CONSTRUCTION CERTIFICATE APPLICATION

BLACKETT MAGUIRE+ GOLDSMITH

Information for the Applicant

+ A construction certificate has no effect if it is issued after the building work or subdivision work to which it relates is physically commenced on the land to which the relevant development consent applies.

APPLICANT

Note – This must be the person having the benefit of the Development Consent. Cannot be the builder unless the builder is the owner of the property.

Company: Trustees of the Roman Catholic Church for the Diocese of Bathurst

ABN (if applicable): 23501787578

Applicant Name: Patrick Cooper - Diocesan Financial Administrator

Applicant Postal Address: 118 Keppel St, Bathurst NSW 2795

Phone: 02 6334 6402

Fax:

Mobile:

Email: dfa@bathurst.catholic.org.au

Signature: ×

Date: 19/5/2021

SUBJECT LAND

Location and title details of the land where the building work or subdivision work is to be carried out.

Unit / Street No.: 48

Street Name: Broadhead Road

Suburb / Town: Spring Flat

State: NSW

Postcode: 2850

Lot No.: 40

DP / SP No.: DP756894

PROPOSED DEVELOPMENT

Briefly describe the development. For example, if a dwelling is proposed, include information such as the type of building (house, townhouse, villa etc.), the number of floors, the number of bedrooms, the major building material (brick, brick veneer, timber clad etc.)

Description

St Mathews Catholic School Secondary Campus: construction of a new high school to cater for up to 680 students comprising:

• Construction of five buildings including administration areas, a chapel. Teaching spaces, specialist and performing arts spaces; and

• Associated works including car parking, drop-off/pick-up facilities, signage, tree removal, landscaping and infrastructure upgrades.

Works to be undertaken in this Stage (if applicable)

Structure & Services including slabs, framing & services rought in

Façade & Building envelope including Erection of façade & building envelopes, wall claddings & roofing

Existing BCA Classification:

Proposed BCA Classification: 9b

Estimated Cost of Works (incl GST): $16,904,792.13

The estimated cost of works is the contract price, or if there is no contract a genuine and accurate estimate, for all labour and material costs associated with all demolition and construction required for the development, including the cost of construction of any building and the preparation of the building for the purpose for which it is to be used (such as the costs of installing plant, fittings, fixtures and equipment). GST is also to be included.

OFFICE USE – RECEIPT OF APPLICATION

This Construction Certificate Application was received by Blackett Maguire + Goldsmith on:

(Please stamp 'Received' stamp or write date received in the space provided).

Date Received:

Received

20 May 2021

Blackett Maguire + Goldsmith

Address: Suite 2.01, 22-36 Mountain St Ultimo NSW 2007

Postal: PO Box 167 Broadway NSW 2007

ABN: 18 408 985 851

Fax: 02 9211 7774

Email: admin@bmplusg.com.au



DEVELOPMENT CONSENT

Development Consent No.

SSD9972

Date of Determination

16 December 2020

Consent Authority

Department of Planning Industry and Environment

DA Applicant Name:

Trustees of the Roman Catholic Church for the Diocese of Bathurst

Has a Section 82a review of determination been submitted to Council?

☐ Yes ☑ No

Does the development relate to building work or subdivision?

☑ Building Work ☐ Subdivision

Does the application relate to a residential flat development which was required, under Clause 50(1A) of the EP&A Regulation, to be accompanied by a design verification from a qualified designer?

☐ Yes ☑ No

If yes, please provide a statement from a qualified designer which verifies that the plans and specifications achieve or improve the design quality of the development for which development consent was granted, having regard to the design quality principles set out in Part 2 of State Environmental Planning Policy No.65: Design Quality of Residential Flat Development (SEPP 65).

CONSENT OF OWNER & AUTHORITY TO ENTER AND INSPECT LAND

A certifying authority must not issue a construction certificate for development on a site which affects an existing building unless the certifying authority (or an accredited certifier, Council or consent authority on behalf of the certifying authority) has carried out an inspection of the site of the development.

If the applicant is the owner of the land, by signing the application authority is given to Blackett Maguire + Goldsmith to enter the subject property at any reasonable time for the purpose of carrying out an inspection in connection with the assessment of the Application. The applicant undertakes to take all necessary steps make access available to the property to enable the inspection to be carried out.

As the owners of the subject property, I / we consent to the application and I / we consent to Blackett Maguire + Goldsmith to enter the property at any reasonable time for the purpose of carrying out an inspection in connection with the assessment of this application. I / we accept to take all necessary steps to make access available to the property to enable the inspection to be carried out.

Name

Nick Windsor

Signature

Date:

19/5/21

OWNERS DETAILS

Company / Full Name

North Construction & Building Pty Ltd

ABN (if applicable)

15 147 507 702

Postal Address

Blueridge Business Park Unit 1 Blueridge Drive, Dubbo NSW 2830

Phone

02 4323 2633

Fax

Mobile

0428 053 481

Email

nick.windsor@north.com.au

DELIVERY OF THE APPLICATION

Applications for construction certificates must be delivered to the principal office of Blackett Maguire + Goldsmith by one of the following methods:

+ By hand;
+ By post; or
+ Transmitted electronically.

Applications **MAY NOT** be sent by fax.

REQUIRED DOCUMENTATION

Please refer to the CC Requirements list issued separately for all documentation required to be forwarded to our office to support this application and facilitate the approval of the Construction Certificate.



SCHEDULE TO APPLICATION

This Information is required for the Australian Bureau of Statistics.

All New Buildings

+ Number of Storeys (including underground floors).	Block A, Block B, Block C, Block D- Single Storey Block E- 2 Storey
+ Gross Floor Area of New Building (m^2)	5346m2
+ Gross Site Area (m^2)	50965

Residential Buildings Only

+ Number of Dwelling to be Constructed		
+ Number of Pre-existing Dwellings on site		
+ Number of Dwellings to be Demolished		
+ Will the New Building(s) be attached to other Building(s)?	☐ Yes	☐ No
+ Will the New Building(s) be attached to Existing Building(s)?	☐ Yes	☐ No
+ Does the site contain a dual occupancy?	☐ Yes	☐ No

Materials

Place a tick (✓) in the box which best describes the materials the new work will be constructed of:

Walls	Code
☐ Brick Veneer	12
☐ Full Brick	11
☐ Single Brick	11
☐ Concrete Block	11
☑ Concrete / Masonry	20
☐ Concrete	20
☐ Steel	60
☑ Fibrous Cement	30
☐ Hardiplank	30
☑ Cladding – Aluminium	70
☐ Curtain Glass	50
☐ Other	80
☐ Unknown	90

Roof	Code
☐ Aluminium	70
☐ Concrete	20
☐ Concrete Tile	10
☐ Fibrous Cement	30
☐ Fibreglass	80
☐ Masonry/Terracotta Shingle Tiles	10
☐ Slate	20
☑ Steel	60
☐ Terracotta Tiles	10
☐ Other	80
☐ Unknown	90

Floor	Code
☑ Concrete	20
☐ Timber	10
☐ Other	80
☐ Unknown	90

Frame	Code
☐ Timber	40
☑ Steel	60
☐ Other	80
☐ Unknown	90

0131 PRELIMINARIES

1 GENERAL

1.1 GENERAL

Interpretation

General: The words principal and contract administrator have the same meaning, respectively, as owner and architect, unless the context requires otherwise.

Cross reference: The clause **GENERAL**, **INTERPRETATION**, in *0171 General requirements*, also applies.

1.2 THE SITE

Site restrictions

Site limitations: Comply with the following restrictions on the use of the site: Refer to SSDA Conditions of Consent including but not limited to for traffic movement restrictions, riparian zone protection, dust, noise and sediment control.

Access: Access onto and within the site, use of the site for temporary works and constructional plant, including working and storage areas, location of offices, workshops, sheds, roads and parking, is restricted to the following areas: Refer to *North Building and Construction* Construction Management Plan.

Secure areas

Designated secure areas: Riparian Zone, Lewis St school premises

Conditions of entry: Refer to *North Building and Construction* Construction Management Plan. Personnel entering the Lewis St school premises are required to provide a Working with Children Check (WWCC) prior to entry on school premises. This can be sought form this website:

http://www.kidsguardian.nsw.gov.au/child-safe-organisations/working-with-children-check/volunteers

Entry permits: Make available, to persons entering designated secure areas, valid entry permits. Make sure these persons comply with conditions of entry.

Personnel: At least 10 working days before entry is required, submit the full name, address, and date and place of birth of persons required to enter designated secure areas.

- Purpose of submission: Review.

Occupied premises

General: For the parts of the site, documented in the **Occupied premises schedule**:

- Allow occupants to continue in secure possession and occupancy of the premises for the required period.
- Maintain safe access for occupants.
- Arrange work to minimise nuisance to occupants and for their safety.
- Protect occupants against weather, dust, dirt, water or other nuisance.

Proposals: Submit details of proposed methods.

- Purpose of submission: Information only.

Occupied premises schedule

Occupants	Occupied premises	Period of occupancy

Protection of persons and property

Temporary works: Provide and maintain required hoardings, barricades, guards, fencing, shoring, temporary roadways, footpaths, signs, lighting and traffic management.

Accessways, services: Do not obstruct or damage roadways and footpaths, drains and watercourses and other existing services in use on or adjacent to the site. Determine the location of such services.

Property: Do not interfere with or damage trees and property which are to remain on or adjacent to the site, including adjoining property encroaching onto the site.

Control of runoff stormwater: Refer to SSDA Conditions of Consent

Rectification

Accessways and services: Rectify immediately any obstruction or damage to roadways and footpaths, drains and watercourses and other existing services in use on or adjacent to the site. Provide temporary services whilst repairs are carried out.

Property: Rectify immediately any interference or damage to trees and property which are to remain on or adjacent to the site, including adjoining property encroaching onto the site.

Existing services

Service to be continued: Repair, divert or relocate service, as documented.

Trenches: If the existing service crosses the line of a required trench or will lose support when the trench is excavated, provide permanent support for the existing service.

Redundant services: Remove redundant parts and make safe.

Interruption to services: Minimise the number and duration of interruptions.

Proposals: Submit proposals for action to be taken to existing services before starting this work.

- Purpose of submission: For review.

Adjoining property

Notice: At least 10 working days before commencing work, submit to owners and occupants of adjoining property written notice of intention to commence work and an outline description of the type and extent of work.

Conditions for work on adjoining property: Refer to SSDA Conditions of Consent

Revealed encroachments: If the works reveal unknown encroachments of adjoining property on to the site or of existing site structures on to adjoining property, immediately seek instructions.

Records: For each property described in the **Adjoining properties to be recorded schedule**:

- Inspect the property with the architect and owner and occupant of the property, before commencement of work.
- Make detailed records of conditions existing within the property, especially structural defects and other damage or defacement.
- Arrange for at least 2 copies of each record, including drawings, written descriptions, and photographs, endorsed by the owner and occupant of the property, or their representatives, as evidence of conditions existing before commencement of work.

Endorsed copies: Submit one endorsed copy of each record. Keep the other endorsed copy on site.

- Purpose of submission: Information only.

Adjoining properties to be recorded schedule

Title	Owner	Description

1.3 CONSTRUCTION PLANT

Access roads

Temporary roads: Refer to *North Building and Construction* Construction Management Plan.

Owner's existing roads: Use only designated roads.

Parking

Owner's existing parking areas: Use only designated parking areas.

Use of existing services

General: Existing services may be used as temporary services for the performance of the contract subject to conditions of use, as documented in the **Existing services schedule**.

Existing services schedule

Service	Conditions of use
Electricity, Data, sewer	Allow for the temporary connection, disconnection and making good of temporary services

Owner's site office

General: Provide a weathertight site office for the use of the owner or the owner's agents before major site operations are started and as follows:

- Pay charges for services.
- Maintain in good order and in clean condition, with secure access, for duration of the work.
- Obtain permission for removal.
- Remove on completion.

Protective clothing

Protective clothing: Make available protective clothing for the use of visitors, as follows:

- Safety helmets: To AS/NZS 1801, Type 1.
- Certification provider: Submit product certification from an organisation accredited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ).

Number of helmets: 4

Project signboards

General: Provide project-specific signboards and as follows:

- Locate where directed.
- Maintain in good condition for duration of the work.
- Obtain permission for removal.
- Remove on completion.

Project signboard description

Location: Corner of Broadhead & Bruce Rd

Size: 2mW x 1mH

Text, graphics: To be advised

Other details: Project Name, Contractor details, Project team details

1.4 BUILDING THE WORKS

Surveys

Setting out: [complete/delete]

Check surveys: [complete/delete]

Final survey: Required, including finished ground levels, building locations, floor, gutter & ridge levels, tree location, pits, driveway, paths and site features

Survey marks

Definition: A survey peg, bench mark, reference mark, signal, alignment, level mark or any other mark used or intended to be used for the purpose of setting out, checking or measuring the work.

Care of survey marks: Preserve and maintain the principal's survey marks in their true positions.

Rectification: If survey marks are disturbed or obliterated, immediately rectify.

Safety

Accidents: Promptly notify the architect of the occurrence of the following:

- Accidents involving death or personal injury.
- Accidents involving loss of time.
- Incidents with accident potential such as equipment failure, slides and cave-ins.

Accident reports: Submit reports of accidents.

- Purpose of submission: Information only.

Contractor's representative

General: Must be accessible, and fluent in English and technical terminology.

Subcontracting

General: Submit a complete list of proposed subcontractors and suppliers.

Program of work

Construction program: Show the following:

- Sequence of work.
- Critical paths of activities related to the work.
- Allowance for holidays.
- Activity inter-relationships.
- External dependencies including provision of access, document approvals and work by others.
- Periods within which various stages or parts of the work are to be executed.

Time scale: Working days.

Updated program: Identify changes since the previous issue, and show the estimated percentage of completion for each item of work.

Program chart: Display in the contractor's site office an up-to-date bar chart and network diagram based on the construction program.

Order of work schedule

Portion of work	Order of work	Time of work

Site meetings

General: Hold and attend site meetings throughout the contract and arrange attendance of appropriate subcontractors, the architect, and appropriate consultants.

Minutes: Make a record of site meetings. Within 5 working days after each meeting, distribute a copy of the minutes to each party.

- Purpose of submission: Review.

Contacts: At the first site meeting, submit names and telephone numbers of responsible persons who may be contacted after hours during the course of the contract.

- Purpose of submission: Information only.

Progress photographs
General: Take colour progress photographs within 5 working days, before each site meeting. At each site meeting submit 2 sets of prints and the digital files. Identify the project, date, time, location and orientation.

- Purpose of submission: Information only.

Minimum frequency: Weekly

Minimum number: 5 per building

Format: jpeg

Items supplied by owner
General: Materials and other items supplied free of charge to the contractor for installation in the execution of the works. Unload and take delivery, inspect for defects and take care of the items. If defects are found, advise. Return unused items to the owner.

Items supplied by owner schedule

Location	Item	Quantity	Date
Refer to *North Building & Constructions* for separate schedule of equipment, fitting and furniture provided by others.			

Persons other than contractor
Facilities: Refer to person other than contractor documentation.

Contractor/person other than contractor interfaces: Refer to person other than contractor documentation.

1.5 COMPLETION OF THE WORKS

Final cleaning
General: Before the date for practical completion, clean throughout, including interior and exterior surfaces exposed to view. Vacuum carpeted and soft surfaces. Clean debris from the site, roofs, gutters, downpipes and drainage systems. Remove waste and surplus materials.

Samples: Remove non-incorporated samples, prototypes and sample panels.

Reinstatement
General: Before the date for practical completion, clean and repair damage caused by installation or use of temporary work and restore existing facilities used during construction to original condition.

Adjoining property
Evaluation: At practical completion, for each property described in the **Adjoining properties to be recorded schedule**, inspect the property with the architect and owner and occupant of the property, recording any damage that has occurred since the pre-commencement inspection.

Pest eradication
General: Employ suitably qualified pest exterminators. At practical completion, verify that completed works are free of pest types documented in the **Pest eradication treatments schedule**.

Pest eradication treatment schedule

Pest type to be treated	Eradication method

Removal of plant
General: Within 10 working days after practical completion, remove temporary works and construction plant no longer required. Remove the balance before the end of the defects liability period.

Separable parts

1.6 PAYMENT FOR THE WORKS

Import costs
Definition: Import costs include costs attributable to exchange rates, customs and import duty of imported content of items purchased for incorporation in the works.

Adjustment: If there are changes in rates applying to import costs of items documented in the **Import cost adjustment schedule**, add or deduct the amount of the difference to or from the contract sum, as applicable.

Import cost adjustment schedule

Item	Country of origin	Import cost

Anticipated progress claims schedule
General: At commencement of the works, submit a schedule of anticipated progress claims for the contract period. Submit a revised schedule with each progress claim.

- Purpose of submission: Information only.

Progress claims
Break-down: With each progress claim, submit a statement of amounts claimed in respect of each worksection or trade heading designated in the specification.

- Purpose of submission: Review.

Method of measurement
General: In conformance with the principles of the Australian Standard Method of Measurement of Building Works (ASMM6).

1.7 MISCELLANEOUS

Contractor and owner to observe confidentiality
Publicity: Do not issue information concerning the project for publication in the media without prior written approval of the owner. Refer to the owner, enquiries from the media concerning the project.

Compliance with the law
Requirements of authorities: The owner, before entering into the contract, has given the notices, paid the fees, and obtained the permits, approvals and other authorisations, as documented in the **Prior applications and approvals schedule**.

Prior applications and approvals schedule

Prior notices given and applications made	Fees paid	Permits, approvals and authorisations received

Authority conditions schedule

Authority	Document	Condition

0171 GENERAL REQUIREMENTS

1 GENERAL

1.1 DESIGN

Design development

General: Develop the design beyond that documented, as required.

Design by contractor: If the contractor provides design, use only appropriately qualified persons and conform to statutory requirements.

Conflict with the documents: If it is believed that a conflict exists between statutory requirements and the documents, notify the contract administrator immediately and provide a recommendation to resolve the conflict.

1.2 PERFORMANCE

Corrosion resistance

General: Atmospheric corrosivity category as defined in AS 4312:

- Exterior atmospheric corrosivity category: C2 Low
- Interior atmospheric corrosivity category: Generally= C1 Very Low, Hall= C2 Low

Galvanizing

Severe conditions: Galvanize mild steel components (including fasteners) to AS/NZS 1214 or AS/NZS 4680 as appropriate, if:

- Exposed to weather.
- Embedded in masonry.
- Exposed to or in air spaces behind the external leaf of masonry walls.
- In contact with chemically treated timber, other than copper chrome arsenate (CCA).

Noise levels

General: Install systems to operate within the noise level limits, as documented for the contract design and documented equipment performance.

Structure

General: If required, provide structures, installations and components as follows:

- Fixed accessways: To AS 1657.
- Structural design actions: To the AS/NZS 1170 series.

1.3 PRECEDENCE

General

Order of precedence:

- The requirements of other worksections of the specification override conflicting requirements of this worksection.
- The requirements of worksections override conflicting requirements of their referenced documents. The requirements of the referenced documents are minimum requirements.

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1.4 CROSS REFERENCES

General

Common requirements

Requirement: Conform to the following worksections:

- *0181 Adhesives, sealants and fasteners*.
- *0182 Fire-stopping*.
- *0183 Metals and prefinishes*.
- *0184 Termite management*.
- *0185 Timber products, finishes and treatment*.

Cross referencing styles

General: Within the text, titles are cross referenced using the following styles:

- Worksection titles are indicated by *Italicised* text.
- Subsection titles are indicated by **BOLD** text.
- Clause titles are indicated by **BOLD** text.
- Subclause titles are indicated by **Bold** text.

1.5 REFERENCED DOCUMENTS

General

Contractual relationships: Responsibilities and duties of the principal, contractor and contract administrator are not altered by requirements in the documents referenced in this specification.

Current editions: Use referenced documents which are the editions, with amendments, current 3 months before the closing date for tenders, except where other editions or amendments are required by statutory authorities.

European standards: Any national European Standard (e.g. BS EN or DIN EN) may be used in place of the equivalent referenced European Standard (EN).

1.6 INTERPRETATION

Documentation conventions

Imperative mood and streamlined language: The words shall or shall be are implied where a colon is used following a keyword or within a sentence or sentence fragment.

Subject of sentences and phrases: Specification requirements are to be performed by the contractor, unless stated otherwise.

Abbreviations

General: For the purposes of this specification the following abbreviations apply:

- AS: Australian Standard.
- BCA: National Construction Code Series Volume One: Building Code of Australia Class 2 to 9 Buildings and Volume Two: Building Code of Australia Class 1 and Class 10 Buildings.
- EN: European Norm (European Standard).
- GRP: Glass Reinforced Plastic.
- IP: Ingress protection.
- NATA: National Association of Testing Authorities.
- NCC: National Construction Code.
- NZS: New Zealand Standard.
- PCA: National Construction Code Series Volume 3: Plumbing Code of Australia.
- PVC: Polyvinyl Chloride.
- PVC-U: Unplasticised Polyvinyl Chloride. Also known as UPVC.
- SDS: Safety data sheets.

- VOC: Volatile Organic Compound.
- WHS: Work Health and Safety.

Definitions

General: For the purposes of this specification, the following definitions apply:

- Access for maintenance: Includes access for maintenance, inspection, measurement, operation, adjustment, repair, replacement and other maintenance related tasks.
- Accessible, readily: Readily accessible, easily accessible, easy access and similar terms mean capable of being reached quickly and without climbing over or removing obstructions, using a movable ladder, and in any case not more than 2.0 m above the ground, floor or platform.
- Accredited Testing Laboratory:
  . An organisation accredited by the National Association of Testing Authorities (NATA) to test in the relevant field; or
  . An organisation outside of Australia accredited to undertake the relevant tests by an authority recognised by NATA through a mutual recognition agreement; or
  . An organisation recognised as being an Accredited Testing Laboratory under legislation at the time the test was undertaken.
- Attendance: Attendance, provide attendance and similar expressions mean give assistance for examination and testing.
- Contract administrator: Has the same meaning as architect or superintendent and is the person appointed by the owner or principal under the contract.
- Contractor: Has the same meaning as builder and is the person or organisation bound to carry out and complete the work under the contract.
- Default: Specified value, product or installation method which is to be provided unless otherwise documented.
- Design life: The period of time for which it is assumed, in the design, that an asset will be able to perform its intended purpose with only anticipated maintenance but no major repair or replacement being necessary.
- Documented: Documented, as documented and similar terms mean contained in the contract documents.
- Economic life: The period of time from the acquisition of an asset to the time when the asset, while still physically capable of fulfilling its function and with only anticipated maintenance, ceases to be the lowest cost alternative for satisfying that function.
- Electricity distributor: Any person or organisation that provides electricity from an electricity distribution system to one or more electrical installations. Includes distributor, supply authority, network operator, local network service provider, electricity retailer or electricity entity, as may be appropriate in the relevant jurisdiction.
- Fire hazard properties: Terminology to BCA A5.5.
- Geotechnical site investigation: The process of evaluating the geotechnical characteristics of the site in the context of existing or proposed construction.
- Give notice: Give notice, submit, advise, inform and similar expressions mean give notice (submit, advise, inform) in writing to the contract administrator.
- High level interface: Systems transfer information in a digital format using an open system interface.
- Hot-dip galvanized: Zinc coated to AS/NZS 4680 after fabrication with coating thickness and mass to AS/NZS 4680 Table 1.
- Ingress protection: IP, IP code, IP rating and similar expression have the same meaning as IP Code in AS 60529.

- Joints:
  - Construction joint: A joint with continuous reinforcement provided to suit construction sequence.
  - Contraction joint: An opening control joint with a bond breaking coating separating the joint surfaces to allow independent and controlled contraction of different parts or components, induced by shrinkage, temperature changes or other causes. It may include unbound dowels to assist vertical deflection control.
  - Control joint: An unreinforced joint between or within discrete elements of construction which allows for relative movement of the elements.
  - Expansion joint: A closing control joint with the joint surfaces separated by a compressible filler to allow axial movement due to thermal expansion or contraction with changes in temperature or creep. It may include unbound dowels to assist vertical deflection control.
  - Sealant joint: A joint filled with a flexible synthetic compound which adheres to surfaces within the joint to prevent the passage of dust, moisture and gases.
  - Structural control joint: A control joint (contraction, expansion and isolation) in structural elements when used with applied material and finishes.
  - Substrate joint: A joint in the substrate which includes construction joints and joints between different materials.
  - Weakened plane joint: A contraction joint created by forming a groove, extending at least one quarter the depth of the section, either by using a grooving tool, by sawing, or by inserting a premoulded strip.
- Local authority (local council): A body established for the purposes of local government by or under a law applying in a state or territory.
- Low level interface: Systems transfer information via terminals and voltage free contacts.
- Manufacturer's recommendations: Recommendations, instructions, requirements, specifications (and similar expressions) provided in written or other form by the manufacturer and/or supplier relating to the suitability, use, installation, storage and/or handling of a product.
- Metallic-coated: Steel coated with zinc or aluminium-zinc alloy as follows:
  - Metallic-coated steel sheet: To AS 1397. Metal thicknesses specified are base metal thicknesses.
  - Ferrous open sections zinc coated an in-line process: To AS/NZS 4791.
  - Ferrous hollow sections zinc coated by a continuous or specialised process: To AS/NZS 4792.
- Network Utility Operator: The entity undertaking the piped distribution of drinking water or natural gas for supply or is the operator of a sewerage system or external stormwater drainage system.
- Obtain: Obtain, seek and similar expressions mean obtain (seek) in writing from the contract administrator.
- Pipe: Includes pipe and tube.
- Practical completion or defects free completion: The requirements for these stages of completion are defined in the relevant building contract for the project.
- Principal: Principal has the same meaning as owner, client and proprietor and is the party to whom the contractor is legally bound to construct the works.
- Professional engineer: As defined by the NCC.
- Proprietary: Identifiable by naming the manufacturer, supplier, installer, trade name, brand name, catalogue or reference number.
- Prototype: A full size mock-up of components, systems or elements to demonstrate or test construction methods, junctions and finishes, and to define the level of quality.
- Provide: Provide and similar expressions mean supply and install and include development of the design beyond that documented.
- Record drawings: Record drawings has the same meaning as as-installed drawings, as-built drawings and work-as-executed drawings.

- Referenced documents: Standards and other documents whose requirements are included in this specification by reference.
- Required: Required by the contract documents, the local or statutory authorities.
- If required: A conditional specification term for work which may be shown in the documents or is a legislative requirement.
- Sample: A physical example that illustrates workmanship, materials or equipment, and establishes standards by which the work will be judged. It includes samples and sample panels.
- Statutory authority: A public sector entity created by legislation, that is, a specific law of the Commonwealth, State or Territory.
- Supply: Supply, furnish and similar expressions mean supply only.
- Tests – completion: Tests carried out on completed installations or systems and fully resolved before the date for practical completion, to demonstrate that the installation or system, including components, controls and equipment, operates correctly, safely and efficiently, and meets performance and other requirements. The superintendent may direct that completion tests be carried out after the date for practical completion.
- Tests – pre-completion: Tests carried out before completion tests, including:
  . Production: Tests carried out on a purchased item, before delivery to the site.
  . Progressive: Tests carried out during installation to demonstrate performance in conformance with this specification.
  . Site: Tests carried out on site.
  . Type: Tests carried out on an item identical with a production item, before delivery to the site.
- Tolerance: The permitted difference between the upper limit and the lower limit of dimension, value or quantity.
- Utility service provider: Includes organisations providing power, water, sewerage, gas and telecommunications services.
- Verification: Provision of evidence or proof that a performance requirement has been met or a default exists.

1.7 CONTRACT DOCUMENTS

Services diagrammatic layouts

General: Layouts of service lines, plant and equipment shown on the drawings are diagrammatic only, except where figured dimensions are provided or calculable.

Before commencing work:

- Obtain measurements and other necessary information.
- Coordinate the design and installation in conjunction with all trades.

Levels

General: Spot levels take precedence over contour lines and ground profile lines.

Warranty: No warranty is given as to the completeness or accuracy of drawings and/or manuals of existing services.

1.8 SUBMISSIONS

Requirement

General: Submit the following:

- Authority approvals: Notes of meetings with authorities whose requirements apply to the work and evidence that notices, fees and permits have been sought and paid, that authority connections are complete and that statutory approvals by the authorities whose requirements apply to the work have been received.
- Building penetrations: Details of the methods to maintain the required structural, fire and other properties to **EXECUTION**, **BUILDING PENETRATIONS**.

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- Certification: Certification of conformance to documented requirements, including certification that the plant and equipment submitted meets all requirements of the contract documents and that each installation is operating correctly.
- Design documentation: Design data and certification of proposed work, if required and as documented.
- Electronic facility and asset management information: For the whole of the work to **EXECUTION**, **ELECTRONIC FACILITY AND ASSET MANAGEMENT INFORMATION**.
- Execution details: Execution programs, schedules and details of proposed methods and equipment. For building services include the following:
  . Embedded services: Proposed method for embedding services in concrete walls or floors or chasing into concrete or masonry walls.
  . Fixing of services: Typical details of locations, types and methods of fixing services to the building structure.
  . Inaccessible services: If services will be enclosed and not accessible after completion, submit proposals for location of service runs and fittings.
- Fire performance: Evidence of conformity to requirement for combustibility, fire hazard properties and fire-resistance of building elements.
- Marking and labelling: Samples and schedules of proposed marking and labels to **EXECUTION**, **MARKING AND LABELLING.**
- Operation and maintenance manuals: For the whole of the work to **EXECUTION**, **OPERATION AND MAINTENANCE MANUALS**.
- Products: Products and materials data, including manufacturer's technical specifications and drawings, SDS for hazardous materials, type tests results, evidence of conformity to documented requirements, product certification, performance and rating tables, service connection requirements and installation and maintenance recommendations.
- Prototypes: Prototypes of components, systems or elements.
- Records: As-built documents, photographs, system diagrams, schedules and logbooks to **EXECUTION**, **RECORD DRAWINGS**.
- Samples: Representative of proposed products and materials and including proposals to incorporate samples into the works, if any to **EXECUTION**, **SAMPLES**.
- Shop drawings: To **EXECUTION**, **SHOP DRAWINGS**.
- Substitutions: To PRODUCTS**, GENERAL, Substitutions**.
- Tests:
  . Inspection and testing plan consistent with the construction program including details of test stages and procedures.
  . Test reports for testing performed under the contract.
- Warranties: To **EXECUTION**, **WARRANTIES**.

Contractor review: Before submissions, review each submission item, and check for coordination with other work of the contract and conformance to contract documents.

Submission times

Default timing: Make submissions at least 5 working days before ordering products or starting installation of the respective portion of the works.

Submission response times: Allow in the construction program for at least the following times:

- Shop drawings: 5 working days
- Samples and prototypes: 3 working days
- Product data: 3 working days
- Product/design substitution or modification: 5 working days

Proposed products schedules: If major products are not specified as proprietary items, submit a schedule of those proposed for use within 3 weeks of site possession.

Identification

Requirement: Identify the project, contractor, subcontractor or supplier, manufacturer, applicable product, model number and options, as appropriate and include relevant contract document references.

Non-conformance: Identify proposals that do not conform with project requirements, and characteristics which may be detrimental to successful performance of the completed work.

Errors

Requirement: If a submission contains errors, make a new or amended submission as appropriate, indicating changes made since the previous submission.

Electronic submissions

Electronic copies file format: PDF

Transmission medium: email or FTP

Hard copy submissions

Hard copy quantity: 2

Standard contract drawing size: A1

1.9 INSPECTION

Notice

Concealment: If notice of inspection is required for parts of the works that are to be concealed, give notice when the inspection can be made before concealment.

Tests: Give notice of the time and place of documented tests.

Minimum notice: As documented in the **Notices schedule**.

Light levels

Lighting levels for inspection: To AS/NZS 1680.2.4.

Attendance

General: Provide attendance for documented inspections and tests.

2 PRODUCTS

2.1 MATERIALS AND COMPONENTS

Manufacturers' or suppliers' recommendations

General: Provide and select, if no selection is given, transport, deliver, store, handle, protect, finish, adjust and prepare for use the manufactured items to the manufacturers' or suppliers' recommendations.

Proprietary items/systems/assemblies: Assemble, install or fix to substrate to the manufacturers' or suppliers' recommendations.

Project modifications: Advise of activities that supplement, or are contrary to the manufacturers' or suppliers' recommendations.

Product identification

Sealed containers: If materials or products are supplied by the manufacturer in closed or sealed containers or packages, bring the materials or products to point of use in the original containers or packages.

Other products: Marked to show the following, as applicable:

- Manufacturer's identification.
- Product brand name.
- Product type.
- Quantity.
- Product reference code and batch number.
- Date of manufacture.

Consistency

General: For each material or product use the same source or manufacturer and provide consistent type, size, quality and appearance.

Prohibited materials

General: Do not provide the following:

- Materials, exceeding the limits of those listed, in the Safe Work Australia *Hazardous Chemical Information System* (HCIS) Workplace exposure standards.

Insulation blowing agents:

- Materials that use chlorofluorocarbon (CFC) or hydrochlorofluorocarbon (HCFC) in the manufacturing process.
- A blowing agent with a global warming potential (GWP) ≥ 140.

Substitutions

Identified proprietary items: Identification of a proprietary item does not necessarily imply exclusive preference for the identified item, but indicates the necessary properties of the item.

Alternatives: If alternatives to the documented products, methods or systems are proposed, submit sufficient information to permit evaluation of the proposed alternatives, including the following:

- Evidence that the performance is equal to or greater than that specified.
- Evidence of conformity to a cited standard.
- Samples.
- Essential technical information, in English.
- Reasons for the proposed substitutions.
- Statement of the extent of revisions to the contract documents.
- Statement of the extent of revisions to the construction program.
- Statement of cost implications including costs outside the contract.
- Statement of consequent alterations to other parts of the works.

Availability: If the documented products or systems are unavailable within the time constraints of the construction program, submit evidence.

Criteria: If the substitution is for any reason other than unavailability, submit evidence that the substitution:

- Is of net enhanced value to the principal.
- Is consistent with the contract documents and is as effective as the identified item, detail or method.

3 EXECUTION

3.1 SAMPLES

General

Incorporation of samples: Only incorporate samples in the works which have been endorsed for inclusion. Do not incorporate other samples.

Retention of samples: Keep endorsed samples in good condition on site, until the date of practical completion.

Unincorporated samples: Remove on completion.

3.2 SHOP DRAWINGS

General

Documentation: Include dimensioned drawings showing details of the fabrication and installation of structural elements, building components, services and equipment, including relationship to building structure and other services, cable type and size, and marking details.

Diagrammatic layouts: Coordinate work shown diagrammatically in the contract documents, and prepare dimensioned set-out drawings.

Services coordination: Coordinate with other building and service elements. Show adjusted positions on the shop drawings.

Space requirements: Check space and access for maintenance requirements of equipment and services indicated diagrammatically in the contract documents.

Building work drawings for building services: On dimensioned drawings show the following:

- Access doors and panels.
- Conduits to be cast in slabs.
- Holding down bolts and other anchorage and/or fixings required complete with loads to be imposed on the structure during installation and operation.
- Openings, penetrations and block-outs.
- Sleeves.
- Plinths, kerbs and bases.
- Required external openings.

Submission medium: PDF

Drawing size: A1

CAD base drawings: DWG (AutoCAD V.2013)

Record drawings: Amend all documented shop drawings to include changes made during the progress of the work and up to the end of the defects liability period.

3.3 OFF-SITE DISPOSAL

Removal of material

General: Dispose of building waste material off site to the requirements of the relevant authorities.

3.4 WALL CHASING

Holes and chases

General: If holes and chases are required in masonry walls, make sure structural integrity of the wall is maintained. Do not chase walls with a fire-resistance level or an acoustic rating.

Parallel chases or recesses on opposite faces of a wall: Not closer than 600 mm to each other.

Chasing blockwork: Only chase core-filled hollow blocks or solid blocks which are not documented as structural.

Concrete blockwork chasing table

Block thickness (mm)	Maximum depth of chase (mm)
190	35
140	25
90	20

3.5 FIXING

General

Suitability: If equipment is not suitable for fixing to non-structural building elements, fix directly to structure and trim around penetrations in non-structural elements.

Fasteners

General: Use proprietary fasteners capable of transmitting the loads imposed, and sufficient for the rigidity of the assembly.

3.6 SERVICES CONNECTIONS

Connections

General: Connect to utility service provider services or service points. Excavate to locate and expose connection points. Reinstate the surfaces and facilities that have been disturbed.

Utility service provider requirements

General: If the utility service provider elects to perform or supply part of the works, make the necessary arrangements. Install equipment supplied, but not installed, by the utility service provider.

3.7 SERVICES INSTALLATION

General

Fixing: If non-structural building elements are not suitable for fixing services to, fix directly to structure and trim around penetrations in non-structural elements.

Installation: Install equipment and services as follows:

- Plumb and securely fixed.
- Allow for movement in both structure and services.
- Arrange services running together, parallel to each other and adjacent building elements.

Concealment: Conceal all cables, ducts, trays and pipes except where installed in plant spaces, ceiling spaces and riser cupboards or documented to be exposed. If alternative routes are available, do not locate on external walls.

Lifting: Provide heavy items of equipment with permanent fixtures for lifting to the manufacturer's recommendations.

Suspended ground floors: Keep all parts of services suspended under ground floors at least 150 mm clear of the ground surface. Make sure services do not impede access.

Dissimilar metals

Jointing: Join dissimilar metals with fittings of electrolytically compatible material.

Temporary capping

Pipe ends: During construction, protect open ends of pipe with metal or plastic covers or caps.

Piping

General: Install piping in straight lines at uniform grades without sags. Arrange to prevent air locks. Provide sufficient unions, flanges and isolating valves to allow removal of piping and fittings for maintenance or replacement of plant.

Spacing: Provide at least 25 mm clear between pipes and between pipes and building elements, additional to insulation.

Changes of direction: Provide as follows:

- If practicable, long radius elbows or bends and sets, and swept branch connections.
- If pipes are led up or along walls and then through to fixtures, provide elbows or short radius bends.
- Do not provide mitred fittings.

Vibration: Arrange and support piping to prevent vibration whilst permitting necessary movement. Minimise the number of joints.

Embedded pipes: Do not embed pipes that operate under pressure in concrete or surfacing material.

Valve groupings: If possible, locate valves in groups.

Pressure testing precautions: Isolate items not rated for the test pressure. Restrain pipes and equipment to prevent movement during pressure testing.

Support and structure

Requirement: Provide incidental supports and structures to suit the services.

Pipe support systems

General: Provide proprietary support systems of metallic-coated steel construction.

Vertical pipes: Provide anchors and guides to maintain long pipes in position, and supports designed for the mass of the pipe and its contents.

Saddles: Provide saddle supports only on DN 25 or smaller pipes.

Dissimilar metals: If pipe and support materials are dissimilar, provide industrial grade electrically non-conductive material securely bonded to the pipe to separate them. Provide fasteners of electrolytically compatible material.

Uninsulated pipes: Clamp piping supports directly to pipes.

Insulated pipes:

- Spacers: Provide spacers at least as thick as the insulation between piping supports and pipes. Extend either side of the support by at least 20 mm.
- Spacer material: Rigid insulation material of sufficient strength to support the piping and suitable for the temperature application.

Support spacing: As follows:

- Cold and heated water pipes: To AS/NZS 3500.1 Table 5.6.4. Provide additional brackets, clips or hangers to prevent pipe movement caused by water pressure effects.
- Sanitary plumbing: To AS/NZS 3500.2 Table 10.2.1.
- Fuel gas: To AS/NZS 5601.1 Table 5.5.
- Other pipes: To AS/NZS 3500.1 Table 5.6.4.

Hanger size table

Nominal pipe size (DN)	Minimum hanger diameter for single hangers (mm)
50 maximum	9.5
65 to 90	12.7
100 to 125	15.8
150 to 200	19.0

Differential movement

General: If the geotechnical site investigation report predicts differential movements between buildings and the ground in which pipes or conduits are buried, provide control joints in the pipes or conduits, as follows:

- Arrangement: Arrange pipes and conduits to minimise the number of control joints.
- Magnitude: Accommodate the predicted movements.

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3.8 BUILDING PENETRATIONS

Penetrations

Requirement: Maintain the required structural integrity, fire performance, waterproofing performance and other properties when penetrating or fixing to the following:

- Structural building elements including external walls, fire walls, fire doors and access panels, other tested and rated assemblies or elements, floor slabs and beams.
- Membrane elements including damp-proof courses, waterproofing membranes and roof coverings. If penetrating membranes, provide a waterproof seal between the membrane and the penetrating component.

Sealing

Fire-resisting building elements: Seal penetrations with a system conforming to AS 4072.1.

Non fire-resisting building elements: Seal penetrations around conduits and sleeves. Seal around cables within sleeves. If the building element is acoustically rated, maintain the rating.

Sleeves

General: If piping, cables or conduits penetrate building elements, provide metal or PVC-U sleeves formed from pipe sections as follows:

- Movement: Arrange to permit normal pipe or conduit movement.
- Diameter (for non fire-resisting building elements): Sufficient to provide a ring shaped space around the pipe or pipe insulation of at least 12 mm.
- Ferrous surfaces: Prime paint.
- Sealing: Seal between pipes or conduits and sleeves to prevent the entry of vermin.
- Terminations:
  - . Cover plates fitted: Flush with the finished building surface.
  - . Fire-resisting and acoustic rated building elements: 50 mm beyond finished building surface.
  - . Floors draining to floor wastes: 50 mm above finished floor.
  - . Other locations: 5 mm beyond finished building surface.
  - . Termite management: To AS 3660.1.
- Thickness:
  - . Metal: 1 mm or greater.
  - . PVC-U: 3 mm or greater.

3.9 CONCRETE PLINTHS

Construction

General: Provide concrete plinths as documented and under all equipment located on concrete floor slabs as follows:

- Surround: Galvanized steel, at least 75 mm high and 1.6 mm thick. Fix to the floor with masonry anchors. Fill with concrete.
- Height: 75 mm or greater, as documented.
- Reinforcement: Single layer of F62 fabric.
- Concrete: Grade N20.
- Finish: Steel float, flush with top edge of the surround.

3.10 PLANT AND EQUIPMENT

General

Location: Locate so failure of plant and equipment (including leaks) does not create a hazard for the building occupants and causes a minimum or no damage to the building, its finishes and contents including water sensitive equipment or finishes.

Safe tray and an overflow pipe: Provide to each tank, hot water heater and storage vessel.

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3.11 ACCESS FOR MAINTENANCE

General

Requirement: Provide access for maintenance of plant and equipment.

Standards: Conform to the relevant requirements of AS 1657, AS/NZS 1892.1, AS 2865 and AS/NZS 3666.1.

Work Health and Safety: Conform to the requirements of the applicable Work Health and Safety regulations.

Protection from injury: Protect personnel from injury caused by contact with objects including those that are sharp, hot or protrude at low level.

Plant room flooring surfaces: R10 Slip resistance classification to AS 4586.

Trip hazards: Do not run small services including drains and conduits across floors where they may be a trip hazard.

Manufacturer's standard equipment: If necessary, modify manufacturer’s standard equipment to provide the plant access documented.

Clearances

Minimum clearances for access: Conform to the following:

- Vertical clearance: ≥ 2100 mm, vertically above horizontal floors, ground and platforms.
- Horizontal clearance: Preferably ≥ 750 mm clear, but in no case less than 600 mm between equipment or between equipment and building features including walls.
- If tools are required to operate, adjust or remove equipment, provide sufficient space so the tools can be used in their normal manner and without requiring the user to employ undue or awkward force.
- Hinged or removable components: To the manufacturer's recommendations.
- Within plant items: Conform to the preceding requirements, and not less than the clearances recommended in BS 8313.

Elevated services other than in occupied areas

Access classifications:

- Access class A: Readily accessible. Provide clear and immediate access to and around plant items. If plant or equipment is located more than 2.0 m above the ground, floor or platform, provide a platform with handrails accessible by a stair, all to AS 1657.
- Access class B: If the plant item requiring access is located more than 2.0 m above the ground, floor or platform, provide a platform with handrails accessible by a non-vertical ladder, all to AS 1657.
- Access class C: Locate plant so temporary means of access conforming to Work health and Safety regulations can be provided.

Temporary means of access: Make sure there is adequate provision in place which is safe and effective.

Areas in which access is restricted to authorised maintenance personnel: Provide access as follows:

- Instruments, gauges and indicators (including warning and indicating lights) requiring inspection at any frequency: Readily accessible.
- Access required monthly or more frequently: Access class A.
- Access required between monthly and six monthly: Access class A or B.
- Access required less frequently than six monthly: Access class A, B or C.

Other areas: Provide access as follows:

- Locate to minimise inconvenience and disruption to building occupants or damage to the building structure or finishes.
- In suspended ceilings, locate items of equipment that require inspection and/or maintenance above tiled parts. If not possible, provide access panels where located above set plaster or other inaccessible ceilings. Arrange services and plant locations to reduce the number of access panels. Coordinate with other trades to use common access panels where feasible.
- Do not locate equipment requiring access above partitions.
- Instruments, gauges and other items requiring inspection at any frequency: Readily accessible.
- Labelling: If equipment is concealed in ceilings, provide marking to **MARKING AND LABELLING**, **Equipment concealed in ceilings**.

Facilities for equipment removal and replacement

Requirement: Provide facilities to permit removal from the building and replacement of plant and equipment, including space large enough to accommodate it and any required lifting and/or transportation equipment. Arrange plant so large and/or heavy items can be moved with the minimum changes of direction.

Removal of components: Allow sufficient space for removal and replacement of equipment components including air filters, tubes of shell and tube heat exchangers, removable heat exchanger bundles, coils and fan shafts. Provide access panels or doors large enough to permit the safe removal and replacement of components within air handling units.

Facilities for access

Equipment behind hinged doors: Provide doors opening at least 150°.

Equipment behind removable panels: Provide panels with quick release fasteners or captive metal thread screws.

Removable panels: Provide handles to permit easy and safe removal and replacement.

Insulated plant and services: If insulation must be removed to access plant and services for maintenance, arrange it to allow for removal and replacement without damage.

Piping

Requirement: Conform to the following:

- Provide access and clearance at fittings which require maintenance, inspection or servicing, including control valves and joints intended to permit pipe removal.
- Arrange piping so it does not interfere with the removal or servicing of associated equipment or valves or block access or ventilation openings.
- Preferably run piping, conduits, cable trays and ducts at high level and drop vertically to equipment.

Electrical equipment and controls

Electrical equipment: Provide clearances and access space to AS/NZS 3000.

Switchboards and electrical control equipment: Locate near the main entrance to plant space and with switchboards visible from the plant being operated.

Control panels: Locate near and visible from the plant being controlled.

3.12 VIBRATION SUPPRESSION

General

Requirement: Minimise the transmission of vibration from rotating or reciprocating equipment to other building elements.

Standard

Machinery noise and vibration: Vibration severity in Zone A to ISO 20816-1 and ISO 10816-3.

Speeds

General: If no maximum speed is prescribed, do not exceed 1500 r/min for direct driven equipment.

Connections

General: Provide flexible connections to rotating machinery and assemblies containing rotating machinery. Isolate pipes by incorporating sufficient flexibility into the pipework or by use of proprietary flexible pipe connections installed to prevent placing stress on pipes due to end reaction.

Inertia bases

General: If necessary to achieve the required level of vibration isolation, provide inertia bases having appropriate mass and to the following:

- Construction: Steel or steel-framed reinforced concrete. Position foundation bolts for equipment before pouring concrete.
- Supports: Support on vibration isolation mountings using height saving support brackets.

Vibration isolation mountings

General: Except for external equipment that is not connected to the structure of any building, support rotating or reciprocating equipment on mountings as follows:

- For static deflections < 15 mm: Single or double deflection neoprene in-shear mountings incorporating steel top and base plates and a tapped hole for bolting to equipment.
- For static deflections ≥ 15 mm: Spring mountings.

Selection: Provide mountings selected to achieve 95% isolation efficiency at the normal operating speeds of the equipment.

Installation: Set and adjust vibration isolation mounting supports to give clearance for free movement of the supports.

Spring mountings: Provide freestanding laterally stable springs as follows:

- Clearances: ≥ 12 mm between springs and other members such as bolts and housing.
- High frequency isolation: 5 mm neoprene acoustic isolation pads between baseplate and support.
- Levelling: Provide bolts and lock nuts.
- Minimum travel to solid: ≥ 150% of the designated minimum static deflection.
- Ratio of mean coil diameter to compressed length at the designated minimum static deflection: ≥ 0.8:1.
- Snubbing: Snub the springs to prevent bounce at start-up.
- Vertical resilient limit stops: To prevent spring extension when unloaded, to serve as blocking during erection and which remain out of contact during normal operation.

3.13 FINISHES TO BUILDING SERVICES

General

Requirement: If exposed to view (including in plant rooms), paint building services and equipment.

Surfaces painted or finished off-site: Conform to *0183 Metals and prefinishes*.

Exceptions: Do not paint chromium or nickel plating, anodised aluminium, GRP, stainless steel, non-metallic flexible materials and normally lubricated machined surfaces. Surfaces with finishes applied off-site need not be re-painted on-site provided the corrosion resistance of the finish is not less than that of the respective finish documented.

Standard: Conform to the recommendations of AS/NZS 2311 Sections 3, 6 and 7 or AS 2312.1 Sections 6, 7 and 8, as applicable.

Inaccessible surfaces: If surfaces are inaccessible after installation, complete finish before installation.

Painting systems

New unpainted interior surfaces: To AS/NZS 2311 Table 5.1.

New unpainted exterior surfaces: To AS/NZS 2311 Table 5.2.

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Paint application
Coats: Apply the first coat immediately after substrate preparation and before contamination of the substrate can occur. Make sure each coat of paint or clear finish is uniform in colour, gloss, thickness and texture and free of runs, sags, blisters or other discontinuities.

Combinations: Do not combine paints from different manufacturers in a paint system.

Protection: Remove fixtures before starting to paint and refix in position undamaged when painting is complete.

Underground metal piping
Requirement: Provide corrosion protection for the following:

- Underground ferrous piping.
- Underground non-ferrous metal piping in corrosive environments.

Corrosion protection: Select from the following:

- Cathodic protection: Sacrificial anodes or impressed current. Incorporate a facility for periodic testing. Conform to the recommendations of AS 2832.1.
- Continuous wrapping using proprietary petroleum taping material.
- Impermeable flexible plastic coating.
- Sealed polyethylene sleeve.

Aggressive soils: If metallic piping or components are installed in chemically aggressive soil, provide additional protection as follows:

- Material: Continuous polyethylene sleeve to ASTM D1248 with a minimum thickness of 0.25 mm.
- Installation: Wrap or sleeve pipes and components. Tape joints between sections of polyethylene and between polyethylene and piping.

Low VOC emitting paints
Paint types: To the recommendations of AS/NZS 2311 Table 4.2.

Repairs to finishes
Requirement: Repair damaged finishes to restore their corrosion protection, appearance and service life.

3.14 MARKING AND LABELLING

General
Requirement: Mark and label services and equipment for identification purposes as follows:

- Locations exposed to weather: Provide durable materials.
- Pipes, conduits and ducts: To AS 1345 throughout its length, including in concealed spaces.
- Cables: Label to indicate the origin and destination of the cable.

Consistency: Label and mark equipment using a consistent scheme across all services elements of the project.

Label samples and schedules
Requirement: For each item or type of item, prepare a schedule of marking and labelling, including the following:

- A description of the item or type of item for identification.
- The proposed text for marking or labelling.
- The proposed location of the marking and labelling.

Submission timing: Before marking or labelling.

Electrical accessories
Circuit identification: Label isolating switches and outlets to identify circuit origin.

Operable devices
Requirement: Mark to identify the following:
- Controls.
- Indicators, gauges, meters.
- Isolating switches.

Equipment concealed in ceilings
Location: Provide a label on the ceiling, to indicate the location of each concealed item requiring access for routine inspection, maintenance and/or operation and as follows:
- Tiled ceilings, locate the label on the ceiling grid closest to the concealed item access point.
- Flush lined ceilings, locate adjacent to closest access panel.

Concealed equipment: Items to be labelled include the following:
- Fan coil units and terminal equipment (e.g. VAV terminals).
- Fire and smoke dampers.
- Isolating valves not directly connected to items otherwise labelled.
- Motorised dampers.

Wall mounted equipment in occupied areas
Location: Provide labels on wall mounted items in occupied areas including the following:
- Services control switches.
- Temperature and humidity sensors.

Points lists
Automatic control points: Provide plasticised, fade-free points lists for each automatic control panel and include terminal numbers, point addresses, short and long descriptors in the lists. Store in a pocket on the door of the panel.

Pressure vessels
General: Mount manufacturer's certificates in glazed frames on a wall next to the vessel.

Valves and pumps
General: Label to associate pumps with their starters and valves. Screw fix labels to body or attach label to valve handwheels with a key ring.

Underground services
Survey: Accurately record the routes of underground cables and pipes before backfilling. Include on the record drawings.

Records: Provide digital photographic records of underground cable and pipe routes before backfilling. Include in operation and maintenance manual.

Location marking: Accurately mark the location of underground cables and pipes with route markers consisting of a marker plate set flush in a concrete base, engraved to show the direction of the line and the name of the service.

Markers: Place markers at ground level at each joint, route junction, change of direction, termination and building entry point and in straight runs at intervals of not more than 100 m.

Marker bases: 200 mm diameter x 200 mm deep, minimum concrete.

Direction marking: Show the direction of the cable and pipe run by means of direction arrows on the marker plate. Indicate distance to the next marker.

Plates: Brass, aluminium or stainless steel with black filled engraved lettering, minimum size 75 x 75 x 1 mm thick.

Plate fixing: Waterproof adhesive and 4 brass or stainless steel countersunk screws.

Marker height: Set the marker plate flush with paved surfaces, and 25 mm above other surfaces.

Marker tape: Where electric bricks or covers are not provided over underground wiring, provide a 150 mm wide yellow or orange marker tape bearing the words WARNING – electric cable buried below, laid in the trench 150 mm below ground level.

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Plastic pipe: Provide a detectable marker tape with trace wire to identify the route of buried piping. Terminate with 1000 mm coil in a readily accessible location. Tag to match the record drawings.

Labels and notices

Materials: Select from the following:

- Cast metal.
- For indoor applications only, engraved two-colour laminated plastic.
- Proprietary pre-printed self-adhesive flexible plastic labels with machine printed black lettering.
- Stainless steel or brass minimum 1 mm thick with black filled engraved lettering.

Emergency functions: To AS 1319.

Colours: Generally to AS 1345 as appropriate, otherwise black lettering on white background except as follows:

- Danger, warning labels: White lettering on red background.
- Main switch and caution labels: Red lettering on white background.

Edges: If labels exceed 1.5 mm thickness, radius or bevel the edges.

Labelling text and marking: To correspond to terminology and identifying number of the respective item as shown on the record drawings and documents and in operating and maintenance manuals.

Lettering heights:

- Danger, warning and caution notices: Minimum 10 mm for main heading, minimum 5 mm for remainder.
- Equipment labels within cabinets: Minimum 5 mm.
- Equipment nameplates: Minimum 40 mm.
- Identifying labels on outside of cabinets: Minimum 5 mm.
- Isolating switches: Minimum 5 mm.
- Switchboards, main assembly designation: Minimum 25 mm.
- Switchboards, outgoing functional units: Minimum 10 mm.
- Switchboards, sub assembly designations: Minimum 15 mm.
- Valves: Minimum 20 mm.
- Self-adhesive flexible plastic labels:
  - Labels less than 2000 mm above floor: 5 mm.
  - Labels minimum 2000 mm above floor: 10 mm.
  - Other locations: Minimum 5 mm.

Label locations: Locate labels so they are easily seen and are either attached to, below or next to the item being marked.

Fixing: Fix labels securely using screws, rivets, proprietary self-adhesive labels or double-sided adhesive tape and as follows:

- If labels are mounted in extruded aluminium sections, use rivets or countersunk screws to fix the extrusions.
- Use aluminium or monel rivets for aluminium labels.

Vapour barriers: Do not penetrate vapour barriers.

3.15 RECORD DRAWINGS

General

Requirement: Prepare record drawings showing the following:

- Installed locations of building elements, services, plant and equipment.
- Off-the-grid dimensions and depth if applicable.
- Any provisions for the future.

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Recording, format and submission

Requirement: Record changes made during the progress of the works on a set of drawings kept on site for that specific purpose.

Drawing layout: Use the same borders and title block as the contract drawings.

Quantity and format: Conform to **SUBMISSIONS.**

Endorsement: Sign and date all record drawings.

Accuracy: If errors in, or omissions from, the record drawings are found, amend the drawings and re-issue in the quantity and format documented for **SUBMISSIONS.**

Date for submission: Not later than 2 weeks after the date for practical completion.

Services record drawings

General: To **General** and **Recording, format and submission** and the following:

- Extensions and/or changes to existing: If a drawing shows extensions and/or alterations to existing installations, include sufficient of the existing installation to make the drawing comprehensible without reference to drawings of the original installation.
- Detention: If on-site detention tanks or pondage are provided, include the volume required on the drawing and the permitted flow rate to the connected system.
- Domestic cold water or fire mains: Show the pressure available at the initial connection point and the pressure available at the most disadvantaged location on each major section of the works.
- Stormwater: If storm water pipes are shown, include the pipe size and pipe grade together with the maximum acceptable flow and the actual design flow.

Diagrams: Provide diagrammatic drawings of each system including the following:

- Controls.
- Piping including all valves and valve identification tags.
- Principal items of equipment.
- Single line wiring diagrams.
- Acoustic and thermal insulation.
- Access provisions and space allowances.
- Fasteners.
- Fixtures.
- Switchgear and control gear assembly circuit schedules including electrical service characteristics, controls and communications.
- Charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

Subsurface services: Record information on underground or submerged services to the documented quality level, conforming to AS 5488.

3.16 OPERATION AND MAINTENANCE MANUALS

General

Authors and compilers: Personnel experienced in the maintenance and operation of equipment and systems installed, and with editorial ability.

Referenced documents: If referenced documents or worksections require submissions of manuals, include corresponding material in the operation and maintenance manuals.

Subdivision: By installation or system, depending on project size.

Contents of manual

Table of contents: Include a table of contents in each volume. Title to match cover.

Table of amendments: Include a table of amendments.

Directory: Include names, addresses, email addresses and telephone and facsimile numbers of principal consultant, subconsultants, contractor, subcontractors and names of responsible parties.

Record drawings: Include complete set of record drawings, full size.

Drawings and technical data: Include as necessary for the efficient operation and maintenance of the installation.

Installation description: Include a general description of the installation.

Systems descriptions and performance: Include a technical description of the systems installed including design concepts embodied, the interrelation with other systems and the building and mode of operation, presented in a clear and concise format readily understandable by the principal's staff. Identify function, normal operating characteristics, safety features and limiting conditions.

Baseline data: To AS 1851, AS 1668.1, AS 1682.2 and AS 1670.1.

Commissioning results: Include for use as baseline data for system and equipment maintenance performance.

Fire systems and equipment: Include documentation to AS 1851, including the schedule of essential functionality and performance requirements.

Digital photographic records: Include records to **MARKING AND LABELLING, Underground services**.

Equipment descriptions:

- Name, address, email address and telephone and facsimile numbers of the manufacturer and supplier of items of equipment installed, together with catalogue list numbers.
- Schedules (system by system) of equipment, stating locations, duties, performance figures and dates of manufacture. Provide a unique code number cross-referenced to the record and diagrammatic drawings and schedules, including spare parts schedule, for each item of equipment installed. Equipment schedules in tabular form including the equipment designation used on the drawings, manufacturer's name and contact details, equipment name plate data, function of item, associated system and capacity data.
- Manufacturers' technical literature for equipment installed, assembled specifically for the project, excluding irrelevant matter. Mark each product data sheet to clearly identify specific products and component parts used in the installation, and data applicable to the installation.
- Supplements to product data to illustrate relations of component parts. Include typed text as necessary.

Certificates:

- Certificates from authorities.
- Copies of manufacturers' warranties.
- Product certification.
- Test certificates for each service installation and all equipment.
- Test reports.
- Test, balancing and commissioning reports.
- Control system testing and commissioning results.
- Warranties.

Trends: 7 day record of all trends at commissioning.

Operation procedures:

- Manufacturers' technical literature as appropriate.
- Safe starting up, running-in, operating and shutting down procedures for systems installed. Include logical step-by-step sequence of instructions for each procedure.
- Control sequences and flow diagrams for systems installed.
- Legend for colour-codes services.
- Schedules of fixed and variable equipment settings established during commissioning and maintenance.
- Procedures for seasonal changeovers.
- Warnings to operators.
- Recommendations for efficient plant operation.
- If the installation includes cooling towers, a water efficiency management plan.

Maintenance procedures:

- Detailed recommendations for periodic maintenance and procedures, including schedule of maintenance work with frequency and manufacturers' recommended tests.
- Manufacturer's technical literature as appropriate. Register with manufacturer as necessary. Retain copies delivered with equipment.
- Safe trouble-shooting, disassembly, repair and reassembly, cleaning, alignment and adjustment, balancing and checking procedures. Provide logical step-by-step sequence of instructions for each procedure.
- Schedule of spares, recommended to be held on site, for those items subject to wear or deterioration and that may involve the principal in extended deliveries when replacements are required. Include complete nomenclature and model numbers, and local sources of supply.
- Schedule of normal consumable items, local sources of supply, and expected replacement intervals up to a running time of 40 000 hours. Include lubrication schedules for equipment.
- Schedules for recording recommissioning data to identify changes in the system over time.
- Instructions for use of tools and testing equipment.
- Troubleshooting procedures.
- Emergency procedures, including telephone numbers for emergency services, and procedures for fault finding.
- Safety data sheets (SDS).
- Instructions and schedules conforming to AS 1851, AS/NZS 3666.2, AS/NZS 3666.3 and AS/NZS 3666.4.

Maintenance records:

- Prototype service records conforming to AS 1851 prepared to include project specific details.
- Prototype periodic maintenance records and report to AS/NZS 3666.2, AS/NZS 3666.3 and AS/NZS 3666.4 as appropriate, prepared to include project specific details.
- Hard copies: Binders to match the manuals, containing loose leaf log book pages designed for recording completion activities including operational and maintenance procedures, materials used, test results, comments for future maintenance actions and notes covering the condition of the installation. Include completed log book pages recording the operational and maintenance activities performed up to the date for practical completion.
- Number of pages: The greater of 100 pages or enough pages for the maintenance period and a further 12 months.

Emergency information: For each type of emergency, including fire, flood, gas leak, water leak, power failure, water failure, system or sub system failure, chemical release or spill, include the following:

- Emergency instructions.
- Emergency procedures including:
  . Instructions for stopping or isolating.
  . Shutdown procedures and sequences.
  . Instructions for actions outside the property.
  . Special operating instructions relevant to the emergency.
  . Contact details relevant to the emergency.

Emergency information manual

Form of emergency information: Provide one of the following:

- An index and coloured tabs identifying emergency information for each type of emergency within the Operation and maintenance manual.
- A separate Emergency manual containing copies of emergency information from the main Operation and maintenance manual.

Format – electronic copies

Scope: Provide the same material as documented for hardcopy in electronic format.

Quantity and format: Conform to **SUBMISSIONS , Electronic submissions**.

Printing: Except for drawings required in the **RECORD DRAWINGS** clause provide material that can be legibly printed on A4 size paper.

Format – hard copies

General: A4 size loose leaf, in commercial quality, 4 ring binders with hard covers, each indexed, divided and titled. Include the following features:

- Cover: Identify each binder with typed or printed title *OPERATION AND MAINTENANCE MANUAL*, to spine. Identify title of project, volume number, volume subject matter, and date of issue.
- Dividers: Durable divider for each separate element, with typed description of system and major equipment components. Clearly print short titles under laminated plastic tabs.
- Drawings: Fold drawings to A4 size with title visible, insert in plastic sleeves (one per drawing) and accommodate them in the binders.
- Pagination: Number pages.
- Ring size: 50 mm maximum, with compressor bars.
- Text: Manufacturers' printed data, including associated diagrams, or typewritten, single-sided on bond paper, in clear concise English.

Number of copies: 3.

Date for submission

Draft submission: The earlier of the following:

- 4 weeks before the date for practical completion.
- Commencement of training on services equipment.

Final submission: Within 2 weeks after practical completion.

3.17 TOOLS AND SPARE PARTS

Spare parts

General: Provide spare parts listed in the appropriate worksections.

Replacement: Replace spare parts used during the maintenance period.

Tools and spare parts schedule
Submission timing: At least 8 weeks before the date for practical completion.

Requirement: Prepare a schedule of tools, portable instruments and spare parts necessary for maintenance of the installation. For each item state the recommended quantity and the manufacturer's current price. Include the following in the prices:

- Checking receipt, marking and numbering in conformance with the spare parts schedule.
- Packaging and delivery to site.
- Painting, greasing and packing to prevent deterioration during storage.
- Referencing equipment schedules in the operation and maintenance manuals.
- Suitable means of identifying, storing and securing the tools and instruments. Include instructions for use.

3.18 TESTING

Attendance
General: Provide attendance on tests.

Testing authorities
General: Except for site tests, have tests carried out by an Accredited Testing Laboratory.

Test instruments: Use instruments calibrated by an Accredited Testing Laboratory.

Test reports
General: Indicate observations and results of tests and conformance or non-conformance with requirements.

Notice
Inspection: Give sufficient notice for inspection to be made of the commissioning and completion testing of the installation.

Controls
General: Calibrate, set and adjust control instruments, control systems and safety controls.

Circuit protection
General: Confirm that circuit protective devices are sized and adjusted to protect installed circuits.

Completion tests
General: Test the works under the contract to demonstrate conformance with the documented performance requirements of the installation.

Functional checks: Carry out functional and operational checks on energised equipment and circuits and make final adjustments for the correct operation of safety devices and control functions.

Type test reports: Required, as evidence of conformance of proprietary equipment.

Sound pressure level measurements: Conform to the following:

- Correction for background noise: To AS/NZS 2107 Table B1.
- External: To AS 1055.
- Internal: To AS/NZS 2107.
- Measurement positions: If a test position is designated only by reference to a room or space, do not take measurements less than 1 m from the floor, ground or walls.
- Sound pressure level analysis: Measure the sound pressure level and the background sound pressure level over the full range of octave band centre frequencies from 31.5 Hz to 8 kHz at the designated positions.
- Sound pressure levels: Measure the A-weighted sound pressure levels and the A-weighted background sound pressure levels at the designated positions.

Fire system test - hot smoke
Requirement: Before date for practical completion conduct a hot smoke test.

Notice: Give notice of the test.

Systems: Test the following:

- Fire alarm system.
- Emergency warning system.
- Fire sprinkler system.
- Hydrant system.
- Access control system.
- Security system.
- Mechanical services systems.
- Building management systems.

Restoration: Demonstrate that the systems return to normal operation after the tests.

Report: Submit a report detailing the tests and results.

Fire system test - integrated fire modes
Requirement: Before Practical completion conduct tests to verify that the independent fire systems operate together in integrated manner.

Notice: Give notice of the test.

Systems: Test the following:

- Fire alarm system.
- Emergency warning system.
- Fire sprinkler system.
- Hydrant system.
- Access control system.
- Security system.
- Mechanical services systems.
- Building management systems.

Restoration: Demonstrate that the systems return to normal operation after the tests.

Report: Submit a report detailing the tests and results.

Certification
General: On satisfactory completion of the installation and before the date of practical completion, certify that each installation is operating correctly.

3.19 TRAINING

General
Duration: Instruction to be available for the whole of the commissioning and running-in periods.

Format: Conduct training at agreed times, at system or equipment location. Also provide seminar instruction to cover all major components.

Operation and maintenance manuals: Use items and procedures listed in the final draft operation and maintenance manuals as the basis for instruction. Review contents in detail with the principal's staff.

Certification: Provide written certification of attendance and participation in training for each attendee. Provide register of certificates issued.

Demonstrators
General: Use only qualified manufacturer's representatives who are knowledgeable about the installations.

Operation
General: Explain and demonstrate to the principal's staff the purpose, function and operation of the installations.

Maintenance
General: Explain and demonstrate to the principal's staff the purpose, function and maintenance of the installations.

Seasonal operation
General: For equipment requiring seasonal operation, demonstrate during the appropriate season and within 6 months.

3.20 CLEANING

Final cleaning
General: Before the date for practical completion, clean throughout, including all exterior and interior surfaces except those totally and permanently concealed from view.

Labels: Remove all labels not required for maintenance.

3.21 WARRANTIES

General
Requirement: If a warranty is documented, name the principal as warrantee. Register with manufacturers as necessary. Retain copies delivered with components and equipment.

Warranty period: Start warranty periods at acceptance of installation.

Approval of installer: If installation is not by manufacturer, and product warranty is conditional on the manufacturer's approval of the installer, submit the manufacturer's written approval of the installing firm.

3.22 PERIODIC MAINTENANCE OF SERVICES

General
Requirement: During the maintenance period, carry out periodic inspections and maintenance work as recommended by manufacturers of supplied equipment, and promptly rectify faults.

Emergencies: Attend emergency calls promptly.

Annual maintenance: Carry out recommended annual maintenance procedures before the end of the maintenance period.

Maintenance period: The greater of the defects liability period and the period documented in the **Maintenance requirements schedule**.

Maintenance program
General: Submit details of maintenance procedures and program, relating to installed plant and equipment, 6 weeks before the date for practical completion. Indicate dates of service visits. State contact telephone numbers of service operators and describe arrangements for emergency calls.

Maintenance records
General: Record in binders provided with the Operation and maintenance manuals.

Referenced documents: If referenced documents or technical worksections require that log books or records be submitted, include this material in the maintenance records.

Certificates: Include test and approval certificates.

Service visits: Record comments on the functioning of the systems, work carried out, items requiring corrective action, adjustments made and name of service operator. On completion of the visit, obtain the signature of the principal's designated representative on the record of the work undertaken.

Site control
General: Report to the principal's designated representative on arriving at and before leaving the site.

3.23 POST-CONSTRUCTION MANDATORY INSPECTIONS AND MAINTENANCE

General

Requirement: For the duration of the defects liability period, provide inspections and maintenance of safety measures required by the following:

- AS 1851.
- Other statutory requirements applicable to the work.

Records: Provide mandatory records.

Certification: Certify that mandatory inspections and maintenance have been carried out and that the respective items conform to statutory requirements.

Annual inspection: Perform an annual inspection and maintenance immediately before the end of the defects liability period.

0172 ENVIRONMENTAL MANAGEMENT

1 GENERAL

1.1 RESPONSIBILITIES

General
Requirement: Provide environmental management, as documented.

Management and control plans
Implementation: To approved management plans.

Management and control measures
Implementation: To the documented management and control measures.

1.2 CROSS REFERENCES

General
Requirement: Conform to the following:

- *0171 General requirements*.

1.3 INTERPRETATION

Abbreviations
General: For the purposes of this worksection the following abbreviations apply:

- EIA: Environmental impact assessment.
- EMP: Environmental management plan.

Definitions
General: For the purposes of this worksection the following definitions apply:

- Clearances: A formal certificate, approval or condition issued by a statutory authority allowing work in a particular area.
- Contamination of land: The presence of a substance in, on or under the land which is designated hazardous material and/or is at a concentration above that which is normally found in that locality, and presents a risk of harm to human health or to the environment.
- Environment: The physical factors of the surroundings of human beings including the land, waters, atmosphere, climate, sound, odours, tastes; and the biological factors of animals; and plants and the social factor of aesthetics.
- Environmental audit: A review of environmental management practices, in particular the evaluation of a site for environmental liability.
- Environmental impact assessment (EIA): A method for predicting environmental impacts of a proposed development including strategies for minimising identified impacts.
- Environmental management plan (EMP): A project or site specific plan describing the management of the environmental issues and considerations for the activity being undertaken. This applies to the design, construction and operation of the buildings, external works and infrastructure.
- Organic waste: Includes all food wastes, vegetative wastes from land clearing and pruning operations, biosolids produced from the treatment of liquid wastes, garden wastes and forestry waste (bark and saw dust) and paper and cardboard products.
- Pollution incident: An incident or set of circumstances during or as a consequence of which there is, or is likely to be, a leak, spill or other escape of a substance as a result of which pollution has occurred, is occurring or is likely to occur.
- Weed: An invasive plant that degrades natural areas, reduces the sustainability or affects the health of people and animals.

1.4 SUBMISSIONS

Subcontractors

Weed management personnel: Submit details of the following:

- Subcontractors: Names and contact details for proposed subcontractors and evidence of experience in treatment of weed infestations.
- Chemical treatments: Name and qualifications of handlers and treatment type and application date.

1.5 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Non-conforming items, e.g. ground contamination.
- Completed removal or rectification of non-conforming items.
- Unexpected finds.

2 ENVIRONMENTAL ADMINISTRATION, MONITORING AND REPORTING

2.1 PROCEDURAL AND PERSONNEL

Legislative environmental control requirements

Development approval conditions: refer to SSDA Conditions of Consent

Environmental impact statement issues: refer to SSDA conditions of Consent

Community liaison

General: Notify residents of construction activities that will affect access to, or disrupt the use of, their properties.

Notice: Minimum 5 working days, unless the work is of an urgent nature with safety implications.

Notification content:

- Description of the work.
- Reason for the work.
- Expected duration.
- Changes to traffic arrangements and property access.
- 24-hour contact number of the representative responsible.

Emergency response

Emergency response personnel: Provide staff names and contact details.

Complaints

Reporting: Within 1 working day of receiving a complaint about an environmental impact, including pollution incidents, submit a written report detailing the complaint and remedial action taken.

Register: Keep a register of all complaints and action taken.

Unexpected finds

Requirement: Give notice and close off affected site area with barrier tapes and warning signs to prevent access. Unexpected finds include asbestos and other hazardous or volatile contaminants, archaeological finds and items of heritage value.

2.2 MONITORING

Internal monitoring

Approval authority: Refer to SSDA Conditions of Consent

Documentation: Provide descriptions of the following:

- Environmental monitoring: Implementation and recording procedures.
- For all control measures to be implemented: Non-conformance control and corrective action procedures.

Records: Maintain records of results of environmental monitoring, including the effectiveness of any remedial action taken.

Internal monitoring personnel: Provide staff names and contact details.

Machinery and equipment: Provide details of proposed plant.

Review timing: Undertake reviews of the EMP or control measures at the following stages:

- When there is a change in the project, e.g. scope.
- Following significant environmental impacts or pollution incidents.
- When improved performance is required to reduce a specific environmental impact.
- At completion of environmental audits.
- At the end of the project.

2.3 REPORTING

General

Requirement: Prepare environmental management reports that record the progress of the following:

- Performance against statutory requirements.
- Performance against the EMP, environmental objective and policy, and ecologically sustainable development outcomes and targets.
- Summary of monitoring, inspection and audits.
- Summary of reports required to meet the statutory requirements.
- Summary of environmental impacts, pollution incidents, non-conformance and complaints.
- Summary of corrective actions where required.
- Unexpected finds.

3 ENVIRONMENTAL MANAGEMENT

3.1 ENVIRONMENTAL MANAGEMENT PLAN

Control plan

EMP: Prepare an environmental management plan with the following details:

- Project description, including site location, construction activities, and project schedule.
- EMP context, describing how the EMP fits into the overall project planning process.
- EMP objective and environmental policy.
- Risk assessment.
- Assignment of responsibility for environmental controls, including hierarchy of management.
- Conditions of approvals, licences and permits to meet statutory requirements.
- Reporting requirements.
- Environmental training plan and procedures: Include in the plan, a program to familiarise staff with the EMP and/or management controls, environmentally sensitive areas and responsibilities.
- Environmental audit program and corrective action procedures.
- Emergency response procedures including response time.
- Control plans, as required.
- Details of operational control measures to reduce risk of environmental impacts on the following:
  - Heritage.
  - Visual values.
  - Endangered species.
  - Habitat.

- Locations of, and environmental controls for, environmentally sensitive areas.
- Details of environmental protection for each activity.
- Communication procedures.
- Other items necessary to protect the surrounding environment.

Activities staging: Address the phases of activity, as appropriate:

- Before construction and site establishment.
- During construction.
- After construction, including rehabilitation activities and site and landscaping maintenance.

3.2 SOIL EROSION AND SEDIMENT CONTROL

Control plan

Plan: Prepare a soil erosion and sediment control plan to protect natural stormwater drainage systems from sedimentation by minimising soil erosion and sediment transportation. Include the following details:

- Staging of operations and sequence of works.
- Diversion of upstream water around the site.
- Provision of temporary drains and catch drains.
- Erosion control measures.
- Sediment control measures.
- Stormwater control measures, including diversion, dispersal and/or retention to control and dissipate stormwater throughout the site without damage.
- Maintenance procedures for control measures.
- Progressive restoration of disturbed areas.

Extent: All site areas, access and haulage tracks, borrow pits, stockpile and storage areas and compound areas.

Control measures

Requirement: Protect natural and stormwater drainage systems from sedimentation by minimising soil erosion and sediment transportation.

Maintenance of controls: Check control measures, minimum daily and following storms, and rectify as required.

Extent: All site areas, access and haulage tracks, borrow pits, stockpile and storage areas and compound areas.

3.3 WASTE MANAGEMENT

Control plan

Plan: Prepare a waste management control plan to minimise solid waste generated byf construction activities and to dispose of the solid waste. Include the following details:

- Major waste streams.
- For each waste stream describe the following:
  . Location.
  . Disposal method.
  . Transport method.
  . Storage method.

Control measures

Requirement: Minimise solid waste generated by construction activities and dispose of the solid waste.

Major waste streams that will be generated during the works:

- Vegetation waste.
- Construction waste, including:
  - . Spoil.
  - . Demolition waste.
  - . Asphalt or bitumen.
  - . Concrete.
  - . Metal.
  - . Hazardous materials including paint.
  - . Office waste.
  - . Kitchen waste.

Covers: Use tarpaulins to prevent the loss of materials onto public roads.

Storage method: Provide details of location, labelling and protection of separate skips for the identified waste stream.

3.4 GROUND CONTAMINATION

Control plan

Plan: Prepare a ground contamination control plan for land suspected of being contaminated or the presence of acid sulphate soil is found, in conformance with the state Environmental Protection Authority (EPA) and the relevant state planning guidelines. Include the following details:

- Preliminary investigation.
- Detailed investigation.
- Site Remedial Action Plan (RAP).
- Stockpile sites.
- Site auditing and reporting procedures.
- Record of maintenance procedures, including record of remediation work, certificates issued and restrictions placed on the site.

Control measures

Requirement: Prevent environmental impacts of ground contamination and acid sulphate soils.

Stockpile sites: Locate on previously cleared areas.

3.5 WEED MANAGEMENT

Control plan

Plan: Prepare a weed management control plan with the following details:

- Weed species.
- Weed infestation zones within the work site and the investigation period.
- Treatment of infestation, including treatment type and application rate.
- Cleaning methods for vehicles and machinery, including cleaning bay location and treatment date.
- Subcontractors: Names and contact details for proposed subcontractors and evidence of experience in treatment of weed infestations and name and qualifications of chemical treatment handlers.

Control measures

Requirement: Prevent the growth and spread of weeds.

3.6 AIR QUALITY

Control plan

Plan: Prepare an air quality control plan to protect adjoining owners, residents and the public from emissions of dust and exhaust gases. Include the following details:

- Dust control.
- Exhaust gases emission control.

Control measures

Requirement: Protect adjoining owners, residents and the public from emissions of dust and exhaust gases.

Prohibition: Do not light fires.

3.7 WATER QUALITY

Control plan

Plan: Prepare a water quality control plan to keep earthworks free of water and to reduce impacts on groundwater and surface water. Include the following details:

- Dewatering system.
- Washout prevention.
- Cross connection prevention to public sewerage system.
- Water disposal.

Control measures

Requirement: Keep earthworks free of water and reduce impacts on groundwater and surface water and as follows:

- Provide and maintain slopes, crowns and drains for excavations and embankments, to make sure there is free drainage.
- Construct, including placing of fill, masonry, concrete and services, on ground where free water has been removed.
- Prevent water flow over freshly laid work.

Washout: Prevent washout from entering waterways or stormwater drains.

Cross connection: Prevent cross connections between stormwater and the public sewerage system.

Water disposal: Dispose off-site.

3.8 NOISE CONTROL AND VIBRATION

Control plan

Plan: Prepare a noise and vibration control plan to protect adjoining owners, residents and the public from noise and vibration impacts. Include the following details:

- Noise control and vibration: To the recommendations of AS 2436.
- Maximum noise level at the site boundary.
- Noise control.
- Vibration assessment.
- Vibration control.

Control measures

Requirement: Protect adjoining owners, residents and the public from noise and vibration impacts.

Noise control and vibration: To the recommendations of AS 2436.

Noise levels: Avoid excessive noise and long periods of elevated noise that is reasonably anticipated to annoy or adversely affect the adjacent community.

Noise suppression: Minimise noise nuisance with measures including the following:

- Noisy equipment enclosure.
- Noise attenuation screens.
- Maintain plant in good working order.
- Effective residential class silencers to all engine exhausts.
- Fit engine covers to all plant.

Limits on ground vibration: Make sure ground vibration levels transmitted from operating items of plant near buildings do not exceed levels that are close to the lower level of human perception inside the premises or cause structural damage to the buildings and other structures.

Monitoring: Provide the following:

- Baseline condition measurements before commencement of the works.
- Progressive monitoring during the works to confirm conformance with approval conditions.

3.9 FLORA AND FAUNA

Control plan

Plan: Prepare a flora and fauna control plan to protect native flora and fauna on site and prevent introduction of pest species. Include the following details:

- Native flora and fauna assessment.
- Pest species assessment.
- Tree pruning.
- Habitat provision.

Control measures

Requirement: Protect native flora and fauna on site and prevent introduction of pest species.

Trees to be removed: Inspect to establish if nesting native fauna are present. If present, give notice.

Tree pruning: To AS 4373.

Provision of alternative habitat:

- Material: Felled trees and excavated rocks.

3.10 CULTURAL AND ABORIGINAL HERITAGE

Control plan

Plan: Prepare a cultural heritage management plan to protect and prevent damage or loss of items of cultural heritage or Aboriginal sites and artefacts. Include the following details:

- Cultural heritage assessment.
- Aboriginal heritage assessment.
- Unexpected finds.
- Training.

Control measures

Requirement: Protect and prevent damage or loss of items of cultural heritage or Aboriginal sites and artefacts.

Training: Make sure all personnel working on the site receive training on their responsibilities regarding cultural heritage and are made aware of any sites/areas that must be avoided. Provide a site map showing heritage sites/areas and make available to relevant personnel during the works.

Notice: If any item is suspected to be an artefact of heritage value, relic or material which is Aboriginal or belonging to early settlement, give notice.

Action: Stop construction work that might affect the item and protect the item from damage or disturbance.

0181P BOSTIK IN ADHESIVES, SEALANTS AND FASTENERS

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide BOSTIK adhesives and sealants with fasteners, as documented.

Performance

Requirements: Conform to the following:

- Fitness for purpose: Capable of transmitting imposed loads, sufficient to maintain the rigidity of the assembly, or integrity of the joint.
- Finished surface: That will not cause discolouration.
- Compatibility: Compatible with the products to which they are applied.
- Sealant replacement: Capable of safe removal without compromising the application of the replacement sealant for future refurbishment.
- Movement: If an adhered or sealed joint is subject to movement, select a system certified to accommodate the projected movement under the conditions of service.
- Fasteners: Suitable for the particular use, capable of transmitting imposed loads and maintaining the rigidity of the assembly.

1.2 COMPANY CONTACTS

BOSTIK technical contacts

Website: www.bostik.com/australia/customer-support/technical-support

1.3 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.4 MANUFACTURER'S DOCUMENTS

Technical manuals

Data sheets: www.bostik.com/australia/Bostik-Products/

Warranty: www.bostik.com/australia/customer-support/warranty-information

1.5 SUBMISSIONS

Products and materials

Sealants: Submit technical data sheets.

Adhesives and sealants: Submit safety data sheets (SDS).

Samples

Visible joint sealants: Submit colour samples.

Tests

Compatibility testing: Submit adhesion and compatibility testing data demonstrating that adhesive, sealant or fastener is compatible with materials to be fixed and is suitable for the project conditions.

Warranties

Manufacturer’s warranty: Submit the manufacturer’s published product warranties.

Sealants and tile adhesives:

- Warranty period: 10 years.
- Warranty terms: As offered by BOSTIK.

1.6 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of prepared joints and penetrations for each sealant application included in the **Installed sealant tests schedule**.

2 PRODUCTS

2.1 GENERAL

Product substitution
Other products: Conform to PRODUCTS, **GENERAL**, **Substitutions** in *0171 General requirements*.

Product identification
General: Marked to show the following:

- Manufacturer's identification.
- Product brand name.
- Product type.
- Quantity.
- Product reference code and batch number.
- Date of manufacture.

2.2 BOSTIK GENERAL ADHESIVES

Bostik UltraGrip
Description: Plasterboard stud adhesive.

VOC: 23 g/litre.

Bostik Xtreme High Tack
Description: Extremely high strength and high early grab adhesive based on modified silyl (MS) polymer technology.

VOC: 36 g/litre.

Colour: White.

Bostik No More Nails
Description: Solvent based construction adhesive.

VOC: 310 g/litre.

Colour: Beige.

2.3 BOSTIK PRIMERS

Bostik UL-Primer
Description: High performance, one component primer for use on porous substrates. A polymer modified formula designed for use with Bostik's Floor Levelling range.

VOC: 5 g/litre.

Colour: White.

Bostik Ultraseal Vapour Barrier
Description: Primer and vapour barrier/retardant that prevents moisture migration through a concrete slab to levels that will not cause swelling or cupping of timber floors.

VOC: 0 g/litre.

Colour: Grey.

Bostik Moisture Seal
Description: Two-part epoxy for priming under flooring adhesives and waterproofing membranes. Compatible with a wide range of coverings including the Bostik Ultraset flooring adhesives and Dampfix waterproofing ranges.

VOC: 0 g/litre.

Colour: Grey.

2.4 BOSTIK FLOOR LEVELLING AND REPAIR COMPOUNDS

Bostik UL-75
Description: Rapid hardening self-levelling, single component cementitious underlay formulated to achieve maximum flow without any shrinkage or cracking.

VOC: 1 g/litre.

Colour: Cement grey.

Bostik UL-100
Description: Self-levelling single component, cementitious underlay formulated to achieve maximum flow without any shrinkage or cracking. Accepting foot traffic within a 2 to 4 hour period.

VOC: 1 g/litre.

Colour: Cement grey.

Bostik UL-200
Description: Rapid hardening, polymer modified, cementitious underlay for vinyl and timber flooring, formulated for maximum flow without shrinkage or cracking.

VOC: 1 g/litre.

Colour: Cement grey.

Bostik UL-Screed
Description: Fast setting, high build modified cementitious underlay formulated for quick and easy application to achieve required falls without any shrinkage or cracking.

VOC: 1 g/litre.

Colour: Cement grey.

2.5 BOSTIK FLOORING ADHESIVES

Bostik Ultraset DX
Description: Solvent-based, foaming, polyurethane timber floor adhesive.

VOC: 97 g/litre.

Colour: Brown.

Bostik Ultraset HP
Description: Solvent-free and isocyanate-free, MS polymer-based, elastomeric timber flooring adhesive.

VOC: 8 g/litre.

Colour: Brown.

Bostik Ultraset SF
Description: Solvent-free polyurethane timber flooring adhesive.

VOC: 2 g/litre.

Colour: Brown.

Bostik Ultraset Singlestep2
Description: High performance timber flooring adhesive, moisture control and sound reduction membrane all in one.

VOC: 0 g/litre.

Colour: White with black thickness spacers.

Bostik Ultraset Greenforce
Description: High performance adhesive and moisture control membrane all in one.
VOC: 0 g/litre.
Colour: White.

2.6 BOSTIK STONE AND TILE ADHESIVES

Bostik Asaflex
Description: Two part, rubber modified adhesive with exceptional flexibility and superb bond.
VOC:
- Powder: 1 g/litre.
- Liquid: 21 g/litre.

Classification to AS ISO 13007.1: C2S2E.

Bostik Conflex
Description: Premium rubber-modified adhesive for demanding or high traffic applications.
VOC: < 1 g/litre.
Classification to AS ISO 13007.1: C2S1E.

Bostik Ultra Mastik
Description: White adhesive with superior anti-slip.
VOC: < 1 g/litre.
Classification to AS ISO 13007.1: C2S1ET.
Colour: White.

Bostik Megafix
Description: Brilliant white adhesive for use in bathrooms with mosaics or when a very white adhesive is needed.
VOC: < 1 g/litre.
Classification to AS ISO 13007.1: C1S1T.
Colour: Bright White.

Bostik Excelflex
Description: General rubber modified flexible adhesive.
VOC: < 1 g/litre.
Classification to AS ISO 13007.1: C1S1.
Colour: Grey.

Bostik Evoflex
Description: Superior high polymer modified adhesive with in-built Evo-Lastic Technology.
VOC: < 1 g/litre.
Classification to AS ISO 13007.1: C2S2ET.
Colour: Off White.

Bostik Superfixall White
Description: White adhesive designed for use on rigid surfaces.
VOC: < 1 g/litre.
Classification to AS ISO 13007.1: C1E (C2S1E when mixed with Bostik Megalastic).
Colour: White.

Bostik Design Epoxy
Description: Two part coloured epoxy grout for applications that require high chemical and mechanical demands. Suitable for wall and floor tiles and can also be used as an adhesive.

VOC: 1 g/litre.

Classification to AS ISO 13007.1: RGR2T.

Colour: 4 colours available.

2.7 BOSTIK TILE GROUTS

Bostik Designer Grout
Description: Commercial grade tile grout, suitable for walls and floors for exterior and interior tiling.

VOC: 1 g/litre.

Classification to AS ISO 13007.1: CG2WA.

Colour: 14 colours available.

Bostik Design Epoxy
Description: Two part coloured epoxy grout for applications that require high chemical and mechanical demands. Suitable for wall and floor tiles and can also be used as an adhesive.

VOC: 1 g/litre.

Classification to AS ISO 13007.1: RGR2T.

Colour: 4 colours available.

Bostik Sanded Grout
Description: Cement based grout used for grouting slate, quarry and treated terracotta tiles or where wider joints are required. Suitable for external installations.

VOC: 1 g/litre.

Classification to AS ISO 13007.1: CG2.

Colour: 2 colours available.

Bostik White Smooth Grout
Description: Bright white, unsanded grout suitable for internal wall tiling.

VOC: 1 g/litre.

Classification to AS ISO 13007.1: CG1.

Colour: Bright White.

2.8 BOSTIK PLUMBING ADHESIVES

Bostik PVC Pipe Cement - Type N (non-pressure)
Description: High bond strength PVC-U pipe cement designed for installation of pipes and fittings subject to non-pressure applications.

VOC: 732 g/litre.

Bostik PVC Pipe Cement - Type P (pressure)
Description: High bond strength PVC-U pipe cement designed for installation of pipes and fittings subject to high pressure.

VOC: 764 g/litre.

Bostik PVC Priming Fluid
Description: Cleans and primes PVC-U pipes, fittings and sheeting before the application of Bostik PVC Pipe Cement.

VOC: 804 g/litre.

2.9 BOSTIK CONSTRUCTION GROUTS

Bostik Flowfill GP
Description: A general purpose, non-shrink (Class A), cementitious grout.
VOC: 1 g/litre.
Colour: Cement grey.

Bostik Flowfill Panel Grout
Description: A general purpose, non-shrink (Class A) cementitious grout.
VOC: 1 g/litre.
Colour: Cement grey.

Bostik Techflow GP
Description: A high performance, multi-purpose, non-shrink (Class C) cementitious grout.
VOC: 1 g/litre.
Colour: Cement grey.

Bostik Techflow HES
Description: A high performance, rapid setting and high early strength, non-shrink (Class C) cementitious grout.
VOC: 1 g/litre.
Colour: Cement grey.

Bostik Techflow HS
Description: A high performance, non-rapid setting and non-shrink (Class C) cementitious grout.
VOC: 1 g/litre.
Colour: Cement grey.

Bostik Patchfix Concrete
Description: A high performance, rapid setting, high early strength and shrinkage compensated repair concrete.
VOC: 1 g/litre.
Colour: Cement grey.

Bostik Patchfix Fine Render
Description: A polymer modified fairing mortar.
VOC: 1 g/litre.
Colour: Cement grey.

Bostik Patchfix Structural HB
Description: A heavy duty, polymer modified, high build structural repair mortar with a high ultimate compressive strength and abrasion resistance.
VOC: 1 g/litre.
Colour: Cement grey.

2.10 SEALANTS

Standards
General: To ISO 11600.

2.11 BOSTIK GENERAL SEALANTS

Bostik 6S
Description: Sanitary grade, neutral cure silicone for wet areas.
VOC: 58 to 65 g/litre, depending on the colour.

Bostik Xtreme Flex
Description: High performance, permanently flexible general purpose sealant and adhesive based on MS polymer technology.

VOC: 37 g/litre.

Bostik Xtreme ClearFix
Description: High performance, ultra-transparent sealant and adhesive based on MS polymer technology.

VOC: 36 g/litre.

Colour: Crystal clear.

Bostik Roof & Gutter Premium
Description: One component silicone sealant.

VOC: 33 to 105 g/litre, depending on the colour.

Bostik Seal N Flex 1
Description: Single component polyurethane construction joint sealant for general construction applications.

VOC: 64 to 74 g/litre, depending on the colour.

Bostik Seal N Flex FC
Description: Fast cure, single component construction sealant.

VOC: 78 g/litre.

2.12 BOSTIK SPECIALTY SEALANTS

Bostik V2
Description: High performance glazing silicone.

VOC: 1 g/litre.

Bostik 5CLM
Description: High joint movement weatherproofing silicone sealant.

VOC: 40 g/litre.

Bostik V60
Description: High performing glazing weatherproofing silicone sealant.

VOC: 39 to 47 g/litre, depending on the colour.

Bostik V70
Description: Structural silicone sealant.

VOC: 43 g/litre.

Colour: Black.

2.13 BOSTIK FIRE-RESISTING SEALANTS

Bostik Fireban One
Description: A fire-resisting, low modulus, single component, Class-A polyurethane sealant.

VOC: 64 g/litre.

Colour: Limestone.

Fire-stopping: To AS 4072.1 and tested AS 1530.4.

Bostik Firecaulk
Description: Fire-resisting acrylic (water-based) sealant.

VOC: 34 g/litre.

Fire-stopping: To AS 4072.1 and tested to AS 1530.4.

Bostik Xtreme Fire Seal
Description: High performance, fire retardant sealant based on MS polymer technology.

VOC: 28 g/litre.

Fire-stopping: To AS 4072.1 and tested to AS 1530.4.

2.14 GENERIC ADHESIVES

High strength adhesive tape
General description: A foam of cross linked polyethylene or closed cell acrylic coated both sides with a high performance acrylic adhesive system, encased in release liners of paper or polyester.

Product classification: Select tape to suit substrate as follows:

- Firm high strength foam tapes: For high energy surfaces including most bare metals such as stainless steel and aluminium.
- Conformable high strength foam: For the following:
  - Medium energy surfaces including many plastics and paints, and bare metals.
  - Lower energy surfaces including many plastics, most paints and powder coatings, and bare metals.

Thickness: Select the tape to make sure a mismatch between surfaces does not exceed half the tape thickness under the applied lamination pressure.

2.15 FASTENERS

General
Masonry anchors: Proprietary expansion or bonded type anchors conforming to **SELECTIONS, ANCHORS**.

Plain washers: To AS 1237.1.

- Provide washers to the heads and nuts of bolts, and the nuts of coach bolts.

Plugs: Proprietary purpose-made plastic.

Stainless steel fasteners: To ASTM A240/A240M.

Steel nails: To AS 2334.

- Length: At least 2.5 times the thickness of the member being secured, and at least 4 times the thickness if the member is plywood or building board less than 10 mm thick.

Unified hexagon bolts, screws and nuts: To AS/NZS 2465.

Fasteners in CCA treated timber: Epoxy coated or stainless steel.

Bolts
Coach bolts: To AS/NZS 1390.

Hexagon bolts Grades A and B: To AS 1110.1.

Hexagon bolts Grade C: To AS 1111.1.

Corrosion resistance
Atmospheric corrosivity category: To *0171 General requirements*.

Steel products: Conform to the **Corrosion resistance table** or provide proprietary products with metallic and/or organic coatings of equivalent corrosion-resistance.

Corrosion resistance table

Atmospheric corrosivity category to AS 4312	**Threaded fasteners and anchors**		**Powder actuated fasteners**
	Material	**Minimum local metallic coating thickness (µm)**	**Material**
C1 and C2	Electroplated zinc or Hot-dip galvanized	30	Stainless steel Type 316
C3	Hot-dip galvanized	50	Stainless steel Type 316
C4	Stainless steel Type 316	-	Stainless steel Type 316
Note: For categories C5, CX and T to the AS/NZS 2312 series, seek specialist advice.			

Finishes

Electroplating:

- Metric thread: To AS 1897.
- Imperial thread: To AS 4397.

Galvanizing:

- Threaded fasteners: To AS/NZS 1214.
- Other fasteners: To AS/NZS 4680.

Mild steel fasteners: Galvanize if:

- Embedded in masonry.
- In external timbers.
- In contact with chemically treated timber other than CCA treated timber.

Epoxy coated: CCA treated timber.

Nuts

Hexagon chamfered thin nuts Grades A and B: To AS 1112.4.

Hexagon nuts Grade C: To AS 1112.3.

Hexagon nuts Style 1 Grades A and B: To AS 1112.1.

Hexagon nuts Style 2 Grades A and B: To AS 1112.2.

Screws

Coach screws: To AS/NZS 1393.

Hexagon screws Grades A and B: To AS 1110.2.

Hexagon screws Grade C: To AS 1111.2.

Hexagon socket screws: To AS 1420.

Self-drilling screws: To AS 3566.1.

Self-tapping screws:
- Crossed recessed countersunk (flat – common head style): To AS/NZS 4407.
- Crossed recessed pan: To AS/NZS 4406.
- Crossed recessed raised countersunk (oval): To AS/NZS 4408.
- Hexagon: To AS/NZS 4402.
- Hexagon flange: To AS/NZS 4410.
- Hexagon washer: To AS/NZS 4409.
- Slotted countersunk (flat – common head style): To AS/NZS 4404.
- Slotted pan: To AS/NZS 4403.
- Slotted raised countersunk (oval – common head style): To AS/NZS 4405.

Blind rivets

Description: Expanding end type with snap mandrel.

Type: Closed end for external application, open end for internal application.

End material:
- Aluminium base alloy for metallic-coated or prepainted steel.
- Stainless steel for stainless steel sheet.
- Copper for copper sheet.

Size:
- For sheet metal to sheet metal: 3 mm.
- For sheet metal to supports, brackets and rolled steel angles: 4.8 mm.

3 EXECUTION

3.1 ADHESIVES

General

Requirement: Install to the manufacturer's recommendations.

Preparation

Substrates: Conform to the following:
- Remove any deposit or finish which may impair adhesion.
- If framed or discontinuous, provide support members in full lengths without splicing.
- If solid or continuous, remove excessive projections.
- If previously painted, remove cracked or flaking paint and lightly sand the surface.

Contact adhesive

Precautions: Do not use contact adhesive if:
- A substrate is polystyrene foam.
- A PVC substrate may allow plasticiser migration.
- The adhesive solvent can discolour the finished surface.
- Dispersal of the adhesive solvent is impaired.

Two-way method: Immediately after application press firmly to transfer adhesive and then pull both surfaces apart. Allow to tack off and then reposition and press firmly together. Tap areas in contact with a hammer and padded block.

One-way method: Immediately after application bring substrates together and maintain maximum surface contact for 24 hours by clamps, nails or screws as appropriate. If highly stressed, employ permanent mechanical fasteners.

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High strength adhesive tape

Preparation:

- Non-porous surfaces: Clean with surface cleaning solvents such as isopropyl alcohol/water, wash down and allow to dry.
- Porous surfaces: Prime the surface with a contact adhesive compatible with the tape adhesive system.

Application to copper, brass, plasticised vinyl and hydrophilic surfaces such as glass and ceramics in a high humidity environment: Conform to manufacturer's recommendations.

Applied lamination pressure: Make sure the tape experiences 100 kPa.

Application temperature: Generally above 10°C and to the manufacturer's recommendations.

Completion: Do not apply loads to the assembly for 72 hours at 21°C.

3.2 JOINT SEALING

General

Requirement: Install to the manufacturer’s recommendations.

Joint preparation

Cleaning: Cut flush joint surface protrusions and rectify if required. Mechanically clean joint surfaces free of any deposit or finish which may impair adhesion of the sealant. Immediately before sealant application, remove loose particles from the joint, using oil-free compressed air.

Bond breaking: Install bond breaking backing material.

Taping: Protect the surface on each side of the joint using 50 mm wide masking tape or equivalent means. On completion of sealant application remove the tape and remove any stains or marks from adjacent surfaces.

Primer: Apply the recommended primer to the surfaces in contact with sealant materials.

Sealant joint proportions

General weatherproofing joints (width:depth):

- 1:1 for joint widths less than 12 mm.
- 2:1 for joint widths greater than 12 mm.

Sealant application

General: Apply the sealant to dry joint surfaces using a pneumatic applicator gun. Make sure the sealant completely fills the joint to the required depth, provides good contact with the full depth of the sides of the joint and traps no air in the joint. Do not apply the sealant outside the recommended working time for the material or the primer.

Weather conditions

Two pack polyurethanes: Do not apply the sealant if ambient conditions are outside the following:

- Temperature: Less than 5°C or greater than 40°C.
- Humidity: To the manufacturer’s recommendations.

Joint finish

General: Force the sealant into the joint and finish with a smooth, slightly concave surface using a tool designed for the purpose.

Excess sealant: Remove from adjoining surfaces using cleaning material nominated by the sealant manufacturer.

Protection

General: Protect the joint from inclement weather during the setting or curing period of the material.

Rectification

General: Cut out and remove damaged portion of joint sealant and reinstall so repaired area is indistinguishable from undamaged portion.

3.3 CONSTRUCTION GROUTS

General

Requirement: Install to the manufacturer's recommendations.

Preparation

Substrates: Conform to the following:

- Surface: Clean, sound and free from oil, grease, curing compound or any loose materials. Mechanically abrade to a sound surface.
- Bolts and anchor holes: Clean and free from dust or loose material.
- Base plates: Free from rust, oil or grease. Provide air pressure relief holes for venting.
- Pre-soaking: Before application, pre-soak substrate with water for a minimum of 6 hours. Immediately before grouting, remove excess water, including water in bolts and anchor holes.

Formwork

Requirement: Construct to facilitate rapid and continuous filling, remaining leak proof and water tight. Provide foam rubber strips or suitable sealants under the formwork to the manufacturer's recommendations.

Unrestrained surfaces: Keep to a minimum.

High temperature working

Requirement: Where possible, erect shade screens to protect the installation area from direct sunlight and schedule grouting for early morning or late afternoon.

Storage: Keep materials cool and away from direct sunlight.

3.4 TESTING

Installed sealant tests

Sampling: For each sealant test, take 3 samples of installed and cured sealant, each at least 50 mm long, from completed joints.

Reinstatement: Repair-as-new the joints from which the samples were taken.

Installed sealant tests schedule

Item to be tested	Property to be tested	Applicable standard

3.5 FASTENERS

General

Requirement: Install to the manufacturer's recommendations.

Fastening to wood and steel

Timber substrates: To AS 1720.1 Section 4.

Self-drilling screws: To AS 3566.1 for timber and steel substrates.

Masonry anchors

Installation: To the manufacturer's recommendations.

4 SELECTIONS

4.1 ADHESIVES

Application schedule

Application	Product	Relevant worksections
Adhesive fixed timber strip flooring and parquetry systems	Bostik Ultraset DX Bostik Ultraset S Bostik Ultraset SF Bostik Ultraset HP Bostik Ultraset Greenforce Bostik Ultraset Singlestep2	*0655 Timber flooring*
Colourback glass faced wall panels or splashbacks	Bostik Xtreme High Tack Bostik V60	*0551 Joinery*, *0641 Applied wall finishes*
Drywall lining/wall panels	Bostik UltraGrip Bostik Xtreme High Tack	*0511 Lining*, *0522 Partitions – framed and lined*
Engineered panel floors	Bostik Ultraset DX Bostik Ultraset S Bostik Ultraset SF Bostik Ultraset HP Bostik Ultraset Greenforce Bostik Ultraset Singlestep2	*0654 Engineered panel flooring*
Mirrors	Bostik V60 Bostik Xtreme High Tack	*0467 Glass components*
Stainless steel faced wall panels or splashbacks	Bostik V60	*0551 Joinery*, *0641 Applied wall finishes*, *0553 Stainless steel benching*
Timber joinery fitments	Bostik Xtreme High Tack	*0551 Joinery*
Mechanical services	Bostik Seal N Flex 1 Bostik Seal N Flex FC	*0732 Air filters*, *0744 Ductwork insulation*, *0752 Mechanical piping insulation*, *0762 Cool rooms*
Hydraulic services	Bostik PVC Priming Fluid Bostik PVC Pipe Cement - Type P (pressure) Bostik PVC Pipe Cement Slow Setting - Type N (non-pressure)	*0802 Hydraulic design and install*, *0812 Tapware*

4.2 ADHESIVES FOR STONE AND TILE MATERIALS

Application schedule

Application	Bostik product group	Relevant worksections
Dry interior	Bostik Stone and Tile Adhesives	*0631 Ceramic tiling*, *0632 Stone and terrazzo tiling*
Internal wet areas	Bostik Stone and Tile Adhesives	*0631 Ceramic tiling*, *0632 Stone and terrazzo tiling*
Exterior	Bostik Stone and Tile Adhesives	*0631 Ceramic tiling*, *0632 Stone and terrazzo tiling*
Underfloor heating	Bostik Stone and Tile Adhesives	*0631 Ceramic tiling*, *0632 Stone and terrazzo tiling*
Driveway/Garage/Showroom	Bostik Stone and Tile Adhesives	*0631 Ceramic tiling*, *0632 Stone and terrazzo tiling*
Commercial/High traffic	Bostik Stone and Tile Adhesives	*0631 Ceramic tiling*, *0632 Stone and terrazzo tiling*
Full immersion (Pool)	Bostik Stone and Tile Adhesives	*0631 Ceramic tiling*, *0632 Stone and terrazzo tiling*
Porcelain tiles	Bostik Stone and Tile Adhesives	*0631 Ceramic tiling*, *0632 Stone and terrazzo tiling*
Large format tiles	Bostik Stone and Tile Adhesives	*0631 Ceramic tiling*, *0632 Stone and terrazzo tiling*

4.3 ANCHORS

Bonded anchor schedule

Refer to Structural Engineer documents and anchor details

4.4 SEALING, POINTING AND BEDDING

Application schedule

Application	Product	Relevant worksections
Metal flashings and rainwater goods	Bostik Roof & Gutter Bostik Xtreme Flex	*0421 Roofing – combined*, *0423 Roofing – profiled sheet metal*, *0424 Roofing – seamed sheet metal*, *0425 Roofing – shingles and shakes*, *0426 Roofing – slate*, *0427 Roofing – tiles*
Metal flashings and sealing non-porous substrates	Bostik 5CLM Bostik Xtreme Flex	*0431 Cladding – combined*, *0432 Curtain walls*, *0434 Cladding – flat sheets and panels*, *0435 Cladding – planks and weatherboards*, *0436 Cladding – profiled and seamed sheet metal*, 0437 Cladding – sheet and pre-assembled systems
Window and external doors	Bostik V60 Bostik Xtreme Flex	*0432 Curtain walls*, *0451 Windows and glazed doors*, *0453 Doors and access panels*, *0463 Glass blockwork*
Mechanical services	Bostik Fireban One Bostik Firecaulk Bostik Xtreme Fire Seal	*0724 Air handling plant – combined*, *0725 Air handling plant – built-up*, *0726 Air handling plant – minor*, *0727 Air handling plant – packaged*, *0732 Air filters*, *0741 Ductwork*

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Application	Product	Relevant worksections
		0702 Mechanical design and install, *0752 Mechanical piping insulation*, *0762 Cool rooms*
Hydraulic services	Bostik 6S	*0811 Sanitary fixtures*, *0812 Tapware*, *0813 Water heaters*, *0815 Drinking water dispensers*

Adhesives, sealant and fasteners combined function

Application	Product	Relevant worksections
Cool room fixing and sealing	Bostik Xtreme range	*0762 Cool rooms*
Fixing and sealing acoustic ceiling tiles	Bostik Xtreme range	*0531 Suspended ceilings – combined*
Control joints tile adhesives and wet area sealants	Bostik Xtreme range	*0631 Ceramic tiling*, *0632 Stone and terrazzo tiling*
Timber floor control joints, adhesives and fixings	Bostik Xtreme range	*0655 Timber flooring*, *0654 Engineered panel flooring*
Wet area sealants and lightweight detail items	Bostik Xtreme range	*0525 Cubicle systems*, *0551 Joinery*, *0811 Sanitary fixtures*

4.5 SEALING STRUCTURALLY DESIGNED CONTROL JOINTS

Application schedule

Application	Sealant type	Sealant colour	Relevant worksection
Internal masonry control joints	Bostik Seal N Flex 1 Bostik Seal N Flex FC	12 colours available Black/Grey/White	*0322 Tilt-up concrete*, *0331 Brick and block construction*, *0332 Stone masonry*
External masonry control joints	Bostik Seal N Flex 1 Bostik Seal N Flex FC	12 colours available Black/Grey/White	*0322 Tilt-up concrete*, *0331 Brick and block construction*, *0332 Stone masonry*
Trafficable masonry control joints	Bostik 5CLM Bostik Seal N Flex FC Bostik Seal N Flex 1	White/Charcoal/Grey/Beige Black/Grey/White 12 colours available	*0274 Concrete pavement*, *0275 Paving – mortar and adhesive bed*

4.6 FIRE-RESISTING SEALANTS

Application schedule

Application	Sealant	Sealant colour	Fire-resistance level to AS 1530.4 (FRL)	Relevant worksection
Masonry control joints	Bostik Fireban One Bostik Xtreme Fire Seal	Limestone White	Up to -/240/240	*0322 Tilt-up concrete*, *0331 Brick and block construction*, *0332 Stone masonry*
Internal pointing and stopping (including acoustic applications)	Bostik Firecaulk	Limestone White Black	Up to -/240/240	*0182 Fire-stopping*, *0346 Structural fire protection systems*, *0472 Acoustic insulation*

0182 FIRE-STOPPING

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide fire-stopping, as documented.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.3 PRECEDENCE

General

Order of precedence:

- The requirements of other worksections of the specification override conflicting requirements of this worksection.
- The requirements of worksections override conflicting requirements of their referenced documents. The requirements of the referenced documents are minimum requirements.

1.4 STANDARDS

General

Service penetration fire-stopping systems: To BCA C3.15.

Control/construction joint fire-stopping systems: To AS 4072.1.

1.5 INTERPRETATION

Definitions

General: For the purposes of this worksection the definitions given in AS 4072.1 apply.

1.6 SUBMISSIONS

Certification

General: Submit evidence of conformity with the recommendations of AS 4072.1 Appendix B.

Certification: Submit a completed certification list and schedule for installed fire-stopped penetrations and control/construction joints.

- List form: To AS 4072.1 Figure B1.
- Schedule form: To AS 4072.1 Figure B2.

Execution details

General: Give notice, if substrates or penetrants or both are not suitable for fire-stopping.

Products and materials

General: Submit the following:

- Evidence that systems conform to documented requirements.
- Copies of relevant manufacturers' instructions.
- Safety data sheets (SDS).
- Product data sheets (PDS).

Type tests: Submit type test reports as evidence of conformance for each combination of fire-stopping system, application, type of service, substrate, penetration orientation and drawings of tested details. Include for the following:

- Service penetration fire-stopping systems: Fire-resistance tested to AS 1530.4.
- Fire-stop mortars: Resistance to explosive spalling to AS 1774.36.
- Control joint fire-stopping systems: Fire-resistance tested to AS 1530.4.

Samples

Sample panels: Supply a sample panel of each fire-stopping assembly, on representative substrates. If built into the works, identify by marking it as a control sample.

Size: 500 mm run for junction seals and 500 x 500 mm area for penetration seals.

Subcontractors

General: Submit names and contact details of proposed suppliers and installers.

Warranties

Proprietary fire-stopping products and systems: Submit the manufacturer's published product warranties.

1.7 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Service penetrations completed and ready for fire-stopping.
- Control/construction joints completed and ready for fire-stopping.
- Finished fire-stopping, before being concealed.

Authority Inspections: Refer to SSDA Conditions of Consent

2 PRODUCTS

2.1 MATERIALS

Storage and handling

General: Deliver, unload and store products and accessories in unbroken manufacturer's packaging in a dry, well-ventilated and secure storage area, unaffected by weather.

Shelf life: Use materials that have not exceeded their shelf life.

Tolerances

Control joint movement to AS 4072.1 clauses 2.3 and 4.7 and Appendix C.

Toxicity

Toxic materials: Free of asbestos and lead and free of, nor requiring the use of, toxic solvents.

Toxicity in fire: Non-toxic.

Product certification

Conformance: Address the following:

- Statutory and performance requirements.
- Adequacy of application/installation.

Appointment: In the joint names of the contractor and the principal.

2.2 FIRE-STOPPING PRODUCTS

Fire-stop mortars

Type: Re-enterable cement-based compound, mixed with water. Non-shrinking, moisture resistant. Insoluble in water, after setting.

Formulated compound of incombustible fibres

Material: Formulated compound mixed with mineral fibres, non-shrinking, moisture resistant. Insoluble in water after setting.

Fibre stuffing
Material: Mineral fibre stuffing insulation, dry and free of other contaminants.

Standard: AS/NZS 4859.1 Section 7.

Intumescent fire pillows
Material: Self-contained self-locking intumescent fire pillows for medium to large openings, where no additional support is required.

Fire-stop composite sheets
Material: Composite system comprised of a number of components, including a fire-resistive elastomeric sheet, bonded on either side with layers of sheet steel and/or steel-wire mesh covered with aluminium foil.

Fire-stop sealants
Material: Elastomeric sealant. Soft, permanently flexible, non-sag, non-shrinking, moisture resistant. Capable of providing a smoke-tight, gas-tight and waterproof seal when properly installed. Insoluble in water after setting.

Fire-stop foams
Material: Single component compound of reactive foam ingredients, non-shrinking, moisture resistant. Insoluble in water after setting.

Fire-stop putty
Material: Single component, mouldable, permanently flexible, non-shrinking, moisture resistant, intumescent compound which conforms to the following:

- Expands on exposure to surface heat gain to form a high-volume thermally insulating char that closes gaps and voids.
- Resists the turbulence of a severe fire.
- Can be placed by hand to form an immediate fire seal.
- Insoluble in water after setting.

2.3 COMPONENTS

Fire-stop collars
Material: Mechanical device with incombustible intumescent fillers covered with sheet steel jacket. Airtight and watertight.

Fire-stop pillows
Material: Formed self-contained compressible flexible mineral fibre in cloth bags, rated to permit frequent changes in service.

