THE MESH AND AND THE THE EXTERNAL COVER TO THE MESH SHALL BE 25mm AND 50mm RESPECTIVELY.

- S24 ALL BOLTS AND STRUCTURAL STEEL EXPOSED TO THE WEATHER SHALL BE HOT-DIP GALVANISED U.N.O. PAINT SYSTEMS TO GALVANISED STEEL TO BE AS SPECIFIED BY THE ARCHITECT
- S25 ALL STEEL LINTELS SUPPORTING MASONRY EXPOSED TO THE WEATHER SHALL BE HOT-DIP GALVANISED.
- S26 PROVIDE ALL NECESSARY CLEATS AND HOLES REQUIRED TO FIX TIMBER AND OTHER MATERIALS AND FINISHES TO THE STEELWORK.
- S27 LINTELS SHALL NOT BE PROPPED DURING LOAD APPLICATION U.N.O.
- S28 THE CONTRACTOR SHALL PROVIDE AND LEAVE IN PLACE UNTIL PERMANENT BRACING ELEMENTS ARE CONSTRUCTED, SUCH TEMPORARY BRACING AS IS NECESSARY TO ADEQUATELY STABILIZE THE STRUCTURE DURING ERECTION.
- S29 PROVIDE 150mm MINIMUM END BEARING WITH 20mm NOM. LEVELLING GROUT U.N.O. TO STEELWORK SEATED ON MASONRY. CHARACTERISTIC COMPRESSIVE STRENGTH OF GROUT IS 30MPa
- S30 PROTECTIVE COATINGS TO INTERNAL STEELWORK (U.N.O.):  
PREPARATION: CLASS 2A ABRASIVE BLAST  
COATING:  
FIRST COAT INORGANIC ZINC SILICATE  
75 DRY FILM THICKNESS  
SECOND COAT ACRYLIC PAINT  
50 DRY FILM THICKNESS  
THIRD COAT ACRYLIC PAINT  
50 DRY FILM THICKNESS  
CONCRETE ENCASED AND FIRE-SPRAYED MEMBERS, AND FRICTION-GRIP BOLTED CONNECTIONS MUST NOT BE PAINTED. U.N.O.
- S31 COATINGS DAMAGED DURING TRANSPORT AND ERECTION OR BY WELDING SHALL BE MADE GOOD AFTER BEING WIRE-BRUSHED CLEAN, AND RECOATED AS ABOVE.
- S32 REFER TO ARCHITECTURAL DRAWINGS FOR ALL ADDITIONAL PLATES, ANGLES ETC. AS REQUIRED FOR FIXINGS TO INTERNAL PARTITIONS, BLOCKING, WINDOW FRAMES, ARCHITECTURAL FEATURES ETC
- S33 PROVIDE ALL NECESSARY TRIMMING ANGLES AND FIXINGS TO SUPPORT CLADDING AND FLASHINGS AT ROOF OR WALL INTERSECTIONS
- S34 PROVIDE ALL NECESSARY SUBFRAMES AND TRIMMERS FOR MECHANICAL AND ELECTRICAL EQUIPMENT AND ARCHITECTURAL FEATURES
- S35 SUPPORT ROOF BRACING FROM EVERY SECOND PURLIN WITH HOOK BOLTS

## SPA MANUFACTURE :

- CONSTRUCTION SEQUENCE :
- STEP 1. VACUUM FORM USING 4.75, ARISTECH ACRYLIC SHEET
- STEP 2. FIRST COATING 1.5MM - 2MM USING APPROX. 40:60 RATIO ( GLASS TO .... RESIN )  
FIBERGLASS PRAY UP ROVING : 110P VINYL ESTER RESIN CATALYST M50 (1.8% - 2%)
- STEP 3. OVER CURE AT 35-40 DEGREES CELSIUS
- STEP 4. SECOND COATING 4MM - 8MM USING APPROX. 40:60 RATIO (GLASS TO RESIN)  
FIBERGLASS PRAY UP ROVING : 290P POLYESTER RESIN CATALYST 388 (1.8% - 2%)  
CALCIUM CARBONATE FILLER ON SECOND LAYER

### NOTES :

SWIMMING POOL AND SPA SAFETY TO FOLLOW THE GUIDELINES OF PN-05-2018 PUBLISHED BY VBA.

BARRIERS AND LOCATION OF BARRIERS TO BE DESIGNED TO REQUIREMENTS OF AS 1926.1-2012 AND AS 1926.2-2007, SWIMMING POOL SAFETY - SAFETY BARRIERS FOR SWIMMING POOLS.

DESIGN AND INSTALL POOLS AND SPAS MANUFACTURED FROM FIBRE-REINFORCED PLASTIC MATERIALS, WITH VOLUMES EXCEEDING 7500 AND DEPTHS GREATER THAN 750MM, TO REQUIREMENTS OF AS/NZS 1838:1994, SWIMMING POOLS - PREMOULDED FIBRE-REINFORCED DESIGN AND FABRICATION.

REV	STATUS	DRAWN	CHECKED	DATE
A	FOR CONSTRUCTION	F.N.	B.E.	07.02.24



TITLE:  
GENERAL NOTES-2

PROJECT :  
PERGOLA STRUCTURAL DRAWINGS  
3400 / 3400M LOUVRE PERGOLA

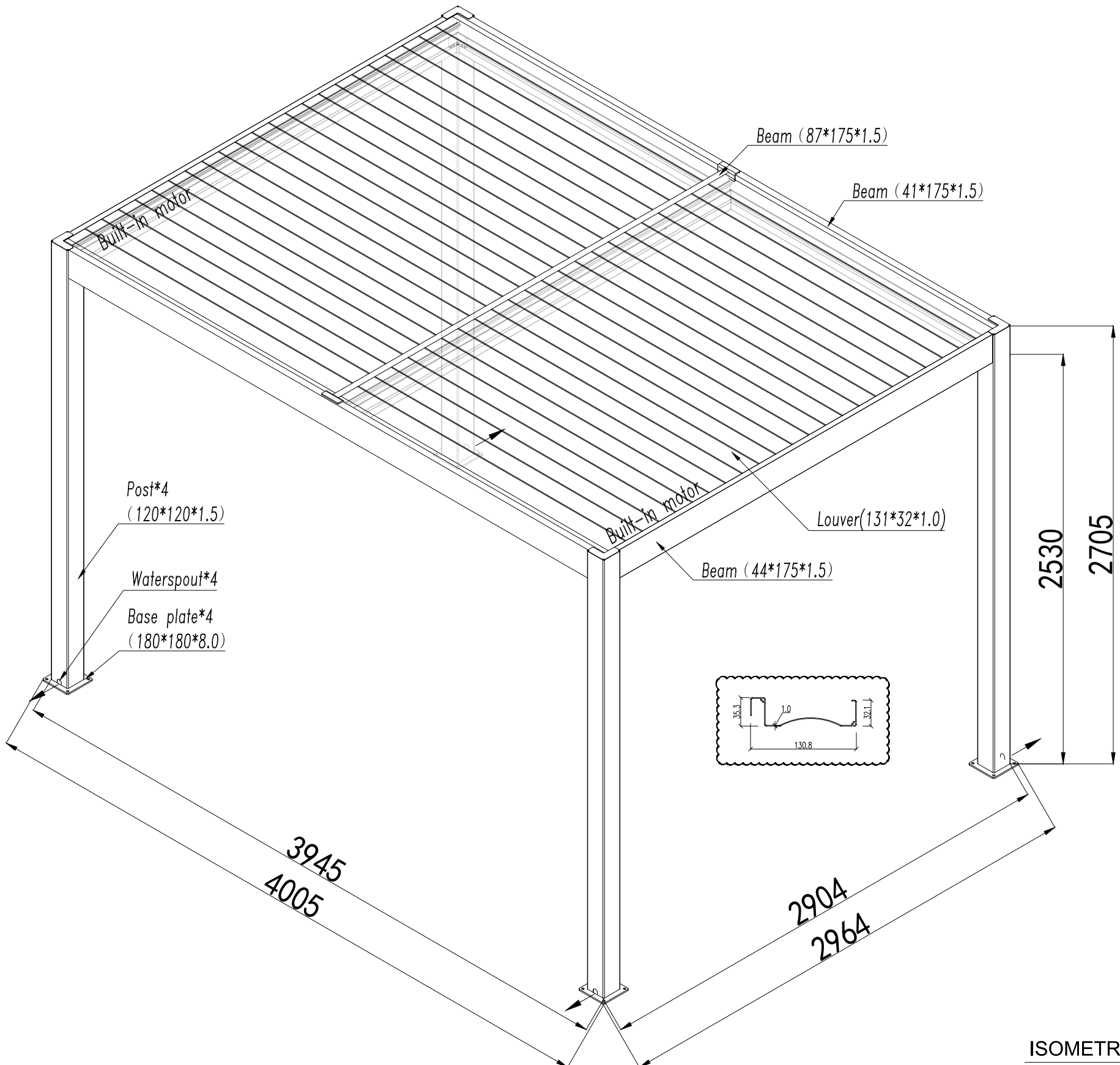
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CLIENT: VORTEX LEISURE  
SCALE: NTS (A3)

DATE: 07.02.2024  
DRAWN: F.N.  
CHECKED: B.E.

DWG No: S002  
REVISION: REV A

**FOR  
CONSTRUCTION**

# Motorized pergola Sized 3945mm Length x 2904mm Projection x 2705mm Height



ISOMETRIC VIEW

REV	STATUS	DRAWN	CHECKED	DATE
A	FOR CONSTRUCTION	F.N.	B.E.	07.02.24



TITLE:  
PERGOLA ISOMETRIC VIEW

PROJECT :  
PERGOLA STRUCTURAL DRAWINGS  
3400 / 3400M LOUVRE PERGOLA

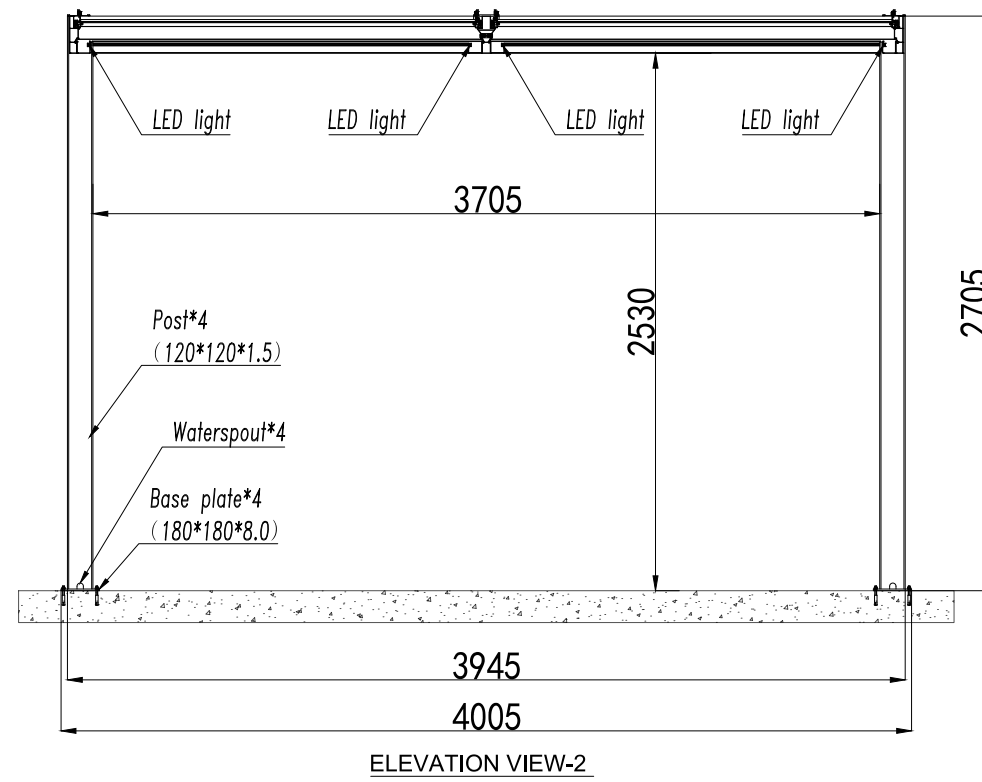
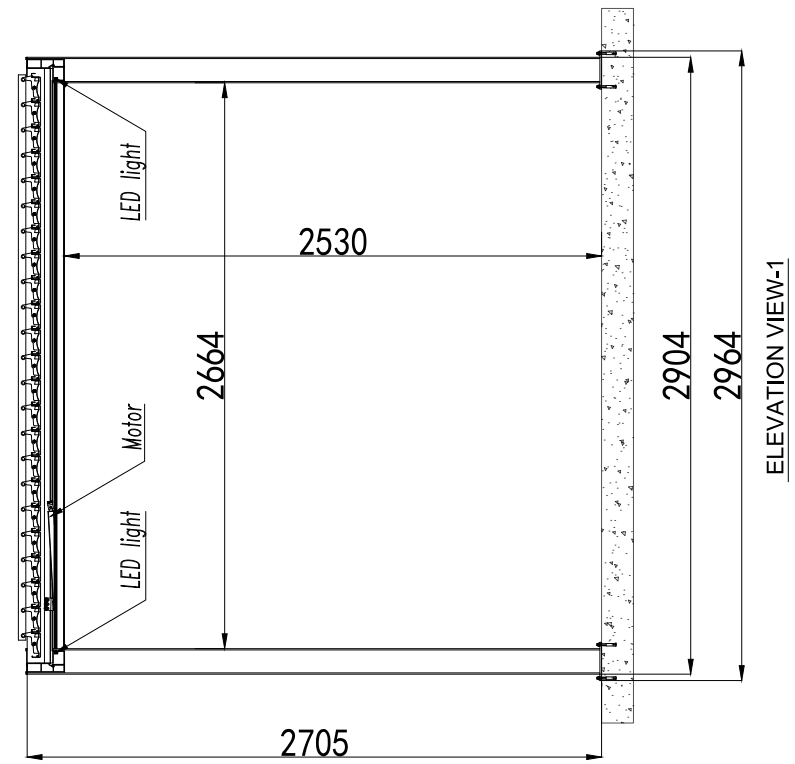
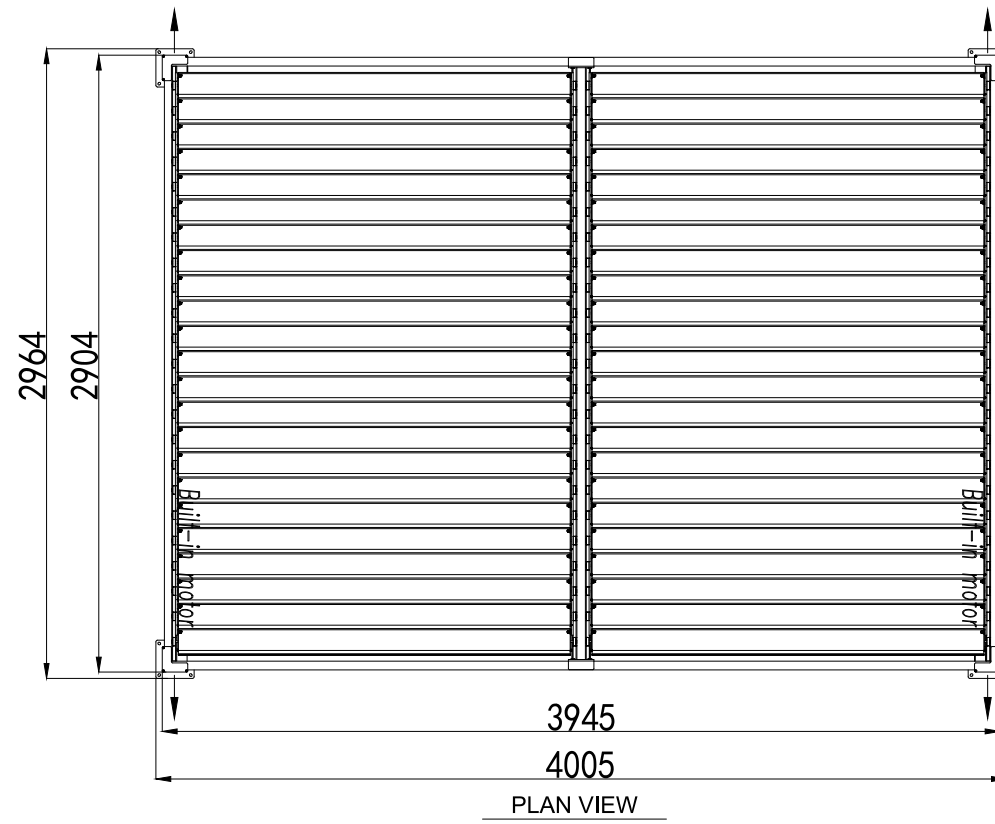
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CLIENT: VORTEX LEISURE  
SCALE: NTS (A3)

DATE: 07.02.2024  
DRAWN: F.N.  
CHECKED: B.E.