Multi-service cable transit box
Material: Mechanical device consisting of a sheet steel sleeve containing heat reactive intumescent polymer, including intumescent seals and smoke rated brushes. The insulation rating can be increased by the incorporation of other fire-stopping products.

Control joint insert – elastomeric foam strip
Material: Elastomeric foam strip laminated with a graphite based intumescent compound on both sides, which is a water resistant seal that expands when exposed to heat.

Accessories
Permanent dam material: Non-combustible.

Installation accessories: Provide clips, collars, fasteners, temporary stops and dams, and other devices required to position, support and contain fire-stopping and accessories.

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3 EXECUTION

3.1 PREPARATION

Substrates

Cleaning: Clean substrates of dirt, dust, grease, oil, loose material, and other matter which may affect the bond of fire-stopping products.

Primer: Dry substrates for primers and sealants.

Restraint: Install backing and/or damming materials to arrest liquid material leakage. Remove temporary dams after material has cured.

3.2 INSTALLATION

General

Extent: Fire-stop and smoke-stop interruptions to fire-resistance rated assemblies, materials and components, including penetrations through fire-resisting elements, breaks within fire-resisting elements (e.g. expansion joints), and junctions between fire-resisting elements.

Sequence: Fire-stop after services have been installed through penetrations and properly spaced and supported, after sleeving where appropriate, and after removal of temporary lines, but before restricting access to the penetrations, including before dry lining.

Ventilation: Supply ventilation for non-aqueous solvent-cured materials.

Density: Apply fire-stopping material to a uniform density.

Fire-stopping exposed to view: Finish surfaces to a uniform and level condition.

Cable separation: Maintain cable separation.

Protection: Protect adjacent surfaces from damage arising through installation of fire-stopping. Protect completed fire-stopping from damage arising from other work.

Loose or damaged fire-stopping material: Remove and replace.

Penetrations by pipes and ducts: Allow for thermal movement of the pipes and ducts.

Preventing displacement: Reinforce or support fire-stopping materials with non-combustible materials when:

- The unsupported span of the fire-stopping materials is greater than 100 mm.
- The fire-stopping materials are non-rigid (unless shown to be satisfactory by test).

Penetrations: Provide structural support around the opening.

Labelling

Requirement: To the recommendations of AS 4072.1 Appendix B.

Additional marking: Include the following text in addition to the above: CAUTION – FIRE BARRIER MUST REMAIN SEALED.

Location: Attach labels to cables, conduits, pipes and ducts on both sides of and close to, the control joint or penetration. On large items, provide multiple labels.

3.3 FIRE-STOPPING SYSTEMS

Control joint insert – elastomeric foam strip

Site conditions: Make sure that the application area is free from dust, oil, solvents or any other foreign substances.

Fire-stop mortars

Ambient conditions: Do not install below 5°C.

Fibre stuffing

Installation: Compress to 40% of its uncompressed volume.

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Fire-stop sealants
Ambient conditions: Do not store above 32°C. Do not install outside the temperature range recommended by the sealant manufacturer. Do not install when humidity exceeds that recommended by the sealant manufacturer for safe installation.

Fire-stop foams
Ambient conditions: Do not store above 32°C. Do not install below 15°C or above 32°C. Do not apply when temperature of substrate and air is below 15°C. Maintain this minimum temperature before, during and for 3 days after installation.

Installation: Test substrates for adhesion and prime if necessary. Place in layers for homogenous density, filling cavities and spaces. Place sealant to completely seal junctions with adjacent dissimilar materials.

Fire-stop putty
Ambient conditions: Do not install below 5°C. Do not allow the material to freeze.

Fire-stop pillows
Ambient conditions: Do not install in conditions outside the manufacturer's recommendations.

3.4 COMPLETION

Cleaning
Requirement: Clean the finished surfaces and remove spilled and excess fire-stopping materials without damaging other work.

0183 METALS AND PREFINISHES

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirements: Provide metal and prefinishes, as documented.

Performance

Requirement: Provide metals in sections of strength and stiffness suited to their required function, finish and method of fabrication.

1.2 PRECEDENCE

General

Order of precedence:

- The requirements of other worksections of the specification override conflicting requirements of this worksection.
- The requirements of worksections override conflicting requirements of their referenced documents. The requirements of the referenced documents are minimum requirements.

1.3 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.4 SUBMISSIONS

Samples

General: Submit samples of the following:

- Stainless steel: One sample of every documented surface finish.
- Anodising: One sample of every colour and finishing option.

2 PRODUCTS

2.1 METALS

Aluminium and aluminium alloys

Drawn pipe: To AS/NZS 1867.

Drawn rod, bar and strip: To AS/NZS 1865.

Extrusions: To AS/NZS 1866.

Plate and sheets: To AS/NZS 1734.

Coated steel

Electrogalvanized (zinc) coating on ferrous hollow and open sections: To AS 4750.

Metallic-coated: Steel coated with zinc or aluminium-zinc alloy as follows:

- Ferrous open sections by an in-line process: To AS/NZS 4791.
- Ferrous hollow sections by a continuous or specialised process: To AS/NZS 4792.
- Metallic-coated steel sheet: To AS 1397. Metal thicknesses specified are base metal thicknesses.

Steel wire: To AS/NZS 4534.

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Copper and copper alloys
Casting: To AS 1565.

Plate, sheet and strip: To AS 1566.

Rods, bars and sections: To AS/NZS 1567.

Composition and designations: To AS 2738.

Stainless steel
Bars: To ASTM A276/A276M.

Plate, sheet and strip: To ASTM A240/A240M.

Welded pipe (plumbing applications): To AS 1769.

Welded pipe (round, square, rectangular): To ASTM A554.

Steel
Sheet: To AS/NZS 1595.

Structural bars and sections: To AS/NZS 3679.1.

Structural hollow sections: To AS/NZS 1163.

Steel for prefinishes
Cold rolled bar: To AS 1443 - Bright.

Cold rolled sheet: To AS/NZS 1595.

- Designation: CA2S-E.

Electric resistance welded tube: To AS 1450.

3 EXECUTION

3.1 GENERAL

Metal separation
Incompatible sheet metals: Prevent direct contact between incompatible metals. Provide separation by one of the following:

- Apply an anti-corrosion low moisture transmission coating such as alkyd zinc phosphate primer or aluminium pigmented bituminous paint to contact surfaces.
- Insert a concealed, non-metallic separation layer such as polyethylene film, adhesive tape, neoprene, nylon or bituminous felt.

Incompatible fixings: Do not use.

Incompatible service pipes: Install lagging or grommets. Do not use absorbent, fibrous or paper products.

Brazing
General: Make sure brazed joints have sufficient lap to provide a mechanically sound joint.

Butt joints: Do not use butt jointing for joints subject to load. If butt joints are used, do not rely on the filler metal fillet only.

Filler metal: To AS/NZS 1167.1.

Finishing
Visible joints: Finish visible joints made by welding, brazing or soldering using methods appropriate to the class of work (including grinding or buffing) before further treatment such as painting, galvanizing or electroplating. Make sure self-finished metals are without surface colour variations after jointing.

Preparation
General: Before applying decorative or protective prefinishes to metal components, complete welding, cutting, drilling and other fabrication, and prepare the surface using a suitable method.

Standard: To AS 1627 series.

Priming steel surfaces: If site painting is documented to otherwise uncoated mild steel or similar surfaces, prime as follows:

- After fabrication and before delivery to the works.
- After installation, repair damaged priming and complete the coverage to unprimed surfaces.

Welding

Aluminium: To AS 1665.

Stainless steel: To AS/NZS 1554.6.

Steel: To AS/NZS 1554.1.

3.2 STAINLESS STEEL FINISHES

General

Requirement: Provide a surface finish to match the approved sample.

Pre-assembly

Mechanically polished and brushed finishes: Apply grit faced belts or fibre brushes that achieve uni-directional finishes with buffing, as required to provide the following:

Bead blasted finish: Provide a uniform non-directional low reflective surface by bead blasting. Do not use sand, iron or carbon steel shot. Blast both sides of austenitic stainless steel to equalise induced stress.

Heat discolouration: Remove by pickling.

Welds: Grind excess material, brush, and polish to match the pre-assembly finish.

Post-assembly finish

Electropolish finish for external installations: Provide an electro-chemical process to stainless steel type 316.

Brushed electropolish finish: Conform to the following:

- Pre-assembly finish: No. 4 brushed finish.
- Post-assembly finish: Provide an electro-chemical processed finish to achieve a No. 7 to No. 8 brushed finish.

Mirror electropolish finish:

- Pre-assembly finish: Mill finish 2B or mirror polished finish.
- Post-assembly finish: Provide an electro-chemical processed finish to achieve a No. 8 mirror like finish.

Completion

Cleaning: Clean and rinse to an acid free condition and allow to dry. Do not use carbon steel abrasives or materials containing chloride.

Protection: Secure packaging or strippable plastic sheet.

3.3 NON-FERROUS FINISHING

Mechanical finishes

Bright finished copper alloy surfaces: For indoor applications, apply a clear lacquer protective coating.

3.4 ELECTROPLATING

Electroplated coatings

Chromium on metals: To AS 1192.

- Service condition number: At least 2.

Nickel on metals: To AS 1192.

- Service condition number: At least 2.

Zinc on iron or steel: To AS 1789.

3.5 ANODISING

General
Standard: To AS 1231.

Thickness grade: To AS 1231 Table H1.

Sample
General: Provide a finish to match the sample in terms of colour and finishing options.

3.6 METAL SPRAYING

Metal spray
Standard: To ISO 2063.2.

Minimum thicknesses:

- Indoor applications: 125 µm.
- Outdoor applications: 175 µm.

Process: Electric arc.

Seal coat: Cover the metal spray finish with two coats of vinyl seal to a total dry film thickness of 80 µm.

3.7 PREPAINTING

Air-drying enamel
Application: Spray or brush.

Finish: Full gloss.

General use:

- Primer: Two-pack epoxy primer to AS/NZS 3750.13.
- Top coats: 2 coats to AS 3730.6.

Oil resistant use:

- Primer: Two-pack epoxy primer to AS/NZS 3750.13.
- Top coats: 2 coats to AS/NZS 3750.22.

Equipment paint system
Description: Brush or spray application using paint as follows:

- Full gloss enamel finish coats, oil and petrol resistant: To AS/NZS 3750.22, two coats.
- Prime coat to metal surfaces generally: To AS/NZS 3750.19 or AS/NZS 3750.20.
- Prime coat to zinc-coated steel: To AS 3730.15 or AS/NZS 3750.16.
- Undercoat: To AS/NZS 3750.21.

Prepainted metal products
Standard: To AS/NZS 2728.

Product type as noted in AS/NZS 2728: Not lower than the type appropriate to the documented atmospheric corrosivity category.

3.8 COMPLETION

Damage
Damaged prefinishes: Remove and replace items, including damage caused by unauthorised site cutting or drilling.

Repair
Metallic-coated sheet: If repair is required to metallic-coated sheet or electrogalvanizing on inline galvanized steel products, clean the affected area and apply a two-pack organic primer to AS/NZS 3750.9.

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0184P TERMGUARD TERMITE MANAGEMENT

1 GENERAL

1.1 RESPONSIBILITIES

General
Requirement: Provide Termguard and Granitgard termite management materials and systems, as documented.

Performance
Objective: Protection of building from damage caused by termite attack.

1.2 COMPANY CONTACTS

TERMGUARD technical contacts
Website: termguard.com.au/your-nearest-termguard-installer

1.3 CROSS REFERENCES

General
Requirement: Conform to the following:

- *0171 General requirements*.

1.4 STANDARDS

General
Termite management systems: To AS 3660.1.

1.5 MANUFACTURER'S DOCUMENTS

Technical manuals
Website: termguard.com.au/contact-us

1.6 SUBMISSIONS

Certification
Certificate of installation: Submit evidence from an accredited technician that the system conforms to AS 3660.1 Appendix A and documented requirements.

Records
Completion: Submit record drawings identifying the locations of the installed system.

Tests
Site tests: Submit test results as follows:

- Chemical termite management systems: To AS 3660.1 Appendix E, and as required for the Codemark Certificate of Conformance.

Warranties
Requirement: Submit the following:

- 50 year warranty: For installations conforming to Termguard and Granitgard specifications.

1.7 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:

- Completed earthworks or substrate preparation before system application/installation.
- The completed termite management system.

2 PRODUCTS

2.1 GENERAL

Product substitution
Other products: Conform to PRODUCTS, **GENERAL**, **Substitutions** in *0171 General requirements*.

2.2 GRANITGARD PHYSICAL SYSTEMS

Granular materials
Standard: To AS 3660.1 Section 6.

Description: Non-chemical termite management system of graded and shaped stone particles and PVC-U strip shielding.

Certification: CodeMark Certificate of Conformity CM40276.

Concrete slab
Standard: To AS 3660.1 Section 4.

Slab penetration and joint protection: Install PVC-U shields to all relevant service penetrations.

2.3 TERMGUARD CHEMICAL SYSTEMS

General
Standard: To AS 3660.1 Section 7.

Type testing: To AS 3660.3 Section 5.

TERMGUARD reticulation system
Description: Chemical perimeter and penetrations retreatment system.

Certification: CodeMark Certificate of Conformity CM40275.

3 EXECUTION

3.1 INSTALLATION

General
Requirement: To AS 3660.1 and the manufacturer's recommendations.

Testing
Chemical soil termite management: Test and evaluate for chemical holding in soil to AS 3660.1 Appendix E.

3.2 COMPLETION

Termite management system notice
General: Permanently fix a durable notice in a prominent location to BCA B1.4(i)(ii) or BCA 3.1.4.4.

Waste materials
Progressive cleaning: Remove waste building materials, which could attract termites, from the site.

Warranties
Residential construction: Conform to the following:

- Warranty form: As provided on the Termguard website.
- Warranty period: 50 years on materials and 10 years on workmanship.
- Renewability: Renewable on a continuous basis without limit.

Non-residential construction: Conform to the following:

- Warranty form: As provided on the Termguard website.
- Warranty period: 50 years on materials and 10 year on workmanship.
- Renewability: Renewable on a continuous basis without limit.

Completion inspection
Report: At the end of the defects liability period, inspect the termite management systems and submit a report on their efficacy and status.

4 SELECTIONS

4.1 SCHEDULE

Termite management systems schedule

Property	TB1	TB2	TB3
Location	Ground Level slab		
Under slabs	Granitguard		
Slab penetrations	Granitguard		
Slab control joints and footing/slab joints	Granitguard		
Building perimeters	Granitguard		
Under suspended floors			
Timber poles and posts			

0191 SUNDRY ITEMS

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide sundry items, as documented.

Performance

Requirements: Installation as follows:

- Undamaged and free of surface defects or distortions.
- Correctly located and aligned, plumb, level and straight.
- Fixed firmly in position.
- Connected to the nominated service(s).

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.3 SUBMISSIONS

Certification

Sealant compatibility: Submit statements from all parties to the installation certifying the compatibility of sealants with items and substrates.

Operation and maintenance manuals

Requirement: Submit a maintenance manual and, if required, an operation manual with the technical specification and manufacturer's recommendations for the item to be installed.

Samples

Samples required: [complete/delete]

Labelling: Label each sample, giving the brand and product name, manufacturer's code reference, date of manufacture and intended building location.

Shop drawings

General: Submit shop drawings, to a scale that best describes the detail, showing the following:

- Details of fabrication and components.
- Details of fabrication involving other trades or components.
- Information necessary for site assembly.
- Proposals for the break-up of large items as required for delivery to the site.
- Proposed method of joining the modules of large items.
- Fixing locations and types.

Requirement: Submit shop drawings for the following:

- Item A: Block C: Stage Lift
- Item B: Block E: Lift

Warranties

Requirement: Submit a manufacturer's and/or installer's warranty.

1.4 INSPECTION

Notice
Inspection: Give notice so inspection can be made of the following:
- Set-out of item locations before fixing.
- Completion of installation.

2 PRODUCTS

2.1 GENERAL

Storage and handling
General: Deliver, unload and store components and accessories in unbroken manufacturer's packaging.

3 EXECUTION

3.1 PREPARATION

Substrates
General: Prepare the substrate to receive the item.

Protection
General: Protect existing work from damage during the installation and rectify any damage. Provide temporary coverings if required.

3.2 INSTALLATION

Accessories and trim
Requirement: Provide accessories and trim necessary to complete the installation.

3.3 TESTING

Completion tests
Item A: Block C: Stage Lift

Item B: Block E: Lift

3.4 COMPLETION

Cleaning
Requirement: Remove packaging. Clean the completed assembly and surrounds. Wipe down appliances and fittings with a damp, soft, clean cloth.

Warranties
Requirement: Cover materials and workmanship in the terms of the warranty in the form of interlocking warranties from the supplier and the installer.

Form: Against failure of materials and execution under normal environment and use conditions.

4 SELECTIONS

Refer to Finishes Fittings and Equipment schedule for selections

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0193 BUILDING ACCESS SAFETY SYSTEMS

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide building access safety systems, as documented.

Performance

Roofing and cladding: Maintain waterproofing integrity without damage or distortion. Maintain the structural integrity of the supporting elements.

1.2 DESIGN

General

Designer: Equipment supplier with Professional Engineer certification

Requirements

Responsibility: Design and coordination of ground to roof access and fall arrest system

Performance requirements: Horizontal lifeline and rail systems to AS/NZS 1891.2 Section 4.

Authority requirements: WHS and School maintenance requirements

Access: Provide a system for three workers at any one time, to access the following:

- Full extent of gutters.
- Roof mounted plant and equipment.
- Roof areas within 2.5 m of fall hazards not otherwise protected by parapets or guard rails.
- External façade areas including glazing.
- External lighting.
- Aerials and telecommunications equipment.

1.3 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.4 STANDARDS

General

Industrial fall-arrest system: To AS/NZS 1891.1, AS/NZS 1891.2, AS/NZS 1891.3 and AS/NZS 1891.4.

Industrial rope access system: To AS/NZS 4488.1 and AS/NZS 4488.2.

1.5 INTERPRETATION

Abbreviations

General: For the purposes of this worksection the following abbreviations apply:

- PPE: Personal protective equipment.

Definitions

General: For the purposes of this worksection the definitions given in AS/NZS 1891.1 and AS/NZS 5532 apply.

1.6 SUBMISSIONS

Certification

General: Submit certification of installed system.

Design documentation
Calculations: Submit calculations by a professional engineer experienced in building access safety systems.

Certification: Submit certification by a professional engineer experienced in building access safety systems design as evidence of conformance to documented requirements.

Drawings: Submit the following drawings:

- Layout of anchors and system components in plan and elevation.
- Proposed methods of fixing to each substrate type in the building.

Marking and labelling
Requirement: Samples and schedules of proposed marking and labels for each system component.

Operation and maintenance manuals
General: Submit a manual describing the following:

- Limitations of the system.
- Operation procedures and methods.
- PPE user manuals.
- Care and maintenance requirements.

Products and materials
Manufacturers data: Submit manufacturer's data including the following:

- Product technical data sheets.
- Installation and maintenance recommendations.

Type tests: Submit results, as follows:

- Industrial fall arrest systems and devices.
- Industrial rope access systems.
- Fixed ladders.
- Single point anchors.

Samples
Samples required: Harness and ancillary attachments

Subcontractors
General: Submit names and contact details of proposed suppliers and installers as recommended by the manufacturer.

Evidence of experience: List of premises like systems installed.

Tests
Site tests: Submit results of proof load tests of drilled-in anchors.

Warranties
Requirement: Submit the warranties for each type of building access safety system, as documented.

1.7 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:

- Shop fabricated or assembled items ready for delivery to the site.
- Commencement of shop or site welding.
- All equipment attachments with concealed fixings, before they are covered.
- Site erected assemblies on completion of erection, before applying finishes.
- Steel surfaces prepared for, and immediately before, site applied finishes.

Installation inspector: Registered height safety inspector or engineer.

Post installation inspection
Inspection interval: Maximum 12 months.
Anchor inspection requirements: To AS/NZS 4488.2 clause 7.1.3.
Suspension equipment inspection interval: Maximum 6 months.

2 PRODUCTS

2.1 GENERAL

Product identification
General: Mark to show the following:
- Manufacturer's identification.
- Installer's contact details.
- Intended location.
- Load rating and direction.
- Current inspection/service date.
- Batch number or serial number of the components.

2.2 FALL PROTECTION SYSTEMS

Access safety system
System: Ladder brackets, harness gear and ancillary equipment, horizontal lifeline and rail systems and anchorage devices.

Anchors
Single point anchors: To AS/NZS 5532.

Vertical lifeline and ladder systems
Product: Vertical rail systems including cables, fixed ladders, guides and fall arrestor trolleys.
Fixed ladders: To AS 1657.

Personal protective equipment (PPE)
Harness: Supply two full body harnesses with shock absorbing lanyards to AS/NZS 1891.1.
Storage: PPE storage holdall supplied by the manufacturer.

Tests
Industrial fall-arrest systems: Tested as follows:
- Horizontal lifeline and rail systems: To AS/NZS 1891.2.
- Fittings components and assemblies: To AS/NZS 1891.3 Section 3.

Industrial rope access systems:
- Rope grabs and descenders: Static load test to AS/NZS 4488.1 Appendix A.
- Back-up type rope grabs and descenders: Dynamic load and performance test to AS/NZS 4488.1 Appendix B.

3 EXECUTION

3.1 INSTALLATION

Standards
Industrial fall arrest systems: To AS/NZS 1891.2.
Industrial rope access systems: to AS/NZS 4488.1.

Subcontractor
Installer: Registered installer, approved by the manufacturer.

Labels and signage
General: To AS/NZS 1891.4 clause 2.2.9.

3.2 TESTING

Proof load test for anchors
Standard: To AS/NZS 4488.2 clause 5.3.

Drilled-in anchors: Load test drilled-in anchors used in shear and not in axial tension (direct pull-out) before use.

Proof load test for horizontal lifeline and rail systems
Standard: To AS/NZS 1891.3 clause 3.1.

3.3 TRAINING

General
Responsibilities: Coordinate the training of owner's facilities management personnel in conformance with *0171 General requirements*.

Training records: Video record all training sessions. Catalogue and include recordings with the operation and maintenance manuals.

3.4 COMPLETION

Reinstatement
Extent: Repair or replace damage to the roofing and rainwater system. If the work cannot be repaired satisfactorily, replace the whole area affected.

Touch up: If it is necessary to touch up minor damage to prepainted metal roofing, do not overspray onto undamaged surfaces.

Cleaning
Roofing and rainwater drainage system: Remove debris, metal swarf, solder, sealants and unused materials.

Warranties
Requirement: Cover materials and workmanship in the terms of the warranty in the form of interlocking warranties from the supplier and installer.

- Form: Against failure of materials and execution under normal environment and use conditions.
- Period: As offered by the supplier/manufacturer.

3.5 MAINTENANCE

General
Preventative and mandatory system maintenance: By an Accredited Height Safety Inspector/Certifier, in conformance with AS/NZS 1891.4 Section 9 and manufacturer's maintenance/recertification recommendations.

Checklist for all inspections: To AS/NZS 1891.2 Supp 1 Table 8, and AS/NZS 1891.4 Section 9 and Appendices C and D.

The installer/competent person: To AS/NZS 1891.2 clause 1.2.1.

Periodic inspections
Standard: To AS/NZS 1891.2 clause 9.2.

Completion certificate:

- Provide inspection, testing and certification by an Accredited Installer and/or Accredited Height Safety Inspector:
  - . Upon completion of the installation at the date for practical completion.
  - . Upon the expiry of the defects liability period or 12 months after completion of the installation whichever is the lesser, and valid for a further 12 months period.
- Record the date of the next system inspection and period of validity and display the certificate at the access points of the work area or on the individual system components where provision is made.

Regular scheduled periodic inspections

Standard: To AS/NZS 1891.2 clause 9.2.

Completion certificate:

- Provide inspection, testing and certification by an Accredited Installer and/or Accredited Height Safety Inspector:
  - . Upon completion of the installation at the date for practical completion.
  - . Upon the expiry of the defects liability period or 12 months after completion of the installation whichever is the lesser, and valid for a further 12 months period.
- Record the date of the next system inspection and period of validity and display the certificate at the access points of the work area or on the individual system components where provision is made.

Inspection after a fall or other event

Standard: To AS/NZS 1891.2 Supp 1 clause 9.3.

Proof testing of drilled-in anchorages

Standard: To AS/NZS 1891.2 Supp 1 clause 9.4.

On-going maintenance

Certificate: Submit the completion certificates and notify the proprietor of the requirement for continued interval testing.

4 SELECTIONS

4.1 FALL PROTECTION SYSTEMS

General

Type: Fall arrest, restraint, and ladder bracket system. Provide all equipment and fixtures required for the operation of the system.

0194P RAVEN DOOR SEALS AND WINDOW SEALS

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide RAVEN door seals and window seals, as documented.

Performance

Handing: Before supply, verify on site, the correct handing of hardware items.

Operation: Make sure working parts are accurately fitted to smooth close bearings, without binding or sticking, free from rattle or excessive play, lubricated where appropriate.

1.2 PERFORMANCE

Bushfire prone areas

Bushfire Attack Level (BAL): Tested to AS 3959.

1.3 COMPANY CONTACTS

RAVEN technical contacts

Website: www.raven.com.au.

1.4 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.5 STANDARDS

Seals general

Quality management for manufacture: To ISO 9001.

Acoustic applications: Tested to AS 1191 or EN ISO 10140-2 and rated to AS/NZS ISO 717.1.

Fire door assemblies: To AS 1530.4 and AS 1905.1.

Smoke door assemblies: To BCA Spec C3.4, tested to AS 1530.7 and rated to AS 6905, and tested to EN 1634-3.

Combined fire and smoke door assemblies: To BCA Spec C3.4, AS 1530.4, AS 1905.1, AS 1530.7 and AS 3959 for weather seals providing BAL FZ.

Buildings in bushfire prone areas: To AS 3959:

- BAL-40: Flame retardant silicon, PVC and TPE weather seals with a Flammability Index not more than 5 when tested to AS 1530.2.
- BAL-FZ: Approved door seals for use with fire doorsets tested to AS 1530.4.

Weather and energy saving seals for proprietary windows and door assemblies: To AS 4420.1 clause 5 and clause 6, and AS 2047.

Door bottom and perimeter seals for glazed external doors: To AS 2047.

Threshold plates: To AS 1428.1.

1.6 MANUFACTURER'S DOCUMENTS

Technical manuals

Website: www.raven.com.au/catalogue.

1.7 INTERPRETATION

Abbreviations and definitions

General: For the purposes of this worksection the following abbreviations and definitions apply:

Ordering abbreviations:

- Al: Aluminium.
- C/A: Clear anodised (15 µm for perimeter seals. 25 µm for threshold plates).
- B/A: Bronze anodised. (15 µm for perimeter seals. 25 µm for threshold plates).
- EPDM: Ethylene Propylene Diene Monomer.
- PE: Painted Polyester Enamel finish (special order and extra cost).
- PVC: Polyvinyl Chloride.
- Si: Silicone Rubber.
- TPE: Thermo Plastic Elastomer.

2 PRODUCTS

2.1 GENERAL

Product substitution

Other products: Conform to PRODUCTS, **GENERAL**, **Substitutions** in *0171 General requirements*.

Product identification

General: Marked to show the following:

- Manufacturer's identification.
- Product brand name.
- Product type.
- Quantity.
- Product reference code and batch number.
- Date of manufacture.

2.2 MATERIALS

Al

Material: Commercial grade alloy B6060 T5 or T6 hardness.

Finish to visible extrusions:

- Satin clear or medium bronze anodised, or as documented.
- Anodising thickness:
  - . Perimeter seal extrusions: Minimum 15 µm.
  - . Threshold plates and threshold plate seals: Minimum 25 µm.

PVC

RAVEN proprietary grade PVC extrusions:

- Highest quality available.
- Added UV inhibitors where exposed to sunlight.
- Self-extinguishing grade.
- Service temperature - 5ºC to + 70ºC.

Si

RAVEN proprietary grade silicon rubber extrusions:

- Are unique and where designated (SE) are self-extinguishing.
- Added UV inhibitors.
- Service temperature - 60ºC to + 230ºC.

TPE

RAVEN proprietary grade TPE extrusions:

- Highest quality available.
- Added UV inhibitors.
- Flammability Index less than 5 to AS 1530.2 where indicated for Bushfire prone areas.

Service temperature - 40ºC to + 100ºC.

EPDM

RAVEN proprietary grade closed cell EPDM rubber extrusions:

- Highest quality available as developed by the automotive industry.
- Added UV inhibitors.
- Classified SE/B self-extinguishing burn rate to SAE J 369, and ISO 3795.
- Service temperature - 40ºC to + 70ºC.

3 EXECUTION

3.1 INSTALLATION

Handing

Requirement: Match door seals to the handing of doors.

Supply

Factory fit and retrofit: Deliver door seals for door perimeter seals and door bottom seals in complete sets for each door, ready for installation.

Identification: Mark packaging with relevant floor level and door location number.

Packaging: For rigid length seals, provide recyclable cartons and recyclable polythene with fixings and fitting instructions.

Off-site installation to proprietary window and door assemblies: Supply RAVEN TPE and silicon rubber weather stripping on bulk reels.

Door assemblies

Modification: Rebate and groove door assemblies to suit the dimensions recommended by RAVEN.

Fitting instructions: Conform to RAVEN's fitting instructions, supplied with each product.

Fixing

Fasteners:

- Unexposed applications: Zinc-plated self-tapping fasteners supplied by RAVEN with each product.
- External coastal exposure applications: Substitute the standard fasteners supplied with equivalent stainless steel fasteners.

Backset: Allow backset clearances as required for hinging, latching and automatic closers.

Proprietary aluminium door/window frames: Select the fixing options to suit the documented RAVEN perimeter/frame seals.

4 SELECTIONS

Refer to Door Hardware Schedule

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0195P DTAC TACTILE INDICATORS AND STAIR EDGINGS

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide DTAC tactile indicators and edging, as documented.

1.2 COMPANY CONTACTS

DTAC technical contacts

Website: www.dtac.com.au/contact

1.3 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.4 STANDARDS

General

Tactile indicators: To AS/NZS 1428.4.1.

Stair edging: To AS 1428.1.

Slip resistance

Classification: To AS 4586.

1.5 MANUFACTURER'S DOCUMENTS

Technical manuals

Technical data sheets and laying guides: www.dtac.com.au/resources

DTAC Tactile ground surface indicators: www.dtac.com.au/product-category/tactile-ground-surface-indicators

DTAC Stair & tread edging: www.dtac.com.au/product-category/stair-treads-edging

DTAC Edge protector: www.dtac.com.au/product-category/urban-products

1.6 SUBMISSIONS

Products and materials

Type tests: Submit results, as follows:

- Slip resistance of tactile indicators and edgings.
- Luminance contrast testing: Submit evidence of conformity to AS/NZS 1428.4.1 Appendix E and AS 1428.1 Appendix B.

Prototypes

General: Provide a prototype of the DTAC product installed in the finished substrate.

Location and extent: 2x Ramps from Block C COLA to Block D & Block E; and 3x Stairs to Block E

Warranties

Tactile indicators, edge protectors and stair edging: Submit DTAC product and installation warranties.

1.7 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the completed substrate ready for tactile indicators and edging installation.

2 PRODUCTS

2.1 GENERAL

Product substitution
Other products: Conform to PRODUCTS, **GENERAL**, **Substitutions** in *0171 General requirements*.

2.2 DTAC TACTILE INDICATORS, EDGE PROTECTORS AND STAIR EDGING

Warning tactile products
Classic: Tactile indicators with a concentric circle design machined or injection moulded on the horizontal face and a smooth outer edge.

Terraced: Tactile indicators with a concentric circle design machined or injection moulded on the horizontal face and a terraced slip-resistant outer edge.

Classic Colourmax: Tactile indicators with a concentric circle design machined on the type 316 stainless steel horizontal face with a smooth injection moulded UV stabilised thermoplastic urethane (TPU) outer edge.

Handrail button: Machined domed type 316 stainless steel button.

Ecotac™ Classic: Tactile indicators with a cupped underside, a concentric circle design machined on the type 316 stainless steel horizontal face and a smooth outer edge.

Ecotac™ Terraced: Tactile indicators with a cupped underside, a concentric circle design machined on the type 316 stainless steel horizontal face and a terraced slip-resistant outer edge.

Ultimat™ Tactile Classic: UV stabilised thermoplastic urethane (TPU) injection moulded tactile with Classic tactile indicators on the horizontal face.

Directional tactile products
Ecotac™ Classic: Tactile indicator type 316 stainless steel with a cupped underside, a grooved design machined on the horizontal face and a smooth outer edge.

Ecotac™ Terraced: Tactile indicator type 316 stainless steel with a cupped underside, a grooved design machined on the horizontal face and a terraced slip-resistant outer edge.

Classic: UV stabilised thermoplastic urethane (TPU) injection moulded tactile with an undulating groove design on the horizontal face and a smooth outer edge.

Integrated tactile products
Classic: Type 316 stainless steel plate with Classic tactile indicators integrated on the horizontal face.

Classic Black Top: Type 316 stainless steel plate with Classic Black tactile indicators integrated on the horizontal face.

Edge protector
Round button: 35 mm diameter urban edge protector.

Bevelled button: 35 mm diameter urban edge protector.

Thin bar: 5 mm thick type 316 stainless steel bar.

Thick bar: 10 mm thick type 316 stainless steel bar.

Stair edging products
Corduroy edging: Extruded aluminium sections with a continuous corduroy pattern.

Pinstripe edging: Extruded smooth, blunt edged aluminium sections with an intermittent high and low profile.

Pleat edging: Extruded smooth, aluminium sections with an intermittent continuous corduroy pattern.

Stitch edging: Extruded aluminium sections with a continuous stitch pattern.

Suede edging: Extruded anodised aluminium sections with a continuous band of silicon carbide.

Urban edging: Continuous band of silicon carbide inserted into anodised aluminium extrusions.

Urban edging - Mill finished aluminium: Intermittent striations of silicon carbide inserted into aluminium extrusions.

Rugged™ edging: Continuous band of fibre glass reinforced plastic extrusion.

3 EXECUTION

3.1 GENERAL

Substrate preparation and installation of DTAC products

Requirement: To DTAC's recommendations and fitting instructions.

Location: As documented.

Classic, Terraced and Classic Colourmax:

- Stone, masonry, timber or vinyl substrates: Drill and pressure fit.
- Carpet or carpet tile substrates: Drill and screw.

Handrail button: Drill and glue to substrate.

Ultimat™ Tactile: Direct stick to substrate with DTAC anchor adhesive.

Button and bar urban edge protector:

- Stone, masonry, timber or vinyl substrates: Drill and glue.
- Vitrified porcelain, ceramics, glass or metal substrates: Diamond core drill and glue.

Fixing stair edging

Corduroy, Pinstripe, Pleat, Stitch, Suede:

- Stone, masonry, timber or vinyl substrates: Adhesive fix.
- Vitrified porcelain, ceramics, glass or metal substrates: Adhesive fix.
- Carpet or carpet tile substrates: Screw-fix or adhesive fix.

Urban and Rugged™: Screw-fix with optional adhesive.

3.2 TESTING

Completion tests

Slip resistance of completed installation: To AS 4663.

Luminance contrast testing of completed installation: Submit evidence of conformity to AS/NZS 1428.4.1 Appendix E and AS 1428.1 Appendix B.

3.3 COMPLETION

Warranties

Conditions: Installation by DTAC or DTAC approved by installer.

Warranty period: 2 years.

4 SELECTIONS

Refer to *Finishes, Fittings and Equipment Schedule* for selections.

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0221 SITE PREPARATION

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide site preparation, as documented.

Performance

Areas for protection: Refer to SSDA Conditions of Consent – Riparian Zone

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.
- *0172 Environmental management*.

1.3 INTERPRETATION

Definitions

General: For the purposes of this worksection the following definitions apply:

- Authority: Any organisation with statutory authority relating to the project, including clearances.
- Clearances: A formal certificate, approval or condition issued by a statutory authority allowing work in a particular area.
- Plant establishment period: The period between the date of practical completion and the end of the defects liability period.
- Utility service provider: Includes organisations providing power, water, sewerage, gas and telecommunications services.

1.4 SUBMISSIONS

Certification

Vermin: Submit pest exterminator's certification as evidence that the completed site works are free from vermin.

Execution details

Requirement: Submit details of methods and equipment proposed for the following:

- Clearing and grubbing.
- Tree removal and transplanting.
- Protecting ground within and adjacent to tree driplines from compaction by proposed earthworks machinery.

1.5 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Enclosures around trees requiring protection.
- Trees requiring removal.
- Trees for transplanting to determine final orientation.

2 EXECUTION

2.1 COMMUNITY LIAISON

Notification

General: Notify residents about construction activities which will affect access to, or disrupt the use of, their properties.

Notice: Minimum 5 working days, unless the work is of an urgent nature with safety implications.

Notification content:

- Description of the work.
- The reason for the work.
- The expected duration.
- Changes to traffic arrangements and property access.
- The 24-hour contact number of the representative responsible.

2.2 EXISTING SERVICES

General

Requirement: Before starting earthworks, locate and mark existing underground services in the areas affected by the earthworks operations including clearing, excavating and trenching.

Utility services: Contact DIAL BEFORE YOU DIG to identify location of underground utility services pipes and cables.

Excavation: Do not machine excavate within 1000 mm of existing services.

Existing service lines: If required, divert services detected during excavation, clear of the building, and reconnect to the utility service provider's requirements.

2.3 SITE CLEARING

Extent

Requirement: Clear only areas occupied by works such as structures, paving, excavation, regrading and landscaping or other areas documented for clearing.

Contractor’s site areas: If not included within the areas documented above, clear only to the extent necessary for the performance of the works.

Clearing and grubbing

Clearing: Remove everything on or above the site surface, including rubbish, scrap, grass, vegetable matter and organic debris, scrub, trees, timber, stumps, boulders and rubble.

Grubbing: Grub out stumps and roots over 75 mm diameter to a minimum depth as follows:

- Below subgrade under buildings, embankments or paving: 500 mm.
- Below finished surface in unpaved areas: 300 mm.

Backfilling: Fill holes remaining after grubbing with sand material to prevent ponding of water. Compact the material to the relative density of the existing adjacent ground material.

Redundant/decommissioned works: Remove works no longer required, including slabs, foundations, paving, drain, and access chambers and covers within the works zone.

Batters

Temporary protection: If the change in level between crest and toe is more than 1500 mm, protect from erosion with geofabric, hessian and tar or heavy duty black polythene sheet cover. Securely fix down at crest and toe.

Surplus material

Topsoil and excavated material: Remove unwanted stripped soil and other material from the site as the work proceeds, including any material dropped on footpaths or roadways.

2.4 STORMWATER AND SEDIMENT CONTROL

General

Erosion and sediment control measures: To *0172 Environmental management*.

Waterways and drains

Waterways: If required, temporarily divert ditches, field drains and other waterways affected by excavation and reinstate on completion.

Stormwater drains: Divert drains detected during excavation, clear of the building, and reconnect as documented or obtain approval.

2.5 EXISTING WORKS TO REMAIN

Marking

Requirement: Identify existing works to remain with 1000 mm high, 50 x 50 mm timber stakes connected by yellow plastic tape to prevent accidental damage.

2.6 TREE REMOVAL

Designation

Marking: Identify trees and shrubs for removal by tagging 1000 mm above ground level.

2.7 TREE PROTECTION

General

Warning signs: In a prominent position at each entrance to the site, display warnings that trees and plantings require protection during the contract. Remove on completion.

Lettering: Road sign type sans serif letters, 100 mm high to AS 4970 Appendix C.

Protection measures: Provide before starting the earthworks.

Trees to remain

Extent: Trees not marked for removal.

Tree protection

Tree protection zone (TPZ): To AS 4970 Section 3.

Tree protective measures: To AS 4970 Section 4.

Monitoring and certification: To AS 4970 Section 5.

Work near trees

Materials placement: Conform to the following:

- Keep the area within the dripline of trees free of sheds and paths, construction material and debris.
- Do not place bulk materials and harmful materials within the dripline of trees.
- Do not place spoil from excavations against tree trunks.
- Prevent wind-blown materials such as cement from harming trees and plants.

Damage: Prevent damage to tree bark. Do not attach stays, guys and similar material to trees.

Work under trees: Do not remove topsoil from, or add topsoil to, the area within the dripline of the trees.

Excavation: If excavation is required near trees, give notice. Minimise period and extent of excavation within the dripline.

Hand methods: Use hand methods to locate, expose and cleanly remove the roots on the line of excavation. If excavation is required within the dripline, use hand methods so that root systems remain intact and undamaged.

Roots: Do not cut tree roots exceeding 50 mm diameter. If required to cut tree roots, use cutting methods that do not excessively disturb the remaining root system. Immediately after cutting, water the tree and apply a liquid rooting hormone to stimulate the growth of new roots.

Backfilling: Backfill excavations around tree roots. Place the backfill in layers of 300 mm maximum depth and compact to a dry density similar to that of the original or surrounding soil. Do not backfill around tree trunks to a height greater than 200 mm above the original ground surface. Immediately after backfilling, thoroughly water the root zone surrounding the tree.

Backfill material:

- Mix proportions (topsoil:well-rotted composts) by volume: 3:1.
- Neutral pH value.
- Free from weed growth and harmful materials.

Compacted ground: Do not compact the ground or use skid-steer vehicles under the tree dripline. If compaction occurs, give notice.

Compaction protection: Protect ground adjacent to the tree dripline.

Watering: Water trees as necessary, including where roots are exposed at ambient temperature more than 35°C.

Mulching: Spread 100 mm thick organic mulch to the whole of the area within the dripline of all existing trees to remain.

2.8 TEMPORARY LANDSCAPE FENCING

Fence dimensions

Height: 1200 mm.

Maximum post spacing: 5000 mm.

Component sizes

Corner and gate posts: Hardwood or preservative-treated softwood, 250 mm diameter.

Intermediate posts: Star picket.

Gate: Provide a suitable hinged gate with a gate latch.

Wire: Top, intermediate and bottom rows of 3.2 mm plain galvanized steel wire. Thread the top wire through pieces of plastic tube and through corner posts.

2.9 SITE NURSERY

Temporary works

Perimeter: Provide a bund wall of compacted fill as follows:

- Height: 400 mm.
- Batter grade (horizontal:vertical): 2:1.

2.10 TREE MAINTENANCE

General

Notice: Give notice before starting tree maintenance.

Pruning: To AS 4373 using a fully qualified and experienced arborist. Carry out all required works in a safe manner.

Execution

Requirement: Rectify any damage to existing trees to remain.

Operations: Remove dead and decayed wood or damaged limbs. Make all cuts at branch collars. If trees show signs of deterioration after the work is completed, amerliorate the soil by soil aeration, irrigation or incorporation of organic material. Continue this program until the end of the plant establishment period.

Root pruning: Do not excessively disturb the remaining root system. Cut off damaged roots cleanly inside the exposed or damaged area. Cover exposed root area with soil immediately after pruning, do not leave roots exposed.

Wetting and new root stimulation: Form a water collecting basin and apply a rooting hormone and wetting agent to the rootball.

Precautions: Avoid damage to trees being treated and to nearby trees and surroundings. Do not use trees as anchors for winching operations or bracing. Provide bracing as necessary before cutting to prevent uncontrolled breakages and damage to surroundings.

Failure: If repair work is impracticable, or is attempted and is rejected, remove the tree and root system and make restitution.

2.11 COMPLETION

Site restoration

Requirement: Reinstate undeveloped ground surfaces to the condition existing at the commencement of the contract.

Clean up

Progressive cleaning: Keep the works clean and tidy, and regularly remove from the site, waste and surplus material arising from execution of the work.

Waste disposal: To *0172 Environmental management*.

Vermin management

Requirement: Employ a suitably qualified pest exterminator to remove vermin found during site preparation.

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0222 EARTHWORK

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide earthworks to the dimensions and tolerances, as documented.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.
- *0172 Environmental management*.

1.3 STANDARDS

General

Earthworks: Conform to the recommendations of those parts of AS 3798 that are referenced in this worksection.

Description and classification of soils: To AS 1726.

1.4 INTERPRETATION

Abbreviations

General: For the purposes of this worksection the following abbreviations apply:

- GITA: Geotechnical inspection and testing authority.
- GTA: Geotechnical testing authority.

Definitions

General: For the purposes of this worksection the definitions given in AS 3798 and the following apply:

- Bad ground: Ground unsuitable for the works, including fill liable to subsidence, ground containing cavities, faults or fissures, ground contaminated by harmful substances and ground that is, or becomes, soft, wet or unstable.
- Rock: Monolithic material with volume greater than 0.3 m^3 that cannot be removed until broken up by rippers or percussion tools.
- Site topsoil: Natural soil, excavated from the site, that contains organic matter, supports plant life, conforms generally to the fine-to-medium texture classification to AS 4419 and is free from the following:
  - . Stones more than 25 mm diameter.
  - . Clay lumps more than 50 mm diameter.
  - . Weeds and tree roots.
  - . Sticks and rubbish.
  - . Material toxic to plants.
- Subgrade: The trimmed or prepared earth material on which the pavement, footing or slab is constructed. Generally taken to relate to the upper line of the earth material.
- Zone of influence: A foundation zone bounded by planes extending downward and outward from the bottom edge of a footing, slab or pavement and defining the extent of foundation material having influence on the stability or support of the footings, slab or pavement.

1.5 TOLERANCES

General

Finish: Finish the surface to the required level, grade and shape within the following tolerances:

- Under building slabs and load bearing elements: + 0, - 25 mm.
- Pavement subgrades: + 0, - 40 mm.
- Batters: No steeper than the slope shown on the drawings. Make sure flatter slopes do not impact on boundaries or required clearances to buildings, pavements or landscaping.
- Other ground surfaces: ± 50 mm, provided the area remains free draining and matches adjacent construction where required. Provide smoothness as normally produced by a scraper blade.

1.6 SUBMISSIONS

Design documentation

Calculations: Submit calculations by a professional engineer showing the stability and safety of proposed excavations and temporary supports, including supports required for adjacent structures.

Execution details

Report: Submit a time-based schedule detailing the methods and equipment proposed for the earthworks, including the following:

- Dewatering and groundwater control and disposal of surface water.
- Excavation methods, stages, clearances, batters and temporary supports.
- Stockpiles and borrow pits.
- Placing and compaction methods and stages.

Geotechnical site investigations: Provide a geotechnical report supporting the methods proposed for excavation.

Disposal location: Submit details of the locations and evidence of compliance with the appropriate authority requirements for the disposal of material requiring removal from site.

Temporary shoring: Submit a proposal for any temporary shoring required, including the progressive removal.

Proof rolling: Submit details of proposed method and equipment for proof rolling.

Records of measurement: Submit a certified copy of the agreed records of measurement.

Site records: Submit the following to AS 3798 clause 3.4 and Appendix B:

- Geotechnical site visit record.
- Earthworks summary report or daily geotechnical reports.

Products and materials

Imported fill: Submit certification or test results by a GTA registered laboratory of the imported fill as evidence of conformity with the contract, including the source.

Tests

Compaction: Submit certification and/or test results in conformance with the documented level of inspection and testing to AS 3798.

1.7 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Items to be measured as listed in **RECORDS OF MEASUREMENT**.
- Areas to be cleared and/or stripped of topsoil.
- Areas stripped of topsoil.
- Excavation completed to contract levels or founding material.
- Proof rolled subgrade before placing fill.
- Filling completed to contract levels.
- Stockpiled topsoil before spreading.

2 PRODUCTS

2.1 FILL MATERIALS

General

Suitable material: To AS 3798 clause 4.4 including inorganic, non-perishable material suitably graded and capable of compaction to the documented density.

Unsuitable materials: To AS 3798 clause 4.3.

Sulfur content: Do not provide material with sulfur content exceeding 0.5% within 500 mm of cement bound elements (for example concrete structures or masonry) unless the elements are protected by impermeable membranes or equivalent means.

Re-use of excavated material: Only re-use suitable material to AS 3798 clause 4.4.

Stockpiles

General: Segregate the earth and rock material and stockpile for re-use in backfilling operations.

Location: Do not stockpile excavated material against tree trunks, buildings, fences or obstruct the free flow of water along drainage channels.

2.2 BORROW OR IMPORTED FILL

General

Borrow or imported material: Use only when suitable excavated material from site is not available.

- Suitable material: To AS 3798 clause 4.4.

Borrow pits:

- Locate more than 3000 mm from any fence line, boundary, edge of excavation or embankment.
- Strip and stockpile topsoil.
- Provide erosion protection during winning operations of material and make sure drainage is maintained.
- On completion of winning operations grade abrupt changes of slope, respread topsoil, and apply and maintain hydroseeded grassing.

2.3 GEOTEXTILE

General

Material: UV stabilised, permeable, polymeric, woven or non-woven textile material used in contact with soil/rock material.

Identification and marking: To AS 3705.

3 EXECUTION

3.1 SITE PREPARATION

Erosion and sedimentation control
Requirement: To *0172 Environmental management*.

3.2 GEOTECHNICAL

As found site conditions
General: If the following are encountered, give notice and obtain instructions before carrying out any further work in the affected area:

- Bad ground.
- Discrepancy in expected conditions.
- Rock.
- Springs, seepages.
- Topsoil more than 100 mm deep.

Inspection and testing
Frequency of testing: To AS 3798 Table 8.1.

3.3 RECORDS OF MEASUREMENT

Excavation and backfilling
Agreed quantities: If a schedule of rates applies, provisional quantities are documented, or there are variations to the contract levels or dimensions of excavations, do not backfill or place permanent works in the excavation until the following have been agreed and recorded:

- Depths of excavations related to the datum.
- Final plan dimensions of excavations.
- Quantities of excavations in rock.

Method of measurement: By registered surveyor.

Rock
Level and class: If rock is measured for payment purposes, either as extra over excavation of material other than rock or for adjustment of provisional measurements, do not remove the rock until the commencing levels and the classes of rock have been determined.

3.4 REMOVAL OF TOPSOIL

General
Extent: Areas of cut or fill and areas occupied by structures, pavements and embankments.

Maximum depth: 200 mm.

Disposal: Remove topsoil unsuitable for re-use from the site to AS 3798 clause 6.1.8.

Topsoil stockpiles
General: Stockpile site topsoil intended for re-use.

Stockpile maximum height: 1.5 m.

Identification: Mark and label stockpiles of different soil types.

Vegetation: Do not burn off or remove plant growth that occurs during storage.

Protection: Conform to the following:

- Provide drainage and erosion protection.
- Do not allow traffic on stockpiles.
- If a stockpile is to remain for more than four weeks, sow with temporary grass.
- Protect the topsoil stockpiles from contamination by other excavated material, weeds and building debris.

3.5 EXCAVATION

Extent

Site surface: Excavate the site to the required levels and profiles for the documented structures, pavements, filling and landscaping. Make allowance for compaction, settlement or heaving.

Footings, pits, wells and shafts: Excavate to the required sizes and depths. Confirm that the foundation conditions meet the design bearing capacity.

Bearing surfaces

Requirement: Provide even plane bearing surfaces for loadbearing elements including footings. Step to accommodate level changes. If supporting masonry, make the steps appropriate to the courses.

Rock

General: Do not use explosives.

Existing footings

Requirement: If excavation is required within the zone of influence of an existing footing, provide supports to the footing sufficient to prevent damage arising from the works. Use methods including temporary shoring or underpinning.

Existing services

Location: Before starting earthworks, locate and mark existing underground services in the areas that will be affected by the earthworks operations including clearing, excavating and trenching.

Utility services: Contact DIAL BEFORE YOU DIG to identify location of underground utility services pipes and cables.

Excavation: Do not excavate by machine within 1000 mm of existing services.

Proof rolling

Extent: Proof roll excavations for pavements, filling and non-spanning slabs on ground to determine the presence of bad ground.

Proof rolling method and equipment: To AS 3798 clause 5.5.

Requirement: If excessive settlement, rebound or heaving is encountered, provide test pits or trenching to determine the extent of bad ground.

Disposal of excess excavated material

General: Remove excess excavated material from site not required or unsuitable for fill.

Standard: To AS 3798 clause 6.1.8.

3.6 REINSTATEMENT

Deterioration of bearing surfaces

Requirement: If the bearing surface deteriorates because of water or other cause, excavate to a sound surface before placing the loadbearing element.

Subgrades affected by moisture

Requirement: If, due to high moisture content the subgrade cannot support construction equipment or the overlying pavement cannot be compacted, perform one or more of the following:

- Allow the subgrade to dry until it provides support for equipment and allows compaction.
- Scarify the subgrade to a depth of 150 mm, work as necessary to accelerate drying, and recompact when the moisture content is satisfactory.
- Excavate the wet material and remove to spoil, and backfill excavated areas.

Over excavation

Requirement: If excavation exceeds the required depths, reinstate to the correct depths, levels and bearing capacity.

Zone of influence: Within the zone of influence of footings, beams, or other structural elements, use concrete of strength equal to the structural element, minimum 15 MPa. Make sure that remedial concrete does not create differential bearing conditions.

Below slabs or pavements: Rectify the over excavation as follows:

- Generally: Provide selected fill compacted to the documented density.
- Less than 100 mm: Do not backfill. Increase the thickness of the layer above.

Rock depressions and subsoil drains: Backfill rock depressions and over excavation of subsoil drains using coarse subsoil filter.

3.7 SUPPORTING EXCAVATIONS

Removal of supports

General: Remove temporary supports progressively as backfilling proceeds.

Voids

General: If voids occur outside sheeting or sheet piling, fill and compact voids to a dry density similar to that of the surrounding material.

3.8 GEOTEXTILE

General

Preparation: Trim the ground to a smooth surface free from cavities and projecting rocks.

Installation: Lay the fabric flat, not stretched tight, and secure with anchor pins. Overlap joints 300 mm minimum.

3.9 PREPARATION FOR FILLING

Preparation

Stripping: Prepare the ground surface before placing fill (including topsoil fill), ground slabs or load bearing elements to AS 3798 clause 6.1.5. Remove material that inhibits or prevents satisfactory placement of fill layers, loose material, debris and organic matter.

Foundation preparation: To AS 3798 clause 6.1.7.

Compaction: Compact the ground exposed after stripping or excavation, to a minimum depth of 150 mm, to the minimum relative compaction in AS 3798 Table 5.1.

Ground treatment or improvement methods:

- Scarify method: Loosen exposed excavation by scarifying to a minimum of 150 mm, moisture-condition and compact to AS 3798 Section 5.
- Impact roller and impact compaction: Use an approved method.

Slope preparation: If fill is placed on a surface steeper than 4:1 (horizontal:vertical), bench the surface to form a key for the fill. As each layer of fill is placed, cut the existing ground surface progressively to form a series of horizontal steps more than 1 m in width and more than 100 mm deep. Recompact the excavated material as part of the filling. Shape to provide free drainage.

Under earth mounds

General: Cultivate the ground to a depth of 200 mm before mound formation.

Under slabs, paving and embankments

General: If required, loosen the ground to a depth of more than 200 mm and adjust the moisture content before compaction to a density consistent with subsequent filling.

Rock ledges

General: Remove overhanging rock ledges.

3.10 PLACING FILL

General

Extent: Place fill to the documented dimensions, levels, grades, and cross sections so that the surface is always self-draining.

Layers: Place fill in near-horizontal layers of uniform thickness, deposited systematically across the fill area.

Edges: At junctions of fill and existing surfaces, do not feather the edges.

Mix: Place fill in a uniform mixture.

Previous fill: Before placing subsequent fill layers, make sure that previously accepted layers still conform to requirements, including moisture content.

Protection: Protect the works from damage due to compaction operations. If required, limit the size of compaction equipment or compact by hand.

Protective covering to membranes: Do not disturb or damage during backfilling.

Placing at structures

Fill adjacent structures and trenches: To AS 3798 clause 6.2.6.

Requirement: Place and compact fill in layers simultaneously on both sides of structures, culverts and pipelines to avoid differential loading. Commence compacting each layer at the structure and proceed away from structure.

Over the top of structures: Carefully place first layers of fill.

Retaining walls: Do not place fill against concrete retaining walls until the concrete has been in place for 28 days unless the structure is supported by struts.

Compaction

General: Compact the subgrade and each layer of fill to the required depth and density, as a systematic construction operation. Shape surface to provide drainage and prevent ponding.

Maximum rock and lump size in layer after compaction: To AS 3798 clause 6.2.2.

Fill batter faces: Either compact separately, or overfill and cut back. Form roughened surfaces to the faces.

Minimum relative compaction: To AS 3798 Table 5.1.

3.11 PLACING TOPSOIL

Stockpiled topsoil

Cultivation: Rip subgrade to a depth of 100 mm or to the depth of rippable subgrade if less. Cultivate around services and tree roots by hand. Trim to allow for the required topsoil depth.

Herbicide: Apply before placing topsoil.

Placing: Spread and grade evenly.

Compaction: Lightly compact topsoil so that the finished surface is smooth, free from lumps of soil, at the required level, ready for cultivation and planting.

Edges: Finish topsoil flush with abutting kerbs, mowing strips and paved surfaces. Feather edges into adjoining undisturbed ground.

Disposal of excess topsoil

On-site: Dispose of surplus topsoil remaining on site by spreading evenly over the areas already placed.

Off-site: Remove excess topsoil from the site and dispose of legally.

3.12 FILL MOISTURE CONTROL

General

Moisture content: Adjust the moisture content of fill during compaction within the range of 85% to 115% of the optimum moisture content determined by AS 1289.5.1.1 or AS 1289.5.2.1, as appropriate, to achieve the required density.

3.13 COMPACTION TESTS

Compaction control tests

Compaction control tests: To AS 1289.5.4.1 or AS 1289.5.7.1.

Compaction control test frequency
Standard: To AS 3798 Table 8.1.

Confined operations: 1 test per 2 layers per 50 m^2.

3.14 COMPLETION

Grading
External areas: Grade to give falls away from buildings, minimum 1:100.

Subfloor areas: Grade the ground surface under suspended floors to drain ground or surface water away from buildings without ponding.

Site restoration
Requirement: If variation of existing ground surfaces is not required as part of the works, restore surfaces to the condition existing at the commencement of the contract.

0223 SERVICE TRENCHING

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide trenching for underground services, as documented.

1.2 DESIGN

Requirements

Trench design: Design and coordinate all trenching required for proposed inground services, as documented.

Existing services: Where possible, design to avoid all existing services. Locate existing services to

1.3 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.4 STANDARDS

Trenching

Earthworks: To AS 3798.

Electrical services: To AS/NZS 3000.

Hydraulic services: To AS/NZS 3500.1.

Communication services: AS/CA S009.

1.5 TOLERANCES

Surface levels

Earthworks: Finish the surface to the required level, grade and shape within the following tolerances:

- Under building slabs and load bearing elements: + 0, - 25 mm.
- Pavement subgrades: + 0, - 40 mm.
- Batters: No steeper than the slope shown on the drawings. Make sure flatter slopes do not impact on boundaries or required clearances to buildings, pavements or landscaping.
- Other ground surfaces: ± 50 mm, provided the area remains free draining and matches adjacent construction where required. Provide smoothness as normally produced by a scraper blade.

Pavement base and subbase: Finish the surface to the required level, grade and shape within the following tolerances:

- Subbase: + 10 mm, - 25 mm.
- Base: + 10 mm, - 5 mm.

Finished pavement or paving surface: Conform to the documented level within the following tolerances:

- Asphalt: ± 10 mm.
- Concrete: + 10 mm, - 0 mm.
- Paving:
  - . Finished level: ± 8 mm.
  - . Height deviation between adjacent units (lippage): ± 2 mm.

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- Granular surfaces: ± 10 mm.
- Lippage between restored surface and adjacent existing surface: ± 5 mm.

1.6 SUBMISSIONS

Records
As-built location: Upon completion submit to the relevant authority, as-built documentation to show the location of the installed services.

1.7 INSPECTION

Notice
Inspection: Give notice so that inspection may be made at the following stages:
- Items to be measured as listed in **GROUND CONDITIONS**, **Records of measurement**.
- Service trenches excavated before laying the service.
- Services laid in trenches and ready for backfilling.
- Completed surface restoration.

2 PRODUCTS

2.1 FILL MATERIALS

General
Suitable material: To AS 3798 clause 4.4 including inorganic, non-perishable material suitably graded and capable of compaction to the documented density.

Unsuitable materials: Do not use unsuitable material for fill in conformance with AS 3798 clause 4.3.

Sulfur content: Do not provide filling with sulfur content exceeding 0.5% within 500 mm of cement bound elements (for example concrete structures or masonry) unless such elements are protected by impermeable membranes or equivalent means.

Re-use of excavated material: Only re-use suitable material in conformance with AS 3798 clause 4.4.

Material in reactive clay areas: In sites classified M, M-D, H1, H1-D, H2, H2-D, E or E-D to AS 2870, re-use excavated site material at a moisture content within ± 1% of that of the adjoining in situ clay.

2.2 SURFACE RESTORATION MATERIALS

General
Re-use: If possible re-use the existing surface materials that were removed during trench excavation, whilst conforming to the documented material requirements.

Subbase and base
Requirement: Provide crushed rock material configured in layers and depths to match existing and adjacent work, as follows:
- Base: 20 mm nominal size.
- Subbase: 40 mm nominal size.

Pathways and paved surfaces generally
Requirement: Provide materials consistent with those of the existing surface before service trenching works commenced.

Concrete surfaces
Material requirements: Normal-class to AS 1379.

Concrete strength grade: N25.

Slump: Maximum 100 mm.

Asphalt surfaces
Aggregate: To AS 2758.5 or to AS 2758.2 for sprayed bituminous surfaces.

Hot mix asphalt: To AS 2150.

Medium cut back bitumen: To AS 2157.

Bitumen emulsion: To AS 1160.

Bitumen binder: Class 170.

Segmental paving
Concrete and clay pavers: To AS/NZS 4455.2.

Bedding and joint filling sand: Well-graded sand, free of deleterious material such as soluble salts which may cause efflorescence.

Stone pavers and setts: Provide sound stone pavers and setts of uniform quality. Reject any with defects liable to affect strength and durability.

Bedding mortar mix (cement:sand): Select from the range 1:3 to 1:4 to obtain satisfactory adhesion. Provide minimum water.

3 EXECUTION

3.1 EXISTING SERVICES

Location
Requirement: Before commencing service trenching, locate and mark existing underground services in the areas which will be affected by the service trenching operations.

Utility services: Contact DIAL BEFORE YOU DIG to identify location of underground utility services pipes and cables.

Excavation
General: Do not excavate by machine within 1 m of existing underground services.

3.2 EXISTING SURFACES

Concrete and asphalt pavements
Method: Sawcut trench set out lines for the full depths of the bound pavement layers except where the set out line is located along expansion joints.

Removal of concrete and asphalt: Break out concrete or asphalt pavement material between the trench set out lines, remove and dispose of off-site.

Segmental paving
Removal: Take up segmental paving units both full and cut by hand, between the trench set out lines, and neatly stack on wooden pallets.

Concrete edging: Break out, remove and dispose of off-site.

Concrete subbase: If present, sawcut along the trench set-out lines.

Grass
Removal method: Neatly cut grass turf between trench set-out lines into 300 mm squares.

Grass suitable for re-use: Take up and store the turf and water during the storage period.

Unsuitable grass: Remove and dispose of off-site.

Small plants, shrubs and trees
Remove for re-planting: Take up and store. Wrap the rootball in a hessian or plastic bag with drain holes and water during the storage period.

Unsuitable vegetation: Remove and dispose of off-site.

3.3 GROUND CONDITIONS

As found site conditions

Unexpected conditions: If the following are encountered, give notice immediately and obtain instructions before carrying out any further work in the affected area:

- Bad ground.
- Discrepancies to expected ground conditions.
- Rock.
- Springs, seepages.
- Topsoil > 100 mm deep.

Records of measurement

Excavation and backfilling: If a schedule of rates applies, provisional quantities are specified, or there are variations to the contract levels or dimensions of excavations, do not commence backfilling or place permanent works in the excavation until the following have been agreed and recorded:

- Depths of excavations related to the datum.
- Final plan dimensions of excavations.
- Quantities of excavations in rock.

3.4 EXCAVATION

General

Requirement: Excavate for underground services in conformance with the following:

- To required lines and levels, with uniform grades.
- Straight between access chambers, inspection points and junctions.
- With stable sides.
- Width tolerance: ± 50 mm, unless constrained by adjacent structures.
- Tree protection: To AS 4970.

Adjacent structures

Existing footings: If excavation is required within the zone of influence of an existing footing, use methods including (temporary) shoring or underpinning that maintain the support of the footing and make sure that the structure and finishes supported by the footing are not damaged.

Temporary supports: Provide supports to adjacent structures where necessary, sufficient to prevent damage arising from the works, as follows:

- Lateral supports: Provide lateral support using shoring.
- Vertical supports: Provide vertical support where necessary using piling or underpinning or both.

Permanent supports: If permanent supports for adjacent structures are necessary and are not described, give notice and obtain instructions.

Encroachments: If encroachments from adjacent structures are encountered and are not shown on the drawings, give notice and obtain instructions.

Trench widths

General: Keep trench widths to the minimum, consistent with the laying and bedding of the relevant service and construction of access chambers and pits.

Trench depths

General: As required by the relevant service and its bedding method.

Obstructions

General: Clear trenches of sharp projections. Cut back roots encountered in trenches to at least 600 mm clear of services. Remove other obstructions including stumps and boulders which may interfere with services or bedding.

Dewatering
General: Keep trenches free of water. Place bedding material, services and backfilling on firm ground, free of surface water.

Pumping: Provide pump-out from adjacent sumps or install well points.

Adjacent subsidence: Provide recharge points to isolate the dewatering zone.

Excess excavation
General: If trench excavation exceeds the correct depth, reinstate to the correct depth and bearing value using compacted bedding material or sand stabilised with 1 part of cement to 20 parts of sand by volume.

Stockpiles
Topsoil removal: Stockpile topsoil intended for re-use to a maximum height of 1500 mm.

Excavated material for backfill: If required, segregate the earth and rock material and stockpile, for re-use in backfilling operations.

Locations: Do not stockpile excavated material against tree trunks, buildings, fences or obstruct the free flow of water along gutters where stockpiling is permitted along the line of the trench excavation.

Disposal: If stockpiling is not permitted, dispose of excavated material off-site.

Unsuitable material
Disposal: Remove unsuitable material from the bottom of the trench or at foundation level and dispose of off-site. Replace with trench backfill material.

Boring
Subcontractor: If boring is required instead of trenches, engage a suitably qualified subcontractor to do the work.

3.5 TRENCH BACKFILL

General
Place fill: To AS 3798 clauses 6.2.2 and 6.2.6.

Timing: Backfill service trenches as soon as possible after laying and bedding the service, if possible on the same working day.

Removal of supports: Remove temporary supports progressively as backfilling proceeds.

Marking services
Marking tape: Provide marking tape above service, with appropriate labelling, to AS/NZS 2648.1 and as follows:

- Non-metallic services: Provide tape capable of being detected by inground scanning devices.
- Location: Locate tape approximately half the depth of the service being marked, to a maximum depth of 200 mm below the finished ground level.

Boring: If boring techniques are used to install the service, provide permanent on site labelling at the start and end of the service run and record on the as-built documentation.

Bedding, haunch, side and overlay zones
Installation and material: To the particular utility authority or utility service requirements. Secure pipes against floatation.

Bedding of services: Surround pipes or conduits on all sides with a minimum of 75 mm compacted bedding sand, or as documented.

Overlay zone thickness: Maximum 300 mm immediately over the utility service.

Trees
Backfill at trees: Backfill minimum 300 mm thick, around tree roots with a topsoil mixture. Place and compact in layers of 150 mm minimum depth to a dry density equal to that of the surrounding soil.

Original surface level: Do not place backfill above the original ground surface around tree trunks or over the root zone.

Watering: Thoroughly water immediately after backfilling the tree root zone.

Compaction

Control moisture within backfill: To AS 3798 clause 6.2.3.

Layers: Compact all material in layers not exceeding 150 mm compacted thickness. Compact each layer to the required relative compaction before starting the next layer.

Compaction: To AS 3798 Section 5.

Frequency of testing: To AS 3798 clause 8.7.

Precautions: Use compaction methods which do not cause damage or misalignment to utility services.

Density tests

Testing authority: Carry out density tests of pipe bedding and backfilling by an Accredited Testing Laboratory.

Test methods: Conform to the following:

- Compaction control tests: To AS 1289.5.4.1 or AS 1289.5.7.1.
- Field dry density: AS 1289.5.3.2 or AS 1289.5.3.5.
- Standard maximum dry density: AS 1289.5.1.1.
- Dry density ratio: AS 1289.5.4.1.
- Density index: AS 1289.5.6.1.

3.6 SURFACE RESTORATION

Subbase and base

Compaction: Uniformly compact each layer of the subbase and base courses over the full area and depth within the trench to a relative compaction of 100% when tested in conformance with AS 1289.5.4.1.

Compacted layer thickness:

- Maximum: 200 mm.
- Minimum: 100 mm.

Compaction test frequency: Minimum 1/every second layer/50 m² of restoration surface area.

Concrete surfaces

Construction: Conform to the following:

- Prime coat the cut edges of the existing surfaces with cement slurry. Lay and compact concrete so that the edges are flush and the centre is cambered 5 mm above the adjoining existing surfaces.
- Surface finish and pattern: Match existing adjoining work.
- Minimum thickness: 75 mm or the adjacent pavement thickness, whichever is thicker.
- Reinforcement and dowels: If required, provide steel reinforcement with dowels into the adjacent concrete.
- Expansion joints: 15 mm thick preformed jointing material of bituminous fibreboard placed in line with joints in existing concrete.
- Control joints:
  - . Form control joints strictly in line with the control joints in existing concrete.
  - . Around service poles: Terminate the concrete paving 200 mm from the pole and fill the resulting space with cold mix asphalt.

Weather: Do not place concrete in ambient temperatures above 30°C or below 10°C, without adequate precautions. Protect surface from rain damage, if required.

Compaction: Compact as follows:

- Thickness 100 mm or less: Compact by placing, screeding and finishing processes. If required use a hand-held vibrating screed at the surface. Do not use immersion vibrators.
- Thickness more than 100 mm and downturns: Use an immersion vibrator.

Curing: Cure by keeping continuously wet for 7 days.

Asphalt surfaces

Placement: To AS 2150.

Operations: Spread the asphalt mix in layers covering the full width of the trench.

Thickness: Match the adjoining asphalt surface.

Finish: Compact to a smooth even surface.

Sprayed bituminous surfaces: To AS 3727.1 Section 8.

Segmental paving units

Bedding: Replicate the bedding used for the original paved surface. Use bedding methods and materials which are appropriate to the paver, the substrate, the conditions of service, and which leave the paver firmly and solidly bedded in the bedding material.

Laying: Re-lay to match the pattern and surface levels of the existing paving.

Damaged paving units unsuitable for relaying: Replace paving units with new units of the same material, type, size and colour as the existing.

Landscaped areas

In topsoil areas: Complete the backfilling with topsoil for at least the top 100 mm.

Lawn: Re-lay stockpiled turf. If existing turf is no longer viable, re-sow the lawn over the trench and other disturbed areas.

Planted areas: Overfill to allow for settlement.

3.7 COMPLETION

General

As-built documentation: Upon completion, record the location of all installed services on the as-built documentation.

0224 STORMWATER – SITE

1 GENERAL

1.1 RESPONSIBILITIES

General
Requirement: Provide stormwater drainage, as documented.

1.2 CROSS REFERENCES

General
Requirement: Conform to the following:
- *0171 General requirements*.

1.3 STANDARDS

Stormwater drainage
Standard: To AS/NZS 3500.3.

1.4 INTERPRETATION

Definitions
General: For the purposes of this worksection the following definition applies:
- Pipe surround: Includes pipe overlay, pipe side support, side zone and haunch zone.

1.5 SUBMISSIONS

Certification
Requirement: Submit certificate stating that network is leak free upon completion.

Samples
General: Submit samples of the following:
- Each type of imported pipe bedding material.
- Each type of filter material.

Tests
Results: Submit results from pre-completion leak testing.

1.6 INSPECTION

Notice
Inspection: Give notice so that inspection may be made at the following stages:
- Excavated surfaces prior to placing bedding material.
- Underground services, or services to be concealed, before being covered.
- Pipe joints before covering.
- Placing of concrete.
- Upon completion.

2 PRODUCTS

2.1 MATERIALS

Concrete and mortar

Concrete: To AS 3500.3 clause 2.9 and the following:

- Grade: N15.
- Cement: To AS 3972.
  . Type: GP, GL or GB.

Steel reinforcement:

- Bars and machine welded mesh: To AS/NZS 4671.

Joints

Solvent cement and priming fluid: To AS 3879.

Rubber ring joints/elastomeric seals: To AS 1646.

Pipes and fittings

Fibre reinforced cement (FRC): To AS 4139 and the following:

- ≤ 450 mm diameter: Rubber ring joints to AS 4139.
- > 450 mm diameter: With a purpose machined internal spigot and socket system within the pipe wall.

Glass-reinforced plastic (GRP): To AS 3571.1.

Access covers and grates: To AS 3996.

Polyvinyl chloride (PVC): To AS/NZS 1254, AS/NZS 1260 or AS 1273, as appropriate.

Polyethylene (PE): To AS/NZS 4129, AS/NZS 4130, ISO 8770 or AS/NZS 2033, as appropriate.

Precast concrete: To AS/NZS 4058.

Plastic pipe for subsoil drainage: To AS 2439.1.

Vitrified clay or ceramic: To AS 1741.

Bedding material

Bed and haunch zones: Provide granular material graded to the AS 1141 series.

Bedding material grading table

Sieve size (mm)	Weight passing %	
	Bed and haunch	Side zones
75.0	-	100
19.0	100	-
9.5	-	50 - 100
2.36	50 - 100	30 - 100
0.60	20 - 90	15 - 50
0.30	10 - 60	-
0.15	0 - 25	-
0.075	0 - 10	0 - 25

Filter material

Requirement: Materials consisting of natural clean washed sands and gravels and screened crushed rock, to AS/NZS 3500.3 clause 2.13.1.

2.2 GEOTEXTILES

General
Material: UV stabilised, permeable, polymeric, woven or non-woven textile material used in contact with soil/rock material.

Identification and marking: To AS 3705.

Subsoil drainage
Filter: Conform to AS/NZS 3500.3 clause 2.13.2.

2.3 PREFABRICATED PITS

General
Requirement: Precast or prefabricated pits conforming to AS/NZS 3500.3 clauses 2.12.8 and 7.5.

Access covers and grates
Cover finish and load classification: Provide access cover and grate with the documented finish, slip resistance and load class.

3 EXECUTION

3.1 PIPING

Installation
Laying: Lay lengths separately with the barrel bearing evenly on the prepared bedding.

Sockets: Lay with socket ends pointing upstream.

Cleaning: Clean pipe interior of dirt, debris, mortar and other foreign matter.

Protection: Provide temporary caps over the ends of incomplete sections to prevent the entry of foreign matter.

3.2 TOLERANCES

Pipeline tolerances table

	Permissible angular deviation from the documented alignment	**Permissible displacement from the documented positions**
Horizontal	1:300	15 mm
Vertical	1:500	5 mm
Note: These tolerances are conditional on falls to outlets being maintained and no part of a pipeline having less than the documented gradient.		

3.3 STORMWATER DRAINS

Location
Layout: Provide stormwater drains to connect surface drains, subsoil drains and drainage pits to the outlet point or point of connection. Make sure that location of piping will not interfere with other planned services and building elements not yet installed or built. Subject to the preceding and documented layouts, follow the most direct route with the least number of changes in direction.

Laying
Installation: Lay in straight lines between changes in direction or grade. If other pipes are adjacent, set each pipe true to line and complete each joint before laying the adjacent pipe.

Identification
Requirement: Lay a detectable strip or plastic tape in the trench after pipe laying, testing and initial backfilling.

Pipe underlay
Bedding: Bed piping on a continuous underlay of bedding material, minimum 75 mm, maximum 150 mm thick after compaction. Grade the underlay evenly to the gradient of the pipeline.

Chases: If necessary, form chases to prevent projections such as sockets and flanges from bearing on the trench bottom or underlay.

Pipe surrounds
Placement: Place the material in the pipe surround in layers, maximum 200 mm loose thickness, and compact without damaging or displacing the piping.

Trench backfill
General: Backfill the remainder of the trench to the underside of the subgrade with fill material placed in layers, maximum 200 mm loose thickness and compacted to minimum 90%, or 95% under pavements, of the standard maximum dry density.

Lifting holes
Sealing: Seal lifting holes in all pipes with plastic preformed plugs or 3:1 (sand:cement) mortar, before the commencement of backfilling.

Anchor blocks
Restraint: If necessary, to restrain lateral and axial movement of the stormwater pipes, provide anchor blocks at junctions and changes of grade or direction conforming to AS/NZS 3500.3 clause 7.9.

3.4 SUBSOIL DRAINS

General
Requirement: Provide subsoil drains to intercept groundwater seepage and prevent water build-up behind walls and under pavements. Connect subsoil drains to surface drains or to the stormwater drainage system as applicable.

Piping: As documented.

Trench width: ≥ 450 mm.

Trench floor: Grade the trench floor evenly to the gradient of the pipeline. If the trench floor is rock, correct any irregularities with compacted bedding material.

Pipe depth: Provide the following minimum clear depths, measured to the crown of the pipe, where the pipe passes below the following elements:

- 100 mm below subgrade level of the pavement, kerb or channel.
- 100 mm below the level of the bottom of footings.
- 450 mm below the finished surface of unpaved ground.

Jointing
General: At junctions of subsoil pipes, provide tees, couplings or adaptors to AS 2439.1.

Pipe underlay
Bedding: Bed piping on a continuous underlay of bedding material, minimum 75 mm, maximum 150 mm thick after compaction. Grade the underlay evenly to the gradient of the pipeline.

Chases: If necessary, form chases to prevent projections such as sockets and flanges from bearing on the trench bottom or underlay.

Pipe surrounds
Placement: Place the material in the pipe surround in layers, maximum 200 mm loose thickness, and compact without damaging or displacing the piping.

Depth of overlay:

- To the underside of the bases of overlying structures such as pavements and channels.
- To within 150 mm of the finished surface of unpaved or landscaped areas.

Geotextiles
Marking: To AS 3705.

Laying: Place geotextile, as documented.

Protection: During installation do not expose the filter fabric to sunlight for more than 14 days.

Filter socks
General: Provide permeable polyester socks, capable of retaining particles 0.25 mm and greater. Securely fit or join the sock at each joint.

3.5 PITS

Installation
Requirement: Prepare foundation, install pit and connect pipes, to manufacturer's recommendations.

Location: At junctions, changes of gradient and changes of direction of stormwater drains, as documented.

Finish to in situ exposed surfaces
General: Provide a smooth, seamless finish, using steel trowelled render or concrete cast in steel forms.

Corners: Cove or splay internal corners.

Metal access covers and grates
Cover levels: Top of cover or grate, including frame:

- In paved areas: Flush with the paving surface.
- In landscaped areas: 25 mm above finished surface.
- Gratings taking surface water runoff: Locate to receive runoff without ponding.

3.6 TESTING

Pre-completion tests
General: Before backfilling or concealing, carry out an air or water pressure test to AS/NZS 3500.3 Section 9.

Leaks: If leaks are found, rectify and re-test.

3.7 COMPLETION

Cleaning
General: Clean and flush the whole installation.

4 SELECTIONS

Refer to Civil Engineers documents for detail

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0241 LANDSCAPE – WALLING AND EDGING

1 GENERAL

1.1 RESPONSIBILITIES

General
Requirement: Provide landscape walling and edging, as documented.

1.2 CROSS REFERENCES

General
Requirement: Conform to the following:
- *0171 General requirements*.

1.3 SUBMISSIONS

Samples
Submit samples as follows: Garden bed edging. Refer to Landscape Architect documents

1.4 INSPECTION

Notice
Inspection: Give notice so inspection may be made of the following:
- Set out before starting construction.
- Geotextiles and subsurface drainage in place before backfilling.

2 PRODUCTS

2.1 TIMBER

Durability
Natural durability class to AS 5604: Class 1.

Preservative treatment
Timber type: Provide only timbers with preservative treatment appropriate to the Hazard class.

Cut surfaces: Provide supplementary preservative treatment to all cut and damaged surfaces.

CCA treated timber: If proposed, provide details.

Hardwood
General: To AS 2796.1 Section 2.

Softwood
General: To AS 4785.1 Section 2.

2.2 STEEL

Steel tubes
Posts, rails, stays: To AS/NZS 1163.
- Grade: C350L0.

Wire
Chainwire, cable wire, tie wire and barbed wire: To AS 2423.

2.3 CONCRETE

General
Standard: To AS 1379.

Exposure classification: To AS 3600 Table 4.3.

Grade, if there are cast-in metal items: To AS 3600 Table 4.4.

2.4 GEOTEXTILES

General
Type: Polymeric fabric formed from a plastic yarn composed of at least 85% by weight of propylene, ethylene, amide or vinylidene chloride and containing stabilisers or inhibitors to make the filaments resistant to deterioration due to ultraviolet light.

Identification and marking: To AS 3705.

3 EXECUTION

3.1 GENERAL

Set-out
General: Set out the position of walls and edging and mark the position of furniture.

Clearing
Extent: Except for trees or shrubs to be retained, clear vegetation within 1 m of the landscape walls. Grub out stumps and roots of removed trees or shrubs and trim the grass to ground level, but do not remove the topsoil.

Excavation
Extent: Excavate for foundations and footings.

Geotextiles
Storage and handling: Store clear of the ground and out of direct sunlight. During installation do not expose the filter fabric to sunlight for more than 14 days.

3.2 EDGING

Sleeper
Installation: Spike through sleepers with two 13 mm diameter galvanized mild steel rods per sleeper, penetrating a minimum of 500 mm into the subgrade. Drive the rods flush with the upper surface of the sleeper. Arris the upper exposed sleeper edges to produce a 15 mm wide face at 45 degrees to the edges.

Concrete
Edging strip: Place in a shallow trench between timber forms. Wood float finish flush with the adjacent finished level. Provide control joints, filled with resilient bituminous material, at 3 m maximum centres.

Concrete kerb: Fixed form, extrusion or slip forms to AS 2876.

Steel
Fixing:

- Angle section: Fixed in place by the mass of surrounding soil works.
- Flats: Fix in place with 250 mm long x 10 mm galvanized steel spikes driven through 50 x 50 mm fixing plates. Weld holed plates at right angles to the face of the flat at 1000 mm centres on alternate sides set parallel and 25 mm below the top of the edging.

Spade edge
Edges: Define mass planting beds by cutting through soil with garden spade at approximately 70° to vertical. Remove sods from garden beds and spread throughout grassed areas.

Finish: Free from kinks in alignment with one curve grading evenly into the next, and free of straight sections.

Brick

Setting: On a 1:1:6 (cement:lime:sand) mortar haunch.

Joints: 3 mm struck flush.

Alignment: Even and free from dips, humps and bends.

Cleaning: Wash off mortar progressively.

0250 LANDSCAPE – COMBINED

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide landscaped planting, as documented.

Performance

Plants: Grown to a standard that allows rapid establishment and growth to maturity.

Maintenance: Encourage and maintain healthy growth for the duration of the contract.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.3 INTERPRETATION

Definitions

General: For the purposes of this worksection the following definitions apply:

- Imported topsoil: Similar to local natural soil, suitable for the establishment and ongoing viability of the selected vegetation, free of weed propagules and of contaminants, and classified by texture to AS 4419 Appendix K Table K1, as follows:
  - . Fine: Clay loam, fine sandy clay loam, sandy clay loam, silty loam, loam.
  - . Medium: Sandy loam, fine sandy loam.
  - . Coarse: Sand, loamy sand.
- Plant establishment period: The period between the date of practical completion and the end of the defects liability period.
- Site topsoil: Natural soil, excavated from the site, that contains organic matter, supports plant life, conforms generally to the fine-to-medium texture classification to AS 4419 and is free from the following:
  - . Stones more than 25 mm diameter.
  - . Clay lumps more than 50 mm diameter.
  - . Weeds and tree roots.
  - . Sticks and rubbish.
  - . Material toxic to plants.

1.4 SUBMISSIONS

Certification

Plant species: Submit the supplier's certification as evidence that plants are true to the required species and type and free from diseases, pests and weeds at time of delivery.

Operation and maintenance manuals

General: Submit recommendations for maintenance of plants.

Products and materials

Supplier's data: Submit supplier's data including the following:

- Material source of supply for topsoil, filling, stone and filter fabrics.

Samples
General: Submit representative samples of each material, packed to prevent contamination and labelled to indicate source and content.

Bulk materials: At least 5 working days before bulk deliveries, submit a 1 kg sample of each type documented with required test results.

Subcontractors
General: Submit names and contact details of proposed suppliers and evidence of the following, if appropriate:

- Experience in the required type of work.
- Production capacity for material of the required type and quantity.
- Lead times for delivery of materials to the site.

1.5 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:

- Subgrades cultivated or prepared for placing topsoil.
- Topsoil spread before planting.
- Grassing bed prepared before turfing, seeding, or temporary grassing.
- Grassing or turfing completed.
- Plant holes excavated and prepared for planting.
- Plant material set out before planting.
- Planting, staking and tying completed.
- Completion of planting establishment work.

2 PRODUCTS

2.1 TOPSOIL

Standard
Site and imported topsoil: To AS 4419.

Potting mixes: To AS 3743.

Composts, soil conditioners and mulches: To AS 4454.

Source
General: If the topsoil of documented quality cannot be provided from material recovered from site, provide imported topsoil.

Imported topsoil
General: Provide imported topsoil, as documented.

Imported topsoil particle size table (% passing by mass)

Sieve aperture (mm)	Soil textures		
	Fine	Medium	Coarse
2.36	100	100	100
1.18	90 – 100	90 – 100	90 – 100
0.60	75 – 100	75 – 100	70 – 90
0.30	57 – 90	55 – 85	30 – 46
0.15	45 – 70	38 – 55	10 – 22
0.075	35 – 55	25 – 35	5 – 10
0.002		2 – 15	2 – 8

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Imported topsoil nutrient level table

Nutrient	Unit	Sufficiency range
Nitrate-N (NO_3)	mg/kg	> 25
Phosphate-P (PO_4) – P tolerant	mg/kg	43 - 63
Phosphate-P (PO_4) – P sensitive	mg/kg	< 28
Phosphate-P (PO_4) – P very sensitive	mg/kg	< 6
Potassium (K)	mg/kg	178 - 388
Sulphate-S (SO_4)	mg/kg	39 - 68
Calcium (Ca)	mg/kg	1200 - 2400
Magnesium (Mg)	mg/kg	134 - 289
Iron (Fe)	mg/kg	279 - 552
Manganese (Mn)	mg/kg	18 - 44
Zinc (Zn)	mg/kg	2.6 - 5.1
Copper (Cu)	mg/kg	4.5 - 6.3
Boron (B)	mg/kg	1.4 - 2.7
Method References pH in H_2O (1:5), pH in $CaCl_2$ (1:5) and Electrical Conductivity (EC) by Rayment & Higginson (1992) method 4A2, 4B2, 3A1 Soluble Nitrate-N by APHA 4500 Soluble Chloride by Rayment and Lyons 2011 modified method 5A2 Extractable P by Mehlich 3 – ICP Exchangeable cations – Ca, Mg, K, Na by Mehlich 3 – ICP Extractable S by Mehlich 3 – ICP Extractable trace elements (Fe, Mn, Zn, Cu, B) by Mehlich 3 - ICP		

Site topsoil

General: Provide site topsoil, as documented.

Soil blend: If required, stripped natural soil with sand and/or organic matter and recommended ameliorants.

2.2 GRASS

Seed mixtures

Description: Fresh, clean, uncoated new seed, thoroughly pre-mixed with a bulking material such as safflower meal.

Unacceptable seed: Wet, mouldy or otherwise impaired.

Purity (minimum): 98%.

Germination viability (minimum): 86%.

Age (maximum) from date of harvest: 2 years.

Handling: Deliver to the site in bags marked to show weight, seed species and supplier's name.

Turf

Description: Cultivated turf of even thickness, free from weeds and other foreign matter.

Supplier: A specialist grower of cultivated turf.

2.3 FERTILISER

General

Type: Proprietary fertilisers, delivered to the site in sealed bags marked to show manufacturer or supplier, weight, fertiliser type, N:P:K ratio, recommended uses and application rates.

Application rate: Vary the application rate to allow for the plant-available immediate fertilizer equivalence value of the soil conditioning compost.

Fertiliser schedule

Fertiliser key	Location	N:P:K ratio	Application rate

2.4 PLANTS - GENERAL

Supply

Supply trees to AS 2303 and with the following properties:

- Stress: Free from stress resulting from inadequate watering, excessive shade or excessive sunlight experienced at any time during their development.
- Site environment: Grown and hardened off to suit anticipated site conditions at the time of delivery.
- Pests and disease: Free from attack by pests or disease.
- Native species with a history of attack by native pests: Restrict plant supply to those with evidence of previous attack to less than 15% of the foliage and make sure actively feeding insects are absent.

Labelling

General: To AS 2303 clause 4.2.1.

Label type: To withstand transit without erasure or misplacement.

Root system

Requirement: Supply plant material with a root system that is:

- Well proportioned in relation to the size of the plant material.
- Conducive to successful transplantation.
- Free of any indication of having been restricted or damaged.

Root inspection: If inspection is by the removal of soil test, such as investigative inspection, sample as follows:

- For > 100 samples: Inspect 1%.
- For < 100 samples: Inspect 1 sample.

Sample plants: Replace plants used in investigative inspection.

Rejection: Do not provide root bound stock.

2.5 IRRIGATION

General

Requirement: Provide automatically controlled, fixed irrigation systems, as documented.

System type: Refer to Landscape Architects documents for irrigation details

Backflow prevention: To meet statutory requirements.

Irrigation controllers
Type: Automatic controllers that are easily programmed and include the following:
- Manual cycle and individual control valve operation.
- Manual on/off operation of irrigation without loss of program.
- ≥ 4 on/off cycles per day.
- Day omit.
- 240 V input and 24 V output capable of operating 2 control valves simultaneously.
- ≥ 24 hour battery program backup.
- Power surge protection.
- Mounted in a lockable cabinet of minimum IP 54 to AS 60529 in external locations.

Micro-irrigation systems
Tubing: Polyethylene micro-irrigation pipe.

Drip systems
Integrated drip line systems: Tubing with integral drippers inserted into the tube during manufacture.

Discrete drip emitter systems:
- Tubing: Polyethylene micro-irrigation pipe.
- Drippers: Turbulent flow types, easily dismantled for cleaning. Connect directly into piping or provide appropriately sized micro-tubes.

Fittings
Type: Barbed fittings rated for the pressure class of the pipe, fastened with ratchet type clamps.

Valve boxes
Requirement: Provide the following in each valve box:
- Automatic control valve.
- Isolating valve.
- Filter:
  . Micro-irrigation systems: 200 µm.
  . Drip irrigation systems: 100 µm.
- Pressure-reducing valve with 170 kPa outlet pressure.

Construction: UV-resistant high impact plastic with high impact snap lock plastic cover.

3 EXECUTION

3.1 PREPARATION

Weed eradication
Herbicide: Eradicate weeds using environmentally acceptable methods, such as a non-residual glyphosate herbicide in any of its registered formulae, at the maximum application rate.

Manual weeding: Regularly remove weed growth by hand throughout grassed, planted and mulched areas. Remove weed growth from an area of 750 mm diameter around the base of the trees in grassed areas. Continue weeding throughout the course of the works and during the planting establishment period.

Vegetative spoil
Disposal: Remove vegetative spoil from site. Do not burn.

3.2 EARTH MOUNDS

Construction

Placing: Place clean fill in layers approximately 150 mm thick compacted to 85% of the dry density ratio of the surrounding soil tested to AS 1289.5.4.1. Minimise slumping and further compacting.

Edges: Construct changes in grade over a minimum width of 500 mm to smooth, gradual and rounded profiles with no distinct joint.

Existing trees: Maintain the natural ground level under the canopy.

Pipes, culverts and associated structures: Construct mounding to avoid unbalanced loading.

Drainage: Construct mounds to allow free drainage of surface water and to eliminate ponding.

3.3 SUBSOIL

Ripping

General: Rip parallel to the final contours. Do not rip when the subsoil is wet or plastic. Do not rip within the dripline of trees and shrubs to be retained.

Ripping depths: Rip the subsoil to the following typical depths:

- Compacted subsoil: 300 mm.
- Heavily compacted clay subsoil: 450 mm.

Planting beds

Excavated: Excavate to reduce the subsoil level to at least 300 mm below finished design levels. Shape the subsoil to fall to subsoil drains, if required. Break up the subsoil to a further depth of 100 mm.

Unexcavated: Remove weeds, roots, rubbish and other debris. Reduce the planting bed level to 75 mm below finished design levels.

Cultivation

Minimum depth: 100 mm.

Services and roots: Do not disturb services or tree roots. If required, cultivate these areas by hand.

Cultivation: Cultivate manually within 300 mm of paths or structures. Remove stones exceeding 25 mm, clods of earth exceeding 50 mm, and weeds, rubbish or other deleterious material brought to the surface during cultivation. Trim the surface to design levels after cultivation.

Additives

General: Apply additives after ripping or cultivation and incorporate into the upper 100 mm layer of the subsoil as documented.

Gypsum: Incorporate at the rate of 0.25 kg/m^2.

Subsoil additives schedule

Location	Additive type	Additive rate

3.4 TOPSOIL

Placing topsoil

Spreading: Spread the topsoil on the prepared subsoil and grade evenly, making allowances, if appropriate, for the following:

- Required finished levels and contours after light compaction.
- Grassed areas finished flush with adjacent hard surfaces such as kerbs, paths and mowing strips.

Steep batters: If using a chain drag, make sure there is no danger of batter disturbance.

Finishing: Feather edges into adjoining undisturbed ground.

Consolidation
General: Compact lightly and uniformly in 150 mm layers. Avoid differential subsidence and excess compaction and produce a finished topsoil surface which has the following characteristics:
- Finished to design levels.
- Smooth and free from stones or lumps of soil.
- Graded to drain freely, without ponding, to catchment points.
- Graded evenly into adjoining ground surfaces.
- Ready for planting.

Topsoil depths
General: Spread topsoil to the following typical depths:
- Excavated planting areas:
  . For organic mulch: 225 mm.
  . For gravel mulch: 250 mm.
- Irrigated grassed areas generally: 150 mm.
- Irrigated grassed areas, heavy use (e.g. playing fields, playgrounds, and public parks): 200 mm.
- Non-irrigated grass areas: 100 mm.
- Earth mounds:
  . Mass planted surfaces: 300 mm.
  . Grassed surfaces: 100 mm.
- Top dressing: 10 mm.

Surplus topsoil
General: Spread surplus topsoil on designated areas on site or dispose off-site.

3.5 GRASS SEEDING

Preparation
General: If a prepared area becomes compacted before sowing can begin, rework the ground surface before sowing.

Application
Ambient conditions: Do not sow in periods of extreme heat, cold or wet or when wind velocities exceed 8 km/h or if frost is likely before the grass is established.

Method: Evenly distribute the seed using purpose-made sowing machinery. Lightly rake the surface to cover the seed.

Rolling: Roll the seed bed immediately after sowing.
- Roller weight (maximum):
  . Clay and packing (heavy) soils: 90 kg/m width.
  . Sandy and light soils: 300 kg/m width.

Reseeding: If germination has not occurred within one month, reseed the sown areas.

Watering
Before germination: Water the seeded area with a fine spray until the topsoil is moistened to its full depth. Until germination, keep the surface damp and the topsoil moist but not waterlogged.

After germination: Water to maintain a healthy condition, progressively hardened off to the ambient climatic conditions.

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Initial establishment

General: Maintain sown areas until there is a dense continuous sward of healthy grass over the whole of the seeded area, evenly green and of a consistent height.

Protection: Protect the newly sown areas against traffic until established.

Weeding: Remove weeds from the sown areas. If required, spray with a selective herbicide for broad leafed weeds. Do not spray grass seeded areas within 3 months of germination.

Fertilising after germination: As follows:

- Six weeks after germination: Spread fertiliser evenly over the sown area and water in. Do not apply fertiliser to wet grass.
- Ten weeks after grass germination: If the planting establishment period occurs during the summer months, spread pelleted sulphate of ammonia at the rate of 250 kg/ha.

3.6 TURFING

Supply

Elapsed time: Deliver the turf within 24 hours of cutting, and lay within 36 hours of cutting. Prevent turf from drying out between cutting and laying. If not laid within 36 hours of cutting, roll turf out on a flat surface with the grass up, and water as required to maintain a good condition.

Application

Method: Lay the turf as follows:

- Stretcher bond pattern with the joints staggered and close butted.
- Parallel with the long sides of level areas, and with contours on slopes.
- Finish flush, after tamping, with adjacent finished surfaces of ground, paving edging, or grass seeded areas.

Strip turf: Close butt the end joints and space the strips 300 mm apart. Lay top dressing between the turf strips. Finish with an even surface.

Tamping: Lightly tamp to an even surface immediately after laying. Do not use a roller.

Stabilising on steep slopes: Peg the turf to prevent downslope movement. Remove the pegs when the turf is established.

Watering

General: Water immediately after laying until the topsoil is moistened to its full depth. Maintain moisture to this depth.

Initial establishment

General: Maintain turfed areas until there is a dense continuous sward of healthy grass over the whole turfed area, evenly green and of a consistent height.

Failed turf: Lift failed turf and replace with new turf.

Levels: If levels have deviated from the design levels after placing and watering, lift turf and regrade topsoil to achieve design levels.

Top dressing: Mow the established turf and remove cuttings. Lightly top dress to a depth of 10 mm. Rub the dressing into the joints and correct any unevenness in the turf surface.

3.7 PLANTING

General

Plant location and spacing: If necessary to vary plant locations and spacings to avoid service lines, or to cover the area uniformly, or for other reasons, give notice.

Planting conditions

Weather: Do not plant in unsuitable weather conditions, including extreme heat, cold, wind or rain. In other than sandy soils, suspend excavation when the soil is wet, or during frost periods.

Watering
Timing: Thoroughly water the plants before planting, immediately after planting, and as required to maintain growth rates free of stress.

Preparation
Individual plantings in grassed areas: Prepare for planting as follows:
- Excavate a hole twice the diameter of the root ball and at least 100 mm deeper than the root ball.
- Break up the base of the hole to a further depth of 100 mm.
- Loosen compacted sides of the hole to prevent confinement of root growth.

Ripline planting: Prepare for planting as follows:
- Rip the row and excavate a plant hole for each plant large enough to accept the root ball plus 0.1 m³ of backfilling with topsoil.
- Clear weeds and other vegetative material within 300 mm radius of the plants.
- If planting holes are excavated by mechanical means, increase the hole size by 100 mm and loosen compacted sides to prevent confinement of root growth.

Placing
General: Place plants as follows:
- Remove the plant from the container with minimum disturbance to the root ball. Make sure that the root ball is moist.
- If required, root prune to make sure all circling roots have been either severed or aligned radially into the surrounding soil.
- Place the plant in its final position, in the centre of the hole and plumb, and with the topsoil level of the plant root ball level with the finished surface of the surrounding soil.

Fertilising
Pellets: In planting beds and individual plantings, place fertiliser pellets around the plants at the time of planting.

Backfilling
General: Backfill with topsoil mixture. Tamp lightly and water to eliminate air pockets. Make sure that topsoil is not placed over the top of the root ball, so the plant stem remains the same height above ground as it was in the container. Avoid mixing mulch with topsoil.

Watering basins for plants in grassed areas
Location: To each individual plant not located in irrigated grassed areas or naturally moist areas.

Watering basin: Construct around the base of each individual plant, consisting of a raised ring of soil capable of holding at least 10 L.

3.8 IRRIGATION

Micro-irrigation systems
General: Connect micro-tube laterals with proprietary push in or screw in fittings.

Drippers: Connect directly into piping or provide appropriately sized micro-tubes.

Microsprays: Mount microsprays 300 mm above ground on stakes and connect to the piping with appropriately sized micro-tubes.

Piping: Lay polyethylene micro-irrigation pipe on finished ground surface under planting bed mulch and anchor at 1.5 m maximum intervals with U-shaped stakes.

Air release valves: Provide at the highest point in each section to drain the system when flow stops.

Drip systems
Piping: Lay polyethylene micro-irrigation pipe on finished ground surface under planting bed mulch and anchor at 1.5 m maximum intervals with U-shaped stakes.

Air release valves: Provide at the highest point in each section to drain the system when flow stops.

3.9 MULCHING

Placing mulch

General: Place mulch to the required depth and clear of plant stems, so that after settling it conforms to the following:

- Smooth and evenly graded between design surface levels.
- Flush with the surrounding finished levels.
- Sloped towards the base of plant stems in plantation bed.
- For gravel mulches: Not closer to the stem than 50 mm.

Extent: Provide mulch to 750 mm diameter to surrounds of plants planted in riplines and grassed areas.

Depths:

- Organic mulch: 75 mm.
- Gravel mulch: 50 mm.

Installation:

- In ripline and grassed areas: Place mulch to 750 mm diameter around plants.
- In mass planted areas: Place after the preparation of the planting bed but before planting and other work.
- In smaller areas (e.g. planter boxes): Place after the preparation of the planting bed, planting and other work.

Mulching schedule

Mulch key	Location	Mulch type	Depth (mm)	Stabilisation method

3.10 TREATMENT

General

Insect attack or disease: If evidence of insect attack or disease of plant material is discovered, immediately give notice.

Physical removal

General: Remove insect infestation and diseased plant material by hand if appropriate.

Pesticide

Product: Spray with insecticide, fungicide or both, as required.

3.11 STAKES AND TIES

Stakes

Material: Hardwood, straight, free from knots or twists, pointed at one end.

Installation: Drive stakes into the ground at least one third of their length, avoiding damage to the root system.

Stake sizes and quantities:

- For plants ≥ 2.5 m high: Three 50 x 50 x 2400 mm stakes per plant.
- For plants 1 to 2.5 m high: Two 50 x 50 x 1800 mm stakes per plant.
- For plants < 1 m high: One 38 x 38 x 1200 mm stake per plant.

Ties

General: Provide ties fixed securely to the stakes, one tie at half the height of the main stem, others as necessary to stabilise the plant. Attach ties loosely so as not to restrict plant growth.

Tie types:

- For plants ≥ 2.5 m high: Two strands of 2.5 mm galvanized wire neatly twisted together, passed through reinforced rubber or plastic hose, and installed around stake and stem in a figure of eight pattern.
- For plants < 2.5 m high: 50 mm hessian webbing stapled to the stake.

Trunk protection

Collar guards: 200 mm length of 100 mm diameter agricultural pipe split lengthways.

3.12 ESTABLISHMENT

Planting

Requirement: Make sure the general appearance and presentation of the landscape and the quality of plant material at date of practical completion is maintained for the planting establishment period.

Plant replacement: Replace failed, dead and/or damaged plants at maximum 3 weekly intervals as necessary throughout the plant establishment period.

Pruning: To AS 4373 and as documented.

Fertilising: Apply either an all purpose fertiliser or a 12 month slow release fertiliser, in two rows and cultivated into soil to a depth of 100 mm.

- Program: September and March according to seasonal growth requirement.

Weeding: Remove unwanted broadleaf plants and grasses considered invasive to the locality.

Remulching: Maintain the original ground levels around the base of plants.

Watering: Minimum 3 complete waterings, soaking to a depth of 150 mm at fortnightly intervals for the first 6 weeks of plant establishment irrespective of natural rainfall.

Grass surfaces

Preparation: Remove litter and fallen branches before mowing.

Mowing:

- Grass height: Consistent with the growth habit of the grass variety and maintained at 25 mm to 40 mm throughout the year. Do not remove more than one third of the grass height at any one time.
- Program: Weekly during the mowing season, November to March, and at fortnightly intervals from April to October. Do not mow during wet conditions.
- Clippings: Remove grass clippings from the site after each mowing.
- Raking: Once every month before mowing from November to March, rake the grass with a flexible rake. On alternate mowings, adopt a north-south and east-west pattern.

Weeding: Remove unwanted broadleaf plants and grasses considered invasive to the locality.

- Program: Quarterly, and as required to maintain the general lawn condition.

Edge trimming: At the same time as mowing, trim lawn edges to plant beds, pathways, base of trees and other obstacles. Do not damage trees and shrubs.

Topdressing for established lawns: Weed-free imported sandy topsoil to a depth of 5 mm.

- Program: The spring following initial establishment.

Fertilising: Apply lawn fertiliser at the completion of the first and last mowings of the plant establishment period, and at other times as required to maintain healthy grass cover.

3.13 COMPLETION

Irrigation

Requirement: On completion of the irrigation system, carry out the following:

- Flush system thoroughly, check heads, sprays and drippers and clean if blocked.
- Clean strainers.
- Adjust for even distribution with no dry areas.

Cleaning

Stakes and ties: Remove those no longer required at the end of the planting establishment period.

Temporary fences: Remove temporary protective fences at the end of the planting establishment period.

4 SELECTIONS

Refer to Landscape Architects document for selections

0261 LANDSCAPE – FURNITURE AND FIXTURES

1 GENERAL

1.1 RESPONSIBILITIES

General
Requirement: Provide landscape furniture and fixtures, as documented.

1.2 CROSS REFERENCES

General
Requirement: Conform to the following:
- *0171 General requirements*.
- *0262 External sports and playground surfacing*.

1.3 SUBMISSIONS

Operation and maintenance manual
Requirement: Submit the manufacturer's published use, care and maintenance requirements for each item.

Products and materials
Requirement: Submit the manufacturer’s standard drawings and details showing methods of construction, assembly and installation; with dimensions and tolerances.

Type test: Submit results as follows:
- Playground equipment: To AS 4685 series.

Subcontractors
General: Submit names and contact details of proposed suppliers and installers.

Warranties
Requirement: Submit the manufacturer's published product warranties.

1.4 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:
- Custom-built furniture and fixtures fabricated and ready to be delivered to the site.
- Furniture items delivered to site before installation.
- Site locations or substrates prepared to receive furniture or fixtures before installation.
- Set-out of furniture and fixtures.
- Completed installation.

2 PRODUCTS

2.1 GENERAL

Storage and handling
General: Deliver, unload and store products and accessories in sealed manufacturer's packaging.

Preservative treatment
CCA treated timber: If proposed, provide details.

Labelling
Playground equipment: To AS 4685 series.

Weathering steel
Standard: To AS/NZS 3678.

Grade: WR350.

2.2 ELEMENTS

Playground equipment and exercise stations
Soft surfacing: To *0262 External sports and playground surfacing*.

Playground equipment: To the AS 4685 series.

Sand pits
Materials:

- Aggregate: 15 mm gauge road base.
- Agricultural pipe: 75 mm diameter slotted PVC pipe.
- Sand: Clean, sharp river sand.

3 EXECUTION

3.1 INSTALLATION

Erection
Line and level: Erect posts or poles vertically. Erect furniture items level. Where installed on slopes, provide a level area around benches and seats.

Sand pits
Requirement: Compact aggregate to 100 mm depth after installation of play structure components. Lay agricultural pipe in aggregate and cover with filter fabric allowing for a fall of 1:75 towards the agricultural pipe. Top up with 300 mm (minimum) sand.

3.2 COMPLETION

Cleaning
General: On completion, remove protective coatings, clean all surfaces and remove all labels not required for maintenance, or by AS 4685 series.

4 SELECTIONS

Refer to Landscape Architects document

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0271 PAVEMENT BASE AND SUBBASE

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide base and subbase courses as documented.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.
- *0222 Earthwork*.

1.3 INTERPRETATION

Definitions

General: For the purposes of this worksection, the following definitions apply:

- Base: One or more layers of material, forming the uppermost structural element of a pavement and on which the surfacing may be placed.
- Subbase: Material laid on the subgrade below the base either for the purpose of making up additional pavement thickness required, to prevent intrusion of the subgrade into the base, or to provide a working platform.

1.4 SUBMISSIONS

Execution details

General: Submit details of the proposed work methods and equipment for each pathway and roadworks operation, including the following:

- Staging of the work, access and traffic control methods.
- Disposal of surface water, control of erosion, contamination and sedimentation of the site, surrounding areas and drainage systems.

Compaction: If a layer is proposed to exceed 200 mm in thickness, submit evidence that the proposed compaction equipment can achieve the required density throughout the layer.

Products and materials

Source of material: Submit the supplier name, material type (crushed rock, natural gravel, recycled concrete aggregate) and source quarry or recycling site.

Conformance: Submit type test results for each material listed in the **Base material properties and test methods table** and **Subbase material properties and test methods table** from an Accredited testing laboratory as evidence of material conformance.

1.5 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Prepared subgrade.
- Proof rolling of subbase before spreading of base.
- Proof rolling of base before sealing.

2 PRODUCTS

2.1 BASE AND SUBBASE MATERIAL

Granular material

Requirement: Provide unbound granular materials, including blends of two or more different materials, which when compacted develop structural stability and are uniform in grading and physical characteristics.

Crushed rock

Requirement: Provide crushed rock as follows:

- Base: 20 mm nominal.
- Subbase: 40 mm nominal.

Recycled materials

Requirement: Provide recycled materials as follows:

- Base and subbase: Conform to the **Limits on use of recycled and manufactured materials as constituent materials table** and the **Undesirable material properties table**.

Natural gravel

Requirement: Provide unbound natural gravel materials as follows:

- Base: 20 mm nominal.
- Subbase: 40 mm nominal.

Subbase material properties and test methods table

Property and test method	**Differentiating criteria**	**Material requirements**	
		Crushed rock	**Natural gravel**
Particle size distribution or grading (% passing through sieve) to AS 1289.3.6.1	**Sieve size (mm)**	—	—
	53.0 mm	100	100
	37.5	90 - 100	95 - 100
	26.5	74 - 96	80 - 97
	19.0	62 - 86	—
	13.2	—	—
	9.5	42 - 66	48 - 85
	4.75	28 - 50	35 - 73
	2.36	20 - 39	25 - 58
	0.425	8 - 21	10 - 33
	0.075	3 - 11	3 - 21
Liquid limit (w_L) to AS 1289.3.1.1	—	max 25%	max 25%
Plasticity index (I_P) to AS 1289.3.3.1	—	max 12%	max 12%
Linear shrinkage (*LS*) to AS 1289.3.4.1	**Rainfall**	—	—
	Areas with annual rainfall > 500 mm	max 4.5%	max 4.5%
	Areas with annual rainfall < 500 mm	max 6.0%	max 6.0%
Maximum dry compressive strength on fraction passing 19 mm sieve (only applies if	—	min 1.0 MPa	min 1.0 MPa

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Property and test method	Differentiating criteria	Material requirements	
		Crushed rock	Natural gravel
plasticity index is less than 1) to AS 1141.52			
Particle shape by proportional calliper - % misshapen (2:1) to AS 1141.14	—	max 35%	—
Aggregate wet strength* to AS 1141.22	—	min 50 kN	—
Wet/dry strength variation* (dry - wet)/dry to AS 1141.22	—	max 40%	—
Los Angeles value to AS 1141.23	—	max 40%	—
4 day soaked CBR (98% modified compaction) to AS 1289.6.1.1	—	min 30%	min 30%
*Use the fraction with the highest wet/dry strength variation as the value for determining conformance. Test the fraction 19.0 to 9.5 mm. For blended materials, also test the fraction 9.5 to 4.75 mm. Test any other fraction where there is risk of failing.			

Limits on use of recycled and manufactured materials as constituent materials table

Recycled material	Unbound or modified base and subbase	Bound base and subbase
Iron and steel slag	100%	100%
Crushed concrete	100%	100%
Brick	20%	10%
RAP	40%	40%
Fly ash	10%	10%
Furnace bottom ash	10%	10%
Crushed glass fines	10%	10%

Undesirable material properties table

Property and test method	Differentiating criteria	Material requirements		
		Crushed rock	Recycled material	Natural gravel
Undesirable constituent materials (% retained on a 4.75 mm sieve) to RMS T276	**Material type**	—	—	—
	Type I - Metal, glass, stone, ceramics and slag	—	max 2.0 %	—
	Type II - Plaster, clay lumps and other friable material	—	max 0.5%	—
	Type III - Rubber, plastic, paper, cloth, paint, wood and other vegetable matter	—	max 0.1%	—

Base material properties and test methods table

Property and test method	**Differentiating criteria**	**Material requirements**		
		Crushed rock	**Recycled material**	**Natural gravel**
Particle size distribution or grading (% passing through sieve) AS 1289.3.6.1	**Sieve size (mm)**	—	—	—
	26.5	100	100	100
	19.0	95 - 100	95 - 100	93 - 100
	13.2	77 - 93	78 - 92	—
	9.5	63 - 83	63 - 83	71 - 87
	4.75	44 - 64	44 - 64	47 - 70
	2.36	29 - 49	30 - 48	35 - 56
	0.425	13 - 23	13 - 21	14 - 32
	0.075	5 - 11	5 - 9	6 - 20
Liquid limit (w_L) to AS 1289.3.1.1	—	max 25%	max 30%	max 25%
Plasticity index (I_P) to AS 1289.3.3.1	**Rainfall**	—	—	—
	All areas	—	—	—
	Areas with annual rainfall > 500 mm	max 6%	max 6%	max 6%
	Areas with annual rainfall < 500 mm	max 10%	max 10%	max 10%
Linear shrinkage (*LS*) to AS 1289.3.4.1	**Rainfall**	—	—	—
	All areas	—	—	—
	Areas with annual rainfall > 500 mm	max 2.0%	max 2.0%	max 2.0%
	Areas with annual rainfall < 500 mm	max 4.0%	max 4.0%	max 4.0%
For materials with plasticity index less than 1: Maximum dry compressive strength to AS 1141.52	—	min 1.7 MPa	min 1.7 MPa	min 1.7 MPa
Particle shape by proportional caliper (% misshapen for 2:1 caliper ratio) to AS 1141.14	—	max 35%	max 35%	—
Aggregate wet strength* to AS 1141.22	—	min 80 kN	min 80 kN	—
Wet/dry strength variation* to AS 1141.22	—	max 35%	max 35%	—
Los Angeles value (% loss or abrasion) to AS 1141.23	—	max 35%	max 40%	—
CBR (98% modified compaction) to AS 1289.6.1.1	—	min 80%	min 80%	min 80%
Unconfined compressive strength to AS 5101.4	—	max 1.0 MPa	max 1.0 MPa	—

Property and test method	Differentiating criteria	Material requirements		
		Crushed rock	Recycled material	Natural gravel
NOTES: *Use the fraction with the highest wet/dry strength variation as the value for determining conformance. Test the fraction 19.0 to 9.5 mm. For blended materials, also test the fraction 9.5 to 4.75 mm. Test any other fraction where there is risk of failing.				

Tests

Material property testing: Conform to the **Base material properties and test methods table** and the **Subbase material properties and test methods table**.

Frequency of material property tests: Not less than the following:

- Particle size distribution: 1 per 1000 t (or part of).
- Liquid limit: 1 per 1000 t (or part of).
- Plasticity index: 1 per 1000 t (or part of).
- Linear shrinkage: 1 per 1000 t (or part of).
- Foreign materials content: 1 per 1000 t (or part of).
- Maximum dry compressive strength: 1 per 5000 t (or part of).
- Particle shape: 1 per 1000 t (or part of).
- Los Angeles value: 1 per 1000 t (or part of).
- Aggregate wet strength: 1 per 5000 t (or part of).
- Wet/dry strength variation: 1 per 5000 t (or part of).

3 EXECUTION

3.1 SUBGRADE PREPARATION

General

Requirement: Prepare the subgrade in conformance with *0222 Earthwork*.

3.2 PLACING BASE AND SUBBASE

General

Weak surfaces: Do not place material on a surface that is weakened by moisture and is unable to support, without damage, the construction plant required to perform the works.

Spreading: Spread material in uniform layers without segregation.

Moisture content: Maintain wet mixed materials at the required moisture content before and during spreading. Add water to dry mixed materials through fine sprays to the entire surface of the layer after spreading, to bring the material to the required moisture content.

Compacted layer thickness: 200 mm maximum and 100 mm minimum. Provide layers of equal thickness in multilayer courses.

Joints

General: Plan spreading and delivery to minimise the number of joints. Offset joints in successive layers by a minimum of 300 mm.

Start of shift: Remix last 2 m of previous days' work for continuity of compaction.

Final trimming

General: Trim and grade the base course to produce a tight even surface with no loose stones or slurry of fines.

3.3 TOLERANCES

Surface level

General: Provide a finished surface level which is free draining and evenly graded between level points.

Subbase: + 10 mm, - 25 mm.

Base: + 10 mm, - 5 mm.

Base abutting gutters: ± 5 mm from the level of the lip of the gutter, minus the design thickness of the wearing course.

Surface deviation

Base: ≤ 5 mm from a 3 m straightedge laid on the surface.

3.4 BASE AND SUBBASE COMPACTION

General

Construction operation: Compact each layer of fill to the required depth and density, as a systematic construction operation.

Unstable areas: If unstable areas develop during rolling or are identified by proof rolling, open up, dry back and recompact, to the requirements of this worksection. If dry back is not possible, remove for the full depth of layer, dispose of and replace with fresh material.

Minimum relative compaction table

Item description	Minimum dry density ratio (modified compaction) to AS 1289.5.2.1
Subbase	95%
Base	98%

Compaction requirements

General: Apply uniform compactive effort over the whole area to be compacted, until the required density is achieved or until failure is acknowledged. If failure is acknowledged, conform to **Rectification**.

Equipment: Use rollers appropriate to the materials and compaction requirements documented.

Moisture content

General: During spreading and compaction, maintain material moisture content within the range of -2% to +1% from the optimum moisture content (modified compaction).

Spraying: Use water spraying equipment to distribute water uniformly, in controlled quantities, over uniform lane widths.

Dry back: Allow materials to dry to 60 to 80% of the optimum moisture content before applying the seal or wearing course.

Rectification

General: If a section of the pavement material fails to meet the required density or moisture content after compaction, remove the non-conforming material, dispose of off-site or rectify for re-use, replace with fresh material, and re-compact.

Level corrections

General: Rectify incorrect levels as follows:

- High areas: If the area can be rectified by further trimming to produce a uniform, hard surface by cutting without filling, trim so that the rectified area conforms to **TOLERANCES**.
- Low areas and high areas not rectifiable by further trimming: Remove layers to a minimum depth of 75 mm, lightly tyne and replace with new material and re-compact.

3.5 TESTING

Site tests

Compaction control tests: To AS 1289.5.4.1 and AS 1289.5.4.2.

Frequency of compaction control tests: Not less than the following (whichever requires the most tests):

- 1 test per layer per 100 lineal metres for two-lane roads.
- 1 test per layer per 2000 m^2 for carparks.
- 3 tests per layer.
- 3 tests per visit.

0273 SPRAYED BITUMINOUS SURFACING

1 GENERAL

1.1 RESPONSIBILITIES

General
Requirement: Provide sprayed bituminous surfacing, as documented.

Performance
Requirements:
- Free draining and uniformly graded.
- Even and smooth riding surface.

1.2 DESIGN

General
Designer: Civil Engineer

Requirements
Authority requirements: Mid-Western Regional Council, refer to SSDA Conditions of Consent

1.3 CROSS REFERENCES

General
Requirement: Conform to the following:
- *0171 General requirements*.

1.4 INTERPRETATION

Definitions
General: For the purposes of this worksection, the following definitions apply:
- Light duty: Gross vehicle mass < 10 t.
- Initial treatment: An application of a prime (prime coat) or initial seal to a prepared basecourse.

1.5 SUBMISSIONS

Execution details
General: Submit details of proposed work methods, including the following:
- Survey control.
- Staging of the work, access and internal traffic control methods.
- Methods and equipment for each operation.
- Material stockpiles.

Spraying equipment: Submit a current sprayer calibration test certificate from an Accredited Testing Laboratory.

Hand spraying: If intended, submit proposals.

Spraying operations: Submit details of start, finish and width of each spray run.

Public safety: Submit proposals for minimising dust, noise, loose materials or roughness of cold milled surface.

Products and materials
Requirement: Submit details of the following:
- Type and source of constituent materials including aggregates and binders.
- Proportion of constituent materials including binders, bitumen emulsion and adhesion agents.

Tests
Site tests: Submit test results.

Certificate of compliance: A certificate of compliance is acceptable as an alternative to testing a manufactured material. Submit the manufacturer's certificate with the results of tests undertaken by the manufacturer, showing compliance with test criteria.

1.6 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:

- Surfaces prepared for priming, sealing or surfacing.
- Commencement of bituminous spraying.
- Completion of surfacing.

2 PRODUCTS

2.1 BITUMINOUS SEALING MATERIALS

Material grades
Bitumen: Class 170 to AS 2008.

Bitumen emulsion: To AS 1160.

Cutback bitumen classification and grading: To AS 2157 and as documented.

Proprietary grades of cutback bitumen: To the manufacturer's recommendations.

Cutter oil and flux oil: To AS 3568.

Aggregate precoating materials
Precoating agent: Provide precoating agents evaluated using both initial adhesion and plate stripping tests.

Adhesion agent content in precoating: Minimum 1 %.

Measuring bitumen and cutter
General: Measure by volume at 15°C.

Volume correction factors: Conform to Austroads AGPT04F Table A 1 for converting volume of bituminous binders.

2.2 AGGREGATE

Aggregate properties
Standard: To AS 2758.2.

2.3 OTHER MATERIALS

Geotextile
Type: Non-woven, needle punched fabric with minimum melting point of 165°C and a minimum fabric mass of 130 g/m^2.

Application: To Austroads AP-T37.

Tactile ground surface indicators
Standard: To AS/NZS 1428.4.1.

3 EXECUTION

3.1 SURFACE PREPARATION

Cleaning

General: Immediately before spraying, remove loose and foreign material from the finished base surface, including dust, debris and sand on primed surfaces, until a mosaic of well embedded aggregate shows on the surface. Keep traffic off the cleaned surface.

Method: Use suitable power blowers or power brooms. Use hand methods for areas inaccessible by power equipment.

Preconditions: Prime and seal in dry and warm weather, on dry pavement surface at a temperature not less than 10°C to Austroads AGPT08 Tables 10.4 and 10.5.

Potholes

General: Trim to a regular shape and a uniform depth of at least 75 mm. Tack coat the sides, and patch with bituminous premix, sanded after completion. Allow sufficient time for the premix to cure before spraying the surface to Austroads AP-PWT09.

3.2 PREPARATION FOR SPRAYING

Precoating aggregates

Supply: Precoat aggregates immediately before loading the aggregate into the spreader trucks.

7 mm cover aggregate: Precoat at least 48 hours before spreading.

Target application: Apply precoating agent thinly and evenly, using a fine pressure spray to a moving stream of aggregate, or by other approved means, so that particles are fully coated but without excess material.

Wet aggregate: If the aggregate is too wet to precoat, or contains enough moisture to cause uneven distribution of the precoating agent, dry the aggregate by turning the stockpile over. Do not precoat aggregate until the moisture has evaporated sufficiently for the precoating agent to adhere evenly.

Target application rate: In the range 4 to 14 L/m^3 of aggregate.

Cutback bitumen

Temperature: Heat sufficient bitumen for immediate use only. Do not keep the material at spraying temperature for longer than 10 hours. Do not reheat.

Mixing and heating (on site): Heat the bitumen at a rate not exceeding 40°C/h, and circulate cutback bitumen for 20 minutes for thorough mixing.

Heating devices: Use devices capable of uniform heating without damaging bituminous materials.

3.3 RESIDENTIAL SEALED PAVEMENTS

Light duty, low volume traffic applications

Construction: To AS 3727.1 Section 8.

Spray sealing: To AS 3727.1 clause 8.4 and Austroads AP-PWT21.

3.4 SPRAYING OPERATIONS

Spraying equipment

Areas not accessible by mechanical sprayer: Use hand spray equipment attached to the mechanical sprayer.

Spraying

General: Completely and uniformly cover the surface to be treated. Prevent the spray overlapping previously treated areas, except where part-width spraying is used, lap the longitudinal joint between adjacent runs. Application rates and lap widths to Austroads AP-PWT21.

Protection

Adjacent surfaces: During spraying, place drip trays under spray bars when the sprayer is stationary. Clean bituminous materials from adjacent surfaces. If this is not possible, replace adjacent surface.

Freshly sprayed surfaces: Protect from contamination.

Primed surface: Keep traffic off the primed surface for at least 3 days after spraying. If required, start sanding 4 to 24 hours after spraying.

Priming

General: Prime the granular pavement to achieve and maintain a strong bond between granular surface and pavement treatment seal.

Edges: At underbed edges, extend the primer 150 mm beyond the edge of the seal.

Primersealing and sealing

Process: Allow at least 3 days between priming and sealing and between first and second binder application in double seals. Incorporate the first course of aggregate thoroughly into the binder before applying a second course.

Spraying temperature ranges:

- Bitumen without cutter: 160°C to 190°C.
- Priming Grade AMC1: 60°C to 80°C.
- Primerbinder Grade AMC3: 95°C to 115°C.
- Bitumen emulsion binder: Ambient temperature.

Junctions with existing pavements: Protect pavement base using a suitable temporary seal or primerseal.

Application rates

General: As documented.

Grade and classification: To AS 2157 or AS 1160.

3.5 PLACING COVER AGGREGATE

Spreading and initial rolling

Spreading: Immediately after the binder or primerbinder has been sprayed, cover with a uniform layer of dry aggregate.

Initial rolling: Immediately after spreading, carry out initial rolling of the surfacing area until it is uniformly covered with aggregate thoroughly embedded in the binder. Roll uniformly over the whole surfacing area. Complete rolling as soon as possible and not later than 3 days after spraying.

- Light drag brooming: Provide if aggregate is not evenly distributed over surfacing area. If drag brooming dislodges aggregate particles from the binder, substitute with light hand brooming.

Pneumatic tyred rolling

Roller: Roll the surfacing area using a pneumatic tyred roller with 7 t minimum mass and 550 to 700 kPa adjustable tyre pressure.

Rolling: Conform to the following:

- Minimum rate: 4 roller hours per 4500 L of binder or primerbinder sprayed.
- Timing: Provide at least one roller pass over the whole surfacing area within 2 minutes of covering. After an initial slow pass, increase the rolling speed to the maximum practicable for the area being sealed. Complete at least 25% of rolling within 2 hours of covering, and 50% within 24 hours of covering.

Loose aggregate

General: When the aggregate has been evenly spread and embedded, remove loose particles remaining on the pavement by sweeping lightly, without disturbing embedded aggregate. Apply additional aggregate to achieve the required surface finish.

Surface finish
General: Provide an even, smooth riding and free draining surface to the documented grades and levels.

3.6 DEFECTIVE SURFACING

Primer
Actual rate of application: Conform to the following:

- Less than 90% of that ordered: Make up the deficiency with a second spray run.
- More than 110% of that ordered: Cover the surface with sand which is chemically inert and free of salts.

Binder and primerbinder
Actual rate of application: If less than 90% or more than 110% of that ordered, reseal the surface.

Minimum criteria for retention
Actual rate of application: 95 to 105% of the target application rate.

Non-conforming material
Removal: Dispose of any residual or non-conforming material off-site.

3.7 COMPLETION

Cleaning
Spraying equipment: Contain any required flushing. Store waste for disposal off-site.

Excess material: Sweep any excess material from finished surfaces and remove.

Excavated material: Remove from site.

4 SELECTIONS

4.1 SCHEDULES

Refer to Civil Engineers documentation for details.

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0274 CONCRETE PAVEMENT

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide concrete pavement as documented.

Performance

Requirement:

- Free draining and evenly graded between level points.
- Even and smooth riding surface.

Conformance: Conform to the local authority requirements for levels, grades and minimum thickness, reinforcement and concrete strength for pavements within the kerb-and-gutter property boundaries.

1.2 DESIGN

General

Coordination: Determine the local authority requirements that may affect grades, transitions and work zones, including the following:

- Drainage.
- Trees (due to settlement).
- Adjacent structures.

1.3 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.
- *0222 Earthwork*.
- *0271 Pavement base and subbase*.

1.4 STANDARDS

Concrete

Specification and supply: To AS 1379.

Materials and construction: To AS 3600.

Residential pavements: To AS 3727.1.

Slip resistance

Classification: To AS 4586.

1.5 INTERPRETATION

Definitions

General: For the purposes of this worksection the following definitions apply:

- Ambient temperature: The air temperature at the time of mixing and placing of concrete.
- Concrete class – normal: Concrete that is specified primarily by a standard compressive strength grade up to 50 MPa and otherwise in conformance with AS 1379 clause 1.5.3.
- Concrete class – special: Concrete that is specified to have certain properties or characteristics different from, or additional to, those of normal-class concrete and otherwise in conformance with AS 1379 clause 1.5.4.
- Weather – cold: Ambient shade temperature less than 10°C.
- Weather – hot: Ambient shade temperature greater than 30°C.

1.6 TOLERANCES

General

Surface abutting gutters: ± 5 mm from the level of the gutter edge.

Rigid pavement surface:

- From design level: + 10 mm, - 0 mm.
- From a 3 m straightedge placed anywhere on surface: 5 mm.

Horizontal position of outer concrete edge: 30 mm from documented position.

Joint locations in plan : 10 mm from documented position.

1.7 SUBMISSIONS

Certification

Test certificates and records: Submit test certificates and also retain results on site.

Compliance certificate: If product testing is not proposed, submit a manufacturer's certificate together with results of recent tests undertaken by the manufacturer, showing compliance with test criteria.

Execution details

Concrete: Submit proposals for mixing, placing, finishing and curing concrete including the following:

- Addition of water on site.
- Changes to the concrete mix.
- Temperature control, curing and protection methods.
- Cutting or displacing reinforcement.
- Handling, placing, compaction and finishing methods and equipment, including pumping.
- Sequence, size and times of concrete pours, and construction joint locations and relocations.

Cores, fixings and embedded items: If required, submit shop drawings showing the proposed locations, clearances and cover, and indicate any proposed repositioning of reinforcement.

Cutting or coring: If cutting or coring of hardened concrete is proposed, provide details.

Sawn joints: Submit proposed methods, timing and sequence of sawing joints.

Damaged galvanizing: If repair is required, submit proposals to AS/NZS 4680 Section 8.

Splicing: If undocumented splicing is proposed, submit details.

Welding: If welding of reinforcement is proposed, provide details and give notice before welding reinforcement.

Joint sealants: Submit proposals for installation methods and sealant performance.

Crack assessment: If unplanned cracks occur in the finished pavement, submit proposals for investigation.

Surface repair method: If required, submit details of the proposed method before commencing repairs.

Trial section: Submit proposal for trial pavement.

Products and materials

Aggregates: Nominate the source for all aggregates.

Reinforcement: Submit the manufacturer's certificate of compliance with AS/NZS 4671, or submit test certificates from an Accredited Testing Laboratory.

Liquid curing compounds: Submit certified test results, including the application rate and the efficiency index to AS 3799 Appendix B.

Curing by covering: Submit details of the proposed covering material.

Repair materials: Submit proposals for epoxy resin/grout and elastomeric sealant.

Concrete: Submit the concrete supply delivery dockets.

Trial mix design report: Six weeks before commencing production, submit a report for each mix design containing the information required in AS 1012.2, the individual and combined aggregate particle size distribution, and the records and reports for the tests.

Subcontractors

Pre-mixed supply: Submit names and contact details of proposed pre-mixed concrete suppliers, and alternative source of supply in the event of breakdown of pre-mixed or site mixed supply.

Tests

Site tests: Submit results, as follows:

- Slip resistance test of completed installations.

1.8 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Base or subgrade before covering.
- Membrane or film underlay installed on the base or subgrade.
- Concrete formwork, reinforcement and dowels in position.
- Commencement of concrete placing.
- Completion of concrete placing.
- Evaluation of surface finish.

2 PRODUCTS

2.1 REINFORCEMENT

Steel reinforcement

Standard: To AS/NZS 4671.

Surface condition: Free of loose mill scale, rust, oil, grease, mud or other material that may reduce the bond between the reinforcement and concrete.

Protective coatings

Requirement: For concrete containing protective coated reinforcement, provide the same coating type to all reinforcement and embedded ferrous metal items, including tie wires, stools, spacers, stirrups, plates and ferrules.

Epoxy coating: Provide high build, high solids chemically resistant coating to AS/NZS 3750.14.

- Thickness: 200 µm minimum.

Galvanizing: To AS/NZS 4680, as follows:

- Sequence: If fabricating after galvanizing, repair damaged galvanising and coat cut ends.
- Zinc-coating (minimum): 600 g/m^2.

Steel fibres
Fibre reinforcement: To CIA CPN35.

Steel fibre content: 45 to 75 kg/m^3 and the steel fibre manufacturer's recommendations.

Accessories
Reinforcement supports: To AS/NZS 2425.

Tie wire: Galvanized annealed steel 1.25 mm diameter minimum.

Dowels
General: Provide each dowel in one piece, straight, cut accurately to length with ends square and free from burrs.

Standard: To AS/NZS 4671.

Grade: 250R steel bars 450 mm long.

Tie bars
Type: Deformed bar, 12 mm diameter, grade 500N, 1 m long.

2.2 AGGREGATE

Characteristics
Standards: AS 2758.1.

Durability: Tested to AS 1141.22:

- Wet strength not less than 80 kN.
- 10% Fines Wet/Dry Variation not to exceed 35%.

Recycled concrete aggregate (RCA): If blending coarse RCA with natural aggregates, make sure substitution rates are below 30%.

2.3 CEMENT

General
Standard: To AS 3972.

Moisture: Protect from moisture until used. Do not use caked or lumpy cement.

Age: Less than 6 months old.

Storage: Store cement bags under cover and above ground.

Supplementary cementitious materials
Fly ash: To AS/NZS 3582.1.

Slag: To AS 3582.2.

Amorphous silica: To AS/NZS 3582.3.

2.4 WATER

General
Quality: Drinking water free from materials harmful to concrete or reinforcement, and not salty or brackish.

Limits: Not containing more than:

- 600 parts per million of chloride ion, tested to AS 3583.13.
- 400 parts per million of sulphate ion, tested to AS 1289.4.2.1.

2.5 ADMIXTURES

General
Standard: Chemical admixtures to AS 1478.1, used to the manufacturer’s recommendations.

Quality: Free from calcium chloride, calcium formate, or triethanolamine or any other accelerator. Do not use admixtures or combinations of admixtures without prior written approval.

Dosage: Vary the dosage of chemical admixture to account for factors such as air temperature, setting time and cement content to the manufacturer’s recommendations.

Types of admixtures
Air entraining agent: Adjust mix for workability allowing up to 5% air entrainment.

Warm season retarder: During the warm season, (October to March inclusive), use a lignin or lignin-based (ligpol) set-retarding admixture (Type Re or Type WRRe) if required to control slump within the limits stated in Concrete mix, properties.

Cool season accelerator: During the cool season, (April to September inclusive), use only a lignin or lignin based set-retarding admixture, if required, containing not more than 6% reducing sugars (Type Ac or Type WRAc to AS 1478.1).

2.6 CURING COMPOUNDS

General
Curing compounds: To AS 3799 and AS 1160, Type 2.

Sheet material covering: To ASTM C171, white opaque or clear polyethylene film, or white burlap-polyethylene sheet, or equivalent material.

2.7 OTHER MATERIALS

Tactile ground surface indicators
Standard: To AS/NZS 1428.4.1.

3 EXECUTION

3.1 GENERAL

Traffic control
Traffic restriction: Do not allow traffic or construction plant other than that associated with testing, sawcutting, cleaning or joint sealing on pavement for minimum 10 days after placing, or when the concrete has reached a compressive strength of at least 20 MPa, and joints have been completely sealed.

3.2 SUBGRADE

Preparation
Conformance: Prepare subgrade to *0222 Earthwork*.

Extent: Prepare a uniform subgrade for the full pavement formation, extending at least to the back of kerbs or at least 300 mm beyond each side of the carriageway if kerbs are not proposed.

Reinstatement: Make sure of uniformity for backfilling of any utility trenches.

3.3 SUBBASE

Width
Subbase width: Extend the subbase at its full depth to at least the back of kerbs or other edge stops before their installation.

No integral kerbs: Extend granular unbound subbase at least 300 mm beyond each side of the carriageway.

Tolerance
Subbase finished surface level: + 0 mm, - 10 mm.

Placement
Bound and unbound subbase materials and placement: To *0271 Pavement base and subbase*.

Friction reduction
Requirement: Provide 200 µm thick polyethylene sheeting with 200 mm taped minimum laps and/or a 20 mm thick layer of sand (silt and clay material less than 5%) directly beneath the concrete pavement.

3.4 TRIAL PAVEMENT

General

Requirement: Provide a trial section of pavement to demonstrate that the proposed method of placement produces a conforming pavement. Remove test sections that do not comply with requirements.

3.5 CONCRETE MIX

Standard

Concrete mix and supply: To AS 3600 clause 17.1 and AS 1379.

Properties

Slump: Maximum 100 mm.

Drying shrinkage: Maximum 450 με after 21 days of air drying.

Elapsed delivery time

General: Make sure that the elapsed time between the wetting of the mix and the discharge of the mix at the site is in conformance with the **Elapsed delivery time table**. Do not discharge at ambient temperature below 10°C or above 30°C unless approved heating or cooling measures are taken to deliver concrete within the range 5°C to 35°C.

Elapsed delivery time table

Concrete temperature at time of discharge (°C)	Maximum elapsed time (minutes)
5 – 24	120
24 – 27	90
27 – 30	60
30 – 35	45

Site mixed supply

Emergencies: If mixing by hand, provide details.

Plant: Mix concrete in a plant located on the construction site.

Pre-mixed supply

Addition of water: Do not add water.

Transport: Make sure the mode of transport prevents segregation, loss of material and contamination of the environment, and does not adversely affect placing or compaction.

Concrete delivery docket: For each batch, provide a docket listing the information required by AS 1379 clause 1.7.3, and the following information:

- Any binders or additives.
- Method of placement and climate conditions.
- Name of concrete delivery supervisor.
- The concrete element or part of the works for which the concrete was ordered, and where it was placed.

3.6 TESTING

Standards

Sampling, identification, testing and recording: To the AS 1012 series.

Specimens: Sample the concrete on-site, at the point of discharge from the agitator.

Type and frequency: To AS 1379.

Testing authority: Concrete supplier or Accredited Testing Laboratory.

Concrete testing methods

Slump: To AS 1379 clause 5.2.

Compressive strength: Test to AS 1012.8.1 and AS 1012.9.

Drying shrinkage: Test to AS 1012.8.4 and AS 1012.13.

Flexural strength: Test to AS 1012.8.2 and AS 1012.11.

Acceptance criterion for strength: The average strength of any set of 3 consecutive project samples must be equal to or greater than the specified minimum value.

Sampling frequency: Provide a minimum of one sample from each 50 m^3 of concrete.

3.7 INSTALLATION

Junctions with existing pavements

Trimming: If new pavement is to be joined to an existing pavement, trim the edge of the existing pavement to create a neat vertical edge for its full depth before placing new pavement material.

Fixed formwork

Description:

- Steel forms.
- Seasoned, dressed timber planks, free of warps, bends or kinks.

Depth: Equal to the edge thickness of the slab and in one piece.

Tolerances on position:

- Level of top of form: - 0 mm, + 10 mm from pavement surface design level.
- Horizontal tolerance: 10 mm (maximum departure from a plane surface).
- Verticality: 3 mm departure from vertical.

Staking: Stake forms in position using at least 3 steel stakes per form, not more than 1.5 m apart. Lock joints between form sections to prevent movement.

Release agent: Before placing reinforcement, apply a release agent compatible with the contact surfaces, to the interior of the formwork, except where the concrete is to receive an applied finish for which there is no compatible release agent.

Re-use: Clean and recoat the forms each time before placing concrete.

Keyways: Form the keyways of keyed construction joints using steel or timber form strips accurately located at the mid-depth of the slab and securely fastened flush against the formwork face.

Reinforcement

Tolerances in fabrication and fixing: To AS 3600.

Locate reinforcement: Place reinforcement in the top half of the pavement.

Minimum cover to reinforcement: 30 mm.

Splicing mesh: Overlap a minimum of 2 crosswires.

Supports: Provide reinforcement supports as follows:

- Able to withstand construction and traffic loads and maintain the concrete cover, as documented.
- With a protective coating if they are ferrous metal extending to the surface of the concrete.
- Use plastic or concrete supports with galvanized or zinc-coated reinforcement.
- Spacing:
  - Bars: ≤ 60 diameters.
  - Mesh: ≤ 600 mm.
- Supports over membranes: Prevent damage to waterproofing membranes or vapour barriers. If appropriate, place a metal or plastic plate under each support.

Projecting reinforcement: If starter or other bars extend beyond reinforcement mats or cages, through formwork or from cast concrete, provide a plastic protective cap to each bar until it is cast into later work.

Tying: Secure the reinforcement against displacement at intersections with either wire ties, or clips. Bend the ends of wire ties away from nearby faces of formwork or unformed faces to prevent the ties projecting into the concrete cover.

Mats: For bar reinforcement in the form of a mat, secure each bar at alternate intersections.

Cores, fixings and embedded items

Position: Fix cores and embedded items to prevent movement during concrete placing. In locating cores, fixings and embedded items, displace but do not cut reinforcement, and maintain cover to reinforcement.

Isolation: Isolate embedded items to prevent water tracking to concrete providing minimum cover to reinforcement.

3.8 CONCRETE PLACING AND COMPACTION

Concrete placing

General: Place concrete uniformly over the width of the slab or lane and so that the face is generally vertical and normal to the direction of placement. Hand spread concrete using shovels, not rakes.

Ponding: Remove any water ponding on the base or subbase before starting placement.

Placing sequence: Commence from one corner (usually the lowest point) and proceed continuously out from that point.

Weather: Do not place concrete in ambient temperatures above 30°C or below 10°C, without adequate precautions.

Compaction

Thickness 100 mm or less: Compact by placing, screeding and finishing processes. If required use a hand-held vibrating screed at the surface. Do not use immersion vibrators.

Thickness more than 100 mm and downturns: Use an immersion vibrator.

Placing records

Log book: Keep on site and make available for inspection a log book recording each placement of concrete, including the following:

- Date.
- Specified grade and source of concrete.
- Slump measurements.
- The portion of work.
- Volume placed.

Rain

Protection: During placement and before setting, protect surface from damage.

Concrete placing in cold weather

Cement: Do not use high alumina cement.

Temperature limits: Maintain the following:

- Freshly mixed concrete: ≥ 5°C.
- Formwork and reinforcement before and during placing: ≥ 5°C.
- Water: Maximum 60°C when placed in the mixer.

High early strength cement: If deteriorating weather conditions are predicted, use high early strength cement.

Temperature control: Heat the concrete materials, other than cement, to the minimum temperature necessary so that the temperature of the placed concrete is ≥ 5°C.

Admixtures: Do not use calcium chloride, salts, chemicals or other material in the mix to lower the freezing point of the concrete.

Frozen materials: Do not allow frozen materials or materials containing ice to enter the mixer, and keep free of frost and ice any formwork, materials, and equipment coming in contact with the concrete.

Placed concrete: Prevent from freezing, without using salts or chemicals.

Concrete placing in hot weather

Handling: Prevent premature stiffening of the fresh mix and reduce water absorption and evaporation losses.

Hot weather placing: Maintain concrete at a temperature ≤ 35°C.

Formwork and reinforcement: Before and during placing maintain temperature ≤ 35°C.

Severe weather: If ambient shade temperature more than 38°C, do not mix concrete.

Temperature control: Select one or more of the following methods of maintaining the specified temperature of the placed concrete:

- Cool the concrete using liquid nitrogen injection before placing.
- Cover the container in which the concrete is transported to the forms.
- Spray the coarse aggregate using cold water before mixing.
- Use chilled mixing water or ice.

Evaporation control barriers: Erect barriers to protect freshly placed concrete from drying winds.

3.9 CONCRETE FINISH

General

Commencement: Immediately after placement, spreading and compaction of the concrete, start initial finishing procedures to achieve the documented finish.

Final finishing: Do not commence final finishing until all bleed water has evaporated from the surface after initial finishing procedures.

Unformed surfaces

General: Strike off, screed and level slab surfaces to finished levels, to the tolerance class and finish documented.

Formed surfaces

Damage: Do not damage concrete works through premature removal of formwork.

Curing: If forms are stripped when concrete is at an age less than the minimum curing period, commence curing exposed faces as soon as the stripping is completed.

Finishing methods - primary finish

Machine float finish:

- After levelling, consolidate the surface using a machine float.
- Cut and fill and refloat immediately to a uniform, smooth, granular texture.
- Hand float in locations inaccessible to the machine float.

Wood float finish: After machine floating use wood or plastic hand floats to produce the final consolidated finish free of float marks and uniform in texture and appearance.

Broom finish: After machine floating and steel trowelling draw a broom or hessian belt across the surface to produce a coarse even-textured transverse-scored surface.

Scored or scratch finish: After screeding, give the surface a coarse scored texture using a stiff brush or rake drawn across the surface before final set.

Sponge finish: After machine floating and steel trowelling, obtain an even textured sand finish by wiping the surface using a damp sponge.

Finishing methods - supplementary finish

Abrasive blast: After steel trowelling, abrasive blast the cured surface to provide texture or to form patterns without exposing the coarse aggregate, using hard, sharp graded abrasive particles.

Coloured applied finish: After machine floating, apply a proprietary liquid or dry shake material to the manufacturer's recommendations and trowel to achieve the required appearance.

Stamped and coloured pattern finish: Provide finishing system.

Surface repairs

Method: If surface repairs are required, detail proposals.

3.10 CONCRETE CURING

General

Curing: Commence curing as soon as possible after finishing, when the concrete has set sufficiently not to be damaged by the curing process, and extend for a minimum period of 7 days.

End of curing period: Prevent rapid drying out at the end of the curing period.

Protection: Maintain at a reasonably constant temperature with minimum moisture loss, during the curing period.

Cold weather curing

General: Maintain concrete surface temperatures above 5°C for the duration of the curing period.

Hot weather curing

Requirement: If the concrete temperature exceeds 25°C, or the ambient shade temperature exceeds 30°C, protect from drying winds and sun by using an evaporative retarder until curing is commenced.

Curing methods

Covering sheet method: Cover concrete using damp hessian or cotton mats overlapped at least 150 mm and anchored against displacement by wind or other interference. Keep the mats continuously damp until covered by the covering sheet material. Repair tears immediately.

Moist curing method: Keep the concrete surface continuously damp by ponding or spraying constantly with water, fog, or mist, using suitable spraying equipment. Continue wetting for the curing period.

Curing compound: Provide a uniform continuous flexible coating to AS 3799, without visible breaks or pinholes. Make sure coating remains unbroken at least for the required curing period after application. Respray defective areas within 30 minutes. Respray within 3 hours after heavy rain.

Self-levelling toppings: If used also as curing compounds, conform to AS 3799.

Coloured concrete: Do not cure with plastic sheeting, damp sand or wet hessian. Use only chemical curing compounds compatible with the sealer or a sealer to the manufacturer's recommendations.

3.11 JOINTS

General

Requirement: Construct expansion, contraction and construction joints straight and plumb. Make transverse joints normal to longitudinal joints. Extend transverse expansion and contraction joints continuously from edge to edge of the pavement through interconnected slabs.

Joint layout: Install joints as documented.

Contraction joints

Installation: Construct transverse and longitudinal contraction joints by early power sawing at an appropriate time, tooling or by placing an insert in the fresh concrete.

Dowelled joints

Requirement: Place dowels as documented, orthogonal to the joint direction and parallel to the pavement surface, accurate alignment is critical.

Dowel assembly: Use a dowel-assembly support frame firmly secured to the subbase during concrete placement. Prevent the dowel assembly support frame from passing through the joint. Do not insert dowels during the placement of concrete.

Debond dowel: Provide a proprietary sleeve or coat with a debonding coating to 0.5 length + 25 mm. Embed the unsleeved or unpainted half of the dowels in the slab placed first.

Dowelled expansion joints: Cap dowels at one end with a compressible material.

Movement: Do not distort or displace beyond the alignment tolerances under testing or during construction. Do not remove and replace dowels in pre-formed holes.

Dowel tolerances:

- Alignment: 1:150.
- Location: ± half the diameter of the dowel.

Tie bar joints

Longitudinal contraction joints: Place tie bars at 800 mm centres. Alignment accuracy of tie bars is not critical.

Construction joints

Installation: Place header board on the subbase or subgrade at right angles to the pavement centre line.

Planned location: Terminate each day's placing operation at a transverse construction joint located to coincide with a planned contraction or expansion joint.

Unplanned joints: If placement is interrupted for 30 minutes or longer, form a tied transverse construction joint within the middle third of the distance between planned joints but no closer than 1.5 m to the nearest planned joint. If necessary remove placed concrete back to the required location.

Expansion joints

Joint filling: Fill with jointing materials as documented. Finish visible jointing material neatly flush with adjoining surfaces.

Jointing materials: Provide jointing materials compatible with each other, and non-staining to concrete in visible locations.

Foamed materials (in compressible fillers): Closed-cell or impregnated, not water absorbing.

Isolation joints

Requirement: Provide formed full depth joints around structures and features which project through, into or against the pavement, and elsewhere as required.

Formed joints

Full depth joints: Form the edge of the concrete placed first to provide a smooth, vertical face. After stripping and cleaning fix the joint filler with a suitable waterproof adhesive to the face of the slab, and place the adjoining concrete after the adhesive has set.

Weakened plane joint: Cut a crack-inducing groove by using a suitable tool into the plastic concrete during finishing of the concrete surface. Compact and refinish the plastic concrete around the groove after forming the joint.

Rebated groove joints: Form the rebate by securely fixing removable steel or timber form strips to the form or forms on the slab which is placed first, so that the top of the strip is flush with the top of the form. After stripping and cleaning, fix the joint filler in the rebate after placing the adjoining concrete.

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Sawn joints

Weakened plane joint: Saw the hardened concrete to depth at least ¼ to ⅓ of the pavement thickness and to a uniform width in the range of 3 to 5 mm as follows:

- Timing: Commence sawing, regardless of time or weather conditions, as soon as the concrete has hardened sufficiently to permit cutting with only minor ravelling of the edges of the saw cut. Complete sawing no later than 24 hours after concrete placement.
- Sequence: If possible, saw every third transverse joint initially, then saw the intermediate joints. Start where concrete placement commenced.
- Cracking: If the concrete has already cracked near the location chosen for a joint, do not saw a joint in that location. If a crack develops ahead of the saw cut, discontinue sawing and submit proposals for extra sawn joints.
- Stand-by machines: Provide one stand-by sawing machine for each machine planned to be used.
- Cleaning and protection: Immediately after each joint is sawn, flush the saw cut and adjacent concrete surface using water, until the waste from sawing is removed from the joint.

Rebated groove joints: Saw straight, parallel sided grooves for joint seals on top of and centred on the sawn weakened plane joints.

- Timing: Commence sawing after the curing period has ended, immediately before joint sealing. Saw during daylight hours.

Preparing joints

Stripping time: At least 12 hours.

Clean: Immediately before installation of the sealer, make sure the joint space is dry, clean and free from loose material. Remove laitance, curing compound and protrusions of hardened concrete from the sides and upper edges of the joint.

Joint sealing

Sealant type: Provide silicone sealant in conformance with the manufacturer's recommendations.

Backing rod: Compressible closed cell polyethylene foam with a bond breaking surface.

3.12 SURFACE SEALERS

General

Application: Apply surface sealer after the curing period and when concrete has dried to allow the sealer to penetrate into the concrete surface.

Curing sealer compound: If using the sealer as a curing compound, apply directly after finishing.

3.13 COMPLETION

Completion tests

Slip resistance of completed installation: To AS 4663.

Rectification

Reinstating adjacent surfaces: Reinstate surfaces next to new pavements and associated elements. If an existing road pavement has been disturbed, trim back to a straight, neat and undisturbed edge, parallel to the new concrete for the full depth of the slab.

Concrete pavement: If pavement does not conform to the tolerances, submit rectification proposal.

Unplanned cracking:

- Maximum 0.4 mm wide crack is acceptable.
- > 1 mm must be assessed, detail a proposal for possible cause and rectification processes.

Cleaning

Excavated material: Remove from site.

4 SELECTIONS

4.1 SCHEDULES

Refer to Finishes Fittings and Equipment Schedule, and Civil Engineers documents

0310 CONCRETE – COMBINED

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide cast in situ reinforced concrete, as documented.

Performance

Requirements:

- Conforming to the design details and performance criteria.
- Satisfying quality and inspection requirements.
- Compatible with documented applied finishes.

1.2 DESIGN

General

Formwork: The design of formwork, other than permanent composite form systems, is the contractor's responsibility. Allow for dimensional changes, deflections and cambers resulting from the following:

- Imposed actions.
- Concrete shrinkage and creep.
- Temperature changes.
- The application of prestressing forces (if any).

Structural design: To AS 3600.

Post-tensioned concrete: To AS 3600.

Concrete structures retaining liquids: To AS 3735.

1.3 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.4 STANDARDS

General

Formwork design and construction: To AS 3610.1.

Plywood formwork: To AS 6669.

Composite steel-concrete construction, including profiled steel sheeting and shear connectors: To AS/NZS 2327.

Reinforced concrete construction: To AS 3600.

Specification and supply of concrete: To AS 1379.

Residential ground slabs and footings: To AS 2870.

Post-tensioned concrete: To AS 3600.

Concrete structures for retaining liquids: To AS 3735.

Strand, bar and wire: To AS 4672.1.

Design, installation and testing of post-installed and cast-in fastenings: To AS 5216.

Formed surfaces: To AS 3610.1.

Slip resistance

Classification: To AS 4586.

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1.5 INTERPRETATION

Definitions

General: For the purposes of this worksection the definitions given in AS/NZS 1314, AS 1379, AS 3600, AS 3610.1 and the following apply:

- Ambient temperature: The air temperature at the time of mixing and placing of concrete.
- Anti-burst reinforcement: Reinforcement cage surrounding anchorages to control the tensile bursting stresses.
- Early age strength: A mean compressive strength at 7 days exceeding the values shown in AS 1379 Table 1.2.
- Green concrete: Concrete which has recently set but has not achieved any design strength.
- Sample: A physical example that illustrates workmanship, materials or equipment, and establishes standards by which the work will be judged. It includes samples and sample panels.
- Specimen: A portion of a sample which is submitted for testing.
- Weather – cold: Ambient shade temperature less than 10°C.
- Weather – hot: Ambient shade temperature greater than 30°C.

1.6 TOLERANCES

Formwork

Plumb of elements > 8 m high: 1:1000.

Plumb of elements ≤ 8 m high: To AS 3610.1.

Position: Construct formwork so that finished concrete conforms to AS 3600 clauses 3.3 and 17.5 and as documented in the **Formwork dimensional deviation schedule**.

Reinforcement

Fabrication: To AS 3600 clause 17.2.

Reinforcement and tendon position: To AS 3600 clause 17.5.3.

Formed surfaces

Finish quality: To AS 3610.1 Table 3.3.3.1.

Unformed surfaces

Flatness: To the **Flatness tolerance class table,** using a straightedge placed anywhere on the surface in any direction, for the documented class of finish.

Flatness tolerance class table

Class	Measurement	Maximum deviation (mm)
A	2 m straightedge	4
B	3 m straightedge	6
C	600 mm straightedge	6

1.7 SUBMISSIONS

Certification

Formwork design certification: For other than permanent composite form systems, submit certification by a professional engineer experienced in formwork design verifying conformance of the design.

Formwork execution certification: Submit certification by a professional engineer experienced in formwork design and construction, verifying conformance of the completed formwork, including the suitability of the formwork for the documented surface finish class.

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Execution details

Moveable formwork: Provide the following details on the formwork drawings:

- Table form and climbing formwork: Proposed method and sequence of moving the formwork to provide concrete of the documented quality and surface finish.
- Continuously climbing formwork (Slipform): The average rate of movement.

Reshoring: Submit details of any proposed reshoring.

Reinforcement: Submit the following:

- General: Details of any proposed changes to documented reinforcement.
- Damaged galvanizing: Details of proposed repair to AS/NZS 4680 Section 8.
- Mechanical bar splices: Details and test certificates for each size and type of bar to be spliced.
- Provision for concrete placement: Details of spacing or cover to reinforcement that does not conform to AS 3600.
- Splicing: Details of any proposed changes to documented requirements.
- Welding: Details of any proposed welding of reinforcement to AS/NZS 1554.3.
- Details of proposed gauging, stressing and grouting equipment and current calibration certificates for tensioning and tension measuring equipment.
- Concrete strength early age test results.

Loading: Submit details of proposed construction systems, loads and procedures, including propping and re-shoring.

Concrete: Submit proposals for mixing, placing, finishing and curing concrete including the following:

- Changes to the concrete mix.
- Curing and protection methods.
- Curing period for low-pressure steam curing.
- Cutting or displacing reinforcement, or cutting or coring hardened concrete.
- Handling, placing, compaction and finishing methods and equipment, including pumping.
- Placing under water.
- Sequence and times for concrete placement, and construction joint locations and relocations. Include any proposed sequential placement of slab segments.
- Site storage, mixing and transport methods and equipment, if applicable.
- Temperature control methods.
- Sawn joints: Submit details of proposed methods, timing and sequence of sawing joints.

Pre-mixed supply delivery dockets: For each batch, submit a docket listing the information required by AS 1379, and the following:

- For special-class performance concrete: Documented performance and type of cement binder.
- For special-class prescription concrete: Details of mix, additives, and type of cement binder.
- Method of placement and climate conditions during pour.
- Name of concrete delivery supervisor.
- Project assessment carried out each day.
- The concrete element or part of the works for which the concrete was ordered, and where it was placed.
- The total amount of water added at the plant and the maximum amount permitted to be added at the site.

Surface repairs: If surface repairs are required, submit proposed methods.

Records
Post-tensioning: Submit the following:
- Post-tensioning record.
- Post-tensioning stressing schedule.
- Post-tensioning grouting record.

Samples
Coloured concrete: Submit sample blocks of coloured concrete produced using the proposed mix and casting method before casting final concrete, as follows:
- Number: 4.
- Size (nominal): 300 x 300 x 50 mm.

Subcontractors
Pre-mixed supply: Submit names and contact details of proposed pre-mixed concrete suppliers and alternative source of supply in the event of breakdown of pre-mixed or site mixed supply.

Tests
Requirement: Submit test results, as follows:
- Concrete compressive strength test results to AS 1012.9.
- Slip resistance test of completed installations.

1.8 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:
- Used forms, after cleaning and before re-use.
- Base or subgrade before covering.
- Membrane or film underlay installed on the base or subgrade.
- Completed formwork and reinforcement, tendons, cores, fixings and embedded items fixed in place before placing concrete.
- Concealed surfaces or elements before covering.
- Commencement of concrete placing.
- Evaluation of the off-form finishes.
- Evaluation of surface finish.

2 PRODUCTS

2.1 CONCRETE

General
Stockpile: If uniform, consistent colour is documented, stockpile sand, cement and aggregates.

Properties
Concrete mix and supply: Conform to the following:
- Normal-class: To AS 1379 clause 1.5.3.
  - Properties: As documented in the **Concrete properties schedule - performance**.
- Special-class: To AS 1379 clause 1.5.4.
  - Performance properties: As documented in the **Concrete properties schedule - performance**.
  - Prescription properties: As documented in the **Concrete properties schedule - prescription**.

Aggregates
Standard: To AS 2758.1.

Cement
Standard: To AS 3972.

Age: Less than 6 months old.

Storage: Store cement bags under cover and above ground.

Supplementary cementitious materials:

- Fly ash: To AS/NZS 3582.1.
- Slag: To AS 3582.2.
- Amorphous silica: To AS/NZS 3582.3.

Water
Standard: To AS 1379 clause 2.4.

Requirement: Clean, free from oil, acid, alkali, organic or vegetable matter and including not more than 500 mg/l of chloride ions.

Concrete colour
Standard: To AS 3610.1.

Chemical admixtures
Standard: To AS 1478.1, used to manufacturer's recommendations.

2.2 FORMWORK

General
Form face, linings and release agents: Compatible with documented concrete surface finish and any proposed applied finishes to concrete.

Trapped forms: Free of timber or chlorides and not to impair the structural performance of the concrete members.

Void formers
Requirement: Material capable of maintaining rigidity and shape until the concrete has set, capable of withstanding construction loads and non-collapsible on absorption of moisture.

Laboratory testing: Use void formers tested under laboratory conditions for conformance with the following:

- Deflection during placing and compaction of the concrete does not exceed beam or slab span/1000.
- Additional deflection between initial set and 7 days does not exceed span/400.

Test method: Place formers on damp sand and load with a mass of wet concrete at least equal to the mass of the beams or slabs to be supported.

Profiled steel sheeting composite forms
Material: Hot-dipped zinc-coated sheet steel to AS 1397.

Minimum steel grade: G550.

Accessories: Use materials and corrosion protection compatible with the profiled steel sheeting.

Plywood forms
Material: To AS 6669.

Grade: Use appropriate grade for the documented design dimensions, loading and surface quality.

Joints: Seal the joints consistent with the documented surface finish class.

Tolerances: To AS 3610.1 Section 3.

2.3 REINFORCEMENT

Fibre reinforcement
Steel fibres: To AS 3600 clause 16.7.1.

Other fibres: To CIA CPN35.

Steel reinforcement
Standard: To AS/NZS 4671.

Surface condition: Free of loose mill scale, rust, oil, grease, mud or other material which would reduce the bond between the reinforcement and concrete.

Protective coating
Standard: To AS 3600 clause 17.2.1.2.

Requirement: For concrete elements containing protective coated reinforcement, provide the same coating type to all that element's reinforcement and embedded ferrous metal items, including tie wires, stools, spacers, stirrups, plates and ferrules, and protect other embedded metals with a suitable coating.

Epoxy coating: High-build, high solids, chemically resistant coating to AS/NZS 3750.14.

- Thickness: 200 µm minimum.

Galvanizing: To AS/NZS 4680, as follows:

- Sequence: If fabricating after galvanizing, repair damaged galvanizing and coat cut ends.
- Zinc-coating (minimum): 600 g/m^2.

Tie wire
General: Annealed steel 1.25 mm diameter (minimum).

External and corrosive applications: Galvanized.

Supports
Standard: To AS/NZS 2425.

2.4 MISCELLANEOUS

Polymeric film underlay
Vapour barriers and damp-proofing membranes: To AS 2870 clause 5.3.3.

Curing compounds
Liquid membrane-forming compounds: To AS 3799.

Surface modifiers
Hardeners, sealants and protectors: If documented, proprietary products conforming to the manufacturer's recommendations.

Slip resistance treatment: If documented, proprietary products conforming to the manufacturer's recommendations.

3 EXECUTION

3.1 POLYMERIC FILM UNDERLAY

Location
Requirement: Under slabs on ground, including integral ground beams and footings, provide a vapour barrier or, in areas prone to rising damp or salt attack, a damp-proofing membrane.

Base preparation
Requirement: Conform to base type, as follows:

- Concrete working base: Remove projections above the plane surface, and any loose material.
- Graded prepared subgrade: Blind with sand to create a smooth surface free from hard projections. Lightly wet the sand just before laying the underlay.

Installation
Standard: To AS 2870 clause 5.3.3.

Requirement: Lay underlay over the base, as follows:

- Lap joints at least 200 mm and seal the laps and penetrations with waterproof adhesive tape.
- Face the laps away from the direction of concrete pour.
- Continue up vertical faces past the damp-proof course where applicable, and tape fix at the top.
- Patch or seal punctures or tears before placing concrete.
- Cut back as required after concrete has gained strength and formwork has been removed.

3.2 FORMWORK

General
Requirement: As documented in the **Formed surface finishes schedule.**

Substrates
Cleaning: Before placing concrete remove free water, dust, debris and stains from the form face and the formed space.

Bolt holes
Formwork tie bolts left in the concrete: Position more than 50 mm from the finished surface.

Corners
Work above ground: Bevel with a chamfer at re-entrant angles, and a fillet at corners.

Face of bevel: 25 mm.

Embedments
Fixing: Fix embedments through formwork to prevent movement, or loss of slurry or concrete, during concrete placement.

Openings
Requirement: In vertical forms provide openings or removable panels for inspection and cleaning, at the base of columns, walls and deep beams.

Access: For thin walls and columns, provide access panels for placing concrete.

Release agents
Application: Before placing reinforcement, apply a release agent to form face and linings.

Profiled steel sheeting composite formwork
Fixing: If sheeting cannot be fixed to structural steel supports with puddle welds, or with welded shear studs, provide details of proposed fixings.

Steel linings
Rust: Clean off any rust and apply rust inhibiting agent prior to re-use.

Visually important surfaces
Surface finish classes 1, 2 or 3: Set out the formwork to give a regular arrangement of panels, joints, bolt holes, and similar visible elements in the formed surface.

3.3 REINFORCEMENT

Dowels
Fixing: If a dowel has an unpainted half, embed that half in the concrete placed first.

Tolerances:

- Alignment: 1:150.
- Location: ± half the diameter of the dowel.

Grade: 250 N.

Cover

Concrete cover generally: To AS 3600 clause 4.10.

Concrete cover for structures for retaining liquids: To AS 3735 clause 4.4.

Concrete cover for residential ground slabs and footings: To AS 2870.

Supports

Concrete, metal or plastic supports: Provide as follows:

- Able to withstand construction and traffic loads.
- With a protective coating if they are ferrous metal, located within the concrete cover zone, or are used with galvanized or zinc-coated reinforcement.

Spacing:

- Bars: ≤ 60 bar diameter.
- Mesh: ≤ 600 mm.

Supports over membranes: Prevent damage to waterproofing membranes or vapour barriers. If appropriate, place a metal or plastic plate under each support.

Projecting reinforcement

Protection: If starter or other bars extend beyond reinforcement mats or cages, through formwork or from cast concrete, provide a plastic protective cap to each bar until it is cast into later work.

Tying

Requirement: Secure the reinforcement against displacement at intersections with either wire ties, or clips. Bend the ends of wire ties away from nearby faces of formwork or unformed faces to prevent the ties projecting into the concrete cover.

Beams: Tie stirrups to bars in each corner of each stirrup. Fix other longitudinal bars to stirrups at 1 m maximum intervals.

Bundled bars: If required, tie bundled bars in closest possible contact. Provide tie wire at least 2.5 mm diameter and spaced not more than 24 times the diameter of the smallest bar in the bundle.

Columns: Secure longitudinal column reinforcement to all fitments (or helical reinforcement) at every intersection.

Mats: For bar reinforcement in the form of a mat, secure each bar at alternate intersections.

Fibre-reinforced concrete

Steel fibres: To AS 3600 Section 16.

3.4 CONCRETE SUPPLY

Elapsed delivery time

General: Make sure that the elapsed time between the wetting of the mix and the discharge of the mix at the site is in conformance with the **Elapsed delivery time table**. Do not discharge at ambient temperature below 10°C or above 30°C unless approved heating or cooling measures are taken to deliver concrete within the range 5°C to 35°C.

Elapsed delivery time table

Concrete temperature at time of discharge (°C)	Maximum elapsed time (minutes)
5 – 24	120
24 – 27	90
27 – 30	60
30 – 35	45

Pre-mixed supply

Addition of water: To AS 1379 clause 4.2.3.

Transport method: Select to prevent segregation, loss of material and contamination of the environment, and not to adversely affect placing or compaction.

Site mixed supply

Emergencies: If mixing by hand, provide details.

Plant: Mix concrete in a plant located on the construction site.

3.5 TESTING

General

Test authority: Concrete supplier or an Accredited Testing Laboratory.

Reports and records of test results: To the relevant parts of the AS 1012 series. Keep results on site.

Assessment process of test results

Standard: To AS 1379.

Method of assessment: Project assessment.

Sampling

Method of sampling: AS 1012.1.

Sampling locations: To AS 1012.1 and the following:

- Slump tests: On site, at the point of discharge from the agitator.
- Compressive strength tests: Spread the site sampling evenly throughout the pour.

Frequency of sampling: To AS 1379 Sections 5 and 6 and the following:

- Slump tests: Take at least one sample from each batch.
- Compressive strength tests: To the **Project assessment strength grade sampling table.**

Project assessment strength grade sampling table

Number of batches for each type and grade of concrete per day	Minimum number of samples: Columns and load bearing wall elements/batch	Minimum number of samples: Other elements/day
1	1	1
2-5	1	2
6-10	1	3
11-20	1	4
each additional 10	1	1 additional

Making and curing of specimens

General: To AS 1012.8.1 and AS 1012.8.2.

Specimens for compressive strength tests: Make and cure at least two specimens from the sample of each grade.

Specimen size:

- Aggregate size ≤ 20 mm: Nominally 200 x 100 mm diameter.
- Aggregate size > 20 mm: Nominally 300 x 150 mm diameter.

Test methods

General: To the relevant parts of the AS 1012 series.

Acceptance criteria:

- General: As documented in the **Concrete properties schedule – performance**.
- Early age compressive strength: As documented in the **Control tests schedule**.

Drying shrinkage at 56 days: To AS 1012.8.4 and AS 1012.13.

Liquid retaining structures
Testing for liquid tightness: To AS 3735.

3.6 CORES, FIXINGS AND EMBEDDED ITEMS

General
Requirement: Install fasteners to manufacturer's recommendations and the assumptions of AS 5216 Appendix D.

Adjoining elements
Fixings: Provide fixings for adjoining elements. If required, provide temporary support to the adjoining elements during concreting, to prevent movement.

Protection
General: Grease threads. Protect embedded items against damage.

Compatibility: Provide inserts, fixings and embedded items that are compatible with each other, with the reinforcement and with the documented concrete mix and surface finish.

Corrosion: In external or exposed locations, galvanize anchor bolts and embedded fixings.

Structural integrity
Position: Fix cores and embedded items to prevent movement during concrete placement. In locating cores, fixings and embedded items, displace but do not cut reinforcement, and maintain documented cover to reinforcement.

Isolation: Isolate embedded items to prevent water tracking to concrete that provides minimum cover to reinforcement.

Tolerances
General: Maximum deviation from correct positions:

- Anchor bolt groups for structural steel: To AS/NZS 5131.
- Cores and embedded items generally: 10 mm.
- Other fixing bolts: 3 mm.

3.7 CONCRETE WORKING BASE

Finish
Membrane support: Wood float finish or equivalent.

Installation
General: Lay over the base or subgrade and screed to the required level.

Surface flatness tolerance
Maximum deviation: 6 mm from a 3 m straightedge.

3.8 PLACING AND COMPACTION

Placing
Horizontal transport: Use suitable conveyors, clean chutes, troughs, hoppers or pipes.

Methods: Avoid segregation and loss of concrete, and minimise plastic settlement. Maintain a nominally vertical and plastic concrete edge during placement.

Horizontal elements: Place concrete in layers not more than 300 mm thick. Compact the following layer into previous layer before previous layer has taken initial set.

Compaction
Methods: Use immersion and screed vibrators accompanied by hand methods as appropriate to remove entrapped air and to fully compact the mix.

Vibrators: Do not allow vibrators to contact set concrete, reinforcement or items including pipes and conduits embedded in concrete. Do not use vibrators to move concrete along the formwork. Avoid causing segregation by over-vibration.

Placing records
Log book: Keep on site and make available for inspection a log book recording each placement of concrete, including the following:

- Date.
- Specified grade and source of concrete.
- Slump measurements.
- The portion of work.
- Volume placed.

Rain
Protection: During placement and before setting, protect the surface from damage.

Time between adjacent placements
Minimum time delay: As documented in the **Minimum time delay schedule.**

Vertical elements
Placement: Limit the free fall of concrete to maximum of 2000 mm.

Placing in cold weather
Cement: Do not use high alumina cement.

Temperature limits: Maintain the following:

- Freshly mixed concrete: ≥ 5°C.
- Forms and reinforcement before and during placing: ≥ 5°C.
- Water: Maximum 60°C when placed in the mixer.

High early strength cement: If deteriorating weather conditions are predicted, use high early strength cement.

Temperature control: Heat the concrete materials, other than cement, to the minimum temperature necessary so that the temperature of the placed concrete is ≥ 5°C.

Admixtures: Do not use calcium chloride, salts, chemicals or other material in the mix to lower the freezing point of the concrete.

Frozen materials: Do not allow frozen materials or materials containing ice to enter the mixer, and keep free of frost and ice any forms, materials, and equipment coming in contact with the concrete.

Freezing: Prevent concrete from freezing.

Placing in hot weather
Handling: Prevent premature stiffening of the fresh mix and reduce water absorption and evaporation losses.

Temperature limits: Maintain the following:

- Normal concrete in footings, beams, columns, walls and slabs: ≤ 35°C.
- For concrete strength grade less than 40 MPa with section thickness ≥ 1 m in all dimensions: ≤ 27°C.
- For concrete strength grade 40 MPa or greater with section thickness ≥ 600 mm in all dimensions: ≤ 27°C.
- Forms and reinforcement before and during placing: ≤ 35°C.

Evaporation control barriers: Erect barriers to protect freshly placed concrete from drying winds.

Temperature control: Select one or more of the following methods of maintaining the temperature of the placed concrete at 35°C or less:

- Cool the concrete using liquid nitrogen injection before placing.
- Cover horizontal transport containers.
- Spray the coarse aggregate using cold water before mixing.
- Use chilled mixing water.

Placing under water
General: Do not place under water unless conditions prevent dewatering.

Minimum cement content for the mix: Increase by 25%.

3.9 JOINTS

Construction joints
Location: Do not relocate or eliminate construction joints, or form undocumented construction joints. If emergency construction joints are made necessary by unforeseen interruptions to the concrete pour, submit a report on the action taken.

Finish: Butt join the surfaces of adjoining pours. In visually important surfaces make the joint straight and true, and free from blemishes impermissible for its surface finish class.

Preparation: Roughen and clean the hardened concrete joint surface. Remove loose or soft material, free water, foreign matter and laitance. Dampen the surface just before placing the fresh concrete and coat with a neat cement slurry.

Expansion joints
Joint filling: Fill with jointing materials as documented. Finish visible jointing material neatly, flush with adjoining surfaces.

Preparation: Before filling, dry and clean the joint surfaces, and prime.

Watertightness: Apply the jointing material so that joints subject to ingress of water are made watertight.

Jointing materials: Provide jointing materials compatible with each other, and non-staining to concrete in visible locations.

Bond breaking: Provide back-up materials for sealants, including backing rods, which do not adhere to the sealant.

Foamed materials (in compressible fillers): Closed-cell or impregnated, not water absorbing.

Slip joints
Requirement: If concrete slabs are supported on masonry, provide proprietary slip joints.

3.10 SURFACE MODIFIERS

General
Application: Apply to clean surfaces, to the manufacturer's recommendations.

3.11 FORMED SURFACES

General
Surface finish: As documented in the **Surface finish class schedule** and the **Formed surface finishes schedule.**

Damage: Do not damage concrete works through premature removal of formwork.

Curing
Requirement: If formwork is stripped before the minimum curing period for the concrete has elapsed, continue curing the exposed faces as soon as the stripping is completed.

Evaluation of formed surfaces
General: If evaluation of formed surface is required, complete the evaluation before surface treatment.

Finishing methods
Requirement: If soffits of horizontal concrete elements or faces of vertical concrete elements are to have a finish other than an off-form finish, provide finishes as documented.

Form removal: If vertical face formwork needs to be removed for finishing methods, while the concrete is green, make sure the concrete has sufficiently set to prevent slump.

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Floated finishes:

- Sand floated finish: While the concrete is green, wet the surface and rub using a wood float. Rub fine sand into the surface until a uniform colour and texture are produced.
- Grout floated finish: While the concrete is green, dampen the surface and spread a slurry, using hessian pads or sponge rubber floats. Remove surplus slurry and work until a uniform colour and texture are produced.

Smooth rubbed finish: While the concrete is green, wet the surface and rub using a carborundum or similar abrasive brick until a uniform colour and texture are produced.

3.12 UNFORMED SURFACES

General

Surface finish: As documented in the **Unformed surface finishes schedule**.

Finished levels: Strike off, screed and level slab surfaces to finished levels and to the flatness tolerance class documented.

Finishing methods – primary finish

Machine float finish:

- After levelling, consolidate the surface using a machine float.
- Cut and fill and refloat immediately to a uniform, smooth, granular texture.
- Hand float in locations inaccessible to the machine float.

Steel trowel finish: After machine floating, finish as follows:

- Use power or hand steel trowels to produce a smooth surface relatively free from defects.
- When the surface has hardened sufficiently, re-trowel to produce the final consolidated finish free of trowel marks and uniform in texture and appearance.

Burnished finish: Continue steel trowelling until the concrete surface attains a polished or glossy finish, uniform in texture and appearance, and free of trowel marks and defects.

Wood float finish: After machine floating, use wood or plastic hand floats to produce the final consolidated finish free of float marks and uniform in texture and appearance.

Broom finish: After machine floating and steel trowelling use a broom or hessian belt drawn across the surface to produce a coarse even-textured transverse-scored surface.

Scored or scratch finish: After screeding, use a stiff brush or rake drawn across the surface before final set, to produce a coarse scored texture.

Sponge finish: After machine floating and steel trowelling, use a damp sponge to wipe the surface to produce an even textured sand finish.

Exposed aggregate finish: After floating and when concrete has stiffened, wet the surface and scrub with stiff fibre or wire brushes, flushing continuously with clean water, until the aggregate is uniformly exposed. Rinse the surface with water.

Finishing methods – supplementary finish

Abrasive blast: After steel trowelling, abrasive blast the cured surface to provide texture or to form patterns without exposing the coarse aggregate, using hard, sharp graded abrasive particles.

Coloured applied finish: After machine floating, apply a proprietary liquid or dry shake material to the manufacturer's recommendations and trowel to achieve the required appearance.

Stamped and coloured pattern finish: Provide a proprietary finishing system.

Polished finish: After steel trowelling, grind the cured surface of the concrete.

3.13 CURING

General

Requirements: Taking into account the average ambient temperature at site over the relevant period affecting the curing, adopt procedures to make sure of the following:

- Curing: Cure continuously from completion of finishing, when the concrete has set sufficiently not to be damaged by the curing process, until the minimum total cumulative number of days or fractions of days, during which the air temperature in contact with the concrete is above 10°C, conforms to the following, unless accelerated curing is adopted:
  - . Fully enclosed internal surfaces/Early age strength concrete: 3 days.
  - . Other concrete surfaces: 7 days.
- End of curing period: Prevent rapid drying out at the end of the curing period.
- Protection: Maintain at a reasonably constant temperature with minimum moisture loss, during the curing period.

Curing compounds

Liquid membrane-forming compounds: Provide a uniform continuous flexible coating without visible breaks or pinholes, which remains unbroken for at least the required curing period after application.

Substrates: Do not use wax-based or chlorinated rubber-based curing compounds on surfaces forming substrates to applied finishes, concrete toppings and cement-based render.

Self-levelling toppings: If used also as curing compounds, conform to AS 3799.

Visually important surfaces: Apply curing compounds to produce uniform colour on adjacent surfaces.

Cold weather curing

Temperature: Maintain concrete surface temperatures above 5°C for the duration of the curing period.

Hot weather curing

Requirement: If the concrete temperature exceeds 25°C, or the ambient shade temperature exceeds 30°C, protect from drying winds and sun by using an evaporative retarder until curing is commenced.

Water curing

Method: Select a method of ponding or continuously sprinkling to prevent damage to the concrete surface during the required curing period.

3.14 COMPLETION

Formwork removal

Extent: Remove formwork, other than permanent forms and trapped forms, including formwork in concealed locations.

Timing: Do not disturb formwork until concrete has reached sufficient hardness to withstand formwork movements and removal without damage.

Stripping:

- General: To AS 3600 where it is more stringent than AS 3610.1.
- Vertical formwork: To AS 3610.1 Appendix C Table C2.
- Multi-storey work: Remove formwork without disturbing props supporting succeeding floors.
- Post-tensioned concrete: Remove formwork supporting post-tensioned concrete members to AS 3600 clause 17.6.2.7.

Removable bolts: Remove tie bolts without damaging the concrete.

Bolt hole filling: Provide material with durability and colour matching the concrete.

Recessed filling: Fill or plug the hole to 6 mm below the finished surface.

Curing: If formwork is stripped before the minimum curing period for the concrete has elapsed, continue curing the exposed faces as soon as the stripping is completed.

Protection
General: Protect the concrete from damage due to construction loads, physical and thermal shocks, and excessive vibrations, particularly during the curing period.

Surface protection: Protect finished concrete surfaces and applied finishes from damage.

Completion tests
Slip resistance of completed installation: To AS 4663.

4 SELECTIONS

4.1 SCHEDULES

Refer to Structural Engineer documents for details

0331 BRICK AND BLOCK CONSTRUCTION

1 GENERAL

1.1 RESPONSIBILITIES

General
Requirement: Provide brick and block construction, as documented.

1.2 CROSS REFERENCES

General
Requirement: Conform to the following:
- *0171 General requirements*.

1.3 STANDARDS

General
Materials and construction: To AS 3700.

1.4 INTERPRETATION

Definitions
General: For the purposes of this worksection the definitions in AS 3700 clause 1.5.2, AS/NZS 4455.1 clause 1.4 and the following apply:
- Facework: Masonry intended to be exposed in a wall.

1.5 TOLERANCES

General
Requirement: To AS 3700 Table 12.1.

1.6 SUBMISSIONS

Fire performance
Fire-resistance level: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE**, **Fire-resistance of building elements**.

Products and materials
Type tests: Submit results, as follows:
- Characteristic unconfined compressive strength of masonry unit: To AS/NZS 4456.4.

Samples
Face units: Submit face units of each type illustrating the range of variation available, including colour, texture, surface irregularities, defective arrises, and shape.
- Number of each type: 6.

Facework sample panel: Submit a sample panel in a suitable position for each type of facework including face or pointing mortar and a finished vertical control joint.
- Minimum size (face of panel): 1200 mm high x 1190 mm or closest unit module long.

Sand: Submit a 2 kg sample of each type of sand required to be of a particular colour, grade or source.

Wall ties: Submit sample of the following wall ties:
- Standard external cavity tie

Tests
Site tests: Submit results as follows:
- Mortar.
- Special masonry.

1.7 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:
- Set-out.
- Unit type, colour and texture.
- Bottoms of cavities, after cleaning out.
- Bottoms of core holes, before grouting.
- Reinforcement type and diameter.
- Positioning of reinforcing before grouting.
- Control joints, ready for insertion of joint filler.
- Damp-proof courses, in position.
- Flashings, in position.
- Lintels, in position.
- Structural steelwork, including bolts and shelf angles, in position.

2 PRODUCTS

2.1 FIRE PERFORMANCE

Fire-resistance of building elements
Fire-resistance level: Tested to AS 1530.4.

2.2 DURABILITY

General
Exposure locations: To AS 3700 clause 5.4.

2.3 MATERIALS

Brick and block units
Selections: As documented.

Standard: To AS/NZS 4455.1 and AS/NZS 4455.3.

Salt attack resistance grade: To AS 3700 Table 5.1.

Minimum age of clay bricks: 7 days.

Mortar materials
Mortar class: To AS 3700 Table 5.1.

Cement: To AS 3972.

White cement: With ≤ 1% iron salts content.

Lime: To AS 1672.1.

Sand: Fine aggregate with a low clay content and free from efflorescing salts, selected for colour and grading.

Water: Clean and free from any deleterious matter.

Admixtures: To AS 3700 clause 11.4.2.4.

Pigment: To EN 12878, and as follows:
- Integral pigment mix proportion: ≤ 10% by weight of cement.

Masonry cement mortar mix proportions table (cement:lime:sand), by volume

Mortar class to AS 3700	Clay	Concrete	Calcium silicate	Water thickener
M3	1:0:4	1:0:4	n/a	Yes
M4	1:0:3	n/a	n/a	Yes

Cement (GP/GB) mortar mix proportions table (cement:lime:sand), by volume

Mortar class to AS 3700	Clay	Concrete	Calcium silicate	Water thickener
M2	1:2:9	n/a	n/a	No
M3	1:1:6	1:1:6	n/a	Optional
M3	1:0:5	1:0:5	1:0:5	Yes
M4	1:0.5:4.5	1:0.5:4.5	n/a	Optional
M4	1:0:4	1:0:4	1:0:4	Yes
M4	1:0-0.25:3	1:0-0.25:3	n/a	Optional

Grout

Standard: To AS 3700 clause 11.7.

Minimum characteristic compressive strength: 12 MPa.

2.4 BUILT-IN COMPONENTS

General

Durability class of built-in components: To AS 3700 Table 5.1.

Steel lintels

Angles and flats: To AS/NZS 3679.1.

Cold formed proprietary lintels: Designed to AS/NZS 4600.

Corrosion protection: To AS/NZS 2699.3.

Galvanizing: Do not cut after galvanizing.

Reinforcement

Standard: To AS/NZS 4671.

Corrosion protection: To AS 3700 clause 5.9.

Minimum cover: To AS 3700 Table 5.1.

Wall ties

Standard: To AS/NZS 2699.1.

Corrosion protection: To AS/NZS 2699.1.

Connectors and accessories

Standard: To AS/NZS 2699.2.

Corrosion protection: To AS/NZS 2699.2.

Flashings and damp-proof courses

Standard: To AS/NZS 2904.

Slip joints

Standard: To AS 3700 clause 4.14.

Air vents
Blockwork: Select from the following:
- Concrete framed: Bronze wire mesh in concrete frame, 390 x 190 mm.
- Vent blocks: Purpose-made vent blocks.

Brickwork: Select from the following:
- Concrete framed: Bronze wire mesh in concrete frames, 470 x 160 mm.
- Cut brick: 2 cut bricks laid vertically and evenly spaced in a 230 mm wide x 2 course high opening, backed with bronze wire mesh built in.
- Terracotta: Perforated, 230 x 160 mm.

3 EXECUTION

3.1 GENERAL

Mortar mixing
General: Measure volumes accurately to the documented proportions. Machine mix for at least six minutes.

Protection
Masonry materials and components: Protect from ground moisture and contamination.

During construction: Cover the top surface of brickwork and blockwork to prevent the entry of rainwater and contaminants.

Bond
Type: Stretcher bond.

Building in
Embedded items: Build in wall ties and accessories as the construction proceeds. If not practicable to obtain the required embedment within the mortar joint in hollow masonry units, fill appropriate cores with grout or mortar.

Steel door frames: Fill the backs of jambs and heads solid with mortar as the work proceeds.

Clearance for timber frame shrinkage
General: In timber frame brick veneer construction, leave clearances between window frames and brick sill and between roof frames and the brick veneer as follows:
- Single storey frames and ground floor windows (not for slab on ground): 10 mm.
- Two storey frames and upper floor windows: 20 mm.
- Additional clearance: To accommodate additional shrinkage of unseasoned floor timbers.

Monolithic structural action
Construction at different rates or times: If two or more adjoining sections of masonry, including intersecting walls, are constructed at different rates or times, rake back or tie the intersections between those sections to obtain monolithic structural action in the completed work.

Header units: Except in stretcher bond facework, provide brick and block header units, to AS 3700 clause 4.11.2.
- Spacing: 600 mm maximum.
- Location: Provide header units in the following locations:
  . At engaged piers.
  . At engagement of diaphragms with the leaves in diaphragm walls.
  . At intersections of flanges with shear walls.
  . At intersections with supporting walls and buttresses.
  . Between leaves in solid masonry construction.

Joining to existing
General: Provide a control joint where joining to existing structures. Do not tooth new masonry into existing work unless approved by a professional engineer.

Mortar joints
General: Set out masonry with joints of uniform width and minimum cutting of masonry units.

Solid and cored units: Lay on a full bed of mortar. Fill perpends solid. Cut mortar flush.

Face-shell bedded hollow units: Fill perpends solid. Cut mortar flush.

Joint thickness: 10 mm.

Finish: Conform to the following:

- Externally: Tool to give a dense water-shedding finish.
- Internally: If wall is to be plastered, do not rake more than 10 mm to give a key.

Rate of construction
General: Regulate the rate of construction to eliminate joint deformation, slumping or instability.

Rods
Set-out: Construct masonry to the following rods:

- 75 mm high units: 7 courses to 600 mm.
- 90 mm high units: 6 courses to 600 mm.
- 190 mm high units: 3 courses to 600 mm.

Temporary support
General: If the final stability of the masonry is dependent on construction of (structural) elements after the brickwork and blockwork is completed, provide proposals for temporary support or bracing.

3.2 FACEWORK

Cleaning
General: Clean progressively as the work proceeds to remove mortar smears, stains and discolouration. Do not erode joints if using pressure spraying.

Acid solution: Do not use.

Colour mixing
Distribution: In facework, distribute the colour range of units evenly to prevent colour concentrations and banding.

Below ground
Facework: Commence face brickwork at least 1 full course for blockwork, or 2 full courses for brickwork, below adjacent finished surface level.

Double face walls
Selection: Select face units for uniform width and double-face qualities.

Preferred face: Before starting, obtain approval of the preferred wall face, and favour that face should a compromise be unavoidable.

Perpends
General: If other than vertically aligned perpends in alternate courses are proposed, provide details.

Sills and thresholds
General: Solidly bed sills and thresholds and lay them with the top surfaces draining away from the building.

Minimum size of cut unit: Three quarters full width.

3.3 CAVITY WORK

Cavity clearance

General: Keep cavities clear at all times.

Cavity fill

General: Fill the cavity with mortar to 1 course above adjacent finished (ground) level. Fall the top surface towards the outer leaf.

Cavity width

General: Construct minimum cavity widths in conformance with the following:

- Masonry walls: 50 mm.
- Masonry veneer walls: 40 mm between the masonry leaf and the load bearing frame and 25 mm minimum between the masonry leaf and sheet bracing.

Openings

Jambs of external openings: Do not close the cavity.

Wall ties, connectors and accessories

Protection: Install to prevent water passing across the cavity.

3.4 DAMP-PROOF COURSES

Location

General: Locate damp-proof courses, as follows:

- Timber floors: In the first course below the level of the underside of ground floor timbers in internal walls and inner leaves of cavity walls.
- Cavity walls built off slabs on ground: In the bottom course of the outer leaf, continuous horizontally across the cavity and up the inner face bedded in mortar, turned 30 mm into the inner leaf 1 course above.
- Masonry veneer construction built off slabs on ground: In the bottom course of the outer leaf, continuous horizontally across the cavity. Fasten to the inner frame 75 mm above floor level.
- Walls adjoining infill floor slabs on membranes: In the course above the underside of the slab in internal walls and inner leaves of cavity walls. Project 40 mm and dress down over the membrane turned up against the wall.

Height: Not less than:

- 150 mm above the adjacent finished ground level.
- 75 mm above the finished paved or concrete area.
- 50 mm above the finished paved or concreted area and protected from the direct effect of the weather.

Installation

General: Lay in long lengths. Lap full width at angles and intersections and at least 150 mm at joints. Step as necessary, but not exceeding 2 courses per step for brickwork and 1 course per step for blockwork. Sandwich damp-proof courses between mortar.

Junctions: Preserve continuity of damp-proofing at junctions of damp-proof courses and waterproof membranes.

Lap sealing: Seal with a bituminous adhesive and sealing compound.

3.5 FLASHINGS

Location

General: Locate flashings, as follows:

- Floors: Full width of outer leaf immediately above slab or shelf angle, continuous across cavity and up the inner face bedded in mortar, turned 30 mm into the inner leaf 2 courses above for brick and 1 course above for block. If the slab supports the outer skin and is not rebated, bed the flashing in a suitable sealant.
- Under sills: 30 mm into the outer leaf bed joint 1 course below the sill, extending up across the cavity and under the sill in the inner leaf or the frame for masonry veneer. Extend at least 150 mm beyond the reveals or each side of the opening.
- Over lintels to openings: Full width of outer leaf immediately above the lintel, continuous across cavity, turned 30 mm into the inner leaf 2 courses above for brick and 1 course above for block or turned up against the inner frame and fasten to it. Extend at least 150 mm beyond the lintels.
- At abutments with structural frames or supports: Vertical flash in the cavity using 150 mm wide material, wedged and grouted into a groove in the frame opposite the cavity.
- At jambs: Vertically flash jamb, extending 75 mm into the cavity, interleaved with the sill and head flashing at each end. Fix to jambs.
- At roof abutments with cavity walls: Cavity flash immediately above the roof and over-flash the roof apron flashing.

Installation

General: Sandwich flashings between mortar except where on lintels or shelf angles. Bed flashings, sills and copings in one operation to maximise adhesion.

Laps: If required, lap full width at angles and intersections and at least 150 mm at joints. Step as necessary, but not exceeding 2 courses per step for brickwork and 1 course per step for blockwork.

Lap sealing: Seal with a bituminous adhesive and sealing compound.

Pointing: Point up joints around flashings, filling voids.

Weepholes

Requirement: Locate weepholes to external leaves of cavity walls in the course immediately above flashings, and cavity fill, and at the bottoms of unfilled cavities.

Form: Open perpends.

Maximum spacing: 1200 mm.

3.6 WALL TIES

Location

General: Space wall ties in conformance with AS 3700 clause 4.10 and at the following locations:

- Not more than 600 mm in each direction.
- Adjacent to vertical lateral supports.
- Adjacent to control joints.
- Around openings.

Installation

Fixing of masonry veneer ties:

- To timber frames: Screw fix to outer face of timber frames with fasteners to AS 3566.1.
- To concrete: Masonry anchors.
- To steel frames: Screw fix to outer face of steel studs with fasteners to AS 3566.1.

3.7 CONTROL JOINTS

General

Location and spacing: Provide contraction joints, expansion joints or articulation joints to AS 3700 clause 4.8.

Control joint filling

Filler material: Provide compatible sealant and bond breaking backing materials which are non-staining to brickwork and blockwork. Do not use bituminous materials with absorbent masonry units.

- Bond breaking materials: Non-adhesive to sealant, or faced with a non-adhering material.
- Foamed materials: Closed-cell or impregnated, not water-absorbing.

Installation: Clean the joints thoroughly and insert an easily compressible backing material before sealing.

Sealant depth: Fill the joints with a gun-applied flexible sealant for a depth of at least two-thirds the joint width.

Fire-resisting control joints

General: If a control joint is located in an element of construction required to have a fire-resistance level (FRL), construct the control joint with fire stopping materials which maintain the FRL of the element.

Fire-stopping: To AS 4072.1.

3.8 BRICKWORK AND BLOCKWORK DUCT RISERS

General

Location: Build a one-piece corrosion resistant metal tray to the masonry duct risers at roof level.

Installation

General: Cut an opening for the riser. Turn tray edges up 25 mm around the opening 13 mm clear of the walls. Externally turn the tray up 100 mm under the stepped flashing and down 100 mm over the apron flashing. Lap and solder joints.

Weepholes

General: Provide 2 weepholes through the masonry duct riser walls on opposite sides immediately above the tray.

3.9 BRICKWORK BED JOINT REINFORCEMENT

Location

General: Locate as follows:

- In 2 bed joints below and above head and sill flashings to openings.
- In 2 bed joints below and above openings.
- In third bed joint above bottom of wall.
- In second bed joint below top of wall.

Maximum vertical intervals: 500 mm.

Installation

General: Lap 450 mm at splices. Fold and bend at corners so that the longitudinal wires are continuous. Stop 50 mm short of control joints. Extend 450 mm beyond each side of openings.

Reinforcement

Material: Galvanized welded wire mesh.

Width: Equal to the width of the leaf, less 15 mm cover from each exposed surface of the mortar joint.

3.10 REINFORCED AND GROUTED BLOCKWORK

Cleaning core holes
General: Provide purpose-made cleanout blocks or machine cut a cleaning hole at the base of each grouted core.

Location: Locate on the side of the wall which is to be rendered or otherwise concealed.

Cleaning: Rod cores to dislodge mortar fins protruding from the blocks and mortar droppings from reinforcement. Remove through the clean-out blocks.

Grouting
Commencement: Do not commence until grout spaces have been cleaned out and the mortar joints have attained sufficient strength to resist blow-outs.

Height of lift: Limit the height of individual lifts in any pour to make sure that the grout can be thoroughly compacted to fill all voids.

Compaction: Compact by vibration or by rodding.

Topping up: On the completion of the last lift, top up the grout after 10 min and within 30 min, and vibrate or rod to mix with the previous pour.

3.11 LINTELS

Location
General: Install one lintel to each wall leaf as documented in the **Lintel schedule**.

Installation
General: Do not cut on site. Keep lintels 10 mm clear of heads of frames.

Steel lintels: Pack mortar between any vertical component and supported masonry units. For angles, install the long leg vertical.

Minimum bearing each end:

- Span ≤ 1000 mm: 100 mm.
- Span > 1000 mm ≤ 3000 mm: 150 mm.
- Span > 3000 mm: To structural drawings.

Propping: Provide temporary props to lintels to prevent deflection or rotation.

- Minimum propping period: 7 days.

3.12 CONNECTORS AND ACCESSORIES

Slip joints
General: Install slip joints to top of all unreinforced masonry walls supporting concrete slabs and other concrete elements.

Protection: Keep the slip joints in place and protect from displacement.

Flexible masonry ties
General: Install stabilising ties at control joints and abutting structural elements, including columns, beams and slab soffits.

Locations and details: As documented.

3.13 ARCHES

Arch voussoirs
General: Cut units using a masonry saw.

Shapes and dimensions
General: Form arches using solid or cored (not hollow) masonry units.

3.14 BAGGING

Preparation
General: Cut joints flush before bagging.

Dry bagging
Application: Apply laying mortar to the surface using a hessian bag or similar. Flush up irregularities, but leave a minimum amount of mortar on the surface.

Textured bagging
Application: Apply laying mortar to the surface using a sponge float. Flush up irregularities, but leave approximately 2 mm of mortar on the surface. When initial set is reached, texture using a hand bristle brush.

3.15 TESTING

Mortar
Durability: Scratch index test to AS 3700 Appendix E.

Compressive strength: To AS 3700 Appendix C.

Flexural strength: To AS 3700 Appendix D.

Special masonry
Sampling and testing: To AS 3700 clause 12.7.

Performance: As documented in the **Brick and block construction performance schedule for special masonry**.

4 SELECTIONS

4.1 SCHEDULES

Refer to Finishes Fixtures & Equipment Schedule for selections.

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0341 STRUCTURAL STEELWORK

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide structural steelwork, as documented.

Performance

Construction category to AS/NZS 5131: Refer to Structural Engineers documents

Adjoining elements: Provide for the fixing of adjoining building elements that are to be connected to or supported on the structural steel.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.
- *0344 Steel – hot-dip galvanized coatings*.
- *0345 Steel – protective paint coatings*.
- *0346 Structural fire protection systems*.

1.3 STANDARDS

General

Materials and design: To AS 4100.

Materials and design of cold-formed decking, purlins and girts: To AS/NZS 4600.

Composite steel-concrete construction including profiled steel sheeting and shear connectors: To AS/NZS 2327.

Fabrication and erection: To AS/NZS 5131.

1.4 INTERPRETATION

Abbreviations

General: For the purposes of this worksection the following abbreviations apply:

- AESS: Architecturally Exposed Structural Steelwork.
- CC: Construction Category.
- NDE: Non-Destructive Examination.

Definitions

General: For the purposes of this worksection the definitions given in AS/NZS 5131 apply.

1.5 TOLERANCES

General

Requirement: To AS/NZS 5131 Section 12 and Appendix F.

Tolerance class: 1.

AESS: To the **AESS schedule**.

1.6 SUBMISSIONS

Execution details

Anchor bolts: If anchor bolts do not meet documented location tolerances, submit proposals for rectification before proceeding.

Bolting connections: For connections not documented, submit proposals.

Site base plate holing: If hand cutting of bolt holes in column base plates is required, submit details.

Purlins and girts: If purlins and girts support components other than roofing or cladding, submit details.

Site modifications: Submit details of proposed on-site modifications or rectifications to any steel member, connection component, mechanical fastener, weld or corrosion protection.

Splices: If variations to documented splice locations or additional splices are proposed, submit details.

Temporary connections or attachments: If not documented, submit details.

Undocumented weld types: Submit proposals for weld type and electrodes.

Welding plan: Submit a welding plan to AS/NZS 5131 clause 7.2.

Work method statement: Before any erection work commences, submit a work method statement to AS/NZS 5131 clause 11.2.3.

Products and materials

Steel members and sections: Submit test reports or test certificates conforming to AS 4100 clause 2.2.2.

Bolts, nuts and washers: Submit test reports or test certificates conforming to AS/NZS 1252.1 Section 6.

Verification testing of bolt assemblies: Submit test reports or certificates conforming to AS/NZS 1252.2 Section 2, together with the Supplier Declaration of Conformity (SDoC).

Anchor bolts: If anchors, other than those documented, are required or proposed for supporting or fixing structural steel, submit evidence of the anchor capacity to carry the load.

Substitution: If alternative sections or connections are proposed, submit details.

Records

Shop detail documentation

General: Submit shop detail documentation to a scale that best describes the detail, conforming to AS/NZS 5131 clause 4.4.

1.7 INSPECTION

Notice – on-site

Inspection: Give notice so that inspection may be made of the following:

- Steelwork on-site before erection.
- Anchor bolts in position before casting in.
- Steelwork and column bases erected on site, before grouting, encasing, site protective coating or cladding.
- Reinforcement and formwork in place before any encasement.

2 PRODUCTS

2.1 GENERAL

Materials

Requirement: To AS/NZS 5131 Section 5.

Storage and handling

Requirement: Pack, support, transport and handle members and components without overstressing, deforming or damaging them or their protective coating.

Damaged items: Rectify or replace. Do not assemble into the structure without approval.

Protection: Wrap or otherwise protect members or components to prevent damage to surface finishes during handling and erection.

Storage: Store off the ground.

Lifting points: Do not allow steel slings to come into direct contact with coated steelwork.

Purchasing and traceability

Purchasing documentation and procedure: To AS/NZS 5131 clause 4.6.

Level of traceability: As defined in AS/NZS 5131 clause 4.7 and the following:

- CC1: Basic traceability.
- CC2: Partial traceability.
- CC3: Full traceability.
- CC4: Full traceability.

2.2 STRUCTURAL STEEL

Steel members and sections steel grade table

Type of steel	Minimum grade
Hot-rolled sections to AS/NZS 3679.1 and SA TS 102	300
Welded sections to AS/NZS 3679.2	300
Hot-rolled plates, floor plates and slabs to AS/NZS 3678 and SA TS 102	250
Hot-rolled flat products to AS/NZS 1594	HA300
Hollow sections to AS/NZS 1163 and SA TS 102: Circular sections less than 166 mm nominal outside diameter	C250
Hollow sections to AS/NZS 1163 and SA TS 102: Sections other than circular sections less than 166 mm nominal outside diameter	C350
Cold-formed purlins and girts to AS 1397	G450, Z350 or Z450

Certification

Steel: Minimum requirements for test and inspection certificates, to the following:

- Hot-rolled bars or sections: To AS/NZS 3679.1 clause 11.2.4.
- Welded I sections: To AS/NZS 3679.2 clause 11.2.4.
- Hot-rolled plate: To AS/NZS 3678 clause 11.2.4.
- Cold-formed hollow sections: To AS/NZS 1163 clause 11.2.4.

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2.3 MECHANICAL FASTENERS

Standards

Bolts: To AS 1110.1, AS 1111.1 and AS/NZS 1252.1.

Nuts: To AS 1112.1, AS 1112.2, AS 1112.3, AS 1112.4 and AS/NZS 1252.1.

Bolting category

Requirement: To the **Bolting category schedule**.

Certification

High-strength bolt assemblies: Minimum requirements for test reports, to AS/NZS 1252.1 clause 6.4.2.

Finish

Bolts, nuts and washers: Hot-dip galvanized to AS/NZS 1214, corrosion-free, and in serviceable condition.

Anchor bolts

Hexagonal bolts: To AS 1111.1.

Hexagonal nuts: To AS 1112.3.

Plain washers: To AS 1237.1.

Requirement: Provide each anchor bolt with 2 nuts and 2 oversize washers with sufficient thread for the levelling nut and washer to set below the base plate.

Mechanical and chemical anchors: To AS 5216, installed to manufacturer's recommendations.

2.4 OTHER MATERIALS

Welding consumables

Requirement: To the relevant part of the AS/NZS 1554 series.

Studs and shear connectors

Requirement: To AS/NZS 5131 clause 5.6.

Grout

Requirement: To AS/NZS 5131 clause 5.8.

3 EXECUTION

3.1 PREPARATION, ASSEMBLY AND FABRICATION

Identification

Traceability: To AS/NZS 5131 clause 6.2.

Marking: Provide marks or other means of identifying each member compatible with the finish, for setting out, locating, erecting and connecting the steelwork to the marking plans.

High-strength bolting: If the work includes more than one bolting category, mark high-strength structural bolted connections with a 75 mm wide flash of colour, clear of holes.

Cold-formed members: Clearly mark material thickness.

Monorail beams: Identify and mark rated capacity in conformance with AS 1418.18 clause 5.12.6.

Natural beam camber

General: If steel beams have a natural camber, within the straightness tolerance, fabricate the steelwork element with the camber up.

Cutting

Shearing: Do not shear edges in areas designated as yielding regions for seismic design to AS 4100 earthquake design categories D and E.

Shaping

Requirement: Where forming, shaping or correcting distorted members, avoid damage and conform to AS/NZS 5131 clause 6.6.

Holing
Slotted holes: Do not use slotted holes for connections, other than those documented.

Tolerances
Measurement: Check tolerances by measurement after fabrication and application of corrosion protection.

3.2 WELDING

General
Requirements: To AS/NZS 5131 Section 7.

Standard: To AS/NZS 1554.1.

Weld category
Weld categories not documented: Category GP.

Weld type
Weld type not documented: Submit proposals for weld type and electrodes

Non-destructive weld examination (NDE)
Requirement: To AS/NZS 5131 clause 13.6.2.

Non-visual NDE: By a third party testing authority.

Repairs: Repair welds revealed as faulty by NDE and repeat the examination.

Site welds
Completion: Weld only when correct alignment and preset or camber have been achieved.

3.3 MECHANICAL FASTENING

Connection contact surfaces
General: To AS/NZS 5131 clause 8.4.1.

Bolting category 8.8/TF: Clean, as rolled and free from applied finishes.

Washers
Requirement: Place one washer under the part rotated during tightening process (nut or bolt head).

Tensioning of bolting categories 8.8/TB and 8.8/TF
Method: Use part-turn method or a direct tension indicator device.

Permanent bolting
Completion: Bolt only when correct alignment and preset or camber has been achieved.

3.4 SURFACE PREPARATION AND TREATMENT

General
Requirement: Conform to *0344 Steel – hot-dip galvanized coatings* and/or *0345 Steel – protective paint coatings*, as appropriate.

3.5 SPECIAL FINISHES

General
Requirement: Apply special finishes to the **Special finishes schedule**.

3.6 METAL SPRAYING

General
Standard: To ISO 2063.2.

Requirement: Apply sprayed metal finishes to the **Metal spray schedule**.

Process: Electric arc.

Application: Apply the coating as soon as possible after blasting.

3.7 FIRE PROTECTION COATINGS

General
Requirement: Apply fire protection to structural steelwork to *0346 Structural fire protection systems*.

3.8 ARCHITECTURALLY EXPOSED STRUCTURAL STEELWORK

General
Requirement: Provide AESS to AS/NZS 5131 Section 10 and the **AESS schedule**.

AESS category
AESS category to AS/NZS 5131 clause 10.2: Includes exposed structural steel framing to covered ways, awnings and COLA. Refer to Architectural drawings.

Fabrication
Additional requirements: To AS/NZS 5131 clause 10.4.

Corners and edges: Grind smooth sharp, marred, or roughened corners and edges.

Rough surfaces: Deburr and ground smooth.

Erection
Additional requirements: To AS/NZS 5131 clause 10.5.

3.9 ERECTION

General
Execution: Make sure every part of the structure has sufficient design capacity and is stable under construction loads produced by the construction procedure.

Temporary work
General: Provide all necessary temporary bracing or propping.

Temporary connections: Detail required cleats, if not shown on shop detail documentation.

Temporary members: If temporary members are required, fix so as not to weaken or deface permanent steelwork.

Anchor bolts
General: For each group of anchor bolts, provide a template with set-out lines clearly marked for positioning the bolts when casting in.

Beam camber
Requirement: If beam elements have a camber (natural or induced), erect them with the camber up.

Site work
General: Other than work shown on the shop detail documentation as site work, do not fabricate, modify or weld structural steel on-site.

Purlins
Trimming members: Provide to support edges of roof sheeting along hips, valleys and roof penetrations.

Movements
General: Allow for thermal movements during erection.

Grouting at supports
Preparation: Before grouting steelwork supported by concrete or masonry, set steelwork on packing or wedges.

- Permanent packing or wedges: Form with solid steel or grout of similar strength to the permanent grout.
- Temporary packing or wedges: Remove before completion of grouting.

Timing: Grout at supports before constructing supported floors, walls and roofing.

Temperature: Do not grout if the temperature of the base plate or the footing surface exceeds 35°C.

Drifting
Limitation: Use drifting only to bring members into position, without enlarging holes or distorting components.

3.10 REPAIRS

General
Requirement: Repair finishes to restore the full integrity of any coating.

3.11 COMPLETION

Tolerances
Conformance: After completing erection, verify conformance with AS/NZS 5131 Section 12 and Appendix F.

Temporary connections
General: Remove temporary cleats on completion and restore the surface.

4 SELECTIONS

4.1 SCHEDULES

Refer to Structural Engineers documentation and Finish, Fitting and Equipment Schedule.

0342 LIGHT STEEL FRAMING

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide light steel floor, wall, roof and truss framing, as documented.

Performance

Requirements:

- Suitable for having flooring, linings, cladding and roofing fixed to it.
- Conforming to the documented performance criteria.
- Independently designed and documented.
- Independently certified by a professional engineer for the design and the erected framing.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.3 STANDARDS

General

Design, materials and protection: To AS/NZS 4600.

Residential and Low-rise steel framing: To NASH-1 (National Association of Steel Housing) and NASH-2.

1.4 INTERPRETATION

Definitions

General: For the purposes of this worksection the definitions given in the NASH-1 and NASH-2 Standards apply.

1.5 TOLERANCES

General

Manufacturing, assembly and installation tolerances: To NASH-1 Appendix D and NASH-2 Appendix A.

1.6 SUBMISSIONS

Design documentation

General: Where the structural documentation defines performance criteria, submit independent design, documentation and certification from a professional engineer including certification for the erected work.

Reactions: Submit the location and magnitude of reactions that are to be accommodated by the support structure.

Floor and wall frame member sizes: Submit a schedule of proposed member sizes, certified as meeting stated project, and AS/NZS 4600 requirements for span, spacings and loadings.

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Shop drawings
General: Submit shop drawings, to a scale that best describes the detail, requirements for the documented configurations and loadings, certified by a professional engineer stating that the design has been carried out to AS/NZS 4600 or NASH-1 and NASH-2.

Prefabricated roof trusses: Include the following:

- Plan: Truss layout.
- Elevations: Arrangement of members, allowing for the accommodation of in-roof services, and the size and section type of each member.
- Method of assembly and connection details.
- Holding down and bracing: Details demonstrating capability to resist lateral and uplift forces.

Prefabricated wall frames: Include the following:

- Plan: Wall layout.
- Elevation: Arrangement of members, and size and section type of each member.
- Method of assembly, connection, holding down and bracing.

Warranties
Requirement: Submit warranties to **COMPLETION**, **Warranties**.

1.7 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:

- Steel framing erected on site before lining or cladding.

2 PRODUCTS

2.1 GENERAL

Storage and handling
Requirement: Transport all components to site and store if required in a manner so as not to damage or distort the components.

2.2 COMPONENTS

Cold-formed steel framing
General: Cold-form sections from steel, metallic-coated to AS 1397.

Corrosion protection: To NASH-2 Section 8.

Framing members
Cold-formed steel framing for proprietary systems: To NASH-1 and NASH-2.

3 EXECUTION

3.1 GENERAL

Fabrication
Length: Cut members accurately to length so that they fit firmly against abutting members.

Service holes: Form holes by drilling or punching.

Bushes: Provide plastic bushes or grommets to site cut holes.

Swarf: Immediately remove swarf and other debris from cold-formed steel framing.

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Fastening
Type: Select from the following:
- Bolting.
- Self-drilling, self-tapping screws.
- Blind rivets.
- Proprietary clinching system.
- Structural adhesives.
- Welding. On-site welded connections are not permitted.

Welding
Burning: Avoid procedures that result in greater than localised burning of the sheets or framing members.

Prefabricated frames
General: Protect frames from damage or distortion during erection.

Metal separation
General: Install lagging to separate non-ferrous service pipes and accessories from the framing.

Unseasoned or CCA treated timber
General: Do not fix in contact with framing without fully painting the timber and/or the steel.

Earthing
Permanent earthing: Required.

Temporary earthing: Provide temporary earthing during erection until the permanent earthing is installed.

Protection
General: Restore coatings which have been damaged by welding or other causes. Thoroughly clean affected areas back to base metal and coat with a zinc rich organic primer.

Grommets: Provide grommets to isolate piping and wiring from cold-formed steel framing.

3.2 WALL FRAMING

Wall studs
General: Provide studs in single lengths without splices. Place a stud under each structural load point from the roof or ceiling (except at openings). Provide multiple studs at points of concentrated load.

Maximum stud spacing: 600 mm.

Heads to openings
Requirement: Provide lintels appropriate to load and span.

Additional support
General: Provide additional support in the form of noggings, trimmers and studs for support and fixing of lining, cladding, hardware, accessories, fixtures and fittings.

Vermin barriers
Brick veneer barrier: Close nail 10 mm steel wire mesh to the underside of the bottom plate of external stud walls, extending across the cavity for building into brickwork.

Damp-proof course
Requirement: Provide damp-proof courses under the bottom plate of stud walls built off slabs or masonry dwarf walls, as documented or as follows if not documented otherwise:
- External walls (not masonry veneer): Turn up a minimum of 75 mm on the inside and tack to studs. Project 10 mm beyond the external slab edge or dwarf wall and turn down at 45°.
- Walls of bathrooms, shower rooms and laundries: Turn up a minimum of 150 mm on the wet side and tack to studs.

Installation: Lay in long lengths. Lap full width at angles and intersections and at least 150 mm at joints.

Junctions: Preserve continuity of damp-proofing at junctions of damp-proof courses, sarking and waterproof membranes.

Flashings

Location: Provide flashings to external openings sufficient to prevent the entry of moisture. Form trays at the ends of sill flashings.

Masonry veneer construction: Extend across cavities and build into brickwork.

3.3 ROOF FRAMING

Beam framing

General: Construct framing for flat or pitched roofs where the ceiling follows the roof line, consisting of rafters or purlins supporting both ceiling and roof covering.

Additional support

General: Provide additional frame members at fibre cement or plasterboard sheeting or lining joint locations.

Battens

Requirement: Supply and fix battens suitable for span, spacing and proposed roofing material.

Anti-ponding boards

Standard: To AS 4200.2.

3.4 TRUSSES

Fabrication

Assembly: Factory assemble trusses.

Supports for in roof services

General: If walkways, mechanical plant or other services are to be supported within the roof space, provide support and make sure trusses have been designed to carry the loads.

Water tank and heater: If a water tank or heater is located in the roof space, provide a support platform to AS/NZS 3500.4 clause 5.5.1 and make sure trusses have been designed to carry the loads.

Marking

General: Permanently mark each truss to show:

- Project identification.
- Manufacturer.
- Tag or number.
- Location.
- Support points.

Installation

Support: Support and fix trusses on the bottom chord only, at the nominated support points, unless designed for additional support.

Vertical movement: Over internal walls not providing support to trusses, provide at least 10 mm vertical clearance and use wall bracing methods which allow for vertical movements.

3.5 ROOF TRIM

Fascia, valley and barge boards

Requirement: Fix fascia, valley gutter boards and barge boards in conformance with the manufacturer's recommendations.

3.6 COMPLETION

Cleaning

General: On completion of framing remove debris from any gaps between members and make sure void between bottom chord of roof trusses and top of any non-supporting internal wall is clear.

Warranties

Requirement: Cover materials and workmanship in the terms of the warranty in the form of interlocking warranties from the supplier and the installer.

- Form: Against failure of materials and execution under normal environment and use conditions.
- Period: As offered by the supplier.

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0345P DULUX STEEL PROTECTIVE PAINT COATINGS

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide Dulux protective paint coatings for the protection of steel products and structural steelwork against interior and exterior atmospheric corrosion, as documented.

Performance

Requirement: Control atmospheric corrosion to structural steelwork and steel products until the first scheduled maintenance.

1.2 COMPANY CONTACTS

DuluxGroup/Dulux technical contacts

Architects and Specifiers' Hotline: 13 23 77.

Website: www.duluxprotectivecoatings.com.au/contact-us.

1.3 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.4 STANDARDS

General

Surface preparation and coating: To AS/NZS 5131 Section 9 and the recommendations of AS 2312.1.

Site testing of protective coatings

Test methods: To AS 3894.

1.5 MANUFACTURER'S DOCUMENTS

Technical manuals

Duspec PDS, SDS, paint system selection: Duspec.

1.6 INTERPRETATION

Abbreviations

General: For the purposes of this worksection the following abbreviations apply:

- ACA: Australasian Corrosion Association.
- DFT: Dry Film Thickness.
- ITP: Inspection and Test Plan.
- MIO: Micaceous Iron Oxide.
- NACE: National Association of Corrosion Engineers (USA).
- PDS: Product Data Sheet.
- SDS: Safety Data Sheet.
- SSPC: The Society for Protective Coatings (USA).
- µm: Micron (10-6m).

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Definitions
General: For the purposes of this worksection the definitions given in AS/NZS 2310 and the following apply:

- Coating contractor: The protective coatings application contractor conducting the on or off-site coating application works.
- Coating manufacturer: Dulux Protective Coatings.
- Inspection and test plans (ITP): A series of formal inspection and test plans, prepared by the coating contractor to reflect the specific inspection and testing that will be carried out on the surface preparation, coating application and the record keeping tasks to be undertaken.
- Safety data sheet (SDS): Prepared in conformance with Safe Work Australia's requirements and distributed by the coating manufacturer to provide information on the safe handling, storage, personal protective equipment requirements, use and disposal of a coating product. Previously called a material safety data sheet (MSDS).

1.7 QUALITY ASSURANCE

General
Standard: Applicator Quality Assurance system to AS/NZS ISO 9001.

Applicator's quality assurance officer: Nominate a qualified NACE Certified Coating Inspector or a ACA Certified Coatings Technician under direction of a NACE inspector.

Records: Maintain records:

- Access: Have records available for inspection.

Verification: Nominate an independent NACE Certified Coating Inspector to carry out quality audits.

Defects: Provide written inspector reports.

1.8 SUBMISSIONS

Execution details
Detailing features: If design and fabrication features of the items to be coated may lead to difficulties, identify these and submit details for improvement.

Repair of damaged coating: If the protective coating is damaged, submit a coating repair proposal, based on the coating manufacturer's recommendations for reinstating the corrosion protection function of the system.

Reinstatement: If final coat varies from the submitted sample, submit proposals for reinstatement of the visible final coating system.

Products and materials
Multi-component coatings: If partial mixing of packs is proposed, submit details.

Records
General: Prepare and maintain records of all surface preparation and coating application works, as follows:

- Standards: To AS 3894.10, AS 3894.11, AS 3894.12, AS 3894.13 and AS 3894.14.
- Reference the relevant parts of the ITP and record conformance.

Warranties
General: Submit details of the proposed warranty terms, form and period.

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1.9 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:
- Items after fabrication, before commencing surface cleaning and preparation.
- Surfaces after preparation, before application of first coating.
- Coating stages:
  . After application of primer or seal coats.
  . After application of each subsequent coat.

2 PRODUCTS

2.1 GENERAL

Product substitution
Other products: Conform to PRODUCTS, **GENERAL**, **Substitutions** in *0171 General requirements*.

Storage and handling
General: Store in a cool shady place.

Care: Handle, store, mix and apply all protective coatings in conformance with Dulux recommendations.

Original containers: Deliver coating products to site in manufacturer's labelled and sealed containers.

Ambient temperature range for storage: 15°C to 25°C.

Sunlight: Protect coating materials from direct sunlight before mixing or adding the converter (catalyst).

Use-by-date: Use products with limited shelf life before their use-by-date, unless written authorisation from the coating manufacturer’s technical services section is provided.

Paint material
Requirement: To AS/NZS 5131 clause 9.9.3.

Proprietary products
Substitution: Dulux paint products and specified coatings systems have been selected for this project and unauthorised product substitution will jeopardise or void the Warranties.

Product data sheets (PDS): Keep on site copies of all relevant Dulux technical data sheets.

Safety data sheets (SDS): Keep on site copies of all relevant Dulux SDS’s.

Recording: To AS/NZS 5131 clause 9.9.5.

3 EXECUTION

3.1 GENERAL

Product warnings
Requirement: Conform to the requirements and recommendations of the relevant Dulux SDS.

Qualifications
Requirement: All work is to be completed by suitably qualified professionals holding TAFE or other recognised qualifications.

Surroundings
Protection: Prevent the release of abrasives, overspray or paint waste debris into the air, ground or to any watercourse. Prevent damage to other assets, services or equipment.

Reinstatement: Repair and/or clean affected surrounding areas.

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Working area
General: Perform all painting under cover and/or protected from rain, condensation, dew, excessive wind, overspray or wind-blown dust.

Period: Continue protection where any of these conditions exist until the coating is no longer affected.

3.2 SURFACE PREPARATION

General
Requirement: Conform to AS/NZS 5131 clauses 9.3, 9.4 and 9.5.

Surface cleansing: Wash and degrease all surfaces to be coated, to AS 1627.1, with a free-rinsing, alkaline detergent, such as Gibson F310B or Gamlen CA No. 1 used in conformance with the manufacturer's written instructions and all safety warnings.

Bolts: Provide washers at heads and nuts at replacement bolts.

Galvanized, aluminium and zinc primed surfaces
Requirement: Remove grease, oil and other solvent-soluble contaminants to AS 1627.1. Allow to dry and immediately proceed with the next operation.

Galvanized and aluminium surfaces: Abrade surfaces to a medium coarse type finish to provide an adhesion key.

Zinc primed surfaces: If present, remove zinc salts from zinc primers.

Treatment of welds
Requirement: Clean welds to remove roughness, using power tools to AS 1627.2. Remove filings by vacuuming or compressed air.

Temporary welds: Grind flush any temporary welds.

Porous, skip or stitch welds: Not permitted.

Site welding: If possible, avoid site welding. If on site welding is required, prepare and treat the weld to AS/NZS 5131 clause 9.12.2.

Shop priming
Requirement: Dust off and apply a coat of primer, according to the technical specification.

Site coating
General: High pressure wash down all surfaces with clean water. Lightly sand down primer/intermediate coats, which have been shop applied, before site application of next coat.

3.3 PREPARATION ASSESSMENT

General
Conformance: Assess all surfaces of each steel member for conformance with the documented preparation requirements.

Abrasive blast cleaning
Assessment: To AS 1627.4 and AS 1627.9.

Minimum acceptance class: Sa 2.5.

Mechanical cleaning
Assessment: To AS 1627.9 and ISO 8501-2.

Minimum acceptance class: St 2.

Surface profile
General: To AS 3894.5 Method A.

Acceptable profile range: 35 to 65 µm.

Surface dust from abrasion
General: To AS 3894.6 Method C.

Chloride level testing
Test: To AS 3894.6 Method A.

Maximum allowable chloride levels: 50 mg/m^2 for critical applications (heavy condensation, fresh water ponding or immersion) or to manufacturer's recommendations.

Conformance: If the maximum allowable chloride is exceeded, rewash the affected surface area until the chloride level is within the acceptable limits using clean water or chloride neutralising solutions. Jet-washing or steam cleaning is also acceptable before re-testing and re-abrasive blasting.

Timing of testing: Early in the blasting work so that removal procedures can be started before the blasting is completed.

3.4 MIXING

General
Requirement: To AS/NZS 5131 clause 9.9.6.

Powered agitators: Mix package sizes larger than 4 litres using powered agitators driven by air motors.

Multi-component coatings: Combine as whole pack units before application.

Thinners: If addition of thinners is proposed, conform to the Dulux PDS for the documented product.

Colour consistency: If colour consistency is required, pre-mix tinted products, before the addition of the curing agent or converter and before coating application.

3.5 COATING APPLICATION

General
Requirement: Conform to the Dulux PDS, the Dulux specification and AS/NZS 5131 clause 9.9.

Painting and coating colour: Verify all project finish colours with the retained samples.

Final surface preparation or coating application
Limits: If the environmental/climatic/substrate conditions listed in AS/NZS 5131 clause 9.9.10 and the following are present do not apply coating:

- Ambient air temperature below 5°C or above 40°C.
- Substrate temperature below 5°C or above 35°C.
- Full prime coat application cannot be carried out before the specified cleanliness of the surface deteriorates.
- Surface preparation standard has not been achieved.
- Time between final surface preparation and the commencement of coating has exceeded 4 hours.
- Visual tarnishing or black spots develop on the surface of the steel.

Exception: Preliminary blast or other surface preparations may be performed in conditions that are outside the limits, providing the final surface preparation and all coating applications are undertaken under the limit conditions.

Pre-coating: Before the spray application of each coating, stripe coat by brush method all edges, welds, seams, rivets, bolts, boltholes (including slots) and difficult to spray areas. Prime the underlying surfaces of replacement bolting, washers and nuts before installation.

Procedure: Conform to the coating order shown in **SELECTIONS, PROTECTIVE PAINT COATING SYSTEMS**.

Subsequent coats: Make sure that before any subsequent coating layer is applied, the surface condition of the preceding coat is complete and correct in all respects, including its DFT achievement, cleanliness and freedom from defects. These are detailed on the Dulux Protective Coating specification. Depending on the applicators chosen method additional coats may be required to achieve the nominated minimum DFT.

Conformance: To AS 2312.1 for the specified film thickness of individual coats.

Correction: Correct any defect in a coating layer before the subsequent coating layer is applied.

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Wet film thickness (WFT)
Method of measurement: To AS 3894.3 Appendix C using an approved wet film gauge continuously during application.

Dry film thickness (DFT)
Method of measurement: To AS 3894.3 clause 10.

Extent: Measure all surfaces at the completion of each prime, intermediate and finish coats, including areas of the element difficult to paint, masked by structure, or where double or light coating is likely.

Number of measurements: To AS 3894.3 clause 7.

Coatings with DFT 150 µm or less: If testing, deduct the effect of the measured surface profile from all DFT readings.

Single readings: Conform to the following:

- The average of 5 point readings for each 10 m^2 area of coating surface to be within the documented coating thickness range.
- No single point reading in any 10 m^2 to be less than 80% of the specified minimum coating thickness. If the average of three readings is used to produce a point reading, an individual reading may be less than 80% of the minimum coating thickness.
- Check any single reading that is greater than 150% of the documented maximum DFT with three additional readings within 50 mm of the original reading. If the average of these three readings is not greater than 150% of the specified DFT, take the average reading as the point reading. If greater than 150%, reject the DFT for that area. If no maximum limit for DFT is documented, consult manufacturer.

Rectification and defects
Rectification: Re-work areas rejected, using the same surface preparation, coatings and sequence as for the original work.

Defects (including under-thickness and over-thickness): Mark with dustless chalk, adhesive inspection labels or masking tape. Do not use crayon, paint or spirit based ink pens.

3.6 PROTECTION

Contamination
Surfaces: Prevent contamination of coated surface, which are not yet dry, from blasting dust, abrasive or surface preparation debris and any other foreign matter.

Post application care
General: Protect the coating against physical, chemical, or atmospheric damage until all components are fully cured.

Care: Stack and handle all coated items using fabric slings or padded chains. Use soft packaging, carpet strips or other deformable materials between all coated items.

Water ponding: Stack coated items to prevent water ponding.

3.7 COATING REPAIR

Repair of coating damage
Preparation: Feather back by hand or machine sanding all leading edges of intact coating adjacent to the repair, to remove any sharp edge.

Surface contamination: Remove by dusting or blowing down before applying the first coat of paint.

Sequence: Apply the repair coating in the same sequence and manner as the original coating.

Areas damaged without exposing the primer: Wash with a proprietary detergent solution, rinse with clean water and abrade so that edges of sound paint are feathered. Coat the area with the appropriate intermediate and finishing coat materials.

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Areas damaged exposing the primer or steel surface: Blast clean to the original standard. Prepare at least 50 mm into the sound coating and to a further feathering zone of approximately 50 mm. Recoat with the documented system to restore the film thickness and integrity over the whole prepared surface including the feathered zone.

Aesthetic reinstatement: If required, repaint to a physical or discernible boundary line.

Defects: If corrosion pitting or areas of significant metal loss and defects are exposed by the blasting process, advise for inspection and have areas passed as being fit for service before proceeding with the coating system.

Timing: Apply the Dulux Protective Coating system within 4 hours of blast cleaning or in any case before visual tarnishing of the steel occurs.

Cleaning: Provide, at no additional cost, surface treatment as follows:

- Surfaces left longer than four hours: Re-blast cleaning before coating.
- Surfaces that develop visual tarnishing (red rust or black spots) at any time before coating: Wash down with clean water then blast clean before coating. There are commercially available chloride reducing solutions that may assist.

3.8 COMPLETION

General

Joints: On completion, seal all joints and mating surfaces with a compatible polyurethane sealant.

Warranties

Requirement: Cover materials and workmanship in the terms of the warranty in the form of interlocking warranties from the supplier and the applicator.

- Form: Against failure of materials and execution under normal environment and use conditions.
- Period: As offered by the supplier.