DWG No: S101  
REVISION: REV A

**FOR CONSTRUCTION**

# Motorized pergola Sized 3945mm Length x 2904mm Projection x 2705mm Height



REV	STATUS	DRAWN	CHECKED	DATE
A	FOR CONSTRUCTION	F.N.	B.E.	07.02.24



TITLE:  
**STRUCTURAL DETAILS -1**

PROJECT :  
**PERGOLA STRUCTURAL DRAWINGS**  
**3400 / 3400M LOUVRE PERGOLA**

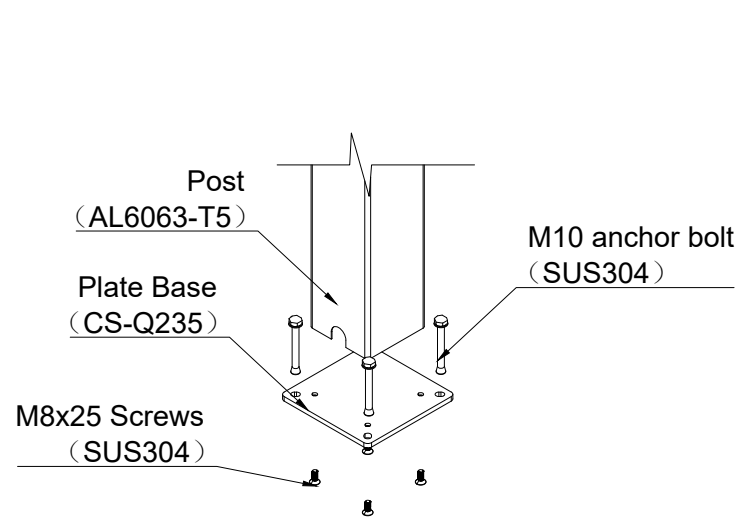
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DATE: 07.02.2024  
 DRAWN: F.N.  
 CHECKED: B.E.

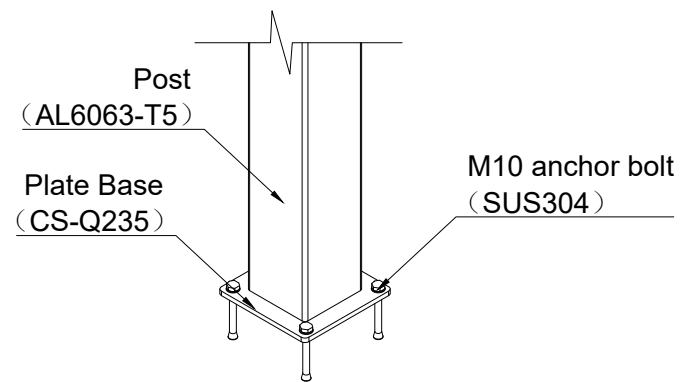
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 REVISION: **REV A**

**FOR CONSTRUCTION**

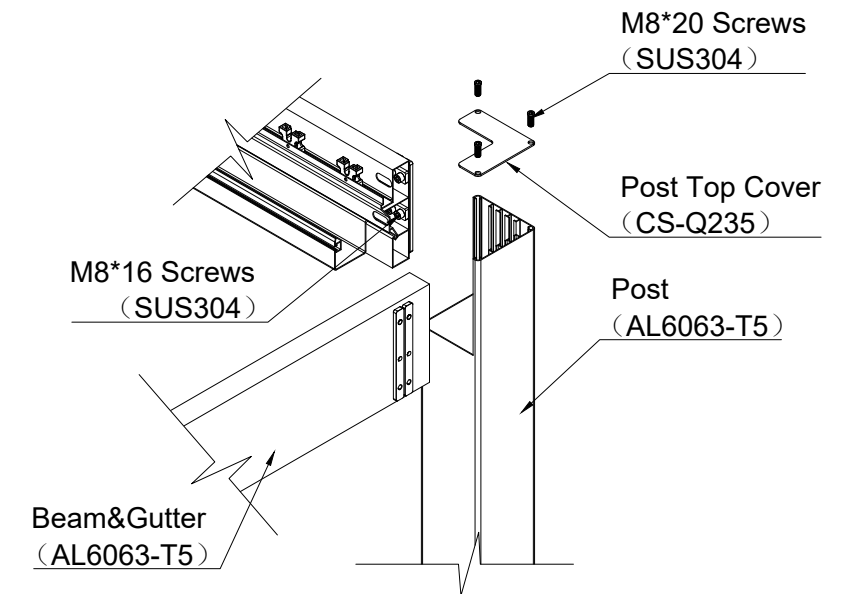




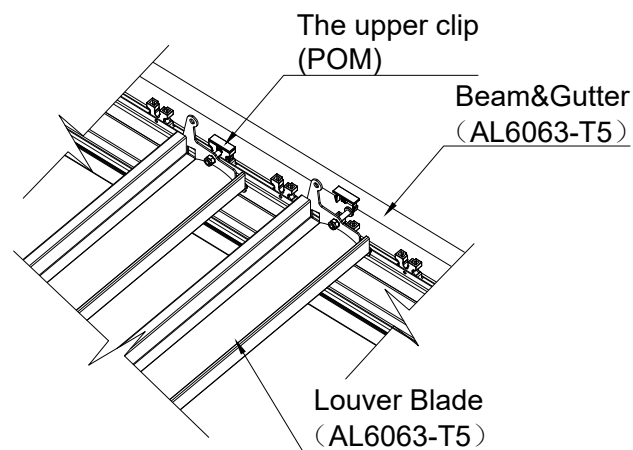
1  
5 Connection of Post and Plate base



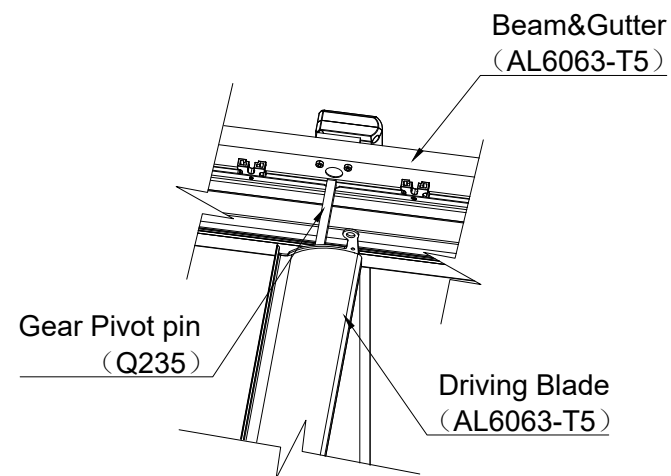
2  
5 The connection between the base and the ground



3  
5 Connection of Post and Beam



4  
5 Connection of blade and beam



5  
5 Connection of blade and Crank Mechanism

REV	STATUS	DRAWN	CHECKED	DATE
A	FOR CONSTRUCTION	F.N.	B.E.	07.02.24



TITLE:  
STRUCTURAL DETAILS -2

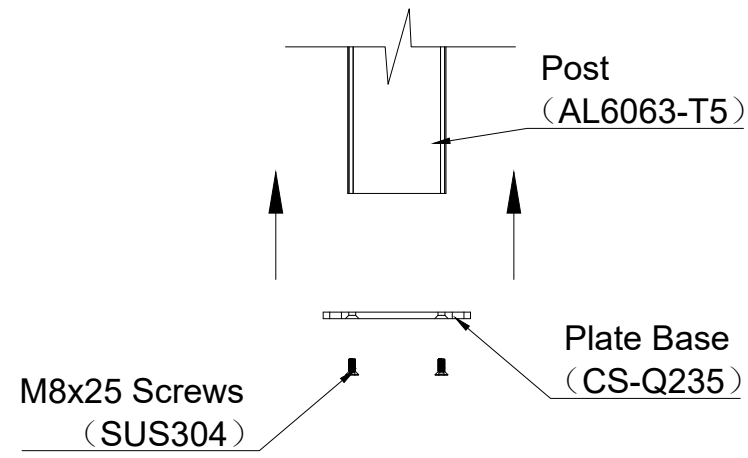
PROJECT :  
PERGOLA STRUCTURAL DRAWINGS  
3400 / 3400M LOUVRE PERGOLA

JOB No: 2402054  
CLIENT: VORTEX LEISURE  
SCALE: NTS (A3)

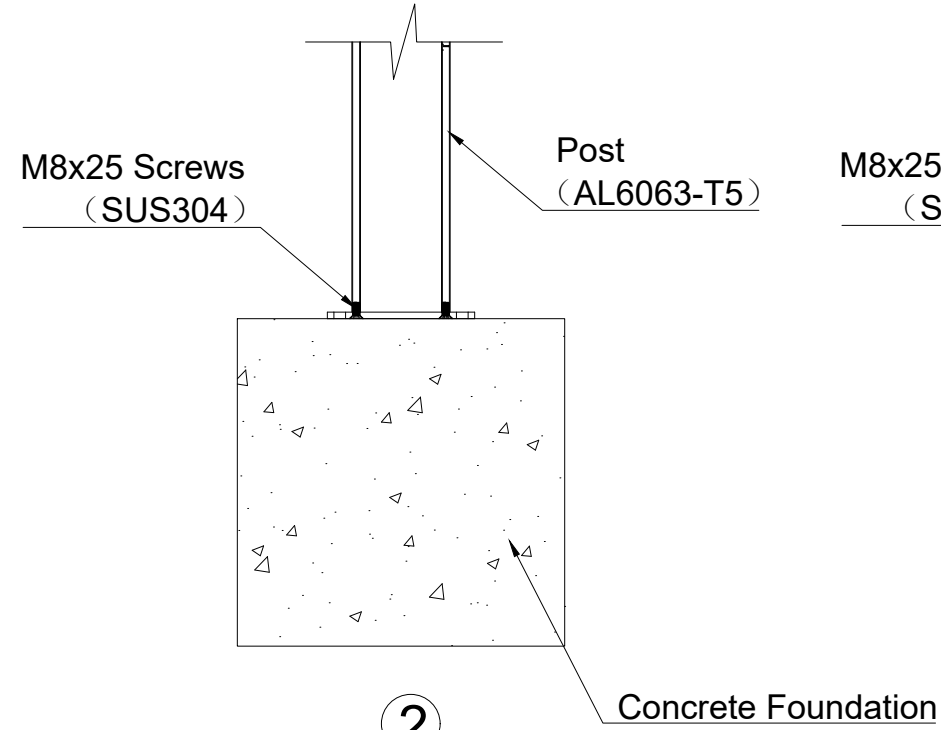
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CHECKED: B.E.

DWG No: S112  
REVISION: REV A

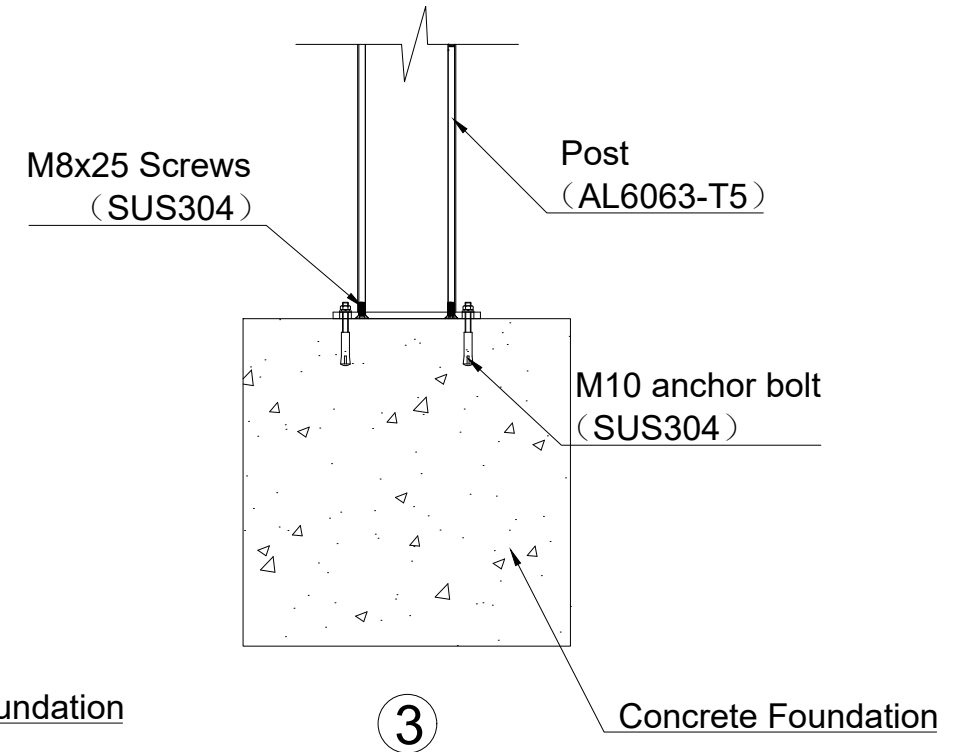
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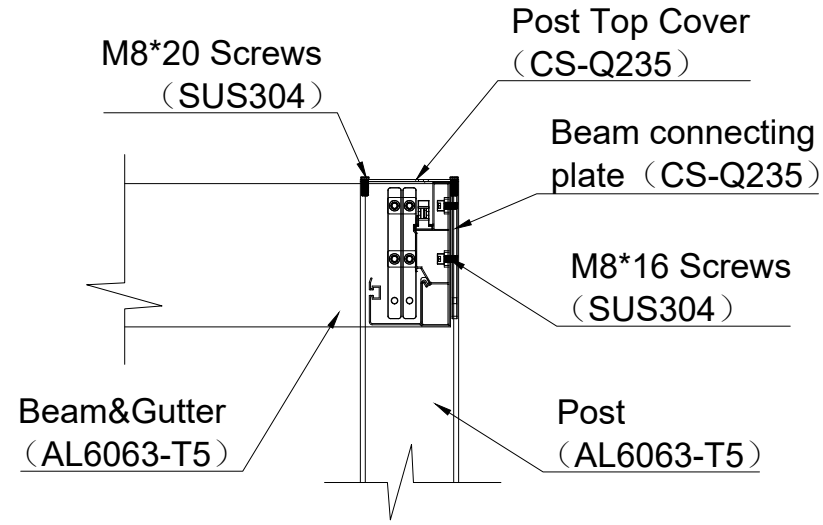
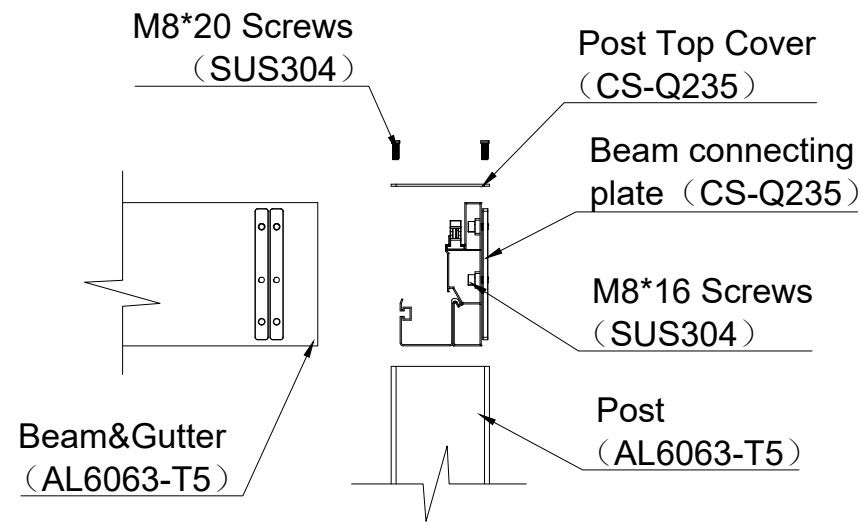
1