4 SELECTIONS

4.1 PROTECTIVE PAINT COATING SYSTEMS

Protective paint coating systems

There are decorative finish options for architectural and structural steel. The most common coating types are:

Gloss polyurethane

Inland AS 2312.1 Categories C1 and C2: Polyurethane

Location	Primer	Second Coat	Third Coat	Duspec No.
Interior non-decorative	75 µm DULUX Durepon P14 DI1117	Nil	Nil	DI1117
Interior decorative	75 µm DULUX Durepon P14 DI1117	75 µm DULUX Weathermax HBR DI1156	Nil	SI3132
Exterior non-decorative	75 µm DULUX Durepon P14 DI1117	75 µm DULUX Weathermax HBR DI1156	Nil	SI3132
Exterior decorative	75 µm DULUX Durepon P14 DI1117	75 µm DULUX Weathermax HBR DI1156	Nil	SI3132

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Micaceous Iron Oxide (MIO)
Inland AS 2312.1 Categories C1 and C2: Micaceous iron oxide

Location	Primer	Second Coat	Third Coat	Duspec No.
Interior non-decorative	75 µm DULUX Luxaprime ZP DI1136	Nil	Nil	SI2580
Interior decorative	75 µm DULUX Luxaprime ZP DI1136	50 µm DULUX Ferrodor 810 PC552	Nil	DI1136 DI1125
Exterior non-decorative equivalent to AS 2312.1 ALK1	40 µm DULUX Metalshield HB ZP LI004	Nil	Nil	DI0533 If exposed this product will chalk
Exterior decorative equivalent to AS 2312.1 ALK6	40 µm DULUX Metalshield HB ZP LI004	40 µm DULUX Ferrodor 810 PC552	40 µm DULUX Ferrodor 810 PC552	SI1485 If in a traffic area change to SI1395

Epoxy acrylic
Inland AS 2312.1 Categories C1 and C2: Epoxy acrylic

Location	Primer	Second Coat	Third Coat	Duspec No.
Interior non-decorative	75 µm DULUX Durepon P14 DI1117	Nil	Nil	DI1117
Interior decorative	75 µm DULUX Durepon P14 DI1117	50 µm DULUX Acrathane IF DI1102	Nil	SI1433
Exterior non-decorative equivalent to AS 2312.1 ACC2	75 µm DULUX Durepon P14 DI1117	50 µm DULUX Acrathane IF DI1102	Nil	SI1433
Exterior decorative equivalent to AS 2312.1 ACC2	75 µm DULUX Durepon P14 DI1117	50 µm DULUX Acrathane IF DI1102	Nil	SI1433

Green buildings using a gloss finish
Inland AS 2312.1 Categories C1 and C2: Steel protection and decoration

Location	Primer	Second Coat	Third Coat	Duspec No.
Interior non-decorative equivalent to AS 2312.1 IZS2	75 µm DULUX Aquagalv DI1137	Nil	Nil	DI1337 If exposed this product will chalk
Interior decorative	75 µm DULUX Zincanode 402 DI0539	40 µm DULUX Aquanamel Gloss DD1282 VOC < 75 g/L	Nil	DI0539 DD1282
Exterior non-decorative equivalent to AS 2312.1 IZS2	75 µm DULUX Aquagalv DI1137	Nil	Nil	DI1337 If exposed this product will chalk

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Location	Primer	Second Coat	Third Coat	Duspec No.
Exterior decorative	75 µm DULUX Zincanode 402 DI0539	100 µm DULUX Weathermax HBR DI1156	Nil	SD07977

Green Buildings using a Micaceous Iron Oxide (MIO) finish.
Inland AS 2312.1 Categories C1 and C2: Steel protection and decoration using a MIO finish

Location	Primer	Second Coat	Third Coat	Duspec No.
Interior non-decorative	75 µm DULUX Aquagalv DI1137	Nil	Nil	DI1337 If exposed this product will chalk
Interior Decorative	75 µm DULUX Zincanode 402 DI0539	100 µm DULUX Weathermax HBR DI1156	Nil	Need to confirm colour to conform with Green Building
Exterior Non-Decorative Equivalent to AS 2312.1 IZS2	75 µm DULUX Aquagalv DI1137	Nil	Nil	DI1337 If exposed this product will chalk
Exterior Decorative	75 µm DULUX Zincanode 402 DI0539	100 µm DULUX Weathermax HBR DI1156	Nil	SD07977

Industrial silicone enamel
Inland AS 2312.1 Categories C1 and C2: Industrial silicone enamel

Location	Primer	Second Coat	Third Coat	Duspec No.
Interior non-decorative	75 µm DULUX Luxaprime ZP DI1136	Nil	Nil	SI3145
Interior decorative	75 µm DULUX Luxaprime ZP DI1136	50 µm DULUX Duraflex™ 2 LI011	Nil	SI3146
Exterior non-decorative	75 µm DULUX Luxaprime ZP DI1136	Nil	Nil	SI3145
Exterior decorative	75 µm DULUX Luxaprime ZP DI1136	50 µm DULUX Duraflex™ 2 LI011	Nil	SI3146

4.2 SCHEDULES

Refer to *Finishes Fittings and Equipment Schedule* for selections.

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0411 WATERPROOFING – EXTERNAL AND TANKING

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide external waterproofing and tanking systems to substrates, as documented.

Performance

Requirements: Conform to the following:

- Graded to falls to dispose of stormwater without ponding above the depth of lapped seams.
- Able to accommodate anticipated building movements.
- Able to accommodate its own shrinkage over the warranty life of the roofing system.
- Able to resist water under hydrostatic pressure.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.3 STANDARDS

External waterproofing

Membrane materials: To AS 4654.1.

Membrane design and installation: To AS 4654.2.

Stormwater drainage

Standard: To AS/NZS 3500.3.

1.4 INTERPRETATION

Definitions

General: For the purposes of this worksection the definitions given in AS 4654.1 and AS 4654.2 and the following apply:

- Bitumen: A viscous material from the distillation of crude oil comprising complex hydrocarbons, which is soluble in carbon disulphide, softens when it is heated, is waterproof and has good powers of adhesion. It is produced as a refined by-product of oil.
  - . APP Bitumen: Bitumen modified with atactic (meaning non-crystalline or amorphous) polypropylene wax to form a plastomeric sheet. The membrane is reinforced with fibreglass or non-woven polyester (NWP).
  - . SBS bitumen: Bitumen modified with Styrene Butadiene Styrene, a thermoplastic rubber that undergoes a phase inversion at elevated temperature and converts to an elastomeric material. The membrane is reinforced with fibreglass or non-woven polyester (NWP).
- Bond breaker: A system preventing a membrane bonding to the substrate, bedding or lining.
- Double detail joint: A joint formed by turning up and bonding the horizontal membrane to a vertical substrate and adding an overflashing of membrane material bonded to the vertical substrate and folded over and bonded to the horizontal membrane. In certain situations the double detail can be achieved by bonding an angle profile of membrane material to the junction prior to laying the membrane.
- Liquid applied: A water-based formulation which cures to form an elastomeric membrane.

- Polyurethane: Water or solvent based formulations which moisture cure to form an elastic rubber membrane.
- PVC membrane: Flexible plastic sheet membrane (vinyl).
- Slip sheet: A sheet used to isolate the membrane system from the supporting substrate or from the topping or mortar bedding. The most common material is polyethylene.
- Substrate: The surface to which a material or product is applied.

1.5 SUBMISSIONS

Products and materials
Manufacturer's documentation: Submit copies of the following data:
- Product technical data sheets.
- Safety data sheets (SDS).
- Preventative maintenance procedures.
- Instructions and procedures for the repair of the membrane.
- Type test certificates verifying compliance with AS 4654.1 Section 2, Tables 2.1 to 2.3.

Subcontractors
General: Submit names and contact details of proposed suppliers and installers as recommended by the manufacturer.

Warranties
Requirement: Submit warranties to **COMPLETION**, **Warranties**.

1.6 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of following:
- Substrate preparation completed.
- Secondary layers preparation completed.
- Before membranes are covered up or concealed.
- Underflashings complete before installation of overflashings.
- After flood testing.

2 PRODUCTS

2.1 GENERAL

Storage and handling
General: Store and handle to the manufacturer's recommendations and as follows:
- Protect materials from damage.

2.2 MEMBRANES

Membrane systems
Requirement: Provide a proprietary membrane systems suitable for the intended external waterproofing.

Tanking systems
Requirement: Provide a proprietary membrane system suitable for the intended below ground tanking.

3 EXECUTION

3.1 PREPARATION

Substrates

General: Prepare substrates as follows:

- Fill all cracks in substrates wider than 1.5 mm with a filler compatible with the membrane system.
- Fill voids and hollows in concrete substrates with a concrete mix not stronger than the substrate.
- Remove projections.
- Remove deleterious and loose material.
- Remove all traces of a concrete curing compound if used.
- Leave the surface free of contaminants, clean and dust free.

Concrete substrates: Cure for more than 28 days.

Moisture content

Requirement: Verify that the moisture content of the substrate is compatible with the water vapour transmission rate of the membrane system by testing to AS 1884 Appendix A.

Falls

Requirement: Verify that falls in substrates are greater than 1:80.

Joints and fillets

External corners: Round or arris edges.

Control joints: Prepare all substrate joints to suit the membrane system.

Priming

Compatibility: If required, prime the substrates with compatible primers for adhesion of the membrane system.

3.2 APPLICATION

Protection during installation

Damage: Protect membrane from damage during installation and for the period after installation until the membrane achieves its service characteristics that resist damage.

Drains

General: Prevent moisture from tracking under the membranes at drainage locations.

Drains and cages: Provide removable grates or cages to prevent blockage from debris. If the finished surface is above the level of the membrane, provide a slotted extension piece to bring the grate up to the level of the finished surface.

Overflows: Apply a bond breaker to the perimeter of the overflow outlet at its junction with the surface to which the membrane will be fixed. Turn the membranes into the overflow to prevent moisture from tracking behind the membrane.

Sheet membrane joints

Orientation of laps: Lap sheets on the upslope side of the roof fall over sheets on the downslope side.

End laps generally: Stagger end lap joints.

Bituminous sheet membranes:

- Side laps: 75 mm.
- End laps: 100 mm.
- Method: Heat welded.

Synthetic rubber membranes:

- Factory-vulcanized laps: More than 40 mm.
- Field side laps: More than 50 mm for side laps.
- Field end-laps: More than 100 mm for end laps.

PVC membranes:

- Factory welded laps: More than 30 mm.
- Field-welded laps:
  - . If used over insulation boards: More than 100 mm.
  - . Other instances: More than 75 mm overlaps.

Curing of liquid applied systems

General: To the manufacturers' instructions.

Control of movement

General: Provide control joints located over control joints in the substructure.

Fillets and bond breakers: Size to allow the membrane to accommodate movement.

Control joint covers: Install after fixing hobs and membranes.

Bonded membranes: Carry control joints in the substrate through to and into the surface finish.

Membrane terminations

Membrane upturns: Provide upturns above the maximum water level expected from the exposure conditions of rainfall intensity and wind.

- Height: To AS 4654.2 Appendix A, Table A1.
- Anchoring: Secure sheet membranes along the top edge.
- Edge protection: Protect edges of the membrane.

Waterproofing above vertical terminations: Waterproof the structure above the termination to prevent moisture entry behind the membrane using cavity flashings, capping, waterproof membranes or waterproof coatings.

Horizontal terminations: Do not provide. Use vertical terminations.

Membrane vertical penetrations

Pipes, balustrades, ducts, and vents: Provide separate sleeves for all pipes, ducts and vents, and fix to the substrate.

Membrane horizontal penetrations

Sleeves: Protect rigid PVC-U conduits and pipes with a sleeve of SBS bitumen in order to seal to the membrane without burning the PVC-U. Do not use high density polyethylene (HDPE), polypropylene (PP) pipes or flexible PVC conduit.

Membrane at balcony doors and windows

Requirement: Install membrane before the fixing of door or window frames.

Hobless and flush thresholds: Install membrane before the fixing of door or window frames with a continuous grated drain abutting the external face of the door or window sill.

Membrane around skylights and hatches

Requirement: Install membranes to upstands before the installation of the skylight or hatch.

Membrane at parapets

Requirement: Terminate membrane upstands under parapet flashing or capping giving 75 mm overlap. Do not top fix parapet cappings. Seal heads of fasteners against capping.

Membrane at gutters

Requirement: Terminate membrane over a corrosion resistant metal angle fixed to the gutter support substrate with the vertical leg of the angle turned down into the gutter at least 35 mm.

Membrane at post supports

Membrane to planter boxes

Membrane: Extend root-resistant membrane at least 100 mm vertically above the soil fill level and secure.

Drainage: Grade the base of the planter to adequately sized drainage outlets and terminate the membrane in the outlets.

Drainage riser: Install a riser with drainage slots that extend from the membrane level to the top of the drainage cell. Extend the riser above the soil fill level and finish with a screw cap to provide access for drain clearing.

Protection board: Provide protection board to the full extent of the membrane including areas between soil level and the underside of flashings and cappings.

Drainage cell: Provide geo-filter fabric wrapped drainage cell to the base of the planter and turn geo-filter fabric up drainage riser at least 100 mm above drainage slots.

Cappings and flashings: Provide capping to the tops of planter walls to protect the membrane. Extend the capping to overlap the top of the protection board on the inside face of the planter wall. Where planter walls abut other walls, provide a flashing over the top of the membrane.

Membrane to below ground structures

Membrane: Externally apply membrane to all walls and return to horizontal surfaces to prevent water tracking around structure at joints and corners.

Protection board: Provide protection board to the full extent of the membrane.

Drainage cell: Provide geo-filter fabric wrapped drainage cell to vertical surfaces of the structure.

Reinforcement: Provide reinforcement to the membrane at junctions, corners and over joints to the manufacturer's recommendations.

Overlaying finishes on membranes

Compatibility: If a membrane is to be overlaid with another system such as tiles, pavers, ballast, insulation or soil, provide an overlaying system that is compatible with and will not cause damage to the membrane.

Bonded or partially bonded systems: If the topping or bedding mortar is to be bonded to the membrane, provide sufficient control joints in the topping or bedding mortar to reduce the movement over the membrane.

Slip sheet: If the topping or bedding mortar is structurally sufficient not to require bonding to the substrate, lay a double slip sheet over the membrane to separate it from the topping or bedding mortar.

Paint coatings: If maintenance pathways are indicated by a paving paint, use a paving paint which is compatible with the membrane.

3.3 TESTING

Flood test

Application: Perform a flood test before the installation of surface finishes.

Moisture content measurement method: Conform to AS 1884 Appendix A.

Set-up:

- Measure the wall/floor junction of adjacent spaces and of the slab soffit below for dryness.
- Record the result for each area.
- Dam the access openings and seal drainage outlets to allow 50 mm water level but no higher than 25 mm below the weir level of the perimeter flashings.
- Provide temporary overflows of the same capacity as the roof outlets to maintain the flood level.
- Fill space with clean water and leave overnight.

Evaluation:

- Make a visual inspection after a minimum period of 2 hours, of the wall/floor junction of adjacent spaces and of the slab soffit below for obvious water or moisture.
- Test the same areas for dryness using a moisture meter, and compare the results to the measurements taken before flooding.

Conformance:

- Evidence of water from the visual test: Failure.
- No visual evidence of water: Proceed with the moisture meter test.
- Increase in test results before and after flooding: Failure.

Records: Submit records of all flood tests.

3.4 COMPLETION

Protection

General: Keep traffic off membrane surfaces until bonding has set or for 24 hours after laying, whichever period is the longer.

Reinstatement: Repair or replace faulty or damaged work. If the work cannot be repaired satisfactorily, replace the whole area affected.

Warranties

Waterproofing: Cover materials and workmanship in the terms of the warranty in the form of interlocking warranties from the supplier and the applicator.

- Form: Against failure of materials and execution under normal environment and use conditions.
- Period: As offered by the supplier.

4 SELECTIONS

Refer to North Construction and Building for selections.

0421 ROOFING – COMBINED

1 GENERAL

1.1 RESPONSIBILITIES

General
Requirement: Provide a roofing system and associated work, as documented.

Performance
Thermal qualities: Provide glazing with U-Value and Solar heat gain coefficient (SHGC), as documented.

Atmospheric corrosivity
Atmospheric corrosivity category: To *0171 General requirements*.

Roof access
Type: Ladder brackets coordinated with fall arrest & restraint system

1.2 CROSS REFERENCES

General
Requirement: Conform to the following:
- *0171 General requirements*.
- *0461 Glazing*.

1.3 INTERPRETATION

Abbreviations
General: For the purposes of this worksection, the following abbreviations apply:
- EPS: Expanded polystyrene.
- PF: Phenolic foam.
- PIR: Rigid polyisocyanurate.
- PUR: Rigid polyurethane.
- XPS: Extruded polystyrene
- MW: Mineral wool.

1.4 TOLERANCES

Sheet metal roofing
Supporting members: To AS 1562.1 clause 4.2.3.

Supporting members: To AS 1562.1 clause 4.2.3.

1.5 SUBMISSIONS

Certification
Design of glazed roofing: Submit an engineer's certificate confirming conformance to AS 1288.

Execution details
Site glazing: If site glazing is intended, submit proposals.

Fire performance
Combustibility: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE**, **Combustibility**.

Fire hazard properties: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE**, **Fire hazard properties**.

Operation and maintenance manuals
On completion: Submit a manual of recommendations from the roofing manufacturer or supplier for the maintenance of the roofing system including, frequency of inspection and recommended methods of access, inspection, cleaning, repair and replacement.

Products and materials
Safety glazing materials: Submit evidence of conformity to AS/NZS 2208 Appendix A.

Thermal insulation performance: Submit evidence of performance to AS/NZS 4859.1 and AS/NZS 4859.2.

Type tests: As appropriate for the project, submit evidence of conformity to the following:

- Metal roofing generally: Roof sheeting and fastenings to AS 1562.1 clause 5.4 for resistance to concentrated load and AS 1562.1 clause 5.5 for resistance to wind pressure.
- Metal roofing in cyclonic regions to AS/NZS 1170.2: Roof sheeting and fastenings to AS 1562.1 clause 5.6.
- Plastic sheet roofing: Roofing and fastenings to AS 1562.3 Section 5 for resistance to wind forces and resistance to impact.
- Tile roofing: Dynamic weather resistance test to AS 4046.9.

Samples
Requirement: Submit samples of the following, showing the range of variation available:

- Trims and accessories with a colour finish.
- Seamed sheet metal roofing:
  . Custom profiled flashings and cappings.
  . Pre-weathered finish to sheet metal.
  . Sealants.
  . Sealants.
- Glazed roofing:
  . Glazing materials, each at least 200 x 200 mm, showing specified visual properties and the range of variation.

Warranties
Roofing materials: Submit the manufacturer’s published product warranties.

1.6 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:

- Roof supports.
- Glazing products before they are installed.
- The parts of the roofing, sarking, vapour barrier, insulation and roof plumbing installation before covering up or concealing.

2 PRODUCTS

2.1 GENERAL

Storage and handling
Storage: To the manufacturer's recommendations and the following:

- Metal roofing materials: Store away from uncured concrete and masonry, on a level base and not in contact with other materials that cause staining, denting or other surface damage.

Handling metal roofing materials: As follows:

- Use gloves when handling precoated metal roofing material.
- Use soft soled shoes when fixing or working on roofs.
- Protect edges and surfaces from damage. Do not drag sheets across each other or over other materials.

Handling glazed roofing material: To the manufacturer's recommendations.

Safety mesh

Standard: To AS/NZS 4389.

2.2 FIRE PERFORMANCE

Combustibility

Roofing: Tested to AS 1530.1.

Fire hazard properties

insulated panels: Group number to AS 5637.1.

Insulation materials and glazing plastics: Conform to the following, tested to AS/NZS 1530.3.

- Spread-of-Flame index: ≤ 9.
- Smoke-Developed Index: ≤ 8 if spread of flame index > 5.

2.3 PROFILED SHEET METAL ROOFING

Standards

Design and materials: To AS 1562.1.

Fasteners

Prefinished exposed fasteners: Finish with an oven baked polymer coating to match the roofing material.

Fastenings to timber battens: Fastenings long enough to penetrate the thickness of the batten without piercing the underside.

Profiled fillers

Type: Purpose-made closed cell polyethylene foam profiled to match the roofing profile.

Location: Provide profiled fillers under flashings to the following:

- Ridges.
- Eaves.
- Lapped joints in roof sheeting.

Insulation spacers

Description: Proprietary spacer system to prevent excessive compression of insulation between roof sheeting and framing.

2.4 GLAZED ROOFING

General

Description: Sloped overhead glazing fixed to glazing bars or directly to the roof framing with the necessary supports, trim, flashings and sealants.

Glass roofing: To AS 1288 Section 6.

Plastic sheet roofing: To AS 1562.3.

Glass and glazing materials

Requirement: To *0461 Glazing*.

Identification

Safety glazing materials: Identify each piece or panel, to AS 1288.

Plastic sheet materials
Unplasticised polyvinyl chloride (PVC-U) sheet: To AS 4256.2.

Glass fibre reinforced polyester (GRP) sheet: To AS 4256.3.

Polycarbonate: To AS 4256.5.

Sealants: Neutral curing silicone or modified silane (MS) polymer based sealant to the roofing manufacturer's recommendations.

Glazing bars
Requirement: A proprietary extruded aluminium glazing bar including screw on pressure cap and snap-on capping.

Translucent panel systems
Description: Multicell polycarbonate glazing systems comprising polycarbonate panels, associated aluminium or polycarbonate connecting profiles and other framing accessories.

Extruded gaskets and seals
General: Provide seals, as documented.

Materials: Non-cellular (solid) elastopressive seals as follows:

- Rubber products (neoprene, ethylene propylene diene monomer (EPDM) or silicone rubber): To BS 4255-1.
- Flexible polyvinyl chloride (PVC): To BS 2571, E type compounds, colour fastness grade B.

2.5 ROOF PLUMBING

General
Description: Flashings, cappings, gutters, rainheads, outlets, downpipes and accessories necessary to complete the roofing system.

Flashing and capping: Notched to match profile of roof sheeting.

Matching fascia/barge capping: If the selected eaves gutter is a proprietary high front pattern forming part of a combined system of gutter, fascia and barge, provide matching proprietary fascias and barge cappings to roof verges and edges.

Standards
Roof drainage: To AS/NZS 3500.3.

Metal rainwater goods: To AS/NZS 2179.1.

Flashings and cappings: To AS/NZS 2904.

2.6 ROOF VENTILATORS

General
Description: A proprietary roof ventilator system including framing, fixing, trim, seals, accessories and flashings.

2.7 ROOF ACCESS

Walkway
Description: A proprietary roof walkway system including fixings.

3 EXECUTION

3.1 INSTALLATION

Protection
General: Keep the roofing and rainwater system free of debris and loose material during construction.

Thermal movement
Requirement: Allow for thermal movement in the roof installation and the structure, including movement in joints and fastenings.

Pan type sheets
Removal: Install sheets so that individual sheets can be removed without damage.

Curved corrugated sheet
General: Form by rolling from material recommended for curving or bullnosing. Minimise crimping or creasing across the face of the sheet. Trim off crimped or creased edges and ends.

Metal separation
Requirement: Prevent direct contact between incompatible metals, and between green hardwood or chemically treated timber and aluminium or coated steel, by one of the following methods:

- Applying an anti-corrosion, low moisture transmission coating to contact surfaces.
- Inserting a separation layer.

3.2 PROFILED SHEET METAL ROOFING

Installation
Standard: To AS 1562.1.

Swarf: Remove swarf and other debris as soon as it is deposited.

Accessories: Provide accessories with the same finish as roofing sheets to complete the roofing installation.

Ridges and eaves
Sheet ends: Treat as follows:

- Project sheets 50 mm into gutters.
- Close off ribs at bottom of sheets using mechanical means or with purpose-made fillers or end caps.
- Turn pans of sheets up at tops and down into gutters by mechanical means.
- Provide pre-cut notched eaves flashing and bird proofing if required.
- Close off ridges with purpose-made ridge fillers of closed cell polyethylene foam.

Ridge and barge
Capping: Finish off along ridge and verge lines with purpose-made ridge capping or barge rolls.

Sprung curved ridge
General: Lay the roofing sheets in single lengths from eaves to eaves by naturally curving the sheets over the ridge.

Ridge: Seal side laps at the ridge and extend the sealant to the point where the roof pitch equals the recommended pitch of the roofing profile.

End laps
General: If end laps are unavoidable, and the sheet profile is not suitable for interlocking or contact end laps, construct a stepped type lap.

3.3 GLAZED ROOFING

Glass roofing
Standard: To AS 1288 section 6.

Plastic sheet roofing
Standard: To AS 1562.3.

Fixing to timber: 30 mm minimum penetration.

3.4 ROOF PLUMBING

Jointing sheet metal rainwater goods
Butt joints: Make joints over a backing strip of the same material.

Soldered joints: Do not solder aluminium or aluminium/zinc-coated steel.

Sealing: Seal fasteners and mechanically fastened joints. Fill the holes of blind rivets with silicone sealant.

Flashings

Installation: Flash roof junctions, upstands, abutments and projections through the roof. Preform to required shapes if possible. Notch, scribe, flute or dress down as necessary to follow the profile of adjacent surfaces. Mitre angles and lap joints 150 mm in running lengths. Provide matching expansion joints at 6 m maximum intervals.

Upstands: Flash projections above or through the roof with two part flashings, consisting of a base flashing and a cover flashing, with at least 100 mm vertical overlap. Provide for independent movement between the roof and the projection.

Large penetrations in low pitch roofs: Extend the base flashing over the roofing ribs to the ridge to prevent ponding behind the penetrating element.

Wall abutments: Where a roof abuts a wall, provide as follows:

- In masonry walls, planked cladding or concrete: Step in courses to the roof slope. Interleave with damp proof course, if any.
- Raking in masonry: Build into the full width of the outer leaf. Turn up within cavity, slope inward across the cavity and fix to or build into the inner leaf at least 75 mm above the roofing line.
- Raking in concrete: Turn 25 mm into joints or grooves, wedge at 200 mm centres with compatible material and point up.

Fixing to pipes: Solder or seal with neutral cured silicone rubber and either of the following:

- Secure with a clamping ring.
- Provide a proprietary flexible clamping shoe with attached metal surround flashing.

Gutters

Gutter and sump support: Provide framing and lining to support valley gutters, box gutters and sumps. Line the whole area under the gutters and sumps.

Box gutter: Prefabricate box gutters to the required section and shape as follows:

- Form stop ends, downpipe nozzles, bends and returns.
- Dress downpipe nozzles into outlets.
- Hail guards: Install grating over the whole of the box gutter, over all box gutter sumps and over the edges of roofing sheeting entering box gutters.
- Overflows: Provide overflows to prevent back-flooding. Size to pass 100% of the design rainfall. Discharge overflows in visible locations and so water does not enter the building or cause damage to the building.
- Sumps: Minimum 150 mm deep and the full width of the box gutter.

Valley gutters: Profile to suit the valley boarding. Turn back both edges 180 x 6 mm radius. Nail or screw to the valley boarding at the top end to prevent the gutter creeping downwards.

Gratings: Install removable gratings over rainheads and sumps.

Leaf guard location: All gutter outlets.

External downpipes

General: Prefabricate downpipes to the required section and shape where possible. Connect heads to gutter outlets and, if applicable, connect feet to rainwater drains.

Access cover: Provide a removable watertight access cover at the foot of each downpipe stack.

Downpipe support: Provide supports and fixings for downpipes.

Internal downpipes

Access: Provide access openings as follows:

- At each junction and bend.
- At the foot of each stack.
- At every second floor level.

Acoustic insulation: Mineral fibre pipe insulation 50 mm thick, spirally bound on with 1.5 mm wire at 150 mm pitch.

Building in: If pipes are built into masonry or concrete, spiral wrap the pipe (and insulation, if any) with building paper.

3.5 TESTING

Site tests

Internal downpipes: Test each stack hydrostatically in stages, each test to run over two storeys high for two hours. Remedy defects and retest if necessary.

3.6 COMPLETION

Reinstatement

Extent: Repair or replace damage to the roofing and rainwater system. If the work cannot be repaired satisfactorily, replace the whole area affected.

Damage to pre-painted finish: Replace panels with scratches in the pre-painted finish greater than 2 mm in width visible from the ground.

Fasteners: Make sure weather tight and external panel facings are not distorted.

Cleaning

Roofing and rainwater drainage system: Remove debris, metal swarf, solder, sealants and unused materials.

Exposed metal surfaces: Clean surfaces of substances that interfere with uniform weathering or oxidisation.

Roof plumbing: Clean out spoutings, gutters and rainwater pipes after completion of roof installation.

Glazed roofing: Clean with soft clean cloths and clean water, finishing with a clean squeegee all glazing and framing. Do not use abrasive or alkaline materials.

Protection: After completion, remove protective coatings using methods to the manufacturer's recommendations.

Insulated panels: Clean surfaces to the manufacturer's recommendations.

Warranties

Requirement: Provide warranties for materials and workmanship warranties in the form of interlocking warranties as follows:

- Form: Against failure of materials and execution under normal environment and use conditions.
- Period: As offered by the supplier/manufacturer.

0431 CLADDING – COMBINED

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide lightweight external wall cladding and associated work, as documented.

Atmospheric corrosivity

Atmospheric corrosivity category: To *0171 General requirements*.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.3 INTERPRETATION

Abbreviations

General: For the purposes of this worksection the following abbreviations apply:

- AAC: Autoclaved aerated concrete.
- CCA: Copper chrome arsenate.
- CFC: Compressed fibre cement.
- EIFS: External insulated finishing system.
- FC: Fibre cement.
- LOSP: Light organic solvent preservative.

1.4 TOLERANCES

Permitted deviations

Profiled metal sheet cladding: To AS 1562.1 clause 4.2.3.

Flat sheet and panel cladding: To the manufacturer's recommendations.

Plank and weatherboard cladding: 5 mm from a 1.8 m straightedge or to the manufacturer’s recommendations.

Structural steelwork for wall panels: ± 5 mm between bearing planes of adjacent supports.

1.5 SUBMISSIONS

Fire performance

Combustibility: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE**, **Combustibility**.

Fire hazard properties: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE**, **Fire hazard properties**.

Fire-resistance level: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE**, **Fire-resistance of building elements**.

Operation and maintenance manuals

General: Submit manufacturer’s published use, care and maintenance requirements.

Products and materials

Type tests: As appropriate for the project, submit evidence of conformity to the following:

- Metal cladding generally: Cladding and fastenings to AS 1562.1 clause 5.5 for resistance to wind pressures.
- Metal cladding in cyclonic regions to AS/NZS 1170.2: Cladding and fastenings to AS 1562.1 clause 5.6.
- Plastic cladding: Cladding and fastenings to AS 1562.3 Section 5 for resistance to wind forces and resistance to impact.
- Insulated panel systems:
  . Air infiltration test to AS/NZS 4284 clause 8.4 for test pressures of ± 150 Pa or ± 300 Pa as documented.
  . Water penetration test by static pressure to AS/NZS 4284 clause 8.5 at test pressure of 300 Pa.
  . Water penetration test by cyclic pressure to AS/NZS 4284 clause 8.6 at test pressure of 600 Pa.

Samples

Finish: Submit samples of the cladding material showing the range of variation available.

Warranties

Cladding materials: Submit the manufacturer's product warranties.

1.6 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Workshop assemblies before delivery to the site.
- Framing, sarking, vapour barrier and insulation before covering up or concealing.

2 PRODUCTS

2.1 GENERAL

Storage and handling

Requirement: Store and handle materials to the manufacturer’s recommendations and the following:

- Protect materials including edges and surfaces from damage.
- Keep dry and unexposed to weather.
- Do not drag sheets or panels across each other or over other materials.
- AAC panels: Stack on edge, support off the ground and level to avoid sagging and damage to ends, edges and surfaces.
- Composite panels: Store unpacked panels by size in racks and protect from scratching, warping or bending.
- Sheeting: Stack flat and off the ground on at least 3 evenly placed bearers.
- Store metal materials away from uncured concrete and masonry on a level base.
- Do not store metal materials in contact with other materials which may cause staining, denting or other surface damage.
- Use gloves when handling precoated metal cladding material.

Components

Fasteners and ties: Type, size, corrosion resistance class and spacing to the cladding manufacturer's recommendations.

Flashings: To AS/NZS 2904.

2.2 FIRE PERFORMANCE

Combustibility
Cladding: Tested to AS 1530.1.

Fire hazard properties
Group number: To AS 5637.1.

Bonded laminated materials: Tested to AS/NZS 1530.3. Fire hazard indices, as follows:

- Spread of Flame Index: 0.
- Smoke-Developed Index: ≤ 3.

Insulation materials: Tested to AS/NZS 1530.3. Fire hazard indices as follows:

- Spread-of-Flame Index: ≤ 9.
- Smoke-Developed Index: ≤ 8 if Spread-of-Flame Index > 5.

Fire-resistance of building elements
Fire-resistance level: Tested to AS 1530.4.

2.3 COMPRESSED FIBRE CEMENT (CFC) SHEETS

General
Requirement: Proprietary compressed fibre cement sheets.

Standard: To AS/NZS 2908.2 and the following:

- Type A Category 5.

Quality: Smooth and even with factory sealed edges, free of imperfections such as chips.

Edge profile: Square.

Sealant and bond breaking tape: To the manufacturer's recommendations.

2.4 FIBRE CEMENT (FC) SHEETS

General
Requirement: Proprietary single faced fibre cement sheets.

Standard: To AS/NZS 2908.2 and the following:

- Type A Category 3.

Sealant and bond breaking tape: To the manufacturer's recommendations.

2.5 PROFILED SHEET METAL

General
Requirement: Proprietary profiled sheet metal cladding.

Design and installation: To AS 1562.1.

3 EXECUTION

3.1 PREPARATION

Substrates or framing
Requirement: Before fixing cladding, check the alignment of substrates or framing and adjust if required.

Flexible underlay: Check that the underlay is restrained.

3.2 INSTALLATION

General

Fixing method: As documented or to one of the following fixing methods to the manufacturer's recommendations:

- Steel framing: Screw.
- Timber framing: Nail or screw.
- Minimum penetration for profiled metal sheets: 30 mm for timber framing.

Horizontal cladding surface:

- Minimum slope: 1:15.
- Staining: Slope away from visible vertical facade areas to prevent staining.

Defective components: Do not install component parts which are defective, including warped, bowed, dented, abraded or broken members.

Damaged parts: Remove and replace damaged members during installation.

Accessories and trim

Requirement: Provide accessories and trim required to complete the installation, or as documented.

Corner flashing for profiled and seamed metal sheets: Finish off at corners with purpose-made folded flashing strips.

Metal separation

Requirement: Prevent direct contact between incompatible metals, and between green hardwood or chemically treated timber and aluminium or coated steel, by either of the following methods:

- Apply an anti-corrosion, low moisture transmission coating to contact surfaces.
- Insert a separation layer.

Incompatible metal fixings: Do not use.

Proprietary systems or products

Product fixing: Fix proprietary systems to the manufacturer's recommendations.

3.3 CFC SHEET CLADDING

Preparation

Requirement: Cut sheets to suit the layout as documented, allowing a joint gap of 10 mm between panels.

Joints

Control joint:

- Locate between the panel and fixing system and the supporting structure, as documented.
- Sheet edges: Square cut.
- Sealant: Do not apply finish coating over joint sealants.

Prefinished metal backing/jointing strip: Fix proprietary backing strip to the rear face of the panel with proprietary closed cell self-adhering foam and horizontal gasket.

- Seal the joint with a 3 mm epoxy fillet.

Vertical joints: Vertical gasket or prefinished jointing strip to framing member.

Arrangement: Set out in even panels with joints coinciding with framing or as documented.

Fixing

General: Screw fix to proprietary framing supports at centres to the manufacturer's recommendations.

Concealed fixings:

- Predrill oversized holes.
- Countersink so that the top of the screw is 2 to 3 mm below the surface.
- Finish: Stop screw heads with epoxy filler. Smooth and level upon application and sand flush after curing.

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3.4 FC SHEET CLADDING

Preparation
Requirement: Cut sheets to suit the layout as documented.

Joints
Control joints:

- Locate between the panel and fixing system and the supporting structure, as documented.
- Sheet edges: Square cut.
- Sealant: Do not apply finish coating over joint sealants.

Arrangement: Set out in even panels with joints coinciding with framing or as documented.

Fixing
General: Corrosion resistant nails or screws to the manufacturer's recommendations.

Eaves and soffit lining: Fix at 150 mm centres to soffit bearers at a maximum of 450 mm centres.

3.5 PROFILED SHEET METAL CLADDING

Installation
Swarf: Remove swarf and other debris as soon as it is deposited.

Ground clearance: Maintain documented clearance.

Cutting sheets: Wherever possible, factory cut to length. Do not use an abrasion disc.

Accessories: Provide material with the same finish as cladding sheets.

3.6 COMPLETION

Reinstatement
Extent: Repair or replace damage to the cladding. If the work cannot be repaired satisfactorily, replace the whole area affected.

Touch up: If it is necessary to touch up minor damage to prepainted metal cladding, do not use spray paints.

Cleaning
Requirement: Remove excess debris, metal swarf, solder, sealants and unused materials.

Exposed metal surfaces: Clean surfaces of substances that interfere with uniform weathering or oxidisation.

Protection: Remove protective coatings using methods required by the manufacturer after completion.

Panels: Clean surfaces with soft, clean cloths and clean water to the manufacturer's recommendations.

Warranties
Requirement: Cover materials and workmanship in the form of interlocking warranties from the supplier and installer.

- Form: Against failure of materials and execution under normal environment and use conditions.
- Period: As offered by the supplier.

4 SELECTIONS

Refer to Finishes Fitting and Equipment Schedule for selections.

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0451P ALSPEC ALUMINIUM WINDOWS AND DOORS

1 GENERAL

1.1 RESPONSIBILITIES

General
Requirement: Provide ALSPEC aluminium systems, as documented.

1.2 COMPANY CONTACTS

ALSPEC Aluminium Systems technical contacts
Website: www.alspec.com.au/contact.php

1.3 CROSS REFERENCES

General
Requirement: Conform to the following:
- *0171 General requirements*.

1.4 STANDARDS

General
Selection and installation: To AS 2047.

Glazing
Glass type and thickness: To AS 1288, if no glass type or thickness is nominated.
- Materials and installation: To AS 1288.
- Quality requirements for cut-to-size and processed glass: To AS/NZS 4667.

1.5 MANUFACTURER'S DOCUMENTS

Technical manuals
Commercial Systems - ALSPEC Aluminium Systems: www.alspec.com.au.
Residential Systems - Carinya Residential Windows and Doors: www.carinyawindows.com.au.
Security Systems - Invisi-Gard Stainless Steel Security: www.invisi-gard.com.au.
Window fall prevention – KidScreen: www.kidscreen.com.au.
Specifiers' guides and CAD drawings: www.alspec.com.au.

1.6 INTERPRETATION

Abbreviations
General: For the purposes of this worksection, the following abbreviations apply:
- AGWA: Australian Glass and Window Association (formerly Australian Window Association (AWA).
- WERS: Window Energy Rating Scheme.

Definitions
General: For the purposes of this worksection the definitions given in AS/NZS 4668 and the following apply:
- Aluminium joinery: The collective term used for aluminium framed and glazed windows and doors.
- Hardware: To AS 4145.1 Section 2.
- Louvres - continuous: Louvres that run continuously past, and are supported by, concealed framing or brackets.
- Louvres - horizontal: Louvres that span horizontally between frame stiles, mullions or vertical supports.

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- Louvres - vertical: Louvres that span vertically between frame heads and sills, or horizontal supports.
- Total system SHGC: Solar heat gain coefficient as defined by the NCC and tested in conformance with NFRC 200.
- Total system U-Value: Thermal transmittance as defined by the NCC and tested in conformance with NFRC 100.

1.7 SUBMISSIONS

Certification

Conformance: Submit evidence that window and door assemblies conform to AS 2047.

Sealant compatibility: Submit statements from all parties to the installation certifying the compatibility of sealants and glazing systems to all substrates.

Opacified glass: Submit a report, from the manufacturer, certifying that the proposed method of opacifying the glass will not be detrimental to the glass or affect the glass product warranty.

Toughened glass: For each batch of glass, submit certification from the manufacturer of heat soaking.

Protection of openable windows: Submit a certificate of on-site fall prevention testing.

Fire performance

Fire-resistance level: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE**, **Fire-resistance of building elements**.

Operation and maintenance manuals

ALSPEC operation and maintenance manual: Submit on completion.

Products and materials

Safety glazing materials: Submit evidence of conformity to AS/NZS 2208 Appendix A.

Type tests: Submit results, as follows:

- Acoustic performance of windows and doors.
- Protection of openable windows.

Subcontractors

General: Submit names and contact details of proposed subcontractors endorsed by ALSPEC.

Warranties

Requirement: Submit ALSPEC warranty.

1.8 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Openings prepared to receive windows (where windows are to be installed in prepared openings).
- Fabricated window assemblies delivered to the site, before installation.
- Commencement of window installation.

2 PRODUCTS

2.1 GENERAL

Product substitution

Other products: Conform to PRODUCTS, **GENERAL**, **Substitutions** in *0171 General requirements*.

Acoustic performance

Windows and doors: Tested to AS 5218.

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Storage and handling
Storage: Store in a clean, dry area and unaffected by weather, to the manufacturer's recommendations. Protect from building materials and loose debris such as wet plaster, mortar, paint and welding splatter.

Handling: Handle frames to the manufacturer's recommendations and the following:

- Stack upright, off the ground and against a flat, vertical surface.
- Carry in the vertical position with sashes locked.
- Do not rack frames out of square.
- Do not remove any bands and corner bracing until after installation.

Protection of openable windows
Fall prevention: To BCA D2.24 and BCA 3.9.2.

Testing: To AS 5203.

Product identification
General: Marked to show the following:

- Manufacturer’s identification.
- Product brand name.
- Product type.
- Quantity.
- Product reference code and batch number.
- Date of manufacture.

Marking
Window assemblies: To AS 2047 Section 8.

2.2 FIRE PERFORMANCE

Fire-resistance of building elements
Fire-resistance level: Tested to AS 1530.4.

2.3 ALSPEC SECURITY SYSTEMS

General
Requirement: Provide metal security screens, or operable screen and frame, fixed to the building structure with tamper resistant fastenings.

Security screens: To AS 5039.

Installation: To AS 5040.

Invisi-Gard Security Screens
Description: Security screens for doors and windows incorporating stainless steel type 316 mesh retained in a heavy duty extruded aluminium perimeter frame with concealed fixings.

Invisi-Maxx High Performance Security and Cyclonic Debris Screen
Description: Security screens for doors and windows incorporating stainless steel type 316 mesh retained in a heavy duty extruded aluminium perimeter frame with concealed fixings, tested to resist debris impact generated by regional wind speed V10000 in Cyclonic regions C and D, to AS/NZS 1170.2 Section 3.

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2.4 ALSPEC COMMERCIAL WINDOWS AND DOORS

Hawkesbury E2/E3 Commercial Multi-Fold Door
Description: Inward or outward stacking, aluminium multi-fold door framing system with top rolling operating hardware:

- Maximum panel height: 3000 mm.
- Maximum panel width: 1000 mm.
- Maximum number of panels in each direction: 8.

Operating hardware:

- Panels up to 60 kg: Stainless steel E2A.
- Panels over 60 kg and up to 115kg: Stainless steel E3A.

Hawkesbury Top Hung Commercial Sliding Door
Description: Commercial top hung multi-track sliding door system:

- Maximum panel height: 3000 mm.
- Maximum panel width: 2500 mm.
- Maximum panel weight: 300 kg.

ProGlide High Performance Sliding Door
Description: Commercial multi-track sliding door system:

- Maximum panel height: 3150 mm.
- Maximum panel width: 2250 mm.
- Maximum panel weight: 200 kg.

ProGlide UltraFlat High Performance Wheelchair Accessible Sliding Door
Description: Commercial multi-track sliding door system:

- Maximum panel height: 3150 mm.
- Maximum panel width: 1800 mm.
- Maximum panel weight: 200 kg.

Altitude Apartment Sliding Door
Description: Aluminium sliding door framing system with fully integrated flyscreen tracks and concealed drainage slots:

- Maximum panel height: 2700 mm.
- Maximum panel width: 1500 mm.
- Maximum panel weight: 160 kg.

Swan Evo 45 mm Commercial Shopfront Door
Description: 45 mm centre pocket glazed door:

- Single glazing: 6 mm to 13.5 mm thick.
- Double glazing: 18 mm to 28 mm thick.

Hinged doors:

- Maximum panel height: 3000 mm.
- Maximum panel width: 1100 mm.
- Maximum panel weight: 100 kg.

Pivot doors:

- Maximum panel height: 3000 mm.
- Maximum panel width: 1250 mm.
- Maximum panel weight: 100 kg.

Sliding doors:

- Maximum panel height: 3000 mm.
- Maximum panel width: 2400 mm.
- Maximum panel weight: 225 kg.

Torrens 45 mm Commercial Shopfront Door

Description: 45 mm double bead glazed door.

Hinged and pivot doors:

- Maximum panel height: 2700 mm.
- Maximum panel width: 1000 mm.

Sliding doors:

- Maximum panel height: 2500 mm.
- Maximum panel width: 2700 mm.

Air-Flo French Door

Description: 40 mm x 85 mm French door framing system with integrated barrier/fly door rebate.

ProVista sashless double hung window

Description: Single glazed sashless double-hung windows for integration with ALSPEC commercial framing systems.

- Maximum sash height: 1800 mm.
- Maximum sash weight: 40 kg.

View-Max Commercial Windows

Description: Single or double glazed sliding and double-hung windows for integration with ALSPEC commercial framing systems.

Sash framing: 76 mm or 100 mm.

ALSPEC Pro Tilt High Performance Awning and Casement Windows

Description: Single or double glazed awning and casement windows for integration with ALSPEC commercial framing systems.

ALSPEC Pro Tilt dimensions and properties table

Product	**Without multipoint locks**	**With multipoint locks**
Awning window:		
- Max height (mm)	1500	2000
- Min height (mm)	400	900
- Max width (mm)	1200	1500
- Min width (mm)	500	500
- Max area (m^2)	1.8	2.4
- Max weight (kg)	80	136
Casement window:		
- Max height (mm)		2100
- Min height (mm)		900
- Max width (mm)		1000
- Min width (mm)		500
- Max area (m^2)		2.0
- Max weight (kg)		49

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ALSPEC Awning and Casement Windows
Description: Single or double glazed awning and casement windows for integration with ALSPEC commercial framing systems.

Sash framing: 35 mm or 50 mm.

ALSPEC Top Hung Awning Windows
Description: Single or double glazed top hung awning windows for integration with ALSPEC commercial framing systems.

Sash framing: 35 mm available as an overlapping or inset sash.

2.5 ALSPEC COMMERCIAL FRAMING

Derwent 76 mm Centre Pocket Framing
Description: Single glazed centre pocket framing system.

Framing section: 76mm x 35 mm.

McArthur Evo Commercial Centre Pocket Framing
Description: Single glazed centre pocket framing system with self-draining subsill.

Framing sections:

- 101.6 mm x 44.4 mm.
- 150 mm x 44.4 mm.

ecoFRAMEplus Centre Pocket Double Glazed Framing
Description: Single or double glazed centre pocket framing system with self-draining subsill.

Framing sections:

- 101.6 mm x 50 mm.
- 150 mm x 50 mm.

Hunter Evo Flush Glazed Framing
Description: Single or double flush glazed framing system.

Framing sections:

- 101.6 mm x 50 mm.
- 150 mm x 50 mm.

ecoWALL 225 Flush Glazed Framing
Description: Flush glazed framing system with reinforced subheads, mullion anti-buckling technology, and self-draining subsill.

Framing section: 225 mm x 60 mm.

Hastings Front Glazed Framing
Description: Front glazed framing system. Use double glazing adaptor for double glazing option, if required.

Framing section:

- 101.6 mm x 50 mm.
- 150 mm x 50 mm.

550 Front Glazed Plant-on Sections
Description: 50 mm capped glazing system of adaptor and covers for fixing to other structures including aluminium, steel or timber.

2.6 ALSPEC LOUVRES AND SOLAR CONTROL

Air-Flo Glass Louvre Framing System
Description: 102 mm and 152 mm louvre framing system including 125 mm extruded aluminium frame, injection moulded UV resistant polypropylene holding clips, cast aluminium pivot bearings riveted to extruded anodised aluminium operating bars.

Fixed louvre
Description: Solid and elliptical aluminium louvre blades in aluminium framing system.

Cityscape Adjustable Screen System
Description: Operable shutters for bifold, sliding or fixed panel configurations:

- Maximum panel height: 3000 mm. Use midrails for panels over 1800 mm high.
- Maximum panel width: 900 mm.
- Maximum panel weight for sliding panels: 40 kg.
- Maximum panel weight for bifolding panels: 20 kg.

2.7 KIDSCREEN

Protection of openable windows
Description: Aluminium framed mesh screen with secure fittings conforming to the requirements of BCA 3.9.2 for protection of openable windows.

2.8 GLASS

Performance
Glass: Free from defects which detract from appearance or interfere with performance under normal conditions of use.

Glazing plastics: Free from surface abrasions, and warranted by the manufacturer for 10 years against yellowing or other colour change, loss of strength and impact resistance, and general deterioration.

Bullet-resistant glazing panels
Standard: To AS/NZS 2343.

Safety glass
Standard: To AS/NZS 2208.

Type: Grade A to AS 1288.

- Certification: Required.
- Certification provider: An organisation accredited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ).

Heat strengthening
Requirement: Heat strengthen all glass that requires extra strength and thermal resistance.

Standard: To ASTM C1048.

Heat soaking
Requirement: All toughened and heat strengthened glass products.

Standard: To EN 14179-1.

Unacceptable blemishes in heat-treated flat glass (including tinted and coated glass)
Standard: To AS/NZS 4667.

Ceramic-coated glass
General: Heat strengthened or toughened glass with a coloured ceramic coating fused to and made an integral part of the surface to ASTM C1048, Condition B.

Opacified glass
Description: Glass with an opacifier permanently bonded to the inner face.

Insulating glass units (IGUs)
Selection and installation: To AS 4666.

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2.9 GLASS IDENTIFICATION

Bullet-resistant panels
Marking: To AS/NZS 2343 clause 8.

Heat soaked glass
Requirement: Marked to EN 14179-1 or certified by the manufacturer to AS 1288 clause 3.8.2.

Safety glazing materials
Identification: To AS 1288.

2.10 GLAZING MATERIALS

General
Requirement: Glazing materials including putty, glazing compounds, sealants, gaskets, glazing tapes, spacing strips, spacing tapes, spacers, setting blocks and compression wedges appropriate for the conditions of application and required performance.

Jointing materials
Requirement: Provide jointing and pointing materials to manufacturer's recommendations that are compatible with each other and with the contact surfaces and non-staining to finished surfaces. Do not provide bituminous materials on absorbent surfaces.

Elastomeric sealants
Sealing compound (polyurethane, polysulfide, acrylic): To ASTM C920 or ISO 11600.

Sealing compound (silicone): To ASTM C920 or ISO 11600.

Sealing compound (butyl): To ASTM C1311.

Primer
Compatibility: Apply the manufacturer's recommended primer to the surfaces in contact with sealant materials.

Control joints
Depth of elastomeric sealant: One half the joint width or 6 mm, whichever is the greater.

Foamed materials (in compressible fillers and backing rods): Closed-cell or impregnated types that do not absorb water.

Bond breaking: Provide backing rods, and other back-up materials for sealants, that do not adhere to the sealant.

2.11 INSECT SCREENS

Fixed screens
General: Provide fixed screens fitted to the window frames with a clipping device that permits removal for cleaning.

Hinged screens
General: Hinged at the top to give access to opening sash.

Retractable screens
General: Provide a proprietary retractable insect screen, comprising aluminium frame and fibreglass mesh, fitted between the guide channels incorporated in the frame, and a retraction system including tension spring, nylon bearings, positive self-locking device and plastic sealing strip at sill.

Sliding screens
General: Provide a matching aluminium head guide, sill runner, and frame stile sections for screens not part of the window frame.

Hardware: Nylon slide runners and finger pull handle. Provide pile strip closers against sash where necessary to close gaps.

Aluminium framed screens
General: Provide aluminium extruded or folded box frame sections with mesh fixing channel, mitred, staked and screwed at corners. Provide an extended frame section where necessary to adapt to window opening gear.

Mesh: Bead the mesh into the frame channel with a continuous resilient gasket, so that the mesh is taut and free of distortion.

2.12 ALUMINIUM FRAME FINISHES

Powder coating
Standard: To AS 3715.

Anodised
Standard: To AS 1231.

Thickness: ≥ 15 microns to 20 microns.

2.13 ANCILLARY COMPONENTS AND FITTINGS

Trims
Timber: Solid timber at least 19 mm thick, mitred at corners.

Extruded gaskets and seals
General: Provide seals, as documented.

Materials: Non-cellular (solid) elastopressive seals as follows:

- Flexible polyvinyl chloride (PVC): To BS 2571, 100% solids with high consistency, ultraviolet stabilised.
- Rubber products (neoprene, ethylene propylene diene monomer (EPDM) or silicone rubber): To BS 4255-1.

Flashings
General: Corrosion resistant, compatible with the other materials in the installation, and coated with a non-staining compound where necessary.

Standard: To AS/NZS 2904.

Nylon brush seals
General: Dense nylon bristles locked into galvanized or stainless steel strips and fixed in a groove in the edge of the door or in purpose-made anodised aluminium holders fixed to the door with double sided PVC foam tape.

Pile weather strips
Standard: To AAMA 701/702.

Materials: Polypropylene or equivalent pile and backing, low friction silicone treated, ultraviolet stabilised.

Finned type: A pile weather seal with a central polypropylene fin bonded into the centre of the backing rod and raised above the pile level.

Weather bars
General: A weather bar for hinged external doors, located under the centres of closed doors.

2.14 HARDWARE

General
Requirement: To ALSPEC's recommendations.

Window locks and latches
Standard: To AS 4145.3.

Window catches: Provide 2 catches per sash to manually latched awning or hopper sashes over 1000 mm wide.

Sash balances
Requirement: Match the spring strength of the balances to the sash weight they support.

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Sash operators
Requirement: Provide sash operators, as documented.

2.15 KEYING

Contractor's keys
Master key systems: Do not use any key under a master key system.

Identification
Labelling: Supply each key with a purpose-made plastic or stamped metal label legibly marked to identify the key, attached to the key by a metal ring.

Key material
Pin tumbler locks: Nickel alloy, not brass.

Lever locks: Malleable cast iron or mild steel.

Keying system
Requirement: Keying system, as documented.

Coding of locks: If window locks are included in building key code groups, provide cylinder or pin tumbler locks coded to match.

Number of keys table

Code	Key type	Minimum number of keys
KD	Locks keyed to differ	2 for each lock
KA#	Locks keyed alike:	
	- 2 locks in code group	4
	- 3-10 locks in code group	6
	- 11-40 locks in code group	10
	- 41 and over locks in code group	1 for every 4 locks or part thereof

3 EXECUTION

3.1 GLASS PROCESSING

General
Processing: Perform required processes on glass, including cutting, obscuring, silvering and bending. Form necessary holes, including for fixings, equipment, access openings and speaking holes. Process exposed glass edges to a finish not inferior to ground arrised.

3.2 INSTALLATION

Glazing
General: Install the glass as follows:

- Permanently fix in place each piece of glass to withstand the normal loadings and ambient conditions at its location without distortion or damage to glass and glazing materials.
- No transfer of building movements to the glass.
- Watertight and airtight for external glass.

Temporary marking: Use a method which does not harm the glass. Remove marking on completion.

Toughened glass: Do not cut, drill, edge-work or permanently mark after toughening. Use installation methods which prevent the glass making direct contact with metals or other non-resilient materials.

Heat absorbing glass: In locations exposed to direct sunlight, provide wheel cut edges free from damage or blemishes, with minimum feather.

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Windows and glazed doors
General: Install windows and glazed doors frames as follows:

- Plumb, level, straight and true within building tolerances.
- Fixed or anchored to the building structure in conformance with the wind action loading requirements.
- Isolated from any building loads, including loads caused by structural deflection or shortening.
- Allow for thermal movement.

Security screens
Installation: To AS 5040.

Weatherproofing
Flashing and weatherings: Install flashings, weather bars, drips, storm moulds, joint sealant and pointing to prevent water penetrating the building between the window frame and the building structure under the prevailing service conditions, including normal structural movement of the building.

Fixing
Fasteners and fastener spacing: To the recommendations of the AGWA (Australian Glass and Window Association) *Fixing - An industry guide to the Correct Fixing of Windows and Doors*.

Packing: Pack behind fixing points with durable full width packing.

Fasteners: Conceal fasteners.

Joints
General: Make accurately fitted tight joints so that neither fasteners nor fixing devices such as pins, screws, adhesives and pressure indentations are visible on exposed surfaces.

Sealants:

- If priming is recommended, prime surfaces in contact with jointing materials.
- If frames are powder coated apply a neutral cure sealant.

Operation
General: Make sure moving parts operate freely and smoothly, without binding or sticking, at correct tensions or operating forces and are lubricated.

Protection
Removal: Remove temporary protection measures from the following:

- Contact mating surfaces before joining up.
- Exposed surfaces.

Trim
General: Provide mouldings, architraves, reveal linings, and other internal trim using materials and finishes matching the window frames. Install to make neat and clean junctions between frames and the adjoining building surfaces.

3.3 HARDWARE

Fasteners
Materials: Use materials compatible with the item being fixed and of sufficient strength, size and quality to perform their function.

- Concealed fixings: Provide a corrosion-resistant finish.
- Exposed fixings: Match exposed fixings to the material being fixed.

Support: Provide appropriate back support (for example lock stiles, blocking, wall noggings and backing plates) for hardware fixings.

- Hollow metal sections: Provide backing plates drilled and tapped for screw fixing, or provide threaded inserts (rivet nuts) with machine thread screws. Do not use self-tapping screws or pop rivets.

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Proprietary window systems
Requirement: Provide the standard hardware and internal fixing points for personnel safety harness attachment, if required by and conforming to the governing regulations.

Operation
General: Make sure working parts are accurately fitted to smooth close bearings, without binding or sticking, free from rattle or excessive play, lubricated where appropriate.

Supply
Delivery: Deliver window hardware items, ready for installation, in individual complete sets for each window set, as follows:

- Clearly labelled with the intended location.
- In a separate dust and moisture proof package.
- Including the necessary templates, fixings and fixing instructions.

3.4 COMPLETION

Hardware
Adjustment: Leave the hardware with working parts in working order, and clean, undamaged, properly adjusted, and lubricated where appropriate.

Keys
Contractor's keys: Immediately before the date for practical completion, replace cylinders to which the contractor has had key access during construction with new cylinders that exclude the contractor's keys.

Keys: For locks keyed to differ and locks keyed alike, verify quantities against key records, and deliver to the contract administrator at practical completion.

Key codes: Submit the lock manufacturer's record of the key coding system showing each lock type, number and type of key supplied, key number for re-ordering, and name of supplier.

Repair of finish
Polyester or fluoropolymer coatings: Contact supplier for approval to apply touch up products, otherwise replace damaged material.

Cleaning
Method: Clean with soft clean cloths and clean water, finishing with a clean squeegee. Do not use abrasive or alkaline materials.

Extent: All frames and glass surfaces inside and out.

Warranties
Aluminium joinery excluding hardware:

- Form: Against failure of materials and execution under normal environment and use conditions.
- Period: 7 years, conditional on compliance with the AGWA Code of Conduct.

Powder coating:

- Dulux Duralloy:
  - Film integrity: 7 years.
  - Colour integrity: 7 years.
- AkzoNobel Interpon D 610:
  - Film integrity: 7 years.
  - Colour integrity: 10 years.

4 SELECTIONS

Refer to Finishes Fitting and Equipment schedule for selections

0453 DOORS AND ACCESS PANELS

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide doors, frames, doorsets, security screen doors and fire-resisting doorsets, as documented.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.
- *0185 Timber products, finishes and treatment*.
- *0455 Door hardware*.

1.3 STANDARDS

General

Timber and composite doors: To AS 2688.

1.4 INTERPRETATION

Definitions

General: For the purposes of this worksection the definitions given in AS 2688 and the following apply:

- Fire-resisting doorset: A doorset which retains its integrity, provides insulation and limits, if required, the transmittance of radiation in a fire.
- Smoke-doorset: A doorset which restricts the passage of smoke.

1.5 SUBMISSIONS

Operation and maintenance manuals

Recommendations: Submit the manufacturer's published recommendations for service use.

Products and materials

Type tests: Submit results, as follows:

- Fire-resisting and smoke doorsets.
- Acoustic performance of doorsets.

Samples

General: Submit 2 samples as follows:

- Colour range from prefinished production material (e.g. anodised or organic coated extrusions and sheet). Following the colour selection, submit 5 sets of samples showing the colour range.
- Door manufacturer's standard hardware items.
- Finishes to prepared surfaces.
- Joints using proposed techniques.
- Proposed sections for frames, louvres and slats.

1.6 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Door frames in place before building in to masonry.
- Door frames installed before fixing trim.

2 PRODUCTS

2.1 FRAMES

Aluminium frames

Construction: Assembled from aluminium sections, including accessories such as buffers, pile strips, strike plates, fixing ties or brackets and cavity flashings, with provision for fixing documented hardware.

Threshold: If the frame includes a threshold member, provide a self-draining section with anti-skid surface.

Steel frames

Construction: Continuously welded from metallic-coated steel sheet sections, including accessories such as buffers, strike plates, spreaders, mortar guards, switch boxes, fixing ties or brackets, and cavity flashing with provision for fixing documented hardware and electronic security assemblies, and prefinished with a protective coating.

Base metal thickness (minimum):

- General: 1.1 mm.
- Fire-resisting doorsets: 1.5 mm.
- Security doorsets: 1.6 mm.

Metallic-coating class to AS 1397 interior: ZF100.

Finish: Grind the welds smooth, cold galvanize the welded joints and shop prime.

Hardware and accessories: Provide 4 mm backplates and lugs for fixing hardware including hinges and closers. Screw fix the hinges into tapped holes in the backplates.

Timber frames

Hardwood: To AS 2796.1:

- Grade: Select.

Softwood: To AS 4785.1:

- Grade: Select.

Joints:

- Morticed head and through tenons.
- Trenched head:
  - . Bare faced tenons on jambs.
  - . Full let-in jambs.

2.2 DOORS

General

Doors: Proprietary products manufactured for interior or exterior applications and for the finish required.

Materials

Standards: Conform to the following:

- Decorative laminated sheets: To AS/NZS 2924.1.
- Wet process fibreboard (including hardboard): To AS/NZS 1859.4.
- Dry process fibreboard (including medium density fibreboard): To AS/NZS 1859.2.
- Particleboard: To AS/NZS 1859.1.

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- Plywood and blockboard for interior use: To AS/NZS 2270.
- Plywood and blockboard for exterior use: To AS/NZS 2271.
- Seasoned cypress pine: To AS 1810.
- Timber – hardwood: To AS 2796.1.
- Timber – softwood: To AS 4785.1.

Identification
Panel doors: Provide panels branded under the authority of a recognised certification scheme to *0185 Timber products, finishes and treatment*, as applicable to the product. Locate the brand on faces or edges which will be concealed in the works.

Joinery doors
General: Provide joinery doors, as documented.

Flush panel doors
General: Provide flush panel doors of balanced construction, as documented.

Medium density fibreboard doors: Single thickness of moisture resistant general purpose medium density fibreboard with the same surface finish to both sides, for internal use.

Smoke doors: Solid core not less than 35 mm thick.

Construction
Adhesives:

- Internal: To AS/NZS 2270.
- External: To AS/NZS 2271.

Door thickness:

- General: 35 mm.
- External doors and doors over 900 mm wide: 40 mm.

Cut-outs: If openings are required in flush panel doors (e.g. for louvres or glazing), do not make cut-outs closer than the width of the stiles at the edges of the doors.

Edge strips: Minimum thickness 10 mm. Increase overall thickness to greater than 15 mm to accommodate the full depth of the rebate in rebated doors. Apply to the external edges of door after the facings are bonded to the door framing/core and finish flush with outside surface of the facings.

Louvre grilles: Construct by inserting the louvre blades into a louvre frame, and fix the frame into the door.

Double doors
Square edged doors: Bevel as necessary to prevent binding between the leaves.

Rebated meeting stiles: If not double acting doors, provide rebated meeting stiles or fix equivalent metal T stop to one leaf. Form rebates to suit standard rebated hardware.

Tolerances
Standard: To AS 2688 clauses 4.1 and 5.3.

2.3 DOORSETS

Acoustic performance
Doorsets: Tested to AS 5218.

Control systems: To *0455 Door hardware*.

Cavity sliding doors
General: Proprietary product comprising steel and timber frame construction with rigid steel top, base and rear supporting members and incorporating the overhead door track, ball race type wheel carriages, guides, stops, split jamb linings and removable pelmet.

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Duct access panels
General: Proprietary products comprising metal-faced doors side hung to steel door frames, including hardware and accessories such as hinges and lock and installation lugs.

Fire-resisting doorsets
Standard: To AS 1905.1 and BCA Spec C3.4.

Floor access panels
Frame: Weld from 50 x 50 x 6 mm angle, with two 40 mm cogged fixing lugs each side and shop prime.

Covers: 6.5 mm checker floorplate, on 40 x 40 x 6 mm angle welded frame with 32 x 6 mm diagonal stiffening flats. Cut, radius and grind off 100 x 25 mm lifting slots in each end of covers.

Security screen doorsets
Standard: To AS 5039.

2.4 ANCILLARY MATERIALS

Trims
Timber: Solid timber at least 19 mm thick, mitred at corners.

Extruded gaskets and seals
Materials: Non-cellular (solid) elastopressive seals as follows:

- Flexible polyvinyl chloride (PVC): To BS 2571, 100% solids with high consistency, ultraviolet stabilised.
- Rubber products (neoprene, ethylene propylene diene monomer (EPDM) or silicone rubber): To BS 4255-1.

Flashings
General: Corrosion resistant, compatible with the other materials in the installation, and coated with a non-staining compound where necessary.

Standard: To AS/NZS 2904.

Jointing materials
General: Compatible with each other and with the contact surfaces and non-staining to finished surfaces. Do not provide bituminous materials on absorbent surfaces.

Nylon brush seals
General: Dense nylon bristles locked into galvanized steel strips and fixed in a groove in the edge of the door or in purpose-made anodised aluminium holders fixed to the door with double sided PVC foam tape.

Pile weather strips
General: Polypropylene or equivalent pile and backing, low friction silicone treated, ultraviolet stabilised.

Standard: To AAMA 701/702.

Weather bars
General: Provide a weather bar under hinged external doors, locate under the centres of closed doors.

3 EXECUTION

3.1 FRAMES

General
Frames: Install the frames as follows:

- Plumb, level, straight and true.
- Fixed or anchored to the building structure.
- Isolated from any building loads, including loads caused by structural deflection or shortening.

Frame fixing

Brackets: Metallic-coated steel:

- Width: Minimum 25 mm.
- Thickness: Minimum 1.5 mm.

Depth of fixing for building into masonry:

- Brackets: Minimum 200 mm.
- Expansion anchors: Minimum 50 mm.
- Plugs: Minimum 50 mm.
- Rods: Minimum 60 mm.

Jamb fixing centres: Maximum 600 mm.

Joints

General: Make accurately fitted joints where fasteners, pins, screws, adhesives and pressure indentations are not visible on exposed surfaces.

Aluminium frames

Building into masonry: Screw galvanized steel brackets twice to jambs and build in.

Fixing to masonry openings: Build in seasoned timber plugs to masonry joints or use proprietary expansion anchors and screw twice through jambs at each fixing.

Fixing to stud frame openings: Screw once to studs at each fixing.

Steel frames

Building into masonry: Attach galvanized steel rods to jambs, build in and grout up.

Fixing to masonry openings: Build in hairpin anchors and install locking bars, or use proprietary expansion anchors and screw twice through jambs at each fixing.

Fixing to stud frame openings: Attach galvanized steel brackets to jambs and screw twice to studs at each fixing.

Timber frames

Building into masonry: Screw galvanized steel brackets twice to jambs and build in.

Fixing to masonry openings: Build in seasoned timber plugs to masonry joints or use proprietary expansion anchors and screw twice through jambs at each fixing.

Fixing to stud frame openings: Back screw twice to jambs at each fixing.

Fixing to thresholds: Dowel external door frames to thresholds other than timber with 10 mm diameter brass dowels, 100 mm long.

Heads of fasteners: Conceal if possible, otherwise sink the head below the surface and fill the sinking flush with a material compatible with the surface finish.

Finishing

Trim: Provide mouldings, architraves, reveal linings, and other internal trim using materials and finishes matching the door frames to make neat and clean junctions between the frame and the adjoining building surfaces.

Seals

General: Provide the fixings, rebates, grooves, and clearances required for installation and operation of the seals. Allow seals unwound from coils to settle before use.

Weatherproofing

Flashings and weatherings: Install flashings, weather bars, drips, storm moulds, caulking and pointing to prevent water from penetrating the building between the door frame and the building structure under the prevailing service conditions, including normal structural movement of the building.

3.2 DOORS

Priming
General: Prime timber door leaves on top and bottom edges before installation.

3.3 DOORSETS

Security screen doorsets
Standard: To AS 5040.

3.4 COMPLETION

Operation
General: Make sure moving parts operate freely and smoothly, without binding or sticking, at correct tensions or operating forces and that they are lubricated where appropriate.

Protection
Temporary coating: On or before the date for practical completion, or before joining up to other surfaces, remove all traces of temporary coatings used as a means of protection.

4 SELECTIONS

Refer to Finishes Fittings and Equipment and Door Hardware Schedule for selections

0455 DOOR HARDWARE

1 GENERAL

1.1 RESPONSIBILITIES

General
Requirement: Provide door hardware, as documented.

1.2 CROSS REFERENCES

General
Requirement: Conform to the following:
- *0171 General requirements*.

1.3 INTERPRETATION

Abbreviations
General: For the purposes of this worksection, the abbreviations given in AS 4145.1 Appendix D apply.

Definitions
General: For the purposes of this worksection, the general definitions given in AS 4145.1 Section 2 and Appendix E apply.

1.4 SUBMISSIONS

Records
Door hardware schedule: Submit an amended schedule, prepared by the door hardware supplier, showing changes to the contract door hardware schedule resulting from the following:
- Approval of a hardware sample.
- Acceptance of an equivalent to a specified proprietary item.
- A contract variation to a door hardware requirement.

Key coding system: Submit the lock manufacturer's record of the key coding system showing each lock type, number and type of key supplied, key number for re-ordering, and name of supplier.

Samples
Generic items: Submit samples of hardware items offered as meeting the description of items not specified as proprietary items.

Reconditioned items: Submit samples of hardware items offered as meeting the standard of cleaning, repair and testing of recovered items.

Warranties
Requirement: Submit the following:
- Hardware: Manufacturer's published product warranties.
- Automatic door operators.

2 PRODUCTS

2.1 GENERAL

Supply
Delivery: Deliver door hardware items, ready for installation, in individual complete sets for each door, as follows:
- Clearly labelled to show the intended location.
- In a separate dust and moisture proof package.

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- Including the necessary templates, accessories fixings and fixing instructions.

Hardware specified generically: Hardware of the required strength and quality to perform its function, appropriate to the intended conditions of use, suitable for use with associated hardware, and fabricated with fixed parts firmly joined.

Replacement items
Door hardware: Match items being replaced with the existing or as documented, unless documented otherwise. Upgrade hinges as necessary to conform to **Hinges for timber doors table** and **Hinges for aluminium doors table**.

2.2 LOCKS AND LATCHES

Standard
General: To AS 4145.2.

Padlocks
Standard: To AS 4145.4.

Lock and latch classification
Rating systems: To AS 4145.1 Section 3.

Performance requirements: To AS 4145.2 Section 3.

2.3 HINGES

Refer to Door Hardware Schedule

2.4 DOOR HANGING SYSTEMS

General
Requirement: Provide sliding door tracks and guides, as documented.

2.5 ANCILLARIES

Bolts
General: Barrel bolts, flush bolts and tower bolts with keepers, including lock plates, staples, ferrules or floor sockets.

Mortar guards
General: For steel door frame installations, provide mortar guards designed to allow the full extension of the lock tongue or similar devices and the correct operation of the locking mechanism.

Rebated doors
General: For mortice locks or latches to rebated doors, provide purpose-made rebated pattern items.

Strike plates
General: Use strike plates supplied with the locks or latches. Do not provide universal strike plates.

2.6 DOOR CONTROLLERS

Standard
General: To AS 4145.5.

Performance
Requirement: Door controllers, pivots, floor or overhead door closers, and automatic door operators, suitable for the door type, size, weight, sliding action and swings required and the operating conditions, including wind and air conditioning pressure.

Closers
Hinged and pivot doors:

- Fire-resisting doors: Closers tested and certified for use as components of fire-resisting door assemblies:
  . Standard: To AS 1905.1.

2.7 ELECTRONIC CONTROL DEVICES

General

Requirement: Electric strikes, electric locks, drop bolts and/or similar devices to suit door construction and hardware.

Electromagnetic hold-open devices: To AS 1905.1 and AS 1670.1.

Fail-safe: Connect door control devices in a fail-safe mode to permit egress in the event of power failure.

Fail-secure: Connect door control devices in a fail-secure mode to prevent egress in the event of power failure.

Glass doors: Tumbler, drop bolts or magnetic holders.

Double leaf doors (solid frame): Electric strike or lock on the inactive leaf, connected to the door frame by concealed flexible wiring.

Activation

Activation device: Keypads, card readers or other activation devices located next to entry points.

External: Weatherproof (IP56) hoods or housings for external units.

Mounting height: 900 to 1100 mm from floor level and not less than 500 mm from internal corners.

2.8 KEYING

Keying requirements

Requirement: Provide door hardware and keys, as documented.

Temporary construction keys and cylinders

Requirement: Provide one of the following:

- Loan cylinder: Install for construction locks and replace at practical completion.
- Construction keyed master key cylinder: Keep up-to-date records of keys issued including recipient's name, company and contact details, date issued and date returned.

Delivery of keys

Great grandmaster, grandmaster and master keys: Arrange for delivery direct to the principal.

For locks keyed to differ and locks keyed alike: Check the quantity against key records, and deliver keys to the contract administrator at practical completion.

Group keying

Keying system: As documented.

Existing system extension: Obtain the details of existing group or master key systems of the system to be extended.

Future extensions: Provide master and grandmaster group keying systems capable of accommodating future extensions.

Proprietary keying control security system: Provide for cylinder or pin-tumbler locks that accept a group key (e.g. master key, maison key).

Stamping: Stamp keys and lock cylinders to show the key codes and/or door number as scheduled.

Identification

Labelling: Supply each key with a purpose-made plastic or stamped metal label legibly marked to identify the key, attached to the key by a metal ring.

Key material

Lever locks: Malleable cast iron or mild steel.

Pin tumbler locks: Nickel alloy, not brass.

Number of keys table

Key code	Key type	Minimum number of keys
GGMK	Great grandmaster keys	2

Key code	Key type	Minimum number of keys
GMK	Grandmaster keys	2
MK	Master keys	2 per code group
KD	Locks keyed to differ	2 per lock
KA	Locks keyed alike:	
	- 2 locks in code group	4
	- 3 to 10 locks in code group	6
	- 11 to 40 locks in code group	10
	- 41 and over locks in code group	1 per 4 locks or part thereof

3 EXECUTION

3.1 INSTALLATION

General

Handing: Before supply, verify on site, the correct handing of hardware items.

Operation: Make sure working parts are accurately fitted to smooth close bearings, without binding or sticking, free from rattle or excessive play, lubricated where appropriate.

Mounting height

Locks and latches: Centreline of the door knob or lever spindle above finished floor: 1000mm

Locks

Cylinders: Fix vertically and with consistent key alignment.

Door stops

Fixing: Fix on the floor, skirting or wall, as appropriate, to prevent the door or door furniture striking the wall or other surface.

Fasteners

Materials: Provide materials compatible with the item being fixed, and of sufficient strength, size and quality to perform their function.

- Concealed fixings: Provide a corrosion resistant finish to concealed fixings.
- Exposed fixings: Match exposed fixings to the material being fixed.

Security: Locate exposed fixings to lock furniture on the inside faces of external doors and on the inside faces of internal doors to lockable rooms.

Support: Provide appropriate back support (for example lock stiles, blocking, wall noggings and backing plates) for hardware fixings.

- Hollow metal sections: Provide backing plates drilled and tapped for screw fixing, or provide rivet nuts with machine thread screws. Do not use self-tapping screws or blind rivets.

Floor springs

General: Form a recess in the floor slab for the floor spring box, securely fix and grout the box in place so that the cover plate is flush with the finished floor.

Hinges

Metal frames: Fix hinges using metal thread screws.

Timber doorsets: Install butt hinges in housings equal in depth to the thickness of the hinge leaf (except for hinges designed for mounting without housing), and fix with countersunk screws.

3.2 COMPLETION

Adjustment

General: Leave the hardware properly adjusted with working parts in working order, and clean, undamaged, properly adjusted, and lubricated where appropriate.

Automatic door operators: Maintain and adjust the system throughout the defects liability period.

Keys

Contractor's keys: Immediately before practical completion, replace or reset cylinders to which the contractor has had key access during construction to exclude the contractor's keys.

Warranties

Automatic door operators warranty (or interlocking warranties): By the supplier and installer for the system and its installation, for a period of at least twelve months from the date of practical completion.

4 SELECTIONS

Refer to Door Hardware schedule for selections.

0456P BREEZWAY LOUVRE WINDOWS

1 GENERAL

1.1 RESPONSIBILITIES

General
Requirement: Provide Breezway Altair louvre window systems, as documented.

1.2 COMPANY CONTACTS

Breezway Pty Ltd technical contacts
Website: www.breezway.com.au

1.3 CROSS REFERENCES

General
Requirement: Conform to the following:
- *0171 General requirements*.

1.4 STANDARDS

General
Selection and installation: To AS 2047.

Glazing
Glass type and thickness: To AS 1288, if no glass type or thickness is nominated.

Materials and installation: To AS 1288.

Quality requirements for cut-to-size and processed glass: To AS/NZS 4667.

1.5 MANUFACTURER'S DOCUMENTS

Technical manuals
Design manual: www.breezway.com.au

Product selection guide: www.breezway.com.au/product-selection-guide

CAD drawings and BIM models: www.breezway.com.au/technical/breezway-downloads/

1.6 INTERPRETATION

Abbreviations
General: For the purposes of this worksection the following abbreviations apply:
- AGWA: Australian Glass and Window Association (formerly Australian Window Association (AWA)).
- WERS: Window Energy Rating Scheme.

Definitions
General: For the purposes of this worksection, the definitions given in AS/NZS 4668 and the following apply:
- Louvres - horizontal: Louvres that span horizontally between frame stiles, mullions or vertical supports.
- Total system SHGC: Solar heat gain coefficient as defined by the NCC and tested in conformance with NFRC 200.
- Total system U-Value: Thermal transmittance as defined by the NCC and tested in conformance with NFRC 100.

1.7 SUBMISSIONS

Certification
Conformance: Submit evidence that the louvre windows conform to AS 2047.

Operation and maintenance manuals
General: Submit the louvre window manufacturer's published instructions for operation, care and maintenance.

Products and materials
Type tests: Submit results as follows:
- Performance requirements, as documented.
- Protection of openable windows.

Samples
General: Submit samples of louvre window system components as follows:
- Manufacturer's standard hardware and accessories, including louvre holders and operators, locks, latches, handles, catches, anchor brackets and attachments, masonry anchors and weather seals (pile or extruded).
- Colour samples of prefinished production materials, showing the limits of the range of variation in the documented colour.
- Frame member profiles and louvre materials.
- Frame member joining techniques.

Glazing: Submit samples of glazing materials, each at least 200 x 200 mm, showing specified visual properties and the range of variation, if any, for each of the following types of glass:
- Tinted or coloured glass.
- Patterned or obscured glass or glazing plastics.

Labelling: Label each sample, giving the series code reference and date of manufacture.

Warranties
General: Submit warranties, as documented.

1.8 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:
- Openings prepared to receive windows (if windows are to be installed in prepared openings).
- Fabricated window assemblies delivered to the site, before installation.
- Commencement of window installation.

2 PRODUCTS

2.1 GENERAL

Product substitution
Other products: Conform to PRODUCTS, **GENERAL**, **Substitutions** in *0171 General requirements*.

Storage and handling
Storage: Store in a clean, dry area and unaffected by weather, to the manufacturer's recommendations. Protect from building materials and loose debris such as wet plaster, mortar, paint and welding splatter.

Protection of openable windows
Fall prevention: To BCA D2.24 and BCA 3.9.2.

Testing: To AS 5203.

Marking
Louvre window assemblies: To AS 2047 Section 8.

Product identification
General: Marked to show the following:
- Manufacturer's identification.

- Product brand name.
- Product type.
- Quantity.
- Product reference code and batch number.
- Date of manufacture.

2.2 BLADES

Safety glass
Standard: To AS/NZS 2208.

Certification: Required.

- Certification provider: An organisation accredited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ).

Heat soaking
Requirement: All toughened and heat strengthened glass products.

Standard: To EN 14179-1.

2.3 GLASS IDENTIFICATION

Safety glazing materials
Identification: Identify each piece or panel, to AS 1288.

2.4 GLAZING MATERIALS

General
Requirement: Glazing materials including putty, glazing compounds, sealants, gaskets, glazing tapes, spacing strips, spacing tapes, spacers, setting blocks and compression wedges appropriate for the conditions of application and required performance.

Jointing materials
Requirement: Provide jointing and pointing materials to manufacturer's recommendations that are compatible with each other and the contact surfaces and non-staining to finished surfaces. Do not provide bituminous materials on absorbent surfaces.

Elastomeric sealants
Sealing compound (polyurethane, polysulfide, acrylic): To ASTM C920 or ISO 11600.

Sealing compound (silicone): To ASTM C920 or ISO 11600.

Sealing compound (butyl): To ASTM C1311.

Primer
Compatibility: Apply the recommended primer to the surfaces in contact with sealant materials.

2.5 ALTAIR LOUVRE WINDOW SYSTEMS

Easyscreen louvre system
Description: Aluminium framing system designed for use with Altair louvres with external screening.

Frame depth: 131 mm.

Screen position: Outside.

Innoscreen louvre system
Description: Aluminium framing system designed for use with Altair louvres with internal screening.

Frame depth: 131 mm.

Screen position: Inside.

SL2 louvre system
Description: Aluminium framing system designed for use with Altair louvres in narrow framing applications.

Frame depth: 52 mm.

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Dualair™secondary glazed louvre window system
Description: Secondary glazed component system for commercial applications.

Altair louvre gallery sets
Description: Fully integrated louvre window system or component system for use with other manufacturer's frames.

2.6 ALTAIR LOUVRE WINDOW OPTIONS

Powerlouvre
Description: Automated operation control system for use with Altair louvre systems with concealed motor.

Stronghold
Description: Mechanical restraint system tested to AS 5203 for use within the Altair louvre system.

2.7 INSECT SCREENS

Fixed screens
General: Fixed screens fitted to the window frames with a clipping device that permits removal for cleaning.

Retractable screens
General: Proprietary retractable insect screen comprising aluminium frame and fibreglass mesh, fitted between the guide channels incorporated in the frame, and a retraction system including tension spring, nylon bearings, positive self-locking device, and plastic sealing strip at sill.

Aluminium framed screens
General: Aluminium extruded or folded box frame sections with mesh fixing channel, mitred, staked and screwed at corners. Provide an extended frame section where necessary to adapt to window opening gear.

Mesh: Bead the mesh into the frame channel with a continuous resilient gasket, so that the mesh is taut and free of distortion.

2.8 ALUMINIUM FRAME FINISHES

Powder coatings
Service condition category to AS 3715: Category 3

Anodised
Standard: To AS 1231.

Thickness:

- 25 microns generally.
- Security bars: 15 microns.

2.9 ANCILLARY COMPONENTS AND FITTINGS

Fasteners
Size and type: To suit louvre window unit size and wind loading conditions.

Flashings
General: Corrosion resistant, compatible with the other materials in the installation, and coated with a non-staining compound where necessary.

Standard: To AS/NZS 2904.

Extruded gaskets and seals
General: Provide seals, as documented.

Type: Non-cellular (solid) elastopressive seals.

Material:

- Rubber products (neoprene, ethylene propylene diene monomer (EPDM) or silicone rubber): To BS 4255-1.

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- Flexible polyvinyl chloride (PVC): To BS 2571, E type compounds, colour fastness grade B.

Altair weatherstrips
Description: Altair component weatherstrips.

Altair louvre keylock
Description: Metal louvre keylock that locks Altair louvres in the closed position.
Finish: Brushed chrome.

3 EXECUTION

3.1 PRE-INSTALLATION

General
Timber reveals: Prime all surfaces of timber reveals which are to be painted before fixing to aluminium frames.

3.2 INSTALLATION

Altair louvre window systems
Requirements: Install to the manufacturer's recommendations.

Glazing
General: Install the glass as follows:

- Permanently fix in place each piece of glass to withstand the normal loadings and ambient conditions at its location without distortion or damage to glass and glazing materials.
- No transfer of building movements to the glass.
- Watertight and airtight for external glazing.

Temporary marking: Use a method which does not damage the glass. Remove marking on completion.

Toughened glass: Do not cut, work, or permanently mark after toughening. Use installation methods which prevent the glass making direct contact with metals or other non-resilient materials.

Heat absorbing glass: Provide wheel cut edges without damage or blemishes and with minimum feather in locations exposed to direct sunlight.

Louvre windows
General: Install louvre windows frames, as follows:

- Plumb, level, straight and true within building tolerances.
- Fixed or anchored to the building structure in conformance with the wind action loading requirements.
- Isolated from any building loads, including loads caused by structural deflection or shortening.
- Allow for thermal movement.

Weatherproofing
Flashing and Weatherings: Install flashings, weather bars, drips, storm moulds, joint sealant and pointing to prevent water penetrating the building between the window frame and the building structure under the prevailing service conditions, including normal structural movement of the building.

Fixing
General: Do not penetrate metal flashings with fixings.

Packing: Pack behind fixing points with durable full width packing.

Fastener spacing (nominal): 600 mm and maximum 150 mm from reveal ends.

Fasteners: Conceal fasteners.

Joints
Requirement: Make accurately fitted tight joints so that fasteners and fixing devices such as pins, screws, adhesives and pressure indentations are not visible on exposed surfaces.

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Sealants:

- If priming is recommended, prime surfaces in contact with jointing materials.
- If frames are powder coated, apply a neutral cure sealant.

Operation

General: Make sure moving parts operate freely and smoothly, without binding or sticking, at correct tensions or operating forces and are lubricated.

Protection

Removal: Remove temporary protection measures from the following:

- Contact mating surfaces before joining up.
- Exposed surfaces.

Trim

General: Provide mouldings, architraves, reveal linings, and other internal trims using materials and finishes matching the window frames. Make neat and clean junctions between frames and the adjoining building surfaces.

3.3 SECURITY WINDOW GRILLES

General

Installation: To AS 5040.

3.4 COMPLETION

Repair of finish

Polyester or fluoropolymer coatings: Contact supplier for approval to apply touch up products, otherwise replace damaged material.

Cleaning

Method: Clean with soft clean cloths and clean water, finishing with a clean squeegee. Do not use abrasive or alkaline materials.

Extent: All frames and glass surfaces inside and out.

Warranties

Louvre window assemblies: Provide Breezway's published product warranties.

4 SELECTIONS

4.1 PERFORMANCE

Refer to Finishes Fittings and Equipment Schedule for selections

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0457 EXTERNAL SCREENS

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide external screens, as documented.

Performance

Requirement: Conform to the following:

- Plumb, level, straight and true within the building tolerances of the structural system.
- Undamaged and free of surface defects or distortions.
- Fixed or fastened to the building structure.
- Able to resist wind and other actions without vibration or permanent distortion.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.3 STANDARDS

General

Aluminium framed sunscreens, awnings and shutters:

- Stress analysis of members: To AS/NZS 1664.1 or AS/NZS 1664.2.

Horizontal screen loadings: To AS/NZS 1170.1.

Electrically operated external louvres and blinds:

- Drive motors: To AS/NZS 60335.2.97.

Access for maintenance: To AS 1657.

1.4 INTERPRETATION

Abbreviations

General: For the purposes of this worksection the following abbreviations apply:

- BMS: Building Management System.
- PVC-U: Unplasticised polyvinylchloride.

Definitions

General: For the purposes of this worksection, the following definitions apply:

- Louvres - continuous: Louvres that run continuously past, and are supported by, concealed framing or brackets.
- Louvres - horizontal: Louvres that span horizontally between frame stiles, mullions or vertical supports.
- Louvres - vertical: Louvres that span vertically between frame heads and sills, or horizontal supports.
- Membrane: A thin and flexible sheet of fabric material.
- Screen: Includes sunscreens, trafficable sunscreens, external louvres and blinds, shutters, awnings and pergolas fixed to building facades or openings; to control sunlight and/or provide privacy, to screen plant and equipment, or to provide an architectural feature. It applies to fixed, adjustable, operable and automatically controlled types.

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- Shade fabric: A fabric designed to prevent a proportion of sunlight or other light from reaching the area beyond the shade fabric.
- Tensioned membrane: A thin cloth or sheet that is held in a predetermined 2- or 3-dimensional shape under permanent tension. The shape and the tension are interrelated and designed to safely carry the permanent and imposed loads (such as those resulting from wind actions) in a predictable manner.

1.5 SUBMISSIONS

Certification
Sealant compatibility: Submit statements from all parties to the installation that certify the compatibility of sealants with screen components, finishes and all substrates.

Operation and maintenance manuals
Requirement: At completion, submit the screen manufacturer's recommendations for operation, care and maintenance.

Samples
General: Submit samples of the following:

- Sections proposed for frame members, louvres, accessories, cover panels and trim.
- Joints made, using proposed techniques.
- Colour samples of prefinished production material (e.g. anodised or thermoset powder coated extrusions or sheet, glazing, infill panel material or fabric), each at least 200 x 200 mm, showing the limits of the range of variation in the selected colour, if any, for each component of the screens specified.
- Accessory and hardware items documented descriptively or by performance (i.e. not proprietary items). Include handles, operators, controls, switches, sensors, motors, fixing clips, anchor brackets and attachments, fixings, gaskets and weather seals.

Labelling: Label each sample, giving the brand and product name, manufacturer's code reference, date of manufacture and intended building location.

Subcontractors
General: Submit names and contact details of the proposed manufacturers and, if the manufacturer is not the installer, the installers recommended by the manufacturers.

Warranties
Requirement: Submit warranties as documented.

1.6 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:

- Fabricated screen assemblies at the factory ready for delivery to the site.
- Fabricated screen assemblies delivered to the site, before installation.
- Prototypes.
- Commencement of installation of screen assemblies.
- Completion of installation.

2 PRODUCTS

2.1 GENERAL

Storage and handling
General: Deliver, unload and store external screens, components and accessories in unbroken manufacturer's packaging.

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Marking
Requirement: Before the separate parts of the screens are delivered to the site, provide suitable and sufficient marks or other means for identifying each part, and for showing its correct location and orientation, when installed.

2.2 FIRE PERFORMANCE

Combustibility
Cladding: Tested to AS 1530.1.

Fire hazard properties
Bonded laminated materials: Tested to AS/NZS 1530.3. Fire hazard indices, as follows:

- Spread-of-Flame Index: 0.
- Smoke-Developed Index: ≤ 3.

Awning, sunshade, canopy, blind or shading hood: Tested to AS/NZS 1530.3. Fire hazard indices, as follows:

- Spread-of-Flame Index: ≤ 9.
- Smoke-Developed Index: ≤ 8, if Spread-of-Flame index is > 5.

2.3 MATERIALS GENERALLY

Structural steel
Design and materials: To AS 4100.

Welding: To the AS/NZS 1554 series.

Galvanizing: To AS/NZS 4680.

2.4 METAL FINISHES

Anodising
Standard: To AS 1231.

Thickness: ≥ 15 microns to 20 microns.

Hot-dip galvanizing
Minimum coating mass/thickness: To AS/NZS 4680.

Powder coating
Application to aluminium and aluminium alloy substrates for architectural applications: To AS 3715 and as appropriate AAMA 2603, AAMA 2604 and AAMA 2605.

Application to metal substrates other than aluminium for architectural applications: To AS 4506.

2.5 FIXED PANEL TYPE SCREENS

General
Requirement: Provide infill panel materials mounted in a metal perimeter frame or subframe as follows:

- To withstand imposed actions and wind actions for the location without failure or permanent distortion, and without panel flutter.
- To shed water without pooling.

Expansion joints
Requirement: Allow for expansion and contraction in continuous sections at spacings not exceeding the manufacturer's recommendations, or 6 m, whichever is the lesser.

Fixing: Provide a fixing system appropriate to the panel material that will retain the panel without distortion or dislocation.

Framing materials
Requirement: Frames fabricated from solid or hollow metal sections.

Fixing: Provide fastener brackets or arms mounted on the face of the building, and brace as necessary with stays, including tensile elements such as wire cables and turnbuckles.

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2.6 LOUVRE TYPE SCREENS

General
Requirement: Provide louvre screen assemblies able to withstand the permissible-stress-design wind pressure for that location without failure or permanent distortion of members, and without blade flutter.

Expansion joints
Requirement: Allow for expansion and contraction in continuous sections (e.g. continuous louvres, interlocking mullions) at spacings not exceeding those recommended by the manufacturer, or 6 m, whichever is the lesser.

Fixed metal louvres
Requirement: Metal louvre blades mounted in a metal perimeter frame or subframe, or on carrier frames, installed horizontally or vertically.

Blades: Rolled or extruded metal, or extruded metal blades swaged together with cross bars to form self-supporting panels.

Adjustable louvres
Requirement: Adjustable louvre system including louvre blades clipped or fixed into blade holders pivoted to stiles or coupling mullions, linked together in banks, installed horizontally or vertically.

Operation: Provide an operating system, incorporating a locking or latching device for each bank of louvres.

Pergolas
Supports: Support wide horizontal louvre assemblies on posts mounted on terraces and balconies to form pergolas. Maintain the integrity of waterproofing membranes when fixing posts or brackets to terraces and balconies.

3 EXECUTION

3.1 FABRICATION

Aluminium fabrication and construction
Standard: To AS/NZS 1664.1 or AS/NZS 1664.2.

Fasteners
Requirement: Provide fasteners of sufficient strength and quality to perform their required function.

Joints
Requirement: Make accurately fitted tight joints so that neither fasteners nor fixing devices create pressure indentations that are visible on exposed faces. Where heads of fasteners are unavoidably visible, finish them to match the adjacent surface.

Protection
Corrosion protection: Provide protection against corrosion that may be caused in metals by products or processes normally employed on a building site or by normal atmospheric or other ambient conditions and by-products including rainwater, drinking and drinking water, airborne salt and airborne pollution.

Durability: Provide materials resistant to exposure to weather and UV radiation so that their colour, surface finish, flexibility and water resistance are maintained.

Temporary measures: Do not use adhesive tape, film or paper, or applied coatings liable to bond to the substrate, when exposed to sunlight or weather, as temporary measures to protect screen components during the course of the works. If temporary measures are used, remove all traces, particularly from contact mating surfaces before joining up.

Operation
Requirement: Provide moving parts which operate freely and smoothly, without vibration, rattling, binding or sticking, and at correct tensions or operating forces. Lubricate if appropriate.

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3.2 WELDING

General

Quality: Provide finished welds descaled and free of surface and internal cracks, slag inclusion and porosity. Provide continuous welding unless permanently concealed.

Restrictions: Do not weld as follows:

- On site.
- On finished surfaces.
- Next to a finished surface or glass, unless the adjacent surface is protected from damage.

3.3 EMBEDDED FIXINGS

General

Fixing: Fix screens to the building structure by one of the following methods, and as documented:

- Fasteners cast into the concrete of the building structure. Do not displace reinforcement, when locating embedded items.
- Chemical fixings, expanding bolt sockets.
- Bolting or welding to brackets or structural framing.

Standard for embedment

For concrete: To AS 3600.

For masonry: To AS 3700.

Fixing brackets

Requirement: Provide fasteners and other methods of attachment of the screens to the structure with the following characteristics:

- Three-way adjustment to accommodate fabrication and construction tolerances.
- Provision for building movements while fixing the screens in their correct positions.
- Adequacy for structural design actions.

Protection

Cast-in items: Prevent the entry of concrete slurry into bolt holes, channels, and other openings for the fasteners. Fill the openings using an easily removed water repellent material before casting in.

Placement

Tolerance:

- Maximum deviation from correct position: 13 mm.

Fastener channels embedded parallel or perpendicular to the edge of a concrete structural member:

- Minimum length of embedded anchor: 200 mm.
- Minimum distance from the concrete edge to the nearest part of the anchor: 100 mm.

3.4 INSTALLATION

Installation tolerance

Alignment:

- Maximum deviation of any member from its true alignment (plumb, level, or line of slope): 1:1000, up to a maximum of 10 mm in a continuous run of members in one direction.
- Maximum misalignment between adjoining members: 1 mm.

Position:

- Maximum deviation of any part from its true position: 10 mm

Reference lines and marks

Requirement: Provide on each floor, in agreed locations, accurate perimeter offset reference lines, plumb with corresponding lines on other floors, and height benchmarks.

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Cleaning
Requirement: During erection, promptly remove foreign matter from the screens without damage to finishes. Do not use abrasive cleaners or acid.

3.5 COMPLETION

Cleaning
Method: Clean all visible surfaces with soft clean cloths and clean water or approved cleanser, finishing with a clean cloth. Do not use abrasive or alkaline materials.

Warranties
Requirement: Cover materials and workmanship in the terms of the warranty from the manufacturer.

4 SELECTIONS

Refer to Finishes Fittings and Equipment Schedule for selections

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0461 GLAZING

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide glazing, as documented.

Performance

Thermal qualities: U-Value and Solar heat gain coefficient (SHGC) as documented.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.3 STANDARDS

Glazing

Glass type and thickness: To AS 1288, if no glass type or thickness is nominated.

Materials and installation: To AS 1288.

Quality requirements for cut-to-size and processed glass: To AS/NZS 4667.

Roof glazing: To AS 1288 Section 6.

1.4 INTERPRETATION

Abbreviations

General: For the purposes of this worksection the following abbreviation applies:

- R_W: Weighted sound reduction index.

Definitions

General: For the purpose of this worksection the definitions given in AS/NZS 4668 apply.

1.5 SUBMISSIONS

Certification

Design: Submit an engineers' certificate confirming conformance to AS 1288.

Opacified glass: Submit a report, from the manufacturer certifying that the proposed method of opacifying the glass will not be detrimental to the glass or affect the glass product warranty.

Toughened glass: For each batch of glass, submit certification from the manufacturer of heat soaking.

Installation: Submit certification from the fabricator that the method of glazing, the selection of sealant systems and conditions next to the glass conform to the following:

- Compatible with the edge seal of insulating glass units (IGUs) and self-cleaning glass.
- Will not be detrimental to the long term structural performance, weathering capabilities and visual qualities of the glass.

Glazier's data: Submit the glazing subcontractor's statement certifying the following:

- A satisfactory thermal safety assessment.
- The assembled frame provides the required glazing clearances and tolerances, and maximum and minimum joint configurations, based on the bow, warp and kink characteristics of the required glass types, and is ready for glazing.

Execution details

Site glazing: If site glazing is intended, submit proposals.

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Products and materials
Safety glazing materials: Submit evidence of conformity to AS/NZS 2208 Appendix A.

1.6 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:
- Glass products before they are installed.

2 PRODUCTS

2.1 GENERAL

Storage and handling
Storage: Store glass and glazing materials in a clean, dry area and unaffected by weather, to the manufacturer's recommendations. Protect from building materials and loose debris such as wet plaster, mortar, paint and welding splatter.

Handling: Handle glass to the manufacturer's recommendations.

2.2 GLASS

Performance
Glass: Free from defects which detract from appearance or interfere with performance under normal conditions of use.

Glazing plastics: Free from surface abrasions, and warranted by the manufacturer for 10 years against yellowing or other colour change, loss of strength and impact resistance, and general deterioration.

Safety glazing materials
Standard: To AS/NZS 2208.

Type: Grade A to AS 1288.

Certification: Required.
- Certification provider: An organisation accredited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ).

Heat strengthening
Requirement: Heat strengthen all glass that requires extra strength and thermal resistance.

Standard: To ASTM C1048.

Heat soaking
Requirement: All toughened and heat strengthened glass products.

Standard: To EN 14179-1.

Unacceptable blemishes in heat-treated flat glass (including tinted and coated glass)
Standard: To AS/NZS 4667.

2.3 GLASS IDENTIFICATION

Safety glazing materials
Identification: Identify each piece or panel, to AS 1288.

2.4 GLAZING MATERIALS

General
Requirement: Glazing materials including putty, glazing compounds, sealants, gaskets, glazing tapes, spacing strips, spacing tapes, spacers, setting blocks, shims and compression wedges appropriate for the conditions of application and required performance.

Primer
Compatibility: Apply the manufacturer's recommended primer to the surfaces in contact with sealant materials.

2.5 ANCILLARY COMPONENTS AND FITTINGS

Extruded gaskets and seals

General: Provide seals, as documented.

Materials: Non-cellular (solid) elastopressive seals as follows:

- Rubber products (neoprene, ethylene propylene diene monomer (EPDM) or silicone rubber): To BS 4255-1.
- Flexible polyvinyl chloride (PVC): To BS 2571, E type compounds, colour fastness grade B.

Pile weather strips

Standard: To AAMA 701/702.

Material: Polypropylene or equivalent pile and backing, low friction silicone treated, ultraviolet stabilised.

Finned type: A pile weather seal with a central polypropylene fin bonded into the centre of the backing rod and raised above the pile level.

3 EXECUTION

3.1 GLASS PROCESSING

General

Processing: Perform required processes on glass, including cutting, obscuring, silvering and bending. Form necessary holes, including for fixings, equipment, access openings and speaking holes. Process exposed glass edges to a finish not inferior to ground arrised.

3.2 INSTALLATION

Glazing

General: Install the glass as follows:

- Permanently fix in place each piece of glass to withstand the normal loadings and ambient conditions at its location without distortion or damage to glass and glazing materials.
- No transfer of building movements to the glass.
- Watertight and airtight for external glazing.

Temporary marking: Use a method which does not harm the glass. Remove marking on completion.

Toughened glass: Do not cut, work, or permanently mark after toughening. Use installation methods which prevent the glass making direct contact with metals or other non-resilient materials.

Heat absorbing glass: In locations exposed to direct sunlight, provide wheel cut edges free from damage or blemishes, with minimum feather.

Preglazing

Window assemblies and glazed doors: Supply inclusive of glazing, shop preglazed.

Curtain walls: Supply inclusive of glazing, shop preglazed.

Site glazing

Minimum dimensional requirements: Edge clearance, edge cover, front clearance and back clearance to AS 1288.

External timber framed glazing: Glaze with putty.

3.3 COMPLETION

Replacement

Requirement: After replacing damaged glass, leave the work clean, polished, free from defects, and in good condition.

Cleaning

Method: Clean with soft clean cloths and clean water, finishing with a clean squeegee. Do not use abrasive or alkaline materials.

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Extent: All frames and glass surfaces inside and out.

Warranties

Glazing subcontractor's warranty: Provide an undertaking conditional only on compliance with the manufacturers' recommendations for maintenance, to repair or replace glass and glazing materials that become defective or prove unsuitable for the nominated application; during the warranty period.

Glass manufacturer's warranty: Provide an undertaking, conditional only on compliance with the manufacturer's recommendation for installation and maintenance, to supply replacement glass units to the site for replacement of defective units defined as follows:

- IGU units: Units in which the hermetic seal has failed as evidenced by intrusion of foreign matter, or internal condensation at temperature above 2°C.
- Coated glass units (including coated super insulating glass units): Units in which the metallic coating shows evidence of manufacturing defects, including but not necessarily limited to cracking or peeling, as determined in conformance with ASTM C1048.

Toughened glass warranty: Provide a manufacturer's warranty that toughened glass supplied for use in curtain walls has been subjected to a heat soaking process that has converted at least 95% of the nickel sulfide content to the stable beta-phase.

4 SELECTIONS

Refer to Section J assessment report for selections.

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0471 THERMAL INSULATION AND PLIABLE MEMBRANES

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide thermal insulation and pliable membrane systems, as documented.

Performance

Requirements:

- Complete for their function.
- Conforming to the detail and location drawings.
- Firmly fixed in position.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.3 INTERPRETATION

Abbreviations

General: For the purposes of this worksection, the following abbreviations apply:

- IRMA: Inverted roof membrane assembly.
- PMR: Protected membrane roof.

Definitions

General: For the purposes of this worksection the following definitions apply:

- Bio-soluble: A product that dissolves in bodily fluids and is quickly cleared from the lungs.
- Fibre batts: Flexible insulation supplied as factory cut pieces and composed of mineral wool (glass and rock fibre) or polyester fibre.
- Fire hazard properties: Terminology to BCA A5.5.
- Pliable building membrane: To AS/NZS 4200.1 and equivalent to sarking-type materials as defined in the NCC.
- Thermal insulation terminology: To AS/NZS 4859.1.
- Vapour permeable (breathable) membrane: A flexible membrane material, normally used for secondary waterproofing that allows for the transmission of water vapour.

1.4 SUBMISSIONS

Fire performance

Fire hazard properties: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE**, **Fire hazard properties**.

Products and materials

Thermal insulation properties: Submit evidence of conformity to AS/NZS 4859.1 and AS/NZS 4859.2.

Warranties

Manufacturer's published product warranties: Submit on completion.

1.5 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the installed pliable membrane and insulation before covered up or concealed.

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2 PRODUCTS

2.1 GENERAL

Storage and handling
Labelling: Deliver mineral wool products to site in packaging with third party mark of conformity indicating product is bio-soluble and not listed as hazardous material in the Safe Work Australia Hazardous Chemical Information System (HCIS).

2.2 FIRE PERFORMANCE

Fire hazard properties
Insulation materials: Tested to AS/NZS 1530.3. Fire hazard indices as follows:

- Spread-of-Flame Index: ≤ 9.
- Smoke-Developed Index: ≤ 8 if Spread-of-Flame Index > 5.

Materials with reflective facing: Tested to AS/NZS 1530.3 and the recommendations of Appendix A6.

Pliable membranes: Flammability Index ≤ 5 tested to AS 1530.2.

2.3 INSULATION AND PLIABLE MEMBRANE MATERIALS

General
Mineral wool insulation: Bio-soluble and not listed as a hazardous material in the Safe Work Australia *Hazardous Chemical Information System* (HCIS).

Insulation
Standard: Thermal insulation materials to AS/NZS 4859.1:

- Cellulosic fibre (loose fill): To AS/NZS 4859.1 Section 4.
- Wool: To AS/NZS 4859.1 Section 5.
- Polyester (compressible): To AS/NZS 4859.1 Section 6.
- Mineral wool blankets and cut pieces (compressible): To AS/NZS 4859.1 Section 7.

Pliable building membranes
Standard: To AS/NZS 4200.1.

Vapour barrier:

- Vapour control classification: Class 1.

Sarking membrane (other than walls and gables):

- Water control classification: Water barrier.

Vapour permeable (breathable) membrane: Minimum class 4.

Fasteners and supports
General: Metallic-coated steel.

Mesh support to roof insulation
Welded safety mesh: To AS/NZS 4389.

3 EXECUTION

3.1 GENERAL

Bulk insulation
Requirement: To AS 3999 and BCA J1.2. or BCA 3.12.1.1, as appropriate.

Installation: Firmly butt together fibre blankets or batts, with no gaps except as follows:

- Access openings and vents: Do not obstruct.
- Light fittings: To AS/NZS 3000 clause 4.5.
- Electrical cables: To AS 3999 clause 2.6.

Glass Wool and Rock Wool insulation: Conform to the
ICANZ Industry code of practice for the safe use of glass wool and rock wool insulation.

Pliable building membrane
Installation: To AS 4200.2 and BCA J1.2 or BCA 3.12.1.1, as appropriate.

3.2 WALLS

Framed walls – thermal break strips
Product type: Proprietary item.

Application: To steel framing with lightweight external cladding.

R-Value (m^2.K/W): ≥ 0.2.

Screw fixing: Button head screws at 1 m centres.

Adhesive fixing: Wallboard adhesive walnuts at 1 m centres.

Framed walls – bulk insulation
Product type: Fibre batts.

Installation: Friction fit between framing members. If other support is not provided, staple nylon twine to the framing and stretch tight.

Masonry veneer cavity walls
Product: Rigid cellular insulation board.

Application: To steel or timber framing.

Installation: Horizontally with the tongue to the top edge, pushed over prefixed wall ties and held firmly against the wall frame. Keep boards clean and dry and free from mortar and grout. Do not bridge the cavity.

Fixing: Hex head screws at 450 mm centres.

Flashings: Install flashings before installing insulation panels. Prevent entry of water behind the insulation boards.

Full masonry cavity walls – inside cavity
Product: Rigid cellular insulation board.

Application: To the external face of the inner masonry leaf.

Installation: Horizontally with the tongue to the top edge and firmly against the inner masonry skin. Keep boards clean and dry and free from mortar and grout. Do not bridge the cavity.

Fixing: Proprietary plastic clips on pre-installed wall ties.

Flashings: Install flashings before installing insulation panels. Prevent entry of water behind the insulation boards.

Full masonry cavity walls – internal face
Product type: Rigid cellular extruded boards.

Application: To the internal face of internal masonry leaf.

Preparation of substrates: Conform to the following:

- Remove any deposit or finish which may impair adhesion.
- Remove excessive projections and fill voids and hollows with plaster.
- Maximum surface deviation from a 2.4 m straightedge: 6 mm.

Substrate correction: Skim plaster.

Installation: Apply boards horizontally with staggered vertical joints, all close butted and without crushing.

Fixing: Proprietary adhesive compatible with the insulation. Apply sufficient pressure to evenly distribute adhesive.

Vapour permeable (breathable) membrane

Application: Provide a vapour permeable membrane behind external facing material which does not provide permanent weatherproofing or which may be subject to condensation forming on the internal face, including the following:

- Boards or planks fixed vertically or diagonally.
- Boards or planks fixed in exposed locations where wind driven rain can penetrate the joints.
- Unpainted or unsealed cladding.
- Masonry veneer.

Installation: Run the vapour permeable membrane horizontally on the outer face of external wall framing, over the flashing, from the bottom plate up. Pull taut over the framing and fix to framing members. Seal across the wall cavity at the top.

Horizontal laps: At least 150 mm wide, lapped to make sure water is shed to the outer face of the membrane.

End or vertical overlaps laps: At least 150 mm wide made over framing.

Openings: Run the vapour permeable membrane over the openings and leave covered until windows and doors are installed. Cut the membrane on a 45° diagonal from each corner of the opening, fold the flaps inside and fix to the inside frame of the opening. If the membrane is used to provide a continuous air tight layer, seal all joints with pressure sensitive adhesive tape.

Fixing: Install as follows:

- Timber frames: Metallic-coated clouts, 20 mm long 6 to 8 mm staples or punched multi-point metallic-coated steel brads.
- Steel or aluminium frames: Hex head screws, with either 20 mm diameter washers or through hardboard strips.
- Plywood: Alternatives:
  . Metallic-coated clouts, 20 mm long 6 to 8 mm staples or punched multi-point metallic-coated steel brads at minimum 300 mm centres.
  . Water based contact adhesive with a 50% adhesive cover.

3.3 ROOFS

General

Location: The whole of the roof area including skylight shaft walls, except the following:

- Eaves, overhangs, skylights, vents and openings.
- Roofs to outbuildings, garages, and semi-enclosed spaces such as verandahs, porches and carports.

Mesh support to roof insulation

Locations: Provide support to the following:

- Sarking, vapour barrier or reflective thermal insulation membranes laid over roof framing members which are spaced at more than 900 mm centres.
- Blanket type thermal insulation laid over roof framing members as sound insulation to metal roofing.

Installing welded safety mesh: To AS/NZS 4389.

Pliable building membranes

Sarking membrane:

- Location: Provide sarking under tile and shingle roofing.

Vapour barrier:

- Installation: Lay over the roof framing with sufficient sag to allow the bulk insulation to achieve its full thickness. Overlap all edges 150 mm and seal all joints with pressure sensitive adhesive tape.

Metal roofs – thermal break strips

Product type: Proprietary item.

Application: To steel framing supporting metal sheet roof cladding.

R-Value (m^2.K/W): ≥ 0.2.

Metal roofs – bulk insulation

Product: Fibre blankets or batts.

Installation:

- Batts: Fit tightly between framing members.
- Blanket for sound insulation: Install over the roof framing, reflective thermal insulation (if any), and mesh support, so that the blanket is in continuous contact with the underside of the metal roofing sheets.
- Combined blanket and reflective insulation: Lay facing reflective insulation face downwards over safety mesh.

Cathedral ceiling insulation – metal roofing and roofing tiles

Product type: Rigid cellular extruded sheets.

Application: Over ceiling lining that has been fixed to rafters.

Installation: Lay insulation boards with their long edges at right angles to the rafters and with the tongue pointing up the slope. Start laying at eaves and progress towards the ridge. Secure temporarily by occasional nailing to the rafters, the permanent fixing is provided by the nails used to secure the counter battens to the rafters. Cut boards and tightly fit to abutments and penetrations. Seal gaps with polyurethane foam.

Ceiling insulation – bulk insulation

Product type:

- Framed ceilings: Fibre batts.
- Suspended ceiling: Fibre blanket.

Application: Over ceiling lining.

Installation:

- Batts: Fit tightly between framing members.
- Blankets: Butt joint and lay over ceiling panels or lining.

4 SELECTIONS

Refer to Finishes, Fitting and Equipment Schedule for selections.

0511 LINING

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide internal lining systems, as documented.

Performance

Requirement: Provide lining system with a surface that is:

- Resistant to impacts expected in use.
- Resistant to moisture encountered under expected environmental conditions.
- Free of irregularities.
- A suitable substrate for the nominated final finish.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.3 INTERPRETATION

Definitions

General: For the purposes of this worksection the definitions given in AS/NZS 4491 and the following apply:

- Decorative overlaid wood panels: Particleboard or fibreboard with a bonded decorative finishing surface such as thermosetting resin (low pressure melamine), PVC film, paper foils or wood veneer.
- Dry process fibreboard (MDF): Panel material with a nominal thickness of 1.5 mm or greater, manufactured from lignocellulosic fibres (derived from wood or other materials) with application of heat and/or pressure, the bond of which is derived from a synthetic adhesive added to the fibres and the panels are manufactured with a forming moisture content of less than 20%.
- Fibre cement sheet linings: Treated cellulose fibre in a matrix of cement and sand autoclaved sheet, sealed on one side.
- High pressure decorative laminates (HPDL):
  - . Panels consisting of core layers impregnated with phenolic and/or aminoplastic resins and a surface layer(s) impregnated with aminoplastic resins (mainly melamine resins).
  - . Sheets consisting of a decorative face and layers of fibrous sheet material (e.g. paper) impregnated with thermosetting resins and bonded together under heat and pressure of at least 5 MPa.
- Particleboard: Panel material manufactured under pressure and heat from particles of wood (wood flakes, chips, shavings, sawdust and similar) and/or lignocellulosic material in particle form (flax shives, hemp hurds, bagasse fragments, rice hulls, wheat straw and similar) with the addition of an adhesive.
- Wet process fibreboard: Panel material with a nominated thickness of 1.5 mm or greater, manufactured from lignocellulosic fibres (derived from wood or other materials) with application of heat and/or pressure, the bond of which is derived from the felting of the fibres and the panels are manufactured with a forming moisture content greater than 20%.