2



3



4

REV	STATUS	DRAWN	CHECKED	DATE
A	FOR CONSTRUCTION	F.N.	B.E.	07.02.24



TITLE:  
STRUCTURAL DETAILS -3

PROJECT :  
PERGOLA STRUCTURAL DRAWINGS  
3400 / 3400M LOUVRE PERGOLA

JOB No: 2402054

DATE: 07.02.2024

CLIENT: VORTEX LEISURE

DRAWN: F.N.

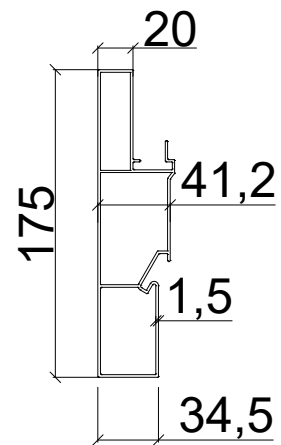
SCALE: NTS (A3)

CHECKED: B.E.

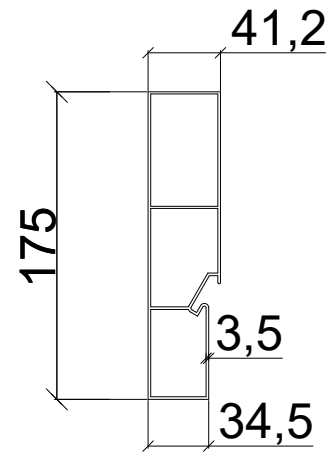
DWG No: S113

REVISION: REV A

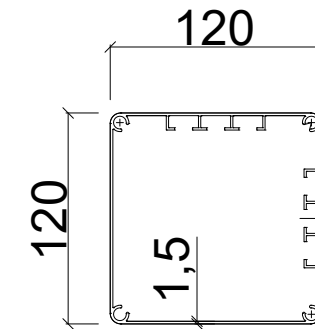
**FOR  
CONSTRUCTION**



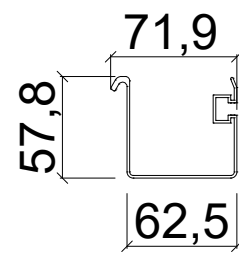
Main beam



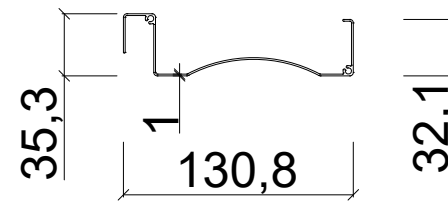
Side Beam



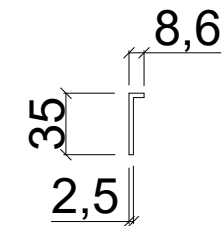
Corner Post



Gutter



Blade



Control Rod

REV	STATUS	DRAWN	CHECKED	DATE
A	FOR CONSTRUCTION	F.N.	B.E.	07.02.24



TITLE:  
STRUCTURAL DETAILS -4

PROJECT :  
PERGOLA STRUCTURAL DRAWINGS  
3400 / 3400M LOUVRE PERGOLA

JOB No: 2402054  
CLIENT: VORTEX LEISURE  
SCALE: NTS (A3)

DATE: 07.02.2024  
DRAWN: F.N.  
CHECKED: B.E.

DWG No: S114  
REVISION: REV A

**FOR CONSTRUCTION**



07 February 2024

Reference: 2402054

**Attention:** Vortex Leisure Pty. Ltd.

Dear Tony,

**Re: Structural Assessment of Vortex 3400 / 3400M Pergola from Vortex Leisure**

This report is a structural assessment of the 4x3 m **Vortex 3400** aluminium pergola manufactured by Vortex Leisure and is intended solely for the use by Vortex Leisure Pty Ltd.

The structural frame of the pergola will be stable when built on a residential site classed up to the following residential wind categories: **N3** and **C1**.

Ultimate Limit State wind speed: **50 m/s**

Serviceability Limit State wind speed: **32 m/s**

The design is in accordance with the following standards: AS1170.0, AS1170.1, AS1664.1, AS4055.1.

### Design Assumptions and Limitations

- This design assumes that the louvres and any attached side screen will be open on days of strong wind.
- It is assumed any attached side screen will be removed by the wind before the wind load is strong enough to destabilise the structure.
- A conservative simplified profile of the beam elements has been designed
- The aluminium louvres are non-structural and have not been assessed in this design
- It is assumed that a swim spa sits beneath the pergola and that no goods or materials will be stored under the pergola that block more than 50% of the cross-section exposed to the wind.
- This design has not considered snow loads - if constructing in areas exposed to snow contact this office for further guidance.

The computations for the pergola follow.



# Structural Member Properties

Cross-section profiles of structural members are provided by Vortex Leisure.

## Material properties

The members are constructed from Grade 6063-T5 Aluminium of below properties:

Property	Fty	Ftu	Fcy	Fsu	Fsy	Fbu	Fby	E
Strength (MPa)	110	152	110	90	62	317	179	70,000

## Calculated Structural Properties

### Column:

120 x 120 x 1.4 mm RHS length 2700 mm

Lb (mm)	2700
A (mm <sup>2</sup> )	653
Ixx (mm <sup>4</sup> )	1516418
Iyy (mm <sup>4</sup> )	1516418
J (mm <sup>4</sup> )	2335512
rx	48.18955
ry	48.18955
ct=cc (mm)	60
Zcx (mm <sup>3</sup> )	25273.63
Zcy (mm <sup>3</sup> )	25273.63
λ	1.55536
S1	0.53954
S2	1.253361
Øcc	0.79775
kt	1
kc	1.12
b (mm)	120
t (mm)	1.4
h (mm)	120

### Simplified Beam:

170 x 25 x 1.5 mm RHS length 4000 mm

Lb (mm)	4000
A (mm <sup>2</sup> )	609.0015
Ixx (mm <sup>4</sup> )	1696741
Iyy (mm <sup>4</sup> )	74500.5
J (mm <sup>4</sup> )	245019.7
rx	52.78355
ry	11.06039
ct=cc (mm)	85
Zcx (mm <sup>3</sup> )	19961.66
Zcy (mm <sup>3</sup> )	5960.04
λ	
S1	
S2	
Øcc	
kt	1
kc	1.12
b (mm)	25
t (mm)	1.5
h (mm)	170