1.4 TOLERANCES

Permitted deviations

Bearing surface of finished framing:

- Gypsum lining: To AS/NZS 2589 clause 4.2.2.
- Other lining: 4 mm from a 1.8 m straightedge.

1.5 SUBMISSIONS

Fire performance
Fire hazard properties: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE**, **Fire hazard properties**.

Samples
Prefinished panels: Minimum 300 x 600 (wide) mm panel for each finish with associated trim.

Shop drawings
General: Submit shop drawings to a scale that best describes the detail, showing the following:

- Decorative panels: Showing panel set-out, large scale panel fixing details, attachment devices and other components.

Warranties
Lining materials: Submit the manufacturer's published product warranties.

1.6 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:

- Substrate or framing before installation of linings.
- Finished surface of installation before applying:
  - . Sealer.
  - . Finish coatings or decorative papers.

2 PRODUCTS

2.1 GENERAL

Storage and handling
Requirement: Dry and undamaged lining stacked in pallets horizontally on a smooth, level surface. Prevent distortion or moisture ingress.

Timber or fibreboard panels: Store off the ground in a well-ventilated area.

Handling: Do not drag sheets across each other or across other materials. Protect edges, corners and surface from damage.

Acclimatisation
Timber panels: Store on-site in final interior conditions for 2 to 3 weeks before installing. Do not install until the air conditioning system of the installation area is operating.

Certification
Timber based products: Label panels under the authority of a recognised certification scheme to *0185 Timber products, finishes and treatment*, as applicable to the product. Locate the label on faces or edges which will be concealed in the works.

2.2 FIRE PERFORMANCE

Fire hazard properties
Group number: To AS 5637.1.

2.3 PLASTERBOARD

General
Standard: To AS/NZS 2588.

2.4 FIBRE CEMENT

General
Standard: To AS/NZS 2908.2.

Wall and ceiling linings: Type B category 2.

Minimum thickness: 4.5 mm.

2.5 DRY PROCESS FIBREBOARD (INCLUDING MEDIUM DENSITY FIBREBOARD)

General
Standard: To AS/NZS 1859.2.

Melamine overlaid medium density fibreboard: Medium density fibreboard (STD MDF) overlaid on both sides with low pressure melamine.

2.6 DECORATIVE OVERLAID WOOD PANELS

General
Standard: To AS/NZS 1859.3.

2.7 HIGH PRESSURE DECORATIVE LAMINATE SHEET

General
Standard: To AS/NZS 2924.1.

2.8 COATED STEEL

General
Standard: To AS 1397, for atmospheric corrosivity categories C1 or C2:

- Coating class interior: Z275.
- Coating class exterior: Z450.

2.9 ADHESIVES, SEALANTS AND FASTENERS

Adhesives
For wallboards: Gunnable synthetic rubber/resin based mastic contact adhesive formulated for bonding flooring and wallboards to a variety of substrates.

Sealants
Fire-resistance rated sealant: Non-hardening sealant, compatible with the materials to be sealed and having a fire-resistance rating equal to that of the building element it seals.

Acoustic sealant: Non-hardening sealant compatible with the materials to be sealed.

Fasteners
Steel nails: Hot-dip galvanized.

3 EXECUTION

3.1 CONSTRUCTION GENERALLY

Conditions
Commencement: Do not start lining work until the building or installation area is enclosed and weathertight, and all wet trades have been completed.

Substrates
Requirement: Plumb, level, in true alignment and to the lining manufacturer's recommendations.

Timber, steel framing and battened masonry: To AS/NZS 2589 clause 4.2.

Preparation: Before fixing linings, check and adjust the alignment of substrates or framing, if necessary.

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Battens
General: Fix at each crossing with structural framing members, to solid walls or ceiling support. Provide wall plugs in solid substrates.

Ceiling linings
General: Do not install until the timber roof structure is fully loaded for at least 14 days.

Accessories and trim
General: Provide accessories and trim as necessary to complete the installation.

Adhesives
General: Provide adhesive types appropriate for the purpose, and apply them so they transmit the loads imposed without causing discolouration of the finished surfaces.

Fire-resisting and acoustic installations
Sealing: Apply sealant to the manufacturer's recommendations and as follows:
- Around services pipes and penetrations.
- Electrical outlets and recessed lights: Line back and sides of fixture with plasterboard and seal around fixture junction with sealant.
- Around perimeter of lining panels: Provide continuous runs of sealant.

3.2 PLASTERBOARD LINING

Installation
Gypsum plasterboard and fibre reinforced gypsum lining: To AS/NZS 2589.

Level of finish and jointing: To AS/NZS 2589 clause 3.1.

Supports
General: Install timber battens or proprietary cold-formed galvanized steel furring channels as follows:
- Where framing member spacing exceed the recommended spacing.
- Where direct fixing of plasterboard is not possible, due to the arrangement or alignment of the framing or substrate.
- Where the lining is the substrate for tiled finishes.
- If required for penetrations for services, including mechanical grilles and lighting fixtures.
- If required to support fixtures.

Multiple sheet layers
Application: Fire-resistance rated and acoustic rated walls.

Joints: Fill and flush up all joints and fasteners in each layer and caulk up perimeters and penetrations before installing following layers. Stagger all sheet joints by minimum 200 mm.

Joints
Flush joints: Provide recessed edge sheets and finish flush using perforated paper reinforcing tape.

Butt joints: Make joints over framing members or provide back blocking.

External corner joints: Make joints over metallic-coated steel corner beads.

Dry joints: Provide square edged sheet and finish with a PVC-U joining section.

Control joints: Provide purpose-made metallic-coated control joint beads at not more than 12 m centres in walls and ceilings and to coincide with structural control joints.

Wet areas: Install additional supports, flashings, trim and sealants as required.

Joints in tiled areas: Do not apply a topping coat after bedding perforated paper tape in bedding compound.

3.3 FIBRE CEMENT LINING

Installation
Joints and layout: Run sheets across the framing members. In flush jointed applications, stagger end joints in a brick pattern and locate them on framing members, away from the corners of large openings. Provide supports at edges and joints.

Supports

General: Install timber battens or proprietary cold-formed galvanized steel furring channels as follows:

- Where framing member spacing exceed the recommended spacing.
- Where direct fixing of fibre cement is not possible, due to the arrangement or alignment of the framing or substrate.
- Where the lining is the substrate for tiled finishes.
- If required for penetrations for services, including mechanical grilles and lighting fixtures.
- If required to support fixtures.

Fixing

Timber framed construction: Nail only or combine with adhesive.

Steel framed construction: Screw only or combine with adhesive.

Wall framing: Conform to the following:

- Do not fix to top and bottom plates or noggings.
- In tiled areas: Provide an extra row of noggings immediately above wall-to-floor flashings. Fix sheet at 150 mm centres to each stud and around the perimeter of the sheet.

Masonry wall construction: Conform to the following:

- Direct fixing: Adhesive fix to the masonry except where lining forms a substrate for tiled finish.
- Furring channels: Fix using screw and/or adhesive.

Ceilings: Fix using screw and/or adhesive to ceiling furring members. Do not fix sheets directly to the bottom chords of trusses.

- Ceiling battens: Fix at 600 mm maximum centres.

Wet areas: Do not use adhesive fixing alone.

Multiple sheet layers

Application: Fire-resistance rated and acoustic rated walls.

Joints: Fill and flush up all joints and fasteners in each layer and caulk up perimeters and penetrations before installing following layers. Stagger all sheet joints by minimum 200 mm.

Joints

Joint width:

- Butt joints: 1 to 2 mm.
- Expressed joints: 10 mm maximum.

Joint backing for expressed joints: Black self-adhesive polyurethane tape.

Flush joints: Provide recessed edge sheets and finish flush using perforated paper reinforcing tape.

External corner joints: Make joints over metallic-coated steel corner beads.

Dry joints: Provide square edged sheet and finish with a PVC-U joining section.

Control joints: Provide control joints to coincide with structural control joints and as follows:

- Walls: ≤ 7.2 m centres.
- Ceilings: To divide into bays not larger than 10.8 x 7.2 m.
- Soffit linings: To divide into bays not larger than 4.2 x 4.2 m or 5.6 x 3.6 m.
- Control joint beads: Purpose-made metallic-coated.
- Support: Provide framing parallel to the joint on each side. Do not fix the lining to abutting building surfaces.

Wet areas: Provide additional supports, flashings, trim and sealants as required.

Joints in tiled areas: Bed perforated paper tape in bedding compound. Do not apply a topping coat.

- Control joints: Not more than 4.2 m centres and space to suit joints required in tiling.

- Internal corners: Reinforce with metallic-coated steel angles. In corners subject to continuous moisture, flash over the angle and under the sheeting with continuous bitumen coated aluminium flashing.

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3.4 TIMBER PANEL LINING

General

Location: Block C Hall

Panel material: Acoustic Supawood

Installation: Set out in even panels with joints coinciding with framing members. Fit and fix panels and trim plumb, level and in true alignment of face and grain.

Fixing:

- Plywood and hardboard: Wallboard adhesive or pin fixed to timber frame, screw fixed to steel frame. Punch pin heads just below surface.
- Laminated plastic: Wallboard adhesive.

Plywood

Expansion joints: Provide a 2 to 3 mm gap at edges of linings and as follows:

- 2 to 3 mm gap at each panel joint, or
- 6 to 9 mm every 3.6 m, or
- 8 to 12 mm every 4.8 m.

Areas with an expected high level of internal moisture: Provide a gap of 4 to 6 mm every 1.2 m.

3.5 TRIM AND ACCESSORIES

General

Requirement: Provide trim such as beads, mouldings and stops to make neat junctions between lining components, finishes and adjacent surfaces.

Proprietary items: Provide complete with installation accessories.

Timber and MDF trim: Fix using full length so that trim is secure and without movement. Where nail or screw fixings are used, make sure fastener finishes sufficiently below face of trim so that stopping piece finishes flush with the face.

3.6 COMPLETION

General

Damaged or marked lining and components: Replace.

Exposed surfaces: Touch up shop applied finishes and restore damaged or marked areas.

Timber panels: If appearance is not uniform, replace panels.

Cleaning: Clean completed surfaces to remove irregularities and leave panels smooth and clean, to the manufacturer’s recommendations. If required, sand with fine paper to remove irregularities and refinish panel surface.

- Debris and unused material: Remove from site.

Warranties

Requirement: At practical completion, submit warranties against defective materials and installation.

4 SELECTIONS

Refer to Finishes, Fittings and Equipment Schedule.

0520 PARTITIONS – COMBINED

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide partitions systems, as documented.

Performance

Strength and stability: To remain stable, and without rattle and signs of deflection or permanent deformation under normal conditions of use, including the slamming of doors.

Serviceability: To support imposed dead loads, seismic loads, wind loads, including designated eccentric loads and not to deflect in excess of the following, where H is the height of the partition:

- The lesser of H/240 or 30 mm for partitions subjected to wind loads and lined with flexible material.
- The lesser of H/360 or 20 mm for partitions subjected to wind loads and lined with brittle materials.
- H/500 for eccentric loads.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.3 INTERPRETATION

Definitions

General: For the purposes of this worksection the following definitions apply:

- Partition - fully demountable: A partition system in which any component may be demounted without damage, using only small hand tools, and subsequently reassembled without cutting, trimming or refinishing.
- Partition - glazed: A partition system consisting of a suite of exposed sections forming door and window frames, ceiling channels, sills, glazing and accessories; and generally intended for use in conjunction with framed and lined partition systems.
- Partition - semi demountable: A partition system in which the major components are designed to be removed and reused but panels or linings, which are likely to be damage during removal, are not.

1.4 TOLERANCES

Demountable partitions

Deviation (from true grid lines and planes): 1:1000 to a maximum of 3 mm.

Misalignment (of adjoining surfaces at panel junctions): 1 mm.

Panel thickness: ± 0.5 mm.

Length and width: 0.1% of the dimension or 0.5 mm, whichever is the greater.

Flatness, twist, winding and bow: 1 mm deviation from a 2.4 m straightedge placed in any position.

Maximum deviation of edges from the intended true line: ± 1 mm.

Framed and lined partitions

Finished framing: To AS/NZS 2589 clause 4.2.2.

1.5 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Set-out before installation.

- Partition framing before installation of linings and finishes.
- Openings prepared to receive internal windows.
- Framed and lined partitions ready to receive the framed and glazed component.
- Completion of installation.

2 PRODUCTS

2.1 GENERAL

Storage and handling
Storage of glass and glazing materials: In a clean, dry area and unaffected by weather, to the manufacturer's recommendations. Protect from building materials and loose debris such as wet plaster, mortar, paint and welding spatter.

Handling glass: to the manufacturer's recommendations and without damage.

2.2 FIRE PERFORMANCE

Fire hazard properties
Group number: To AS 5637.1.

Fire-resistance of building elements
Fire-resistance level: Tested to AS 1530.4.

2.3 FRAMED AND LINED PARTITIONS

Light steel framing
General: Proprietary framing system of metallic-coated folded steel strip lipped studs and channel section top and bottom tracks and noggings.

Sections and members: To AS/NZS 4600.

Light timber framing
Timber species: Radiata pine.

Seasoning: Required.

Stress grade: F5 to AS/NZS 1748.1.

Plasterboard
Standard: To AS/NZS 2588.

Fibre cement
Standard: To AS/NZS 2908.2.

Wall and ceiling linings: Type B category 2.

Minimum thickness: 4.5 mm.

Accessories
General: Accessories necessary to complete the installation including the following:

- Corner beads.
- Stop beads.
- Shadowline.
- Control joints.
- Sheet metal and MDF partition end caps.

Adhesives
General: Provide adhesives of types appropriate to their purpose and substrates, applied to transmit the loads imposed without causing discolouration of finished surfaces.

Sealants
General: Sealant types appropriate for the partition's documented acoustic rating and fire-resistance level, and compatible with partition materials and building substrate.

2.4 GLAZED PARTITIONS

General
System: Proprietary non-load bearing glazed partition suite comprising main frames, door frames, sills, ceiling channels and other extrusions and accessories to form a complete and finished system, as documented.

Frames
Aluminium extrusions: To AS/NZS 1866.

Sealants
General: Sealant types appropriate for the partition's documented acoustic rating and compatible with partition materials and building substrate.

Tests
Weighted sound reduction index (R_w) for proprietary double glazed systems: Interpolation between test results for similar systems is acceptable, subject to the following:

- Dimensional (thickness or width) differences do not exceed a ratio of 1:1.5.
- Each tested system differs from the proposed system by not more than one variable from the following elements:
  . Cavity: Width dimension.
  . Cavity reveal: Acoustic absorption treatment.
  . First panel: Glass type, glass thickness.
  . Mounting: Type, seal type.
  . Second panel: Glass type, glass thickness.

2.5 GLASS

Standards
Glass type and thickness: To AS 1288, if no glass type or thickness is documented.

Materials and installation: To AS 1288.

Quality requirements for cut-to-size and processed glass: To AS/NZS 4667.

Terminology for work on glass: To AS/NZS 4668.

Performance
Glass: Free from defects which detract from appearance or interfere with performance under normal conditions of use.

Glazing plastics: Free from surface abrasions, and warranted by the manufacturer for 10 years against yellowing or other colour change, loss of strength and impact resistance, and general deterioration.

Heat soaking
Requirement: All toughened and heat strengthened glass products.

Standard: To EN 14179-1.

Safety glazing materials
Standard: To AS/NZS 2208.

Type: Grade A to AS 1288.

Certification: Required.

- Certification provider: An organisation accredited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ).

Glass identification
Safety glazing materials: Identify each piece or panel, to AS 1288.

Heat soaked glass: Marked to EN 14179-1 or certified by the manufacturer to AS 1288 clause 3.8.2.

Unacceptable blemishes in heat-treated flat glass (including tinted and coated glass)
Standard: To AS/NZS 4667.

Ceramic-coated glass
General: Heat strengthened or toughened glass with a coloured ceramic coating fused to and made an integral part of the surface to ASTM C1048, condition B.

2.6 GLAZING MATERIALS

General
Requirement: Glazing materials including putty, glazing compounds, sealants, gaskets, glazing tapes, spacing strips, spacing tapes, spacers, setting blocks and compression wedges appropriate for the conditions of application and required performance.

Glazing tapes
Standards: To AAMA 800, Products coded 804.3, 806.3 or 807.3, as applicable.

Jointing materials
General: Provide recommended jointing and pointing materials which are compatible with each other and with the contact surfaces and non-staining to finished surfaces. Do not provide bituminous materials on absorbent surfaces.

Primer
Compatibility: Apply the recommended primer to the surfaces in contact with sealant materials.

Extruded gaskets and seals
Material: Non cellular (solid) elastopressive seals as follows:

- Rubber products (neoprene, ethylene propylene diene monomer (EPDM) or silicone rubber): To BS 4255-1.
- Flexible polyvinyl chloride (PVC): To BS 2571, E type compounds, colour fastness Grade B.

2.7 PLENUM BAFFLES

Application
Requirement: Plenum baffles that maintain documented fire-resistance level and acoustic performance of the partitions.

Types
Impregnated vinyl: Lead impregnated vinyl sheeting hung as a curtain from the slab soffit.

Plasterboard: Plasterboard sheets bonded together (if more than one layer).

Bulk insulation: Layers of bulk insulation batts compressed between the top of the partition and the slab soffit.

3 EXECUTION

3.1 PREPARATION

Substrate
General: Prepare the substrate to receive the partitions.

Carpet: Fix bottom tracks over polyethylene film. Prevent carpet threads from pulling if drilling or installing fasteners.

Protection
General: Protect existing work from damage during the installation and rectify any damage. Provide temporary coverings if required.

Pre-conditioning
General: Acclimatise wood based system components in the in-service conditions for a minimum period of two weeks before assembly.

Set-out
General: Set out the partition grid on the centreline of framing members, and to coincide with the ceiling grid and other major building grid, as applicable.

3.2 FRAMED AND LINED PARTITIONS

Partition erection

General: Install partitions plumb, level, on their correct alignment, and firmly fixed.

Building movements: Provide clearances or deflection heads so that partitions are not damaged by structural building movements including long term slab deflection.

- If fire-resistance levels or acoustic ratings are required, provide a resilient foam or mastic seal with properties equal to those required for the partition.

Structural floor control joints

General: Do not run or fix partitions framing across control joints.

Acoustic rated partitions

General: Isolate the frames from floors, ceilings and vertical abutments with beads of non-hardening sealant compatible with the materials to be sealed.

Trim

General: Provide trim such as beads, mouldings, stops and skirtings to make neat junctions between lining components, finishes and adjacent surfaces.

Sealing fire-resisting and acoustic rated partitions

General: Apply sealant to the manufacturer's recommendations and as follows:

- Around services pipes and penetrations.
- Electrical outlets and recessed lights: Line back and sides of fixture with plasterboard and seal around fixture junction with sealant.
- Around perimeter of lining panels: Provide continuous runs of sealant.

3.3 LIGHT STEEL FRAMES IN FRAMED AND LINED PARTITIONS

Tracks

General: Conform to the following:

- Fix bottom tracks to floor substrate.
- Fix top wall tracks to suspended ceiling grid or as documented.
- Fix deflection head tracks to the structural soffit above.

Fixing to masonry: Provide masonry anchors of expansion or chemical grout type. Do not use explosive-driven fastenings.

Track fixing: Fix top and bottom tracks at 600 mm maximum centres generally, and 100 mm from ends. Splice plates at ends to maintain continuity and alignment.

Stud framing

General: Provide studs in single lengths without splices. Rotate intermediate studs into tracks for friction fixing. Screw fix jamb studs, corner studs and wall intersection studs to tracks.

Fixing: Fix noggings at 1350 mm maximum centres vertically and as required for skirtings and wet area lining. Make sure that faces of noggings and studs are accurately aligned.

Lintels: Install a stiffened top plate lintel for spans of 1800 mm or greater.

Curved partitions

Stud spacing: Conform to the sheeting manufacturer’s recommendations for curved partitions.

Jambs

General: Install boxed double studs at jambs and heads to all openings.

Additional frame support

General: Provide frame support for fixing the following:

- Floor and wall mounted fixed joinery units, furniture and equipment.
- All wet area fittings and fixtures.
- All grabrails and handrails.

Timber nogging: Provide 240 x 40 mm timber nogging with proprietary stud fixing brackets for wall hung sanitary fittings.

Stud stiffening: Provide stud stiffening to support wall hung joinery units and equipment with:

- Full height close fitting timber inserts.
- Boxed steel lipped studs.

Stud service holes

General: Use factory pre-cut flared holes, or provide site cut holes punched or drilled on the centreline of the member and fit proprietary plastic bushes or grommets. Splice additional stiffening to studs if site cut service holes exceed 1/3 the depth of the member.

Metal separation

General: Isolate non-ferrous service pipes and accessories from the metal framing.

Earthing

Permanent earthing: Required.

Temporary earthing: Provide temporary earthing during erection until the permanent earthing is installed.

Cavity walls

General: If bridging is nominated, follow the manufacturer's recommendations.

Staggered stud framed walls

General: Provide studs staggered at 300 mm centres set in oversized top and bottom plates so that each face has stud fixings at 600 mm centres.

3.4 LIGHT TIMBER FRAMES IN FRAMED AND LINED PARTITIONS

Moisture content

General: Do not install framing that does not meet the following values tested to AS/NZS 1080.1:

- Air conditioned buildings: 8 to 10%.
- Intermittently heated buildings: 10 to 12.5%.
- Unheated buildings: 12 to 15%.

Framing

General: Construct wall frames to AS 1684.4 Section 6, as appropriate for internal walls.

Double faced walls: Provide gauged timbers in studs, noggings and plates.

3.5 PLASTERBOARD LINING IN FRAMED AND LINED PARTITIONS

Installation

Gypsum plasterboard and fibre reinforced gypsum lining: To AS/NZS 2589.

Multiple sheet layers

Application: Fire-resisting and acoustic rated partitions.

Joints:

- Fill and flush up all joints and fixings in each layer and caulk up perimeters and penetrations before installing following layers.
- Stagger all sheet joints: Minimum 200 mm.

Joints and joint treatment

General: Install joint accessories as documented, in conformance with manufacturer's recommendations. Install plumb, level and true to line.

Flush joints: Use joint reinforcing tape bedded in joint compound with recessed edge sheets and finish flush.

Butt joints: Make joints over framing members or provide back blocking.

External corner joints: Bed purpose fabricated perforated metallic-coated steel corner beads in joint compound.

Ceiling junctions: Install purpose fabricated perforated metallic-coated steel shadowline to top of partition.

Sheet metal partition end caps: Provide purpose fabricated perforated metallic-coated steel end caps, sized for partition thickness and bedded in joint compound.

MDF end caps: Provide recessed edge sheets and finish flush using joint reinforcing tape and joint compound.

Dry joints: Use square edged sheet and finish with a PVC-U joining section.

Control joints: Provide purpose-made perforated metallic-coated control joint beads at not more than 12 m centres in partitions and to coincide with structural control joints. Bed in joint compound.

Wet areas: Provide additional supports, flashings, trim and sealants as required.

Joints in tiled areas: Bed reinforcing tape in joint compound. Do not apply a topping coat.

3.6 FIBRE CEMENT LINING IN FRAMED AND LINED PARTITIONS

Installation

General: Install as follows:

- Run sheets across the framing members.
- In flush jointed applications, stagger end joints in a brick pattern and locate joints on framing members, away from the corners of large openings.
- Provide supports at edges and joints.
- Do not fix to top and bottom plates or noggings.

Timber framing: Nail only or combined with adhesive.

Steel framing: Screw only or combined with adhesive.

Tiled and wet areas: Provide an extra row of noggings immediately above wall-to-floor flashings. Fix sheet at 150 mm centres to each stud and around the perimeter of the sheet. Do not use adhesive fixing alone.

Multiple sheet layers

Application: Fire-resisting and acoustic rated partitions.

Joints:

- Fill and flush up all joints and fixings in each layer and caulk up perimeters and penetrations before installing following layers.
- Stagger all sheet joints: Minimum 200 mm.

Joints and joint treatment

General: Install joint accessories as documented, in conformance with manufacturer's recommendations. Install plumb, level and true to line.

Flush joints: Use joint reinforcing tape bedded in joint compound with recessed edge sheets and finish flush.

External corner joints: Bed purpose fabricated perforated metallic corner beads in joint compound.

Ceiling junctions: Install purpose fabricated perforated metallic-coated steel shadowline to top of partition.

Sheet metal partition end caps: Provide purpose fabricated perforated metallic-coated steel end caps, sized for partition thickness and bedded in joint compound.

MDF end caps: Provide recessed edge sheets and finish flush using joint reinforcing tape and joint compound.

Dry joints: Use square edged sheet and finish with a PVC-U joining section.

Control joints: Provide control joints to coincide with structural control joints and as follows:

- Walls: ≤ 7.2 m centres.
- Control joint beads: Purpose-made metallic-coated.

- Support: Provide framing parallel to the joint on each side. Do not fix the lining to abutting building surfaces.

Wet areas: Provide additional supports, flashings, trim and sealants as required.

Joints in tiled areas: Bed reinforcing tape in joint compound. Do not apply a topping coat.

- Control joints: At maximum 4.2 m centres and spaced to suit joints required in tiling.
- Internal corners: Reinforce with metallic-coated steel angles. In corners subject to continuous moisture, flash over the angle and under the sheeting with continuous bitumen coated aluminium flashing.

3.7 GLAZED PARTITION SYSTEMS

General

Requirement: Conform to manufacturer's recommendations and assembly details.

Frame erection

Frames: Install main frames, sills, ceiling channels, door and window frames and other framing members as follows:

- Plumb, level, square, straight and true.
- Fixed or anchored to the building structure.
- Isolated from any building loads, including loads caused by structural deflection or shortening.
- Joints tightly fitted and neatly aligned.
- Door and window openings accurately sized.
- Use concealed fixings.

Sealant

Acoustic sealant: If documented or if required to maintain rated acoustic performance, bed sill and ceiling channels in acoustic sealant.

Glass processing

Processing: Perform required processes on glass, including cutting, obscuring, silvering and bending. Form necessary holes, including for fixings, hardware, equipment, access openings and speaking holes. Process exposed glass edges to a finish not inferior to ground arrised.

Framed glazing

Assembly: Provide proprietary glazing beads and resilient (PVC, butyl or similar) glazing tapes, gaskets and inserts, to hold the glass firmly without distortion and to withstand the documented loadings.

Frameless glazing

Assembly: Join the vertical edges of adjacent glass panels with a clear structural silicone jointing compound.

Support: For frameless installations not fixed directly to the building structure, provide adequate connection of the top and bottom glazing channels or bead to resist lateral loads.

3.8 PLENUM BAFFLES

Baffles

General: Install plenum baffles tightly butted to building structure, service ducts, pipes and conduits and to the top of the partition or the top of the suspended ceiling directly above the line of the partition. Seal joints, penetrations and intersections and maintain the required performance.

Fire-resisting partitions

General: If a suspended ceiling of equivalent fire-resistance is not provided, either extend the partitions to the underside of the structural soffit, or provide plenum baffles of equivalent fire-resistance level.

Acoustic rated partitions
General: If a suspended ceiling of equivalent sound insulation rating is not provided, either extend the partitions to the underside of the structural soffit, or provide acoustic plenum baffles. The ceiling and baffle to provide a combined rating equivalent to the partition rating.

3.9 COMPLETION

Cleaning
General: Remove protective coverings, replace damaged glass and leave the work clean, polished, free from defects, and in good condition.

Rectification
General: Correct any defects to joints, remove any excess joint compound, and leave the partition installation complete, clean and ready for the application of finishes.

Operation and maintenance manual
Requirement: Provide a manual that includes the following:

- Full product information for each partition system, including product designations, components list, colours and finishes, and accessories.
- Information on all glass, including type, thickness, and details of any colouration or treatment affecting the physical appearance of the installation.
- Information on all doors and hardware supplied as part of the partition system, including door type, size, finishes, and hardware details.
- Maintenance recommendations.
- Copies of type-tests and compliance certificates for fire, acoustic or other system performance requirements.
- Detailed instructions for demounting and re-erecting each demountable partition system without damage and to maintain acoustic and fire-resisting properties. Include information on the relocation of inbuilt services.

Paint
General: Within 14 days of the date of practical completion, provide touch-up paint for each demountable partition colour used, including application instructions.

Warranties
Requirement: Warrant against defective materials and installation.

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0531 SUSPENDED CEILINGS – COMBINED

1 GENERAL

1.1 RESPONSIBILITIES

General
Requirement: Provide suspended ceilings, as documented.

1.2 CROSS REFERENCES

General
Requirement: Conform to the following:
- *0171 General requirements*.

1.3 STANDARDS

General
Suspended ceilings: To AS/NZS 2785.

1.4 INTERPRETATION

Definitions
General: For the purposes of this worksection the definitions given in AS/NZS 2785 and the following apply:
- Ceiling unit: Tile, panel, plank, strip or open grid supported within a ceiling suspended system.

1.5 TOLERANCES

Suspension system
Flatness, twist, winding and bow: 1.5 mm deviation from a 1.5 m straightedge placed in any position.

Sheeted or flush ceiling system
Suspension system bearing surface for flush lined ceiling: To AS/NZS 2589 Table 4.2.2.

Suspended grid system deflection: To AS/NZS 2785 Table 3.4.4.

1.6 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:
- The suspension system before the installation of ceiling units or lining.
- The ceiling assembly before the installation of fittings and site painting, if applicable.
- The completed ceiling.

2 PRODUCTS

2.1 GENERAL

Storage and handling
Requirement: Store suspended ceiling system and components in a dry and secure storage area, unaffected by weather.

2.2 FIRE PERFORMANCE

Fire hazard properties
Group number: To AS 5637.1.

Fire-resistance of building elements
Fire-resistance level: Tested to AS 1530.4.

2.3 CEILING SYSTEMS

Proprietary systems
Consistency: Provide suspended ceilings as complete proprietary systems, fabricated by one manufacturer.

Installation: Specialist installers recommended by the ceiling system manufacturer.

Ceiling units: As documented.

Support: Fix proprietary suspension system to the structural soffit.

2.4 SUSPENSION SYSTEM

Proprietary system
General: As documented.

Protective coatings for steel components: To AS/NZS 2785 Table F1.

2.5 CEILING UNITS

General
Ceiling units: As documented.

2.6 LINING

Plasterboard
Standard: To AS/NZS 2588.

Fibre cement
Standard: To AS/NZS 2908.2.

Wall and ceiling linings: Type B category 2.

Minimum thickness: 4.5 mm.

Sealants
Fire-resisting sealant: Non-hardening sealant compatible with the ceiling materials and documented fire-resistance level.

Acoustic sealant: Non-hardening sealant compatible with the ceiling materials and rated to R_w 65.

3 EXECUTION

3.1 CONSTRUCTION GENERALLY

Working environment
General: Do not start work before the building is enclosed, wet work is complete and dry, and all work above the ceiling, including services, is complete.

Protection
General: Protect existing work from damage during the installation.

Partitions
General: If partitions are attached to the underside of the ceiling systems, include the partition mass in the seismic mass of the ceiling.

Stability
General: Install the ceilings level and fix to prevent looseness or rattling of ceiling components under normal conditions.

Structure-borne sound
General: Provide a ceiling system which does not amplify structure-borne sound. Provide suitable proprietary products or systems for reducing contact vibrations between structure and ceiling.

Control of movement
Abutments: Install the ceiling to allow for differential movement at abutting surfaces.

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Alignment: Align ceiling control joints with structural control joints. Do not bridge structural control joints.

Prefinishes

General: Repair damaged prefinishes by recoating.

Curtain recesses

General: Provide curtain recesses, including the following:

- Lining.
- Curtain track support.
- Accommodation for motors and cabling.

3.2 SUSPENSION SYSTEM

Ceiling grid

Set-out: Align ceiling unit joints and centrelines of visible suspension members with documented grid lines. If not documented, set out with equal margins.

Suspension system

Support members: Install support members as follows:

- Space as required by the loads on the system and the type of ceiling.
- Allow for the installation of services and accessories, including ductwork, light fittings and diffusers.
- Provide additional back support or suspension members for the fixing of services and accessories to prevent distortion, overloading or excessive vertical deflection.
- Allow for access for maintenance of services.

Failure: Provide a ceiling system where failure of any one suspension point does not cause a progressive failure of the ceiling.

Height adjustment: Provide height adjustment with a length adjustment device at each suspension point, permitting length variation of at least 50 mm.

Grid members: If required, notch grid members at the junction with the perimeter trim to make sure the ceiling units lay flat on the perimeter trim.

Restriction: Do not attach the suspension system to the lip or flange of purlins.

Services

Support: Conform to the following:

- If the service has not been designed to accept the ceiling load, do not fix suspension members to services (e.g. ductwork).
- If services obstruct the ceiling supports, provide bridging and suspension on each side of the services.
- Do not support services terminals on ceiling units.

Bracing

General: Provide bracing to prevent lateral movement and to resist the imposed horizontal seismic force.

Bulkheads

General: Integrate bulkheads with the ceiling structure and brace to prevent lateral movement. If the ceiling is terminated at a bulkhead, provide for seismic requirements.

External suspended soffits

General: Support external suspended soffits on rigid members capable of carrying the loads from imposed actions. Install members to minimise any eccentricity, and carry the upward and downward loads from wind actions through to the supporting structure.

Fasteners

General: Provide concealed fasteners. If material supporting hangers is less than 3 mm thick, do not use screw fasteners.

3.3 CEILING UNITS

Installation

Fitting: Fit ceiling units accurately and neatly, without distortion, and free from air leakage and staining.

Lock clips: If ceiling units are exposed to loads from wind actions or if required for security, insert lock clips at the junction of carrier rails and units.

Pattern and texture: Set out patterned or heavily textured materials with a consistent direction of pattern or texture, or as documented.

Service penetrations

General: Provide openings for all services elements, including light fittings, ventilation outlets, detectors, sprinklers and loudspeakers.

Repair: If services pass through ceiling grid members, provide additional grid members and support or relocate service.

Cut ceiling unit edges

General: Conceal, or finish to match prefinished edges, including at openings for services elements.

3.4 PLASTERBOARD LINING

Installation

Gypsum plasterboard and fibre reinforced gypsum plaster: To AS/NZS 2589.

Suspended flush ceilings: Fix using screw or screw and adhesive to ceiling members or support frame.

Multiple sheet layers

Application: Fire-resisting and acoustic rated ceilings.

Joints: Fill and flush up all joints and fixings in each layer and caulk up perimeters and penetrations before installing following layers. Stagger all sheet joints by minimum 200 mm.

Joints

Flush joints: Provide recessed edge sheets and finish flush using perforated paper reinforcing tape.

Butt joints: Make joints over framing members or otherwise provide back blocking.

External corner joints: Make joints over metallic-coated steel corner beads.

Control joints: Align lining control joints with structural control joints and as follows:

- Ceilings: At maximum 12 m centres.
- Control joint beads: Purpose-made metallic-coated.
- Location: If possible, position joints to intersect light fixtures, vents or air diffusers.

Wet areas: Install additional supports, flashings, trim and sealants, as required.

3.5 FIBRE CEMENT LINING

Installation

General: Run sheets across the framing members. In flush jointed applications, stagger end joints in a brick pattern and locate them on framing members, away from the corners of large openings. Provide supports at edges and joints.

Suspended flush ceilings: Screw or screw and adhesive fix to ceiling members or support frame.

Multiple sheet layers

Application: Fire-resisting and acoustic rated ceilings.

Joints: Fill and flush up all joints and fixings in each layer and caulk up perimeters and penetrations before installing following layers. Stagger all sheet joints by minimum 200 mm.

Joints

Flush joints: Provide recessed edge sheets and finish flush using perforated paper reinforcing tape.

External corner joints: Make joints over metallic-coated steel corner beads.

Dry joints: Provide square edged sheet and finish with a PVC-U joining section.

Control joints: Align lining control joints with structural control joints and as follows:

- Ceilings: To divide into bays not larger than 10.8 x 7.2 m.
- Soffit linings: To divide into bays not larger than 4.2 x 4.2 m or 5.6 x 3.6 m.
- Control joint beads: Purpose-made metallic coated.
- Support: Provide framing parallel to the joint on each side. Do not fix the lining to abutting building surfaces.
- Location: If possible, position joints to intersect light fixtures, vents or air diffusers.

Wet areas: Install additional supports, flashings, trim and sealants, as required.

3.6 ACCESS PANELS

Finish
General: Match the access panels to the ceiling in appearance and performance.

Identification
General: Provide each access panel with an identification mark.

Non-demountable ceilings
General: Provide access panels supported and anchored to permit ready removal and refixing.

Reinforcement
General: Reinforce the back of the access panel to prevent warping and facilitate handling.

3.7 TRIM

General
Trim: Provide trim at junctions with other building elements and surfaces, including walls, beams and penetrations, consistent with the materials and finishes of the ceiling system.

Accessories
General: Provide accessories as part of the proprietary ceiling system necessary to complete the installation.

Fire-resisting walls
Requirement: Seal to soffit with sealant with an equivalent fire-resistance level before fixing decorative cornices, if any.

3.8 COMPLETION

Spares
General: Provide spare matching ceiling components, as follows, and store the spare materials on site where directed:

- Supporting system: One spare supporting member (hanger or framework member) for every 100 members or part thereof of the same type installed in the ceiling.
- Ceiling units: One spare unit for every 50 units or part thereof installed in the ceiling.
- Accessories: One spare of each type for every 50 units or part thereof installed in the ceiling.

Warranties
Requirement: Provide warranties for materials and workmanship in the form of interlocking warranties from the supplier and the installer.

Form: Against failure of materials and execution under normal environment and conditions of use.

4 SELECTIONS

Refer to Finishes, Fittings and equipment Schedule for selections.

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0551 JOINERY

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide joinery, as documented.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.
- *0185 Timber products, finishes and treatment*.

1.3 STANDARDS

General

Tactile indicators to stairs: To AS/NZS 1428.4.1.

1.4 TOLERANCES

General

Requirement: Fabricate and install joinery items to substrates undamaged, plumb, level, straight and free of distortion**.**

Tolerances table

Property	Tolerance
Plumb and level	1:800
Offsets in flush adjoining surfaces	0.5 mm
Offsets in revealed adjoining surfaces	2 mm
Alignment of adjoining doors	0.5 mm
Difference in scribe thickness for joinery items centred between walls	2 mm
Doors centred in openings	0
Joints in finished surfaces	0

1.5 SUBMISSIONS

Certification

Requirement: Submit evidence of conformity to documented requirements for grading, species and board size. Evidence may be in any of the following forms:

- Supplier’s certificate which may be included on an invoice, delivery docket or packet label.
- Report by an independent inspecting authority.

Moisture content: Submit documentation noting moisture content of timber products.

Environmental rating evidence or certification: Equal to 4 star Green Star rating

Operation and maintenance manuals

General: Submit manufacturer’s published recommendations for service use.

Products and materials

Manufacturer's data: Submit manufacturer's product data.

Proprietary items: Submit the manufacturer’s standard drawings and details showing:

- Methods of construction.
- Assembly and fixing, with dimensions and tolerances.

1.6 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:
- Shop fabricated or assembled items ready for delivery to the site.
- Openings prepared to receive assemblies.
- Site erected assemblies on completion of erection, before covering up by cladding and encasing.
- Surfaces prepared for, and immediately before, site applied finishes.
- Completion of installation.

2 PRODUCTS

2.1 DELIVERY AND STORAGE

General
Requirement: Deliver joinery units to site in unbroken wrapping or containers and store so that its moisture content is not adversely affected. Do not store in areas of wet plaster. Store in an adequately ventilated space away from heat and direct sunlight. Keep storage time to a minimum by delivering items only when required for installation.

2.2 JOINERY MATERIALS AND COMPONENTS

Visible work
Clear finished timber and veneer: Make sure all visible surfaces are free of branding, crayon or chalk marks and of blemishes caused by handling.

Joinery timber
Hardwood for trim: To AS 2796.1.

Hardwood for furniture: To AS 2796.3.

Seasoned cypress pine: To AS 1810.

Softwood for trim: To AS 4785.1.

Softwood for furniture: To AS 4785.3.

Finished sizes of milled timbers: Not less than the documented dimensions unless qualified by a term such as nominal, out of or ex to which industry standards for finished sizes apply.

Plywood
Interior use generally: To AS/NZS 2270.

Interior use, exposed to moisture: To AS/NZS 2271.

Visible surface with a clear finish: Veneer quality A.

Other visible surfaces: Veneer quality B.

Wet process fibreboard (including hardboard)
Standard: To AS/NZS 1859.4.

Particleboard
Standard: To AS/NZS 1859.1.

Melamine overlaid particleboard: Particleboard overlaid on both sides with low pressure melamine.

Dry process fibreboard (including medium density fibreboard)
Standard: To AS/NZS 1859.2.

Melamine overlaid medium density fibreboard: Medium density fibreboard (STD MDF) overlaid on both sides with low pressure melamine.

Decorative overlaid wood panels
Standard: To AS/NZS 1859.3.

Certification
Branding: Brand panels under the authority of a recognised certification scheme to *0185 Timber products, finishes and treatment,* as applicable to the product. Locate the brand on faces or edges which will be concealed in the works.

High-pressure decorative laminate (HPDL) sheets
Standard: To AS/NZS 2924.1.

Minimum thickness: Conform to the following:

- For horizontal surfaces fixed to a continuous substrate: 1.2 mm.
- For vertical surfaces fixed to a continuous substrate: 0.8 mm.
- For post formed laminate fixed to a continuous substrate: 0.8 mm.
- For vertical surfaces fixed intermittently (e.g. to studs): 3.0 mm.
- For edge strips: 0.4 mm.

2.3 VENEERS

Timber veneer
Veneer quality: To AS/NZS 2270.

Grades (minimum requirement):

- Select grade, veneer quality A, for visible surfaces to have clear finish or to have no coated finish.
- General purpose grade, veneer quality B, for other visible surfaces.

Requirement: Provide veneers slip matched and flitch batched and falling within the visual range of the approved samples.

Vinyl veneer
Type: Proprietary unbacked vinyl fabric factory-bonded to the designated surface.

2.4 JOINERY ASSEMBLIES

General
Standard: To AS 4386.

Product certification

Plinths
Material: Select from the following:

- Exterior general purpose plywood.
- High moisture resistant particleboard.
- High moisture resistant medium density fibreboard.

Thickness: 16 mm.

Fabrication: Form up with front and back members and full height cross members at not more than 900 mm centres.

Fasteners: Conceal with finish.

Installation: Scribe to floor and secure to wall to provide level platform for carcasses.

Carcasses
Material: Select from the following:

- Overlaid high moisture resistant particleboard.
- Overlaid high moisture resistant medium density fibreboard.

Thickness: 16 mm.

Joints: Select from the following:

- Proprietary mechanical connections.

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- Dowels and glue.
- Screws and glue.
- Proprietary joining plates and glue.

Adjustable shelves: Support on proprietary pins in holes bored at equal centres vertically.

- Spacing: 32 mm.

Fasteners: Conceal with finish.

Installation: Secure to walls at not more than 600 mm centres.

Drawer fronts and doors

Material: Select from the following:

- Melamine overlaid high moisture resistant particleboard.
- Melamine overlaid high moisture resistant medium density fibreboard.

Thickness: 16 mm.

Door size: Not exceeding 1.5 m^2 on face, with 2400 mm maximum height and 900 mm maximum width.

Drawer fronts: Rout for drawer bottoms.

Drawer backs and sides

Material: PVC film wrapped particleboard.

Thickness: 12 mm.

Installation: Mitre corners leaving outer skin of foil intact, finish with butt joints, glue to form carcass and screw to drawer front. Rout for drawer bottoms.

Drawer bottoms

Material: PVC film laminated hardboard.

Thickness: 3 mm.

Drawer and door hardware

Hinge types: Concealed metal hinges with the following features:

- Nickel plated.
- Adjustable for height, side and depth location of door.
- Integrated soft and self-closing action.
- Hold open function.

Piano hinges: Chrome plated steel, extending full height of doors.

Slides: Metal runners and plastic rollers with the following features:

- 30 kg loading capacity.
- Integrated soft and self-closing action.
- Closure retention.
- White thermoset powder coating or nickel plated.

2.5 WORKING SURFACES

Laminated benchtops

Exposed edges: Extend laminate over shaped nosing, finishing more than 50 mm back on underside. Splay outside corners at 45°.

Balance underside: Extend laminate to the undersides of benchtops.

Installation: Scribe to walls. Fix to carcass at least twice per 600 mm length of benchtop.

Joint sealing: Fill joint with sealant matching finish and clamp with proprietary mechanical connectors.

2.6 LABORATORY JOINERY

Benchtops

Joints: Minimise joints in fixed benchtops.

Splashbacks: Incorporate splashbacks to fixed benches where they abut walls.

Select from:

- Acrylic resin sheet with mineral fillers.
- Cellulose fibre, homogeneously reinforced phenolic thermosetting resin core.
- Chemical resistant laminate post formed over high moisture resistant (HMR) MDF (typically 32 mm thick). Factory laminate on all faces.
- 1.2 mm minimum thickness type 316 stainless steel sheeting over moisture resistant structural plywood. Encapsulate on the underside with 0.4 mm galvanized steel sheeting and silicone-seal to the stainless steel sheeting.

Bench framing

Requirement: Engineered to suit expected loads, including heavy items such as bio-hazard or laminar flow cabinets.

Height adjustment: Include adjustable feet in frames.

Under bench cabinets

Construction: To **JOINERY ASSEMBLIES**.

Sinks

Integration with benchtops: Form and integrate sinks and bowls into the benchtop surface material to avoid joints and crevices.

Service droppers

Type: Two-compartment segregated service droppers for reticulation of gases, power and data with removable access cover plates on two opposing faces.

Venting: Provide pre-drilled ventilation slots in droppers containing gas services.

Fixing: Suspend droppers from a system of steel plates, hangers and structural bracing, using the fixings and plates for alignment.

Bracing: Between the droppers, provide a removable arrangement of horizontal power and data reticulation duct, pre-slotted powder coated shelving bracing frame and shelves.

Services

Electrical services: Provide task bench lighting.

3 EXECUTION

3.1 JOINERY

General

Joints: Provide materials in single lengths whenever possible. If joints are necessary, make them over supports.

Framing: Frame and trim where necessary for openings, including those required by other trades.

Concealed surfaces: Prime surfaces concealed by substrates.

Deficiencies: Examine joinery units for completeness and remedy deficiencies.

Substrate: Damp clean and vacuum substrate surfaces that will be permanently concealed.

Acclimatisation

General: Acclimatise the joinery items by stacking in the in-service conditions with air circulation to all surfaces after the following are complete:

- Air conditioning operational.
- Lighting operational.
- Site drainage and stormwater works are complete.
- Space fully enclosed and secure.
- Wet work complete and dry.

Accessories and trim
General: Provide accessories and trim necessary to complete the installation.

Fasteners
Visibility: Do not provide visible fasteners except in the following locations:

- Inside cupboards and drawer units.
- Inside open units, in which case provide proprietary caps to conceal fixings.

Visible fasteners: Where fasteners are unavoidable on visible joinery faces, sink the heads below the surface and fill the sinking flush with a material compatible with the surface finish. In surfaces which are to have clear or tinted finish, provide matching wood plugs showing face (not end) grain. In surfaces which are to have melamine finish, provide proprietary screws and caps finished to match.

Fix joinery units to substrates as follows:

- Floor mounted units: 600 mm centres maximum.
- Wall mounted units: To each nogging and/or stud stiffener.

Fasteners: Screws with washers into timber or steel framing, or masonry anchors.

Adhesives
General: Provide adhesives to transmit the loads imposed and for the rigidity of the assembly, without causing discolouration of finished surfaces.

Finishing
Junctions with structure: Scribe, plinths, benchtops, splashbacks, ends of cupboards, kickboards and returns to follow the line of structure.

Joints: Scribe internal and mitre external joints.

Edge strips: Finish exposed edges of sheets with edge strips which match sheet faces.

Matching: For surfaces which are to have clear or tinted finish, arrange adjacent pieces to match the grain and colour.

Hygiene requirements: To all food handling areas and voids at the backs of units in all areas, seal all carcass and junctions wall/floor, and cable and pipe entries with silicone beads for vermin proofing. Apply water resistant sealants around all plumbing fixtures and make sure sealants are fit for purpose.

Benchtops
Installation: Fix to carcass at least twice per 600 mm length of benchtop.

Joint sealing: Fill joints with sealant matching the finish colour and clamp with proprietary mechanical connectors.

Edge sealing: Seal to walls and carcasses with a sealant, which matches the finish colour.

Labelling
General: Permanently mark each unit of furniture with the manufacturer's name, on an interior surface.

3.2 TRIMS

General
Requirement: Provide trims such as architraves, beads, mouldings, stops and skirtings to make neat junctions to openings and between lining components, finishes and adjacent surfaces.

Fixing
To masonry walls: Screw with wall plugs at 600 mm centres maximum.

To stud walls: Nail to plate or framing at 600 mm centres maximum.

3.3 COMPLETION

Protection
Timber treads: Provide full timber or plywood casing.

Cleaning
Temporary coatings: On or before completion of the works, or before joining up to other surfaces, remove all traces of temporary protective coatings.

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Requirement: Remove all dust, marks and rubbish from all surfaces and internal spaces. Clean and polish all self-finished surfaces such as anodised and powder coated metals, sanitary ware, glass, tiles and laminates.

4 SELECTIONS

Refer to Finishes Fitting and Equipment and Furniture Schedule for selections.

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0552 METALWORK - FABRICATED

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide metal fixtures, as documented.

Performance

Requirements:

- Undamaged, plumb, level and straight or as documented.
- Free of surface defects or distortions or as documented.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.3 STANDARDS

General

Access for maintenance: To AS 1657.

Tactile indicators: To AS/NZS 1428.4.1.

1.4 TOLERANCES

General

Requirement: ± 2 mm from design dimensions.

1.5 SUBMISSIONS

Execution details

Welding procedures: Submit details of proposed welding procedures and risk mitigation before fabrication.

Welding dissimilar metals: Submit the following details:

- Type and thickness of materials to be welded.
- Proposed joint preparation and welding procedures.
- Proposed filler metal.
- Expected dilution (proportion of fused parent metal in the weld metal).

Operation and maintenance manuals

General: Submit manufacturer's published recommendations for service use.

Products and materials

Proprietary items: Submit the manufacturer's product data standard drawings and details showing:

- Methods of construction.
- Assembly and fixing, with dimensions and tolerances.

Stainless steel: For each batch of stainless steel supplied to the works, submit the certificate of conformance or test certificate to the applicable standard, as documented.

Stainless steel welding: Before fabrication commences, submit evidence of qualification of the welding procedure by testing to AS/NZS 1554.6 clause 4.7 or evidence of prequalification to AS/NZS 1554.6 clause 4.12.

Shop drawings
General: Submit shop drawings to a scale that best describes the detail, showing the following information:
- Overall and detail dimensions.
- Details of fabrication and components.
- Details of fabrication involving other trades or components.
- Information necessary for site assembly.
- Proposals for the break-up of large items as required for delivery to the site.
- Proposed method of joining the modules of large items.

Subcontractors
General: Submit names and contact details of proposed suppliers, fabricators and installers.

1.6 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:
- Arrival of materials on site or in workshop.
- Shop fabricated or assembled items ready for delivery to the site.
- Commencement of shop or site welding.
- Site erected assemblies on completion of erection, before covering up by cladding and encasing.
- Steel surfaces prepared for, and immediately before, site applied finishes.

2 PRODUCTS

2.1 GENERAL

Storage and handling
Requirement: Store and handle fabricated metalwork, as follows:
- Deliver to site in unbroken wrapping or packing.
- Store on a level base, away from uncured concrete and masonry and areas of wet plaster.
- Do not store in contact with other materials that may cause staining, denting or other surface damage.
- Use gloves when handling precoated finishes.
- Keep storage time to minimum by delivering items only when required for installation.

Marking
General: Provide suitable and sufficient marks or other means for identifying each member of site-erected assemblies, and for their correct setting out, location, erection and connection. Mark bolted connections to show the bolting category. Do not mark stainless steel by notching.

2.2 MATERIALS

Metals and components
Performance: Provide metals and components in quantity, lengths and cross-sections of strength and stiffness suited to their required function, finish, fabrication and method of installation.

Fasteners
Performance: Provide fasteners to resist galvanic corrosion in materials of structural and mechanical strengths and corrosion resistance at least equal to that of the lowest resistant metal in the connection.

Materials: Provide fasteners as follows:
- To copper and copper alloys: Copper or copper-alloy fixing devices only.

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- To aluminium and aluminium alloys: Aluminium alloy or non-magnetic stainless steel fixing devices only.
- To stainless steel: Appropriate stainless steel materials only.

3 EXECUTION

3.1 CONSTRUCTION GENERALLY

Aluminium structures
Standard: To AS/NZS 1664.1 or AS/NZS 1664.2.

Metals
Incompatible metals: Separate using concealed layers of suitable materials in appropriate thicknesses.

Fabrication
Workshop: Fabricate and pre-assemble items in the workshop wherever practicable.

Edges and surfaces: Keep clean, neat and free from burrs and indentations. Remove sharp edges without excessive radiusing.

Tube bends: Form bends in tube without deforming the cross section and the material thickness.

Colour finished work: Match colours of sheets, extrusions and heads of fasteners.

Thermal movement: Accommodate thermal movement in joints and fastenings.

Joints
General: Fit joints to an accuracy appropriate to the class of work. Finish visible joints made by cutting, drilling, welding, brazing or soldering using grinding, buffing or other methods appropriate to the class of work, before further treatment.

Self-finished metals: Free of surface colour variations, after jointing.

Joints: Fit accurately to a fine hairline or as documented.

Splicing
General: Provide structural members in single lengths.

3.2 WELDING AND BRAZING

Welding
Quality: Provide finished welds which are free of surface and internal cracks, welding slag, and porosity.

Site welds: Avoid site welding wherever possible. If required, locate site welds in positions for down hand welding.

Butt weld quality level: Not inferior to the appropriate level recommended in AS/NZS 1554.1 Section 6, AS/NZS 1554.6 Section 6 or AS 1665 Appendix A, as appropriate.

Brazing
General: Make sure brazed joints have sufficient lap to provide a mechanically sound joint.

Butt joints: Do not use butt joints for joints subject to load. If butt joints are used, do not rely on the filler material only.

3.3 STAINLESS STEEL FABRICATION

Welding stainless steel
Certification of welders: To AS 1796.

Riveting
General: Use only to join stainless steel sheet or strip less than 1 mm thick. Drill (not punch) the rivet hole, and drive the rivet cold. On completion, clean and passivate the riveted assembly.

Soldering
General: Do not solder stainless steel.

3.4 PROPRIETARY STAIR SYSTEMS

General

Materials, design and construction: To AS 1657.

Nosing strip: To BCA D2.13 and BCA D2.14.

Straight flight stair assembly: A proprietary system, pre assembled and fixed in place, comprising the following:

- Stair flights with treads and risers.
- Top landing.
- Balustrade and handrail to stair flight and landings.

Circular stairs: A proprietary system, mechanically assembled and fixed in place, comprising the following:

- A central steel tube column.
- Prefabricated metal treads sleeved over and cantilevered from the column.
- Top landing.
- Balustrade and handrail to stair and landings.
- Spacers, fixings and accessories necessary to complete the system.

3.5 PIPE RAIL BALUSTRADES

Fabrication

Method: Welding.

Joints: Produce smooth unbroken surfaces at joints. Scribe the joints between posts and rails. Make end-to-end joints over an internal sleeve.

Bends: Make changes of direction in rails by evenly curved pipe bends.

Free ends: Seal the free ends of pipes with fabricated or purpose-made end caps.

Fixing to structure

General: Provide fabricated predrilled or purpose-made brackets or post bases, and attach the piping to the building structure with fixings, including bolts into masonry anchors, and coach screws or bolts into timber, of metal compatible with the piping.

Galvanizing

General: If possible, complete fabrication before galvanizing; otherwise apply a zinc-rich primer to affected joint surfaces.

Other protective coatings

General: Apply other protective coatings as documented and to the manufacturer’s recommendations.

3.6 PROPRIETARY BALUSTRADES

General

Balustrades: A proprietary system, pre-assembled and fixed in place, comprising the following:

- Posts, rails and balusters.
- Infill frame and panels.
- Handrails, if required.

3.7 CORNER GUARDS

Guards

General: Where salient corners of the structure require protection from mechanical damage, provide metal corner guards as follows:

- Consisting of rolled angle sections or sections fabricated from metal sheet bent to the radius or angle of the corner.
- Fitting close to adjoining surface finishes.

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- Solidly grouted up at the back as necessary to eliminate voids.
- Securely fixed by a method which does not cause distortion in the guard surface, and consists of either concealed built in lugs, or flush countersunk head fixings into appropriate anchors.

3.8 RESILIENT DOCK BUMPERS

Product

General: Provide and install a proprietary system of fabric reinforced rubber pads pressure laminated and bolted between galvanized mild steel fixing angles.

Fixing: Bolt or weld the angles to the dock structure.

3.9 COMPLETION

Cleaning

Temporary coatings: On or before completion of the works, or before joining up to other surfaces, remove all traces of coatings used as temporary protection.

4 SELECTIONS

Refer to Finishes Fittings and Equipment Schedule for selections.

0553 STAINLESS STEEL BENCHING

1 GENERAL

1.1 RESPONSIBILITIES

General
Requirement: Provide stainless steel fixtures, as documented.

Performance
Requirements:
- Free of surface defects or distortions.
- Installed to conform to Heath Authorities having jurisdiction over the installation.

1.2 CROSS REFERENCES

General
Requirement: Conform to the following:
- *0171 General requirements*.

1.3 SUBMISSIONS

Execution details
Site welding: If proposed, submit details indicating location and process.

Operation and maintenance manuals
Requirement: Submit maintenance manuals.

Shop drawings
General: Submit shop drawings showing the following:
- Bench/bench junctions.
- Welded joints.
- Material, grade and finish.
- Standard drawings for proprietary components.
- Proposals for the break-up of large items as required for delivery to the site.
- Proposed method of joining the modules of large items.
- Installation details required by Health Authorities.

Warranties
Requirement: Submit the installer’s warranty of the workmanship and application.

1.4 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:
- Fabrication complete, before delivery.
- Installation complete.

2 PRODUCTS

2.1 GENERAL

Storage and handling
Requirement: Transport all benching to site and store without damage or distortion of components.

2.2 MATERIALS

Stainless steel
Plate, sheet and strip: To ASTM A240/A240M.
Bar: To ASTM A276/A276M.
Tube: To ASTM A554.
Type: 304.

Stainless steel sheet
Surface finish: No. 4 finish, not including to underside of shelves, and door and drawer backs.
Thickness: 1.2 mm minimum.

Particleboard
Standard: To AS/NZS 1859.1.
Classification: Moisture resistant (MR).

Plywood
Standard: To AS/NZS 2271.
Visible surface with a clear finish: Veneer quality A.
Other surfaces: Veneer quality C or D.
Bond: Type A.

Certification
Timber based products: Brand panels under the authority of a recognised certification scheme to *0185 Timber products, finishes and treatment,* as applicable to the product. Locate the brand on faces or edges which will be concealed in the works.

2.3 COMPONENTS

Fasteners
Material: Stainless steel.
Dimensional system: Metric.
Bolt and screw heads: Polished, pan type or countersunk.

Hardware
Material: Stainless steel.

Sealants
Type: Neutral cure one-part silicone.
Performance:
- Flexible.
- Resistant to physical and chemical damage characteristic of installed environment.
- Resistant to growth of mould, bacteria and fungi.
- Colourfast.

Curing period: Less than 4 days to a depth of 10 mm.
Peel strength (minimum): 100 kPa.

Adhesive
Type: Spray contact adhesive.

3 EXECUTION

3.1 FABRICATION GENERALLY

Stainless steel welding
Process: Gas tungsten arc welding.
Weld type: Butt.

Internal weld category: Category 2 to AS/NZS 1554.6 Appendix B.

External weld category: Class B to AS/NZS 1554.6 Appendix B.

Surface finish: Grade I, 120 grit.

Welding materials: Compatible with metal being welded.

Weld quality: Free from imperfections such as cracks and pits. Grind and polish to give required surface finish. Continuous exposed welds.

Joints: Strength at least that of parent metal. Free from crevices and folds.

Joint position: At corners and edges as far as possible. Minimise joints in flat panels.

Protection

General: Provide temporary self-adhesive plastic film to stainless steel surfaces.

Hardware fixing

General: Drill and tap, or weld fix.

Linishing grain direction

Benches and shelves: Lengthwise.

Bowls: Horizontal to sides, parallel to bench grain to bottom. Mitre at bottom corners.

Abutting surfaces: Parallel where possible.

3.2 BENCHTOP FABRICATION

Benchtops

Material: Stainless steel sheet.

Thickness: 2 mm.

Bench height: To top of dry bench and to top of perimeter bead to wet bench.

Bench lengths: Maximum, to minimise number of bench/bench junctions.

Exposed corners: Radius exposed corners at least 5 mm, including back vertical corners of upstands.

Internal back vertical corners: Fuse only from behind.

Wet bench perimeter: Except at wall flashing, provide a raised bead, with a fascia.

Dry bench perimeter: Except at wall flashing, provide a fascia.

Drainer

Drainer falls to sinks: 1:50, 450 mm long.

Drainer surface: Plain.

Falls:

- To dishwashing machine: Between 1:100 and 1:72, 1800 mm maximum length.
- Fascia: Fall to match.

Wall splashback

Type: Integral.

Ends: Return.

Type: Spot weld threaded stainless steel M5 studs to underside of bench top, centred over framing members, and 2 studs per front-to-back framing member. Make sure stud fixing does not indent the bench top. Provide star washers and nuts.

3.3 BOWL FABRICATION

Bowls

Type: Deep drawn stainless steel.

Thickness:

- Capacity < 75 L: 1.6 mm.
- Capacity ≥ 75 L: 2 mm.

Internal radii: 25 mm minimum.

Minimum depth: 250 mm.

Wastes:

- Size (minimum): DN 50 to AS 2887.
- Nut and washer: To AS 1589 or AS 2887 Locate with the washer to the underside of the bowl.
- Position: Centred in single bowls, adjacent in double bowls.
- Plug: Heavy-duty commercial.
- Pot sinks: Extended lever handle type, with 50 mm ball valve.

Falls: In the long dimension.

Fall to waste (minimum):

- Capacity < 75 L: 10 mm.
- Capacity ≥ 75 L: 25 mm.

3.4 FRAME FABRICATION

Benchtop support frame

Support: Provide sufficient support so that no load is placed on the waste pipe or water connections.

- Design deflection (maximum): 3 mm.

Members: 31.8 x 31.8 x 1.6 mm stainless steel tube. Seal ends.

Extent: Perimeter and at sides of bowls, with additional members spaced as follows:

- 1.6 mm sheet: 350 mm maximum centres.
- 2 mm sheet: 500 mm maximum centres.

Maximum unsupported area: 0.3 m^2.

Connections: Welded.

Fixing to benchtop: Pre-drill for studs.

Bench legs

Members: 31.8 x 31.8 x 1.6 mm stainless steel tube. Seal ends.

Fixing to benchtop support frame: Weld all around at junctions.

Spacing: 1200 mm maximum.

Fixing to walls: Pre-drilled 100 x 50 x 2 mm stainless steel plate welded to legs at 600 mm high.

Adjacent to walls: 50 to 150 mm clear of wall.

Feet: Nylon or chrome-plated aluminium, adjustable vertically ± 25 mm. Threaded section must not protrude from leg.

3.5 SHELVING FABRICATION

Under bench shelving

Material: Stainless steel.

Thickness: 1.6 mm.

Shelf support: 30 x 30 x 5 mm stainless steel angles.

- Extent: Perimeter, with additional angles spaced to give a maximum unsupported area of 0.3 m^2.
- Connections: Welded.

Fixing of support to legs: Welded or threaded.

Over bench shelving

Material: Stainless steel.

Thickness: 1.6 mm.

Shelf support: 25.4 x 25.4 x 1.6 mm stainless steel L-shaped brackets. Seal ends.

- Spacing: 900 mm maximum.
- Fixing to wall: At least two M8 hexagon head bolts.

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Fixing of shelf to support: Threaded M5 studs through tube with nuts on underside. Seal between shelf and support.

3.6 DRAWERS FABRICATION

Drawers

Material: Stainless steel.

Thickness: 1.2 mm.

Construction: Welded.

Frames: Removable, and interchangeable with other drawer frames. Provide extension-type drawer slide mechanism and front panel. Open top and bottom, for insert liner. Provide rubber stops at rear.

Front panel: 20 mm thick double pan construction.

Drawer liners: Removable.

Housing: Back and 2 sides, of a neat external appearance.

Runners: Incline to rear so drawers roll closed. Provide stop so drawer cannot be pulled out accidentally.

Locks: Chrome-plated brass.

3.7 INSTALLATION

Welding

General: Do not site weld.

Sealing

Gaps < 5 mm wide: Apply sealant at the following locations:

- Butt joints between benches.
- Between benches, including flashings, and walls.
- Spaces and gaps under benches.

Gaps ≥ 5 mm wide: Close with stainless steel infill panels.

Floor fixing

Steel dowels: 8 mm diameter stainless steel dowels, sealed to floor with silicone sealant.

- Adjustable fixings: Provide for height adjustment, as appropriate.

3.8 COMPLETION

Cleaning

General: Wipe down with a damp, soft, clean cloth.

Grease removal: Wipe with moist, soft cloth with ammonia solution, or household liquid grease remover.

Surface protection

General: Temporary self-adhesive plastic film: Remove from stainless steel surfaces.

0572 MISCELLANEOUS FURNITURE

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide miscellaneous furniture, as documented.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.3 INTERPRETATION

Definitions

General: For the purposes of this worksection the following definition applies.

- Mobile shelving: Also referred to as compactus shelving.

1.4 SUBMISSIONS

Fire performance

Fire hazard properties: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE**, **Fire hazard properties**.

Operation and maintenance manuals

General: Submit the manufacturers' data as follows:

- Recommendations for demounting and relocation.
- Recommendations for service use, care and maintenance.
- List of manufacturers and suppliers for replacement parts.

Products and materials

Manufacturer's drawings: Submit the manufacturer's standard drawings and details showing methods of construction, assembly and fixing, with dimensions and tolerances, connection method for all removable components.

Insect resistance: Submit evidence of conformity to PRODUCTS, **MATERIALS**, **Insect resistance** tested to AS 2001.6.1.

Workstation screen sound absorption: Submit evidence of weighted sound absorption coefficient (α_w) to AS ISO 11654 tested to AS ISO 354 for workstations required to have a particular rating (α_w).

Samples

General: Submit two samples of each of the following where applicable:

- Finishes to prepared surfaces with associated selected edgestrips and trims.
- Colour range samples of facings and prefinished production material.

Shop drawings

General: Submit shop drawings to a scale that best describes the detail showing the following:

- Construction, assembly and fixing details for custom designed (non-standard) furniture items.
- The proposed layout for furniture installations.
- Work surface edge detail.

Subcontractors

General: Submit names and contact details of proposed suppliers and installers.

1.5 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Custom-built furniture items fabricated and ready to be delivered to the site.
- Furniture items delivered to site before installation.
- Building locations or substrates prepared to receive furniture before the furniture is installed.
- Completion of installation.

2 PRODUCTS

2.1 GENERAL

Storage and handling

Requirement: Transport all furniture to site and store without damage or distortion of components.

Marking and labelling

General: Label furniture with the following details in an inconspicuous location:

- Manufacturer's name and address.
- Date of manufacture.

Product certification

Certification scheme: Equal to 4 star Green star rating

2.2 FIRE PERFORMANCE

Fire hazard properties

Fire hazard indices for all materials: Tested to AS/NZS 1530.3.

2.3 MATERIALS

Decorative overlaid wood panels

Standard: To AS/NZS 1859.3.

Dry process fibreboard (including medium density fibreboard)

Standard: To AS/NZS 1859.2.

Flexible cellular polyurethane

Standard: To AS 2281.

High-pressure decorative laminate sheets

Standard: To AS/NZS 2924.1.

Thickness (minimum):

- For horizontal surfaces fixed to a continuous substrate: 1.2 mm.
- For vertical surfaces fixed to a continuous substrate: 0.8 mm.
- For post formed laminate fixed to a continuous substrate: 0.8 mm.
- For vertical surfaces fixed intermittently (e.g. to studs): 3.0 mm.
- For edge strips: 0.4 mm.

Powder coating

Application to aluminium and aluminium alloy substrates: To AS 3715.

Application to metal substrates other than aluminium: To AS 4506.

Stainless steel

Finish: Surface finish 4 (general purpose polished).

Textile upholstery fabrics

Standard: To AS 2687.

Performance classification (minimum): 3.

Wool and woolblend fabrics:

- Woolmark/ Woolmark Blend/Wool Blend: Required.
- Leather: To AFRDI Standard 146.

Anti-microbial treatment
Requirement: Non-metallic, colourless, odourless, positively charged polymer applied during manufacturing to form a molecularly bonded surface to resist bacteria and mould growth.

Insect resistance
Requirement: Provide upholstery fabrics composed entirely of materials either inherently resistant to insect attack or treated against insect attack by moth, by application of insecticide to the yarn during the dyeing or scouring process.

Insect resist agents for wool: Conform to the recommended application levels published by the Woolmark Company for Level 4 protection.

2.4 DESKS

Office desks
Standard: To AS/NZS 4442.

School tables
Standard: To AS/NZS 4610.3.

2.5 CHAIRS

Height adjustable swivel chairs
Standard: To AS/NZS 4438.

Plastic monobloc chairs
Standard: To AS/NZS 3813.

School chairs
Standard: To AS/NZS 4610.2.

2.6 SCREENS

Movable office screens
Type: Proprietary modular floor mounted screens, consisting of purpose-made solid and semi-glazed panels forming divisions, fronts and nibs assembled and installed with purpose-made fixings.

2.7 CABINETS

Lateral filing cabinets
Standard: To AS 5079.1.

Vertical filing cabinets
Standard: To AS 5079.2.

Mobile pedestals
Standard: To AS 5079.3.

School storage furniture
Standard: To AS/NZS 4610.3.

2.8 SHELF UNITS

Office shelving systems
Shelving generally: A proprietary modular system incorporating the following:

- Rigidly self-braced frame, extendable in modular increments.
- Shelf height adjustable in increments not exceeding 50 mm.
- Other accessories necessary for the satisfactory erection and service use of the shelving.

Steel shelving construction and assembly: Free of burrs and sharp edges.

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Mobile shelving

System: A proprietary system consisting of closed-type steel shelving units mounted on floor tracks.

Safety and security: Provide a pin-tumbler lock, to lock together all continuous units in a single key operation.

Dust protection: Provide replaceable resilient rubber strips to the contact edges of the units.

Shelving: Steel units, single sided in the case of end units, otherwise double sided, fitted with adjustable steel shelving, together with manufacturer's standard accessories.

2.9 DISPLAY SURFACES

Chalkboards

Chalkboard panels: Hardboard 5 mm minimum thickness, with an applied long life, fine finish chalkboard surface of good abrasive properties, producing clear sharp edged chalk lines.

Wet processed fibreboard (including hardboard): To AS/NZS 1859.4.

- Type: General purpose.

Pinboards

Panel thickness: At least 6 mm.

Panel material: Wet processed fibreboard (including softboard) to AS/NZS 1859.4.

Panel backing: Fix board to a 6 mm plywood backing with PVA emulsion adhesive.

Whiteboards

Whiteboard panels: White seamless vitreous enamel surface on sheet steel base, resistant to chipping and fracture when the base is slightly flexed, fixed with a suitable contact adhesive to a backing of primed particleboard at least 12 mm thick.

Surface: Suitable for use with fast-evaporation, dry-erase pens.

Edges: Trim the edges of the panels with hollow square aluminium sections mitred at corners.

Pen rails: Proprietary aluminium section fixed to the full width of the bottom edge of the board.

2.10 RETRACTABLE PROJECTION SCREENS

General

Screen system: Proprietary extendible screen system for front projection, mounted on a spring-loaded roller so as to be fully retractable when not in use.

Screens: Flexible synthetic fabric, flame retardant and mildew resistant, presenting a flat plane surface when extended, textured to control the distribution of projected light evenly over a wide viewing angle.

Finishes: Metal components factory prefinished by plating, anodising, or a thermoset powder coating.

Portable projection screens

Description: A screen system extendable from a bottom roller, with a retractable extension arm, on a floor mounting providing stability when the screen is extended, and consisting of either of the following:

- A folding metal tripod.
- An integrated floor stand capable of assembly without tools.
- Foldable single frame/heavy duty truss.

Manual projection screens

Description: A screen system extendable from a top roller, suspended from proprietary hanging brackets fixed to the building structure, with provision for mechanical locking in the fully or partially extended pull-down positions.

Wall mounted projection screen

Description: A fixed framed screen, wall mounted.

Motorised screens
Description: Screen extension and retraction operated by an electric motor mounted in the roller, activated by a limit switch with automatic stops in the terminal (up or down) positions, and at adjustable preset intermediate positions.

2.11 CONTAINERS

Letterboxes
Type: Proprietary metal letter box with corrosion resistant, weatherproof body, weather protected letter slot, lockable hinged door, house or unit number, and accessories necessary for correct installation.

Standard: To AS 4253.

Waste bins
Type: Prefinished proprietary products manufactured from metals or plastics in standard sizes and colours.

3 EXECUTION

3.1 INSTALLATION

Fabrics
Fabric surface: Provide a finished surface that is smooth and without irregularities.

3.2 SHELF UNITS

General
Height to depth ratio of free standing shelving units: Maximum 6:1, unless as follows:

- A positive connection between sections is made so that the height/depth ratio of the connected shelving is maximum 6:1.
- The connected shelving is anchored to an external rigid fixing.

Lateral deflection: As follows:

- Free standing shelving: Maximum H/50, where H is the height of the shelving, when a lateral load of 2.5% of the vertical test load (sum of vertical test load applied to each shelf) is applied in any direction at the top of the shelving.
- Multi-tiered shelving tied at floor and soffit levels: Maximum H/50, where H is the height of the shelving, when a lateral load of 2.5% of the full vertical test load (sum of vertical test load applied to each shelf) is applied in any direction at a position mid height between ties.

Mobile shelving
Bases: Mount each unit on a base of structural steel sections supporting the unit between bearings, incorporating necessary bearing and guide wheels.

Tracks: Provide bearing and guide tracks which are bright mild steel sections fixed to the structural concrete floor. Where tracks are to be flush with the finished floor surface, provide linings or edge trim for recesses required for floor guides, operating gear, or the like.

3.3 DISPLAY SURFACES

Chalkboards
Chalkboard surface: Primer and at least two finishing coats of modified alkyd epoxy, infra-red heat dried, with an abrasive in the final coat.

Wall fixing: Fix the chalkboard to the wall with at least 4 sets of interlocking brackets, of sufficient strength to withstand the forces produced by a 90 kg load swinging on the end of an open swing leaf at right angles to the fixed board surface.

Swinging leaves: Fix swing leaves with reinforced pivot points at either end of the wall mounted board with minimum 10 mm diameter mild steel pivot pins through 5 mm (minimum) thick zinc plated steel pivot plates. Provide a 6 mm thick ebonite washer to the bottom plate.

Map rails: Continuous clear anodised aluminium extruded section incorporating a cork pin-up strip and sliding paper chart hanger rail, screwed to a rebated support rail fixed to the wall above the chalkboard, or constructed integrally with the top of the wall mounted board.

Frame: Trim the edges of the chalkboard and swing leaf panels with clear anodised extruded aluminium sections, rounded at corners.

Chalk rails: Trim the bottom of the fixed board with a section incorporating an integral chalk rail.

Applied lines: 3 mm wide yellow painted lines formed straight, true and even, using durable paint of an equivalent life to the chalk surface and capable of frequent abrasion by eraser without fading or wear.

- Graph surface: 1000 x 1000 mm graph marked in 100 x 100 mm squares.
- Stave surface: Four staves spaced approximately 90 mm apart with individual lines of staves spaced approximately 38 mm apart.

Projection surfaces: A matt white projection screen wrapped at least 25 mm over the edges of a hardboard backing and fixed by adhesives and staples. Do not adhere screen material to the hardboard face surface, but allow it to set freely with sufficient stretch to achieve and hold a flat surface.

Pinboards and whiteboards

Installation: Attach the panels to building substrates with either of the following:

- Mastic adhesive.
- Masonry wall plugs and chromium plated raised head screws over chromium plated cup washers.
- Concealed keyhole slots over screwheads in the substrate (for demountable pinboards).

3.4 COMPLETION

Warranties

Requirement: Installer's warranty against defective workmanship or wrong installation.

Chalkboard maintenance instructions

General: Locate in the bottom left-hand corner of the board, fix an instruction sheet of pressure sensitive film listing procedures for the care and maintenance of the board surface.

0573 FIRE EXTINGUISHERS AND BLANKETS

1 GENERAL

1.1 RESPONSIBILITIES

General
Requirement: Provide fire extinguishers and fire blankets, as documented.

1.2 CROSS REFERENCES

General
Requirement: Conform to the following:
- *0171 General requirements*.

1.3 SUBMISSIONS

Products and materials
Evidence of suitability: Submit evidence of suitability for use, to BCA A5.0, for all fire protection products.

2 PRODUCTS

2.1 EXTINGUISHERS

Standards
General: Portable fire extinguishers:
- General requirements: To AS/NZS 1841.1.
- Water: To AS/NZS 1841.2.
- Wet chemical: To AS/NZS 1841.3.
- Foam: To AS/NZS 1841.4.
- Powder: To AS/NZS 1841.5.
- Carbon dioxide: To AS/NZS 1841.6.
- Non-rechargeable: To AS/NZS 1841.8.

Selection and location: To AS 2444.

2.2 BLANKETS

Standards
Fire blankets: To AS/NZS 3504.
Selection and location: To AS 2444.

3 EXECUTION

3.1 COMPLETION

Maintenance
Fire extinguishers: To AS 1851.
Fire blankets: To AS 1851.

0574 WINDOW COVERINGS

1 GENERAL

1.1 RESPONSIBILITIES

General
Requirement: Provide window coverings, as documented.

1.2 CROSS REFERENCES

General
Requirement: Conform to the following:
- *0171 General requirements*.

1.3 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:
- Building locations or substrates prepared to receive window coverings before installation.

2 PRODUCTS

2.1 MATERIALS

Fabrics
Uncoated woven and knitted fabrics: To AS 2663.1.

Coated woven and knitted fabrics: To AS 2663.2.
- Performance classification (minimum): 2.

Vertical blind fabrics: To AS 2663.3.

Anti-microbial treatment
Requirement: Non-metallic, colourless, odourless, positively charged polymer applied during manufacturing to form a molecularly bonded surface to resist bacteria and mould growth.

Insect resistance
Requirement: Provide window coverings composed entirely of materials either inherently resistant to insect attack or treated against insect attack by moth, by application of insecticide to the yarn during the dyeing or scouring process.

Insect resist agents for wool: Conform to the recommended application levels published by the Woolmark Company for Level 4 protection.

2.2 FIRE PERFORMANCE

Fire hazard properties
Windows coverings: Tested to AS/NZS 1530.3.

2.3 CURTAINS

Curtains
Requirement: Complete proprietary systems, as documented, fabricated by one manufacturer.

2.4 BLINDS

Venetian blinds
Requirement: Complete proprietary systems, as documented, fabricated by one manufacturer.

Tape: To allow a 42 mm pitch between ladders and an 8 mm slat overlap.

Top and bottom rails: 0.5 mm aluminium zinc coated steel powder coat finish.

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Vertically retracting fabric blinds
Requirement: Complete proprietary systems, as documented, fabricated by one manufacturer.

Horizontally retracting fabric blinds
Requirement: Complete proprietary systems, as documented, fabricated by one manufacturer.

Track material: Extruded aluminium alloy 6063-T6.

3 EXECUTION

3.1 INSTALLATION

General
Installation: Install tracks in documented locations using manufacturer's purpose fabricated mounting brackets, clips, track splicing and other hardware. Install window coverings to hang plumb and level, and true to line.

Fixing: Provide concealed mechanical fixings suitable for mounting tracks to substrate. Match exposed mounting hardware to the finish and colour of adjacent track.

Adjustment: Adjust all operating hardware for smooth operation free from binding, and to provide even, accurate alignment of window covering in open and closed positions.

Safety: Install child safety devices on all control cords and chains. Install all control cords and chains in conformance with *ACCC SSCompetition and Consumer (Corded Internal Window Coverings) Safety Standard.*

Horizontally retracting fabric blinds
Slats and panels: Fix slats and panels in single straight lengths finishing 10 mm above floor or sill level, without twists, warp, bows, edge ripples or fraying. Fix a weight into a pocket formed in the bottom of each slat or a rail to the top and bottom of each panel.

Slat bottoms: Connect bottoms of slats using a chain with reversers.

Spacing: Install slats evenly using plastic spacers which lock into the carrier rail to provide a continuous linkage, and fix with sealed plastic slat holders carried by plastic rotation pivots.

3.2 COMPLETION

Warranties
General: Submit the following:

- Manufacturer's warranty against defects in workmanship.
- Installer's warranty against defects in installation.

Maintenance manual
General: Submit the manufacturers' data as follows:

- Recommendations for service use, care and maintenance.
- List of manufacturers and suppliers of replacement parts.

4 SELECTIONS

Refer to finishes Fittings and Equipment Schedule for selections.

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0581 SIGNAGE

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide signage systems, as documented.

Performance

Requirement: Provide signage as follows:

- Appropriately secured.
- Located within a clear line of vision.
- To contrast with the background.
- With clean, well defined edges or arrises, and free from blemishes.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.
- *0921 Low voltage power systems*.

1.3 STANDARDS

Signs

Safety signs - design and use: To AS 1319.

Signs and graphics for disability access: AS 1428.1 and AS 1428.2.

Tactile wayfinding signs: To AS 1428.4.2.

1.4 INTERPRETATION

Definitions

General: For the purposes of this worksection the following definitions apply:

- Changeable letter systems: Sign systems consisting of display boards or holders into which removable individual letters, numbers, etc can be inserted .
- Changeable plate systems: Sign systems consisting of fixed plate holders to which removable interchangeable sign plates may be attached or inserted.
- House signage: Internal and external project specific signs.
- Illuminated signs: Signs consisting of cabinets enclosing a light source, illuminating translucent face panels bearing the specified signage.
- Statutory signage: Signs prescribed by the NCC and statutory authorities.
- Variable room identification systems: Changeable plate systems incorporating fixed room numbers and removable name strips.

1.5 SUBMISSIONS

Operation and maintenance manuals

General: Submit the manufacturers' data as follows:

- Recommendations for service use, care and maintenance.
- List of manufacturers and suppliers of replacement parts.

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Samples
Materials: Submit samples showing each colour and finish of exposed signage materials and accessories. If there is a range of colours and/or textures for a particular item, submit samples showing the extremes and mean of the range.

Shop drawings
General: Submit shop drawings showing the following information if appropriate:
- Layout, construction and fixing details for custom designed (non-standard) sign systems.
- Large scale (full size if practicable) lettering layouts for individual letter signs.
- Computer generated graphic images.
- Full size spacing templates for individually mounted characters.
- Location template drawings for anchorages to permanent construction. Show type of anchorage.
- Wiring diagrams for illuminated signs.

Warranties
Requirement: Submit the manufacturer's published product warranties.

1.6 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:
- Signage and graphic items delivered to site before installation.
- Building locations or substrates prepared to receive signage and graphic items before they are installed.

2 PRODUCTS

2.1 MATERIALS

Materials standards
Aluminium:
- Plate for engraving: Alloy and temper designation 6063-0 to AS 2848.1.
- For casting: To AS 1874.

Stainless steel: Surface finish designation 4 (general purpose polished).

Plastics:
- PVC-U sheet: Semi-rigid sheet.
- Rigid cellular polystyrene: To AS 1366.3, class VH for cut-out shapes.

Photoluminescent exit signs: To BCA E4.8(b).

3 EXECUTION

3.1 WORKMANSHIP

Production
General: Form signage and graphic items accurately with clean, well defined edges or arises, free from blemishes.

Engraving to two layer plastic laminate: Engrave lettering to expose the lower laminate.

Engraved and filled: Lettering precision cut and filled colouring material. Clean faces of all filling material.

Casting: Produce shapes free of pits, scale, blow holes or other defects, hand or machine finished if necessary.

Laser cut lettering: Individual vinyl letters with self-adhesive backing.

Printed lettering: Lettering and graphic images screen/digitally printed on:

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- Film with self-adhesive backing.
- Acrylic sheet.
- Aluminium plate.
- Stainless steel plate.

Large format digital printing: Lettering and graphic images screen printed film with self-adhesive backing.

Signwriting: Lettering and graphic images hand painted direct to the background by a tradesman with recognised qualifications and demonstrated skills.

Fabricated: Three dimensional, formed as follows:

- Laser cutting from solid material and hand finished as necessary.
- Moulding: Individual plastic hollow three dimensional characters and shapes formed by:
  . Injection moulding.
  . Vacuum forming.
- Built-up individual shapes by fabricating the faces and edges from separate pieces neatly and securely joined.

3.2 INSTALLATION

General

Requirement: Install signage and graphic items level and plumb, securely mounted, with concealed corrosion and theft-resistant fixings.

Self-adhesive signs

Requirement: Fix free of bubbles and creases.

Illuminated signs

Electrical fittings: Provide a junction box for power connection, and the necessary lamps with proper mountings, protection, and accessories including wiring transformers and insulators. Install signs and conceal cabling to *0921 Low voltage power systems*.

3.3 COMPLETION

Cleaning

General: Remove protective coverings, replace damaged signage and leave the work clean, polished, free from defects, and in good condition.

Warranties

Requirement: Installer’s warranty against defective workmanship or wrong installation.

4 SELECTIONS

Refer to Finishes Fitting and Equipment Schedule for selections.

4.1 STATUTORY SIGNS

Termite protection

Position	In or near meter box or similar
Message	Details of termite management system Indicate: - The method of protection - The date of installation - The life expectancy of a chemical barrier as listed on the appropriate authority's pesticides register label

	- The installer's recommendation for inspections
Sign type	Laminated page(s)
Conformance	BCA 3.1.4.4, BCA B1.4(i)(ii) AS 3660.1 Appendix A

Required fire door and required smoke door

Position	On or adjacent to the door, on the side of the door that faces a person seeking egress, and if the door is in the held open position, on either the wall adjacent the doorway or both sides of the door.
Message if auto door with auto hold open device	FIRE SAFETY DOOR – DO NOT OBSTRUCT
Message if self-closing door	FIRE SAFETY DOOR DO NOT OBSTRUCT DO NOT KEEP OPEN
Message if door discharging from a fire isolated exit	FIRE SAFETY DOOR – DO NOT OBSTRUCT
Letter height (minimum)	20 mm
Sign type	
Conformance	BCA D2.23

Braille and tactile exit signage

Position	To BCA Spec D3.6 for every door described in BCA E4.5
Message	Exit (and) Level (followed by the floor level number)
Letter height (minimum)	BCA Spec D3.6
Sign type	
Conformance	BCA E4.5, BCA D3.6 and BCA Spec D3.6

Fire exit offence notice (NSW)

Position	Adjacent door providing access to (but not within) a fire exit stair, passage or ramp
Message	OFFENCE RELATING TO FIRE EXITS It is an offence under the Environmental Planning and Assessment Act 1979 (a) to place anything in or near this fire exit that may obstruct persons moving to and from the exit, or (b) to interfere with or obstruct the operation of any fire doors, or (c) to remove, damage or otherwise interfere with this notice.
Letter height (minimum)	8 mm (title), 2.5 mm (remainder)
Sign type	
Conformance	Environmental Planning and Assessment Regulation 2000 clause 183

Lifts – warning

Position	Near every call button for passenger lift(s)
Message	DO NOT USE LIFTS IF THERE IS A FIRE (or) Do not use lifts if there is a fire
Letter height (minimum)	10 mm (upper case) 8 mm (lower case)
Sign type	Incised, inlaid or embossed letters on metal, wood, plastic or similar plate securely and permanently attached to the wall; or letters incised or inlaid directly into the surface of the material forming the wall
Conformance	BCA E3.3

Fire hose reels and fire hydrants

Position	Cupboard door or adjacent the FHR
Message	FIRE HOSE REEL (and/or) FIRE HYDRANT
Letter height (minimum)	External cabinets: 75 mm Internal cabinets: 50 mm
Sign type	White adhesive backed vinyl
Conformance	AS 2441 AS 2419.1 BCA E1.3 and BCA E1.4

Fire hose reel location sign

Position	Above or adjacent the FHR if located in a recess or obscure location
Message	To AS 2441 Figure 10.1
Letter height (minimum)	16 mm
Sign type	Adhesive backed vinyl
Conformance	AS 2441

Fire brigade booster assembly cabinet location sign

Position	Cabinet doors
Message	FIRE HYDRANT BOOSTER, or FIRE HYDRANT AND SPRINKLER BOOSTER, or COMBINED FIRE HYDRANT AND SPRINKLER BOOSTER, as appropriate. If a feed fire hydrant is enclosed in the cabinet, add the symbol FH within a 100 mm circle of thickness and colour to match lettering.
Letter height (minimum)	50 mm
Sign type	Adhesive backed vinyl
Conformance	AS 2419.1 clause 7.10.1

Fire brigade booster assembly – Notice of pressure

Position	Adjacent or within the cabinet or recess
Message	BOOST PRESSURE: ‹› kPa TEST PRESSURE: ‹› kPa

Letter height (minimum)	25 mm
Sign type	
Conformance	AS 2419.1 clause 7.10.1

Fire brigade relay pumps

Position	At each pump location
Message	FIRE BRIGADE RELAY PUMP
Letter height (minimum)	75 mm
Sign type	
Conformance	AS 2419.1 clause 7.7

Boosters in series with pumps

Position	Adjacent the pressure gauge
Message	WARNING-THIS BOOSTER IS CONNECTED IN SERIES (RELAY) WITH THE FIXED ON-SITE FIRE PUMPS WHICH MAY BE RUNNING. THIS GAUGE SHOWS THE TRUE BOOST PRESSURE AT THE FIXED ON-SITE PUMP DISCHARGE
Letter height (minimum)	25 mm
Sign type	
Conformance	AS 2419.1 clause 7.6

Hose reel system valve

Position	At any system valve that can isolate flow in the hose reel water supply main
Message	FIRE SERVICE VALVE – CLOSE ONLY TO SERVICE FIRE HOSE REELS
Letter height (minimum)	8 mm
Sign type	Label with engraved non-ferrous metal tag
Conformance	AS 2441, clause 6.2

Portable fire extinguishers – cabinet

Position	Cabinet
Message	FIRE EXTINGUISHER
Letter height (minimum)	32 mm
Sign type	Adhesive backed vinyl
Conformance	AS 2444 clause 3.6 Fire Brigade

Portable fire extinguishers – location signs

Position	As nominated in AS 2444 clause 3.2 at every installed extinguisher nominated BCA Table E1.6
Message	Prescribed graphic
Letter height (minimum)	16 mm

Sign type	Computer generated adhesive backed vinyl graphic
Conformance	AS 2444 clause 3.3 Fire Brigade

Fire point

Position	As nominated in AS 2444 clause 3.8 at each fire point
Message	FIRE POINT (and prescribed graphic)
Letter height (minimum)	
Sign type	Computer generated adhesive backed vinyl graphic
Conformance	AS 2444 clause 3.8

Fire blankets

Position	As nominated in AS 2444 clause 6.4 at every blanket location
Message	Prescribed graphic
Letter height (minimum)	
Sign type	Computer generated adhesive backed vinyl graphic
Conformance	AS 2444 clauses 6.3, 6.4 and Fig 6.1 Fire Brigade

Regulatory carpark signs: Stop and Give Way

Position	As required for traffic control
Message	Graphic nominated in AS/NZS 2890.1 clause 4.3.4(b)
Sign type	AS/NZS 2890.1 R1-1 (Stop), R1-2 (Give Way)
Conformance	AS/NZS 2890.1 clause 4.3.4

Regulatory carpark signs: Speed limit

Position	As required for traffic control
Message	Graphic nominated in AS/NZS 2890.1 clause 4.3.4(c)
Sign type	AS/NZS 2890.1 R4-1
Conformance	AS/NZS 2890.1 clause 4.3.4

Regulatory carpark signs: Hump warning

Position	As required for traffic control
Message	Graphic nominated in AS/NZS 2890.1 clause 4.3.4(d)
Sign type	AS/NZS 2890.1 W5-10
Conformance	AS/NZS 2890.1 clause 4.3.4

Regulatory carpark signs: Disabled persons parking facilities

Position	Designated car space
Symbol	Graphic size and position nominated in AS/NZS 2890.6 clause 3.1 figure 3.1
Sign type	Pavement marking paint.
Conformance	AS/NZS 2890.6 clause 3.1

Unisex accessible sanitary facilities

Position	To BCA Spec D3.6
Message	- Braille and tactile signage incorporating the international symbol of access. - Indicate suitability for left or right handed use.
Symbol size	AS 1428.2 clause 16, Table 1.
Letter height (minimum)	Braille: BCA Spec D3.6 Raised characters: Sans serif type font 20 mm.
Sign type	
Conformance	AS 1428.1 BCA D3.6

Ambulant sanitary facilities

Position	To BCA Spec D3.6
Message	Braille and tactile signage incorporating the male/ female ambulant symbol.
Symbol size	AS 1428.2 clause 16, Table 1.
Letter height (minimum)	Braille: BCA Spec D3.6 Raised characters: Sans serif type font 20 mm.
Sign type	
Conformance	AS 1428.1 BCA D3.6

Non-accessible sanitary facilities

Position	At each bank of sanitary facilities that are not provided with an accessible unisex sanitary facility.
Message	- Braille and tactile signage incorporating the international symbol of access. - Indicate location of the nearest accessible unisex sanitary facility.
Letter height	AS 1428.2 clause 17, Table 2.
Symbol size	AS 1428.2 clause 16, Table 1.
Sign type	
Conformance	AS 1428.1 BCA D3.6

Non-accessible pedestrian entrance

Position	At each non-accessible pedestrian building entrance.
Message	Signage incorporating the international symbol of access to direct a person to the location of the nearest accessible pedestrian entrance
Letter height	AS 1428.2 clause 17, Table 2.
Symbol size	AS 1428.2 clause 16, Table 1.
Sign type	
Conformance	AS 1428.1 BCA D3.6

Hearing augmentation

Position	Where hearing augmentation is installed to BCA D3.7
Message	Braille and tactile signage incorporating the international symbol of deafness. Identify: - Type of hearing augmentation. - Area covered within the room. - If receivers are being used and where the receivers can be obtained.
Letter height (minimum)	BCA Spec D3.6
Symbol size	AS 1428.2 clause 16, Table 1
Sign type	
Conformance	BCA D3.7 BCA Spec D3.6 AS 1428.1

Access to lift pits

Position	At the landing side of the doorway
Message	DANGER LIFTWELL – ENTRY OF UNAUTHORISED PERSONS PROHIBITED – KEEP CLEAR AT ALL TIMES
Letter height (minimum)	35 mm
Sign type	Incised, inlaid or embossed
Conformance	BCA D1.17

Emergency access doors in a single enclosed lift shaft

Position	On the landing side face of the access door
Message	DANGER LIFTWELL ACCESS – KEEP FURNITURE AND FIXTURES CLEAR
Letter height (minimum)	35 mm
Sign type	Incised, inlaid or embossed
Conformance	BCA Spec E3.1

Plant room signs – Generating sets

Position	To single doors or left hand leaf of double doors
Message	WARNING – THIS SET MAY START AT ANY TIME WITHOUT NOTICE (and) Prescribed notice/pictogram for hearing conservation protection to AS 1319
Letter height (minimum)	50 mm, red on white background
Sign type	
Conformance	AS 1319

Main switchboard - main entry, excluding Class 1 dwellings

Position	Each entry that may be used by emergency services or at Fire detection control and indicating equipment (FDCIE)
Message	Indicate location of main switchboard. Incorporate the term Main Switchboard into notice
Letter height (minimum)	
Sign type	
Compliance	AS/NZS 3000 clause 2.10.2.4

Safety curtains – NSW

Application	In a Class 9b building used as a place of public entertainment.
Position	On curtain
Message	Safety curtain
Letter height (minimum)	Readable from all parts of the auditorium.
Sign type	
Conformance	BCA Schedule 1 NSW H101.10

Safety curtains – operating controls – NSW

Application	In a Class 9b building used as a place of public entertainment
Position	At safety curtain operating controls
Message	(Indicate its use and operation)
Letter height (minimum)	Readable at control location.
Sign type	
Conformance	BCA Schedule 1 NSW H101.10

Stages – automatic smoke and heat vents for stages – NSW

Application	In a Class 9b building used as a place of public entertainment.
Position	At operating controls
Message	(Indicate method of activation)
Letter height (minimum)	

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Sign type	
Conformance	BCA Schedule 1 NSW H101.22

Doorways and doors – Public Entertainment – NSW

Application	In a Class 9b building used as a place of public entertainment
Position	Any doorway or opening within sight of the audience but not intended for egress
Message	(Indicate its purpose)
Letter height (minimum)	
Sign type	Must not be internally illuminated
Conformance	BCA Schedule 1 NSW D2.19

Sliding doors – Public Entertainment – NSW

Application	In a Class 9b building used as a place of public entertainment
Position	Any sliding door that leads directly to a road or open space and forms a main entrance, and is capable of swinging in the direction of egress.
Message	(Indicate, to persons seeking egress, the potential for swinging the door open in an emergency)
Letter height (minimum)	
Sign type	
Conformance	BCA Schedule 1 NSW D2.19

Stage – Load notice – NSW

Application	In a Class 9b building used as a place of public entertainment
Position	Adjacent to the stage floor
Message	(Indicate the actual distributed and concentrated load for which the stage has been designed)
Letter height (minimum)	50 mm
Sign type	
Conformance	BCA Schedule 1 NSW H101.8

0621 WATERPROOFING – WET AREAS

1 GENERAL

1.1 RESPONSIBILITIES

General
Requirement: Provide wet area waterproofing systems, as documented.

Performance
Requirements:
- Grade to floor wastes, to dispose of water without ponding.
- Prevent moisture entering the substrate or adjacent areas.

1.2 CROSS REFERENCES

General
Requirement: Conform to the following:
- *0171 General requirements*.

1.3 STANDARDS

Waterproofing wet areas
Standard: To AS 3740.

1.4 INTERPRETATION

Definitions
General: For the purposes of this worksection the definitions given in AS 3740 and the following apply:
- Bond breaker: A system preventing a membrane bonding to the substrate, bedding or lining.
- Membranes (waterproof): Impervious barriers to liquid water which may be:
  . Installed below floor finishes.
  . Installed behind the wall sheeting or render and termed External.
  . Installed to the face of the wall sheeting or render and termed Internal.
  . Applied in liquid or gel form and air cured to form a seamless film.
  . Applied in sheet form with joints lapped and sealed.
- Preformed shower base: A preformed, prefinished vessel (including integral upstands) installed as the finished floor of a shower compartment, and provided with a connection point to a sanitary drainage system.
- Shower tray: An internal or external liquid applied or sheet membrane system used to waterproof the floor and the wall/floor junctions of a shower area.
- Substrate: The surface to which a material or product is applied.
- Waterproof (WP): The property of a material that does not allow moisture to penetrate through it.
- Waterproofing systems: Combinations of membranes, flashings, drainage and accessories which form waterproof barriers and which may be:
  . Loose-laid.
  . Bonded to substrates.
- Water resistant (WR): The property of material that restricts moisture movement and will not degrade under conditions of moisture.
- Wet area: An area within a building supplied with a floor waste.

1.5 SUBMISSIONS

Products and materials
Documentation: Submit copies of product manufacturer's:
- Product technical data sheets.
- Safety data sheets (SDS).
- Type tests certificates verifying conformance to AS/NZS 4858 Table 8.1.

Records
Placing records: Photographically record the application of membranes and information as follows:
- Date.
- Portion of work.
- Substrate preparation.
- Protection provided from traffic.

Subcontractors
General: Submit names and contact details of proposed suppliers and installers.

Warranties
Requirement: Submit warranties to **COMPLETION**, **Warranties**.

1.6 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:
- Substrate preparation completed.
- Secondary layers preparation completed.
- Before membranes are covered up or concealed.
- After flood testing, if applicable.

2 PRODUCTS

2.1 GENERAL

Storage and handling
General: Store and handle to the manufacturer's recommendations and as follows:
- Protect materials from damage.

2.2 MEMBRANES

Standards
Standard: To AS/NZS 4858.

Membrane systems
Requirement: Provide a proprietary membrane systems suitable for the intended internal wet area waterproofing.

2.3 ACCESSORIES

Shower tray
General: Purpose-made jointless shower tray, with wall upstands at least 50 mm higher than the hob upstands. Set hob masonry on the inside of the tray upstands.

Water stop angles
Material: Rigid, corrosion resistant angles compatible with the waterproof membrane system.

Bond breakers
Requirement: Compatible with the extensibility class of the membrane to be used.
Material: Purpose made bond breaker tapes and closed cell foam backing rods or fillets of sealant.

Flashings
Requirement: Flexible waterproof flashings compatible with the waterproof membrane system.

Liquid membrane reinforcement
Requirement: Flexible fabric compatible with the waterproof membrane system.

Sealants
Requirement: Waterproof, flexible, mould-resistant and compatible with host materials.

Adhesives
Requirement: Waterproof and compatible with host materials.

3 EXECUTION

3.1 PREPARATION

Substrates
General: Make sure substrates are as follows:
- Clean and free of any deposit or finish which may impair adhesion of membranes.
- If walls are plastered, remove loose sand.
- If walls or floors are framed or discontinuous, support members are in full lengths without splicing.
- If floors are solid or continuous:
  . Excessive projections are removed.
  . Voids and hollows greater than 10 mm with abrupt edges are filled with a cement:sand mix not stronger than the substrate nor weaker than the bedding.
  . Depressions less than 10 mm are filled with a latex modified cementitious product with feathering eliminated by scabbling the edges.
  . Cracks in substrates wider than 1.5 mm are filled with a filler compatible with the membrane system.

Concrete substrates: Cure for more than 28 days.

External corners: Round or arris edges.

Moisture content
Requirement: Verify that the moisture content of the substrate is compatible with the water vapour transmission rate of the membrane system by testing to AS 1884 Appendix A.

Falls
Membrane directly under the floor finish: Make sure the fall in the substrate conforms to the fall documented for the finish.

Sheet substrate fastening
Requirement: Fasten or adequately fix to the supporting structure.

Control joints
Finishes: Align control joints in finishes and bedding with control joints or changes in materials in the substrate.

Water stop angles
Requirement: Provide water stop angles at door thresholds and shower enclosures to support the waterproof membrane at junctions between waterproofed and non-waterproofed areas.

Sizing: Size the vertical leg of the water stop angle to conform to the requirements of AS 3740.

Corners: Cut the horizontal leg and bend the vertical leg at corners instead of forming vertical joints between separate lengths of angle.

Fixing: Fix water stop angles to the substrate with compatible sealant or adhesive and corrosion-resistant countersunk or wafer head screws.

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Priming
Compatibility: If required, prime the substrates with compatible primer for adhesion of the membrane system.

Bond breakers
Requirement: After the priming of surfaces, provide bond breakers at all wall/floor, hob/wall junctions and at control joints where the membrane is bonded to the substrate.

Sealant fillet bond breakers:

- Application: Form a triangular fillet or cove of sealant to internal corners within the period recommended by the membrane manufacturer after the application of the primer.
- Widths: 5 mm x 5 mm to vertical corners. 6 mm x 6 mm to 9 mm x 9 mm to horizontal corners.

Backing rod bond breakers: Retain in position with continuous length of tape pressed firmly in place against the surfaces on each side of the rod.

3.2 APPLICATION

Protection
Damage: Protect membrane from damage during installation and for the period after installation until the membrane achieves its service characteristics that resist damage.

Extent of waterproofing
Waterproof or water resistant surfaces: To the requirements of BCA F1.7 for Class 2, 3 and 4 buildings, or BCA 3.8.1.2 for Class 1 buildings.

Sheet membrane joints
Bituminous sheet membranes:

- Side laps at least 75 mm.
- End laps at least 100 mm.

Synthetic rubber membranes:

- Factory-vulcanized laps at least 40 mm.
- Field side laps at least 50 mm for side laps.
- Field end-laps at least 100 mm for end laps.

PVC membranes:

- Factory welded laps at least 30 mm.
- Field–welded laps at least 75 mm.

Vertical membrane terminations
Upstands: At least 150 mm above the finished tile level of the floor or 25 mm above the maximum retained water level, whichever is the greater.

Anchoring: Secure sheet membranes along the top edge.

Edge protection: Protect edges of the membrane.

Flashings
Junctions between waterproof surfaces: Provide a bond breaker at internal corners behind flashings.

Junctions between waterproof surfaces and other surfaces: Provide a bead of sealant at the following junctions:

- Waterproof and water-resistant surfaces.
- Water-resistant and water-resistant surfaces.
- Water-resistant and non water-resistant surfaces.

Perimeter flashings: Provide continuous flashings to the full perimeter of waterproof areas at wall/floor junctions and to water stop angles.

Vertical flashings: Provide vertical corner flashings continuous across wall/wall junctions to at least 1800 mm above finished floor level.

Vertical liquid applied flashings:

- Return legs at least 40 mm on each wall.
- Overlap the vertical termination of the floor waterproofing membrane at least 20 mm.

Vertical sheet flashings:

- Return legs at least 50 mm on each wall.
- Overlap shower tray upstands at least 50 mm.
- Do not penetrate flashing with wall lining fasteners.

Reinforcement: At coves, corners and wall/floor junctions with gaps greater than 3 mm reinforce liquid applied membranes with reinforcement fabric tape recommended by the membrane manufacturer. Fold the tape in half lengthways and imbed it in the first flashing coat of membrane with one half of the tape on each side of the corner or joint. Apply a second coat of liquid membrane to seal the fabric.

Door jambs and architraves

Requirement: If the bottom of doorjambs and architraves do not finish above the floor tiling, waterproof their surfaces below tile level to provide a continuous seal between the perimeter flashing to the wall/floor junction and the water stop angle.

Drainage connections

Floor wastes: Provide floor wastes of sufficient height to accommodate the thickness of floor finishes and bedding at the outlet position. Position drainage flange to drain at membrane level. Turn membrane down 50 mm minimum into the floor waste drainage flanges, and adhere to form a waterproof connection.

Floor wastes in shower trays: Provide drainage of the tile bed and a waterproof connection between the tray and the drain.

Preformed drainage channels:

- With continuous drainage flanges: Provide a continuous waterproof connection between the membrane and the channel.
- Without drainage flanges: Provide continuous waterproofing under the channel and terminate the membrane at a floor waste with a recessed drainage flange.

Enclosed showers with hobs

General: Construct from masonry, concrete or corrosion-resistant metal. Fix securely to the floor, seal against walls and make flush all gaps, joints and intersections before applying the membrane.

Autoclaved aerated concrete hobs: Do not use for external membrane systems. Prime before applying the membrane.

Internal membranes: Extend membrane over the hob and into the room at least 50 mm.

External membranes (hob located inside membrane tray): Dress membrane up outside of hob and finish at the underside of tiles capping the top of the hob.

Enclosed hobless showers with framed shower screens

Requirement: Conform to AS 3740 Figure 3.6 and as follows:

- Turn the membrane up against a water stop angle fixed securely to the substrate directly below the shower screen sill.
- Size the angle so that the vertical leg finishes at least 5 mm above the level of the tiles.
- Support and adhere the membrane to the angle and finish it flush with the top of the vertical leg.

Enclosed hobless showers with trench drain located below screen

Framed or frameless shower screens: Install a water stop angle where the outer edge of the trench drain to the perimeter of the shower will be installed. Size the angle so that the vertical leg finishes at the underside of the tiles. Support and adhere the membrane over the water stop angle and terminate the membrane at floor wastes as described in **Drainage connections**. Install the trench drain with the shower screen located vertically above it.

Unenclosed showers

Requirement: Extend membrane at least 1500 mm into the room from the shower rose outlet, on the walls and floor.

Preformed shower bases

Support: Fully support shower bases without causing distortion or cracking.

Junction with walls for bases with integral perimeter upstands: Conform to AS 3740 Figure 3.1 and as follows:

- Recess shower base into walls or batten off wall lining sufficiently to allow water-resistant wall finishes to overlap the integral upstands along the top edge of the shower base.
- Maintain the structural integrity of walls that are rebated.

Taps and spouts

Requirement: Waterproof penetrations for taps and spouts with proprietary flange systems or a sealant.

Provision for servicing: Install taps in a manner that allows tap washers or ceramic discs to be serviced without damaging the waterproofing seal.

Curing of liquid applied systems

General: To the manufacturer's instructions.

Curing: Allow membrane to fully cure before tiling.

Overlaying finishes on membranes

Requirement: Protect waterproof membranes with compatible water-resistant surface materials that do not cause damage to the membrane.

Suitable materials: Conform to AS 3740.

Bonded or partially bonded systems: If the topping or bedding mortar is required to be bonded to the membrane, provide sufficient control joints in the topping or bedding mortar to reduce the movement over the membrane.

3.3 TESTING

Flood test

Application: Perform a flood test before the installation of surface finishes.

Moisture content measurement method: Conform to AS 1884 Appendix A.

Set-up:

- Measure the wall/floor junction of adjacent spaces and the floor soffit below for dryness.
- Record the result for each area.
- Dam the doorway(s) and seal floor wastes and drainage outlets to allow 50 mm water level.
- Fill space with clean water and leave overnight.

Evaluation:

- Make a visual inspection after a minimum period of 2 hours of the wall/floor junction of adjacent spaces and of the floor soffit below for obvious water or moisture.
- Test the same areas for dryness and compare the results to the measurements taken before flooding.

Compliance:

- Evidence of water from the visual test: Failure.
- No visual evidence of water: Proceed with moisture measurements.
- Test results indicating an increase in moisture before and after flooding: Failure.

Records:

- Submit records of all flood tests.

3.4 COMPLETION

Protection

General: Keep traffic off membrane surfaces until bonding has set or for 24 hours after laying, whichever period is the longer.

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Reinstatement: Repair or replace faulty or damaged work.

Warranties

Requirement: Cover materials and workmanship in the terms of the warranty in the form of interlocking warranties from the supplier and the applicator.

- Form: Against failure of materials and execution under normal environment and use conditions.
- Period: As offered by the supplier.

0631 CERAMIC TILING

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide tiling systems to walls, floors and other substrates, as documented.

Performance

Requirement:

- Consistent in colour and finish.
- Firmly bonded to substrates for the expected life of the installation.
- Set out with joints accurately aligned in both directions and wall tiling joints level and plumb.
- Direct all water flowing from supply points to drainage outlets without leakage to the substrate or adjacent areas.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.3 STANDARDS

Tiling

General: Conform to the recommendations of those parts of AS 3958.1 which are referenced in this worksection.

Slip resistance

Classification: To AS 4586.

1.4 INTERPRETATION

Definitions

General: For the purposes of this worksection the following definitions apply:

- Acoustic underlay: A resilient material laid between the structural floor and the flooring material to provide sound isolation.
- Adhesives - cementitious (C): Adhesive in which the binders are hydraulic, e.g. General purpose cement, with aggregates and organic additives.
- Adhesives - dispersion (D): Adhesives in which the binders are in the form of aqueous polymer dispersion with mineral fillers and organic additives.
- Adhesives - reaction resin (R): Adhesives in which in the binders are synthetic resins with mineral fillers and organic additives. The curing occurs by chemical reaction.
- Bedding: Mixtures of materials which are applied to substrates in a plastic state and which dry, cure and adhere tiles to substrates:
  - . Adhesive bedding: Paving/tiling adhered by adhesives.
  - . Mortar bedding: Paving/tiling adhered in a cementitious mortar bed.
- Lippage: Height deviation between adjacent units.
- Stepping: The relative surface level of adjacent paving elements within the expanse of the main pavement.
- Substrate: The surface to which a material or product is applied.
- Tile: Thin slab made from clay and/or other inorganic raw materials used generally as coverings for floors and walls and adhered to continuous supporting substrates.

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- Tiles – cementitious: Cement based prefinished tiles.
- Tiles – dry-pressed: Tiles made from a finely milled body mixture and shaped in moulds at high pressure. Also known as Type B.
- Tiles – extruded: Tiles whose body is shaped in the plastic state in an extruder then cut to size. Also known as Type A.
- Underlay: A non-structural layer of sheet material or in situ levelling material on the substrate to provide a smooth and level surface.
- Wet area: An area within a building supplied with a floor waste.

1.5 TOLERANCES

Completed tiling
Requirement: To the recommendations of AS 3958.1 clause 5.4.6.

1.6 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:
- Substrate immediately before tiling.
- Trial set-outs before execution.
- Control joints before sealing and grouting.
- Grout and sealant colours before application.

2 PRODUCTS

2.1 UNDERLAY

Fibre cement underlay
Standard: To AS/NZS 2908.2, Type B, category 2 minimum.

Thickness: 5 mm minimum.

Acoustic underlay
General: Provide proprietary product recommended by the manufacturer as compatible with the tiling system.

2.2 TILES AND ACCESSORIES

Tiles
Standard: To AS ISO 13006.

Tactile ground surface indicators: To AS/NZS 1428.4.1.

Coves, nosings and skirtings: Provide matching stop-end and internal and external angle tiles moulded for that purpose.

Exposed edges: Purpose-made border tiles with the exposed edge (whether round, square or cushion) glazed to match the tile face. If such tiles are not available, mitre tiles on external corners.

Accessories
General: Provide tile accessories which match the composition, colour and finish of the surrounding tiles.

2.3 ADHESIVES

General
Standard: To AS ISO 13007.1.

Type
General: Provide adhesives compatible with the materials and surfaces to be adhered, and as documented**.**

Prohibited uses: Do not provide the following combinations:

- Cement-based adhesives on wood, metal, painted or glazed surfaces, gypsum-based plaster.
- Organic solvent-based adhesives on painted surfaces.
- Organic PVC-based adhesives and organic natural rubber latex adhesives in damp or wet conditions.
- PVA (polyvinyl acetate) based adhesives in wet areas or externally.

2.4 MORTAR

Materials

Cement type to AS 3972: GP.

- White cement: Iron salts content ≤ 1%.
- Off-white cement: Iron salts content ≤ 2.5%.

Lime: To AS 1672.1.

Sand: Fine aggregate with a low clay content selected for grading, sharp and free from efflorescing salts.

Measurement of volume: Measure binders and sand by volume using buckets or boxes. Do not allow sand to bulk by absorption of water.

Bedding mortar

Mix proportion (cement:sand), by volume: Select proportions from the range 1:3 to 1:4 for satisfactory adhesion. Provide minimum water.

Terracotta tiles: Use proprietary polymer modified mortar.

Mixing: To AS 3958.1 clause 2.15.

Water

General: Clean and free from any deleterious matter.

2.5 GROUT

Type

Cement based proprietary grout: Mix with water. Fine sand may be added as a filler in wider joints.

Terracotta tiles: Use proprietary polymer modified grout.

General purpose cement based grout: Mix with fine sand. Provide minimum water consistent with workability.

Mix proportions (cement:sand), by volume:

- For joints < 3 mm: 1:2.
- For joints ≥ 3 mm: 1:3.

Pigments

Pigments for coloured grout: Provide colourfast fillers compatible with the grout material. For cement-based grouts, provide lime-proof natural or synthetic metallic oxides compatible with cement.

2.6 CONTROL JOINTS

Control joint materials

Control joint strip: A proprietary control joint consisting of a neoprene core sandwiched between metal plates with lugs or ribs for mechanical keying. Set flush with the finished surface.

Proprietary slide plate divider strip: An arrangement of interlocking metal plates grouted into pockets formed in the concrete joint edges.

Sealant: One-part self-levelling non-hardening mould resistant, silicone or polyurethane sealant applied over a backing rod. Finish flush with the finished surface.

- Floors: Trafficable, shore hardness greater than 35.

Backing rod: Compressible closed cell polyethylene foam with a bond-breaking surface.

3 EXECUTION

3.1 SUBSTRATES

Drying and shrinkage
General: Before tiling, allow at least the following times to elapse (for initial drying out and shrinkage) for these substrates:

- Concrete slabs: 42 days.
- Concrete blockwork: 28 days.
- Toppings on slabs and rendering on brick or blockwork: A further 21 days.

3.2 PREPARATION

Standard
Preparation: To the recommendations of AS 3958.1 Section 4.

Ambient temperature
General: If the ambient temperature is less than 5°C or greater than 35°C, do not lay tiles.

Substrates without wet area membranes
General: Conform to the following:

- Clean off of any deposit or finish which may impair adhesion or location of tiles.
- If framed or discontinuous, support members are in full lengths without splicing.
- If solid or continuous:
  . Remove excessive projections.
  . Fill voids and hollows greater than 10 mm with abrupt edges with a cement:sand mix not stronger than the substrate or weaker than the bedding.
  . Fill depressions less than 10 mm with a latex modified cementitious product and eliminate feathering by scabbling the edges.

Absorbent substrates: If suction is excessive, control it by dampening but avoid over-wetting and do not apply mortar bedding to substrates showing surface moisture.

Dense concrete: If not sufficiently rough to provide a mechanical key, roughen by scabbling or the like to remove 3 mm of the surface and expose the aggregate; then apply a bonding treatment.

Substrates with wet area membranes
General: Make sure substrates are as follows:

- Clean and free of any deposit or finish which may impair adhesion or location of tiles.
- Compatible with all components of the floor system.

Trial set-out
General: Prepare a trial tile set-out of each area as follows to:

- Maximise the size of equal margins of cut tiles.
- Locate control joints.
- Note minor variations in joint widths to eliminate cut tiles at margins.
- Locate fittings on walls.

3.3 FIXING UNDERLAY

Installation
Requirement: Lay in staggered (brick) pattern, perpendicular to the direction of the subfloor, with joins in the underlay not coinciding with joints in the subfloor. Fix with fasteners and fastener spacing to the manufacturers recommendations.

3.4 TILING GENERALLY

Cutting and laying

Cutting: Cut tiles neatly to fit around fixtures and fittings and at margins where necessary. Drill holes without damaging tile faces. Cut recesses for fittings such as soap holders. Rub edges smooth without chipping.

Laying: Return tiles into sills, reveals and openings. Butt up to returns, frames, fittings, and other finishes. Strike and point up beds where exposed. Remove tile spacers before grouting.

Variations

General: Distribute variations in hue, colour, or pattern uniformly, by mixing tiles or tile batches before laying.

Protection

Floor tiles: Keep traffic off floor tiles until the bedding has set and attained its working strength.

Cleaning: Keep the work clean as it proceeds and protect finished work from damage.

Bath ventilation

General: Ventilate the space below fully enclosed baths with at least 2 vermin proof ventilating tiles.

3.5 SETTING OUT

Tile joints

Joint widths: Set out tiles to give uniform joint widths within the following limits:

- Floors:
  - . Vitrified: 3 to 5 mm.
  - . Chemical resistant epoxy jointed tiling: 5 to 6 mm.
- Large and/or irregular floor tiles: 6 to 12 mm.
- Walls:
  - . Dry pressed tile: 1.5 mm.
  - . Extruded tile: 6 mm.

Joint alignment: Set out tiling with joints accurately aligned in both directions and wall tiling joints level and plumb.

Joint position: Set out tiles from the centre of the floor or wall to be tiled.

Margins

General: Provide whole or purpose-made tiles at margins where practicable, otherwise, set out to give equal margins of cut tiles. If margins less than half a tile width are unavoidable, locate the cut tiles where they are least conspicuous.

Fixtures

General: If possible, position tiles so that holes for fixtures and other penetrations occur at the intersection of horizontal and vertical joints or on the centre lines of tiles. Continue tiling fully behind fixtures which are not built in to the tiling surface. Before tiling make sure fixtures interrupting the tile surfaces are accurately positioned in their designed or optimum locations relative to the tile layout.

3.6 FALLS AND LEVELS

Grading

General: Grade floor tiling to even and correct falls to floor wastes and elsewhere as required. Make level junctions with walls. Where falls are not required, lay level.

Fall, general: 1:100 minimum.

Fall, in shower areas: 1:60 minimum.

Change of finish: Maintain finished floor level across changes of floor finish including carpet.

3.7 BEDDING

Standard

Cement mortar: To AS 3958.1 clause 5.5.

Adhesive: To AS 3958.1 clause 5.6.

Preparation of tiles

Adhesive bedding: Fix tiles dry; do not soak.

Mortar bedding: Soak porous tiles in water for half an hour and then drain until the surface water has disappeared.

Terracotta tiles: Use pre-sealed tiles or apply a breathable sealer and lay dry. If a final sealed finish is selected, use a compatible laying sealer.

Bedding

General: Use bedding methods and materials which are appropriate to the tile, the substrate, the conditions of service, and which leave the tile firmly and solidly bedded in the bedding material and adhered to the substrate. Form falls integral with the substrate.

Thin adhesive beds

General: Provide only if the substrate deviation is less than 3 mm, tested with a 3 m straightedge. Cover the entire tile back with adhesive when the tile is bedded.

Thickness: 1.5 to 3 mm.

Thick adhesive beds

General: Provide on substrates with deviations up to 6 mm, tested with a 3 m straightedge, and with tiles having deep keys or frogs.

Nominal thickness: 6 mm.

Adhesive bedding application

General: Apply adhesive by notched trowel to walls and floors and direct to tiles if required, to provide evenly distributed coverage after laying as follows:

- Domestic internal walls: > 65%.
- Domestic internal floors: > 80%.
- Other wall and floors: > 90%.
- Wet areas and bench tops: 100%.

Pattern of distribution of adhesive: To the recommendations of AS 3958.1 clause 5.6.4.3. Verify by examining one tile in ten as work proceeds.

Wall tile spacers: Do not use spacer types that inhibit the distribution of adhesive.

Curing: Allow the adhesive to cure for the period nominated by the manufacturer before grouting or allowing foot traffic.

Mortar beds

For floor tiles: Either lightly dust the screeded bed surface with dry cement and trowel level until the cement is damp, or spread a thin slurry of neat cement, or cement-based thin bed adhesive, on to the tile back. Do not use mortar after initial set has occurred.

- Nominal thickness: 20 to 40 mm.

Thick reinforced beds: Place mortar bed in two layers, and incorporate the mesh reinforcement in the first layer.

Mechanical fixing

General: Provide a proprietary system of support and fixing appropriate to the type of tile and the substrate conditions.

3.8 CONTROL OF MOVEMENT

General

Requirement: Provide control joints carried through the tile and the bedding to the recommendations of AS 3958.1 clause 5.4.5 and as follows:

- Floor location:
  . Over structural control joints.
  . To divide complex room plans into rectangles.
  . Around the perimeter of the floor.
  . At junctions between different substrates.
  . To divide large tiled areas into bays.
  . At abutments with the building structural frame and over supporting walls or beams where flexing of the substrate is anticipated.
- Wall location:
  . Over structural control joints.
  . At junctions with different substrate materials when the tiling is continuous.
  . At vertical corners in shower compartments.
- Depth of joint: Right through to the substrate.
- Sealant width: 6 to 25 mm.
- Depth of elastomeric sealant: One half the joint width, or 6 mm, whichever is the greater.

3.9 GROUTED AND SEALANT JOINTS

Grouted joints

General: Commence grouting as soon as practicable after bedding has set. Clean out joints as necessary before grouting.

Face grouting: Fill the joints solid and tool flush. Clean off surplus grout. Wash down when the grout has set. When grout is dry, polish the tiled surface with grout film remover and a clean cloth.

Edges of tiles: Grout exposed edge joints.

Epoxy grouted joints: Make sure tile edge surfaces are free of extraneous matter such as cement films or wax, before grouting.

Sealant joints

General: Provide joints filled with sealant and finished flush with the tile surface as follows:

- Where tiling is cut around sanitary fixtures.
- At internal corners of walls in showers.
- Around fixtures interrupting the tile surface, for example pipes, brackets, bolts and nibs.
- At junctions with elements such as window and door frames and built-in cupboards.

Material: Anti-fungal modified silicone.

Width: 5 mm.

Depth: Equal to the tile thickness.

3.10 JOINT ACCESSORIES

Floor finish dividers

General: Finish tiled floors at junctions with differing floor finishes with a corrosion-resistant metal dividing strip fixed to the substrate using mechanical fixings, with top edge flush with the finished floor. If changes of floor finish occur at doorways, make the junction directly below the closed door. Grout up underneath to provide continuous support.

Stepping: Less than 5 mm.

Adjustments

Requirement: Check that the height of the floor finish divider is sufficient for the topping and tile thickness. Adjust as required with a matching flat bar adhesive fixed to the divider angle.

Weather bars

General: Provide a corrosion-resistant metal weather bar under hinged external doors. Locate under the centres of closed doors.

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3.11 TESTING

Completion tests
Slip resistance of completed installation: To AS 4663.

3.12 COMPLETION

Cleaning
General: Clean tiled surfaces using an appropriate tile cleaning agent, and polish.

Spare tiles
General: Supply spare matching tiles and accessories of each type for future replacement purposes. Store the spare materials on site.

Quantity: At least 1% of the quantity installed.

4 SELECTIONS

Refer to Finishes Fittings and Equipment schedule for selections.

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0651 RESILIENT FINISHES

1 GENERAL

1.1 RESPONSIBILITIES

General
Requirement: Provide resilient floor finishes to substrates, as documented.

1.2 CROSS REFERENCES

General
Requirement: Conform to the following:
- *0171 General requirements*.

1.3 STANDARDS

General
Installation: To AS 1884.

Slip resistance
Classification: To AS 4586.

1.4 INTERPRETATION

Definitions
General: For the purposes of this worksection the definitions given in AS 1884 and the following apply:
- Acoustic underlay: A resilient material laid between the structural floor and the flooring material to provide sound isolation.
- Resilient floor coverings classification: To EN ISO 10874.
- Substrate: The surface to which a material or product is applied.
- Underlay: A non-structural layer of sheet material or in situ levelling material on the substrate to provide a smooth and level surface.

1.5 SUBMISSIONS

Certification
General: Submit a certificate of conformity for static dissipative and static conductive floor installations.

Fire performance
Fire hazard properties: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE**, **Fire hazard properties**.

Operation and maintenance manuals
General: Submit manufacturer's published use, care and maintenance requirements for each type of finish.

Products and materials
Manufacturer's data: Submit the manufacturer's product data for each type of finish, and the manufacturer's recommendations for its application in the project including the following, as appropriate:
- Thickness and width of sheet or size of tile.
- Adhesive and jointing method.
- Resistance to wear, indentation, chemicals, light and fire.
- Flexibility and bending strength.

Type tests: Submit results, as follows:
- Slip resistance to AS 4586.

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Samples
Range: Submit labelled samples of resilient finishes illustrating the range of colour, pattern or texture of the product.

Minimum size per sample:

- Sheet: 450 x 450 mm.
- Tiles: A whole tile or 0.09 m^2, whichever is the greater.
- Linear accessories, (including coving, skirting, stair nosing, protection strips): A piece 300 mm long.
- Welded joints: 300 mm long.

Identification: Label each sample, with brand, product name, and manufacturer's code reference (including the code for each coat of multi-coat work).

Trial set-out: Prepare a trial set-out before fixing.

Subcontractors
General: Submit names and contact details of proposed suppliers and installers.

Substrate acceptance: Submit evidence of installer's acceptance of the flooring substrate before starting installation.

Tests
Site tests: Submit results, as follows:

- Site slip resistance test of completed installations.
- Surface pH test.
- Moisture content test.

Warranties
Requirement: For each type of resilient finish specified, submit the manufacturer and installer's warranty of the material, workmanship and application.

1.6 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:

- Substrate immediately before fixing resilient finishes or underlay.
- Completed underlay, if any.
- Finished surface before applying sealers or polishes (if any).
- Completed installation.

2 PRODUCTS

2.1 FIRE PERFORMANCE

Fire hazard properties
Critical radiant flux: Tested to AS ISO 9239.1.

2.2 UNDERLAYS

Cementitious
General: Polymer modified cementitious smoothing and self-levelling compound.

Thickness: 3 mm minimum.

2.3 ADHESIVES

General
Requirement: To the resilient finishes manufacturer's recommendations.

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2.4 SHEETS, TILES AND PLANKS

Linoleum
Standard: To EN ISO 24011.

Rubber
Standard:
- Smooth rubber: To EN 1817.
- Textured/relief rubber: To EN 12199.

Polyvinyl chloride (PVC)
Resilient floor covering, homogeneous: To EN ISO 10581.

Resilient floor covering, heterogeneous: To EN ISO 10582.

Resilient floor covering, jute or polyester felt backing: To EN 650.

Resilient floor covering, with foam layer: To EN 651.

Resilient floor covering, with particle based enhanced slip resistance: To EN 13845.

Resilient floor covering, semi-flexible polyvinyl chloride tiles: To EN ISO 10595.

Static control flooring
General: Unbacked flexible sheet with electrical resistance.

Acoustic sheet vinyl
General: Unbacked flexible sheet vinyl laid over separate closed cell foam acoustic underlay.

Acoustic underlay thickness: 2 mm.

Slip-resistant sheet vinyl
Slip resistance classification: To AS 4586.

Inlaid vinyl sheet
General: A layer of vinyl chips inlaid in a translucent vinyl matrix, bonded to a moisture resistant backing.

2.5 SYNTHETIC SPORTING SURFACES

Standard
General: To EN 14904.

3 EXECUTION

3.1 SUBCONTRACTORS

General
Requirement: Use specialist installers recommended by the material manufacturers.

3.2 PREPARATION

Substrates
General: To AS 1884 Section 3.

Substrate tolerance table

Property	Length of straightedge laid in any direction	Max. deviation under the straightedge
Planeness	2 m	4 mm
Smoothness	150 mm	1 mm
Projections	50 mm	0.5 mm

Concrete substrates
Requirement: Do not start installation of the resilient finishes until the concrete substrate conforms to AS 1884 clause 3.1 and the adhesive and resilient finish manufacturers' recommendations.

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Substrate rectification: Conform to the following:

- Surface treatments: Mechanically remove any incompatible surface treatments, including the following:
  . Sealers and hardeners.
  . Curing compounds.
  . Waterproofing additives.
  . Surface coatings and contamination.
- Planeness, smoothness, projections: Remove projections and fill voids and hollows with a smoothing and self-levelling compound compatible with the adhesive. Allow filling or levelling compound to dry to manufacturer's recommendations.

Cleaning: Remove loose materials or dust.

Timber, plywood and particleboard substrates

Requirement: Do not start installation of the resilient finishes until the timber, plywood or particleboard substrate conforms to AS 1884 clause 3.2.

Substrate rectification: Remove projections. If conformance to the **Substrate tolerance table** cannot be achieved, provide an underlay in brick pattern with joints avoiding substrate joints.

Cleaning: Remove oil, grease, traces of applied finishes and loose materials or dust.

Working environment

General: Do not start work before the building is enclosed, wet work is complete and dry, overhead work is complete and good lighting is available. Protect adjoining surfaces.

Conditioning

General: Stabilise the room temperature for seven days before, and two days after, installation of resilient finishes, as follows:

- Areas with air conditioning installed: Run air conditioning at operational temperature.
- Air conditioned areas not operational: Maintain an ambient room temperature range of 15°C to 28°C.
- Non-air conditioned areas: Install at an ambient room temperature range of 15°C to 28°C.
- Underfloor heating: Turn off heating and allow substrate to stabilise at the temperature recommended by the manufacturer.

Underlay: Expose both faces of each sheet for at least 24 hours before fixing.

Resilient sheet and tile floor coverings: Stack for at least 48 hours before installation.

3.3 INSTALLATION

Sheet set-out

General: Set out sheets to give the minimum number of joints. Position joints away from areas of high stress. Run sheet joints parallel with the long sides of floor areas, vertically on non-horizontal surfaces.

Tile set-out

General: Set out tiles from centre of room. If possible, cut tiles at margins only to give a cut dimension of at least 100 mm x full tile width. Match edges and align patterns. Arrange the tiles so that any variation in appearance is minimised.

Plank set-out

General: Set out planks from centre of room. Align patterns, texture and grain in one direction.

Edges

General: Make sure edges are firm, unchipped and machine-cut accurately to size and square to the face, and that edges are square to each other before installation.

Joints

Non-welded: Butt edges together to form tight neat joints showing no visible open seams.

Expansion joints

General: To the manufacturer's recommendations for joint widths, and area and length limitations.

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Junctions
General: Scribe neatly up to returns, edges, fixtures and fittings. Finish flush with adjoining surfaces.

Rolling
General: If rolling is required, roll the finish in multiple directions before the adhesive sets.

Change of finish
General: Maintain finished floor level across changes of floor finish including carpet.

Cleaning
General: Keep the surface clean as the work proceeds.

3.4 SHEETING

Laying vinyl
Requirement: To AS 1884 Section 5 and the manufacturer's recommendations.

Welded joints
Heat welding: After fixing, groove the seams using a grooving tool and weld the joints with matching filler rod, using a hot air welding gun. When the weld rod has cooled, trim off flush.

Chemical welding: Apply seaming compound 100 mm wide to the substrate centrally under the seam. Roll the seam until the compound is forced up into the joint. Clean off flush with a damp cloth.

Epoxy jointing: Join seams with epoxy adhesive.

Conductive flooring
General: Install conductive sheet on a copper grid comprising copper tape 80 µm thick x 10 mm wide adhered to the floor with conductive adhesive. Lay copper tape along each length of sheet vinyl and connect it at right angles to a 1 MΩ resistor. Connect to earth with copper tape at 20 to 30 m^2 intervals.

3.5 JOINTS AND ACCESSORIES

Junctions
General: Finish junctions tapered to with adjoining surfaces. Where changes of floor finish occur at doorways, locate the joint on the centreline of the closed door leaf.

Accessories
General: Provide purpose-made matching moulded accessories for nosings, coves, skirtings, edge cover strips and finishes at junctions, margins, and angles, if available. Otherwise, form accessories from the sheet material. Provide solid backing for radiused coves and nosings.

Edge strips
General: Provide edge cover strips at junctions with different floor finishes and to exposed edges.

Metal cover strip: Extruded tapered strip 25 mm wide, of the same thickness as the sheet or tile. Fix with matching screws to timber bases or to masonry anchors in concrete bases, at 200 mm maximum centres.

PVC cover strip: Feather edge strip matching the floor finish, fixed with contact adhesive.

Control joints
Location: Provide control joints as follows:

- Over structural control joints.
- At junctions between different substrates.

Depth of joint: Right through to the substrate.

Sealant width: 6 to 25 mm.

Depth of elastomeric sealant: One half the joint width, or 6 mm, whichever is the greater.

Control joint materials – sheet flooring
Proprietary slide plate divider strip: Provide interlocking metal plates grouted into pockets formed in the concrete joint edges to finish flush with the flooring surface.

Vinyl skirting
Feather edge: Moulded PVC skirting section.

Flat skirting: Flat PVC skirting section.

Fixing: Scribe as necessary. Mitre corners. Fix to walls with contact adhesive.

Minimum height: 100 mm.

Rubber coved skirtings and margins

General: Form from smooth flat sheet matching the colour and total thickness of the rubber flooring. Scribe and mitre at internal corners.

External corners and stop ends: Provide purpose-made matching moulded pieces.

Coved skirtings

Site formed coving: Carry the flooring material up over a profiled coving section to form the skirting and mitre and weld all joints. Make sure the radius of the coving section conforms to the floor finish manufacturer's recommendations for sheeting material and thickness.

3.6 TESTING

Substrate tests

Surface pH: Test concrete subfloor for suitability for the installation of resilient floor coverings to AS 1884 Appendix B.

- Maximum pH: 10.

Moisture content: Test substrate for suitability for the installation of resilient floor coverings to AS 1884 Appendix A.

- Maximum relative humidity of concrete: To AS 1884 Appendix A3.1.2 and AS 1884 Appendix A3.1.3.
- Moisture content of timber, plywood and particleboard subfloors: To AS 1884 Appendix A3.2.

Completion tests

Slip resistance testing of completed installation: To AS 4663.

3.7 COMPLETION

Protection

Finished floor surface: Keep traffic off floors for a minimum of 24 hours after laying or until bonding has set, whichever period is the longer. Avoid contact with water for minimum 7 days after laying.

Reinstatement

Extent: Repair or replace faulty or damaged work. If the work cannot be repaired satisfactorily, replace the whole area affected.

Cleaning

General: Clean the finished surface. Buff and polish. Before the date for practical completion, mop and leave the finished surface clean and undamaged on completion.

Cleaning static control flooring

General: Do not use sealers, wax or floor polish. Clean using a mild neutral detergent and lukewarm water. Dry buff clean floor using a scrubbing machine with a white nylon pad.

Spare materials

General: Supply spare matching resilient finishes and accessories of each type for future replacement purposes. Store the spare materials on site where directed.

Quantity: At least 1% of the quantity installed.

4 SELECTIONS

Refer to Finishes Fittings and Equipment Schedule for selections.

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0652 CARPETS

1 GENERAL

1.1 RESPONSIBILITIES

General
Requirement: Provide textile floor coverings and underlays to subfloors, as documented.

1.2 CROSS REFERENCES

General
Requirement: Conform to the following:
- *0171 General requirements*.

1.3 STANDARDS

Slip resistance
Classification: To AS 4586.

1.4 INTERPRETATION

Abbreviations
General: For the purposes of this worksection, the following abbreviations apply:
- ACCS: Australian Carpet Classification Scheme.
- CIAL: Carpet Institute of Australia Limited.
- ECS: Environmental Certification Scheme.
- IRA: Insect Resist Agent.
- VOC: Volatile Organic Compound.

Definitions
General: For the purposes of this worksection, the definitions given in AS 2454, AS 2455.1 and AS 2455.2 apply.

1.5 SUBMISSIONS

Fire performance
Fire hazard properties: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE**, **Fire hazard properties**.

Operation and maintenance manuals
Contents: Submit maintenance manuals with the following:
- A technical specification of the carpet installation.
- The manufacturer’s recommendations for use, care and maintenance of the carpet to AS/NZS 3733.
- The names and address of the supplier and manufacturer of each component.

Products and materials
Manufacturer's documentation: Submit copies of the following data:
- Product technical data sheets.
- Safety data sheets (SDS) for adhesives.

Slip resistance classification: Submit evidence of conformity to documented requirements.

Type tests: Submit results of testing to **PRODUCTS**, **TESTS**, as evidence of conformity to documented requirements.

Subcontractors
General: Submit name and contact details of proposed suppliers and installers.

Substrate acceptance: Submit evidence of installer's acceptance of the subfloor/substrate before starting installation.

Tests

Moisture content and alkalinity of subfloor/substrate: Submit test report as evidence of conformity to **PREPARATION**, **Substrate**.

Warranties

General: Submit the manufacturer's product warranties.

1.6 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Each batch of material upon delivery.
- Substrate immediately before fixing underlay.
- Fixings, edge strips, and underlay installed ready to lay carpet.
- Completed carpet after cleaning and before covering for protection.

2 PRODUCTS

2.1 GENERAL

Storage and handling

Requirement: Store on a flat, clean, dry, well ventilated and secure storage area, elevated above the subfloor and unaffected by weather.

2.2 FIRE PERFORMANCE

Fire hazard properties

Critical radiant flux: Tested to AS ISO 9239.1.

2.3 CARPET

Tolerances

Requirement: To AS/NZS 1385.

Batching

Requirement: In a single area and for each documented type, quality, or colour, use carpet from one manufacturing batch and dye lot.

Antimicrobial treatment

Requirement: Non-metallic, colourless, odourless, positively charged polymer applied during manufacturing to form a molecularly bonded surface to resist bacteria and mould growth.

Insect resistance

Requirement: Carpets and underlays comprising materials either inherently resistant to insect attack or treated against insect attack by moth and carpet beetle, by application of insect resist agents (IRA) to the yarn during wet processing at the manufacturing stage.

Insect resist treatment of wool: Application Level 4 to the recommendations of Woolmark Specification CP-4.

Electrostatic propensity

Maximum electrostatic propensity value: 2500 V at a relative humidity of 25% tested to AATCC TM 134.

Stain and soil resistance

Requirement: Carpet with one or more of the following:

- Fluoro-treatments: Fluorochemical soil and liquid repelling chemical treatment applied during manufacturing.
- Stain blockers: Colourless acid-based dye stainblocker applied to dyed fibres.

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Total VOC
Total VOC emission tested to ISO 10580: < 0.5 mg/m^2/h.

2.4 CARPET TILES

General
Type: Non-stick, non-curling tiles capable of being taken up without damage and then re-laid in different positions.

Marking: On the back, showing manufacturer's instructions or directional arrow for laying.

Tolerances
Requirement: Conform to the following:

- Dimensional tolerance: 0.2%.
- Squareness: Maximum difference of 2 mm between lengths of diagonals.

Sustainable carpet tile backing
Re-usable backing: Proprietary vinyl backing to carpet tiles capable of separation and recycling in new carpet tiles.

2.5 MATS

General
General: Provide a mat made to fit each designated mat recess.

2.6 UNDERLAYS

Application
Performance: To AS 2455.1 clause 1.5.2.

Soft underlay
Standard: To AS 4288.

2.7 OTHER MATERIALS

Adhesives
General: Compatible with the floor covering material, and suitable for bonding it to the subfloor to AS 2455.1 clause 1.5.3.

Friction compound: Suitable for holding carpet tiles in position without permanent sticking.

Hot-melt adhesive tapes
General: Commercial grade glass fibre and cotton thermoplastic adhesive-coated tape 60 mm wide on a 90 mm wide metal foil base and backed with silicone-coated release paper.

Preformed carpet grippers
General: Architectural plywood carpet grippers with 3 rows of corrosion-resistant angled pins of length appropriate to the carpet type to AS 2455.1 clause 1.5.4.

Size (minimum): 33 mm wide x 7 mm thick.

Location: At edges, except where edge strips are used. Provide double grippers to edges where recommended by the manufacturer.

Edge strips
Type: Heavy duty edge strip appropriate to the floor covering type (tackless or adhesive fixed), capable where necessary of accommodating different levels of adjacent floor finishes.

Form: Metal moulding or extrusion, with vinyl inserts.

Location: At exposed edges of the carpet, and at junctions with differing floor finishes or finishes of a different thickness. Where edge strips occur at doorways, locate the junctions directly below the closed door.

2.8 TESTS

Textile floor coverings

Requirement: Arrange for sampling and testing of carpet by an Accredited Testing Laboratory, as documented.

Sampling: To AS/NZS 2119.

Testing: Perform the documented number of tests for each test group (T, S or Q) as follows:

- For each type of carpet documented.
- For each documented area (or part) of installed carpet.

Number of carpet tests table

Test group type	Definition	Number of tests	Per installed area
Type test (T)	Tests on samples of carpet having the same specification, but not necessarily from carpet manufactured for the project. Authenticated test reports less than 12 months old are acceptable.	One	not applicable
Specification test (S)	Tests on samples taken before laying from carpet manufactured for the project.	One	each 5000 m^2
Quality assurance test (Q)	Tests on samples taken from the site during laying or from the manufacturer's premises before dispatch to the site.	Three	each 5000 m^2

Carpet tests table

Carpet property	Test method	Test group
Colour fastness: To artificial light	AS 2001.4.21	T S Q
Colour fastness: To water	AS 2001.4.E01	T S
Colour fastness: To rubbing	AS/NZS 2111.19.1	T S
Colour fastness: To shampoo solution	AS/NZS 2111.19.2	T S Q
Colour fastness: To solvents	AS 2001.4.16	T S
Treatment: For insect resistance	AS 2001.6.1	S
Dichloromethane extractable matter of pile	AS 2001.3.4	S Q
Pile structure: Total pile mass (g/m^2)	AS/NZS 2111.11	S
Pile structure: Pile length above substrate (mm)	AS/NZS 2111.6	S
Pile structure: Surface pile mass above substrate (g/m^2)	AS/NZS 2111.4	S Q

Carpet property	Test method	Test group
Pile structure: Pile thickness above substrate (mm)	AS/NZS 2111.5	S
Pile structure: Tuft density (tufts/100 mm)	AS/NZS 2111.9	S
Pile structure: Tuft withdrawal force (N)	AS/NZS 2111.15	S Q
Burning behaviour	AS/NZS 2111.18	T
Bond strength between backing components (N)	AS/NZS 2111.16	S Q
Electrostatic protection: Electrostatic propensity	AATCC TM 134	S
Soft underlay property: Mass per unit area	AS/NZS 2111.3	Q
Soft underlay property: Fibre content	AS 2001.7	Q
Soft underlay property: Performance	AS 4288	T
Soft underlay property: Thickness	BS 4051	Q
Soft underlay property: Thickness deviation	AS 4288	Q
Soft underlay property: Extractable matter	AS 2001.3.4	Q
Tile dimensions	BS 5921	S Q
Pile yarn construction: Yarn count	AS 2001.2.23	S
Pile yarn construction: Twist level	AS 2001.2.14	S

3 EXECUTION

3.1 PREPARATION

General

Pre-installation requirements: To AS 2455.1 Section 2.

- Carpet tiles: Pre-laying requirements including access panel floors to AS 2455.2 clause 4.

Working environment: Do not start work before the building is enclosed, wet work is complete and dry, overhead work is complete and good lighting is available.

Protection: Protect adjoining surfaces.

Substrates

General: Conform to the following:

- To AS 2455.1 or AS 2455.2, as appropriate.
- Clean and free of any deposit or finish which may impair adhesion or location and functioning of control joints.
- Free of any imperfections, including ridges, indentations and projections which may adversely affect the installed carpet.

Concrete substrate rectification: Remove projections, grind as necessary and fill voids and hollows with a levelling compound compatible with the adhesive to achieve the required tolerance.

Timber substrate rectification: Remove projections. If conformance with the **Substrate tolerance table** cannot be achieved, fix a hard underlay in brick pattern. Make sure joints do not coincide with substrate joints.

Moisture content: Do not start installation unless:

- Concrete: The moisture content of the concrete has been tested to AS 2455.1 Appendix B and the values in AS 2455.1 Appendix B and AS 2455.2 Appendix B as appropriate have been obtained.
- Timber, plywood or particleboard substrates: The moisture content of the substrate has been tested to AS 1080.1 for timber and particleboard or AS/NZS 2098.1 for plywood and values are obtained as follows:
  - . Air conditioned buildings: 8 to 10%.
  - . Intermittently heated buildings: 10 to 12.5%.
  - . Unheated buildings: 12 to 15%.

Alkalinity: Do not start installation unless:

- Concrete: The alkalinity of the concrete has been tested to AS 2455.1 Appendix B and the values in AS 2455.1 Appendix B and AS 2455.2 Appendix B as appropriate have been obtained.

Fixtures: Remove door stops and other fixtures, and refix in position undamaged on completion of the installation. Make sure fixings penetrate substrate and are stable.

Substrate tolerance table

Property	Length of straightedge laid in any direction	Max. deviation under the straightedge
Flatness Class B	3 m	6 mm
Smoothness	150 mm	1 mm
Planar	2000 mm	4 mm

Conditioning

General: Stabilise the room temperature for seven days before, and two days after laying carpet as follows:

- Areas with air conditioning installed: Run air conditioning at operational temperature.
- Air conditioned areas not operational: Maintain a room temperature range between 10°C and 35°C.
- Underfloor heating: Turn off heating and allow substrate to stabilise at the temperature recommended by the carpet manufacturer.
- Non-air conditioned areas: Install at room temperature between 10°C and 35°.

Carpet: Cut to length and lay in position, 24 hours before installation.

Carpet tiles: Unpack tiles at least 48 hours before installation.

Hardboard underlay: Expose both faces of each sheet for more than 24 hours before fixing.

Soft underlay: Unroll the carpet and allow to come to the temperature of the in-service environment before laying.

3.2 INSTALLATION - CARPET

General

Requirement: To AS 2455.1 Section 3 and the manufacturer's recommendations.

Setting out

Joints in underlay: Make sure joints in underlay do not coincide with carpet joints. Do not carry underlay over carpet grippers or edge strips.

Partition layout: Confirm that permanent partitions have been installed before starting carpet laying.

Seaming methods

Woven carpet: Machine or hand sew. Do not provide glued taped seams unless selvages are woven to suit and recommended by manufacturer.

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Tufted carpet: Seam with hot-melt adhesive tape.

Seam sealing: Apply appropriate seam sealer to each cut edge.

Cutting laid carpet

Method: If penetrations through laid carpet are necessary for electrical, telephone or other outlets, cut the carpet either by cross cutting or by cutting rectangular or circular openings.

Cutting holes in concrete floors: Protect the carpet and remove concrete particles and dust on completion. Replace the cut carpet over the opening without any signs of fraying or other damage, and fix with a peel-up adhesive, or resew.

3.3 INSTALLATION - CARPET TILES

General

Installation: To AS 2455.2 and the manufacturer's recommendations.

3.4 COMPLETION

Spares

Spare material: Supply spare matching materials of each type, colour and design of carpet from the same batch for future replacement purposes.

Offcuts: Retain carpet offcuts exceeding 0.5 m^2 in area and 450 mm in both length and width.

Labelling: Label spare and offcut material appropriately, including the location of the laid area corresponding to each batch. Securely and separately package each batch in a suitable wrapping.

Quantity of spare material: At least 1% of the quantity installed, in full or part length rolls.

Cleaning

Requirement: Progressively clean the work. Remove waste, excess materials and adhesive.

Final cleaning: When the installation is complete, clean the carpet as necessary to remove extraneous matter, marks and soiling and to lift the pile where appropriate.

Protection

Requirement: Provide fabric drop sheets. Do not use plastic sheeting. If wheeled traffic is to follow carpet installation, protect with hardboard sheets butted and fixed with adhesive tape.

4 SELECTIONS

Refer to Finishes Fitting and Equipment Schedule for selections.

0657 RESIN BASED SEAMLESS FLOORING

1 GENERAL

1.1 RESPONSIBILITIES

General
Requirement: Provide resin based floor finishes to substrates, as documented.

Performance
Requirement:
- Forming a strong permanent bond to the substrate.
- Impermeable to liquids.
- Hygienic and easily cleaned.
- Slip resistant or chemical resistant.

1.2 CROSS REFERENCES

General
Requirement: Conform to the following:
- *0171 General requirements*.

1.3 STANDARDS

Slip resistance
Classification: To AS 4586.

1.4 INTERPRETATION

Abbreviations
General: For the purposes of this worksection the following abbreviations apply:
- MMA: Methyl methacrylate.

Definitions
General: For the purposes of this worksection the following definitions apply:
- Resin based seamless floor finish: Any combination of a resin based flooring system that combines two part resins, with or without an aggregate, to provide a continuous floor coating without joints except those that may already exist in the substrate.
- Substrate: The surface to which a material or product is applied.

1.5 SUBMISSIONS

Fire performance
Fire hazard properties: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE**, **Fire hazard properties**.

Operation and maintenance manuals
Requirement: At completion, submit the manufacturer's published use, care and maintenance instructions.

Products and materials
Manufacturer's data: Submit the manufacturer's technical product data for each type of finish, and recommendations for its application in the project, including the following:
- Composition, thickness, finish and time between coats for multi-coat work.
- Safety data sheets.

Type tests: Submit results as follows:
- Slip resistance.

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Samples
Resin based flooring generally: For each required finish, submit a sample of the coating on a suitable base, showing the thickness of each coat.
- Slip resistance: If documented, demonstrate conformance in the sample.

Labelling: Label each sample identifying the following:
- Brand.
- Product name.
- Manufacturer's reference code (including the code for each layer of a multi-layer system).

Size: 300 x 300 mm minimum.

Sample panels: If required, construct a panel to verify the floor finish, its aesthetic and material properties, as documented and as follows:
- Location: Hall
- Size (mm): 1m x 1m

Subcontractors
General: Submit names and contact details of proposed suppliers and applicators.

Evidence of experience: List of similar installation of same product.

Substrate acceptance: Submit evidence of applicator's acceptance of the coating substrate before starting installation.

Tests
Site tests: Submit results, as follows:
- Slip resistance test of completed installations.
- Surface pH test.
- Substrate moisture content test.

Warranties
Requirement: Submit warranties to **COMPLETION, Warranties**.

1.6 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:
- Completion of substrate preparation.
- Substrate joints, thresholds and perimeter walls.
- Completed priming of base.
- Completion of each coat in the flooring system.
- Completed application.

2 PRODUCTS

2.1 GENERAL

Storage and handling
Delivery: Check all deliveries to site for quantities, damage and material conformance.

Storage: Store materials to the manufacturer's recommendations, with seals and labels intact and legible. Maintain temperatures at 10ºC to 30ºC or within the recommended range. Do not use materials that have been stored longer than the manufacturer's maximum recommended shelf life.

2.2 FIRE PERFORMANCE

Fire hazard properties
Critical radiant flux: Tested to AS ISO 9239.1.

2.3 SEAMLESS FINISHES

Materials

Product supply: Supply all resin flooring mix components in pre-measured units in the correct proportion ready for mixing.

Resin flooring system: Floor coating systems consisting of primer, waterproofing membrane, reinforcing membrane, as appropriate and as recommended by the manufacturer.

Reinforcement: Flexible fibreglass fabric that inhibits substrate cracks transferring to the resinous flooring finish.

Resin flooring type table

Finish type	Description	Durability*	Typical thickness
Floor seal	Applied in 2 or more coats. Generally solvent or waterborne.	LD	≤ 150 µm
Floor coating	Applied in 2 or more coats. Generally solvent free.	LD/MD	150 to 300 µm
High build floor coating	Applied in 2 or more coats. Generally solvent free.	MD	300 to 1000 µm
Multi-layer flooring	Aggregate dressed systems based on multiple layers of floor coatings or flow applied floorings.	MD/HD	> 2 mm
Flow applied flooring	Self-smoothing or self-levelling flooring, having a smooth surface.	MD/HD	2 to 3 mm
Resin screed flooring	Trowel finished, heavily filled systems, generally incorporating a surface seal coat to minimise porosity.	MD/HD	> 4 mm
Heavy duty flowable flooring	Having a smooth surface or slip resistant finish	HD/VHD	4 to 9 mm
Heavy duty resin flooring	Trowel finished, aggregate filled systems effectively impervious throughout their thickness	VHD	> 6 mm

*Note:
- LD (Light duty): Light foot traffic, occasional rubber tyred vehicles.
- MD (Medium duty): Regular foot traffic, frequent fork lift truck traffic, occasional hard plastic wheeled trolleys.
- HD (Heavy duty): Constant fork lift truck traffic, hard plastic wheeled trolleys, some impact.
- VHD (Very heavy duty): Severe heavily loaded traffic and impact

Surface regularity for wearing surface table

Class	Maximum permissible departure from a 2 m	Application

	straightedge laid in contact with the floor (mm)	
SR1	3	High standard: Special floors.
SR2	5	Normal standard: Normal use in commercial and industrial buildings
SR3	10	Utility standard: Where surface regularity is less critical

3 EXECUTION

3.1 GENERAL

Subcontractors
Requirement: Use specialist applicators recommended by the material manufacturer.

Ambient conditions
General: Do not start work before the building is enclosed and wet work is complete and dry.

Room and floor temperature: Maintain at temperatures recommended by the manufacturer for a minimum of 72 hours before and after the floor installation.

Lighting: Provide permanent lighting or if not in place, simulate permanent lighting conditions during flooring application.

Protection
Adjacent surfaces: Protect adjacent surfaces by masking or other methods and maintain free of the flooring finish.

Ventilation: Provide adequate ventilation and fire protection at mixing and application locations to the manufacturer’s recommendations including smoke, spark and flame prohibition.

Finished installation: Prevent exposure to traffic, water and chemicals until flooring is fully cured.

Removal of fixtures and fittings
Fixtures: Remove door stops and other fixtures within or adjacent to the work area.

Labelling and storage: Attach labels or mark fixtures using a non-permanent method, identifying the location and refixing instructions, if required. Store and protect against damage.

Difficult to remove fixtures: If removal is impractical, apply surface protection before substrate preparation.

3.2 PREPARATION

Substrate condition
Requirement: Sound, clean and free of any deposit or finish, including laitance, efflorescence, curing compounds, dirt and grease, which may impair bonding or is incompatible with the floor coating.

Concrete surface: Cured for at least 28 days and free of water for at least 7 days.

Concrete moisture content: Do not start installation of the resin based seamless flooring until the concrete substrate conforms to AS 1884 Section 3.1 and the flooring manufacturer's recommendations.

Substrate alkalinity: Verify the concrete pH is within the range recommended by the manufacturer.

Substrate adhesion: Perform adhesion tests as recommended by the manufacturer, do not proceed with application unless the substrate passes the test.

Grouts, patching materials and metal embedments: Make sure these are compatible with the resin flooring.

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Substrate tolerances table

Property	Length of straightedge laid in any direction	Maximum deviation under the straightedge
Flatness Class A	2 m	4 mm
Smoothness	150 mm	1 mm
Projections	50 mm	0.5 mm

Substrate correction

Concrete surface cleaning and preparation: Remove contaminants by high pressure water jetting and roughen mechanically by shot blasting, planing or grinding.

Concrete surface treatments: Mechanically remove by shot blasting, planing or grinding the following:

- Sealers and hardeners.
- Curing compounds.

Resin flooring ≤ 3 mm: Remove laitance or surface sealers by grinding or light contained shot blasting. Do not remove by percussive scabbling.

Precast unit surfaces: Leave as cast and wash and clean by wire brushing to remove any dirt. Do not mechanically scabble.

Existing concrete substrates: Abrade and remove the uppermost cement matrix mechanically by grinding, planing or shot blasting. Repair damaged and deteriorated concrete to the resin flooring manufacturer's recommendations.

Patching and filling: Remove projections and fill voids and hollows with an epoxy resin based repair mortar compatible with the seamless flooring system, to the manufacturer's recommendations.

3.3 MIXING

Unfilled systems

Two component systems: Blend together with a mechanical mixer to form a homogenous mix.

Filled systems

Requirement: Mix mechanically to the resin flooring manufacturer's recommendations.

Order of mixing: Mix liquid components first, gradually add fillers and/or aggregates while continuing to mix until fillers and/or aggregates have been wetted out by the resin.

3.4 APPLICATION

General

Requirement: Apply components of the resin flooring system to the manufacturer's recommendations to produce a uniform, monolithic wearing surface.

Priming

Coating application: Apply primer over prepared substrate at the manufacturer's recommended spreading rate with a stiff brush, roller or trowel. Fully saturate the substrate surface.

Porous or open textured surfaces: If required to minimise pin holes, apply a second coat to achieve full saturation.

Multi-layer, flow applied and heavy duty flowable flooring: Allow primer to reach a tack-free state before applying the resin flooring. If required to assist flooring application, incorporate a light scatter of dry graded aggregate while the primer is wet.

Resin screed flooring: Allow primer to reach a semi-set (tacky) state before applying the resin flooring.

Curing: Maximum 48 hours at 15°C to 20°C before applying the resin flooring. If curing exceeds 48 hours, mechanically prepare the surface and reapply primer.

Perimeter edges

Integral cove edges or skirting: Apply cove skirting mix to wall surfaces and perimeter edges before applying flooring. Mask adjacent surfaces, mix, prime, trowel, sand and apply top coat of the skirting to the manufacturer's recommendations. Round all internal and external corners.

Resin coatings
Floor seal, floor coating and high build floor coating: Apply by brush or roller to the manufacturer's recommendations.

Curing: Allow first coat to cure for 16 to 24 hours until it is tack-free before applying second coat.

Flow applied systems
Flow applied and heavy duty flowable flooring: Apply by spreading evenly over the surface, using a serrated trowel, pin rake or squeegee. Immediately follow by rolling with a spiked roller to release entrapped air and assist in smoothing out.

Partially set or thickened areas: Do not use spiked roller on these areas.

Multi-layer flooring
Requirement: Apply to **Resin coatings** and/or **Flow applied systems** to the manufacturer's recommendations.

Trowel applied resin flooring
Resin screed and heavy duty resin: Spread mixed product over the primed substrate by trowel, screed box, or between screeding laths or bars to achieve uniform overall thickness.

Finish: Steel trowel to a uniform finish. Keep trowel clean at all times by using a minimum amount of solvent or water.

Hygienic surface: Conform to the following:

- Resin screed: If required, seal surface with one or two coats of compatible resin sealer applied by brush, roller or squeegee after the screed has cured sufficiently.
- Heavy duty resin: If an impervious screed system is used, additional resin seals are not required.

Reinforcement
Fibreglass fabric: If reinforcing is required to minimise problems arising from cracks or bay joints in the substrate, after applying the primer and a thin layer of resin, roll in the fibreglass fabric. Overlap the fabric by 50 mm minimum at joins and apply the final resin layer before the first layer fully hardens.

Curing
Finished flooring: Allow to cure to the manufacturer's recommendations before exposure to light traffic and 3 to 7 days before exposure to heavy traffic, wet cleaning or chemicals.

Uncured resin flooring: Maintain minimum 3°C above dew point or below 75% relative humidity to reduce the risk of blooming on the floor finish.

3.5 JOINTS AND ACCESSORIES

Junctions
General: Finish junctions flush with adjoining surfaces. If changes of floor finish occur at doorways locate the joint on the centreline of the closed door leaf.

Control joints
Location: Provide control joints in resin based seamless flooring as follows:

- Over structural control joints.
- At junctions between different substrates.

Flooring finish: If possible, carry the seamless finish material over the edges of the control joint in the substrate. Provide a sealant joint as follows:

- Sealant width: 6 to 25 mm.
- Sealant depth: One half the joint width, or 6 mm, whichever is the greater.
- Sealant: One part, flexible, abrasion resistant sealant applied over a backing rod. Finish flush with the seamless flooring surface.
- Trafficable floors: Shore hardness greater than 35.
- Backing rod: Compressible closed cell polyethylene foam with a bond-breaking surface.

3.6 TESTING

Substrate tests

Surface pH: Test concrete subfloor for suitability for the installation of resilient floor coverings to AS 1884 Appendix B.

- Maximum pH: 10.

Moisture content: Test subfloors for suitability for the installation of resin based seamless flooring to AS 1884 Appendix A.

- Maximum relative humidity of concrete: To AS 1884 Appendix A3.1.2 and AS 1884 Appendix A3.1.3.

Completion tests

Slip resistance of completed installation: To AS 4663.

3.7 COMPLETION

Reinstatement

Extent: Repair or replace faulty or damaged work. If the work cannot be repaired satisfactorily, replace the whole area affected.

Removed fixtures and fittings

Requirement: Reinstall undamaged hardware and fittings on completion of the installation.

Warranties

Requirement: Provide interlocking warranties from the supplier and applicator covering materials and workmanship.

- Form: Against failure of materials and execution under normal environment and use conditions.
- Period: As offered by the supplier and applicator.

4 SELECTIONS

Refer to Finishes Fittings and Equipment Schedule for selections.

0671P DULUX PAINTING

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide DuluxGroup/Dulux coating systems to substrates, as documented.

Performance

Requirement:

- Consistent in colour, gloss level, texture and dry film thickness.
- Free of runs, sags, blisters, or other discontinuities.
- Paint systems which are fully opaque or at the documented level of opacity.
- Clear finishes at the level of transparency consistent with the product.
- Fully adhered.
- Resistant to environmental degradation within the manufacturer's stated life span.

1.2 COMPANY CONTACTS

DuluxGroup/Dulux technical contacts

Architects and Specifiers' Hotline (Paint, Acratex, Protective Coatings): 13 23 77.

Powder Coatings Technical Advice Hotline: 13 24 99.

Website: www.dulux.com.au/contact-us/architects-and-specifiers

1.3 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.4 STANDARDS

Painting

General: To the recommendations of those parts of AS/NZS 2311 referenced in this worksection.

1.5 MANUFACTURER'S DOCUMENTS

Technical manuals

Product Guide: www.dulux.com.au/specifier/product/product-selector

Duspec Product Data Sheets, SDS, paint system selection: www.dulux.com.au/specifier/duspec

1.6 INTERPRETATION

Abbreviations

General: For the purposes of this worksection the following abbreviations apply:

- ASU: Acrylic sealer undercoat multipurpose combo product.
- DFT: Dry film thickness.
- OFC: Off form concrete.
- PDS: Product data sheet.
- PRN: Paint reference number.
- PSU: Primer sealer undercoat multipurpose combo product.
- WFT: Wet film thickness.

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Definitions
General: For the purposes of this worksection the definitions given in AS/NZS 2310 and the following apply:
- Gloss: The optical property of a surface, characterised by its ability to reflect light specularly.
- Gloss unit: Numerical value for the amount of specular reflection relative to that of a standard surface under the same geometric conditions.
- Levels of gloss finish: When the specular direction is 60 degrees, surfaces with the following specular gloss reading is defined as follows:
  . Full gloss: Over 85 gloss units.
  . Gloss: Over 50 and up to 85 gloss units.
  . Semi-gloss (satin): Over 20 and up to 50 gloss units.
  . Low gloss (low sheen): Over 5 and up to 20 gloss units.
  . Flat finish (matt): Up to 5 gloss units.
- Opacity: The ability of a paint or textured and membrane coating to obliterate the colour difference of a substrate.
- Paint or coating system: A product in liquid form, which when applied to a surface, forms a dry film having protective, decorative or other specific technical properties.
- Primer, prime coat: The first coat of a painting system that helps bind subsequent coats to the substrate and which may inhibit its deterioration.
- Sealer: A product used to seal substrates to prevent the following:
  . Materials from bleeding through to the surface.
  . Reaction of the substrate with incompatible top coats.
  . Undue absorption of the following coat into the substrate.
- Substrate: The surface to which a material or product is applied.
- Undercoat: An intermediate coat formulated to prepare a primed surface or other prepared surface for the finishing coat.

1.7 SUBMISSIONS

Products and materials
General: Dulux coatings systems have been selected for this project. Submit the following details at least 3 weeks before the paint is required:
- Paint brand name and product range quality statement.
- Safety data sheets (SDS) showing the health and safety precautions to be taken during application.
- The published recommendations for maintenance.

Samples
Clear finish coatings: Submit samples of timber or timber veneer matching those to be used in the works as follows:
- Requirement: Label for identification and prepare, putty, stain, seal and coat, as documented.
- Size: Minimum 500 x 500 mm.

Opaque coated samples: Submit labelled samples of each coating system, on representative substrates, showing surface preparation, colour, gloss level, texture, and physical properties.

Coated samples schedule

Substrate	Paint system	Colour	Sample size
e.g. Plasterboard	P1	Dulux Vivid White	A4

Wet samples
General: Submit two clearly labelled 500 mL samples of each type of coating required to be tested.

Wet samples schedule

Coating type	Colour
e.g. Dulux Acratex Acrashield Low Gloss	Garden Picket (P15.F3)

Subcontractors
Specialist applicators: Submit names and contact details of proposed specialist applicators.

Warranties
Material warranty: Submit the manufacturer's material warranty as follows:
- Extent: Paintwork generally.
- Terms: Paint systems are suitable for their intended use.
- Warranty period: As defined by the manufacturer.

Material performance warranty: Submit an alternative performance warranty as follows:
- Terms: Submit the performance criteria as defined by the manufacturer.
- Measure: As defined by the manufacturer.
- Warranty period: As defined by the manufacturer.

Timing: Before the application of the paint system.

1.8 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:
- Opaque finishing stages:
  . Completion of surface preparation.
  . After application of final coat.
- Clear finishing stages:
  . Before surface preparation of timber.
  . Completion of surface preparation.
  . After application of final coat.

2 PRODUCTS

2.1 GENERAL

Product substitution
Other products: Conform to PRODUCTS, **GENERAL**, **Substitutions** in *0171 General requirements*.

Storage and handling
General: Store materials not in use in tightly covered containers in well-ventilated areas with temperatures maintained at the manufacturer's recommendations.

Delivery: Deliver paints to the site in the manufacturer's labelled and unopened containers.

Product identification
General: Marked to show the following:
- Manufacturer's identification.
- Product brand name.
- Product type.

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- Quantity.
- Product reference code and batch number.
- Date of manufacture.

2.2 PAINTING MATERIALS

Combinations

General: Do not combine paints from different manufacturers in a paint system. Dulux paint products and coating systems have been selected and specified for this project. Any unauthorised product substitution will void the warranties.

Clear timber finish systems: Provide only the combinations of putty, stain and sealer recommended by the manufacturer of the top coats.

Tinting

General: Provide only products which are colour tinted by the manufacturer or supplier.

Toxic ingredients

General: To the *Poisons Standard (SUSMP)* Part 2 Section 7.

Standards

Paint types: Conform to the Australian Standard referenced in the **OCP/Dulux paint type reference table**.

DuluxGroup/Dulux paint type reference table legend

Key:

ASU = Acrylic Sealer/Undercoat.

NE = No Equivalent.

PSU = Primer/Sealer/Undercoat.

Low VOC products are noted in the Table.

^ Use is discouraged in favour of water based paints because of environmental concerns.

These paints have either limited availability or low requirement in the Building Industry.

DuluxGroup/Dulux paint type reference table

Paint type	DuluxGroup/Dulux material description	Dulux PDS No.	PRN AS/NZS 2311 (Table 4.2)	Standard
Semi-gloss solvent-borne: interior	Dulux Super Enamel Semi-Gloss	DD0028	B3	AS 3730.5
Semi-gloss water-borne, interior /exterior trim (alt B8b)	Dulux Aquanamel Semi Gloss (low VOC)	DD1281	B41	AS 3730.2
Gloss solvent-borne: aerosols	Dulux Spray Pak	DD0009	B4#	NE
Full gloss solvent-borne: exterior	Dulux Super Enamel Full Gloss Dulux Metalshield Premium UV Resistant High Gloss	DD0026 LI 011	B5a	AS 3730.6
Full gloss solvent-borne: interior	Dulux Super Enamel Full Gloss	DD0026	B5b	AS 3730.6
Full gloss waterborne interior/exterior trim (alt B9b)	Dulux Aquanamel Gloss (low VOC)	DD1282	B42	AS 3730.2

Paint type	DuluxGroup/Dulux material description	Dulux PDS No.	PRN AS/NZS 2311 (Table 4.2)	Standard
Flat latex: interior ceilings	Dulux White Ceiling Paint (low VOC)	DD02251	B6a	AS 3730.1
Flat latex: interior ceilings (tinted colours)	Dulux Professional EnvirO2 Tintable Ceiling Flat (low VOC)	DD1466	B6a	AS 3730.1
Low gloss latex: exterior	Dulux Weathershield Low Sheen Acrylic	DD0053	B7b	AS 3730.8
Low gloss latex: interior	Dulux Wash&Wear Low Sheen Acrylic (low VOC) Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen (low VOC)	DD02070 DD02074	B7a	AS 3730.3
Low gloss latex: interior	Dulux Professional Steriguard Acrylic Low Sheen	DD01990	B7a	AS 3730.3
Semi-gloss latex: exterior	Dulux Weathershield Semi Gloss Acrylic	DD0037	B8b	AS 3730.9
Semi-gloss latex: interior	Dulux Wash&Wear Semi Gloss Acrylic (low VOC) Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss (low VOC)	DD02071 DD02075	B8a	AS 3730.2
Semi-gloss waterborne latex: interior	Dulux Professional Steriguard Water Based Enamel Semi Gloss	DD01993	B42	AS 3730.2
Gloss latex: exterior	Dulux Weathershield Gloss	DD0054	B9b	AS 3730.10
Gloss latex: interior	Dulux Wash&Wear Gloss	DD02072	B9a	AS 3730.12
Gloss waterborne interior/exterior trim (alt B9a/B9b)	Dulux Aquanamel Gloss (low VOC)	DD1282	B42	AS 3730.1
Gloss waterborne latex: interior	Dulux Professional Steriguard Water Based Enamel Gloss	DD01992	B42	AS 3730.1
Wood primer, solvent-borne	Dulux 1 Step Oil Based Primer Sealer Undercoat	DD1227	B10	AS 3730.13
Wood primer, latex	Dulux 1 Step Acrylic Primer Sealer Undercoat	DD1192	B10a	AS 3730.17
Metal primer for steel – solvent-borne	Dulux Metalshield All Surface Primer	DI1640	B11	AS 3730.21

Paint type	DuluxGroup/Dulux material description	Dulux PDS No.	PRN AS/NZS 2311 (Table 4.2)	Standard
Metal primer, latex	Dulux Prepcoat All Metal Primer (water based, low VOC)	DD01891	B11a#	AS 3730.15
Metal primer for zinc-coated surfaces, latex	Dulux Professional Galvanised Iron Primer (water based, low VOC)	DD0156	B12a	AS 3730.15
Metal primer for non ferrous metals	Dulux Prepcoat All Metal Primer (water based, low VOC)	DD01891	B13	AS 3730.17
Zinc-rich organic binder/primer for steel	Dulux Zinc Rich 1P Primer	DI0541	B14	AS 3730.9
Concrete and masonry sealer	Dulux Sealer Binder Dulux Acratex Acraprime 501/2 Berger Gold Label Acrylic Block Filler	DD0074 DA0442 DD0217	B15	AS 3730.22
Clear low viscosity paint for concrete	Dulux AquaTread Concrete Sealer (low VOC) Dulux DureSeal Acrylic Dust Sealer	DD1187 DI1118	B15a	NE
Moisture resistant plasterboard sealer binder	Dulux EnvirO2 Water Based Sealer Binder (low VOC)	DD1449	B15a	AS 3730.18
Concrete and masonry, latex wallboard sealer, sealer/undercoat,	Dulux Acrylic Sealer Undercoat (low VOC) Dulux 1 Step Acrylic Primer Sealer Undercoat (low VOC)	DD1402 DD1192	B16	AS 3730.18
Undercoat, solvent-borne	Dulux 1 Step Oil Based Primer Sealer Undercoat	DD1227	B17	AS 3730.14
Undercoat, latex: exterior	Dulux 1 Step Acrylic Primer Sealer Undercoat (low VOC) Dulux Acratex Water Based 501/1	DD1192 DD0441	B17a	AS 3730.18
Undercoat, latex: interior	Dulux 1 Step Acrylic Primer Sealer Undercoat (low VOC) Dulux Acrylic Sealer Undercoat (low VOC)	DD1192 DD1402	B17a	AS 3730.18
Exterior latex stain, semi-transparent	Intergrain NaturalStain (low VOC)	DW0758	B22	AS 3730.16
Fence stain, latex paints, opaque	Dulux Weathershield Garden Shades Cabot's Timbercolour	DD0055 DW0660	B22b	AS 3730.16
Exterior stain, solvent-borne, opaque	Cabot's Deck & Exterior Stain	DW1579	B23#	AS 3730.28

Paint type	DuluxGroup/Dulux material description	Dulux PDS No.	PRN AS/NZS 2311 (Table 4.2)	Standard
Exterior stain, solvent-borne, semi-transparent	Feast Watson Timber & Deck Stain Cabot's Deck & Exterior Stain	DW01894 DW1579	B23a	NE
Intumescent paints		N/A	B28#	NE
Epoxy paint, two-pack, solvent-borne topcoats, interior only	Dulux Durebild STE 2 Pack Epoxy (high build & surface tolerant) Dulux Duremax GPE	DI1109 DI1115	B29	AS/NZS 3750.1
Epoxy paint, two-pack, solvent-borne topcoats, exterior & pools		N/A	B29	AS/NZS 3750.1
Epoxy paint, two-pack, water based, interior only	Dulux Luxafloor ECO2 (low VOC) Dulux Enviropoxy WBE	I1315 DI1120	B29a	NE
High Build Recoatable two-pack, solvent-borne gloss polyurethane	Dulux Weathermax HBR Luxathane HPX	DI1156 DC02059	B29c B29c	NE
High build membrane or texture coatings for masonry and concrete: exterior	Dulux Acratex Range	Acratex	B38b	AS/NZS 4548.1 AS/NZS 4548.2 AS/NZS 4548.3 AS/NZS 4548.4
Texture finish latex coatings for masonry and plasterboard: interior only	Dulux Effects Range (interior)		B38a	NE
Clear or colourless coatings (waterborne) for timber, exterior	Intergrain UltraClear Exterior – Gloss, Satin Note: not suitable for decking.	DW1401 DW1400	B39	NE
Clear coatings (waterborne) for timber, interior	Intergrain Ultraclear Interior - Gloss, Satin (low VOC)	DW0762 DW0761	B39	NE
Clear or colourless coatings (waterborne) for timber, interior floors	Intergrain Enviropro Endure 1 Pack - Matt, Satin, Gloss (low VOC) Intergrain Enviropro Endure 2 Pack - Matt, Satin, Gloss	DW1420 DW1419 DW1418 DW1423 DW1422 DW1421	B39	AS 3730.27

Paint type	DuluxGroup/Dulux material description	Dulux PDS No.	PRN AS/NZS 2311 (Table 4.2)	Standard
Sanding sealer	Feast Watson Sanding Sealer	DW0744	B40	NE
Semi-gloss latex, interior trim (alt B8b)	Dulux Aquanamel Semi-Gloss (low VOC)	DD1281	B41	NE
Gloss or full gloss latex, interior trim	Dulux Aquanamel Gloss (low VOC)	DD1282	B42	NE
Gloss pigmented polyurethane	Dulux Luxathane R Dulux Luxathane HPX Dulux Weathermax HBR	DD1137 DC02059DI1156	B44	AS/NZS 3750.6
Powder coatings for non-ferrous metals	Dulux Powder coat Range		B45b	AS 3715
Powder coatings for ferrous metals	Dulux Powder coat Range (www.duluxpowders.com.au)		B45b	AS 4506

Low VOC compliance reference table

Green Star Interiors	VOC Limits MAX g/litre	DULUX Products compared to the GBCA specification	VOC g/litre Untinted
COMPLIANCE CRITERIA – GBCA specifications (obtain latest figures).			
Walls and ceilings - interior semi-gloss		Dulux Professional Enviro2 Interior Semi-Gloss	2
Walls and ceilings - interior semi-gloss	16	Dulux Wash&Wear Semi Gloss Dulux Wash&Wear +Plus Kitchen&Bathroom Semi Gloss	16 16
Walls and ceilings - interior low sheen	16	Dulux Professional Enviro2 Interior Low Sheen	5
Walls and ceilings - interior low sheen	16	Dulux Wash&Wear Low Sheen Dulux Wash&Wear +Plus Kitchen& Bathroom Low Sheen	16 16
Walls and ceilings - interior flat-washable	16	Dulux Professional Enviro2 Interior Matt	1
Ceilings - interior flat	14	Dulux Professional Enviro2 Interior Tintable ceiling Flat	1
Ceilings - interior flat	14	Dulux White Ceiling Paint	14
Trim - interior gloss	75	Dulux Aquanamel Gloss	50 74

Green Star Interiors	VOC Limits MAX g/litre	DULUX Products compared to the GBCA specification	VOC g/litre Untinted
		Dulux Professional Steriguard Water Based Enamel Gloss	
Trim - interior semi-gloss	75	Dulux Aquanamel Semi Gloss Dulux Professional Steriguard Water Based Enamel Semi Gloss	50 74
Timber primer	30	Dulux Professional Enviro2 Acrylic Sealer Undercoat (ASU)	1
Timber primer	30	Dulux Acrylic Sealer Undercoat Dulux Professional Enviro2 Acrylic Sealer Undercoat (ASU)	5 1
Latex primer for galvanized iron and zincalume NOT FOR HDG	60	Dulux Professional Total Prep	45
Latex primer for galvanized iron and zincalume NOT for HDG	60	Dulux Professional Galvanised Iron Primer	< 60
Interior latex undercoat	65	Dulux Professional Enviro2 Acrylic Sealer Undercoat (ASU)	1
Interior latex undercoat	65	Dulux Prepcoat Acrylic Sealer Undercoat	< 5
Exterior latex undercoat	65	Dulux 1 Step Acrylic Primer Sealer Undercoat (PSU) Dulux Professional Total Prep	<37 45
Interior sealer	65	Dulux Professional Enviro2 Acrylic Sealer Undercoat (ASU)	1
Interior concrete sealer	65	Dulux Luxafloor Eco2 (clear) + colours Dulux Luxafloor WB (Clear) + colours	10 10
One and two pack performance coatings for floors	140	Dulux Luxafloor Eco2 concrete Dulux Luxafloor WB concrete Intergrain Enviropro Timber Endure One Pack Intergrain Enviropro Timber Endure Two Pack	10 10 <90 <135 (Part A & B)

3 EXECUTION

3.1 PREPARATION

Standards

General: To AS/NZS 2311 Sections 3.

Order of work

Other trades: Before painting, complete the work of other trades as far as practicable within the area to be painted, except for the installation of fittings, floor sanding and laying flooring materials.

Clear finishes: Complete clear timber finishes before commencing opaque paint finishes in the same area.

Protection

General: Before painting, clean the area and protect it from dust contamination. Use drop sheets and masking agents to protect surfaces, including finished surfaces and adjacent finishes, during painting.

Fixtures and furniture: Remove door furniture, switch plates, light fittings and other fixtures before painting, and conform to the following:

- Labelling and storage: Attach labels or mark fixtures using a non-permanent method, identifying location and refixing instructions, if required. Store and protect against damage.

Difficult to remove fixtures: Where removal is impractical or difficult, apply surface protection before substrate preparation and painting.

Substrate preparation – generally

General: Prepare substrates to receive the documented paint system.

Cleaning: Clean down the substrate surface. Do not cause damage to the substrate or the surroundings.

Filling: Fill cracks and holes with fillers, sealants, putties or grouting cements as appropriate for the finishing system and substrate, and sand smooth.

- Clear finish: Provide filler tinted to match the substrate.

Clear timber finish systems: Prepare the surface so that its attributes will show through the clear finish without blemishes, using methods including the following:

- Removal of bruises.
- Removal of discolourations, including staining by oil, grease and nailheads.
- Bleaching where necessary to match the timber colour sample.
- Puttying.
- Fine sanding, with the last abrasive no coarser than 220 grit, so that there are no scratches across the grain.

Treated surfaces: If surfaces have been treated with preservatives or fire retardants, make sure the paint system is compatible with the treatment and does not adversely affect its performance.

Iron and steel: Remove weld spatter, slag, burrs, or any other objectionable surface irregularities and radius all edges to a minimum of 2 mm. Degrease by solvent or alkaline cleaning.

Iron and steel blast cleaning: To AS 1627.9 and to the class specified in the specified protective treatment. Provide a surface roughness or profile appropriate for the specified treatment. Where steelwork to be abrasive cleaned includes irregular shapes allow for special equipment to achieve required abrasive cleaning.

Structural steel: All exposed fixings including bolts, screws and the like, are to be painted to match adjacent steelwork paint system.

Concrete and masonry: Before application to very smooth concrete, brick or masonry, either acid etch, mechanically grind or abrasive track blast the surface as appropriate to provide a suitable key for the

subsequently applied coating and to remove laitance. Remove loose friable matter before filling surface discontinuities.

Set plaster surfaces: Do not apply solvent borne paint or other impervious coatings if the moisture content at the surface, tested with a moisture meter, exceeds 12%.

Unpainted surfaces

Standard: To AS/NZS 2311 Section 3.

Previously painted surfaces

Preparation of a substrate in good condition: To AS/NZS 2311 clause 7.4.

Preparation of a substrate in poor condition: To AS/NZS 2311 clause 7.5.

Preparation of steel substrates with protective coatings: To AS 2312.1 Section 8 and AS 1627.1.

PVC-U: Clean with methylated spirit and a nylon scouring pad.

Wallcovering: Remove wallcovering and residual paste with clean water. Patch and repair substrate to a uniform surface before painting.

Lime wash paints: Remove by brushing with warm water.

Reconditioned damaged surfaces in galvanized steel: To AS/NZS 4680 clause 8.

Cleaning external surfaces

Sound external surfaces other than timber: Remove dirt, grease, loose and foreign matter, efflorescence and mould by water blasting or steam cleaning without damaging the surface. Remove remaining loose material with hand tools. Use sanding blocks to preserve the arrises of masonry and stone details.

Efflorescence: Eliminate the source of salt and water before cleaning. Allow surface to dry for 15 to 30 days before repainting.

New masonry: Allow 30 days for the masonry to cure and pH level to stabilise before painting.

3.2 PAINTING SYSTEMS

Dulux paint systems

Requirement: Apply paint systems as documented in the **Interior painting schedule** and the **Exterior painting schedule**.

General: Apply the paint system nominated for each substrate to the referenced manufacturer's Product Data Sheets (PDS) and Spec Sheets and include:

- The number and order of coats.
- The paint type for each coat.

Additional coats: Apply if necessary to:

- prepare porous or reactive substrates with prime or seal coats consistent with the manufacturer's recommendations;
- achieve the total film thickness or texture specified; or
- achieve a satisfactory opacity, in the specified or required colour.

Painting systems

Standards: The scheduled DuluxGroup/Dulux paint systems override AS/NZS 2311 as follows:

- New unpainted interior surfaces: To AS/NZS 2311 Table 5.1.
- New unpainted exterior surfaces: To AS/NZS 2311 Table 5.2.
- Standard: To AS/NZS 2311 clause 5.2. Provide the following final coats:
  - . High build textured or membrane finishes for concrete and masonry: B38 using products conforming to the AS 4548 series.
  - . Two-pack gloss pigmented polyurethane: B44.
  - . Two-pack epoxy: B29.
  - . Two-pack water based epoxy: B29A.

Paint Reference Number (PRN): The number in brackets against the individual product refers to the Paint Ref. No. (PRN) listed in the **DuluxGroup/Dulux paint type reference table** (See **PRODUCTS**) and AS/NZS 2311 Appendix D.

3.3 APPLICATION

Standard
General: To AS/NZS 2311 Section 6.

Light levels
General: During preparation of surfaces, painting and inspection, maintain light levels such that the luminance (photometric brightness) of the surface is equal to the specified permanent artificial illumination conditions or 400 lux, whichever is the greater.

Substrate moisture content
Requirement: Use a moisture meter to demonstrate that the moisture content of the substrate is at or below the recommended maximum level for the type of paint and the substrate material.

Paint application
General: Apply the first coat immediately after substrate preparation and before contamination of the substrate can occur. Apply subsequent coats after the manufacturer's recommended drying period has elapsed.

Painting conditions
General: Unless the paint is recommended for such conditions, do not paint under the following conditions:

- Dusty conditions.
- Relative humidity: > 85%.
- Surface temperature: < 10°C or > 35°C.

Priming timber before fixing
General: Apply one coat of wood primer, and 2 coats to end grain, to the back of the following before fixing in position:

- External fascia boards.
- Timber door and window frames.
- Bottoms of external doors.
- Associated trims and glazing beads.
- Timber board cladding.

Spraying
General: If the paint application is by spraying, use conventional or airless equipment which conforms to the following:

- Satisfactorily atomises paint being applied.
- Does not require paint to be thinned beyond the maximum amount recommended by the manufacturer.
- Does not introduce oil, water or other contaminants into the applied paint.

Paint with known health hazards: Provide personal protection, masking, ventilating and screening facilities to AS/NZS 4114.

Sanding
Clear finishes: Sand the sealer using abrasives no coarser than 320 grit without cutting through the colour. Take special care with round surfaces and edges.

Repair
Requirement: Clean off marks, paint spots and stains progressively and restore damaged surfaces to their original condition.

Maintenance painting: To AS/NZS 2311 Section 8.

Repair of galvanizing
Cleaning: For galvanized surfaces which have been subsequently welded, power tool grind to remove all surface contaminants, including rust and weld splatter. Prime affected area immediately after cleaning.

Primer: Type 2 organic zinc-rich coating for the protection of steel to AS/NZS 3750.9.

Tinting
General: Tint each coat of an opaque coating system so that each has a noticeably different tint from the preceding coat where possible, except for top coats in systems with more than one top coat.

Services
General: Paint all new services and equipment, including those in plant rooms, if not embedded, except chromium, anodised aluminium, GRP, PVC-U, stainless steel, non-metallic flexible materials and normally lubricated machined surfaces.

Proprietary items: Repaint only if damaged.

Windows
Operation: Make sure opening windows function correctly before and after painting.

Doors
Drying: Maintain door leaf in the open position during drying. Do not allow door hardware or accessories to damage the door finish during the drying process.

Wet paint warning
Notices: Place in a conspicuous location and do not remove until the paint is dry.

Exclusions
Exclude the following surfaces from paint systems (unless specifically requested):

- Flexible duct connections, rubber hoses and mountings and other non metallic flexible fittings.
- Wire rope and machined surfaces.
- Metals plated or specially finished for appearance, bronze, brass, copper and stainless steel (except as specified in the *Pipe identification* clause of the *Services* worksections).
- Aluminium frames.
- Prefinished aluminium frames to windows and doors, and trim.
- Metal floor duct covers.
- Raised access floors.
- Floors.
- Fair faced brickwork, blockwork, stonework, artificial stone and exposed aggregates.
- Sprayed vermiculite.
- Floors, paving, roads unless otherwise specified.
- Timber roof structure.
- Concealed timber roof structure.
- Timber ceiling and eaves lining.
- Exterior timber sheeting.
- Exterior timber stairs and decking.
- Plastic finishes generally
- Inside of service ducts, heat exchangers, pipes and valves.
- Shower seats, store shelving, work benches.
- Those parts of timber fixtures, such as insides of cupboards, not visible when doors are closed, unless otherwise specified. Insides of bathroom cabinets are not excluded and shall be painted.
- Self finished surface such as glass and plastic laminates.
- Door hardware, including hinges.

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3.4 COMPLETION

Cleaning

General: On completion of painting, remove splatters from adjacent finished surfaces by washing, scraping or other methods which do not scratch or damage the surfaces.

Protection and masking: Remove masking and protection coverings before paint has dried.

Reinstatement: Repair, replace or refinish any damage, including works of other trades. Touch up new damaged paintwork or misses only with the paint batch used in the original application.

Fixtures: Refix undamaged fixture in the original location, make sure they are properly fitted and in proper working order.

Disposal of paint and waste materials.

Requirement: Conform to requirements of the local government authority.

Spares

Spare material: Supply clearly labelled sealed containers of each type, coat and colour of paint/coating from the same batch, for future repair purposes.

4 SELECTIONS

4.1 INTERIOR PAINTING SCHEDULE

Flat and matt latex - Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Plasterboard (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear Matt	Dulux Wash&Wear Matt	SD05662
Plasterboard (ceilings) (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux White Ceiling Paint	Dulux White Ceiling Paint	SD 0010
Fibrous/set plaster	Dulux Sealer Binder (solvent based)	Dulux Wash&Wear Matt	Dulux Wash&Wear Matt	SD 05883
Fibrous/set plaster (with glancing light issues)	Dulux Sealer Binder (solvent based)	Dulux Wash&Wear Matt	Dulux Wash&Wear Matt	SD 05883
Fibre cement products (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear Matt	Dulux Wash&Wear Matt	SD06059
Timber and veneers	Dulux Professional Total Prep	Dulux Aquanamel Low-Gloss	Dulux Aquanamel Low-Gloss	SD13399
Acoustic ceiling tiles, vents & grids Vermiculite	Dulux Professional Acousticoat Flat			SD13203

Low-gloss latex - Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Plasterboard (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear Low Sheen	Dulux Wash&Wear Low Sheen	SD 0002
Fibrous/set plaster	Dulux Precision Sealer Binder	Dulux Wash&Wear Low Sheen	Dulux Wash&Wear Low Sheen	SD0667

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Fibre cement products (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear Low Sheen	Dulux Wash&Wear Low Sheen	SD 2971
Timber and veneers	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Wash&Wear Low Sheen	Dulux Wash&Wear Low Sheen	SD 1528
Concrete (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear Low Sheen	Dulux Wash&Wear Low Sheen	SD 0901
MDF	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Wash&Wear Low Sheen	Dulux Wash&Wear Low Sheen	SD 1041
Brick and masonry (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear Low Sheen	Dulux Wash&Wear Low Sheen	SD 3284
Concrete blockwork (low VOC system)	Berger Gold Label Acrylic Block Filler	Dulux Wash&Wear Low Sheen	Dulux Wash&Wear Low Sheen	SD 07827

Low-gloss latex (mould resistant) – Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Plasterboard (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	SD 4511
Plasterboard (MR grade) (low VOC system)	Dulux Professional Acrylic Sealer Undercoat	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	SD13491
Fibrous/set plaster	Dulux Sealer Binder (solvent based)	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	SD 5008
Fibre cement products (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	SD 4543
Concrete	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	SD 5009
Cement render (low VOC system)	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	SD 5010
MDF	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	SD 3430

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Brick and masonry (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	SD 5018
Concrete blockwork (low VOC system)	Berger Gold Label Acrylic Block Filler	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	SD 2741

Low-gloss latex (mould and bacteria resistant) - Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Plasterboard (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Professional Steriguard Acrylic Low Sheen	Dulux Professional Steriguard Acrylic Low Sheen	SD11373
Plasterboard (MR grade) (low VOC system)	Dulux Professional Acrylic Sealer Undercoat	Dulux Professional Steriguard Acrylic Low Sheen	Dulux Professional Steriguard Acrylic Low Sheen	SD13491
Fibrous/set plaster	Dulux Sealer Binder (solvent based)	Dulux Professional Steriguard Acrylic Low Sheen	Dulux Professional Steriguard Acrylic Low Sheen	SD09836
Timber and veneers	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Professional Steriguard Acrylic Low Sheen	Dulux Professional Steriguard Acrylic Low Sheen	SD11374
Concrete	Dulux Acrylic Sealer Undercoat	Dulux Professional Steriguard Acrylic Low Sheen	Dulux Professional Steriguard Acrylic Low Sheen	SD11376
MDF	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Professional Steriguard Acrylic Low Sheen	Dulux Professional Steriguard Acrylic Low Sheen	SD09757
Brick and masonry (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Professional Steriguard Acrylic Low Sheen	Dulux Professional Steriguard Acrylic Low Sheen	SD11375
Concrete blockwork (low VOC system)	Berger Gold Label Acrylic Block Filler	Dulux Professional Steriguard Acrylic Low Sheen	Dulux Professional Steriguard Acrylic Low Sheen	SD10165

Semi-gloss latex - Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Plasterboard (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear Semi Gloss	Dulux Wash&Wear Semi Gloss	SD 0003
Fibrous/set plaster	Dulux Sealer Binder (solvent based)	Dulux Wash&Wear Semi Gloss	Dulux Wash&Wear Semi Gloss	SD 0815

Fibre cement products (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear Semi Gloss	Dulux Wash&Wear Semi Gloss	SD 0903
Timber and veneers	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Wash&Wear Semi Gloss	Dulux Wash&Wear Semi Gloss	SD 3410
Concrete (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear Semi Gloss	Dulux Wash&Wear Semi Gloss	SD 1065
Cement render (low VOC system)	Dulux Total Prep	Dulux Wash&Wear Semi Gloss	Dulux Wash&Wear Semi Gloss	SD 1066
MDF (low VOC system)	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Wash&Wear Semi Gloss	Dulux Wash&Wear Semi Gloss	SD 3615
Brick and masonry (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear Semi Gloss	Dulux Wash&Wear Semi Gloss	SD 0678
Concrete blockwork (low VOC system)	Berger Gold Label Acrylic Block Filler	Dulux Wash&Wear Semi Gloss	Dulux Wash&Wear Semi Gloss	SD 2797

Semi-gloss latex (mould resistant) - Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Plasterboard (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	SD 4523
Plasterboard (MR grade) (low VOC system)	Dulux Professional EnvirO2 Interior Acrylic Sealer Undercoat	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	AUSD0632
Fibrous/set plaster	Dulux Sealer Binder (solvent based)	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	SD 5014
Fibre cement products (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	SD 4512
Concrete (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	SD 4522
MDF	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	SD 5016
Brick and masonry (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	SD 5017

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Concrete blockwork (low VOC system)	Berger Gold Label Acrylic Block Filler	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	SD 3333

Semi-gloss water based enamel: Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Plasterboard	Dulux Acrylic Sealer Undercoat	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 2591
Plasterboard (MR grade)	Dulux Acrylic Sealer Undercoat	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD2591
Fibrous/set plaster	Dulux Sealer Binder (solvent based)	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 3058
Fibre cement products	Dulux Acrylic Sealer Undercoat	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SW 5020
Timber and veneers (low VOC system)	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 2199
Concrete	Dulux Acrylic Sealer Undercoat	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 5021
Cement render	Dulux Professional Acrylic Primer	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 07495
MDF (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 2294
Brick and masonry	Dulux Acrylic Sealer Undercoat	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 5026
Concrete blockwork	Berger Gold Label Acrylic Block Filler	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 5045
Zinc-coated metals (zincalume, Galvabond, zincanneal, zincseal, zinc-primed steel) (low VOC system)	Dulux Galvanised Iron Primer (water based)	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 2523
Shop primed or red oxide primed (ROZP) ferrous metal (low VOC system)	Dulux Metalshield All Surface Primer (water based)	Dulux Aquanamel Semi Gloss Acrylic	Dulux Aquanamel Semi Gloss Acrylic	SD 2279
Non-ferrous metals (incl. aluminium, brass, copper, tin plate) (low VOC system)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 09798

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Plastics (solvent resistant types e.g. FRP, PVC-U) (low VOC system)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 3960

Semi-gloss water based enamel (mould and bacteria resistant) - Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Plasterboard	Dulux Acrylic Sealer Undercoat	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	SA11377
Fibrous/set plaster	Dulux Sealer Binder (solvent based)	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	SD10021
Fibre cement products	Dulux Acrylic Sealer Undercoat	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	SD11379
Timber and veneers (low VOC system)	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	SD11380
Concrete	Dulux Acrylic Sealer Undercoat	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	SD11381
MDF (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	D11382
Concrete blockwork	Berger Gold Label Acrylic Block Filler	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	SD11384
Zinc-coated metals (zincalume, Galvabond, zincanneal, zincseal, zinc-primed steel) (low VOC system)	Dulux Galvanised Iron Primer (water based)	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	SD11385
Shop primed or red oxide primed (ROZP) ferrous metal (low VOC system)	Dulux Metalshield All Surface Primer (water based)	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	SD11386

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Non-ferrous metals (incl. aluminium, brass, copper, tin plate) (low VOC system)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	SD11387
Plastics (solvent resistant types e.g. FRP, PVC-U) (low VOC system)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	SD11388

Semi-gloss, solvent-borne - Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Timber and primed hardboard veneers	Dulux 1 Step Oil Based Primer Sealer Undercoat (solvent based)	Dulux Super Enamel Semi Gloss	Dulux Super Enamel Semi Gloss	SD 0041
MDF	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Super Enamel Semi Gloss	Dulux Super Enamel Semi Gloss	SD 1169
Zinc-coated metals (zincalume, Galvabond, zincanneal, zincseal, zinc-primed steel)	Dulux Galvanised Iron Primer	Dulux Super Enamel Semi Gloss	Dulux Super Enamel Semi Gloss	SD 09093
Shop primed or red oxide primed (ROZP) ferrous metal.	Dulux Metalshield All Surface Primer (water based)	Dulux Super Enamel Semi Gloss	Dulux Super Enamel Semi Gloss	SD 08446
Non-ferrous metals (incl. aluminium, brass, copper, tin plate)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Super Enamel Semi Gloss	Dulux Super Enamel Semi Gloss	SD 3452
Plastics (solvent resistant types e.g. FRP, PVC-U)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Super Enamel Semi Gloss	Dulux Super Enamel Semi Gloss	SD 3340
Plastics (solvent sensitive types e.g. polystyrene)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 3340

Full gloss water based enamel - Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Plasterboard	Dulux Acrylic Sealer Undercoat	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 0990
Plasterboard (MR grade)	Dulux Professional EnvirO2 Water	Dulux Aquanamel Gloss Acrylic	Dulux Aquanamel Gloss	SD 11227

	Based Sealer Binder			
Fibrous/set plaster	Dulux Sealer Binder (solvent based)	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 3849
Fibre cement products	Dulux Acrylic Sealer Undercoat	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 5027
Timber and veneers (low VOC system)	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 0458
Concrete	Dulux Acrylic Sealer Undercoat	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 5028
Cement render	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 2263
MDF (low VOC system)	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 3298
Brick and masonry	Dulux Acrylic Sealer Undercoat	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 5046
Concrete blockwork	Berger Gold Label Acrylic Block Filler	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 1522
Zinc-coated metals (zincalume, Galvabond, zincanneal, zincseal, zinc-primed steel) (low VOC system)	Dulux Galvanised Iron Primer (water based)	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD08559
Shop primed or red oxide primed (ROZP) ferrous metal	Dulux Metalshield All Surface Primer	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 2279
Non-ferrous metals (incl. aluminium, brass, copper, tin plate) (low VOC system)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 3455
Plastics (solvent resistant types e.g. FRP, PVC-U) (low VOC system)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 11228

Full gloss water based enamel (mould and bacteria resistant) - Interior

Substrate	**1st coat**	**2nd coat**	**3rd coat**	**Manufacturer's Spec Sheet Ref**
Plasterboard	Dulux Acrylic Sealer Undercoat	Dulux Professional SteriGuard Water Based Enamel Gloss	Dulux Professional SteriGuard Water Based Enamel Gloss	SD11389

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Fibrous/set plaster	Dulux Sealer Binder (solvent based)	Dulux Professional SteriGuard Water Based Enamel Gloss	Dulux Professional SteriGuard Water Based Enamel Gloss	SD10018
Fibre cement products	Dulux Acrylic Sealer Undercoat	Dulux Professional SteriGuard Water Based Enamel Gloss	Dulux Professional SteriGuard Water Based Enamel Gloss	SD11391
Timber and veneers (low VOC system)	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Professional SteriGuard Water Based Enamel Gloss	Dulux Professional SteriGuard Water Based Enamel Gloss	SD11392
Concrete	Dulux Acrylic Sealer Undercoat	Dulux Professional SteriGuard Water Based Enamel Gloss	Dulux Professional SteriGuard Water Based Enamel Gloss	SD11393
MDF (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Professional SteriGuard Water Based Enamel Gloss	Dulux Professional SteriGuard Water Based Enamel Gloss	SD11394
Concrete blockwork	Berger Gold Label Acrylic Block Filler	Dulux Professional SteriGuard Water Based Enamel Gloss	Dulux Professional SteriGuard Water Based Enamel Gloss	SD11395
Zinc-coated metals (zincalume, Galvabond, zincanneal, zincseal, zinc-primed steel) (low VOC system)	Dulux Galvanised Iron Primer (water based)	Dulux Professional SteriGuard Water Based Enamel Gloss	Dulux Professional SteriGuard Water Based Enamel Gloss	SD11396
Shop primed or red oxide primed (ROZP) ferrous metal (low VOC system)	Dulux Metalshield All Surface Primer (water based)	Dulux Professional SteriGuard Water Based Enamel Gloss	Dulux Professional SteriGuard Water Based Enamel Gloss	SD11399
Non-ferrous metals (incl. aluminium, brass, copper, tin plate) (low VOC system)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Professional SteriGuard Water Based Enamel Gloss	Dulux Professional SteriGuard Water Based Enamel Gloss	SD11397
Plastics (solvent resistant types e.g. FRP, PVC-U) (low VOC system)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Professional SteriGuard Water Based Enamel Gloss	Dulux Professional SteriGuard Water Based Enamel Gloss	SD11398

Full gloss solvent-borne – Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Timber and primed hardboard veneers	Dulux 1 Step Oil Based Primer Sealer Undercoat	Dulux Super Enamel High Gloss	Dulux Super Enamel High Gloss	SD 0039
MDF (interior only)	Dulux 1 Step Acrylic Primer Undercoat	Dulux Super Enamel High Gloss	Dulux Super Enamel High Gloss	SD 1168
Zinc-coated metals (zincalume, Galvabond, zincanneal, zincseal, zinc-primed steel)	Dulux Galvanised Iron Primer (water based)	Dulux Super Enamel High Gloss	Dulux Super Enamel High Gloss	SD 09093
Shop primed or red oxide primed (ROZP) ferrous metal.	Dulux Metalshield All Surface Primer	Dulux Super Enamel High Gloss	Dulux Super Enamel High Gloss	SD 08446
Non-ferrous metals (incl. aluminium, brass, copper, tin plate)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Super Enamel High Gloss	Dulux Super Enamel High Gloss	SD 3451
Plastics (solvent resistant types e.g. FRP, PVC-U)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Super Enamel High Gloss	Dulux Super Enamel High Gloss	SD 0385
Plastics (solvent sensitive types e.g. polystyrene)	Dulux Precision Maximum Strength Adhesion Primer	Use water based paints, not solvent based.	Use water based paints, not solvent based.	N/A

Full gloss, epoxy primed enamel - Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Zinc-coated metals (zincalume, Galvabond, zincanneal, zincseal, zinc-primed steel)	Dulux Durebild STEto 100 microns DFT	Dulux Metalshield Prem UV Resistant Enamel Topcoat Gloss	Dulux Metalshield Prem UV Resistant Enamel Topcoat Gloss	D11407

Full gloss, epoxy primed two-pack polyurethane - Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Zinc-coated metals (incl. HD Galvanized steel, zincalume, Galvabond, zincanneal, zincseal, zinc-primed steel)	Dulux Duremax GPE Zinc Phosphate to 125 microns DFT	Dulux Duremax GPE to 100 microns DFT	Dulux Weathermax HBR to 75 microns DFT	SI 3359

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Concrete (solvent based system)	Berger Jet Dry Non-Slip Paving Paint	Berger Jet Dry Non-Slip Paving Paint	Berger Jet Dry Non-Slip Paving Paint	SD 0643
Concrete (low VOC, water based system)	Berger Jet Dry Aqua Tread Satin	Berger Jet Dry Aqua Tread Satin		SD 1145

Clear sealer for concrete – Interior or exterior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Concrete (Domestic) (low VOC, water based system)	Berger Jet Dry Aqua Tread Satin	Berger Jet Dry Aqua Tread Satin	Berger Jet Dry Aqua Tread Satin	SD 1145
Concrete (commercial) (low VOC, water based system)	Dulux Luxafloor WB	Dulux Luxafloor WB		SC 11138
Concrete (commercial) (water based system)	Dulux 956/1 Acraglaze (Interior only)	Dulux 956/1 Acraglaze (Interior only)	(Optional) Dulux 956/1 Acraglaze (Interior only)	SA 2589
Concrete (commercial) (solvent based system)	Dulux Luxafloor ACS	Dulux Luxafloor ACS		SI 1574

4.2 EXTERIOR PAINTING SCHEDULES

Low-gloss latex – Exterior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Weatherboard - hardboard cladding (Weathertex)	Dulux Professional Acrylic Primer	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 9246
Weatherboard - fibre cement board cladding (Hardiboard)	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 2539
Fibre cement products	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 1333
Timber and veneers	Dulux Professional Acrylic Primer	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 9246
Concrete (OFC, tilt slab or precast)	Dulux AcraPrime 501/1 Water Based Primer	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 1620

Concrete (OFC, tilt slab or precast) (High-build performance coating system)	Dulux AcraPrime 501/1 Water Based Primer	Dulux AcraTex AcraShield 955 Low Gloss RollerRoller Finish	Dulux AcraTex AcraShield 955 Low Gloss RollerRoller Finish	SA 0770
Cement render (High-build performance coating system)	Dulux AcraPrime 501/1 Water Based Primer	Dulux AcraTex AcraShield 955 Low Gloss Roller Finish	Dulux AcraTex AcraShield 955 Low Gloss Roller Finish	SA 4029
Clay brick and masonry	Dulux Professional Acrylic Primer	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 7507
Concrete blockwork	Berger Gold Label Acrylic Blockfiller	Dulux Weathershield Low Sheen Acrylic	Dulux Weathershield Low Sheen Acrylic	SD 1555
Concrete blockwork (High-build performance coating system)	Dulux AcraPrime 501/1 Water Based Primer	Dulux AcraTex AcraShield 955 Low Gloss Roller Finish	Dulux AcraTex AcraShield 955 Low Gloss Roller Finish	SA 2957
Zinc coated metals (incl. Zincalume, Galvabond, Zincanneal, zincseal, zinc-primed steel)	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 3275
HD Galvanized steel or zinc-primed steel (Domestic)	Dulux Durebuild STE Two Pack Epoxy	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 11541
Shop primed or red oxide primed (ROZP) ferrous metal.	Dulux Luxaprime Zinc Phosphate Primer	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 07815
Plastics (solvent resistant types e.g. FRP, PVC-U) (low VOC)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 3006

Semi-gloss latex – Exterior

Substrate	**1st coat**	**2nd coat**	**3rd coat**	**Manufacturer's Spec Sheet Ref**
Weatherboard - hardboard cladding (Weathertex)	Dulux Professional Acrylic Primer	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 9246
Weatherboard - fibre cement board cladding (Hardiboard)	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 2539

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Fibre cement products	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 1333
Timber and veneers	Dulux Professional Acrylic Primer	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 9246
Concrete (OFC, tilt slab or precast)	Dulux AcraPrime 501/1 Water Based Primer	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 1620
Concrete (OFC, tilt slab or precast) (High-build performance coating system)	Dulux AcraPrime 501/1 Water Based Primer	Dulux AcraTex AcraShield 955 Low Gloss RollerRoller Finish	Dulux AcraTex AcraShield 955 Low Gloss RollerRoller Finish	SA 0770
Cement render (High-build performance coating system)	Dulux AcraPrime 501/1 Water Based Primer	Dulux AcraTex AcraShield 955 Low Gloss Roller Finish	Dulux AcraTex AcraShield 955 Low Gloss Roller Finish	SA 4029
Clay brick and masonry	Dulux Professional Acrylic Primer	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 7507
Concrete blockwork	Berger Gold Label Acrylic Blockfiller	Dulux Weathershield Low Sheen Acrylic	Dulux Weathershield Low Sheen Acrylic	SD 1555
Concrete blockwork (High-build performance coating system)	Dulux AcraPrime 501/1 Water Based Primer	Dulux AcraTex AcraShield 955 Low Gloss Roller Finish	Dulux AcraTex AcraShield 955 Low Gloss Roller Finish	SA 2957
Zinc coated metals (incl. Zincalume, Galvabond, Zincanneal, zincseal, zinc-primed steel)	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 3275
HD Galvanized steel or zinc-primed steel (Domestic)	Dulux Durebuild TE Two Pack Epoxy	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 11541
Shop primed or red oxide primed (ROZP) ferrous metal.	Dulux Luxaprime Zinc Phosphate Primer	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 07815
Plastics (solvent resistant types e.g. FRP, PVC-U) (low VOC)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 3006

Gloss latex – Exterior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Fibre cement products	Dulux Weathershield Gloss	Dulux Weathershield Gloss	Dulux Weathershield Gloss	SD 2938
Timber and veneers	Dulux Professional Acrylic Primer	Dulux Weathershield Gloss	Dulux Weathershield Gloss	SD 09362
Concrete (OFC, tilt slab or precast)	Dulux AcraPrime 501/1 Water Based Primer	Dulux Weathershield Gloss	Dulux Weathershield Gloss	SD 4653
Concrete (OFC, tilt slab or precast) (High-build performance coating system)	Dulux AcraPrime 501/1 Water Based Primer	Dulux AcraTex AcraShield 955 Low Gloss Roller Finish	Dulux AcraTex AcraShield 955 Low Gloss Roller Finish	SA 0770
Cement render (High-build performance coating system)	Dulux AcraPrime 501/1 Water Based Primer	Dulux AcraTex AcraShield 955 Low Gloss Roller Finish	Dulux AcraTex AcraShield 955 Low Gloss Roller Finish	SA 4029
Clay brick and masonry	Dulux Professional Acrylic Primer	Dulux Weathershield Gloss	Dulux Weathershield Gloss	SD 7512
Concrete blockwork	Berger Gold Label Acrylic Blockfiller	Dulux Weathershield Gloss	Dulux Weathershield Gloss	SD 5050
Concrete blockwork (High-build performance coating system)	Dulux AcraPrime 501/1 Water Based Primer	Dulux AcraTex AcraShield 955 Low Gloss Roller Finish	Dulux AcraTex AcraShield 955 Low Gloss Roller Finish	SA 2957
Zinc coated metals (incl. Zincalume, Galvabond, Zincanneal, zincseal, zinc-primed steel)	Dulux Professional Galvanised Iron Primer	Dulux Weathershield Gloss	Dulux Weathershield Gloss	SD12545
HD galvanized steel or zinc-primed steel (Domestic)	Dulux Durebuild STE Two Pack Epoxy	Dulux Weathershield Gloss	Dulux Weathershield Gloss	SI 3762
Shop primed or red oxide primed (ROZP) ferrous metal.	Dulux Luxaprime Zinc Phosphate Primer (solvent based)	Dulux Weathershield Gloss	Dulux Weathershield Gloss	SD 07817
Plastics (solvent resistant types e.g. FRP, PVC-U) (low VOC system)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Weathershield Gloss	Dulux Weathershield Gloss	SD 11231

Acrylic paint system for bagged masonry – Exterior

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Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Brickwork and concrete – flush finish (bagged or sponged) – no texture	Berger Gold Label Block Filler	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 1555
Brickwork and concrete – flush finish (bagged or sponged) – slight texture	Dulux AcraPrime 501/1 Water Based Primer	Dulux Acratex AcraSand Acrylic (2nd coat Optional)	Dulux Acratex Acrashield	SA 0754
Brickwork and concrete – flush finish – medium texture	Dulux AcraTex Mediterranean Classique	Dulux AcraTex Mediterranean Classique	Dulux AcraTex AcraShield	SA 09533

Textured acrylic paint system – Exterior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Concrete, blockwork and cement render	Dulux Acraprime 501/1 Water Based Primer	Dulux Acratex Contempo 959 Advance Base Coat	Dulux Acratex Contempo 959 Advance Finish Coat	SA 1868
Concrete, blockwork and cement render	Dulux Acraprime 501/1 Water Based Primer (B15)	Dulux Acratex Roll On 950-00 Low Profile Texture	Dulux Acratex Acrashield 955 Finish	SA 0696
Concrete, masonry, blockwork and cement render	Dulux Acraprime 501/1 Water Based Primer	Dulux Acratex Acrashield 955 Low Gloss Rolana Finish	Dulux Acratex Acrashield 955 Low Gloss Rolana Finish	SA 0770

Semi-gloss water based enamel – Exterior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Fibre cement products	Dulux Professional Acrylic Primer	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 7549
Timber and veneers	Dulux Professional Acrylic Primer	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 07476
Concrete	Dulux Professional Acrylic Primer	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 11234
Cement render	Dulux Professional Acrylic Primer	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 07495
Brick and masonry	Berger Gold Label Acrylic Block Filler	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 5041
Concrete blockwork	Berger Gold Label Acrylic Block Filler	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 5041

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Zinc coated metals Zincalume, Galvabond, Zincanneal, zincseal, zinc-primed steel) (low VOC system)	Dulux Professional Galvanised Iron Primer	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 11235
Shop primed or red oxide primed (ROZP) ferrous metal	Dulux Metalshield All Surface Primer	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 07789
Non-ferrous metals (incl. aluminium, brass, copper, tin plate) (low VOC system)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 09798
Plastics (solvent resistant types e.g. FRP, PVC-U) (low VOC system)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 7494

Full gloss water based enamel – Exterior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Fibre cement products	Dulux Professional Acrylic Primer	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 7548
Timber and veneers	Dulux Professional Acrylic Primer	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 08475
Concrete	Dulux Professional Acrylic Primer	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 11236
Cement render	Dulux Professional Acrylic Primer	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 07496
Brick and masonry	Berger Gold Label Acrylic Blockfiller	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 11237
Concrete blockwork	Berger Gold Label Acrylic Blockfiller	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 11238
Zinc-coated metals (Zincalume, Galvabond, Zincanneal, zincseal, & zinc-primed steel)	Dulux Professional Galvanised Iron Primer	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 11239
Shop primed or red oxide primed (ROZP) ferrous metal.	Dulux Luxaprime Zinc Phosphate Primer (solvent based)	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 07570

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Non-ferrous metals (incl. aluminium, brass, copper, tin plate)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 11240
Plastics (solvent resistant types e.g. FRP, PVC-U)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 11241

Full gloss, solvent borne – Exterior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Timber and primed hardboard veneers	Dulux 1 Step Oil Based PSU (solvent based)	Dulux Super Enamel High Gloss	Dulux Super Enamel High Gloss	SD 0039
Zinc-coated metals (zincalume, Galvabond, zincanneal, zincseal, zinc-primed steel)	Dulux Professional Galvanised Iron Primer	Dulux Super Enamel High Gloss	Dulux Super Enamel High Gloss	SD 07814
Shop primed or red oxide primed (ROZP) ferrous metal.	Dulux Luxaprime Zinc Phosphate Primer (solvent based)	Dulux Super Enamel High Gloss	Dulux Super Enamel High Gloss	SD 07818
Non-ferrous metals (incl. aluminium, brass, copper, tin plate)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Super Enamel High Gloss	Dulux Super Enamel High Gloss	SD 3451
Plastics (solvent resistant types e.g. FRP, PVC-U)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Super Enamel High Gloss	Dulux Super Enamel High Gloss	SD 0385
Plastics (solvent sensitive types, e.g. polystyrene)	Dulux Precision Maximum Strength Adhesion Primer	Don't use Solvent Based, Use Water Based Paints	Don't use Solvent Based, Use Water Based Paints	N/A

Car parking line marking

Requirement:

- Apply nominally 70 mm wide line marking for car parking spaces nominated on drawings.

Materials:

- Paint System: Dulux Roadmaster WB2, spray applied to manufacturers written recommendations.
- Colour shall be white and shall not be subject to discolouration by the bitumen from the road surface.

Application: Unless approved all paint shall be applied by a mechanical line marking sprayer. The road surface shall be clean and dry at the time of painting. Paint shall be applied at wet thickness in the range of 0.35 to 0.40 mm. Bitumen shall be at least 30 days old before coating.

Standard: To AS/NZS 2890.1.

0673 POWDER COATINGS

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide powder coating systems to substrates, as documented.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.3 STANDARDS

General

Application to aluminium and aluminium alloy substrates for architectural applications: To AS 3715 and AAMA 2603, AAMA 2604 and AAMA 2605 as appropriate.

Application to metal substrates other than aluminium for architectural applications: To AS 4506.

1.4 INTERPRETATION

Definitions

General: For the purposes of this worksection the following definitions apply:

- Powder coating: The process of preparing, applying, fusing and curing a thermoset powder coating material to a substrate:
  - . Thermoset powder coating: A mixture of finely ground particles of pigment and resin sprayed on to a prepared substrate. Charged powder particles adhere to electrically grounded surfaces until heated and fused into a smooth coating in a curing oven.
  - . Polyester powder coating: Uses an enhanced polyester resin.
  - . Fluoropolymer powder coating: Uses PTFE (poly tetra fluoro ethylene) for aluminium substrates.
- Substrate: The surface to which a material or product is applied.

1.5 SUBMISSIONS

Products and materials

Coating manufacturer: Submit the following details at least 3 weeks before fabrication:

- Recommended coating system for the nominated service condition.
- Brand name.
- Storage and handling recommendations.
- Product data sheets.
- Maintenance recommendations.

Warranties

General: Submit the coating manufacturer’s warranties, as documented.

2 EXECUTION

2.1 PREPARATION

Substrate pre-treatment

Powder coating to aluminium: To AS 3715 Appendix G.

Powder coating to metals, other than aluminium: To AS 4506 Appendix I.

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2.2 COMPLETION

Cleaning

Aluminium architectural applications: Clean completed assembly to AS 3715 Appendix C.

Metal, other than aluminium, architectural applications: Clean completed assembly to AS 4506 Appendix D.

3 SELECTIONS

Refer to Finishes Fittings and Equipment Schedule for selections.

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Our Ref: 21-000048

19 May 2021

Principal Certifying Authority
Blackett Maguire + Goldsmith Pty Ltd
PO Box 167
Broadway NSW 2007

Attention: Michael Potts

Dear Michael

RE: St Matthews Catholic School Mudgee, Secondary Campus – Certificate of Design – Electrical Services

SUBJECT PREMISES: 48 Broadhead Road, Spring Flat DEVELOPMENT CONSENT: SSD 9872

This design statement relates to the electrical services documentation and specifications for the proposed new St Matthews Catholic School Mudgee – Secondary Campus located at 48 Broadhead Road, Spring Flat.

Relevant Construction Certificate stages covered by this certificate includes:

- CC2 – Structure and Services

Pursuant to the provisions of Clause A5.2 of the Building Code of Australia Amendment 1, we certify that we have taken reasonable care to design the electrical elements listed in the Description of Works below in accordance with the Building Code of Australia 2019 Amendment 1, relevant Australian Standards, the Environmental Planning and Assessment Regulation, relevant conditions of the Development Consent and accepted engineering principals. A Schedule of Applicable Documentation is appended to this certificate.

Description of Works	BCA Clause / DA Condition	Applicable Australian Standard
Emergency Lighting	E4.2 & E4.4	AS/NZS 2293.1:2018
Illuminated Exit Signage	E4.5, E4.6 & E4.8	AS/NZS 2293.1:2018
Artificial Lighting	F4.4	AS/NZS 1680.0:2009
Energy Efficiency	J6 & J8.3	N/A
Outdoor Lighting	DA Condition C21	AS 1158.3.1:2005
Obtrusive Lighting	DA Condition C21	AS 4282:2019

I am appropriately qualified and experienced professional engineer as defined by the NCC Part A5.2 and are competent in the relevant field as applicable to provide this certificate, and as such can certify that the design and performance of the design systems comply with the above.

We possess Indemnity Insurance to the satisfaction of the building owner or my principal.

Full name of Designer:	Pradeep Pejavar
Qualifications:	BEng (Hons), RPEQ (Electrical), MIEAust
Address of Designer:	Level 3, 545 Queen Street, Brisbane QLD 4000
Business Telephone No:	+61 7 3895 3444
Email:	Pradeep.Pejavar@calibregroup.com

Signature:



Yours faithfully
Calibre Professional Services Pty Ltd

Pradeep Pejavar
Principal Engineer – Building Services & Renewables
BEng (Hons), RPEQ (Electrical), MIEAust

ATTACHMENTS

1. Schedule of Applicable Documentation

SCHEDULE OF APPLICABLE DOCUMENTATION

Electrical Drawings	Electrical Specifications
21-000048 - SITE_BR-E5250_COVER SHEET & DRAWING LIST	21-000048 - ESPEC
21-000048 - SITE_BR-E5251_LEGEND	
21-000048 - SITE_BR-E5261_SITE PLAN	
21-000048 - SITE_BR-E5262_PART SITE PLAN	
21-000048 - BLOCK A_BR-E5300_POWER, COMMS & SECURITY LAYOUT	
21-000048 - BLOCK B_BR-E5301_POWER, COMMS & SECURITY LAYOUT	
21-000048 - BLOCK C_BR-E5302_POWER, COMMS & SECURITY LAYOUT	
21-000048 - BLOCK D_BR-E5303_POWER, COMMS & SECURITY LAYOUT	
21-000048 - BLOCK E_BR-E5304_OVERALL POWER, COMMS & SECURITY LAYOUT	
21-000048 - BLOCK E_BR-E5305_BUILDING 1 POWER, COMMS & SECURITY LAYOUT	
21-000048 - BLOCK E_BR-E5306_BUILDING 2 POWER, COMMS & SECURITY LAYOUT	
21-000048 - BLOCK E_BR-E5307_BUILDING 3 POWER, COMMS & SECURITY LAYOUT	
21-000048 - BLOCK A_BR-E5400_LIGHTING LAYOUT	
21-000048 - BLOCK B_BR-E5401_LIGHTING LAYOUT	
21-000048 - BLOCK C_BR-E5402_LIGHTING LAYOUT	
21-000048 - BLOCK D_BR-E5403_LIGHTING LAYOUT	
21-000048 - BLOCK E_BR-E5404_OVERALL LIGHTING LAYOUT	
21-000048 - BLOCK E_BR-E5405_BUILDING 1 LIGHTING LAYOUT	
21-000048 - BLOCK E_BR-E5406_BUILDING 2 LIGHTING LAYOUT	
21-000048 - BLOCK E_BR-E5407_BUILDING 3 LIGHTING LAYOUT	
21-000048 - SITE_BR-E5450_DETAIL SHEET 1	
21-000048 - SITE_BR-E5451_DETAIL SHEET 2	
21-000048 - SITE_BR-E5452_DETAIL SHEET 3	
21-000048 - SITE_BR-E5453_DETAIL SHEET 4	
21-000048 - SITE_BR-E5454_DETAIL SHEET 5	
21-000048 - SITE_BR-E5455_DETAIL SHEET 6	
21-000048 - SITE_BR-E5456_DETAIL SHEET 7	
21-000048 - SITE_BR-E5457_DETAIL SHEET 8	
21-000048 - SITE_BR-E5458_DETAIL SHEET 9	
21-000048 - SITE_BR-E5459_DETAIL SHEET 10	
21-000048 - SITE_BR-E5460_DETAIL SHEET 11	
21-000048 - SITE_BR-E5461_DETAIL SHEET 12	

All documentation is the latest revision at the date of this certificate

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Our Ref: 21-000048

19 May 2021

Principal Certifying Authority
Blackett Maguire + Goldsmith Pty Ltd
PO Box 167
Broadway NSW 2007

Attention: Michael Potts

Dear Michael

RE: St Matthews Catholic School Mudgee, Secondary Campus – Certificate of Design – Hydraulic Services

SUBJECT PREMISES: 48 Broadhead Road, Spring Flat **DEVELOPMENT CONSENT: SSD 9872**

This design statement relates to the hydraulic services documentation and specifications for the proposed new St Matthews Catholic School Mudgee – Secondary Campus located at 48 Broadhead Road, Spring Flat.

Relevant Construction Certificate stages covered by this certificate includes:

- CC2 – Structure and Services
- CC3 – Façade & Building Envelope

Pursuant to the provisions of Clause A5.2 of the Building Code of Australia Amendment 1, we certify that we have taken reasonable care to design the hydraulic elements listed in the Description of Works below in accordance with the Building Code of Australia 2019 Amendment 1, relevant Australian Standards, the Environmental Planning and Assessment Regulation, relevant conditions of the Development Consent and accepted engineering principals. A Schedule of Applicable Documentation is appended to this certificate.

Description of Works	BCA Clause / DA Condition	Applicable Australian Standard
Sanitary Plumbing & Drainage	National Construction Code Revision 1 Volume 3 - Plumbing Code of Australia Section C	AS/NZS 3500.2:2018
Stormwater and roof water drainage	National Construction Code Revision 1 Volume 3 - Plumbing Code of Australia	AS/NZS 3500.3:2018
Cold Water Service	National Construction Code Revision 1 Volume 3 - Plumbing Code of Australia – Section B Water Services – Part B1	AS/NZS 3500.1:2018
Hot Water Service	National Construction Code Revision 1 Volume 3 - Plumbing Code of Australia – Section B Water Services – Part B2	AS/NZS 3500.4:2018, AS/NZS 3500.1:2018
LP Gas Service	N/A	AS/NZS 5601.1:2013 & AS/NZS 1596:2014
Energy Efficiency	J6 & J8.3	N/A

I am appropriately qualified and experienced professional as defined by the NCC Part A5.2 and are competent in the relevant field as applicable to provide this certificate, and as such can certify that the design and performance of the design systems comply with the above.

We possess Indemnity Insurance to the satisfaction of the building owner or my principal.

Full name of Designer:	Chris Morris
Qualifications:	Diploma Hydraulic Design
Address of Designer:	Level 3, 545 Queen Street, Brisbane QLD 4000
Business Telephone No:	+61 7 3895 3444
Email:	chris.morris@calibregroup.com

Signature:



Yours faithfully
Calibre Professional Services Pty Ltd

Chris Morris
Senior Hydraulic Designer – Building Services & Renewables

ATTACHMENTS

1. Schedule of Applicable Documentation

SCHEDULE OF APPLICABLE DOCUMENTATION

Hydraulic Drawings	Hydraulic Specifications
SITE_BR-H5500_COVER SHEET & DRAWING LIST	21-000048 - HSPEC
SITE_BR-H5501_LEGEND, LINETYPES AND ABBREVIATIONS	
SITE_BR-H5502_DRAWING NOTES	
SITE_BR-H5512_SITE PLAN NORTH	
SITE_BR-H5513_SITE PLAN SOUTH	
SITE_BR-H5514_PART SITE PLAN - SOUTH	
BLOCK A_BR-H5520_SANITARY DRAINAGE & PLUMBING LAYOUT	

BLOCK A_BR-H5521_ROOF SANITARY DRAINAGE & PLUMBING LAYOUT	
BLOCK B_BR-H5522_SANITARY DRAINAGE & PLUMBING LAYOUT	
BLOCK B_BR-H5523_ROOF SANITARY DRAINAGE & PLUMBING LAYOUT	
BLOCK C_BR-H5524_SANITARY DRAINAGE & PLUMBING LAYOUT	
BLOCK C_BR-H5525_ROOF SANITARY DRAINAGE & PLUMBING LAYOUT	
BLOCK D_BR-H5526_SANITARY DRAINAGE & PLUMBING LAYOUT	
BLOCK D_BR-H5527_ROOF SANITARY DRAINAGE & PLUMBING LAYOUT	
BLOCK E_BR-H5528_OVERALL SANITARY DRAINAGE & PLUMBING LAYOUT	
BLOCK E_BR-H5529_ROOF SANITARY DRAINAGE & PLUMBING LAYOUT	
BLOCK E_BR-H5530_BUILDING 1 SANITARY DRAINAGE & PLUMBING LAYOUT	
BLOCK E_BR-H5531_BUILDING 1 ROOF SANITARY DRAINAGE & PLUMBING LAYOUT	
BLOCK E_BR-H5532_BUILDING 2 SANITARY DRAINAGE & PLUMBING LAYOUT	
BLOCK E_BR-H5533_BUILDING 2 ROOF SANITARY DRAINAGE & PLUMBING LAYOUT	
BLOCK E_BR-H5534_BUILDING 3 SANITARY DRAINAGE & PLUMBING LAYOUT	
BLOCK E_BR-H5535_BUILDING 3 ROOF SANITARY DRAINAGE & PLUMBING LAYOUT	
BLOCK A_BR-H5540_WATER RETICULATION LAYOUT	
BLOCK B_BR-H5541_WATER RETICULATION LAYOUT	
BBOCK C_BR-H5542_WATER RETICULATION LAYOUT	
BLOCK D_BR-H5543_WATER RETICULATION LAYOUT	
BLOCK E_BR-H5544_OVERALL WATER RETICULATION LAYOUT	
BLOCK E_BR-H5545_BUILDING 1 WATER RETICULATION LAYOUT	
BLOCK E_BR-H5546_BUILDING 2 WATER RETICULATION LAYOUT	
BLOCK E_BR-H5547_BUILDING 3 WATER RETICULATION LAYOUT	
SITE_BR-H5600_DETAIL SHEET 1	
SITE_BR-H5601_DETAIL SHEET 2	
SITE_BR-H5602_DETAIL SHEET 3	
SITE_BR-H5700_ISOMETRIC SHEET 1	
SITE_BR-H5701_ISOMETRIC SHEET 2	
SITE_BR-H5702_ISOMETRIC SHEET 3	
SITE_BR-H5703_ISOMETRIC SHEET 4	
SITE_BR-H5704_ISOMETRIC SHEET 5	

All documentation is the latest revision at the date of this certificate

ALLEANZA ARCHITECTURE

19th May 2021

Principal Certifying Authority
Blackett Maguire + Goldsmith Pty
Ltd PO Box 167
BROADWAY NSW 2007

ARCHITECT'S DESIGN STATEMENT – Construction Certificate No.2

RE: **ST MATTHEW'S CATHOLIC SCHOOL**
MUDGEE SECONDARY CAMPUS

SUBJECT PREMISES**: 48 Broadhead Rd, Spring Flat (Lot 40, DP756894)**

SSD APPLICATION NUMBER**: SSD 9872**

This is to certify that the architectural drawings are consistent with the conditions of development consent and SSDA stamped approved plans pursuant to Building Code of Australia NCC 2019 Amendment 1; and incorporate the relevant BCA requirements identified in the BM+G BCA Report.