## Calculated Buckling Constants for Temper 5 Designation

### Columns

Bc	119.264
Dc	0.492
Cc	99.330

Bp	134.288
Dp	0.588
Cp	93.608

Bt	132.002
Dt	3.624
Ct	*

Bbr	194.517
Dbr	1.256
Cbr	103.260

Btb	198.003
Dtb	10.371
Ctb	95.687

Bs	75.864
Ds	0.250
Cs	124.542

k1 (flat plate compression)	0.35
k2 (flat plate compression)	2.27

k1 (flat plate bending)	0.50
k2 (flat plate bending)	2.04

### Simplified Beam

Bc	119.264
Dc	0.492
Cc	99.330

Bp	134.288
Dp	0.588
Cp	93.608

Bt	132.002
Dt	3.624
Ct	*

Bbr	194.517
Dbr	1.256
Cbr	103.260

Btb	198.003
Dtb	10.371
Ctb	95.687

Bs	75.864
Ds	0.250
Cs	124.542

k1 (flat plate compression)	0.35
k2 (flat plate compression)	2.27

k1 (flat plate bending)	0.50
k2 (flat plate bending)	2.04

# Design Loads

## G + Q

Dead load (G): **self-weight**

Live load (Q): **0.27 kPa**

## Wind Loads

Residential Wind Speed Category in accordance with AS4055.1

Ultimate Limit State Wind Speed: **50 m/s**

Serviceability Limit State Wind Speed: **32 m/s**

### Wind Load on Monoslope Free Roof with 0° pitch

Roof height	2700 mm
Roof depth	4000 mm
h/d ratio	0.675
Roof area	12 m <sup>2</sup>
C <sub>pw</sub> – uplift	-0.3
C <sub>pl</sub> – uplift	-0.4
C <sub>pw</sub> – down	0.4
C <sub>pl</sub> – down	0
K <sub>a</sub>	1
K <sub>l</sub>	1
K <sub>p</sub>	1
C <sub>fig</sub> critical case	-0.4
ρ <sub>air</sub>	1.2 kg/m <sup>3</sup>
C <sub>dyn</sub>	1
Critical Uplift Pressure ULS	<b>-0.60 kPa</b>
Critical Uplift Pressure SLS	<b>-0.246 kPa</b>

### Wind Load on Side Beams

C <sub>pe</sub>	0.8
ULS Wind pressure	<b>1.20 kPa</b>
SLS Wind pressure	<b>0.49 kPa</b>

### Wind Load on Columns

l	2700
b	120
l/b	22.5
K <sub>ar</sub>	0.85
K <sub>i</sub>	1
bV <sub>desθ</sub> ULS	7.32
bV <sub>desθ</sub> SLS	4.68
C <sub>d</sub> ULS – conservative	1.2
C <sub>d</sub> SLS – conservative	1.2
C <sub>fig</sub> ULS	1.02
C <sub>fig</sub> SLS	1.02
ULS Wind pressure	<b>1.53 kPa</b>
SLS Wind pressure	<b>0.627 kPa</b>



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## Modelled Load Combinations

- Case 1 – ULS: 1.35G
- Case 2 – ULS: 1.2G + 1.5Q
- Case 3 – ULS: 1.2G +  $W_u$
- Case 4 – ULS:  $W_u - 0.9G$
- Case 5 – SLS: 1G
- Case 6 – SLS:  $W_s - G$