Construction Certificate 2

I certify that the primary building elements are not timber.

I am an appropriately qualified and competent person in this area being listed in the Australian Institute of Architects and as such can certify that the design and performance of the design systems comply with the above and which are detailed on the following drawings.

Drawing Number	***Revision***	***Date***
AA111	E	18.05.21
AA211	C	06.04.21
AC111	J	18.05.21
AC211	E	11.05.21
AC212	D	11.05.21
AD111	F	05.04.21
AD211	C	06.04.21

Drawing Number	***Revision***	***Date***
AE111	F	13.05.21
AE113	F	13.05.21
AE115	F	13.05.21
AE211	B	08.04.21
AE212	B	08.04.21
AE213	B	08.04.21
AF111	G	18.05.21
AF201	C	06.04.21

I am a properly qualified person and have a good working knowledge of the BCA clauses and standards referenced above. The information contained in this statement is true and accurate to the best of my knowledge.

I possess Indemnity Insurance to the satisfaction of the building owner or my principal.

Designer:	Charles Glanville
Qualifications:	NSW registration 3130
Address:	Level 1, 695-699 George Street, Haymarket NSW 2000
Phone:	(02) 8039 8822, Mobile: 0412 268 417
Signature:	



Yours faithfully,

Alleanza Architecture



Charles Glanville
ARCHITECT

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ALLEANZA
ARCHITECTURE

19th May 2021

Principal Certifying Authority
Blackett Maguire + Goldsmith Pty
Ltd PO Box 167
BROADWAY NSW 2007

ARCHITECT'S DESIGN STATEMENT – Construction Certificate No.3

RE: **ST MATTHEW'S CATHOLIC SCHOOL**
MUDGEE SECONDARY CAMPUS

SUBJECT PREMISES**: 48 Broadhead Rd, Spring Flat (Lot 40, DP756894)**

SSD APPLICATION NUMBER**: SSD 9872**

This is to certify that the architectural drawings are consistent with the conditions of development consent and SSDA stamped approved plans pursuant to Building Code of Australia NCC 2019 Amendment 1; and incorporate the relevant BCA requirements identified in the BM+G BCA Report.

Construction Certificate 3

This is to certify that in accordance with DA Condition Clause A22, the external walls of all buildings including additions to existing buildings comply with the relevant requirements of the BCA.
In accordance with DA Condition B1, please find documented evidence in the accompanying *External Wall System Disclosure Statement*.

Please refer to the below list of relevant plans and specification with respect to this design element, and Appendix A for FP 1.4 Weatherproofing Performance Solution Report.

Architectural Spec_Rev D
External Finishes Schedule Rev H

Drawing Number	***Revision***	***Date***
A007	B	21.04.21
A201	B	12.04.21
A202	B	12.04.21
A211	B	12.04.21
A212	B	12.04.21

Drawing Number	***Revision***	***Date***
AD102	C	04.05.21
AD201	B	06.04.21
AD211	C	09.04.21
AD212	C	09.04.21
AD301	C	06.04.21

AA102	B	06.04.21
AA201	B	06.04.21
AA.211	C	12.04.21
AA250	B	06.04.21
AA301	B	06.04.21
AA302	C	12.04.21
AC102	B	08.04.21
AC201	B	08.04.21
AC202	B	08.04.21
AC211	E	11.05.21
AC212	D	11.05.21
AC301	B	08.04.21
AC302	B	08.04.21

AE103	B	08.04.21
AE106	B	08.04.21
AE109	B	08.04.21
AE201	C	19.05.21
AE202	B	08.04.21
AE203	C	19.05.21
AE211	B	08.04.21
AE212	B	08.04.21
AE213	B	08.04.21
AE301	C	04.05.21
AF101	D	18.05.21
AF201	D	18.05.21
AF301	C	06.04.21

I am a properly qualified person and have a good working knowledge of the BCA clauses and standards referenced above. The information contained in this statement is true and accurate to the best of my knowledge.

I possess Indemnity Insurance to the satisfaction of the building owner or my principal.

Designer: Charles Glanville
Qualifications: NSW registration 3130
Address: Level 1, 695-699 George Street, Haymarket NSW 2000
Phone: (02) 8039 8822, Mobile: 0412 268 417

Signature:



Yours faithfully,

Alleanza Architecture



Charles Glanville
ARCHITECT

S:\Mudgee\18150 St Matthews Catholic School_Masterplan\B Design\B12 Reports\CC Design Statements\Architects Design Statement CC 3.docx

APPENDIX A – BCA clause FP1.4 Weatherproofing
Performance Solution Report

FP 1.4 – Weatherproofing

Site Details:					
Project Name.	***St Matthew's Catholic School***				
Street no. / Street name:	***48 Broadhead Road***				
Suburb:	***Spring Flat***	*State:*	*NSW*	*Postcode:*	***2850***
Description of Work:	***Weatherproofing to the external walls***				

Development Consent:			
SSD No.	*SSD-9872*	*Consent authority:*	*Minister for Planning and Public Spaces*

INTRODUCTION
This Performance Solution Report has been prepared to verify that the weatherproofing to the external walls of the building complies with BCA Performance Requirement FP1.4 at the proposed St Matthew's Catholic School located at 48 Broadhead Road, Spring Flat NSW 2850.

1.1 Information Relied Upon
The following documentation has been reviewed, referenced and/or relied upon in the preparation of this report:

- *Relevant provisions of the Building Code of Australia 2019 Amendment 1*
- *The Guide to the Building Code of Australia 2019 Amendment 1*
- *Reference and append any applicable specification, test protocol, test report/certificate, CodeMark certificates*
- *Architectural plans prepared by Alleanza Architecture:*

Drawing Number	***Revision***	***Date***	***Drawing Number***	***Revision***	***Date***
AA120	*B*	*06/04/21*	*AE120*	*B*	*06/04/21*
AA201	*B*	*06/04/21*	*AE201*	*C*	*19/05/21*
AA211	*C*	*06/04/21*	*AE202*	*B*	*08/04/21*
AA301	*B*	*06/04/21*	*AE203*	*C*	*19/05/21*
AA302	*C*	*12/04/21*	*AE211*	*B*	*08/04/21*
AA303	*A*	*06/04/21*	*AE212*	*B*	*08/04/21*
AC120	*B*	*06/04/21*	*AE213*	*B*	*08/04/21*
AC201	*B*	*08/04/21*	*AE301*	*C*	*04/05/21*
AC202	*B*	*08/04/21*	*AE302*	*B*	*08/04/21*
AC211	*E*	*11/05/21*	*AE303*	*B*	*08/04/21*
AC212	*D*	*11/05/21*	*AE304*	*B*	*08/04/21*
AC301	*B*	*06/04/21*			
AC302	*B*	*06/04/21*			
AC311	*B*	*06/04/21*	*AF201*	*C*	*06/04/21*
AC312	*B*	*06/04/21*	*AF301*	*C*	*04/05/21*
AC313	*B*	*06/04/21*	*AF302*	*B*	*06/04/21*
AD120	*B*	*06/04/21*	*AF303*	*B*	*06/04/21*
AD201	*B*	*06/04/21*			
AD211	*C*	*06/04/21*	*Architectural Specification / C*		*12/04/21*
AD212	*C*	*06/04/21*	*Finishes, Fixtures & Equipment Schedule / H*		*19/05/21*
AD213	*C*	*06/04/21*			

1.2 Regulatory Framework
Compliance with the Building Code of Australia can be achieved by satisfying the Performance Requirements
The Performance Requirements can only be satisfied by a

(a) Performance Solution; or
(b) Deemed-to-Satisfy Solution; or
(c) Combination of (a) and (b).

performance solution

2.1 Performance Requirement

Performance Requirement	
FP1.4	*A roof and external wall (including openings around windows and doors must prevent the penetration of water that could cause:* • *Unhealthy or dangerous conditions, or loss of amenity for occupants: and* • *Undue dampness or deterioration of building elements*

2.2 Assessment Method

Pursuant to BCA clause A2.2(2), the following Assessment Methods, have been used to determine that the Performance Solution complies with the Performance Requirements:

Assessment Method	*Approach*
Clause A2.2(2)(a) - Evidence of suitability in accordance with Part A5 that shows the use of a material, product, plumbing and drainage product, form of construction or design meets the relevant Performance Requirements	*Qualitative Assessment relying upon material and product test reports and certificates.*
Clause A2.2(2)(c) – Expert Judgment	*Qualitative Assessment relying upon similar project designs*

2.3 Assessment Verification

The following verifications apply:

(a) The design has considered the building height, wind region, eave width and overall roof and external wall envelope complexity associated with the new external walls and roofing design.
(b) The design and specification has considered the external wall and roofing systems with regard to the following if and where applicable;
(i) Manufacturers specifications and design requirements for each of the materials proposed
(ii) Relevant Australian standards
(iii) CodeMark and other test certificates as appropriate
(iv) Good construction practise
(v) Flashing and sealing details associated with roofing, windows, doors and other openings,
(vi) Flashing and sealing details associated with material interfaces,
(vii) Any specified in situ test and approval protocol for prototype wall or roofing systems
(c) The roof and external wall systems, including openings around windows and doors, have been designed and/or specified appropriately to prevent the penetration of water that could cause
(i) unhealthy or dangerous conditions or loss of amenity for occupants and
(ii) undue dampness or deterioration of building elements.
(d) The plans, specifications, test protocols, and test report or certificate, and CodeMark certificates listed in Appendix A to this document have been relied on in making this assessment.

2.4 Assessment Discussion

The external walls comprise:
1. Face Brick - Equal to PGH smooth volcanic
2. Compressed Fibre Cement Cladding – Equal to CSR Cemintel ExpressPanel commercial
3. Metal Sheet cladding – Equal to Lysaght Spandek Colorbond
4. Windows - Equal to Alspec Macarthur Evo 100x45, with Murray awning frames, Altitude sliding door suite, Hawkesbury sliding door suite or Breezway Louvres.
The materials are contiguous with joints sealed, corners flashed and with a lapped vapour permeable barrier beneath.
The vapour-permeable barrier wraps the wall framing with cavity flashing to the head and sill draining any condensation/moisture which may permeate in extreme weather conditions.
The construction technique and materials used are standard materials installed according to the manufacturer's recommendations.
Windows, doors and wall penetrations are installed with proprietary gaskets and flashings in accordance with the manufacturer's recommendations.

The roof construction to building enclosures comprises:
1. Roofs <3 degrees - Equal to Lysaght Klip-Lok 700 hi-strength, colorbond finish
2. Roofs >3 degrees - Equal to Lysaght Spandek colorbond finish.
3. Roof Sarking – Equal to CSR Bradford Glasswool building blanket with reflective foil laminate.

The roof sheeting is overlapped and jointed in accordance with the manufacturer's recommendations.
The roof sarking is folded and lapped to drain any condensation or moisture to the gutter.
Roof penetrations are minimized, with flashing kits to all penetrations.
Construction detailing on the architectural Section and Plan Details illustrate the proposed solutions, with Specification and Finishes, Fixtures and Equipment Schedule outlining the specific selections and requirements.

conclusion

Based on the above assessment it is consideration that Performance Requirements FP1.4 has been met, with consideration of the following:
As outlined above, the construction techniques and materials proposed are well proven, and utilizes standard construction detailing which has been tried and tested over many years.
The cladding, flashing and jointing techniques are specified and detailed as per the manufacturers detail.

I am a properly qualified person and have a good working knowledge of the relevant codes and standards referenced above. A summary of my qualifications and accreditations are listed below and my Curriculum Vitae is appended to this document.

Designer: *Charles Glanville*
Qualifications: *NSW registration 3130*
Address: *Level 1, 695-699 George Street, Haymarket NSW 2000*
Phone: *(02) 8039 8822,* *Mobile: 0412 268 417*
Signature:



ABN 12 608 518 896
ACN 608 518 896

A: L1 695-699 George Street
Sydney NSW 2000
P: +61 412 268 417
E: charles.glanville@alleanza.com.au

Nominated Architect
Charles Glanville
Registration No: 3130

TRIAXIAL
CONSULTING

COMPLEX PROBLEMS
RESOLVED SIMPLY

Suite 12, Level 14, 327 Pitt St
Sydney NSW 2000

triaxial.com.au
1300 874 294

21 May 2021

BLACKETT MAGUIRE & GOLDSMITH
Attn: Mr Michael Potts
Suite 2.01, 22-36 Mountain Street
ULTIMO NSW 2137

Dear Mr Michael,

Re: St. Matthews Catholic School Mudgee – Secondary Campus
SSDA 9872
Lot 40 Broadhead Road, Mudgee NSW 2850
Structural Design Certification CC2 CC3
Triaxial Reference: TX13843.01-06-DesignCert-CC2 CC3.docx

Pursuant to the provisions of Clauses A5.2 of the *National Construction Code - BCA 2019 Amendment 1*, we certify that the structural design for the above project, as documented on the drawings listed below, has been completed in accordance with normal engineering practices and meets the requirements of the *National Construction Code* and the following Australian Standards:

AS/NZS 1170.0(2002)	Structural Design Actions – General principles
AS/NZS 1170.1(2002)	Structural Design Actions – Permanent, imposed, and other actions
AS/NZS 1170.2(2011)	Structural Design Actions - Wind actions
AS/NZS 1170.4(2007)	Structural Design Actions – Earthquake Actions
AS3600 (2018)	Concrete Structures
AS3700 (2018)	Masonry Structures
AS 4100(1998)	Steel Structures
AS 4600(2018)	Cold-formed Steel Structures

National Construction Code BCA 2019 Amendment 1:

- Part B1 of BCA 2019 Amendment 1

- In accordance with Table B1.2 – importance level 3.

- Type A Construction in accordance with BCA - FRLs in accordance with table 3, of specification C1.1

SSDA 9872:

- In accordance with Condition C3 of SSD 9872".

We acknowledge our understanding of the report. Geotechnical Reports; '27786-GR01a' dated 23/08/207 prepared by Barnson, and Fire Engineering Report '21128-R01' dated 10 May 2021 prepared by innova services.

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The structural design is documented on the following drawings:

Drawing No:

TX13843.01-

Drg No.	Drawing Title	Rev
S01.01	COVER SHEET	C
S01.11	GENERAL NOTES - SHEET 1	C
S01.12	GENERAL NOTES - SHEET 2	C
S01.13	GENERAL NOTES - SHEET 3	C
S01.15	LOADING PLANS	C
S02.00	EXTERNAL SITE WORKS	B
S02.10	SITE WALKWAYS	D
S10.00	BLOCK A - COVER SHEET	0
S11.01	BLOCK A - FOOTING & GROUND FLOOR PLAN	1
S11.51	BLOCK A - FOOTING & GROUND FLOOR DETAILS SHEET 1	1
S11.52	BLOCK A - FOOTING & GROUND FLOOR DETAILS SHEET 2	0
S13.02	BLOCK A - BRACING PLAN	0
S13.51	BLOCK A - FEATURE WALL DETAILS	0
S14.51	BLOCK A - FEATURE WALL PLAN AND ELEVATIONS	1
S14.52	BLOCK A - FEATURE WALL DETAILS	0
S30.00	BLOCK C - COVER SHEET	0
S31.01	BLOCK C - FOOTING & GROUND FLOOR PLAN	4
S31.51	BLOCK C - FOOTING & GROUND FLOOR DETAILS SHEET 1	2
S31.52	BLOCK C - FOOTING & GROUND FLOOR DETAILS SHEET 2	1
S31.53	BLOCK C - FOOTING & GROUND FLOOR DETAILS SHEET 3	1
S32.02	BLOCK C - BONDEK SLAB PLAN	2
S33.01	BLOCK C - ROOF STEELWORK PLAN	1
S33.02	BLOCK C - LOWER ROOF STEELWORK PLAN	1
S33.11	BLOCK C - ELEVATIONS & SECTIONS SHEET 1	3
S33.12	BLOCK C - ELEVATIONS & SECTIONS SHEET 2	3
S33.13	BLOCK C - ELEVATIONS & SECTIONS SHEET 3	1
S33.51	BLOCK C - STEELWORK DETAILS SHEET 1	1
S33.52	BLOCK C - STEELWORK DETAILS SHEET 2	0
S33.53	BLOCK C - STEELWORK DETAILS SHEET 3	0
S33.54	BLOCK C - STEELWORK DETAILS SHEET 4	1
S33.55	BLOCK C - STEELWORK DETAILS SHEET 5	0
S33.56	BLOCK C - STEELWORK DETAILS SHEET 6	0
S33.57	BLOCK C - STEELWORK DETAILS SHEET 7	3
S35.51	WALL DETAILS	0

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S40.00	BLOCK D - COVER SHEET	0
S41.01	BLOCK D - FOOTING & GROUND FLOOR PLAN	2
S41.51	BLOCK D - FOOTING & GROUND FLOOR DETAILS SHEET 1	2
S41.52	BLOCK D - FOOTING & GROUND FLOOR DETAILS SHEET 2	1
S43.01	BLOCK D - ROOF STEELWORK PLAN	0
S43.02	BLOCK D - LOWER STEELWORK PLAN	0
S43.11	BLOCK D - ELEVATIONS & SECTIONS SHEET 1	0
S43.12	BLOCK D - ELEVATIONS & SECTIONS SHEET 2	0
S43.13	BLOCK D - ELEVATIONS & SECTIONS SHEET 3	0
S43.51	BLOCK D - STEELWORK DETAILS SHEET 1	0
S43.52	BLOCK D - STEELWORK DETAILS SHEET 2	0
S43.53	BLOCK D - STEELWORK DETAILS SHEET 3	0
S43.54	BLOCK D - STEELWORK DETAILS SHEET 4	0
S43.55	BLOCK D - STEELWORK DETAILS SHEET 5	0
S43.56	BLOCK D - STEELWORK DETAILS SHEET 6	0
S50.00	BLOCK E - COVER SHEET	0
S51.01	BLOCK E - FOOTING & LEVEL 1 PLAN OVERALL	1
S51.02	BLOCK E - FOOTING & LEVEL 1 PLAN SHEET 1	1
S51.03	BLOCK E - FOOTING & LEVEL 1 PLAN SHEET 2	1
S51.04	BLOCK E - FOOTING & LEVEL 1 PLAN SHEET 3	1
S51.05	BLOCK E - LEVEL 1 HEADER & BRACING PLAN SHEET 1	0
S51.06	BLOCK E - LEVEL 1 HEADER & BRACING PLAN SHEET 2	0
S51.07	BLOCK E - LEVEL 1 HEADER & BRACING PLAN SHEET 3	0
S51.51	BLOCK E - FOOTING & LEVEL 1 DETAILS SHEET 1	1
S51.52	BLOCK E - FOOTING & LEVEL 1 DETAILS SHEET 2	1
S52.01	BLOCK E - LEVEL 2 PLAN OVERALL	0
S52.02	BLOCK E - LEVEL 2 PLAN SHEET 1	0
S52.03	BLOCK E - LEVEL 2 PLAN SHEET 2	0
S52.04	BLOCK E - LEVEL 2 PLAN SHEET 3	0
S52.05	BLOCK E - LEVEL 2 HEADER & BRACING PLAN SHEET 1	0
S52.06	BLOCK E - LEVEL 2 HEADER & BRACING PLAN SHEET 2	0
S52.07	BLOCK E - LEVEL 2 HEADER & BRACING PLAN SHEET 3	0
S52.12	BLOCK E - LEVEL 2 REINFORCEMENT PLAN SHEET 1	0
S52.13	BLOCK E - LEVEL 2 REINFORCEMENT PLAN SHEET 2	0
S52.14	BLOCK E - LEVEL 2 REINFORCEMENT PLAN SHEET 3	0
S52.51	BLOCK E - LEVEL 2 DETAILS SHEET 1	0
S53.01	BLOCK E - ROOF STEELWORK PLAN OVERALL	0
S53.02	BLOCK E - ROOF STEELWORK PLAN SHEET 1	0
S53.03	BLOCK E - ROOF STEELWORK PLAN SHEET 2	0
S53.04	BLOCK E - ROOF STEELWORK PLAN SHEET 3	0
S53.05	BLOCK E - ROOF STEELWORK PLAN SHEET 4	0

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S53.11	BLOCK E - ELEVATIONS & SECTIONS SHEET 1	0
S53.12	BLOCK E - ELEVATIONS & SECTIONS SHEET 2	0
S53.13	BLOCK E - ELEVATIONS & SECTIONS SHEET 3	0
S53.51	BLOCK E - STEELWORK DETAILS SHEET 1	0
S53.52	BLOCK E - STEELWORK DETAILS SHEET 2	0
S53.53	BLOCK E - STEELWORK DETAILS SHEET 3	0
S53.54	BLOCK E - STEELWORK DETAILS SHEET 4	0
S53.55	BLOCK E - STEELWORK DETAILS SHEET 5	0
S53.56	BLOCK E - STEELWORK DETAILS SHEET 6	0
S53.57	BLOCK E - STEELWORK DETAILS SHEET 7	0
S54.51	BLOCK E - CONCRETE DETAILS SHEET 1	0
S55.51	BLOCK E - WALL DETAILS	0
S55.52	BLOCK E - STAIR DETAILS	0
S60.00	BLOCK B - COVER SHEET	0
S61.01	BLOCK B - FOOTING & GROUND FLOOR PLAN	1
S61.51	BLOCK B - FOOTING & GROUND FLOOR DETAILS SHEET 1	1
S61.52	BLOCK B - FOOTING & GROUND FLOOR DETAILS SHEET 2	0
S63.01	BLOCK B - ROOF STEELWORK PLAN	0
S63.11	BLOCK B - ELEVATIONS & SECTIONS SHEET 1	0
S63.12	BLOCK B - ELEVATIONS & SECTIONS SHEET 2	0
S63.51	BLOCK B - STEELWORK DETAILS SHEET 1	0
S63.52	BLOCK B - STEELWORK DETAILS SHEET 2	0
S63.53	BLOCK B - STEELWORK DETAILS SHEET 3	0
S63.54	BLOCK B - STEELWORK DETAILS SHEET 4	0
S63.55	BLOCK B - STEELWORK DETAILS SHEET 5	0
S63.58	BLOCK B - WALL BRACING DETAILS	0

The certificate is provided by Triaxial Consulting Pty Ltd and is signed by a professional engineer as defined in the *National Construction Code* of Australia.

Yours faithfully,

TRIAXIAL CONSULTING



DANIEL CULLY
FIEAust, NER, CPEng: 3547466
Director
Encl.

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Our Ref: 21-000048

25 May 2021

Principal Certifying Authority
Blackett Maguire + Goldsmith Pty Ltd
PO Box 167
Broadway NSW 2007

Attention: Michael Potts

Dear Michael

RE: St Matthews Catholic School Mudgee, Secondary Campus – Design Endorse Certificate – Fire Hydrant and Hose Reel Services

SUBJECT PREMISES: 48 Broadhead Road, Spring Flat **DEVELOPMENT CONSENT: SSD 9872**

This design statement relates to the Fire Hydrant and Hose Reel services documentation and specifications for the proposed new St Matthews Catholic School Mudgee – Secondary Campus located at 48 Broadhead Road, Spring Flat.

Relevant Construction Certificate stages covered by this certificate includes:

- CC2 – Structure and Services

Pursuant to the provisions of Clause 146B of the Environmental Planning & Assessment Regulation 2000, I hereby endorse the following plans and specifications as complying with the relevant provisions of the NCC, Volume 1, Building Code of Australia 2019 Amendment 1. In particular the design is in accordance with

The following BCA Clauses / BCA Specifications:	National Construction Code 2019 Amendment 1 Volume 1 – Section E – Part EP1.1 – Fire Hose Reels National Construction Code 2019 Amendment 1 Volume 1 – Section E – Part EP1.3 – Fire Hydrants National Construction Code 2019 Amendment 1 Volume 3 - Plumbing Code of Australia – Section B Water Services – Part B4
The following Australian Standards:	AS 2419.1-2005 – Fire Hydrant Installations AS 2441 – 2005 Installation of Fire Hose Reels

Endorsed Plans

Drawing Number	*Revision*	*Date*
SITE_BR-H5500	1	01.04.2021
SITE_BR-H5501	1	01.04.2021
SITE_BR-H5502	1	01.04.2021
SITE_BR-H5512	1	01.04.2021

SITE_BR-H5513	1	01.04.2021
SITE_BR-H5514	2	14.05.2021
BLOCK A_BR-H5540	1	27.04.2021
BBOCK C_BR-H5542	2	14.05.2021
BLOCK D_BR-H5543	2	27.04.2021
BLOCK E_BR-H5544	1	27.04.2021
BLOCK E_BR-H5545	1	27.04.2021
BLOCK E_BR-H5546	2	14.05.2021
BLOCK E_BR-H5547	2	14.05.2021
SITE_BR-H5600	1	27.04.2021
SITE_BR-H5601	1	27.04.2021
SITE_BR-H5602	1	27.04.2021
SITE_BR-H5700	1	27.04.2021
SITE_BR-H5701	1	27.04.2021
SITE_BR-H5702	1	27.04.2021
SITE_BR-H5703	1	27.04.2021
SITE_BR-H5704	2	14.05.2021
BR-H5805	2	25.05.21
BR-H5810	1	27.04.21
BR-H5811	1	27.04.21
BR-H5820	2	25.05.21
BR-H5821	2	25.05.21
BR-H5830	1	27.04.21
BR-H5831	1	27.04.21
BR-H5840	2	25.05.21
BR-H5841	1	27.04.21

Specifications:

Specification	*Revision*	*Date*
HSPEC	2	25.05.2021

I am an **Accredited Practitioner (Fire Safety) [APFS]** as defined in clause 3 of the Environmental Planning & Assessment Regulation 2000.

APFS Accreditation: FPAS Accredited Fire Systems Designer

☑ I am accredited as a Fire Systems Designer under the Fire Protection Accreditation Scheme (FPAS) for the following fire safety systems: (please tick)

- ☐ Fire Sprinkler Systems
- ☑ Fire Hydrant and Hose Reel Systems
- ☐ Fire Detection and Alarm Systems

or

Fair Trading Registered Certifier or Engineer

☐ I am registered Certifier under clause 64 of the Building and Development Certifiers Regulation for the following fire safety systems: (please tick)

- ☐ Engineer – Electrical (Fire Detection & Alarm Systems)
- ☐ Engineer – Mechanical (Mechanical Ducted Smoke Control Systems)
- ☐ Certifier – Hydraulic (Fire Hydrant, Hose Reel & Sprinkler Systems)

We possess Indemnity Insurance to the satisfaction of the building owner or my principal.

Full name of Designer: Christopher Morris
Qualifications: Diploma Hydraulic Design. FPAS – Fire Hydrant & Hose Reel Systems Advanced (Level 3)
Accreditation No. F054054D
Address of Designer: Level 3, 545 Queen Street, Brisbane QLD 4000
Business Telephone No: +61 7 3895 3444
Email: chris.morris@calibregroup.com

Signature:



Yours faithfully
Calibre Professional Services Pty Ltd

Chris Morris
Senior Hydraulic Designer – Building Services & Renewables
FPAS ACCREDITATION No. F054054D

ATTACHMENTS

DESIGN CERTIFICATE

Site Details:					
Project Name.	St Matthews Catholic School				
Level/Unit no.		Street no. / Street name:		Corner of Broadhead and Bruce Rd	
Suburb:	**Mudgee**	State:	NSW	Postcode:	2850
Description of Work:	Supply & Installation of lift Block E (Q 3406342) – Approved For Construction				

Pursuant to the provisions of the Environment Planning and Assessment Regulations 2000 and Clause A5.2 of the Building Code of Australia:

I Kurt Russell (name) of Kleemann Elevators Australia (company)

hereby certify that the above building works have been installed / implemented / constructed in the above building/development and they have been inspected, assessed and tested (where appropriate) in accordance with:-

a)	The relevant clauses of the Building Code of Australia, as follows:	BCA Part E3, AS1735 series (as applicable) E3.1, E3.2, E3.3, E3.6 (table a and b), E3.7, E3.9, E3.10 BCA 2019 Amendment 1 NCC2019 part one AS1735.1 referring to AS1735.11, AS1735.12 and EN81-20. C3.10 and AS1735.11, AS1428.1 - Lift Controls, AS1288.
b)	The following Australian Standards:	AS 1735.11-1986, AS 1735.12-1999, AS 1530.4-2014,
c)	The following manufacturers specifications:	Attached Kleemann Lifts Specification
d)	*Other practices or standards relied upon for this certification (including any relevant Council or other authority requirements):*	CC2 and SSD 9872

- Reference, lift landing doors are designed to achieve ***an*** FRL not less than -/60-/-.

Exclusions: Yes or No

Details of any exclusions: .....

Where there are no exclusions, I certify that this certificate includes all lifts and associated works and covers the whole building / development.

I also certify that I am an appropriately qualified and competent person practicing in the relevant area of work. I have recognised relevant experience in the area of work being certified. I / my employer hold/s appropriate current professional indemnity insurance to the satisfaction of the building owner or the principal authorizing the design work being certified.

Name:	Kurt Russell	*Licence No.:*	73095S
Company Name:	Kleemann Elevators Australia	*ABN No:*	13 169 317 391
Company Address:	*Unit 1A, 2-6 Orion Road* *Lane Cove West, NSW 2066*	*Tel:*	02 9907 2066
Signature:		*Position Title:*	*Technical Manager*
		Date:	05-03-2021

TECHNICAL SPECIFICATIONS OF COMPLETE TRACTION LIFT PACKAGE

Suspension : 2:1	DBG : 1500 mm	dbg : 800 mm	Car Buffer : ACLA D 300402 L4
Car Travel : 3600 mm	Counterweight Guides : 50x50x5/cold draw		Tension Pulley Type : Tensioner KLT-R Ø23 (1x25kg) 81.20
Rated Load : 630 Kg	Steel Wire - Ropes : 6 x 6.5 mm		Main Door : 2-P Central
Car Speed : 1 m/sec	Motor Type : KLEEMANN RN ERS-61P0B		Rear Door : Doesn't Exist
Voltage : 3 Phase-400	Nominal Power : 4 kW		Left Door : Doesn't Exist
Levels : 2	Nominal Current : 10,7 A	Starting Current : 21 A	Right Door : Doesn't Exist
Machine Room : mrl	Car Dims : 1100 x 1400 x 2200 mm		Motor Frequency : 50 Hz
Car Guides Rails : 75x62x10/machined	Door(s) Weight : 100 kg		Job Number: **Q3406342**
Responsible Dept.: **Engineering dept.** / Technical Reference: **Malakoudis A.**	Created By: **PORTAL USER NEW**	Approved By: **-**	Document Type: **Elevator Plan** / Document Status: **Preliminary**
KLEEMANN Your 1st Choice in Lifts	Project: St Matthew Catholic School Lift Type : ATLAS BASIC, VERSION ATLAS 2:1 EU		Customer : **KLEEMANN ELEVATORS AUSTRALIA PTY LTD** Reference Number
	Rated Load : 630 Kg Levels : 2	Passengers : 8	Rev. / Drawing Creation Date: 2021 / 4 / 27 / Lang.: en_US / Page: 1 /15

Note: Attach any supporting documentation.

19/05/21

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY
46 Market St
Mudgee NSW 2850

Principal Certifying Authority
Blackett Maguire + Goldsmith Pty Ltd
PO Box 167
BROADWAY NSW 2007

Dear Sir,

Re: St Matthews Catholic School Mudgee – Secondary Campus
CERTIFICATE OF DESIGN - Civil

SUBJECT PREMISES ***48 Broadhead Road, Mudgee NSW 2850***

DEVELOPMENT APPLICATION ***SSD 9872***

Pursuant to the provisions of **Clause A5.2 of the National Construction Code BCA Amendment 1,** I hereby certify that the above design is in accordance with normal engineering practice and meets the requirements of the Building Code of Australia, the Environmental Planning and Assessment Regulation, relevant Australian Standards and relevant conditions of the Development Consent.

I futher certify that the design is in accordance with the findings of the Road Safety Audit Report Number NOR-PROJ-0001-01 DD RSA MUDGEE REV 1 prepared by DC Traffic Engineering Pty Ltd dated 27th January 2021.

In particular the design is in accordance with the following:

Condition B4 of SSD 9872

Condition B6 of SSD 9872

Condition B10 of SSD 9872

Condition B11 of SSD 9872

Condition C19 of SSD 9872

Condition C20 of SSD 9872

Consultation with Mid Western Regional Council was undertaken as part of the design process. Comments from discussions with council staff have been addressed in the design and are included in the drawings below.

I am an appropriately qualified and competent person in this area being listed in the National Professional Engineers Register (NPER) and as such can certify that the design and performance of the design systems comply with the above and which are detailed on the following drawings.

Drawing Number	Drawing Title	Revision
C1.0	COVER SHEET	0
C1.1	GENERAL NOTES	0
C2.0	EXISTING SITE PLAN	0
C2.1	PROPOSED SITE WORKS AND ROAD SECTIONS	J
C3.0	EROSION & SEDIMENT CONTROL PLAN	1
C3.1	EROSION & SEDIMENT CONTROL DETAILS	0
C4.0	BULK EARTHWORKS PLAN INTERNAL	0
C4.1	BULK EARTHWORKS CONTOURS – INTERNAL	0
C4.2	SUB STATION PAD SECTIONS	0
C4.5	CARPARK LEVELS PLAN	0
C5.0	BROADHEAD ROAD LONG SECTION SHEET 1	H
C5.1	BROADHEAD ROAD LONG SECTION SHEET 2	G
C5.2	BROADHEAD ROAD CROSS SECTIONS SHEET 1	A
C5.3	BROADHEAD ROAD DETAIL	0
C6.0	BRUCE ROAD LONG SECTION SHEET 1	H
C6.1	BRUCE ROAD LONG SECTION SHEET 2	A
C6.2	BRUCE ROAD CROSS SECTIONS SHEET 1	A
C7.0	SITE FLOOD MITIGATION	0
C7.1	STORMWATER PLAN	0
C7.2	BIO FILTRATION SWALE DETAILS	0
C7.3	LEVEE BANK	0
C7.4	PIT AND PIPE SCHEDULE	0
C7.5	DRAINAGE LONGITUDINAL SECTIONS – LINE A PART 1	0
C7.6	DRAINAGE LONGITUDINAL SECTIONS – LINE A PART 2 & LINE B	0
C7.7	DRAINAGE LONGITUDINAL SECTIONS – LINE C, X, Y	0
C8.0	SEWER PLAN	0
C9.0	WATER PLAN	0
C9.1	BROADHEAD ROAD WATER LONG SECTION SHEET 1	0
C9.2	BROADHEAD ROAD WATER LONG SECTION SHEET 2 & DETAIL	0
C10.0	VEHICLE SIMULATION PLAN	G
C10.1	INTERSECTION PLAN SHEET 1	B
C10.2	INTERSECTION PLAN SHEET 2	B
C11.0	PAVEMENT PLAN – INTERNAL	0
C12.0	CIVIL DETAILS – BRUCE ROAD CULVERT	A

I possess Indemnity Insurance to the satisfaction of the building owner or my principal.

The certificate is provided by Triaxial Consulting Pty Ltd and is signed by a professional engineer as defined in the National Construction Code of Australia.

Yours faithfully,

TRIAXIAL CONSULTING



DANIEL CULLY

BE(Hons), ME(Hons), CPEng, Eng Exec, FIEAust, NER, RPEQ, RBPV APEC Eng IntPE

CPEng: 3547466

Director

Encl.

Tuesday, 24 May 2021
Ref No: MN12307

North Construction & Building Pty Ltd
PO Box 3517
TUGGERAH NSW 2259

Attention: Nick Millar

RE: St. Matthews Catholic School – Secondary Campus
CERTIFICATE OF DESIGN – ELECTRICAL SERVICES

SUBJECT PREMISES: Corner of Broadhead & Bruce Rd Mudgee, NSW 2850
Development Consent (SSD 9872)
CC reference CC2: Structure and Services

Pursuant to the provisions of **Clause A5.2 of the Building Code of Australia,** I hereby certify that the above design is in accordance with normal engineering practice and meets the requirements of the Building Code of Australia, Part 7 of the Environmental Planning and Assessment Regulations, relevant Australian Standards and relevant conditions of Development Consent. In particular the design is in accordance with the following:

Fire Detection	**BCA/NCC 2019 Amendment 1 E2.2 NSW Table E2.2b, Clause 6 of Specification E2.2a, and AS 1670.1-2018**
Building Occupant Warning system	**BCA/NCC 2019 Amendment 1 Clause 6(c)(ii) and 7 E2.2a**
Alarm Signalling Equipment	**AS 1670.3-2018**

I am an appropriately qualified and competent person in this area and as such can certify that the design and performance of the design systems comply with the above and which are detailed on the following drawings.

Dwg No.	Title	Revision
BR-E5251	SITE_BR-E5251_LEGEND (FIRE DETECTION SECTION ONLY)	2
BR-E5400	BLOCK A_BR-E5400_LIGHTING LAYOUT (FIRE DETECTION SECTION ONLY)	3
BR-E5401	BLOCK B_BR-E5401_LIGHTING LAYOUT (FIRE DETECTION SECTION ONLY)	2
BR-E5402	BLOCK C_BR-E5402_LIGHTING LAYOUT (FIRE DETECTION SECTION ONLY)	5
BR-E5406	BLOCK E_BR-E5406_BUILDING 2_LIGHTING LAYOUT (FIRE DETECTION SECTION ONLY)	2

Marline Newcastle Pty Ltd
ABN 49 612 456 381
ACN 612 456 381
www.marline.com.au

Managing Director Brendan Maher, AMIEAust, NER
Director Daniel White, BE (Hons), B.BUS, MIEAust

Unit F 56 Clyde Street
Hamilton North NSW 2292
P 02 4925 9300
mail@marline.com.au

Marline Newcastle possesses Indemnity Insurance to the satisfaction of the building owner.

Full Name of Designer: Rajneel Sharma
Qualifications: B.Eng Tech (Elec & Electronics)
FPAS – Competent Fire Safety Practitioner F053852D
Address of Designer: Unit F 56 Clyde Street, Hamilton North, NSW 2292
Business Telephone No: 02 4925 9300 **Fax No:** 02 4926 3811
Name of Employer: Marline Newcastle Pty Ltd
Signature:



24 May 2021

Principal Certifier
Blackett Maguire + Goldsmith Pty Ltd
PO Box 167
BROADWAY NSW 2007

Dear Sir,

Re: **DESIGN ENDORSEMENT CERTIFICATE**
Fire Detection & Alarm System

SUBJECT PREMISES **Corner of Broadhead & Bruce Rd Mudgee, NSW 2850**

DA/CDC No.: SSD 9872

CC reference CC2: Structure and Services

Pursuant to the provisions of Clause 146B of the Environmental Planning & Assessment Regulation 2000, I hereby endorse the following plans and specifications as complying with the relevant provisions of the NCC, Volume 1, Building Code of Australia 2019 Amendment 1. In particular the design is in accordance with

The following BCA Clauses / BCA Specifications:	**BCA/NCC 2019 Amendment 1 E2.2 NSW Table E2.2b, Clause 6 of Specification E2.2a** **BCA/NCC 2019 Amendment 1 Clause 6(c)(ii) and 7 E2.2a for the Building Occupant Warning System**
The following Australian Standards:	**AS 1670.1-2018 – Fire Detection System** **AS1670.3-2018 – Alarm Signaling Equipment**

Endorsed Plans

Drawing Number	*Revision*	*Date*
BR-E5251	SITE_BR-E5251_LEGEND (FIRE DETECTION SECTION ONLY)	25-04-21
BR-E5400	BLOCK A_BR-E5400_LIGHTING LAYOUT (FIRE DETECTION SECTION ONLY)	27-04-21
BR-E5401	BLOCK B_BR-E5401_LIGHTING LAYOUT (FIRE DETECTION SECTION ONLY)	25-04-21
BR-E5402	BLOCK C_BR-E5402_LIGHTING LAYOUT (FIRE DETECTION SECTION ONLY)	20-05-21
BR-E5406	BLOCK E_BR-E5406_BUILDING 2_LIGHTING LAYOUT (FIRE DETECTION SECTION ONLY)	25-04-21

I am an **Accredited Practitioner (Fire Safety) [APFS]** as defined in clause 3 of the Environmental Planning & Assessment Regulation 2000.

APFS Accreditation: FPAS Accredited Fire Systems Designer

☑ I am accredited as a Fire Systems Designer under the Fire Protection Accreditation Scheme (FPAS) for the following fire safety systems: (please tick)

- ☐ Fire Sprinkler Systems
- ☐ Fire Hydrant and Hose Reel Systems
- ☑ Fire Detection and Alarm Systems

Name:	RAJNEEL SHARMA	**FPAS Accreditation No. / Fair Trading Registration No.**	F053852D
Position Title:	*ELECTRICAL ENGINEER*	**ABN No:**	*49 612 456 381*
Company Name:	MARLINE NEWCASTLE PTY LTD	**Phone Number:**	02 4925 9300
Signature:		**Date:**	24-05-21

St Matthews Catholic High School, Mudgee

NCC 2019 – Amendment 1 Section J Fabric Report

Catholic Education Diocese of Bathurst

Job No:	1022539
Doc Ref:	1022539-SY-RPT-001
Revision:	C
Revision Date:	21 May 2021

Project title	St Matthews Catholic High School, Mudgee	**Job Number**
Report title	NCC 2019 – Amendment 1 Section J Fabric Report	1022539

Document Revision History

Revision Ref	Issue Date	Purpose of issue / description of revision
A	15 April 2020	For SSDA
B	11 May 2021	Update
C	21 May 2021	Update for CC

Document Validation (latest issue)

21/05/2021	21/05/2021	21/05/2021
X	X	X
Principal author	Checked by	Verified by
Signed by: Lia, Daniel	Signed by: Wu, Jason	Signed by: Apollo, Anna

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Executive Summary

The proposed St Matthews Catholic High School, Mudgee development has been tested against the NCC 2019 – Amendment 1deemed-to-satisfy (DTS) fabric requirements.

Below are the required building fabric and glazing thermal performances for the proposed development to meet the thermal performance requirements of Section J of the NCC 2019 – Amendment 1.

Table 1.1 Thermal performance requirement – Building Fabric Elements

Building Envelopment Element	R_T (m².K/W)
Roof or ceiling (solar absorptance of not more than 0.45)	R_T3.7
Wall – ▪ External (outer surface solar absorptance value of not more than 0.6) ▪ Internal	 R_T1.4 R_T1.4
Floor (direction downwards)	R_T2.0

Note: R_T means total R-value build-up of the building envelope element. Absorptance is the fraction of solar radiation absorbed by the roof and is affected by the colour and reflectance of the outer surface.

Based on the façade assessments as shown on , the following glazing system performances are compliant.

Note: All glazing properties are based on AFRC figures for the total glazing system (glass + frame).

Table 1.2 Summaries of glazing performance requirements

Block A

Elevation	U-value (W/m². K)	SHGC
Vision Glazing – All elevations	≤4.75	≤0.51

Block B

Elevation	U-value (W/m². K)	SHGC
Vision Glazing – All elevations	≤5.75	≤0.56

Block C

Elevation	U-value (W/m². K)	SHGC
Vision Glazing – All elevations	≤8.0	≤0.80

Block D

Elevation	U-value (W/m². K)	SHGC
Vision Glazing – All elevations	≤6.15	≤0.70

Block E – Building 1

Elevation	U-value (W/m². K)	SHGC
Vision Glazing – All elevations	≤7.25	≤0.80

Block E – Building 2

Elevation	U-value (W/m². K)	SHGC
Vision Glazing – All elevations	≤8.0	≤0.73

Block E – Building 3

Elevation	U-value (W/m². K)	SHGC
Vision Glazing – All elevations	≤7.25	≤0.80

It is recommended that the uniform glazing system used for all buildings is a low-e single glazing with a neutral or light grey tint, which would achieve an approximate SHGC of 0.50. This would increase the energy efficiency of each building and promote thermal comfort of building occupants. A JV3 assessment can be performed at a later stage, if necessary, in order to test alternative glazing selections and in the situation where thermal bridging requirements cannot be met.

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Appendices

Appendix A List of Reference Drawings & Information

Appendix B NCC 2019 Amendment 1 Section J1 Façade Reports

Appendix C Fabric Mark-ups

1.0 Introduction

Cundall has been engaged by Catholic Education Diocese of Bathurst to provide a National Construction Code (NCC) 2019 – Amendement 1 Section J DTS assessment for the proposed St Matthews Catholic High School, Mudgee development.

1.1 Project Overview

Introduction

St Matthews Catholic School is an existing Kindergarten to Year 12 School located in the heart of Mudgee CBD. The school has outgrown the existing school campus and is considered inadequate in its capacity to cater for the anticipated enrolment growth, necessary facilities and open space.

The new 12.14ha site is located on the corner of Broadhead and Bruce Roads in South Mudgee. This is a relatively flat Greenfields site, which provides the opportunity for appropriate built and landscaped spaces to cater for the schools' aspirations.

This proposal is for the construction of a new Secondary school, (Years 7-12) component of the school, with the Primary school remaining at the existing Lewis Street site. Masterplanning includes for the provision of future stages to allow capacity and flexibility for future direction.

The school has identified their vision as: "*At St Matthews Catholic School we believe that all in our community can learn at high levels in a Christ-centred, engaging, collaborative, and nurturing environment*".

Project Description

The SSD DA seeks consent for the construction of a new multi-purpose secondary education facility within the Mudgee Region that meets future demands for the developing region.

The new secondary school to be known as St Matthews Catholic High School Mudgee School will cater for 680 secondary school students (4-Stream Year 7-12) and will comprise of a cluster of five low-rise school buildings (1-2 storeys) including;

- Block A - Professional Hub (office and administration)
- Block B - Spiritual Hub (Chapel)
- Block C - Community Hub (Multi-purpose hall, Music/Dance Studio and canteen)
- Block D - STEM Research Hub (teaching spaces)
- Block E - Knowledge and Learning Hubs (General Teaching spaces)
- Yarning Circle (Outdoor learning area)
- Outdoor Student Assembly Area and COLA
- Student free play area
- Staff and student amenities
- Associated site landscaping and public domain improvements
- On-site parking and access arrangements off Bruce Road, including:
  - On-grade car park for staff, students and visitors (75 spaces – including 2 accessible spaces)
  - A 12 bay student drop-off and pick-up area
  - A 3-bay bus drop-off and layover area
  - Bus turning area and servicing access
  - Dedicated separate driveway for service vehicles
  - Bicycle parking for 30 bicycles

- Associated earthworks, civil works, perimeter roadworks, fencing, services and utilities connections and augmentation, including:
  - Roadworks to Broadhead Road and Bruce Road to the full extent of the site frontages
  - Roadworks to the Broadhead Road and Bruce Road intersection to cater for bus movements
  - Footpath along the site frontage of Broadhead Road and suitable pedestrian crossing to connect to existing footpath.
  - Stormwater infrastructure upgrades adjacent to and within the site, including new culverts and drains, levee, and bioswale.
  - Connection to existing sewer line within the site
  - Electrical and water connections into the site

1.2 Scope

This report includes a review of the proposed building envelope design in accordance with Section J1 – Building Fabric. All other aspects of Section J compliance are the responsibility of the architect, building services consultants and associated contractors.

The aim is to identify and propose a uniform set of thermal performances that would meet the Section J requirements when the building is located in climate zone 6 in NSW.

1.3 Section J background

The general objective of Section J of the 2019 NCC – Amendment 1 is to reduce greenhouse gas emissions of developments. A building, and its services, is required to use energy efficiently so that the greenhouse gas emissions associated with its operation are minimised. This is subject to the intended use of the building and the necessary level of occupant comfort. For buildings that are air-conditioned, the amount of energy has also been quantified.

This is important, as energy consumption in a building is highly dependent on how the building is used. Energy efficiency cannot be assured simply by 'building-in' appropriate measures, as the building also needs to be operated, managed and maintained in an appropriate way. This also addresses the need for a low greenhouse gas intensity source or a renewable source of energy for the building's services.

For the purposes of Section J, the renewable energy source must be generated and used on-site (so cannot be GreenPower or include energy that is exported to the grid) and includes solar, geothermal, wind and biofuels. Heat reclaimed from another source includes the heat recovered for water heating and water chilling from co-generation type processes as well as other industrial processes.

There are multiple pathways to ensure compliance with Section J of the NCC. Compliance can be achieved by using the Deemed to Satisfy (DTS) requirements, which set out the thermal performance of envelope elements of a development, or a performance solution which test the thermal performance of a proposed development against pre-defined measures.

1.4 Reference documents

The following resources were used throughout this verification exercise:

- Drawings; a list of which is contained in Appendix A;
- NCC 2019, Amendment 1, volume one, class 2 to 9 buildings; and
- NCC 2019 facade calculator.

1.5 Limitations and disclaimers

The DTS review assesses the building for compliance against Section J of the NCC, and only considers the design from an energy efficiency perspective. This assessment does not study the impacts the proposed insulation strategy has on peak load conditions, sizing of mechanical systems, thermal comfort for occupants or condensation issues.

This report does not review the impact of the facades' performance on achieving thermal comfort, adequate daylight or glare reduction. Should modelling of these building performance aspects be desired, separate analyses will be required.

The thermal performance requirements indicated in this report are to be determined and achieved in accordance with AS/NZS 4859.2. The standard comprises a calculation method that takes into account the impact of thermal bridges on the thermal performance of a façade. Depending on the extent of the thermal bridges within a façade, extra insulation may need to be added, or thermal breaks installed in order for a façade to be compliant. As such, achieving the as-built thermal performance of elements shall be the responsibility of the contractors.

2.0 Design details

2.1 Location and weather zones

The proposed St Matthews Catholic High School, Mudgee development is located in NSW. The climate zones as defined by the NCC are illustrated below.

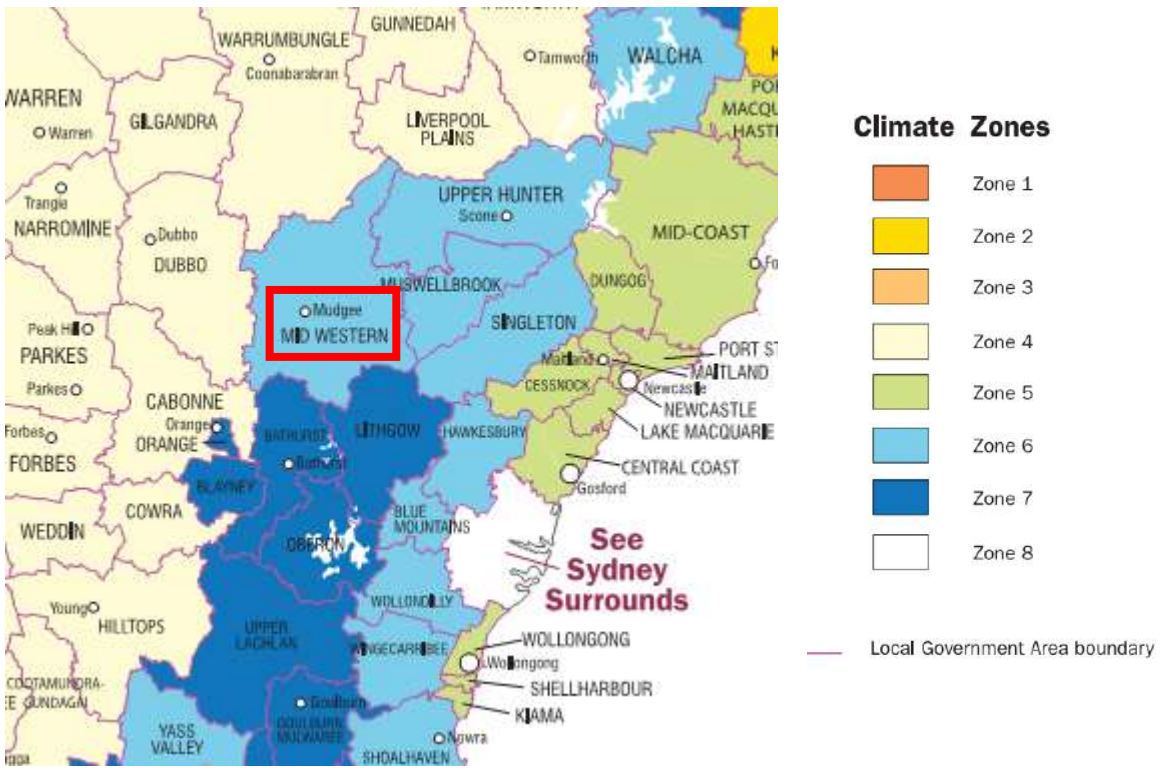


Figure 2.1 Potential climate zones of proposed building locations

As observed in the above climate zone map, the building has been assessed for climate zone 6.

2.2 Building classification

The proposed development has been identified as a class 9b (assembly) building as defined by the NCC 2019 – Amendment 1 Section A6 Classifications.

The specification indicates the type of materials used for the buildings' envelopment elements such as roof and external wall.

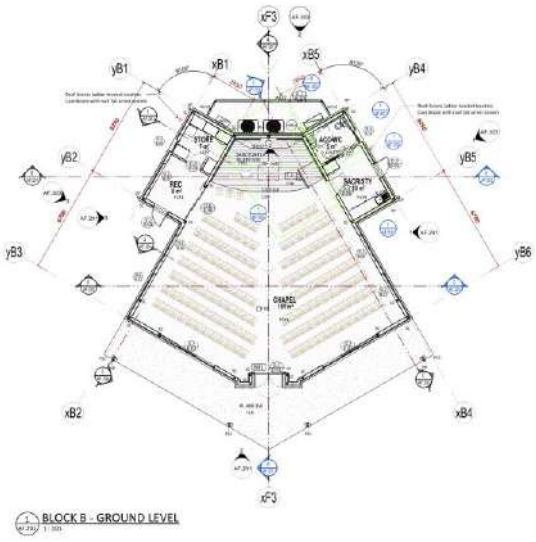
2.3 Building geometry

The following figures show the typical layout of the proposed buildings.

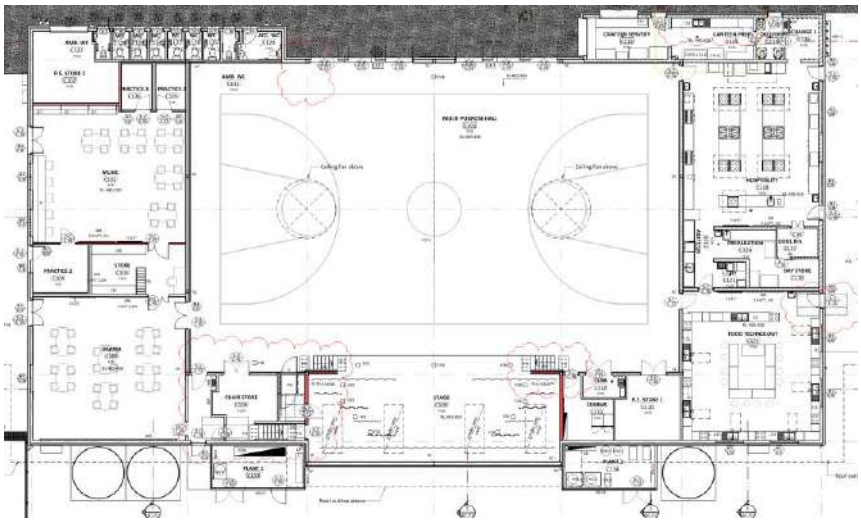
Building A



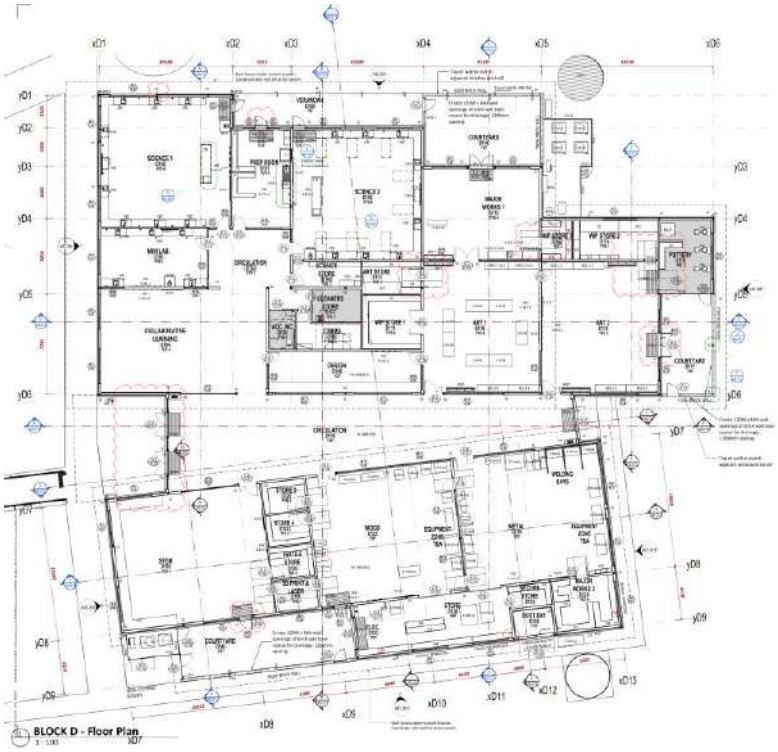
Building B



Building C



Building D



Building E

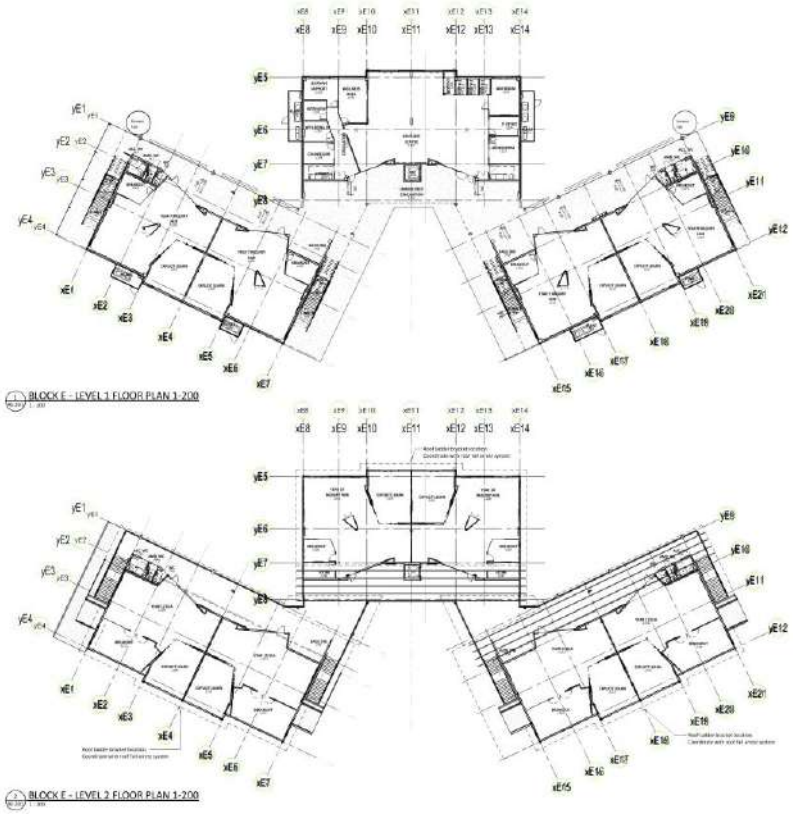


Figure 2.2 Building layouts of the St Matthews Catholic High School, Mudgee development

3.0 Deemed to satisfy requirements

3.1 Total R-Value and total U-Value

Must be, including allowance for thermal bridging—

(i) calculated in accordance with AS/NZS 4859.2 for a roof or floor; or
(ii) determined in accordance with Specification J1.5a for wall-glazing construction; or
(iii) determined in accordance with Specification J1.6 or Section 3.5 of CIBSE Guide A for soil or sub-floor spaces.

3.2 Fabric requirements

The fabric of the building has been assessed against Section J Part J1. The assessment determined the thermal performance of the fabric.

The following table summarises the minimum required thermal performance requirements for elements of the proposed building.

Table 3.1 Thermal performance requirement – Opaque elements

Building Envelopment Element	R_T (m².K/W)
Roof or ceiling (solar absorptance of not more than 0.45)	R_T3.7
Wall – ▪ External (outer surface solar absorptance value of not more than 0.6) ▪ Internal	 R_T1.4 R_T1.4
Floor (direction downwards)	R_T2.0

Note: R_T means total R-value build-up of the building envelope element. Absorptance is the fraction of solar radiation absorbed by the roof and is affected by the colour and reflectance of the outer surface.

Based on the façade assessments, the following glazing system performances are recommended.

Note: All glazing properties are based on AFRC figures for the total glazing system (glass + frame).

Block A

Table 3.2 Summaries of glazing performance requirements

Elevation	U-value (W/m². K)	SHGC
Vision Glazing – All elevations	≤4.75	≤0.51

Block B

Elevation	U-value (W/m². K)	SHGC
Vision Glazing – All elevations	≤5.75	≤0.56

Block C

Elevation	U-value (W/m². K)	SHGC
Vision Glazing – All elevations	≤8.0	≤0.80

Block D

Elevation	U-value (W/m². K)	SHGC
Vision Glazing – All elevations	≤6.15	≤0.70

Block E – Building 1

Elevation	U-value (W/m². K)	SHGC
Vision Glazing – All elevations	≤7.25	≤0.80

Block E – Building 2

Elevation	U-value (W/m². K)	SHGC
Vision Glazing – All elevations	≤8.0	≤0.73

Block E – Building 3

Elevation	U-value (W/m². K)	SHGC
Vision Glazing – All elevations	≤7.25	≤0.80

4.0 Conclusions and recommendations

A Section J fabric assessment has been carried out to demonstrate that the proposed development is able to meet the thermal performance requirements specified within Section J of the NCC 2019 Amendment 1.

Based on the design drawings and information listed in Appendix A, the building will meet the Section J requirements when constructed with the thermal performances outlined in Section 3.0

4.1 Recommendations

The DTS (Deemed-to-Satisfy) method of assessment has been utilised to show compliance with the NCC 2019 Amendment 1 Section J thermal performance requirements. Although no formal assessment of thermal or visual comfort has been undertaken, it is recommended that this be undertaken to understand the impact sunlight will have on occupied areas. The intent of this study would be to reduce discomfort from direct solar exposure as well as reducing solar glare which may cause discomfort for occupants of the occupied areas.

It is recommended that the uniform glazing system used for all buildings is a low-e single glazing with a neutral or light grey tint, which would achieve an approximate SHGC of 0.50. This would increase the energy efficiency of each building and promote thermal comfort of building occupants. If necessary, a JV3 assessment can be performed at a later stage in order to test alternative glazing selections and in the situation where thermal bridging requirements cannot be met.

Appendix A List of Reference Drawings & Information

Drawing Number	Drawing Title	Revision	Date Issued
AA.101	Block A Floor Plan	C	04.05.21
AF.101	Block B Level 1 Floor Plan & Roof Plan	B	06.04.21
AC.101	Block C Level 1 Floor Plan	F	11.05.21
AD.100	Block D Floor Plan	C	05.04.21
AE.005	Block E Overall Floor Plans	B	08.04.21
AE.101	Block E Building 1 Level 1 Floor Plan	E	11.05.21
AE.102	Block E Building 1 Level 2 Floor Plan	C	21.04.21
AE.103	Block E Building 1 Roof Plan	B	08.04.21
AE.104	Block E Building 2 Level 1 Floor Plan	D	04.05.21
AE.105	Block E Building 2 Level 2 Floor Plan	C	21.04.21
AE.106	Block E Building 2 Roof Plan	B	08.04.21
AE.107	Block E Building 3 Level 1 Floor Plan	C	21.04.21
AE.108	Block E Building 3 Level 2 Floor Plan	D	21.04.21

Appendix B NCC 2019 Amendment 1 Section J1 Façade Reports

Please see overleaf.

Façade

Report

Project Summary

Date
20/05/2021

Name
DL

Company
Cundall

Position
ESD

Building Name / Address
Building A

Building State
NSW

Climate Zone

6

Building Classification

Class 9b - schools

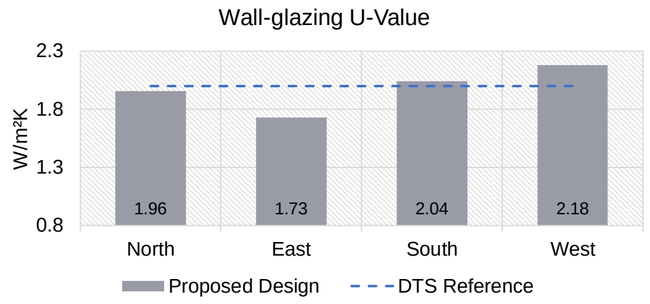
Storeys Above Ground
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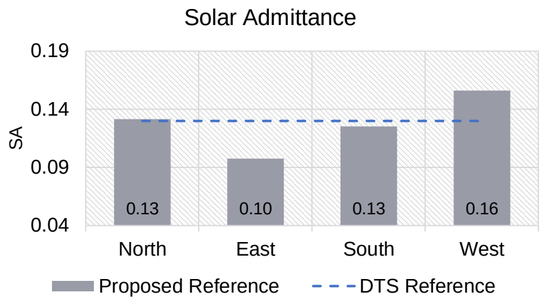
The summary below provides an overview of where compliance has been achieved for Specification J1.5a - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

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Non-Compliant Solution =

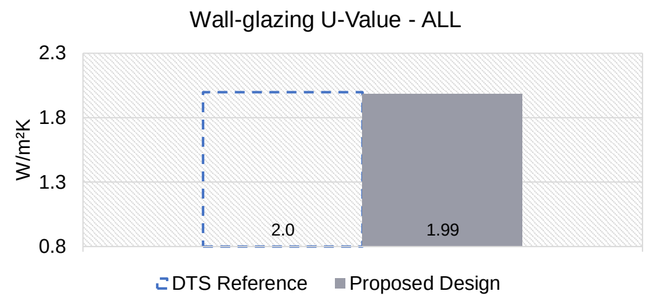
	Method 1				Method 2
	North	East	South	West	All
Wall-glazing U-Value (W/m².K)	1.96	1.73	2.04	2.18	1.99
Solar Admittance	0.13	0.10	0.13	0.16	
AC Energy Value					94

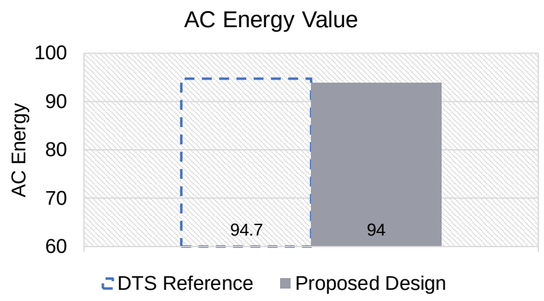
Method 1





Method 2





Project Details

	North	East	South	West
Glazing Area (m²)	50.9	16.1	55.3	23.2
Glazing to Façade Ratio	31%	25%	33%	36%
Glazing References	Base Glazing	Base Glazing	Base Glazing	Base Glazing
Glazing System Types	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)
Glass Types	Base Glazing	Base Glazing	Base Glazing	Base Glazing
Frame Types	Aluminium	Aluminium	Aluminium	Aluminium
Methodology	AFRC (True module size)			
Average Glazing U-Value (W/m².K)	4.75	4.75	4.75	4.75
Average Glazing SHGC	0.51	0.51	0.51	0.51
Shading Systems	P0.95_H4.65_G0 + P0.95_H2.36_G0.56	P1.05_H3.3_G1.5 + P20_H3.6_G0.6	P2.8_H2.36_G0.56 + P0.6_H3.6_G0.6 + P2.9_H2.36_G0.56 +	P8.1_H3.6_G0.6
Wall Area (m²)	114.3	47.9	113.1	40.6
Wall Types	R1.4	R1.4	R1.4	R1.4
Methodology	NCC Specification J1.5b			
Wall Construction	R1.4	R1.4	R1.4	R1.4
Wall Thickness	300	300	300	300
Average Wall R-value (m²K/W)	1.40	1.40	1.40	1.40
Solar Absorbtance	0.7	0.7	0.7	0.7

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Façade

Report

Project Summary

Date
20/05/2021

Name
DL

Company
Cundall

Position
ESD

Building Name / Address
Building B

Building State
NSW

Climate Zone

6

Building Classification

Class 9b - schools

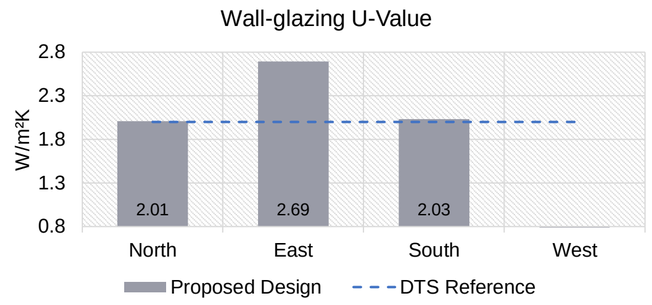
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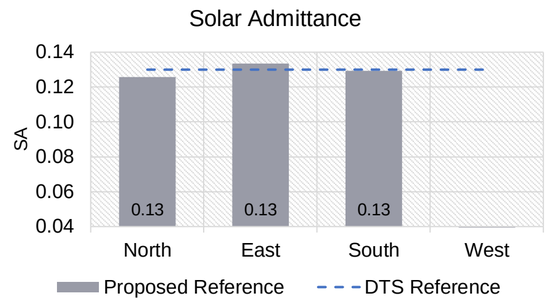
The summary below provides an overview of where compliance has been achieved for Specification J1.5a - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

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Non-Compliant Solution =

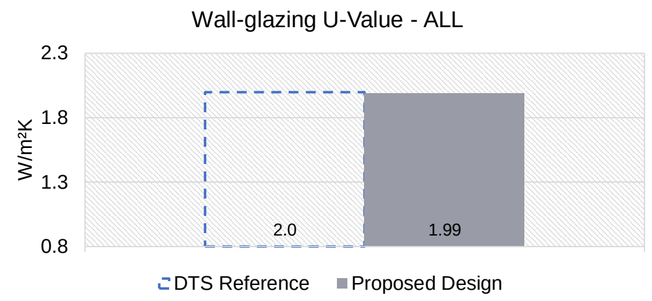
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	North	East	South	West	All
Wall-glazing U-Value (W/m².K)	2.01	2.69	2.03	0.71	1.99
Solar Admittance	0.13	0.13	0.13		
AC Energy Value					37

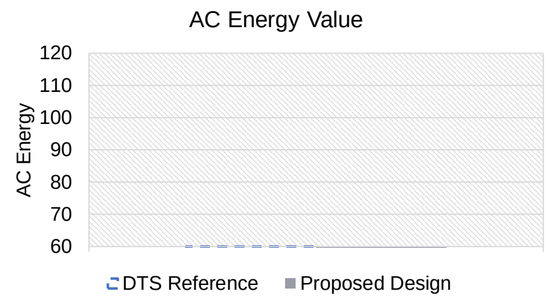
Method 1





Method 2





Project Details

	North	East	South	West
Glazing Area (m²)	13.5	28.9	13.8	0.0
Glazing to Façade Ratio	26%	39%	26%	0%
Glazing References	Base Glazing	Base Glazing	Base Glazing	
Glazing System Types	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	
Glass Types	Base Glazing	Base Glazing	Base Glazing	
Frame Types	Aluminium	Aluminium	Aluminium	
Methodology	AFRC (True module size)			
Average Glazing U-Value (W/m².K)	5.75	5.75	5.75	-
Average Glazing SHGC	0.56	0.56	0.56	-
Shading Systems	P0.95_H2.85_G1.35 + P1.05_H2.85_G0.15 + P1.05_H1.65_G0.65 +	P2.75_H3.6_G0.9 + P3.8_H5.3_G0.7 + P3.8_H5.3_G4.95	P0.95_H2.85_G1.35 + P1.05_H1.65_G0.15 + P0.95_H1.45_G0.65	
Wall Area (m²)	38.9	44.8	38.9	42.8
Wall Types	R1.4	R1.4	R1.4	R1.4
Methodology	NCC Specification J1.5b			
Wall Construction	R1.4	R1.4	R1.4	R1.4
Wall Thickness	300	300	300	300
Average Wall R-value (m²K/W)	1.40	1.40	1.40	1.40
Solar Absorbtance	0.7	0.7	0.7	0.7

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Façade

Report

Project Summary

Date
20/05/2021

Name
DL

Company
Cundall

Position
ESD

Building Name / Address
Building C

Building State
NSW

Climate Zone

6

Building Classification

Class 9b - schools

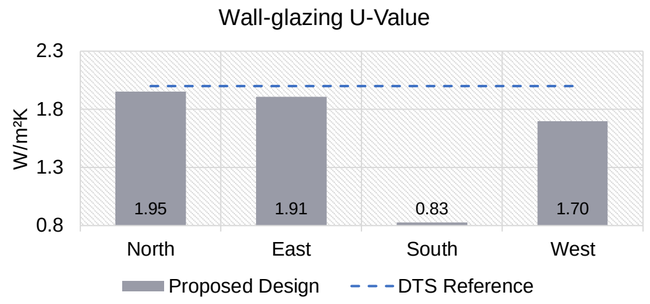
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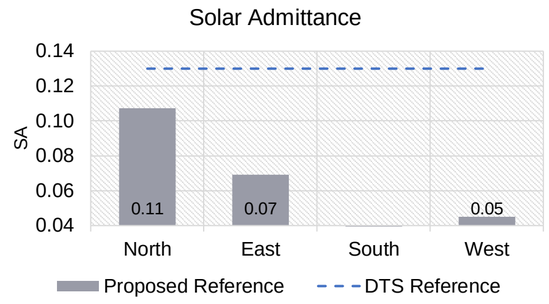
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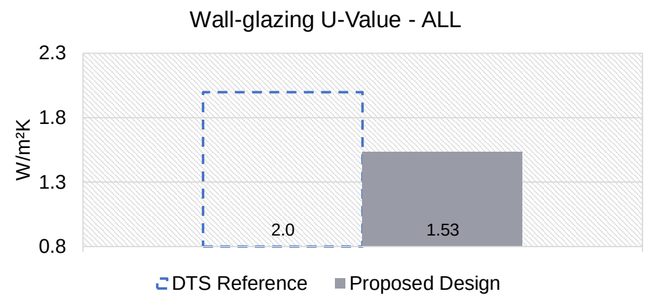
	Method 1				Method 2
	North	East	South	West	All
Wall-glazing U-Value (W/m².K)	1.95	1.91	0.83	1.70	1.53
Solar Admittance	0.11	0.07	0.01	0.05	
AC Energy Value					0

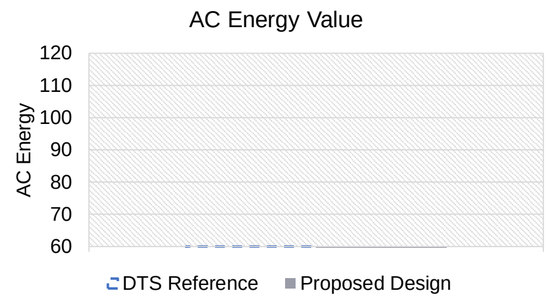
Method 1





Method 2





Project Details

	North	East	South	West
Glazing Area (m²)	51.1	38.3	5.5	31.0
Glazing to Façade Ratio	17%	16%	2%	13%
Glazing References	Base Glazing	Base Glazing	Base Glazing	Base Glazing
Glazing System Types	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)
Glass Types	Base Glazing	Base Glazing	Base Glazing	Base Glazing
Frame Types	Aluminium	Aluminium	Aluminium	Aluminium
Methodology	AFRC (True module size)			
Average Glazing U-Value (W/m².K)	8.00	8.00	8.00	8.00
Average Glazing SHGC	0.80	0.80	0.80	0.80
Shading Systems	P3_H0.9_G0.59 + P14.5_H7.2_G3.6	P2.9_H2.06_G0.56 + P2.9_H3.3_G0.55	P1.1_H2.8_G1.3 + P1.2_H0.9_G0.59	P3_H2.06_G0.56 + P3_H3.3_G0
Wall Area (m²)	249.7	195.3	348.2	199.0
Wall Types	R1.4	R1.4	R1.4	R1.4
Methodology	NCC Specification J1.5b			
Wall Construction	R1.4	R1.4	R1.4	R1.4
Wall Thickness	300	300	300	300
Average Wall R-value (m²K/W)	1.40	1.40	1.40	1.40
Solar Absorbtance	0.7	0.7	0.7	0.7

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Façade

Report

Project Summary

Date
20/05/2021

Name
DL

Company
Cundall

Position
ESD

Building Name / Address
Building D

Building State
NSW

Climate Zone

6

Building Classification

Class 9b - schools

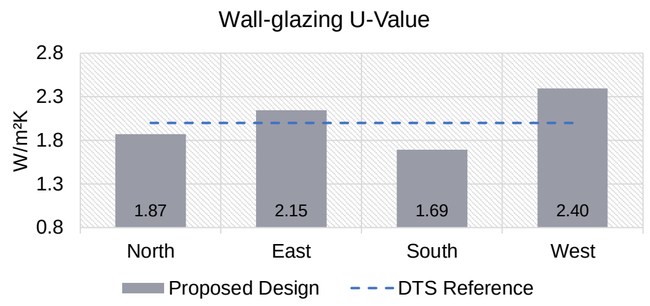
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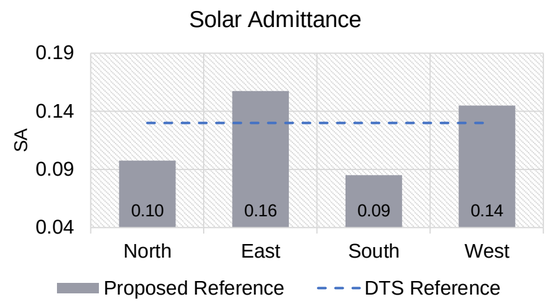
The summary below provides an overview of where compliance has been achieved for Specification J1.5a - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

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Non-Compliant Solution =

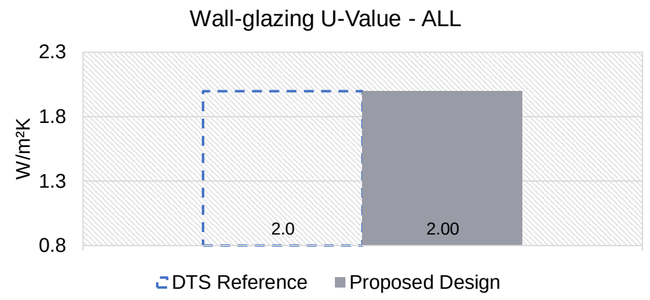
	Method 1				Method 2
	North	East	South	West	All
Wall-glazing U-Value (W/m².K)	1.87	2.15	1.69	2.40	2.00
Solar Admittance	0.10	0.16	0.09	0.14	
AC Energy Value					116

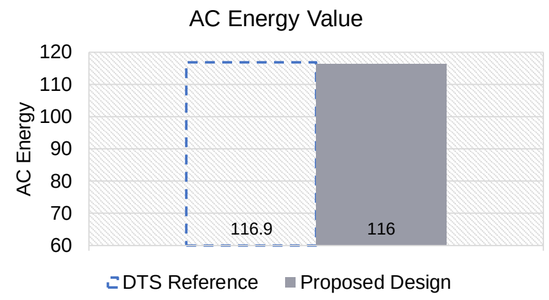
Method 1





Method 2





Project Details

	North	East	South	West
Glazing Area (m²)	36.5	40.8	40.5	52.8
Glazing to Façade Ratio	21%	26%	18%	31%
Glazing References	Base Glazing	Base Glazing	Base Glazing	Base Glazing
Glazing System Types	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)
Glass Types	Base Glazing	Base Glazing	Base Glazing	Base Glazing
Frame Types	Aluminium	Aluminium	Aluminium	Aluminium
Methodology	AFRC (True module size)			
Average Glazing U-Value (W/m².K)	6.15	6.15	6.15	6.15
Average Glazing SHGC	0.70	0.70	0.70	0.70
Shading Systems	P3.5_H3.6_G0.9 + P6.5_H2.3_G0.8 + P3.5_H2.3_G0.8 +	P14.5_H3.6_G0.9 + P2.85_H5.15_G1.55 + P0.85_H2.8_G1.3 +	P5_H2.3_G0.8 + P5_H3.6_G0.9 + P5_H2.3_G1.4 +	P0.9_H4.4_G2.9 + P7.15_H3.6_G0 + P2.35_H4.4_G2.9
Wall Area (m²)	134.9	113.9	184.1	118.0
Wall Types	R1.4	R1.4	R1.4	R1.4
Methodology	NCC Specification J1.5b			
Wall Construction	R1.4	R1.4	R1.4	R1.4
Wall Thickness	300	300	300	300
Average Wall R-value (m²K/W)	1.40	1.40	1.40	1.40
Solar Absorbtance	0.7	0.7	0.7	0.7

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Façade

Report

Project Summary

Date
20/05/2021

Name
DL

Company
Cundall

Position
ESD

Building Name / Address
Building E1

Building State
NSW

Climate Zone

6

Building Classification

Class 9b - schools

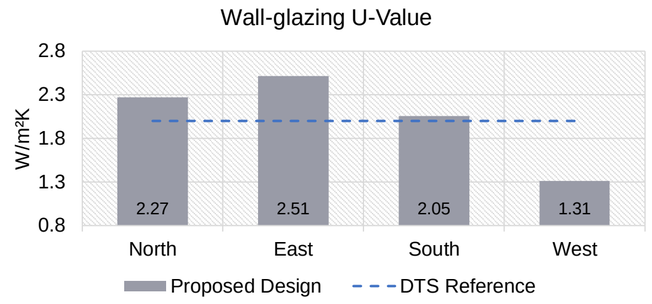
Storeys Above Ground
2.0

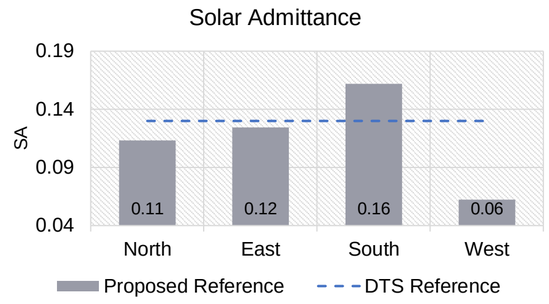
The summary below provides an overview of where compliance has been achieved for Specification J1.5a - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

Compliant Solution =
Non-Compliant Solution =

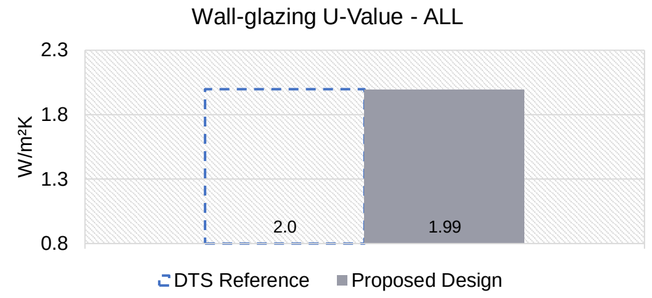
	Method 1				Method 2
	North	East	South	West	All
Wall-glazing U-Value (W/m².K)	2.27	2.51	2.05	1.31	1.99
Solar Admittance	0.11	0.12	0.16	0.06	
AC Energy Value					111

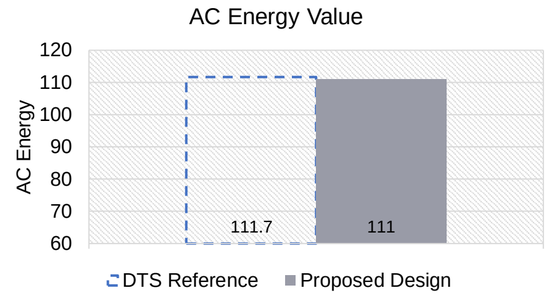
Method 1





Method 2





Project Details

	North	East	South	West
Glazing Area (m²)	47.2	35.1	47.7	7.1
Glazing to Façade Ratio	24%	28%	21%	9%
Glazing References	Base Glazing	Base Glazing	Base Glazing	Base Glazing
Glazing System Types	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)
Glass Types	Base Glazing	Base Glazing	Base Glazing	Base Glazing
Frame Types	Aluminium	Aluminium	Aluminium	Aluminium
Methodology	AFRC (True module size)			
Average Glazing U-Value (W/m².K)	7.25	7.25	7.25	7.25
Average Glazing SHGC	0.80	0.80	0.80	0.80
Shading Systems	P4.4_H3.45_G0.75 + P2.55_H3.45_G1.35 + P4.4_H3.05_G0.35 +	P4.75_H3.45_G0.75 + P0.9_H3.45_G1.35 + P4.75_H3.05_G0.35 +	P0.9_H2.95_G1.15	P5.1_H1.85_G0.05 + P0.9_H3.15_G1.35
Wall Area (m²)	150.9	92.4	184.8	70.4
Wall Types	R1.4	R1.4	R1.4	R1.4
Methodology	NCC Specification J1.5b			
Wall Construction	R1.4	R1.4	R1.4	R1.4
Wall Thickness	300	300	300	300
Average Wall R-value (m²K/W)	1.40	1.40	1.40	1.40
Solar Absorbtance	0.7	0.7	0.7	0.7

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Façade

Report

Project Summary

Date
20/05/2021

Name
DL

Company
Cundall

Position
ESD

Building Name / Address
Building E2

Building State
NSW

Climate Zone

6

Building Classification

Class 9b - schools

Storeys Above Ground
2.0

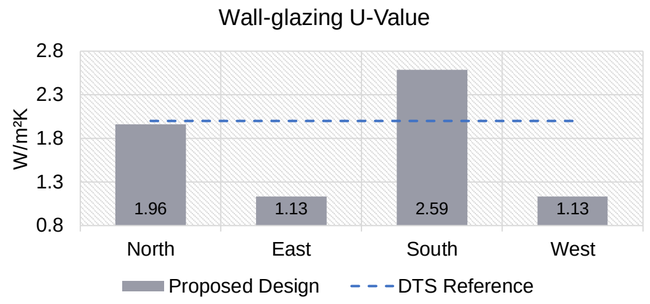
The summary below provides an overview of where compliance has been achieved for Specification J1.5a - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

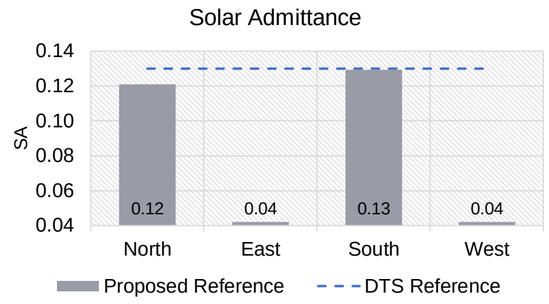
Compliant Solution =
Non-Compliant Solution =

	Method 1				Method 2
	North	East	South	West	All
Wall-glazing U-Value (W/m².K)	1.96	1.13	2.59	1.13	1.90
Solar Admittance	0.12	0.04	0.13	0.04	

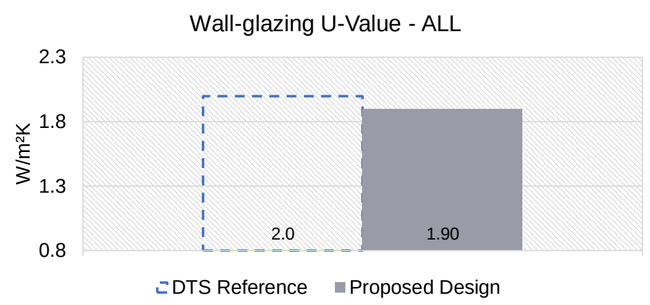
AC Energy Value 32

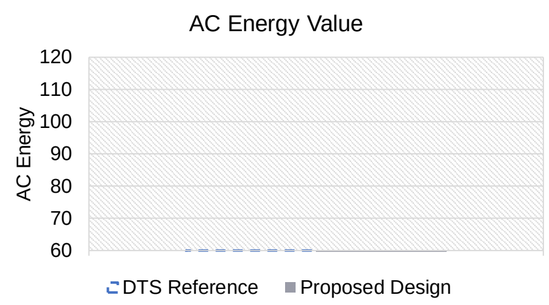
Method 1





Method 2





Project Details

	North	East	South	West
Glazing Area (m²)	38.2	6.1	63.2	6.1
Glazing to Façade Ratio	17%	6%	26%	6%
Glazing References	Base Glazing	Base Glazing	Base Glazing	Base Glazing
Glazing System Types	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)
Glass Types	Base Glazing	Base Glazing	Base Glazing	Base Glazing
Frame Types	Aluminium	Aluminium	Aluminium	Aluminium
Methodology	AFRC (True module size)			
Average Glazing U-Value (W/m².K)	8.00	8.00	8.00	8.00
Average Glazing SHGC	0.73	0.73	0.73	0.73
Shading Systems	P1.05_H6.45_G4.65 + P1.05_H2.85_G1.05	P0.85_H6.45_G4.65 + P0.85_H3.65_G1.85	P7.4_H3.45_G0.75 + P4.85_H2.95_G0.25 + P0.9_H1.45_G0.55	P0.85_H6.45_G4.65 + P0.85_H3.65_G1.85
Wall Area (m²)	184.7	100.1	182.7	100.1
Wall Types	R1.4	R1.4	R1.4	R1.4
Methodology	NCC Specification J1.5b			
Wall Construction	R1.4	R1.4	R1.4	R1.4
Wall Thickness	300	300	300	300
Average Wall R-value (m²K/W)	1.40	1.40	1.40	1.40
Solar Absorbtance	0.7	0.7	0.7	0.7

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Façade

Report

Project Summary

Date
20/05/2021

Name
DL

Company
Cundall

Position
ESD

Building Name / Address
Building E3

Building State
NSW

Climate Zone

6

Building Classification

Class 9b - schools

Storeys Above Ground
2.0

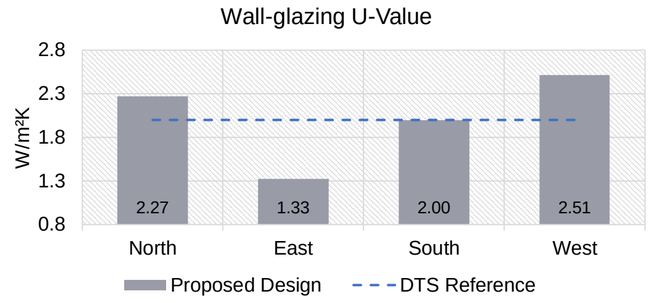
The summary below provides an overview of where compliance has been achieved for Specification J1.5a - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

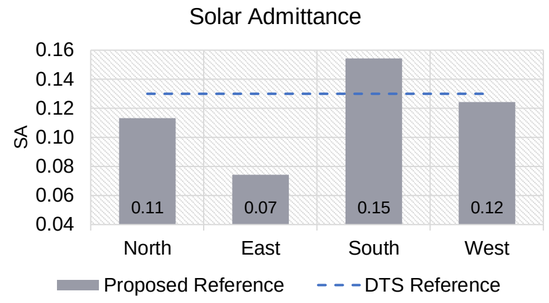
Compliant Solution =
Non-Compliant Solution =

	Method 1				Method 2
	North	East	South	West	All
Wall-glazing U-Value (W/m².K)	2.27	1.33	2.00	2.51	1.99
Solar Admittance	0.11	0.07	0.15	0.12	

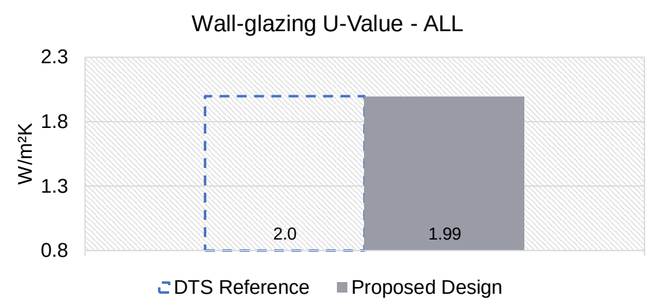
AC Energy Value 74

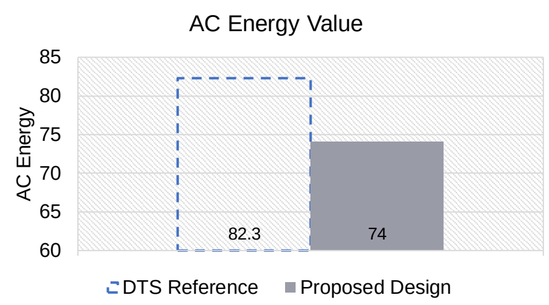
Method 1





Method 2





Project Details

	North	East	South	West
Glazing Area (m²)	47.2	5.5	49.2	35.1
Glazing to Façade Ratio	24%	9%	20%	28%
Glazing References	Base Glazing	Base Glazing	Base Glazing	Base Glazing
Glazing System Types	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)	DEFAULTS (GENERIC)
Glass Types	Base Glazing	Base Glazing	Base Glazing	Base Glazing
Frame Types	Aluminium	Aluminium	Aluminium	Aluminium
Methodology	AFRC (True module size)			
Average Glazing U-Value (W/m².K)	7.25	7.25	7.25	7.25
Average Glazing SHGC	0.80	0.80	0.80	0.80
Shading Systems	P4.4_H3.45_G0.75 + P2.55_H3.45_G1.35 + P4.4_H3.05_G0.35 +	P0.9_H3.15_G1.35	P0.9_H2.2_G0.4 + P0.9_H2.95_G1.15	P4.75_H3.45_G0.75 + P0.9_H3.45_G1.35 + P4.75_H3.05_G0.35 +
Wall Area (m²)	150.9	53.5	201.7	92.4
Wall Types	R1.4	R1.4	R1.4	R1.4
Methodology	NCC Specification J1.5b			
Wall Construction	R1.4	R1.4	R1.4	R1.4
Wall Thickness	300	300	300	300
Average Wall R-value (m²K/W)	1.40	1.40	1.40	1.40
Solar Absorbtance	0.7	0.7	0.7	0.7

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Appendix C Fabric Mark-ups

Please see overleaf.

CUNDALL

Project. St Matthews Catholic High School, Mudgee	Sketch No. SK01	Revision. C	Job No. 1022539	Made by. DL
Title. NCC 2019 DTS Fabric Markup - Block A		Date. 20-05-21	Scale. NTS	Page No. 1 of 7

Notes:
1. Version of NCC: 2019 Amendment 1
2. Climate Zone: 6
3. Building Class: 9b
4. This mark-up is indicative only and requires approval by the client.
5. This information is to be incorporated into the appropriate documentation.
6. This advice relates to Section J1 only. Other sections by others.
7. The R-values represent complete roof, wall and floor constructions, including air films/gaps and including allowance for thermal bridging. Complete constructions are to be shown for compliance.
8. All glazing properties are based on AFRC figures for the total glazing system (glass and frame).
9. Architect and/or contractor are to ensure compliance with the construction requirements of section J1. Including the calculation and application of R-value adjustments.

Legend:

External Wall - R 1.4

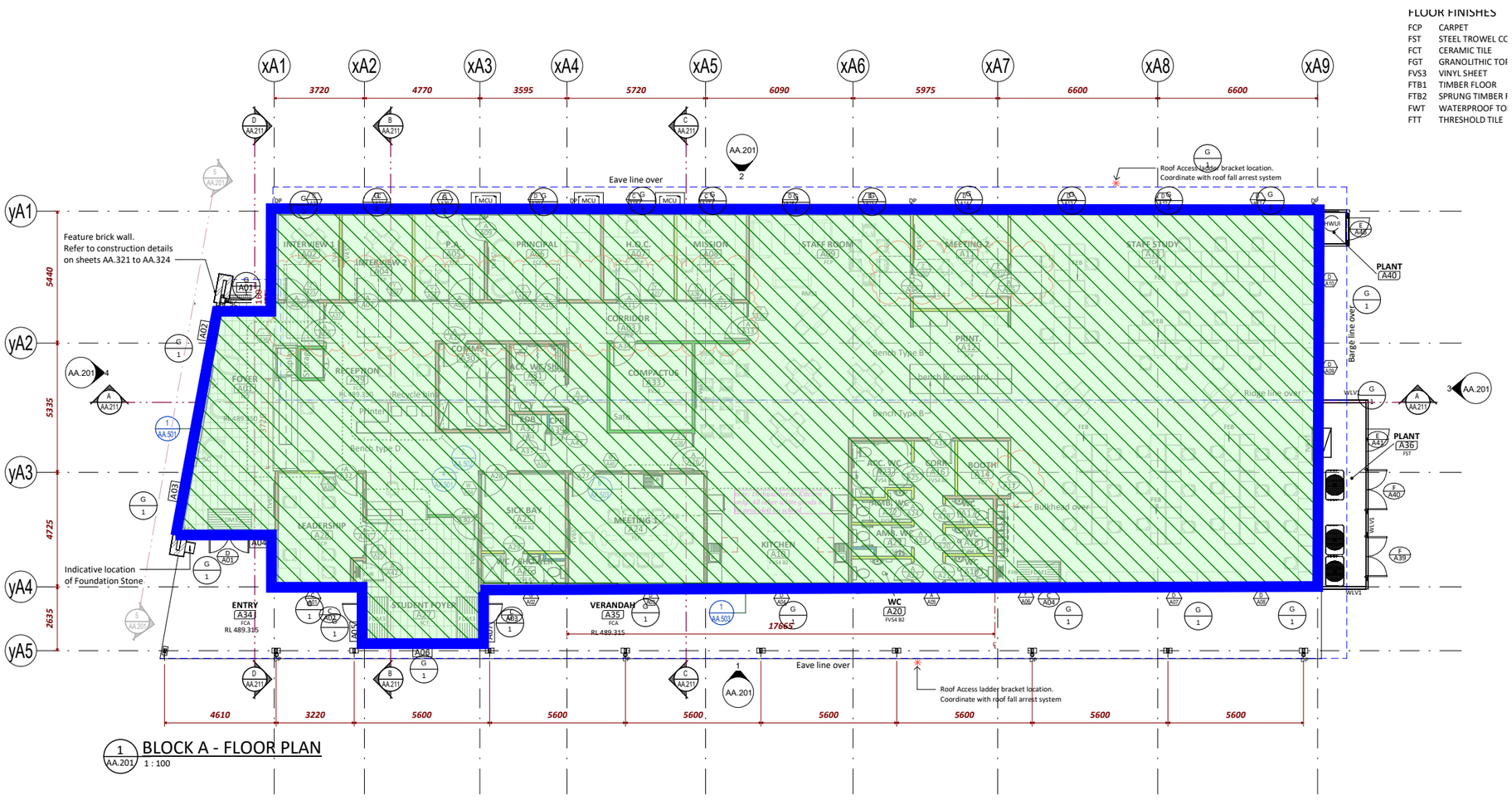
Internal Wall (≤ 1.5ACH) - R1.4

Exposed Roof - R 3.7↓ (absorptance < 0.45)

Suspended Exposed Floor - R 2.0↓

Note: Arrows indicate direction of heat flow.

G / 1 Glazing: U; ≤4.75 SHGC; ≤0.51



CUNDALL	Project. St Matthews Catholic High School, Mudgee	Sketch No. SK02	Revision. C	Job No. 1022539	Made by. DL
	Title. NCC 2019 DTS Fabric Markup - Block B		Date. 20-05-21	Scale. NTS	Page No. 2 of 7

Notes:
1. Version of NCC: 2019 Amendment 1
2. Climate Zone: 6
3. Building Class: 9b
4. This mark-up is indicative only and requires approval by the client.
5. This information is to be incorporated into the appropriate documentation.
6. This advice relates to Section J1 only. Other sections by others.
7. The R-values represent complete roof, wall and floor constructions, including air films/gaps and including allowance for thermal bridging. Complete constructions are to be shown for compliance.
8. All glazing properties are based on AFRC figures for the total glazing system (glass and frame).
9. Architect and/or contractor are to ensure compliance with the construction requirements of section J1. Including the calculation and application of R-value adjustments.

Legend:

External Wall - R 1.4

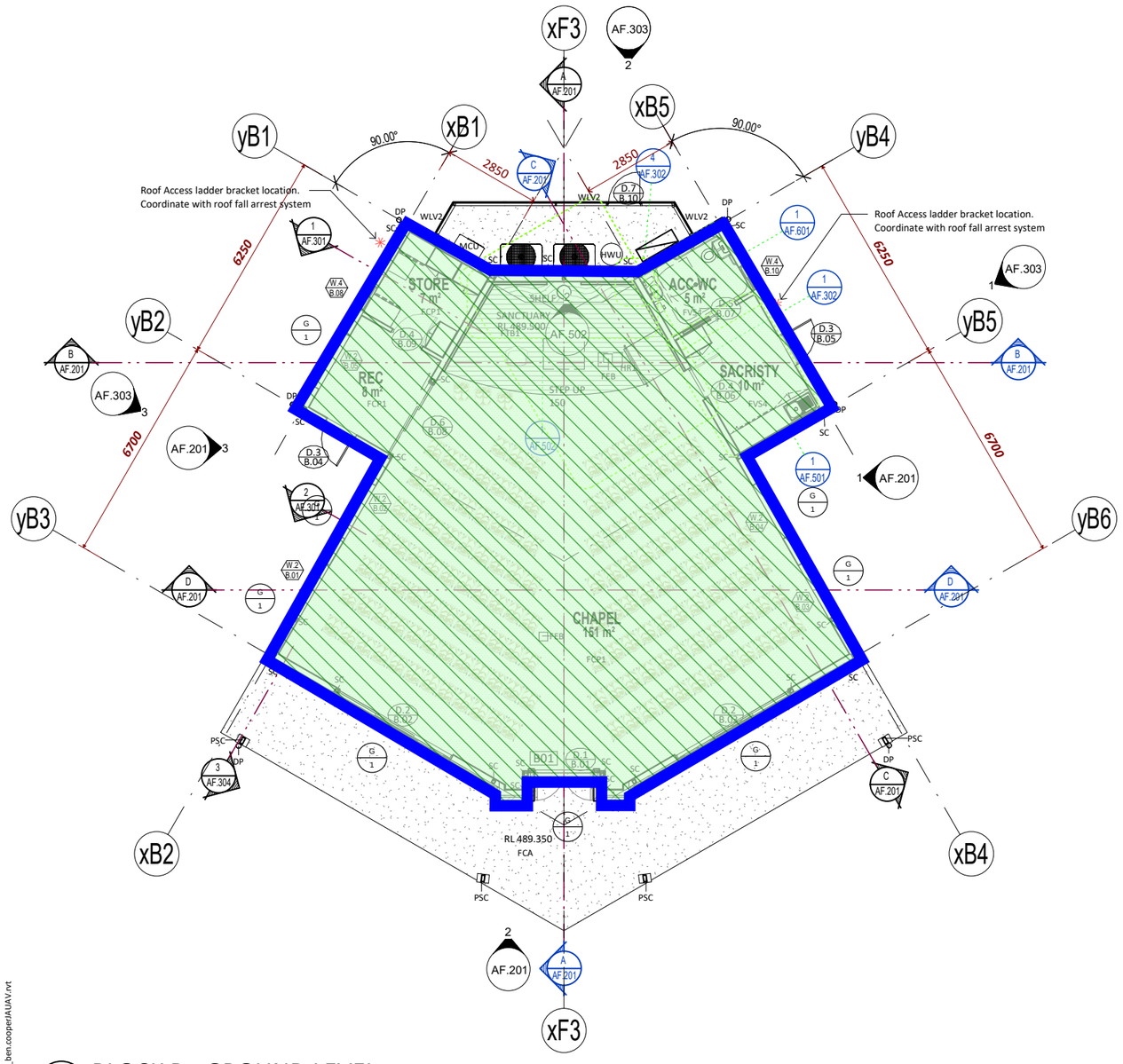
Internal Wall (≤ 1.5ACH) - R1.4

Exposed Roof - R 3.7↓ (absorptance < 0.45)

Suspended Exposed Floor - R 2.0↓

Note: Arrows indicate direction of heat flow.

G 1 Glazing: U; ≤5.75 SHGC; ≤0.56



1 AF.201 BLOCK B - GROUND LEVEL
1 : 100

_Block B (Central)_ben.cooper.AUAV.rvt

CUNDALL	Project. St Matthews Catholic High School, Mudgee	Sketch No. SK03	Revision. C	Job No. 1022539	Made by. DL
	Title. NCC 2019 DTS Fabric Markup - Block C		Date. 20-05-21	Scale. NTS	Page No. 3 of 7

Notes:
1. Version of NCC: 2019 Amendment 1
2. Climate Zone: 6
3. Building Class: 9b
4. This mark-up is indicative only and requires approval by the client.
5. This information is to be incorporated into the appropriate documentation.
6. This advice relates to Section J1 only. Other sections by others.
7. The R-values represent complete roof, wall and floor constructions, including air films/gaps and including allowance for thermal bridging. Complete constructions are to be shown for compliance.
8. All glazing properties are based on AFRC figures for the total glazing system (glass and frame).
9. Architect and/or contractor are to ensure compliance with the construction requirements of section J1. Including the calculation and application of R-value adjustments.

Legend:

External Wall - R 1.4
(Including all upper external walls of Level 2)

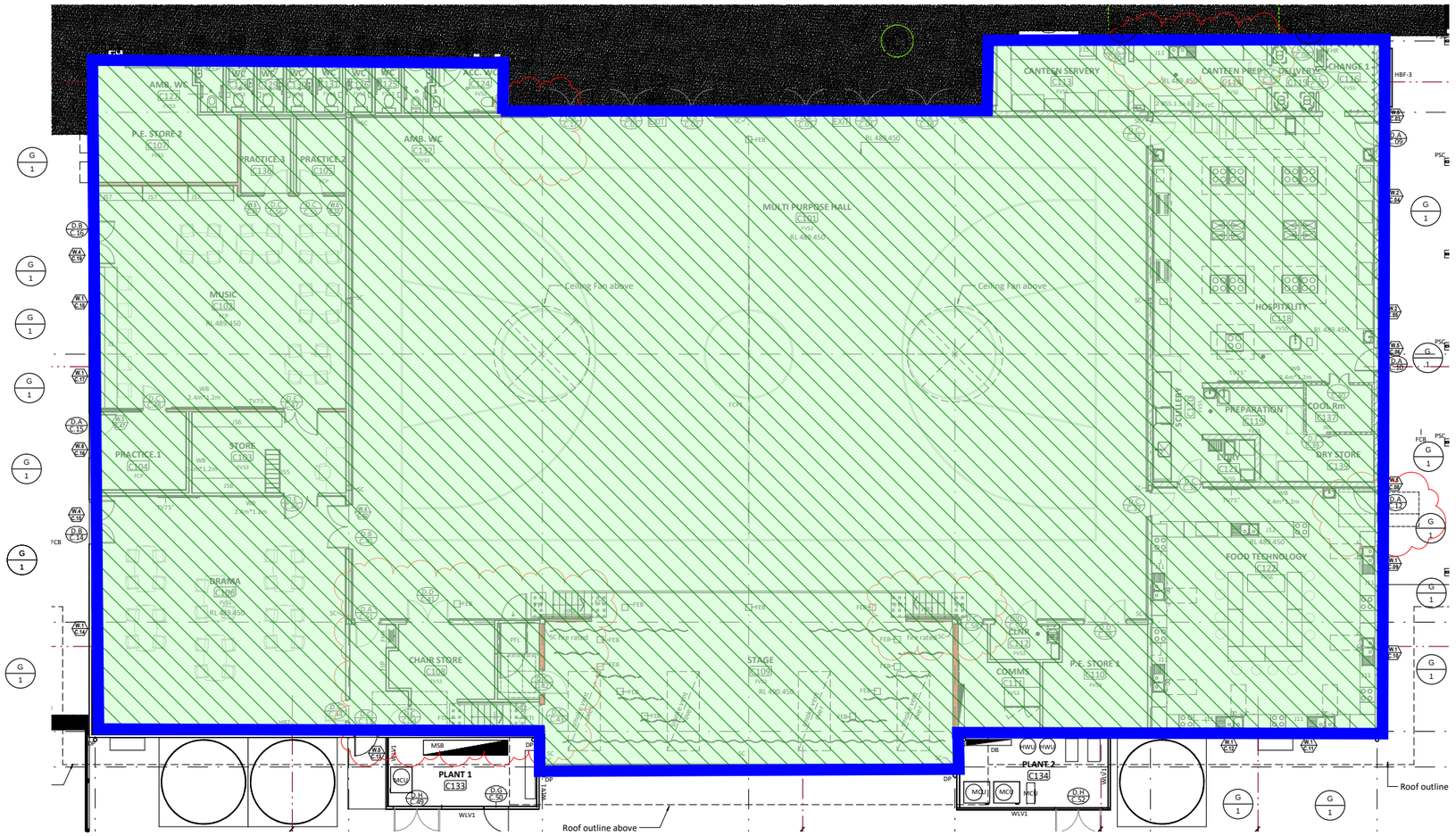
Internal Wall (≤ 1.5ACH) - R1.4

Exposed Roof - R 3.7 ↓
(absorptance < 0.45)

Suspended Exposed Floor - R 2.0 ↓

Note: Arrows indicate direction of heat flow.

G 1 Glazing:
U; ≤8.0 SHGC; ≤0.80



CUNDALL

Project. St Matthews Catholic High School, Mudgee	Sketch No. SK04	Revision. C	Job No. 1022539	Made by. DL
Title. NCC 2019 DTS Fabric Markup - Block D		Date. 20-05-21	Scale. NTS	Page No. 4 of 7

Notes:
1. Version of NCC: 2019 Amendment 1
2. Climate Zone: 6
3. Building Class: 9b
4. This mark-up is indicative only and requires approval by the client.
5. This information is to be incorporated into the appropriate documentation.
6. This advice relates to Section J1 only. Other sections by others.
7. The R-values represent complete roof, wall and floor constructions, including air films/gaps and including allowance for thermal bridging. Complete constructions are to be shown for compliance.
8. All glazing properties are based on AFRC figures for the total glazing system (glass and frame).
9. Architect and/or contractor are to ensure compliance with the construction requirements of section J1. Including the calculation and application of R-value adjustments.

Legend:

External Wall - R 1.4
(Including all upper external walls adjacent to circulation space)

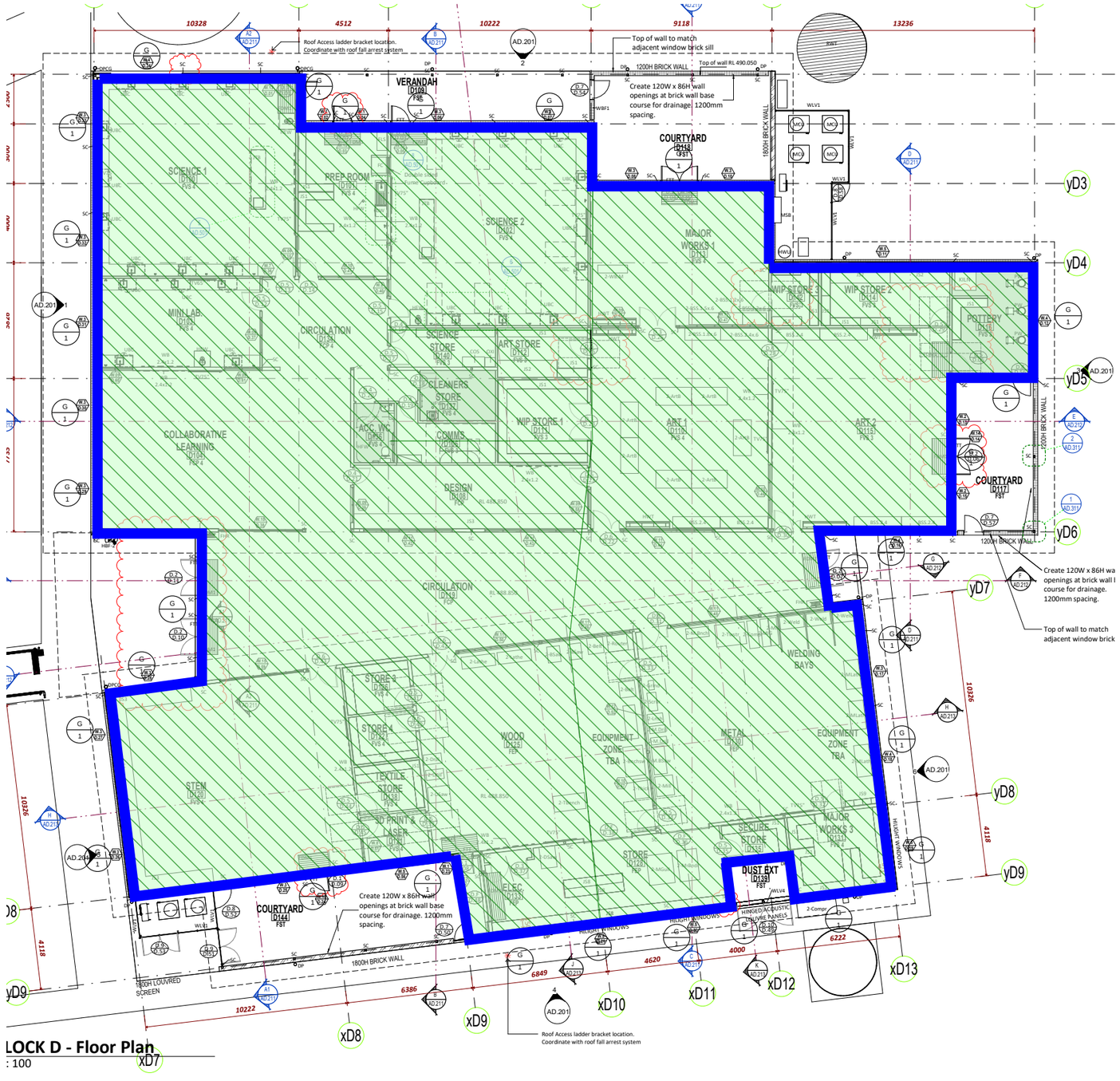
Internal Wall (≤ 1.5ACH) - R1.4

Exposed Roof - R 3.7↓
(absorptance < 0.45)

Suspended Exposed Floor - R 2.0↓

Note: Arrows indicate direction of heat flow.