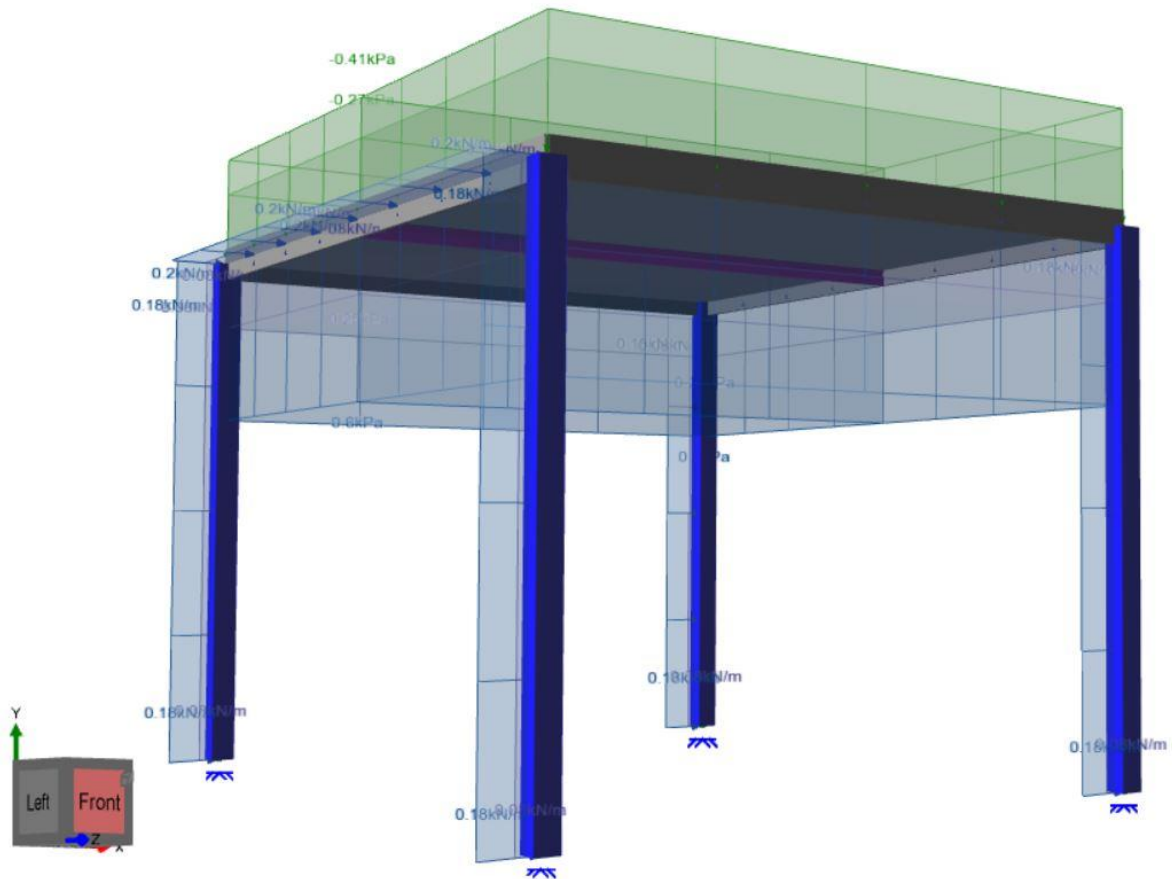


Figure 1 - Load cases applied to the Structure



# Modelled Results

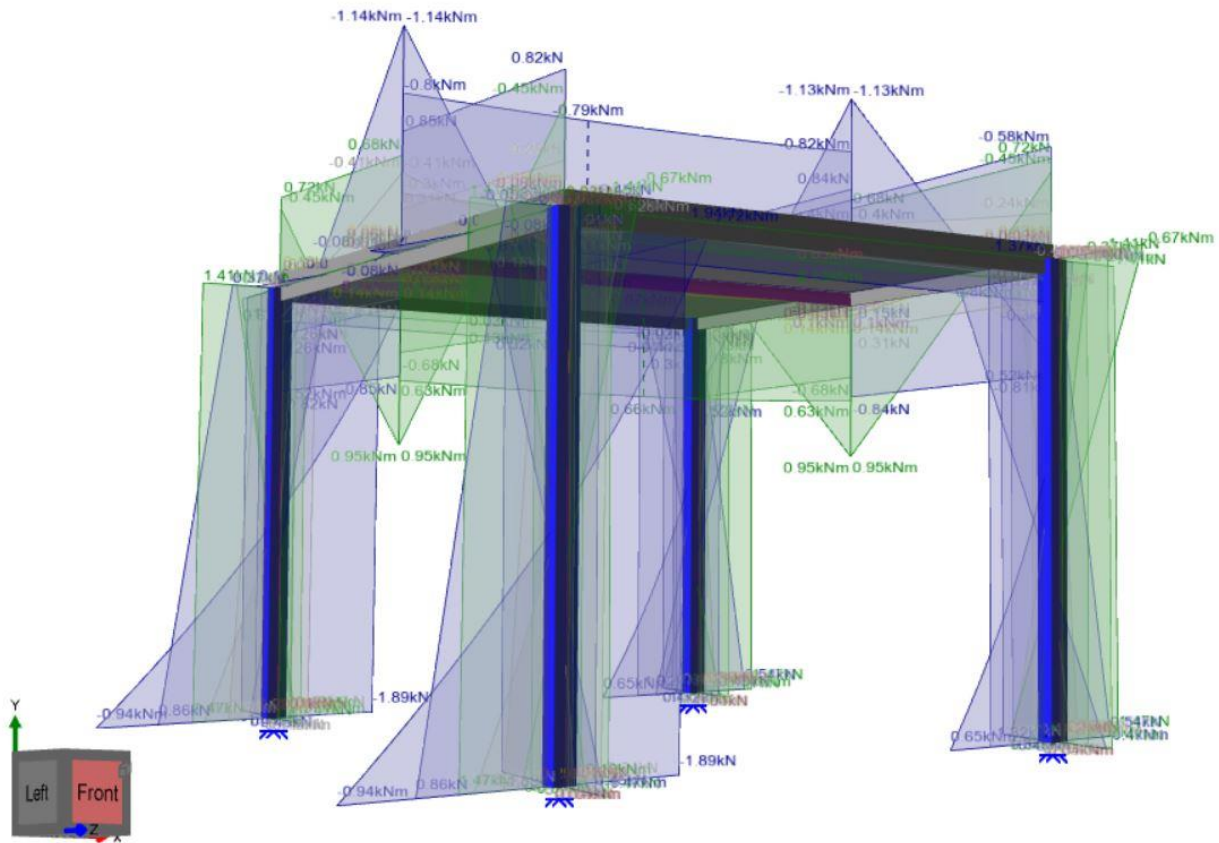


Figure 2 - Reaction Forces & Moments

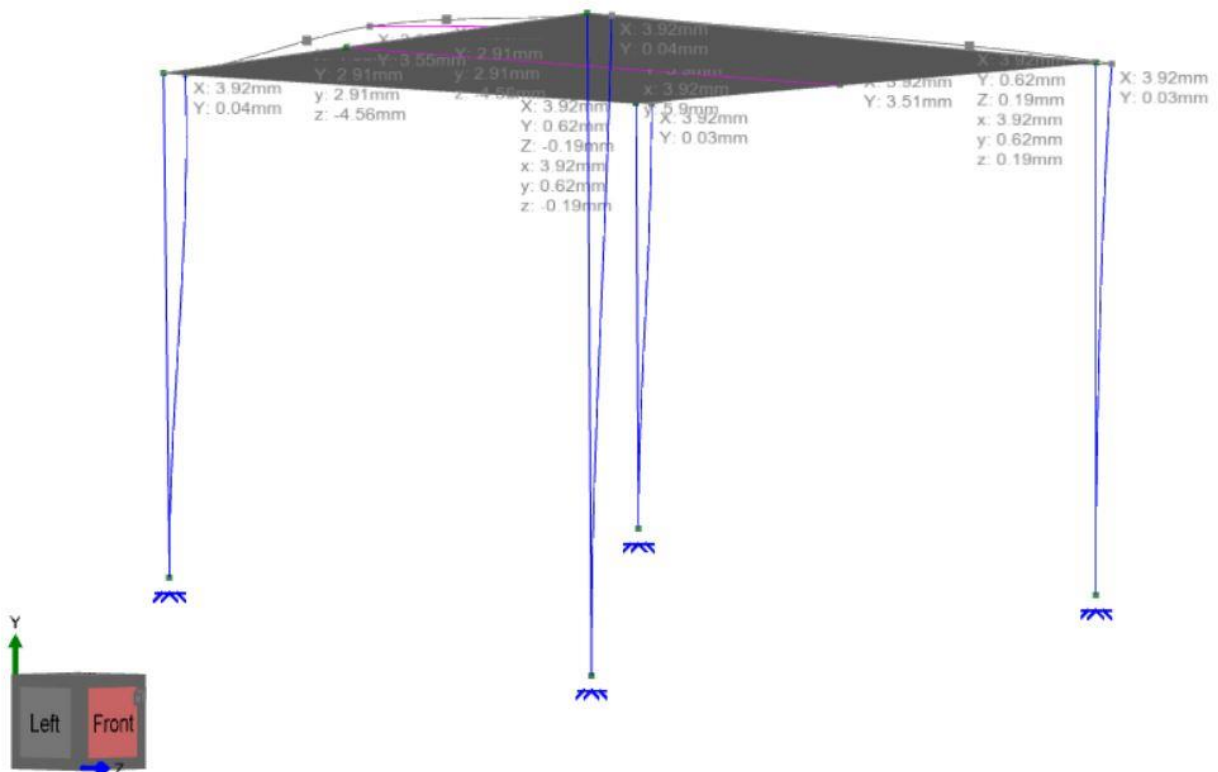


Figure 3 - Displacement Results

# Calculated Design Stresses

## Beams

Gross cross-sectional area	$A_g$	609.0015	mm <sup>2</sup>
In-plane elastic section modulus	$Z_{cx}$	19961.659	mm <sup>3</sup>
Out-of-plane elastic section modulus	$Z_{cy}$	5960.04	mm <sup>3</sup>
Axial load compression	$P_c$	0	kN
Axial load tension	$P_t$	0	kN
In-plane Moment	$M_x$	0.89	kNm
Out-of-plane moment	$M_y$	0.05	kNm
Shear force	$V$	0.39	kN
Stress axial compression	$f_{a.c}$	0	MPa
Stress axial tension	$f_{a.t}$	0	MPa
Stress from in-plane bending	$f_{bx}$	57.109482	MPa
Stress from out-of-plane bending	$f_{by}$	13.422729	MPa
Stress from shear force	$f_s$	1.3957273	MPa

## Columns

Gross cross-sectional area	$A_g$	653	mm <sup>2</sup>
In-plane elastic section modulus	$Z_{cx}$	25273.633	mm <sup>3</sup>
Out-of-plane elastic section modulus	$Z_{cy}$	25273.633	mm <sup>3</sup>
Axial load compression	$P_c$	1.27	kN
Axial load tension	$P_t$	2.25	kN
In-plane Moment	$M_x$	1.39	kNm
Out-of-plane moment	$M_y$	0.39	kNm
Shear force	$V$	1.33	kN
Stress axial compression	$f_{a.c}$	2.2511485	MPa
Stress axial tension	$f_{a.t}$	2.8943338	MPa
Stress from in-plane bending	$f_{bx}$	37.192911	MPa
Stress from out-of-plane bending	$f_{by}$	32.049211	MPa
Stress from shear force	$f_s$	1.3169985	MPa

# Deflection Results

## Beam

Modelled Deflection	L/250	Result
4.56 mm	16	PASS

## Column

Modelled Deflection	L/500	Result
3.92	5.4	PASS



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# Calculated Factored Limit Stresses

## Overview

### Beams

Stress Type	Clause	ØFL (MPa)
Tension in beams – rectangular tubes	3.4.3	104.50
Bearing – bolts in slotted holes	3.4.7	113.37
Compression in columns	3.4.8	21.74
Compression in columns components	3.4.10.1	93.30
Compression in beams – in-plane rectangular tube	3.4.15	90.84
Compression in beams – out-of-plane rectangular tube	3.4.15	88.80
Compression in beam components – uniform compression	3.4.17	93.30
Compression in beam components – own plane bending	3.4.22	85.71

### Columns

Stress Type	Clause	ØFL (MPa)
Tension in beams – rectangular tubes	3.4.3	104.50
Bearing – bolts in slotted holes	3.4.7	113.37
Compression in columns	3.4.8	36.27
Compression in columns components	3.4.10.1	44.17
Compression in beams – in-plane rectangular tube	3.4.15	95.67
Compression in beams – out-of-plane rectangular tube	3.4.15	95.67
Compression in beam components – uniform compression	3.4.17	44.17
Compression in beam components – own plane bending	3.4.22	105.47

## Tension Capacity

### Beam

Factored Limit Stress (Ø <sub>FL</sub> )	Yield	Ultimate
$\phi$	0.950	0.900
Kt		1.00
Factored tension stress in beams (MPa)	<b>104.5</b>	136.8

<b><math>f_a/F_a</math> (tension)</b>	<b>0 PASS</b>
---------------------------------------	---------------

### Column

Factored Limit Stress (Ø <sub>FL</sub> )	Yield	Ultimate
$\phi$	0.950	0.900
Kt		1.000
Factored tension stress in beams (MPa)	<b>104.5</b>	136.8

<b><math>f_a/F_a</math> (tension)</b>	<b>0.0277 PASS</b>
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## Factored Bearing Stress on Bolts in Slotted Holes

Factored Limit Stress ( $\phi_{FL}$ )	Yield	Ultimate
Factored bearing stress bolts in holes (MPa)	<b>113.36667</b>	<b>149.69444</b>

## Uniform Compression Capacity

### Beam

#### *Axial Compression of member*

k (effective length factor)	2.2	
L (unsupported length)	4000	mm
r (radius of gyration about axis of buckling)	52.78355	
$\lambda$ (slenderness parameter)	2.104	
$\phi_{cc}$	0.875	
Dc* (buckling formula constant for compression in columns)	39.013579	
S1*	0.53954	
S2*	1.2533612	
$\phi_{FL}$ for columns in axial compression	<b>21.74</b>	<b>MPa</b>

#### *Uniform Compression in Flat Plate Components*

b	22
t	1.5
b/t	14.666667
$\phi_y$	0.95
$\phi_c$	0.85
S1	26.054427
S2	49.943387
$\phi_{FL}$	<b>93.304 MPa</b>

### 3.4.8.2

For closed cross sections:

Largest slenderness ratio for flexural buckling

125.04

$f_a/F_A$ (compression)	<b>0</b>	<b>PASS</b>
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## Column

### *Axial Compression of member*

k (effective length factor)	2.2
L (unsupported length)	2700
r (radius of gyration about axis of buckling)	48.18955
$\lambda$ (slenderness parameter)	1.5553603
$\phi_{cc}$	0.7977504
Dc* (buckling formula constant for compression in columns)	39.013579
S1*	0.53954
S2*	1.253
$\phi_{FL}$	<b>36.27 MPa</b>

### *Uniform Compression in Flat Plate Components*

b	117.2
t	1.4
b/t	83.71429
$\phi_y$	0.95
$\phi_c$	0.85
S1	26.05443
S2	49.94339
$\phi_{FL}$	<b>44.17 MPa</b>

#### 3.4.8.2

For closed cross sections:

Largest slenderness ratio for flexural  
buckling

123.26324

$f_a/F_A$ (compression)	<b>0.062</b>	<b>PASS</b>
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## Compression Capacity in Bending

### Beam

#### *In-plane & out-of-plane bending in general beam*

Lb	4000
Zcx	19961.66
Zcy	5960.04
Ixx	1696741
Iyy	74500.5
J	245019.7
$\phi_y$	0.95
$\phi_b$	0.85
S1	21.80
S2	3854.05
LbZcx/.5 sqrt(IxxJ) in plane	247.67
LbZcy/.5 sqrt(IyyJ) our of plane	352.91
$\phi_{FL}$ in-plane (Fbx)	<b>90.84</b>
$\phi_{FL}$ out-of-plane (Fby)	<b>88.80</b>

#### *Uniform compression in component*

b	22.00
t	1.50
b/t	14.67
$\phi_y$	0.95
$\phi_b$	0.85
S1	12.06
S2	49.94
$\phi_{FL}$	<b>102.41</b>

#### *Compression bending about own plane in component*

h	167.00
t	1.50
h/t	111.33
$\phi_y$	0.95
$\phi_b$	0.85
S1	41.23
S2	115.59
$\phi_{FL}$	<b>85.71</b>

#### *Capacity check*

$f_{bx}/F_{bx}$	<b>0.629</b>	<b>PASS</b>
$f_{by}/F_{by}$	<b>0.15</b>	<b>PASS</b>



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## Column

### *In-plane & out-of-plane bending in general beam*

Lb	2700
Zcx	25273.63
Zcy	25273.63
Ixx	1516418
Iyy	1516418
J	2335512
$\phi_y$	0.95
$\phi_b$	0.85
S1	21.80
S2	3854.05
LbZcx/.5 sqrt(IxxJ) in plane	72.52
LbZcy/.5 sqrt(IyyJ) our of plane	72.52
$\phi_{FL}$ (b) in-plane (Fbx)	<b>95.67</b>
$\phi_{FL}$ (b) out-of-plane (Fby)	<b>95.67</b>

### *Uniform compression in component*

b/t	83.71
$\phi_y$	0.95
$\phi_b$	0.85
S1	12.06
S2	49.94
$\phi_{FL}$	<b>44.17</b>

### *Compression bending about own plane in component*

h/t	83.71
$\phi_y$	0.95
$\phi_b$	0.85
S1	41.23
S2	115.59
$\phi_{FL}$	<b>105.47</b>

### *Capacity check*

fbx/Fbx	<b>0.389</b>	<b>PASS</b>
fby/Fby	<b>0.33</b>	<b>PASS</b>

## Calculated Combined Axial Load & Bending Ratios

### Beam

Combined Compression & Bending	<b>0.78</b>	<b>PASS</b>
Combined Tension & Bending	<b>0.78</b>	<b>PASS</b>

### Column

Combined Compression & Bending	<b>0.79</b>	<b>PASS</b>
Combined Tension & Bending	<b>0.75</b>	<b>PASS</b>



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## Shear Capacity in Webs

### Beam

$\phi_y$	0.95
$\phi_v$	0.8
$\phi_{vp}$	0.9
h	167
t	1.5
h/t	111.33333
S1	33.375518
S2 (intersecting h/t)	97.780895
$\phi_{FL}$	<b>28.54 MPa</b>

fs/Fs	<b>0.049</b>	<b>PASS</b>
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### Column

$\phi_y$	0.95
$\phi_v$	0.8
$\phi_{vp}$	0.9
h	117.2
t	1.4
h/t	83.714286
S1	33.375518
S2 (intersecting h/t)	88.900865
$\phi_{FL}$	<b>44.8 MPa</b>

fs/Fs	<b>0.029</b>	<b>PASS</b>
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### Local Buckling Stress in Beam

Clause	Fcr	$\phi_y$	$\phi_{FL}$	Fec	$\phi_y * Fcr$	$\phi_{Frb}$ (MPa)
3.4.17	<b>1254.5702</b>	0.95	102.41	25861.87671	1191.8417	<b>102.4129</b>
3.4.22	<b>124.16459</b>	0.95	85.71	25861.87671	117.95636	<b>85.71395</b>

Weighted Average of element cross-section: 90.83 MPa

Cannot exceed compressive stress in general beam: 90.84 MPa

Final local buckling check ratio of beam	<b>0.78</b>	<b>PASS</b>
--	-------------	-------------

### Local Buckling Stress in Column

Clause	Fcr	$\phi_u$	$\phi_{FL}$	Fec	$\phi_u * Fcr$	$\phi_{Frc}$ (MPa)
3.4.10.1	38.51	0.85	36.27	14.47	32.73	<b>23.622</b>

Weighted Average of element cross-section: 44.16 MPa

Cannot exceed compressive stress in general column: 36.27 MPa

Final local buckling check ratio of column	<b>0.819</b>	<b>PASS</b>
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## Column Connection Check

M8 x 100 Expansion Bolt check:

### Bolt Capacity in Shear

$\phi V_f$	<b>7.26 kN</b>
$\phi$	0.8
$V_f$	9.0768
$f_{uf}$	400 MPa
$k_r$	1
$n_n$	1
$A_c$	36.6 mm <sup>2</sup>

### Bolt Capacity in Tension

$\phi N_{tf}$	<b>11.71 kN</b>
$\phi$	0.8
$N_{tf}$	14.64
$A_s$	36.6 mm <sup>2</sup>
$f_{uf}$	400 MPa

### Concrete Pull-out Capacity

Pull-out capacity	<b>11.16 kN</b>
Concrete grade	25 MPa
Shear strength	0.31 MPa
Embedded length	80 mm minimum

The column connections pass.

Regards,

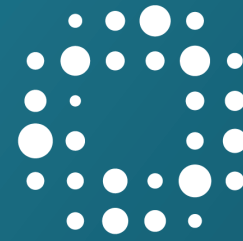


**Dr Andrew Barraclough**

BEng Meng PhD FIEAust CPEng RBP



Chartered Professional Engineers | National Engineering Register (CEC 53929, EC46301, RPEQ 22822) | Registered Building Practitioners (CDB-U 58799),  
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**Vortex**<sup>TM</sup>  
**Pergolas**