G/1 Glazing:
U;≤ 6.15 SHGC; ≤0.70



LOCK D - Floor Plan
: 100

CUNDALL

Project.	Sketch No.	Revision.	Job No.	Made by.
St Matthews Catholic High School, Mudgee	SK05	C	1022539	DL
Title. NCC 2019 DTS Fabric Markup - Block E1		**Date.** 20-05-21	**Scale.** NTS	**Page No.** 5 of 7

Notes:
1. Version of NCC: 2019 Amendment 1
2. Climate Zone: 6
3. Building Class: 9b
4. This mark-up is indicative only and requires approval by the client.
5. This information is to be incorporated into the appropriate documentation.
6. This advice relates to Section J1 only. Other sections by others.
7. The R-values represent complete roof, wall and floor constructions, including air films/gaps and including allowance for thermal bridging. Complete constructions are to be shown for compliance.
8. All glazing properties are based on AFRC figures for the total glazing system (glass and frame).
9. Architect and/or contractor are to ensure compliance with the construction requirements of section J1. Including the calculation and application of R-value adjustments.

Legend:

External Wall - R 1.4

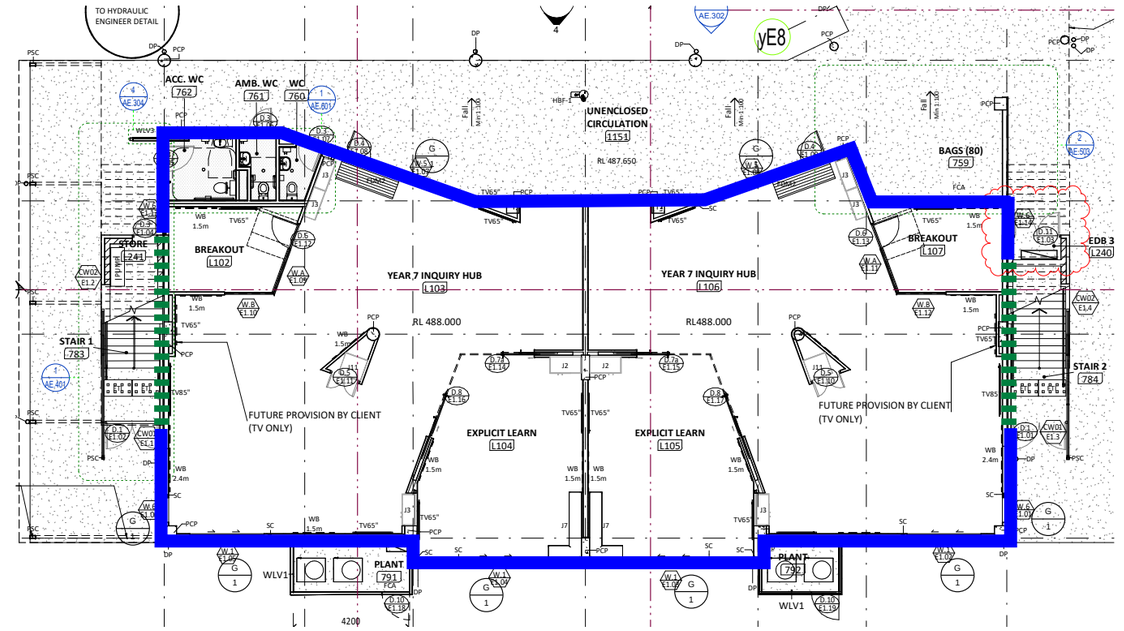
Internal Wall (≤ 1.5ACH) - R1.4

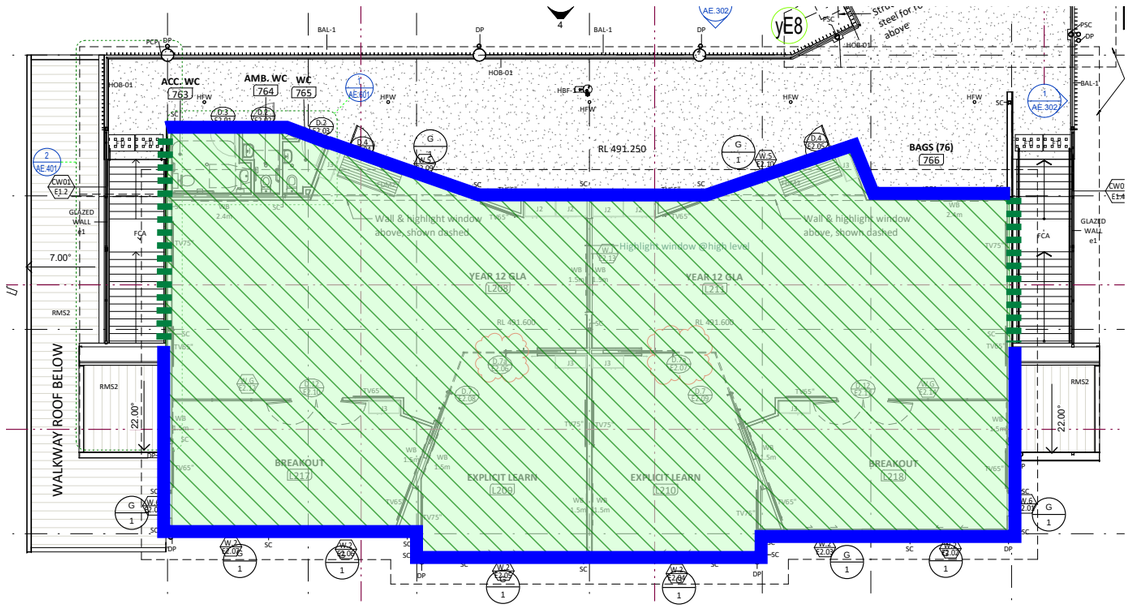
Exposed Roof - R 3.7↓ (absorptance < 0.45)

Suspended Exposed Floor - R 2.0↓

Note: Arrows indicate direction of heat flow.

G 1 Glazing:
U; ≤7.25 SHGC; ≤8.0





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Project.	Sketch No.	Revision.	Job No.	Made by.
St Matthews Catholic High School, Mudgee	SK06	C	1022539	DL
Title. NCC 2019 DTS Fabric Markup - Block E2		**Date.** 20-05-21	**Scale.** NTS	**Page No.** 6 of 7

Notes:
1. Version of NCC: 2019 Amendment 1
2. Climate Zone: 6
3. Building Class: 9b
4. This mark-up is indicative only and requires approval by the client.
5. This information is to be incorporated into the appropriate documentation.
6. This advice relates to Section J1 only. Other sections by others.
7. The R-values represent complete roof, wall and floor constructions, including air films/gaps and including allowance for thermal bridging. Complete constructions are to be shown for compliance.
8. All glazing properties are based on AFRC figures for the total glazing system (glass and frame).
9. Architect and/or contractor are to ensure compliance with the construction requirements of section J1. Including the calculation and application of R-value adjustments.

Legend:

External Wall - R 1.4

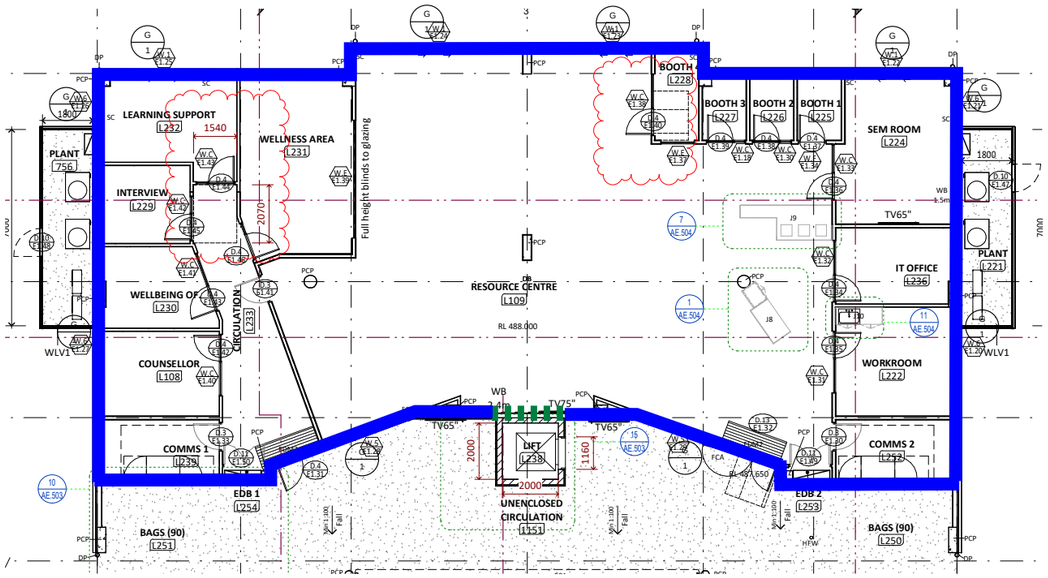
Internal Wall (≤ 1.5ACH) - R1.4

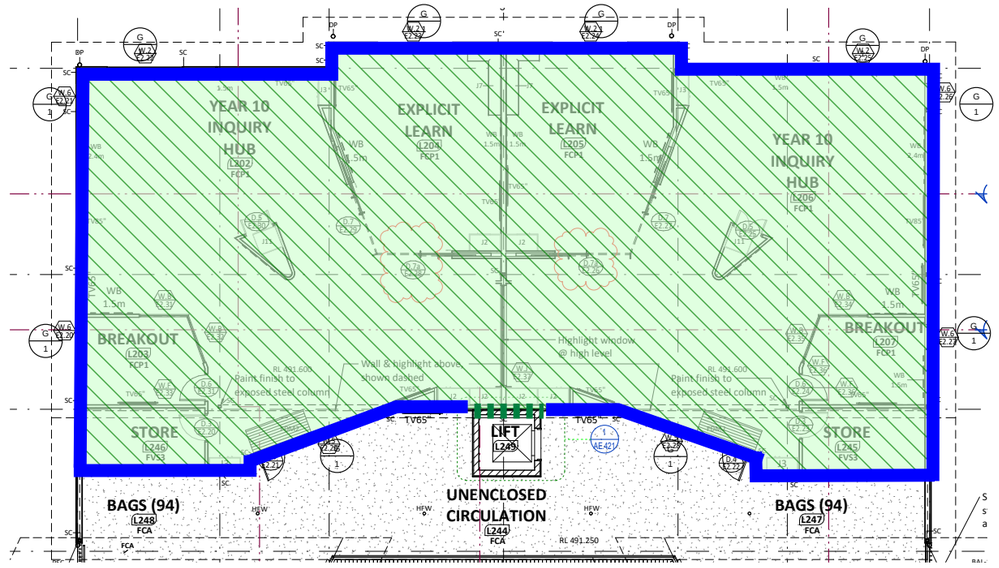
Exposed Roof - R 3.7↓
(absorptance < 0.45)

Suspended Exposed Floor - R 2.0↓

Note: Arrows indicate direction of heat flow.

G 1 Glazing:
U; ≤8.0 SHGC; ≤0.73





CUNDALL

Project. St Matthews Catholic High School, Mudgee		Sketch No. SK07	Revision. C	Job No. 1022539	Made by. DL
Title. NCC 2019 DTS Fabric Markup - Block E3			Date. 20-05-21	Scale. NTS	Page No. 7 of 7

Notes:
1. Version of NCC: 2019 Amendment 1
2. Climate Zone: 6
3. Building Class: 9b
4. This mark-up is indicative only and requires approval by the client.
5. This information is to be incorporated into the appropriate documentation.
6. This advice relates to Section J1 only. Other sections by others.
7. The R-values represent complete roof, wall and floor constructions, including air films/gaps and including allowance for thermal bridging. Complete constructions are to be shown for compliance.
8. All glazing properties are based on AFRC figures for the total glazing system (glass and frame).
9. Architect and/or contractor are to ensure compliance with the construction requirements of section J1. Including the calculation and application of R-value adjustments.

Legend:

External Wall - R 1.4

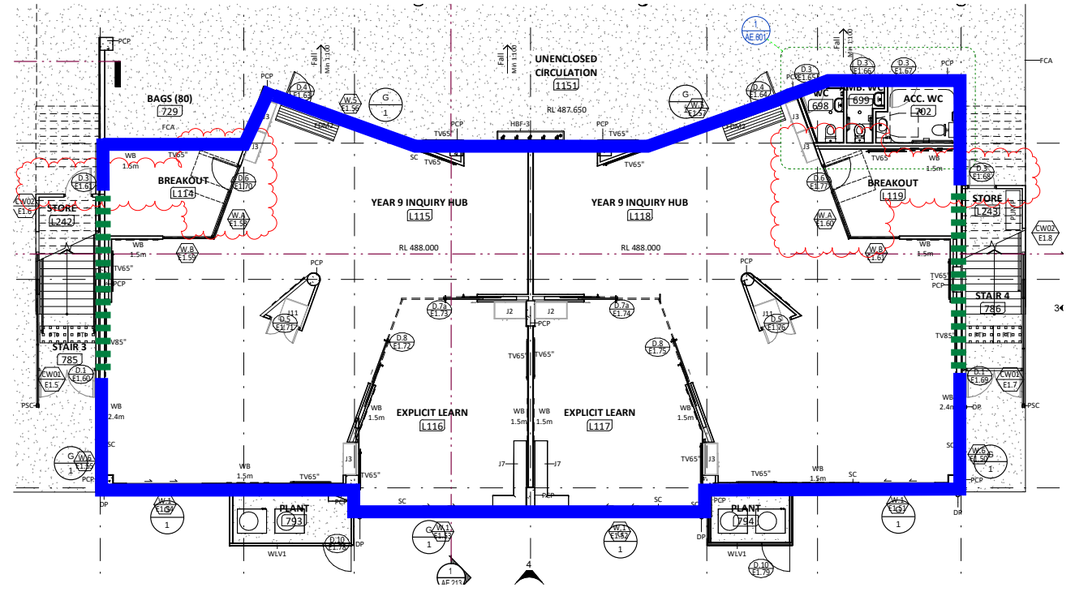
Internal Wall (≤ 1.5ACH) - R1.4

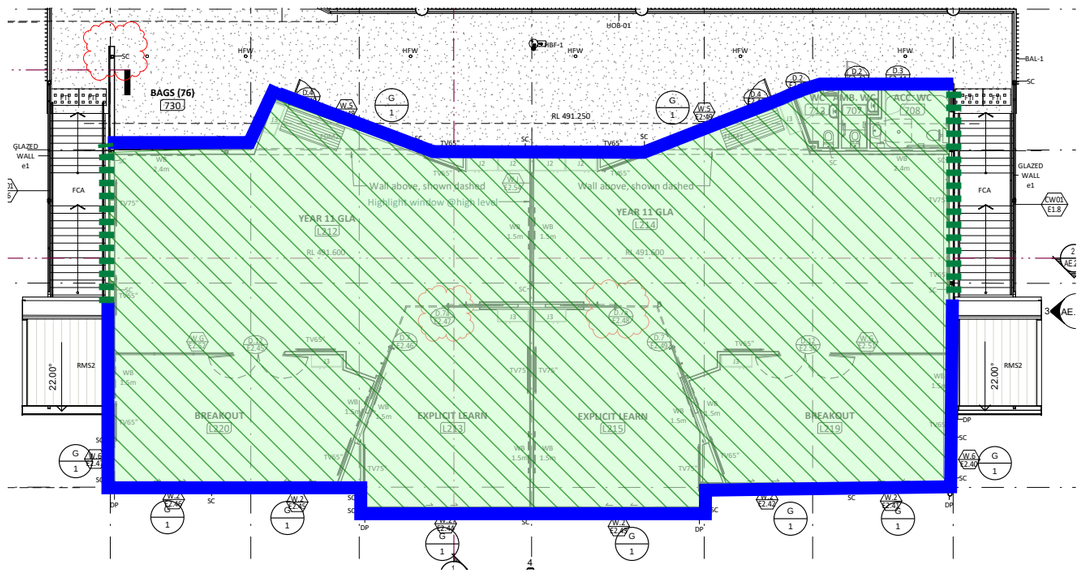
Exposed Roof - R 3.7↓ (absorptance < 0.45)

Suspended Exposed Floor - R 2.0↓

Note: Arrows indicate direction of heat flow.

G / 1 Glazing: U; ≤7.25 SHGC; ≤0.80





Cundall Johnston & Partners PTY
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Asia Australia Europe MENA UK and Ireland
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Post Approval

Proponent Details

Personal Details

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Company Details

Applying as a company/business?

Yes

Company Name	TRUSTEES OF THE ROMAN CATHOLIC CHURCH FOR THE DIOCESE OF BATHURST
ABN	23501787578
Branch Name	

Primary Contact

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Email	isaac.conway@tsamgt.com
Phone	0401526236
Role/Position	Assistant Project Manager

Post Approval Details

Project:

St Matthews Catholic College - SSD-9872-PA-10

Name of Document

SSD9872 - B1 - Walls and Cladding Statement

Related matter

Design Statement

Type of Document Lodgement

New Document

Description of the document and reason for submission / Overview of changes made to existing documents

I refer to the St Mathews Catholic College project (SSD 9872) that was approved 16 December 2020.
In accordance with Consent Condition B1, please see the attached external wall system disclosure statement that has been provided to the certifier.

Applicable Conditions

Schedule	Condition
Administrative Schedule	A22
Before Construction	B1

Consultation through the Major Projects portal

Consultation required as part of the preparation of the document?

No

Attachment of Post Approval application

File Name	Category
Signed SSD9872 - B1 - Walls and cladding statement V1.1.pdf	Post Approval Document

RWDI Australia Pty Ltd (RWDI)
Level 4, 272 Pacific Highway
Crows Nest, NSW, 2065

Tel: +61.2.9437.4611
E-mail: solutions@rwdi.com
ABN: 86 641 303 871

MEMORANDUM

DATE:	24 May 2021	**RWDI REFERENCE #:** 2102338
TO:	Nick Windsor	**EMAIL:** Nick.Windsor@north.com.au
	CC: Jake Worth	**EMAIL:** Jake.Worth@north.com.au
FROM:	Ben Lawrence	**Email:** ben.lawrence@rwdi.com
RE:	**St Matthews Catholic School – Assessment of Mechanical Services Emissions**	

Dear Nick,

As you are aware, Wilkinson Murray (now RWDI) have conducted a Noise and Vibration Impact Assessment (Report: 19120 Version B, 15 April 2020) for the new St Matthews Catholic School at 48 Broadhead Road, Spring Flat (Mudgee). At the time, there was insufficient information to conduct a full assessment of mechanical services for the project.

This has now been provided (drawings BR-M5000 to BR-M5012, BR-M5100 to BR-M5108, BR-M5203, BR-M5204, construction issue, dated 23 April 2021) and we have reviewed this design. The following table presents the predicted noise levels and assessment at neighbouring receivers. We have conservatively assumed that all plant will operate at full load during the daytime and evening periods. In reality, only Blocks C and D may potentially operate during the evening period and it's unlikely that any equipment will reach full load during this time.

Table 1 Predicted Noise Levels from Mechanical Services and Assessment

Receiver	Address	Predicted Noise Level ($L_{Aeq,15min}$)	Criteria	Assessment
R1	227 Bruce Road	30	35	Pass
R2	Hamel Park, 198 Bruce Road	32	35	Pass
R3	66 Broadhead Road	30	35	Pass
R4	56 Broadhead Road	26	35	Pass

BEST MANAGED COMPANIES Platinum member

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Based on our assessment of the current mechanical services design, the required criteria will be achieved at each of the four receivers included in our assessment. No further mitigation of external noise emissions will be required.

Yours faithfully,

RWDI Australia Pty Ltd



Ben Lawrence, **B.E.(Mech), MIEAust, MAAS**
TECHNICAL DIRECTOR | DIRECTOR OF OPERATIONS

ACOUSTICS AND AIR

ST MATTHEWS CATHOLIC COLLEGE MUDGEE

NOISE AND VIBRATION IMPACT ASSESSMENT

REPORT NO. 19120
VERSION B

APRIL 2020

PREPARED FOR

TSA MANAGEMENT
LEVEL 15, 207 KENT STREET
SYDNEY NSW 2000

WILKINSON MURRAY

DOCUMENT CONTROL

Version	Status	Date	Prepared By	Reviewed By
A	Final	3 July 2019	Lee Hudson	Ben Lawrence
B	Final	15 April 2020	Lee Hudson	Ben Lawrence

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AAAC
This firm is a member firm of the Association of Australasian Acoustical Consultants and the work here reported has been carried out in accordance with the terms of that membership.

Celebrating 50 Years in 2012
Wilkinson Murray is an independent firm established in 1962, originally as Carr & Wilkinson. In 1976 Barry Murray joined founding partner Roger Wilkinson and the firm adopted the name which remains today. From a successful operation in Australia, Wilkinson Murray expanded its reach into Asia by opening a Hong Kong office early in 2006. Today, with offices in Sydney, Newcastle, Wollongong, Orange, Queensland and Hong Kong, Wilkinson Murray services the entire Asia-Pacific region.

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GLOSSARY OF ACOUSTIC TERMS

Most environments are affected by environmental noise which continuously varies, largely as a result of road traffic. To describe the overall noise environment, a number of noise descriptors have been developed and these involve statistical and other analysis of the varying noise over sampling periods, typically taken as 15 minutes. These descriptors, which are demonstrated in the graph below, are here defined.

Maximum Noise Level (L_{Amax}) – The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

L_{A1} – The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

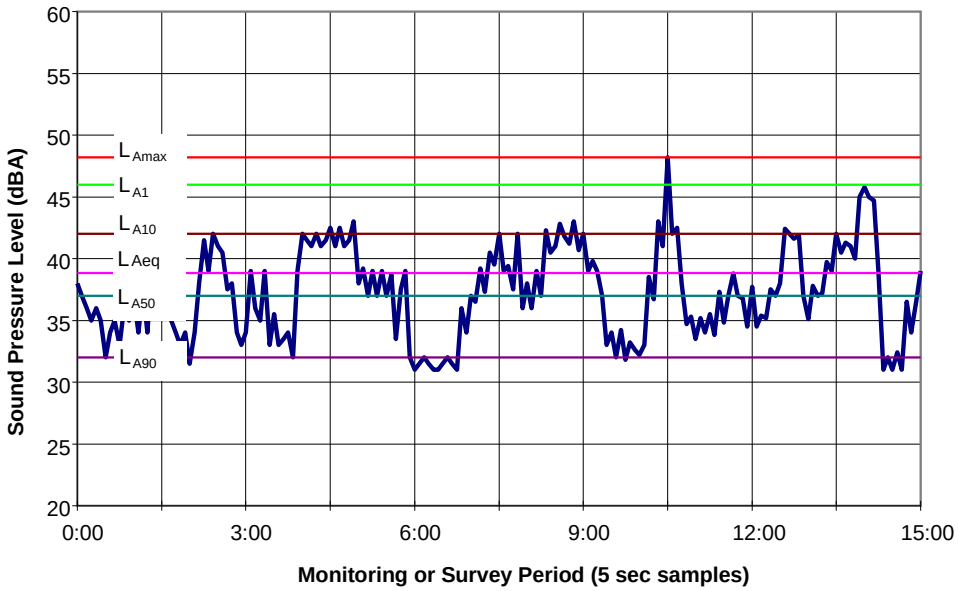
L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

ABL – The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night time) for each day. It is determined by calculating the 10th percentile (lowest 10th percent) background level (L_{A90}) for each period.

RBL – The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and night time.

Typical Graph of Sound Pressure Level vs Time



1 INTRODUCTION

This Noise and Vibration Impact Assessment has been prepared by Wilkinson Murray Pty Limited on behalf of the Catholic Education Diocese of Bathurst (the 'Applicant'). It accompanies an Environmental Impact Statement (EIS) prepared in support of State Significant Development Application SSD 9872 for the development of St Matthews Catholic College, Mudgee (Stage 1).

The SSD DA seeks consent for the construction of a new 4-stream, year 7-12 catholic secondary school at Mudgee NSW. The school can accommodate a maximum population of 680 students plus associated staff.

The purpose of this report is to provide an assessment of the proposal as detailed within the EIS.

This report specifically determines the potential impacts of operational noise generated by school activities and mechanical plant and equipment upon nearby residential receivers. Noise and vibration generated during construction works and road traffic noise generated by the project are also addressed.

The acoustic assessment was conducted generally in accordance with the following environmental planning instruments, policies and guidelines:

- *SEPP (Infrastructure) 2007* (iSEPP);
- *Noise Policy for Industry (EPA 2017);*
- *Interim Construction Noise Guideline (DECC 2009);*
- *Assessing Vibration: A Technical Guideline (DECC 2006);*
- *NSW Road Noise Policy (DECCW 2011).*

The key issues to be addressed as identified in the Secretary's Environmental Assessment Requirements (SEARS), together with the relevant cross-reference, are documented in Table 1-1.

Table 1-1 SEARS – Key Issues

5. Environmental Amenity	Report Reference
Assess amenity impacts on the surrounding locality, including solar access, visual privacy**,** visual amenity, overshadowing and **acoustic impacts**.	Sections 4.4, 0, 4.6, 5.2, 5.3.
Identify any proposed use of the school outside of school hours (including weekends) and assess any resultant amenity impacts on the immediate locality and proposed mitigation measures.	Sections 5.2.2, 5.2.4, 5.2.10.
Detail amenity impacts including solar access, **acoustic impacts**, visual privacy, view loss, overshadowing and wind impacts. A high level of environmental amenity for any surrounding residential land uses must be demonstrated.	Sections 4.5.1, 4.6, 5.2.1, 5.2.2, 5.2.4, 5.2.5, 5.2.6, 5.2.7, 5.2.8, 5.2.9, 5.2.10, 5.3.

11. Noise and Vibration	
Identify and provide a quantitative assessment of the main noise and vibration generating sources during construction demolition, site preparation, bulk excavation, construction. Outline measures to minimise and mitigate the potential noise impacts upon surrounding occupiers of land.	Section 4.
Identify and assess operational noise, including consideration of any public address system, school bell, mechanical services (e.g. air conditioning plant), use of any school hall for concerts etc. (both during and outside school hours), and any out of hours community use of school facilities, and outline measures to minimise and mitigate the potential noise impacts on surrounding occupiers of land.	Section 5.

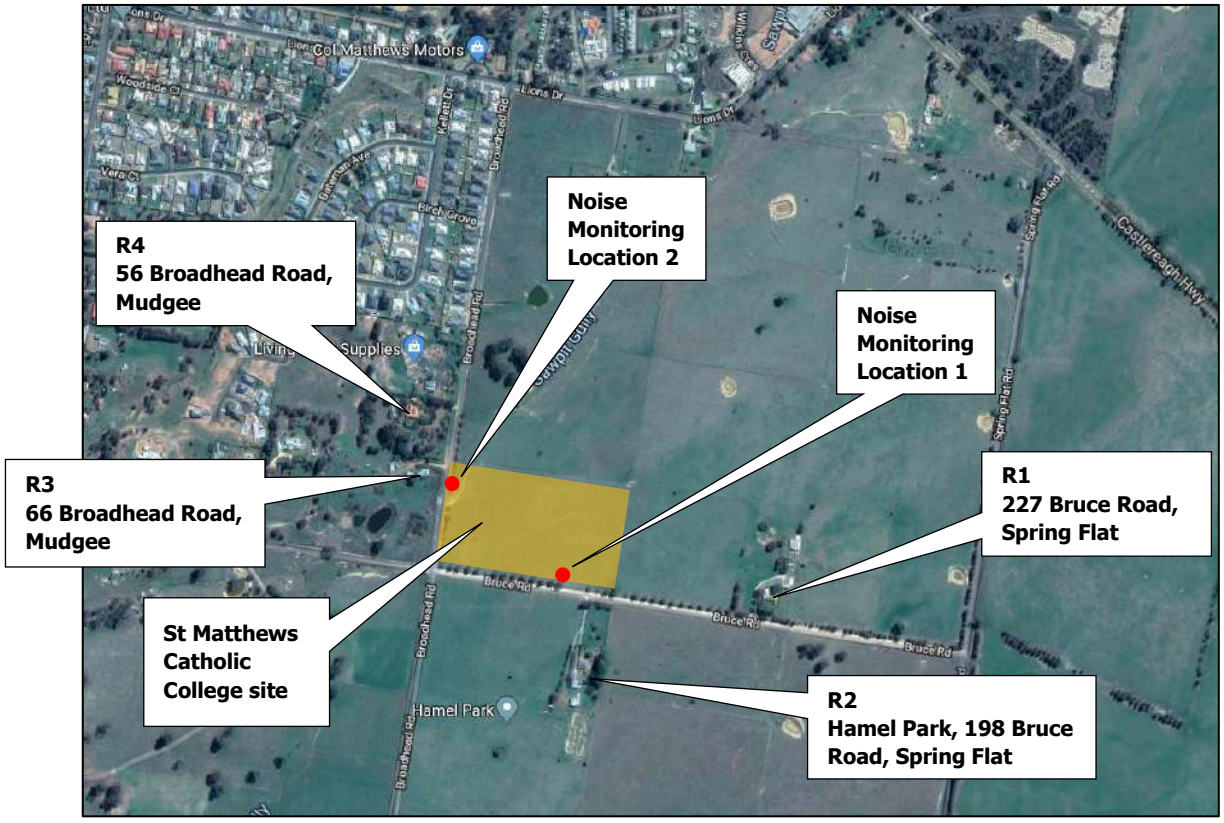
This report presents the assessment methodology, regulatory criteria relevant to operational, construction and road traffic noise and vibration. Where required, recommendations have been included to ensure operations do not result in any adverse noise impacts upon surrounding occupiers of land.

2 PROJECT OVERVIEW

2.1 Site Location

The Stage 1 development of St Matthews Catholic College will involve the construction of new school buildings and outdoor play/sports facilities to accommodate students from Years 7 to 12 on the site known as Lot 40 DP 756894 – 48 Broadhead Road, Spring Flat (Mudgee). The site location is shown in Figure 2-1.

Figure 2-1 Site Location



Aerial image courtesy of ©2019 Google

The proposed secondary College campus will be located on the north-eastern corner of the intersection of Broadhead Road and Bruce Road.

Surrounding land occupancy is primarily rural residential. The nearest residences to the future College are shown on Figure 2-1 as follows:

- R1 227 Bruce Road, Spring Flat (east);
- R2 Hamel Park 198 Bruce Road, Spring Flat (south);
- R3 66 Broadhead Road, Mudgee (west); and
- R4 56 Broadhead Road, Mudgee (north west).

2.2 Proposed Development

The SSD DA seeks consent for the construction of a new multi-purpose secondary education facility within the Mudgee Region that meets future demands for the developing region.

The new secondary school to be known as St Matthews Catholic High School Mudgee School will cater for 680 secondary school students (4-Stream Year 7-12) and will comprise of a cluster of five low-rise school buildings (1-2 storeys) including:

- Block A - Professional Hub (office and administration)
- Block B - Spiritual Hub (Chapel)
- Block C - Community Hub (Multi purpose hall, Music/Dance Studio and canteen)
- Block D – STEM Research Hub (teaching spaces)
- Block E - Knowledge and Learning Hubs (General Teaching spaces)
- Yarning Circle (Outdoor learning area)
- Outdoor Student Assembly Area and COLA
- Student free play area
- Staff and student amenities
- Associated site landscaping and public domain improvements
- On-site parking and access arrangements off Bruce Road, including:
    - On-grade car park for staff, students and visitors (75 spaces – including 2 accessible spaces)
    - A 12 bay student drop-off and pick-up area
    - A 3-bay bus drop-off and layover area
    - Bus turning area and servicing access
    - Dedicated separate driveway for service vehicles
    - Bicycle parking for 30 bicycles
- Associated earthworks, civil works, perimeter roadworks, fencing, services and utilities connections and augmentation, including:
    - Roadworks to Broadhead Road and Bruce Road to the full extent of the site frontages
    - Roadworks to the Broadhead Road and Bruce Road intersection to cater for bus movements
    - Footpath along the site frontage of Broadhead Road and suitable pedestrian crossing to connect to existing footpath.
    - Stormwater infrastructure upgrades adjacent to and within the site, including new culverts and drains, levee, and bioswale.
    - Connection to existing sewer line within the site
    - Electrical and water connections into the site.

The College campus will operate during normal school hours. After-hours access for outside community groups will be available for facilities in the Block C and Block D. Organisations permitted to use the school facilities will meet the requirements of the SEPP *(Education Establishment and Child Care Facilities)* 2017 (Education SEPP). Community use will be subject to the approved hours of operation. Hours of operations will be from 7.00am to 10.00pm when activities will cease.

The proposed floor plans for the educational development are included in **Appendix A**.

This assessment considers noise emissions associated with the development, and their potential impact on nearby residences, including:

- Noise and vibration generated during construction works;
- Noise from mechanical plant associated with the new buildings;
- Noise from activities and operations associated with the new buildings and facilities at the school including vehicular movements; and
- Road traffic noise generation.

3 EXISTING NOISE ENVIRONMENT

3.1 Ambient Noise Survey

In order to quantify the existing ambient noise environment of the area, noise monitoring was conducted at two locations on the site (refer Figure 2-1) as follows:

Location 1 Southern site boundary –opposite Hamel Park 198 Bruce Road, Spring Flat

Location 2 Western site boundary – opposite 66 Broadhead Road, Mudgee

Unattended environmental noise monitoring was conducted between Tuesday 14 May 2019 to Thursday 23 May 2019.

Instrumentation for the survey comprised an ARL Ngara and Type 316 Environmental Noise Loggers (serial numbers 8780F2 and 16-707-014, respectively) both fitted with microphone and windshield and set to A-weighted and fast response. Calibration of the loggers was checked prior to and following measurements. Drift in calibration did not exceed ±0.5 dBA. All equipment carried appropriate and current NATA (or manufacturer) calibration certificates.

The loggers continuously sampled noise levels over the entire survey period, and calculated relevant statistical indices for each 15-minute interval. All measurements were undertaken in general accordance with AS 1055:2018: *Acoustics – Description and Measurement of Environmental Noise* and the NSW EPA's *Noise Policy for Industry* (*NPfI*). Data measured during periods of adverse weather, established through consultation with historical weather reports provided by the Bureau of Meteorology (BOM), has been excluded. The survey results are included in **Appendix B**.

3.2 Noise Monitoring Results

To determine the project specific criteria on which to base assessment of operational noise emissions, the measured data was processed according to the NSW Environment Protection Authority's (EPA) *Noise Policy for Industry* (NPfI) assessment time periods. Table 3-1 details the RBL (background) noise levels and the L_{Aeq} noise levels recorded during the daytime, evening and night-time periods.

Table 3-1 Measured Ambient Noise Levels

Monitoring Location	Noise Level – dBA re 20 µPa					
	Daytime 7:00am – 6:00pm		Evening 6:00pm – 10:00pm		Night-time 10:00pm – 7:00am	
	RBL [1]	L_{Aeq} [2]	RBL	L_{Aeq}	RBL	L_{Aeq}
Location 1, Bruce Road	29	56	28	50	24	49
Location 2, Broadhead Road	29	54	31	50	21	45

Note 1: The RBL noise level is representative of the average minimum background sound level (in the absence of the source under consideration), or simply the background level.

Note 2: The LAeq is essentially the average sound level. It is defined as the steady sound level that contains the same amount of acoustical energy as a given time-varying sound.

The monitoring results have also been processed in accordance with the NSW *Road Noise Policy* (RNP) time periods to determine the daytime and night-time levels of road traffic noise. Table 3-2 details the $L_{Aeq(15hour)}$ daytime and the $L_{Aeq(9hour)}$ night-time noise levels recorded during the survey.

Table 3-2 Measured Road Traffic Noise Levels

Monitoring Location	Noise Level - dBA re 20 µPa	
	$L_{Aeq(15hour)}$	$L_{Aeq(9hour)}$
Location 1, Bruce Road	55	49
Location 2, Broadhead Road	53	44

4 CONSTRUCTION NOISE & VIBRATION

This section of the assessment relates to typical construction activities expected to occur during development works on the site, and their impact on the surrounding residential receivers.

4.1 Construction Noise Criteria – Residential Receivers

The following sections detail the applicable site-specific noise and vibration criteria based on the EPA's *Interim Construction Noise Guideline*.

4.1.1 Construction Noise Management Levels

The EPA released the "*Interim Construction Noise Guideline*" *(ICNG)* in July 2009. The guideline provides noise goals that assist in assessing the impact of construction noise.

For residences, the basic daytime construction noise goal is that the $L_{Aeq,15min}$ noise management level should not exceed the background noise by more than 10dBA. This applies to construction works conducted during standard hours which are defined as Monday to Friday 7.00am-6.00pm, and Saturday 8.00am-1.00pm. Outside the standard hours, where construction is justified, the noise management level applicable is background + 5dBA. Table 4-1 details the *ICNG* noise management levels.

Table 4-1 Construction Noise Management Levels at Residences using Quantitative Assessment

Time of Day	Management Level $L_{Aeq,(15min)}$	How to Apply
Recommended Standard Hours: Monday to Friday 7am to 6pm Saturday 8am to 1pm No work on Sundays or Public Holidays	Noise affected RBL + 10dBA	The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured $L_{Aeq,(15min)}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to minimise noise. The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75dBA	The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the proponent should consider very carefully if there is any other feasible and reasonable way to reduce noise to below this level. If no quieter work method is feasible and reasonable, and the works proceed, the proponent should communicate with the impacted residents by clearly explaining the duration and noise level of the works, and by describing any respite periods that will be provided.

Time of Day	Management Level $L_{Aeq,(15min)}$	How to Apply
Outside recommended standard hours	Noise affected RBL + 5dB	A strong justification would typically be required for works outside the recommended standard hours. The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and noise is more than 5dB(A) above the noise affected level, the proponent should negotiate with the community. For guidance on negotiating agreements see section 7.2.2 of the guideline.

On the basis of the background noise logging results presented in Section 3.2 the noise management levels adopted for construction activities during standard hours at residential receivers are presented in Table 4-2. A minimum background level of 35dBA has been adopted for daytime, in accordance with NPfI convention.

Table 4-2 Standard Hours Construction Noise Management Level

Construction Noise Management Level $L_{Aeq,15\ min}$ (dBA)	Highly Noise-Affected Noise Level $L_{Aeq,15min}$ (dBA)
Day	
45	75

4.2 Hours of Operation

Construction works for this project will be undertaken during standard hours as follows:

- Monday to Friday 7.00am to 6.00pm
- Saturdays 8.00am to 1.00pm
- Sundays and Public Holidays No work

4.3 Vibration Criteria

Criteria for assessment of the effects of vibration on human comfort are set out in British Standard 6472-1992. Methods and criteria in that Standard are used to set "preferred" and "maximum" vibration levels in the document "*Assessing Vibration: A Technical Guideline*" (2006) produced by the NSW DECCW.

Acceptable values of human exposure to continuous vibration, such as that associated with drilling, are dependent on the time of day and the activity taking place in the occupied space (e.g. workshop, office, residence or a vibration-critical area). Guidance on preferred values for continuous vibration is set out in Table 4-3.

Table 4-3 Criteria for Exposure to Continuous Vibration

Place	Time	Peak Particle Velocity (mm/s)	
		Preferred	Maximum
Residences	Daytime	0.28	0.56
	Night time	0.20	0.40
Offices	Day or night time	0.56	1.1
Workshops	Day or night time	1.1	2.2

In the case of intermittent vibration, which is caused by plant such as rock breakers, the criteria are expressed as a Vibration Dose Value (VDV) and are presented in Table 4-4.

Table 4-4 Acceptable Vibration Dose Values for Intermittent Vibration ($m/s^{1.75}$)

Location	Daytime		Night Time	
	Preferred Value	Maximum Value	Preferred Value	Maximum Value
Critical areas	0.10	0.20	0.10	0.20
Residences	0.20	0.40	0.13	0.26
Offices, schools, educational institutions and places of worship	0.40	0.80	0.40	0.80
Workshops	0.80	1.60	0.80	1.60

Calculation of VDV requires knowledge of the number of events and their duration in the relevant time period.

4.3.1 Building Damage

In terms of the most recent relevant vibration damage objectives, Australian Standard AS 2187: Part 2-2006 *"Explosives – Storage and Use – Part 2: Use of Explosives"* recommends the frequency dependent guideline values and assessment methods given in BS 7385 Part 2-1993 *"Evaluation and measurement for vibration in buildings Part 2"*, as they "are applicable to Australian conditions".

The British Standard sets guide values for building vibration based on the lowest vibration levels above which damage has been credibly demonstrated. These levels are judged to give a minimum risk of vibration-induced damage, where minimal risk for a named effect is usually taken as a 95% probability of no effect.

The recommended limits (guide values) from BS7385 for transient vibration to ensure minimal risk of cosmetic damage to residential and industrial buildings are presented numerically in Table 4-5.

Table 4-5 Transient Vibration Guide Values – Minimal Risk of Cosmetic Damage

Type of Building	Peak Component Particle Velocity in Frequency Range of Predominant Pulse	
	4 Hz to 15 Hz	15 Hz and Above
Reinforced or framed structures Industrial and heavy commercial buildings	50mm/s at 4 Hz and above	N/A
Un-reinforced or light framed structures Residential or light commercial type buildings	15mm/s at 4 Hz increasing to 20mm/s at 15 Hz	20mm/s at 15 Hz increasing to 50mm/s at 40 Hz and above

The Standard states that the guide values in Table 4-5 relate predominantly to transient vibration which does not give rise to resonant responses in structures, and to low-rise buildings.

The British Standard goes on to state that *"Some data suggests that the probability of damage tends towards zero at 12.5 mm/s peak component particle velocity"*. In addition, a building of historical value should not (unless it is structurally unsound) be assumed to be more sensitive.

4.4 Construction Equipment & Noise Source Levels

Sound Power Levels (L_W) for typical construction plant are identified in Table 4-6. These L_w are based upon archival data from measurements at other similar construction sites.

Table 4-6 Typical Construction Plant Sound Levels

Plant	Sound Power Level L_w dBA	Source
Concrete Truck	107	DEFRA
Concrete Pump	103	DEFRA
Mobile Crane	99	DEFRA
Dump Truck	108	WM
Compressor	103	WM
Hand Tools	100	WM
Bulldozer (CAT D11)	113	WM
Auger Piling Rig	107	WM /DEFRA
Excavator (40t)	107	DEFRA/SLR

4.5 Construction Noise Predictions – Residential Receivers

Assessment of likely noise generation at surrounding receivers has been undertaken for the proposed construction works.

Site-related noise emissions were calculated addressing the following factors:

- Equipment sound level emissions and location;
- Receiver locations;
- Ground topography;
- Distance between source and receiver;
- Ground absorption;
- Atmospheric absorption.

Modelling of the noise levels potentially generated during the three major works stages as summarised in Table 4-7 has been conducted using the computer program, CadnaA. This noise modelling software enables calculations to be performed using various recognised algorithms taking into account noise generated at the source, attenuation with distance and any shielding provided by intervening topography or structures. Modelling of construction noise was carried out in accordance with ISO 9613.1 procedures.

Table 4-7 Construction Works Scenarios

Stage	Description	Works
1	Bulk Excavation	Site preparation and excavation – mainly using excavators with dozers. Truck movements.
2	Building Construction	Bored piling, concreting and lifting. Bored piling rig, concrete pump & boom, compressor, crane are assumed to operate continuously over 15 minutes. Also, concrete trucks and normal delivery trucks.
3	Facade / Fitout	In the event that the construction of the facade occurs in isolation. Mobile crane and power tools assumed.

Calculations have been conducted for each stage with plant operating in "worst case" and "typical" locations across the construction site.

In all instances it has been assumed plant operates continuously and simultaneously. As such, predictions represent the noise levels that would likely occur during intensive periods of construction. The resulting noise levels can be considered in the upper range expected at surrounding receivers throughout the course of construction works.

The results of construction noise modelling are shown in Table 4-8. Exceedances of the NML (45dBA) are listed applicable to works during recommended standard hours. No exceedances of the "Highly Noise-Affected" 75dBA limit were identified.

Table 4-8 Predicted Construction Noise Levels at Residences – $L_{Aeq(15\ min)}$ – dBA

R1 227 Bruce Road, Spring Flat						
Stage	**Activities**	**Total L_w dBA**	**Maximum Noise Level**		**Exceedance NML**	
			Closest	**Typical**	**Closest**	**Typical**
1	Site Preparation and Excavation	118	48	47	+3	+2
2	Building Construction	115	44	43	0	0
3	Facade/Fitout	106	36	34	0	0
R2 Hamel Park, 198 Bruce Road, Spring Flat						
Stage	**Activities**	**Total L_w dBA**	**Maximum Noise Level**		**Exceedance NML**	
			Closest	**Typical**	**Closest**	**Typical**
1	Site Preparation and Excavation	118	52	51	+7	+6
2	Building Construction	115	49	48	+4	+3
3	Facade/Fitout	106	41	39	0	0
R3 66 Broadhead Road, Mudgee						
Stage	**Activities**	**Total L_w dBA**	**Maximum Noise Level**		**Exceedance NML**	
			Closest	**Typical**	**Closest**	**Typical**
1	Site Preparation and Excavation	118	57	55	+12	+10
2	Building Construction	115	54	51	+9	+6
3	Facade/Fitout	106	47	42	+2	0
R4 56 Broadhead Road, Mudgee						
Stage	**Activities**	**Total L_w dBA**	**Maximum Noise Level**		**Exceedance NML**	
			Closest	**Typical**	**Closest**	**Typical**
1	Site Preparation and Excavation	118	53	52	+8	+7
2	Building Construction	115	50	48	+5	+3
3	Facade/Fitout	106	42	39	0	0

4.5.1 Discussion of Results

A review of the predicted noise level range indicates maximum exceedances of up to 12dBA may occur during site preparation and excavation works. This exceedance is not unusual for construction works in a relatively quiet areas and can be mitigated by the construction noise management procedures detailed in the following sections. The maximum levels predicted are consistent with typical existing L_{Aeq} noise levels measured. The resultant noise levels within surrounding residences would not be likely to adversely impact upon normal daytime residential activities.

The adoption of reasonable and feasible noise management and mitigation is recommended. These measures should be determined in detail when a contractor, with defined construction techniques, has been engaged on the project. However, "in-principle" mitigation measures are detailed in the following sections.

4.6 Construction Vibration Assessment

Given the likely construction methodology involved and the distance between works and the closest surrounding residential and associated structures, ground vibration is not considered to be a potential issue.

Table 4-10 sets out the typical ground vibration levels at various distances for safe working distances. On review of the site layout and surrounding receivers, the minimum distance between any potentially vibration generating activities and surrounding residences will be a minimum of 100 metres. Safe working distances will be achieved and no further assessment of vibration is warranted.

Table 4-10 Recommended Safe Working Distances for Vibration-Intensive Plant

Item	Description	Safe Working Distance	
		Cosmetic Damage	Human Response
Pile Boring	≤ 800mm diameter	2m (nominal)	N/A
Jackhammer	Hand held	1m (nominal)	Avoid contact with structure

4.7 Construction Noise & Vibration Mitigation Measures

When operating in closest proximity to the surrounding residential properties, noise levels from construction works are likely, at times, to exceed the applicable noise management levels. Noise control measures are recommended to ensure that noise is minimised where feasible and reasonable.

The following project-specific mitigation measures should be adopted:

- Selection of quietest feasible construction equipment;
- Use of rock saws and ripping in preference to rock breakers if rock removal is required (unlikely);
- Localised treatment, such as barriers, shrouds and the like around fixed plant, such as pumps and generators; and
- Provision of respite periods, particularly on Saturdays.

In addition, the following measures should be included in a Noise and Vibration Management Plan.

- *Plant Noise Audit* – Noise emission levels of all critical items of mobile plant and equipment should be checked for compliance with noise limits appropriate to those items prior to the equipment going into service. To this end, testing should be established with the Contractor.
- *Operator Instruction* – Operators should be trained to raise their awareness of potential noise problems and to increase their use of techniques to minimise noise emission.
- *Equipment Selection* – All fixed plant at the work sites should be appropriately selected, and where necessary, fitted with attenuators, acoustical enclosures and other noise attenuation measures to ensure that the total noise emission from each work site complies with EPA guidelines.
- *Site Noise Planning* – Where practical, the layout and positioning of noise-producing plant and activities should be optimised to minimise noise emission levels.

Adoption of these measures is aimed at working towards achieving the noise management levels established at surrounding receivers.

4.8 Community Liaison & General Approaches to Mitigation

An effective community relations programme should be put in place to keep the surrounding community informed of work progress, and to forewarn potentially affected receivers (e.g. by letterbox drop, meetings with surrounding owners / tenants, etc.) of any anticipated changes in noise and vibration emissions prior to critical stages of the works, and to explain complaint procedures and response mechanisms. This programme should include a *Community and Stakeholder Engagement Strategy* developed specifically for the Project.

Close liaison should be maintained between the residents surrounding the site and the parties associated with the construction works to provide effective feedback in regard to perceived emissions. In this manner, equipment selections and work activities can be coordinated where necessary to minimise disturbance to the neighbouring community, and to ensure prompt response to complaints, should they occur.

4.9 Noise & Vibration Management Plan

A Construction Noise and Vibration Management Plan should be prepared and implemented by the Contractor. The plan should reference the findings of this assessment. Areas to be addressed in plan include:

- Noise and vibration mitigation measures;
- Noise and vibration monitoring;
- Response to complaints**;**
- Responsibilities;
- Monitoring of noise emissions from plant items;
- Reporting and record keeping;
- Non-compliance and corrective action; and
- Community consultation and complaint handling.

5 OPERATIONAL NOISE ASSESSMENT

5.1 Assessment Criteria

5.1.1 Operational Noise Emissions

Operational noise may be generated by the following:

- Mechanical services plant;
- Teaching and practical activities, particularly (timber and metal) technology workshops and performing arts;
- Services in the Chapel;
- School announcements and bells;
- Sporting events and concerts in the Hall;
- Sporting activities in outdoor play areas.

Noise impact from the general operation of the proposed school development is to be assessed with respect to site-specific noise criteria based on ambient noise monitoring conducted at the site in accordance with the NSW *Noise Policy for Industry* (NPfI).

The NPfI is not intended to be applicable to schools, and there are no criteria specifically relating to noise emissions from primary and secondary schools. Some noise emissions will be consistent with those from industrial or commercial premises. These include external mechanical plant and activity-related noise generated during the use of such spaces as the hall, music facilities and performance spaces and industrial technology workshops. It is therefore reasonable and appropriate to consider these sources of noise in the context of the NPfI.

The NPfI recommends two noise criteria:

- Amenity Noise Level - 50dBA for a rural area during day and 45dBA during the evening, applying to the $L_{Aeq,11hour}$ and $L_{Aeq,4hour}$, respectively; and
- Intrusiveness Noise Level – Rating Background Level (RBL) plus 5dB, applying to the $L_{Aeq,15min}$ level.

Minimum RBLs apply in the NPfI, 35dBA for daytime and 30dBA for evening and night time periods.

Applying the NPfI guidelines, the project-specific goals for continuous operational noise emissions associated with the school facilities during the daytime and evening assessment periods at nearby residential receivers is shown in Table 5-1. The project noise trigger levels, being the lower of either the intrusiveness or amenity noise levels, are shown in bold.

The project-specific goals for continuous operational noise emissions associated with the school facilities are shown in bold in Table 5-1. Note that intrusiveness noise levels are evaluated over a 15-minute period, while amenity noise levels are evaluated over an entire day, evening or night period. As industrial noise sources do not determine (or influence) the existing ambient noise levels in the immediate area, and future development would be predominantly residential, it is appropriate to use the 'recommended amenity noise levels' specified in the NPfI for a rural area as the project amenity noise level for the development.

Table 5-1 Project Noise Trigger Levels for Continuous Operational Noise

Location	Area Classification	Period	ANL [1] $L_{Aeq(period)}$ dBA	RBL [2] $L_{A90(15min)}$ dBA	$L_{Aeq\ (period)}$ Noise Level dBA	Project Noise Level	
						Intrusive[4] $L_{Aeq(15min)}$	Amenity[5] $L_{Aeq\ (15min)}$
Bruce Road Residences	Rural	Day	50	35	56	**40**	53
		Evening	45	30	50	**35**	48
		Night	40	30	49	**35**	43
Broadhead Road Residences	Rural	Day	50	35	54	**40**	53
		Evening	45	30[3]	50	**35**	48
		Night	40	30	45	**35**	43

Note 1: Recommended - ANL Amenity Noise Level.
Note 2: RBL Rating Background Level. Actual RBLs are below assumed policy minimums; therefore assumed minimums are adopted.
Note 3: Where the measured RBL for the evening period is higher than the daytime RBL, the project intrusiveness level for evening is to be set at no greater than the project intrusiveness noise level for daytime.
Note 4: Intrusive criterion only applicable to residential receivers.
Note 5: Project amenity noise level (ANL) is rural ANL plus 3dBA to convert from a period level to a 15-minute level.

5.1.2 Road Traffic Noise

The *NSW Road Noise Policy* (2011) was released by the EPA to replace the *Environmental criteria for road traffic noise* (1999) from 1 July 2011. The key provisions of the policy are an emphasis on the use of land use planning, better road design and vehicle noise emission control to avoid or minimise road traffic noise impacts. The assessment criteria for residences potentially affected by additional traffic generated by land use developments on arterial, sub-arterial and local roads are summarised in Table 5-2.

Table 5-2 Road Traffic Noise Assessment Criteria for Residential Land Uses

Road Category	Type of Development	Assessment Criteria – dBA	
		Day (7am-10pm)	**Night (10pm-7am)**
Freeway/arterial/sub-arterial roads	Existing residences affected by **additional traffic** on existing freeways/arterial/sub-arterial roads generated by land use developments	$L_{Aeq,15hr}$, 60 (external)	$L_{Aeq,9hr}$ 55 (external)
	Relative Increase Criteria	Existing traffic $L_{Aeq,15hr}$ + 12 dB (external)	Existing traffic $L_{Aeq,9hr}$ + 12 dB (external)
Local roads	Existing residences affected by **additional traffic** on existing local roads generated by land use developments	$L_{Aeq,(1hour)}$ 55 (external)	$L_{Aeq,(1hour)}$ 50 (external)

Where predicted noise levels exceed the project-specific noise criteria, an assessment of all feasible and reasonable mitigation options should be considered. The *RNP* states that *an increase of up to 2 dB represents a minor impact that is considered barely perceptible to the average person*.

5.2 Operational Noise Assessment

5.2.1 Mechanical Services

The noise emission of any mechanical plant associated with the proposed new buildings should be controlled so that the operation of such plant does not adversely impact upon surrounding residential properties. Air-conditioning will be provided throughout the general school with localised plantrooms and use of roof-mounted plant as required. Given the distance from the proposed campus buildings, Blocks A, B C D and E to surrounding residential properties, operational noise emissions from HVAC plant would achieve design limits at surrounding residential receivers.

Exhaust fans and dust extraction systems will likely be required for the TAS Food Technology and TAS Block D rooms.

Mechanical plant selection and location will be finalised during the detailed design phase. At this stage, potentially noise generating equipment will be examined to ensure compliance with the project noise trigger levels for mechanical noise emissions both to surrounding residential properties and at sensitive receiver locations within the College itself.

5.2.2 Classroom/Activities

Generally, it is anticipated that the noise levels throughout the secondary school general learning spaces, collaboration and collaborative teaching spaces, laboratories and passive social space will be relatively low. The technology-related workshops, performing arts, music rooms and multi-purpose hall are more likely to result in audible noise emissions.

Modelling to determine the indicative levels of noise received at surrounding residential properties due to activities typically conducted within these spaces has been conducted using the computer program, CadnaA.

5.2.3 Chapel

Liturgical services held in the Chapel may potentially contribute noise emissions to surrounding residential receivers. A worst-case acoustical scenario would involve the use of music with school congregation singing. The assumed reverberant sound pressure level within the space in this scenario is 90dBA (based upon a sound power level L_w 105dBA).

Modelling has been conducted for potentially worst-case emissions with operable doors open. The predicted results, together with the relevant assessment criteria, are shown in Table 5-3.

Table 5-3 Predicted Noise Emissions – Chapel

Receiver	Predicted Noise Level $L_{Aeq,15min}$ dBA	Noise Trigger Limit $L_{Aeq,15min}$ dBA Day[1]	Noise Trigger Limit $L_{Aeq,15min}$ dBA Evening[2]	Complies
R1 227 Bruce Road, Spring Flat	7	40	35	Yes
R2 Hamel Park, 198 Bruce Road, Spring Flat	13	40	35	Yes
R3 66 Broadhead Road, Mudgee	20	40	35	Yes
R4 56 Broadhead Road, Mudgee	17	40	35	Yes

Note 1: Daytime is 7.00am to 6.00pm.
Note 2: Evening is 6.00pm to 10.00pm

These levels comply with the criteria applicable to operational noise during normal school and out of hours use.

5.2.4 Multi-purpose Hall

The multi-purpose hall building is located in the middle of Block C, with Food Technology and Hospitality on the eastern side and Performing Arts on the western side. The proposed building construction comprises a combination of fibre cement and metal sheet cladding with entry doors on the northern elevation and louvres at high level on the southern elevation.

Since the building will function as both a gymnasium and auditorium, noise will be generated by sporting activities, performances and presentations.

In sports mode, the highest noise-generating usage would likely be associated with competitive basketball games. An L_{Aeq} over 15 minutes of around 84dBA (reverberant sound pressure level) is typical during normal school basketball games, which includes the use of whistles.

When operating in event mode, the worst-case acoustical scenario would involve the use of amplified or live music. The assumed reverberant sound pressure level within the space in this scenario is 90dBA (based upon a sound power level L_w 115dBA).

Modelling has been conducted for potentially worst-case emissions with entry doors open. The predicted results, together with the relevant assessment criteria, are shown in Table 5-4.

Table 5-4 Predicted Noise Emissions – Multi-purpose Hall

Receiver	Predicted Noise Level $L_{Aeq,15min}$ dBA		Noise Trigger Limit $L_{Aeq,15min}$ dBA Day[1]	Noise Trigger Limit $L_{Aeq,15min}$ dBA Evening[2]	Complies
	Sports Mode	Event Mode			
R1 227 Bruce Road, Spring Flat	18	27	40	35	Yes
R2 Hamel Park, 198 Bruce Road, Spring Flat	27	34	40	35	Yes
R3 66 Broadhead Road, Mudgee	18	28	40	35	Yes
R4 56 Broadhead Road, Mudgee	21	29	40	35	Yes

Note 1: Daytime is 7.00am to 6.00pm.
Note 2: Evening is 6.00pm to 10.00pm.

The most stringent project-specific noise trigger limit for residential receivers is $L_{Aeq,15min}$ 35dBA assuming an evening (out of school hours 6.00pm – 10.00pm) event. Use of the multi-purpose hall in both event mode (worst case scenario) and sports mode, including community use, will achieve the project specific noise trigger limits for environmental noise emissions during all operational periods and also during out of hours use.

5.2.5 Performing Arts

The performing arts unit, located on the western side of the multi-purpose hall, includes a music facility with two individual music practice rooms and a drama studio. The school orchestra is expected to practise within the music room and modelling has assumed this as a worst-case scenario with a reverberant sound pressure level of up to 94dBA (based upon a sound power level L_w 107dBA) with a typical school band playing within the space. For the drama studio, a reverberant sound pressure level of 77dBA (based upon a sound power level L_w 89dBA) has been adopted as typical of pre-recorded amplified background music.

Modelling of noise emissions have assumed open windows and doors along the western elevation. The predicted results, together with the relevant assessment criteria, are shown in Table 5-5.

Table 5-5 Predicted Noise Emissions – Performing Arts

Receiver	Predicted Noise Level $L_{Aeq,15min}$ dBA		Noise Trigger Limit $L_{Aeq,15min}$ dBA Day[1]	Noise Trigger Limit $L_{Aeq,15min}$ dBA Evening[2]	Complies
	Music	Drama			
R1 227 Bruce Road, Spring Flat	13	<10	40	35	Yes
R2 Hamel Park, 198 Bruce Road, Spring Flat	21	<10	40	35	Yes
R3 66 Broadhead Road, Mudgee	27	<10	40	35	Yes
R4 56 Broadhead Road, Mudgee	25	<10	40	35	Yes

Note 1: Daytime is 7.00am to 6.00pm.
Note 2: Evening is 6.00pm to 10.00pm

These levels comply with the criteria applicable to operational noise during normal school and out of hours use.

5.2.6 TAS Timber and Metal Technology

Block D houses TAS Timber and Metal, TAS Science and Visual Arts. The Timber and Metal Technology facility is considered to be the only space of acoustic significance in Block D.

The proposed building construction comprises a combination of fibre cement and metal sheet cladding with windows and doors on the southern and eastern elevations.

Modelling of noise emissions has assumed open windows and doors. The predicted results, together with the relevant assessment criteria, are shown in Table 5-6.

Table 5-6 Predicted Noise Emissions – TAS Timber and Metal Technology

Receiver	Predicted Noise Level $L_{Aeq,15min}$ dBA	Noise Trigger Limit $L_{Aeq,15min}$ dBA Day[1]	Noise Trigger Limit $L_{Aeq,15min}$ dBA Evening[2]	Complies
R1 227 Bruce Road, Spring Flat	17	40	35	Yes
R2 Hamel Park, 198 Bruce Road, Spring Flat	25	40	35	Yes
R3 66 Broadhead Road, Mudgee	<10	40	35	Yes
R4 56 Broadhead Road, Mudgee	<10	40	35	Yes

Note 1: Daytime is 7.00am to 6.00pm.
Note 2: Evening is 6.00pm to 10.00pm

These levels comply with the criteria applicable to operational noise during normal school and out of hours use.

5.2.7 Cumulative Operational Noise

Based upon the results of noise modelling, the cumulative noise levels at surrounding residential properties with all acoustically significant spaces functioning simultaneously are shown in Table 5-7. The overall levels have been predicted for both operational scenarios applicable to the multi-purpose hall.

Table 5-7 Cumulative Operational Noise from Classroom/Activities

Receiver	Predicted Noise Level $L_{Aeq,15min}$ dBA		Noise Trigger Limit $L_{Aeq,15min}$ dBA Day[1]	Noise Trigger Limit $L_{Aeq,15min}$ dBA Evening[2]	Complies
	Hall in Sports Mode	Hall in Event Mode			
R1 227 Bruce Road, Spring Flat	22	27	40	35	Yes
R2 Hamel Park, 198 Bruce Road, Spring Flat	30	35	40	35	Yes
R3 66 Broadhead Road, Mudgee	28	31	40	35	Yes
R4 56 Broadhead Road, Mudgee	27	31	40	35	Yes

Note 1: Daytime is 7.00am to 6.00pm.
Note 2: Evening is 6.00pm to 10.00pm

When all potentially acoustically significant spaces are simultaneously operational in worst-case operational scenarios (with windows and doors open), the criteria applicable to operational noise during normal school and out of hours use will be achieved at all surrounding residential properties.

5.2.8 School Announcements and Bells

Announcements and school bells are typical activities associated with school operations. Typically, these are produced by the school PA system and can vary significantly depending on the final volume settings of the system.

At this stage, no design of the PA system has been determined. However, the following measures should be adopted to ensure that their impact at all surrounding residences is minimised:

- Speakers should be located and orientated to provide good coverage of the school areas whilst being directed away from residences. System coverage should be reviewed during the detailed design stage.
- The volume of the system should be adjusted on site so that announcements and bells are clearly audible on the school site without being excessive. The system should initially be set so that noise at surrounding residences does not exceed 40dBA during the daytime period.
- Once the appropriate level has been determined on site, the system should be limited to the acceptable level so that staff cannot increase noise levels.
- The system bell should be set so that it only occurs on school days.

5.2.9 Carpark and Vehicular Movements

Noise emissions will be generated by vehicles entering and leaving the carpark and vehicle-related activities, such as opening and closing of doors, vehicles starting, manoeuvring and the like.

The site plan shows parking spaces for 75 vehicles to accommodate staff, senior students and visitors within the carpark area accessed directly from Bruce Road. The carpark will also include a student drop off/pickup zone along the northern perimeter comprising 12 marked bays to be used before and after school. A bus lay-by would be provided off Bruce Road to accommodate three buses at any one time.

Based on the traffic report prepared by The Transport Planning Partnership (TTPP, ref 18472 version 05, dated 26 March 2020), the summary of peak vehicle trip generation during morning and afternoon peak periods is shown in Table 5-8. Note that the trips associated with staff and senior students would generate a single movement whereas parental drop off and pickup would generate two vehicle movements (one "in" trip plus one "out" trip). This is accounted for in Table 5-8.

Table 5-8 Peak Vehicle Trips

Peak Period	Peak Period Vehicle Trips			
	Staff	Senior Students	Student Drop off/Pickup	Total
AM	47	18	315	380
PM	6	20	350	376

An $L_{Aeq,15min}$ sound power level per vehicle of 70dBA has been adopted for modelling purposes, based upon the BayLfU method (Bavarian State Agency for the Environment 2007) and the study results published by Ron Rumble Renzo Tonin (Acoustics, 2011) which established sound power levels of 63dBA/hour and 64dBA/hour (70dBA per 15 minutes), respectively for vehicular movements in carparks. According to the traffic assessment, the bulk of students would depart in the initial 15 minutes after school finishes in the afternoon with the remainder gradually leaving over the next 15 minutes or so.

Schools typically have a prominent afternoon peak period while the morning period tends to be more staggered across the hour. Therefore, the afternoon peak is considered as the 'worst-case' for assessment purposes. Accordingly, the total afternoon vehicle trips have been assumed to occur over a 30 minute period, rather than a 1 hour period (as for the morning peak), for the purposes of predicting noise emission associated with peak arrivals and departures.

The predicted $L_{Aeq,15min}$ noise levels during peak carpark operational periods are summarised in Table 5-9.

Table 5-9 Predicted $L_{Aeq,15min}$ Carpark Noise Levels

Receiver	Predicted $L_{Aeq,15min}$ dBA		Assessment Criterion $L_{Aeq,15min}$ dBA	Complies
	AM	PM		
R1 227 Bruce Road, Spring Flat	16	23	40	Yes
R2 Hamel Park, 198 Bruce Road, Spring Flat	23	30	40	Yes
R3 66 Broadhead Road, Mudgee	28	33	40	Yes
R4 56 Broadhead Road, Mudgee	24	29	40	Yes

From the results shown above, noise emissions due to carpark activity will comply with the applicable criterion for the assessment of continuous operational noise.

5.2.10 Outdoor Noise

Noise will be generated by students engaged in recreational activities for a short period prior to commencement of classes, during recess and lunch. The current proposal does not include any formal outdoor sporting fields however a student free play area has been assumed in the north-eastern area of the site with a smaller student assembly area located to the north of the Block C, in the area surrounded by the campus buildings.

Noise from school children engaged in outdoor play cannot be assessed in the same manner as noise generated by the use of learning facilities such as classrooms, technology workshops, gymnasium and hall. The EPA's *NPfI* has previously been referred to for the assessment of such classroom and activity noise emissions (and noise from mechanical plant) however, the policy does not present appropriate criteria for the assessment of noise from outdoor areas.

Schools traditionally form an essential part of all residential communities. Noise emissions from students engaged in active outdoor play are unlikely to achieve a "background + 5 dBA" criterion at the site boundary. This is common across all educational facilities, particularly if the students are located near the boundary, and is often the case, in close proximity to residences.

In general, the impact of outdoor activity noise from schools is considered to be sufficiently mitigated by the site zoning and the limited periods of outdoor recreational activities, that is during recess and lunch breaks and for a short time before school, occurring from Monday to Friday during the 40-week school year, and, as such, does not typically warrant quantitative assessment.

A guideline for the assessment of noise from child care centres has been prepared by the Association of Australasian Acoustical Consultants (AAAC) as a result of a NSW Australian Acoustical Society (AAS) Technical Meeting held in September 2007 on Child Care Noise. The document, *AAAC Guideline for Child Care Centre Acoustic Assessment*, *October 2013*, provides criteria for the assessment of noise associated with outdoor play. The guideline has been placed before the Land and Environment Court during matters involving Child Care Centre applications.

Since the time in which children are involved in outdoor play is limited, the potential impact associated with these noise emissions is minimised. The AAAC considers a total limit of 2 hours outdoor play per day at a child care facility reasonable to apply a criterion that the $L_{Aeq,15min}$ noise level emitted from the outdoor play area not exceed the background noise level by more than 10dB at the assessment location.

The 2-hour duration time limit applied by AAAC for child care centres should be viewed as a guideline rather than a set limit when applied to schools - *Best Western v Blacktown City Council* (2011). The time in which outdoor play can be expected throughout the school day would fall within this range and the 2-hour duration is considered reasonable as a practical guideline. A "background + 10dBA" criterion has also been applied to schools in other local government areas within the Sydney Metropolitan area.

In the case of *Al Faisal College Limited v Canterbury Bankstown Council* (2018), which involved the development of a new school, consistent with this application, whilst the Court accepted that the "background + 10dBA" approach may, be considered a 'datum' of acceptability when considering whether acoustical impacts arising from an educational establishment are reasonable in a merit assessment of the application, Commissioner Dixon found that this guideline was not intended to be directly applied to the assessment of noise from outdoor play at a school.

In the absence of any quantitative criterion for assessment of noise emissions from outdoor play, the "background + 10dBA" criterion will be applied as a 'yardstick' or 'datum' for determining the acceptability of noise from outdoor play at the proposed school.

Applying the AAAC guideline for the assessment of noise emissions from outdoor play, the relevant "guideline" limits are presented in Table 5-10.

Table 5-10 Emission Guidelines for Noise from Outdoor Play

Receiver Location	RBL [1] $L_{A90,(15min)}$ dBA	Emission Guideline $L_{Aeq,15min}$ dBA
Bruce Road and residences to south & east	35	45
Broadhead Road and residences to west & north	35	45

Note 1: A minimum background level of 35dBA has been adopted for daytime, in accordance with NPfI convention.

For prediction of noise emissions from outdoor play, students are assumed to be evenly distributed across the entire student free play and student assembly areas. For the purposes of modelling, we have divided the proposed total enrolment (680 students) equally across the six years (Years 7 to 12) and assumed that the junior students (Years 7 to 10) would occupy the larger student free play area and the senior students (Years 11 and 12) would occupy the student assembly area.

Based upon the results of previous measurements conducted by Wilkinson Murray of children engaged in outdoor play, an L_{Aeq} sound power level of 79dBA per student has been adopted. The sound power level (L_w) across each outdoor play area has been calculated according to the number of students (ie 453 students in the free play area and 226 students in the student assembly area).

The noise levels generated during outdoor play periods will vary according to the following factors:

- The number of students in the area – students will be spread around the outdoor play areas;
- The level of noise made by each student – this is obviously different from individual to individual, and various factors such as age, personality, mood, activity and countless other factors will play a part. The louder events are not capable of being sustained over an extended period; and
- The location of the students relevant to the residences – as the distance between the source and the receiver increases, the noise level at the receiver will decrease.

The predicted noise levels ($L_{Aeq, 15min}$) at the surrounding residential receivers, are shown in Table 5-11.

Table 5-11 Predicted $L_{Aeq15min}$ Noise Level from Outdoor Play

Receiver Location	Predicted $L_{Aeq15min}$ dBA	Emission Guideline $L_{Aeq,15min}$ dBA
R1 227 Bruce Road, Spring Flat	35	45
R2 Hamel Park, 198 Bruce Road, Spring Flat	38	45
R3 66 Broadhead Road, Mudgee	37	45
R4 56 Broadhead Road, Mudgee	36	45

Noise emissions associated with outdoor activities (school and community use) are expected to be generally within the range of background L_{A90} + 10dBA.

In order to minimise the potential impact at residences the following recommendations made:

- Restrict the use of outdoor play areas prior to 7.00am.
- Minimise PA use and ensure speakers are appropriately located and limited to achieve acceptable levels.
- The L_{Amax} noise level from the PA system operation shall not exceed 45 dBA at the nearest residential boundary.
- The PA system should use small low-powered horn-type speakers oriented in such a manner to fire away from residential premises.
- Speakers should be mounted at a downward angle of 45^{o} and as close to ground level as possible.
- Only nominated persons, trained in the appropriate use of the system, should be permitted to operate the PA system.
- A sound limiter is to be installed to ensure that the maximum limiting criterion at residential boundaries is not exceeded.

It is recommended that management of noise be included in any site management plan.

5.3 Road Traffic Noise

The roads surrounding the project site include local and state roads as follows:

Bruce Road is a local road running east-west along the southern boundary of the Project site. It is unsealed between Broadhead Road and Spring Flat Road. The speed limit is 50km/h.

Broadhead Road is a local road running north-south along the western boundary of the Project site. The speed limit is 50km/h.

Springflat Road is a local road running north-south that provided access to/from Castlereagh Highway to the north and surrounding primary production zones to the south. The speed limit is 100km/h.

Lions Drive is a local road running east-west with access to/from Castlereagh Highway.

Castlereagh Highway is a State classified road running northwest-southeast with a speed limit of 80km/h.

Traffic surveys were carried out in February 2019 to capture typical weekday traffic turning movement at key surrounding intersections. The peak hourly traffic flows on the surrounding roads has been determined based upon this count data as presented in the TTPP traffic impact assessment.

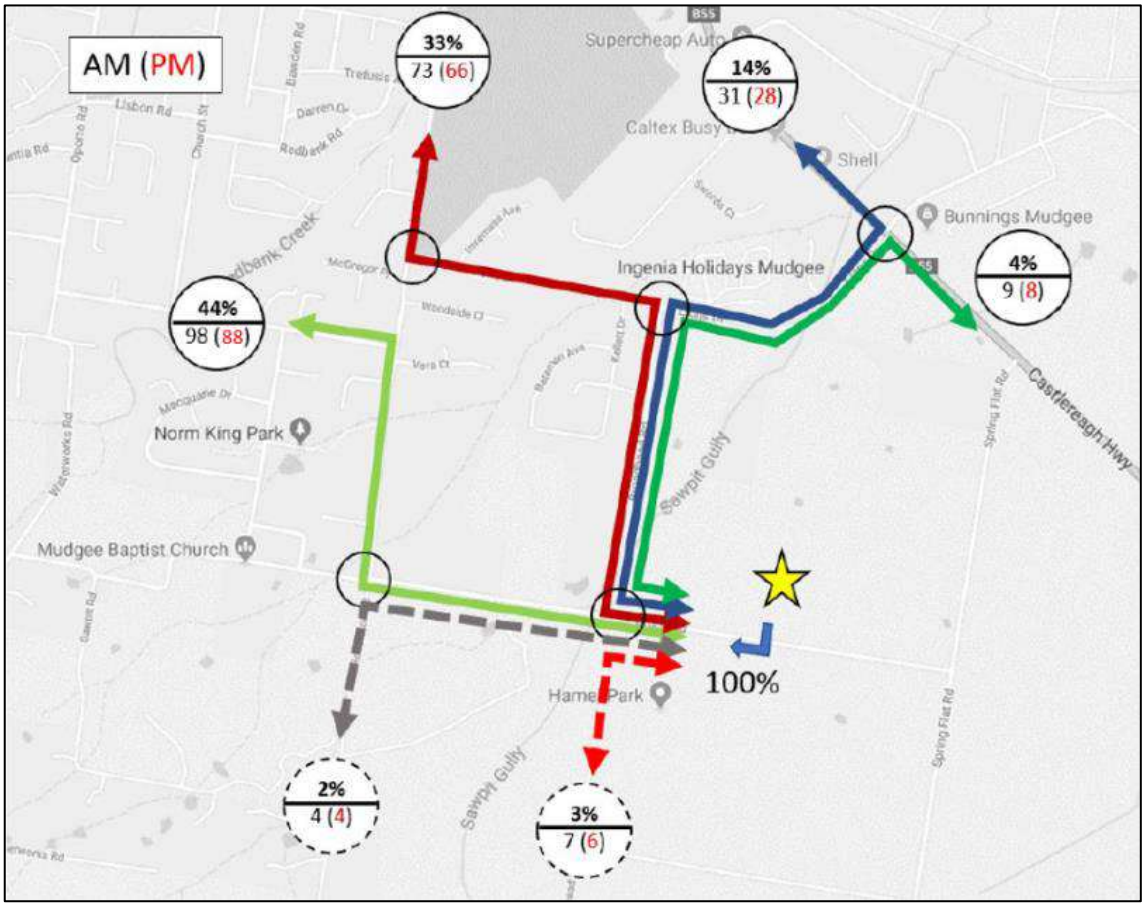
According to the traffic consultant's report, surrounding local roads mainly carry very low traffic numbers during the morning and afternoon (school) peak periods as summarised in Table 5-12.

Table 5-12 Traffic Volumes on Surrounding Road Network

Road	Vehicles during AM Peak	Vehicles during PM Peak
Bruce Road between Springflat Road and Broadhead Road	8	9
Bruce Road between Broadhead Road and Robertson Road	15	15
Broadhead Road between Lions Drive and Bruce Road	43	42
Lions Drive between Castlereagh Highway and Broadhead Road	281	254
Springflat Road between Castlereagh Highway and Bruce Road	25	22
Springflat Road south of Bruce Road	34	20

With the 380 and 376 vehicle trips generated by the Project during the morning and afternoon peak periods, respectively, a considerable increase in traffic volumes on local roads immediately surrounding the Project site will be experienced. The TTPP traffic assessment includes projected future traffic distribution based on the location of high school students' residences. These are generally concentrated within the Mudgee township and to the northwest of the Project site. Future trip distribution has recognised there is likely to be residential development across surrounding vacant lots and a conservative growth rate has been adopted, applying a 2% trip proportion to streets which lead to the southwest. The future trip distribution is shown in Figure 5-1.

Figure 5-1 Future Vehicle Trip Distribution



Source: Transport Planning Partnership *St Matthews High School, Mudgee Traffic, Parking and Transport Impact Assessment* (TTPP, ref 18472 version 05, dated 26 March 2020)

The expected noise levels at surrounding representative receiver locations due to Project-generated traffic have been predicted using the Calculation of Road Traffic Noise 1988 (CoRTN) procedure and based upon the future trip distributions shown in Figure 5-1. The predicted noise levels are shown in Table 5-13.

Table 5-13 Predicted Road Traffic Noise at Residences

Receiver Location	Predicted $L_{Aeq,1hr}$ Traffic Noise Level dBA	Criterion $L_{Aeq,1hr}$ dBA	Complies
	AM/PM Peak		
R1 227 Bruce Road, Spring Flat	37	55	Yes
R2 Hamel Park, 198 Bruce Road, Spring Flat	48	55	Yes
R3 66 Broadhead Road, Mudgee	55	55	Yes
R4 56 Broadhead Road, Mudgee	51	55	Yes
119 Bruce Road, Mudgee (west of Broadhead Road)	55	55	Yes

The predicted noise levels at existing residences affected by additional traffic on existing local roads generated as a result of the Project will achieve the RNP recommended limit for daytime.

6 CONCLUSION

An assessment of the noise and vibration impacts associated with the development of the St Matthews Catholic College, Mudgee has been conducted. This assessment has been carried out in accordance with NSW regulatory requirements and this report is forms part of the EIS submission to the NSW Department of Planning, Industry and Environment.

The scope of the assessment involved a survey of the existing noise environment; derivation and establishment of assessment criteria for noise emissions; a noise impact assessment relative to appropriate criteria; and recommendations for measures to minimise the potential for disturbance to surrounding residents. The findings are as follows:

Construction Noise and Vibration

No detailed construction plan or schedule is available at this stage of the project, therefore prediction of construction noise levels should be regarded as indicative. Three work stage scenarios have been considered, with an overall sound power level adopted for each based upon the likely plant operating throughout. Predictions for surrounding residential receivers have been carried out assuming the concurrent operation of all plant at worst case (closest) and typical locations.

The NMLs at nearby residential receivers can be expected to be exceeded, at times significantly, mainly during periods of intensive high noise level works associated with site preparation excavation and to a lesser extent during building construction involving bored piling, concrete pours and the like. During general construction works, for example facade and fitout, the NMLs would be generally achieved at all surrounding receivers.

Throughout the noisier work periods adoption of reasonable and feasible noise management and mitigation will be required to minimise impact at residences.

A Construction Noise Management Plan, to be implemented by the Contractor, should be prepared. This plan should clearly identify the strategies to be put in place to minimise potentially adverse noise impacts upon the surrounding community.

Vibration is unlikely to be an impact given the distances between surrounding receivers and plant exceed those recommended for safe work in terms of structural damage and human response.

Operational Noise

The predominant sources of potential operational noise were identified as the Chapel, multi-purpose hall, performing arts facilities (music and drama), TAS Timber and Metal technology workshop and future mechanical plant. The noise level emissions from assumed worst-case operational scenarios of the future potentially noise-generating activity/teaching spaces have been predicted to the nearest surrounding residential receivers.

The results of calculations of continuous operational noise sources were compared with design goals for environmental noise, determined in accordance with State Government guidelines. All relevant criteria can be achieved by the development. Detailed mechanical plant selection will take place during the detailed design phase. Acceptable noise levels due to plant operation are likely to be achieved given the location of plant within services zones and the distance between

plant locations and receivers. Further assessment should be carried out to confirm compliance when detailed mechanical services design and plant selection becomes available.

Noise from outdoor activities held on the site (school and community use) are expected to generally achieve a L_{A90} background + 10dBA emission 'guideline'. Operation of outdoor areas should be managed to minimise noise emissions to nearby residences by measures such as restricting use prior to 7.00am and limiting the use of whistles and PA system (where feasible).

Road Traffic Noise

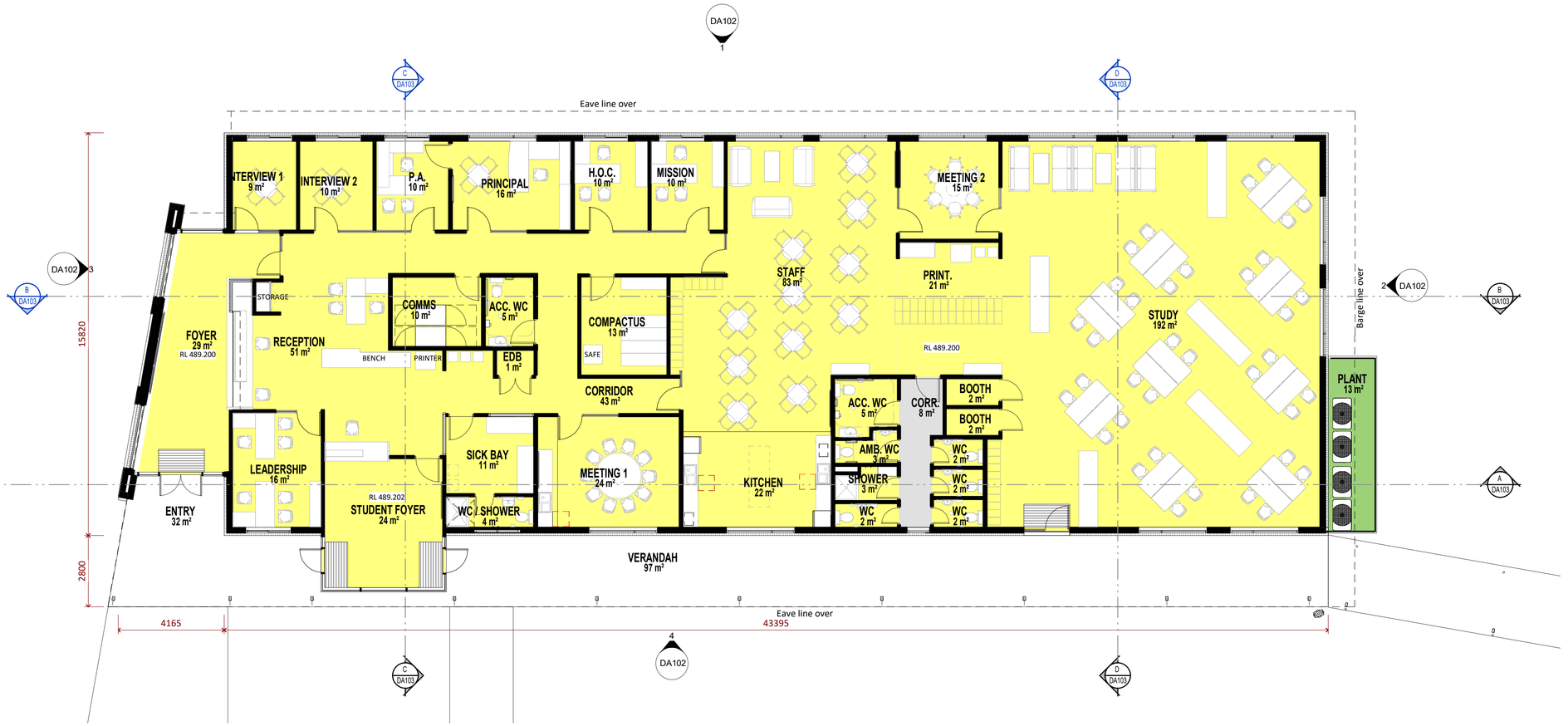
Road traffic generated by the development will comply with the NSW *Road Noise Policy* (RNP) guidelines at all surrounding receivers.

APPENDIX A

PROJECT PLANS

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keyplan



- Administration
- Building Services
- Chapel
- Enclosed Circulation
- GLA-Secondary
- Multi-Purpose Hall
- Performing Arts
- Pupil Facilites
- Resource Centre
- TAS
- TAS Science
- TAS-Food Technology
- Visual Arts

Administration

Name	Area
ACC. WC	5 m²
ACC. WC	5 m²
AMB. WC	3 m²
BOOTH	2 m²
BOOTH	2 m²
COMMS	10 m²
COMPACTUS	13 m²
CORRIDOR	43 m²
EDB	1 m²
FOYER	29 m²
H.O.C.	10 m²
INTERVIEW 1	9 m²
INTERVIEW 2	10 m²
KITCHEN	22 m²
LEADERSHIP	16 m²
MEETING 1	24 m²
MEETING 2	15 m²
MISSION	10 m²
P.A.	10 m²
PRINCIPAL	16 m²
PRINT.	21 m²
RECEPTION	51 m²
SHOWER	3 m²
SICK BAY	11 m²
STAFF	83 m²
STUDENT FOYER	24 m²
STUDY	192 m²
WC	2 m²
WC	2 m²
WC	2 m²
WC	2 m²
WC / SHOWER	4 m²
Grand total area	654 m²

SSDA Issue, Legend Updated	BLC	03.04.20	16
SSDA Issue, levels adjusted, dims added	BLC	01.04.20	15
GA NSW Issue	BLC	20.03.20	14
Preliminary SSDA Review	BLC	28.02.20	13
Block A Draft Single Storey	BLC	21.01.20	12
Design Development Sign off	CG	21.10.19	11
Access adjust, dis car added	BLC	31.07.19	10
SSDA Documentation 90% Completion	DO	03.06.19	9
Carpark, paths, Block B Adjusted	BLC	22.05.19	8
Client Workshop Presentation	BLC	14.05.19	7
purpose of issue	by	date	issue no.

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TSA MANAGEMENT

project

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address

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Lot 40 of DP 756894

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BLOCK A - PLANS

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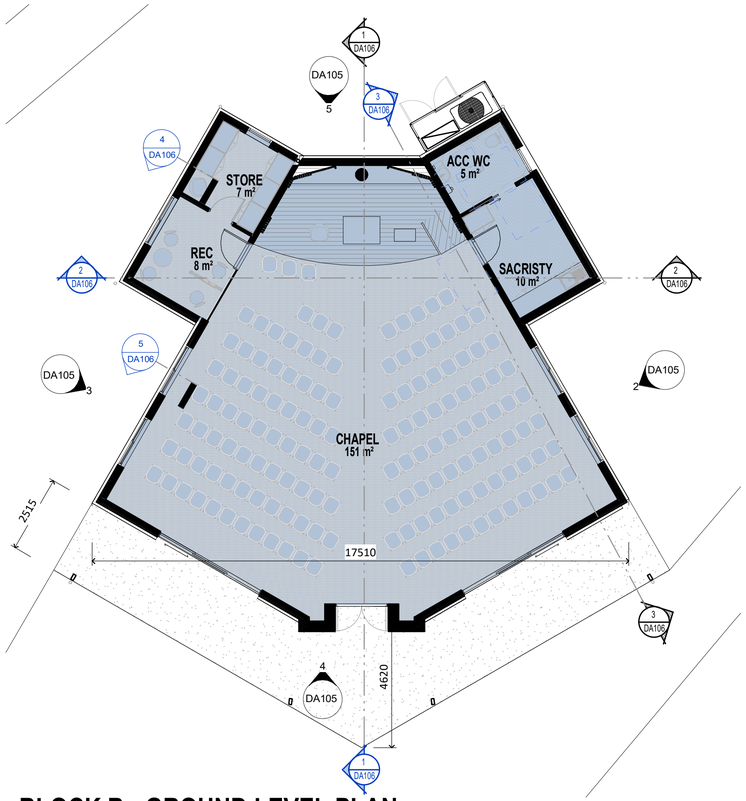
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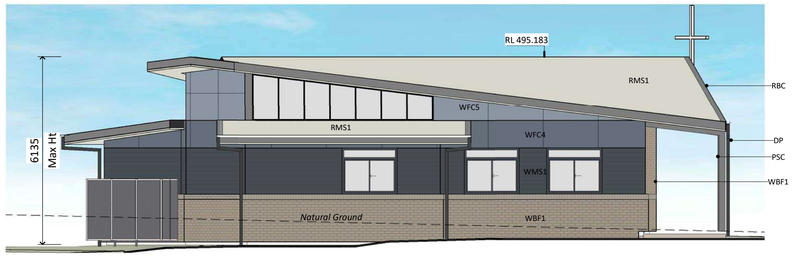
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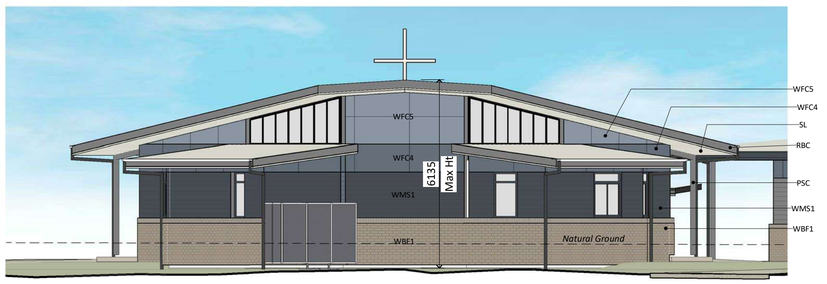
BLOCK B - NORTH-WEST ELEVATION
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BLOCK B - SOUTH-EAST ELEVATION
1 : 100



BLOCK B - NORTH-EAST ELEVATION
1 : 100



BLOCK B - SOUTH-WEST ELEVATION
1 : 100

Chapel	
Name	**Area**
CHAPEL	151 m²
SACRISTY	10 m²
STORE	7 m²
REC	8 m²
ACC WC	5 m²
Grand total	182 m²

- Administration
- Building Services
- Chapel
- Enclosed Circulation
- GLA-Secondary
- Multi-Purpose Hall
- Performing Arts
- Pupil Facilites
- Resource Centre
- TAS
- TAS Science
- TAS-Food Technology
- Visual Arts

LEGEND

CODE	DESCRIPTION
BAL-1	Balustrade & handrail - type 1 to details
DP	Downpipe
GT	Gutter refer to hydraulic engineer
LOC1	Lockers - Student
PCP	Painted concrete column
PSC	Painted steel column
RBC	Colorbond metal Barge capping
RGF	Colorbond metal gutter & fascia
RMS1	Colorbond profiled metal roof sheet - type 1
RMS2	Colorbond profiled metal roof sheet - type 2
RPS	Polycarbonate roof sheet
RWT	Rain water tank
SL	Metal profiled Soffit Lining
WBF	Face brickwork
WBF1	Face brickwork - type 1
WBF3	Face brickwork - type 3
WFC1	Painted fibre cement cladding type 1
WFC2	Painted fibre cement cladding type 2
WFC3	Painted fibre cement cladding type 3
WFC4	Painted fibre cement cladding type 4
WFC5	Painted fibre cement cladding type 5
WFC6	Painted fibre cement cladding type 6
WFC7	Painted fibre cement cladding type 7
WFC8	Painted fibre cement cladding type 8
WFC9	Painted fibre cement cladding type 9
WFC.1	
WLV1	Louvre screen - type 1
WLV2	Louvre screen - type 2
WMS1	Profiled metal sheet cladding - type 1
WMS2	Profiled metal sheet cladding - type 2
WPL4	Pinboard lining - type 4

purpose of issue	by	date	issue no.
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SSDA Issue, levels adjusted, dims added	BLC	01.04.20	10
GA NSW Issue	BLC	20.03.20	9
Site Plan, Block B & F adjusted	BLC	19.09.19	8
Block B & F adjusted	BLC	30.08.19	7
SSDA Documentation 90% Completion	DO	03.06.19	6
Carpark, paths, Block B Adjusted	BLC	22.05.19	5
Client Workshop Presentation	BLC	14.05.19	4
Chapel Option 3	BLC	09.05.19	3

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address
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Lot 40 of DP 756894

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BLOCK B - FLOOR PLAN, ELEVATIONS & SECTIONS

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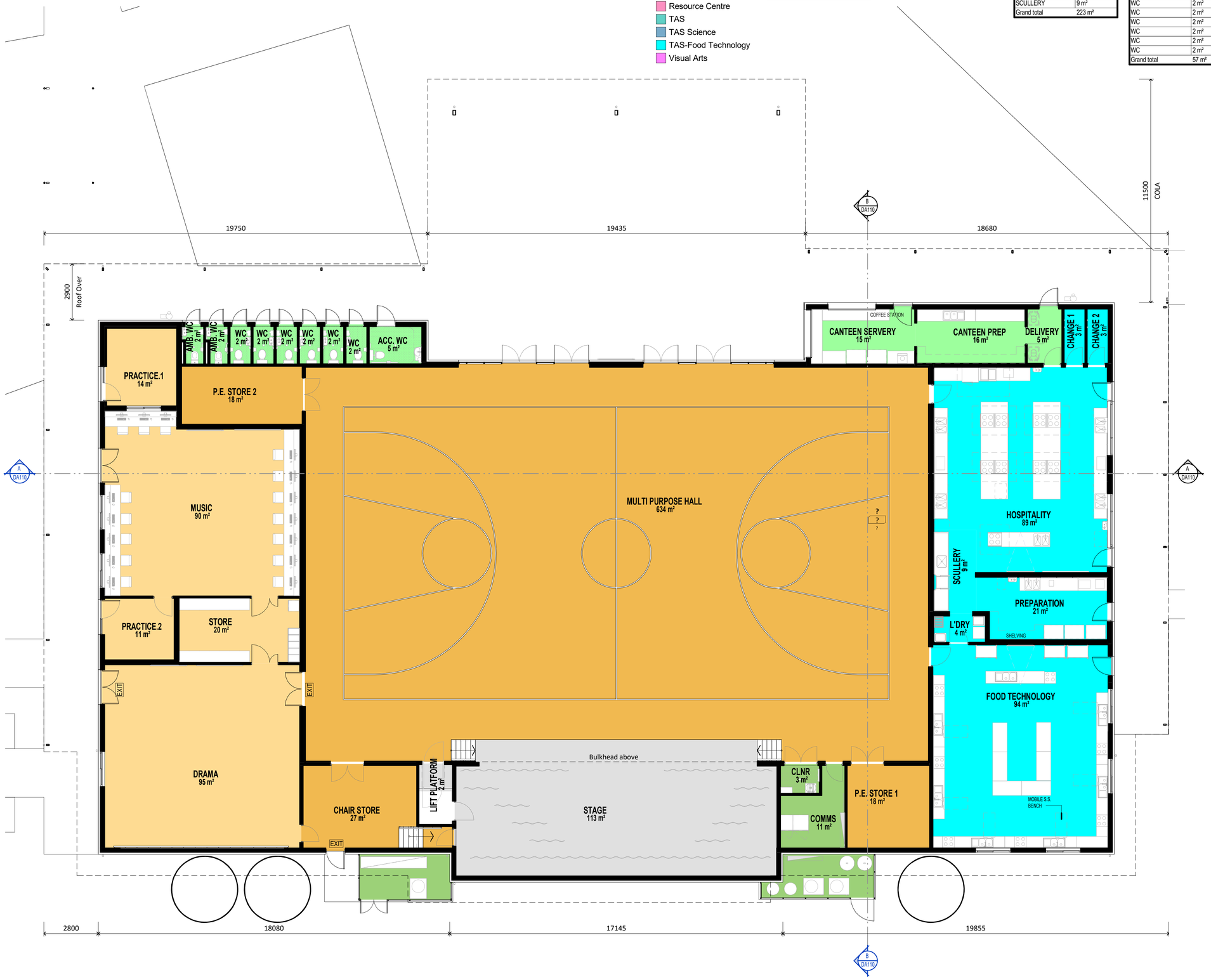
- Administration
- Building Services
- Chapel
- Enclosed Circulation
- GLA-Secondary
- Multi-Purpose Hall
- Performing Arts
- Pupil Facilites
- Resource Centre
- TAS
- TAS Science
- TAS-Food Technology
- Visual Arts

Performing Arts	
Name	Area
DRAMA	95 m²
MUSIC	90 m²
PRACTICE.1	14 m²
PRACTICE.2	11 m²
STORE	20 m²
Grand total	230 m²

Multi Purpose Hall	
Name	Area
MULTI PURPOSE HALL	634 m²
P.E. STORE 1	18 m²
CHAIR STORE	27 m²
P.E. STORE 2	18 m²
Grand total	697 m²

TAS Food Technology	
Name	Area
CHANGE 1	3 m²
CHANGE 2	3 m²
FOOD TECHNOLOGY	94 m²
HOSPITALITY	89 m²
L'DRY	4 m²
PREPARATION	21 m²
SCULLERY	9 m²
Grand total	223 m²

Pupil Facilities Block C	
Name	Area
ACC. WC	5 m²
AMB. WC	2 m²
AMB. WC	2 m²
CANTEEN PREP	16 m²
CANTEEN SERVERY	15 m²
DELIVERY	5 m²
WC	2 m²
WC	2 m²
WC	2 m²
WC	2 m²
WC	2 m²
WC	2 m²
Grand total	57 m²



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LEGEND

CODE	DESCRIPTION
BAL-1	Balustrade & handrail - type 1 to details
DP	Downpipe
GT	Gutter refer to hydraulic engineer
LOC1	Lockers - Student
PCP	Painted concrete column
PSC	Painted steel column
RBC	Colorbond metal Barge capping
RGF	Colorbond metal gutter & fascia
RMS1	Colorbond profiled metal roof sheet - type 1
RMS2	Colorbond profiled metal roof sheet - type 2
RPS	Polycarbonate roof sheet
RWT	Rain water tank
SL	Metal profiled Soffit Lining
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WBF1	Face brickwork - type 1
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WFC3	Painted fibre cement cladding type 3
WFC4	Painted fibre cement cladding type 4
WFC5	Painted fibre cement cladding type 5
WFC6	Painted fibre cement cladding type 6
WFC7	Painted fibre cement cladding type 7
WFC8	Painted fibre cement cladding type 8
WFC9	Painted fibre cement cladding type 9
WFC.1	
WLV1	Louvre screen - type 1
WLV2	Louvre screen - type 2
WMS1	Profiled metal sheet cladding - type 1
WMS2	Profiled metal sheet cladding - type 2
WPL4	Pinboard lining - type 4

purpose of issue	by	date	issue no.
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GA NSW Issue	BLC	20.03.20	10
Block C Comms & Store Revised	BLC	07.02.20	9
Preliminary Cost Plan 2A Amendments	BLC	06.02.20	8
Design Development Sign off	CG	21.10.19	7
Access adjust, dis car added	BLC	31.07.19	6
SSDA Documentation 90% Completion	DO	03.06.19	5
Carpark, paths, Block B Adjusted	BLC	22.05.19	4
Client Workshop Presentation	BLC	14.05.19	3

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BLOCK C - GROUND FLOOR PLAN

project no.	sheet no.	issue
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sheet

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TAS Science	
Name	**Area**
COLLABORATIVE LEARNING	103 m²
MINI LAB.	37 m²
PREP ROOM	34 m²
SCIENCE 1	100 m²
SCIENCE 2	100 m²
Grand total	373 m²

TAS Block D	
Name	**Area**
3D PRINT	7 m²
CNC	7 m²
COURTYARD	56 m²
LASER CUT	7 m²
MACHINES	45 m²
MAJOR WORKS 3	24 m²
METAL	100 m²
PLANT	8 m²
STEM	100 m²
STORE	43 m²
WIP STORE 3	16 m²
WIP STORE 4	7 m²
WOOD	100 m²
Grand total	522 m²

Visual Arts	
Name	**Area**
ART 1	91 m²
ART 2	92 m²
ART SUPPLIES	13 m²
COURTYARD	29 m²
COURTYARD	47 m²
DESIGN	45 m²
MAJOR WORKS 1	63 m²
POTTERY	22 m²
WIP STORE 1	21 m²
WIP STORE 2	27 m²
Grand total	450 m²

Pupil Facilities Block D	
Name	**Area**
ACC. WC	6 m²
Grand total	6 m²

- Administration
- Building Services
- Chapel
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- Visual Arts

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keyplan

LEGEND

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WFC4	Painted fibre cement cladding type 4
WFC5	Painted fibre cement cladding type 5
WFC6	Painted fibre cement cladding type 6
WFC7	Painted fibre cement cladding type 7
WFC8	Painted fibre cement cladding type 8
WFC9	Painted fibre cement cladding type 9
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WMS2	Profiled metal sheet cladding - type 2
WPL4	Pinboard lining - type 4

purpose of issue	by	date	issue no.
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GA NSW Issue	BLC	20.03.20	8
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Access adjust, dis car added	BLC	31.07.19	6
SSDA Documentation 90% Completion	DO	03.06.19	5
Carpark, paths, Block B Adjusted	BLC	22.05.19	4
Client Workshop Presentation	BLC	14.05.19	3
DRAW NUMBERS ADJUSTED, Buildings moved, Elevations adjusted	BLC	08.05.19	2

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ALLEANZA ARCHITECTURE

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sheet size:	**A1**
scale:	1 : 100

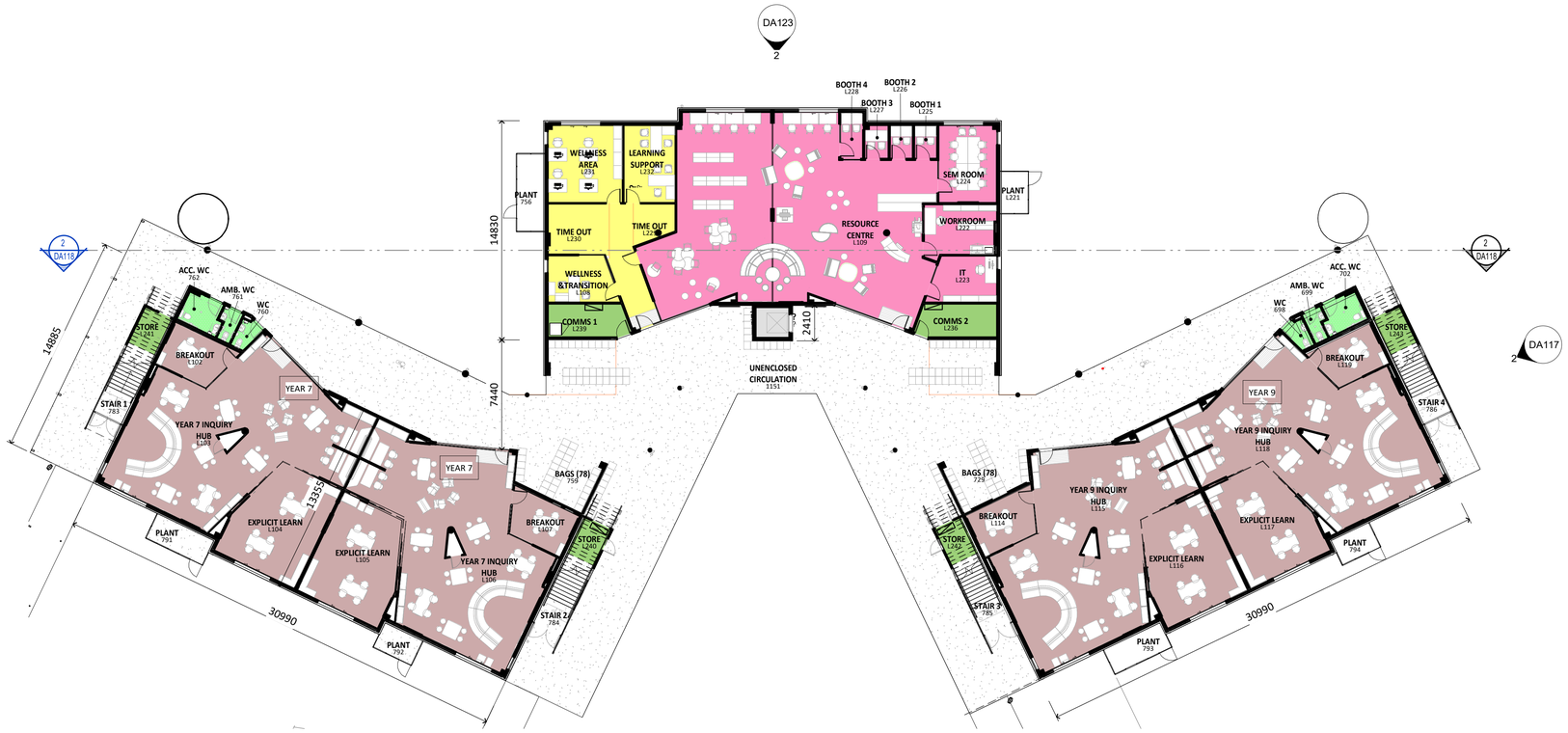
north

graphic scale 6

BLOCK D - GROUND FLOOR PLAN

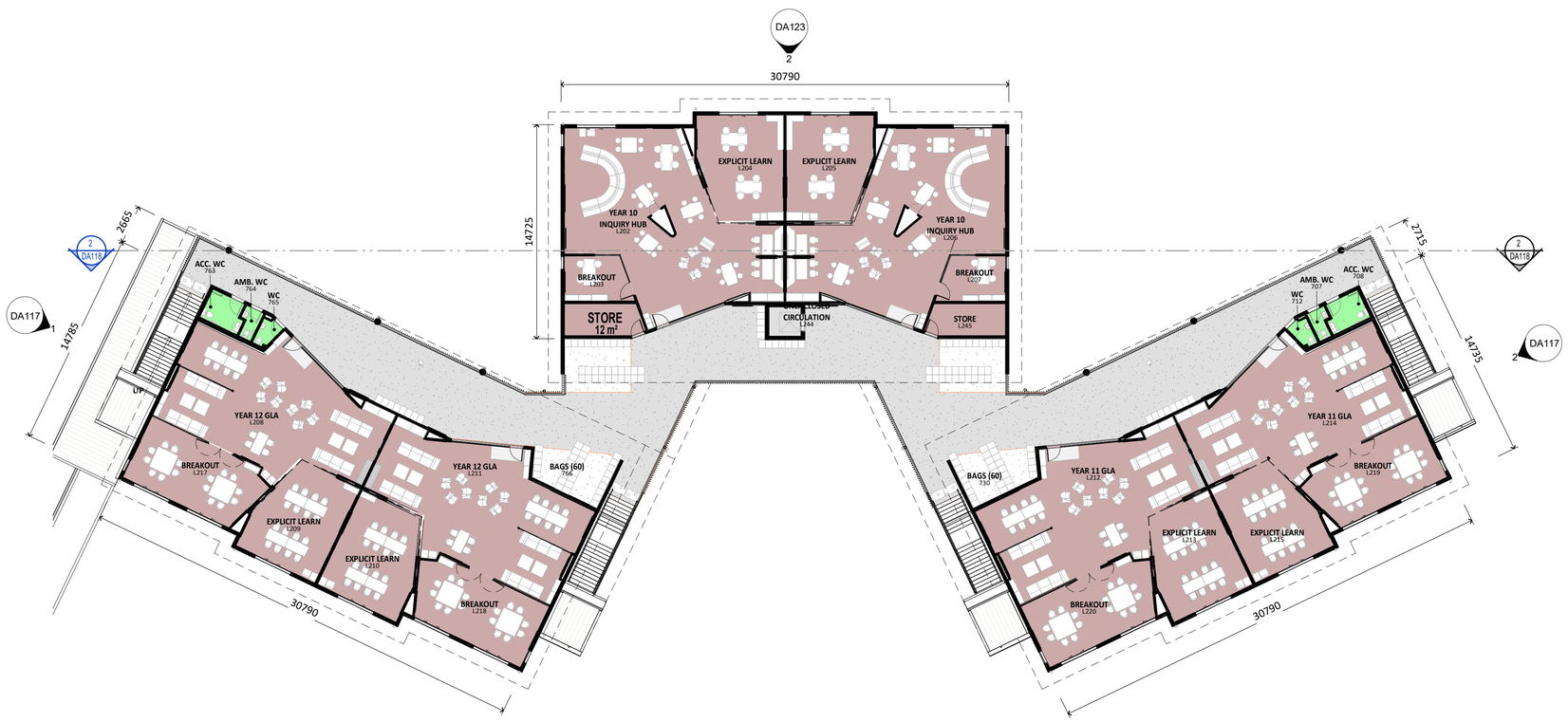
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BLOCK E - LEVEL 1 FLOOR PLAN

1 : 200



BLOCK E - LEVEL 2 FLOOR PLAN

1 : 200

GLA - Secondary	
vv	Area
YEAR 7 INQUIRY HUB	130 m²
YEAR 9 INQUIRY HUB	129 m²
YEAR 9 INQUIRY HUB	130 m²
BREAKOUT	13 m²
BREAKOUT	13 m²
BREAKOUT	14 m²
BREAKOUT	13 m²
EXPLICIT LEARN	40 m²
EXPLICIT LEARN	40 m²
EXPLICIT LEARN	40 m²
EXPLICIT LEARN	40 m²
YEAR 10 INQUIRY HUB	131 m²
YEAR 10 INQUIRY HUB	130 m²
EXPLICIT LEARN	40 m²
EXPLICIT LEARN	40 m²
BREAKOUT	14 m²
BREAKOUT	13 m²
EXPLICIT LEARN	40 m²
EXPLICIT LEARN	40 m²
EXPLICIT LEARN	40 m²
EXPLICIT LEARN	40 m²
YEAR 12 GLA	105 m²
YEAR 12 GLA	105 m²
YEAR 11 GLA	105 m²
YEAR 11 GLA	105 m²
YEAR 7 INQUIRY HUB	130 m²
BREAKOUT	41 m²
BREAKOUT	41 m²
BREAKOUT	41 m²
BREAKOUT	41 m²
STORE	12 m²
STORE	12 m²
Grand total	1864 m²

Pupil Facilities Block E	
Name	Area
ACC. WC	6 m²
ACC. WC	6 m²
ACC. WC	6 m²
ACC. WC	6 m²
AMB. WC	2 m²
AMB. WC	2 m²
AMB. WC	2 m²
AMB. WC	2 m²
WC	2 m²
WC	2 m²
WC	2 m²
WC	2 m²
Grand total	42 m²

- Administration
- Building Services
- Chapel
- Enclosed Circulation
- GLA-Secondary
- Multi-Purpose Hall
- Performing Arts
- Pupil Facilites
- Resource Centre
- TAS
- TAS Science
- TAS-Food Technology
- Visual Arts

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Dimensions take precedence over scaling. Do not measure off drawings as print sizes may vary.

keyplan

LEGEND	
CODE	DESCRIPTION
BAL-1	Balustrade & handrail - type 1 to details
DP	Downpipe
GT	Gutter refer to hydraulic engineer
LOC1	Lockers - Student
PCP	Painted concrete column
PSC	Painted steel column
RBC	Colorbond metal Barge capping
RGF	Colorbond metal gutter & fascia
RMS1	Colorbond profiled metal roof sheet - type 1
RMS2	Colorbond profiled metal roof sheet - type 2
RPS	Polycarbonate roof sheet
RWT	Rain water tank
SL	Metal profiled Soffit Lining
WBF	Face brickwork
WBF1	Face brickwork - type 1
WBF3	Face brickwork - type 3
WFC1	Painted fibre cement cladding type 1
WFC2	Painted fibre cement cladding type 2
WFC3	Painted fibre cement cladding type 3
WFC4	Painted fibre cement cladding type 4
WFC5	Painted fibre cement cladding type 5
WFC6	Painted fibre cement cladding type 6
WFC7	Painted fibre cement cladding type 7
WFC8	Painted fibre cement cladding type 8
WFC9	Painted fibre cement cladding type 9
WFC.1	
WLV1	Louvre screen - type 1
WLV2	Louvre screen - type 2
WMS1	Profiled metal sheet cladding - type 1
WMS2	Profiled metal sheet cladding - type 2
WPL4	Pinboard lining - type 4

SSDA Issue, Legend Updated	BLC	03.04.20	11
SSDA Issue, levels adjusted, dims added	BLC	01.04.20	10
GA NSW Issue	BLC	20.03.20	9
Access adjust, dis car added	BLC	31.07.19	8
SSDA Documentation 90% Completion	DO	03.06.19	7
Carpark, paths, Block B Adjusted	BLC	22.05.19	6
Client Workshop Presentation	BLC	14.05.19	5
DRAW NUMBERS ADJUSTED, Buildings moved, Elevations adjusted	BLC	08.05.19	4
ESD Consult Issue	BLC	02.05.19	3
purpose of issue	by	date	issue no.

architect

ALLEANZA ARCHITECTURE
NOMINATED ARCHITECT : CHARLES GLANVILLE NSW REGISTRATION No. 3130

CATHOLIC EDUCATION DIOCESE OF BATHURST
TSA MANAGEMENT

project

ST MATTHEW'S CATHOLIC SCHOOL

address

Corner of BROADHEAD and BRUCE RD. MUDGEE
Lot 40 of DP 756894

STATE SIGNIFICANT DEVELOPMENT APPLICATION

drawn:	BLC
checked:	BLC
verified:	CG
sheet size:	A1
scale:	1 : 200

north

graphic scale 6

BLOCK E - GROUP FLOOR PLANS

sheet

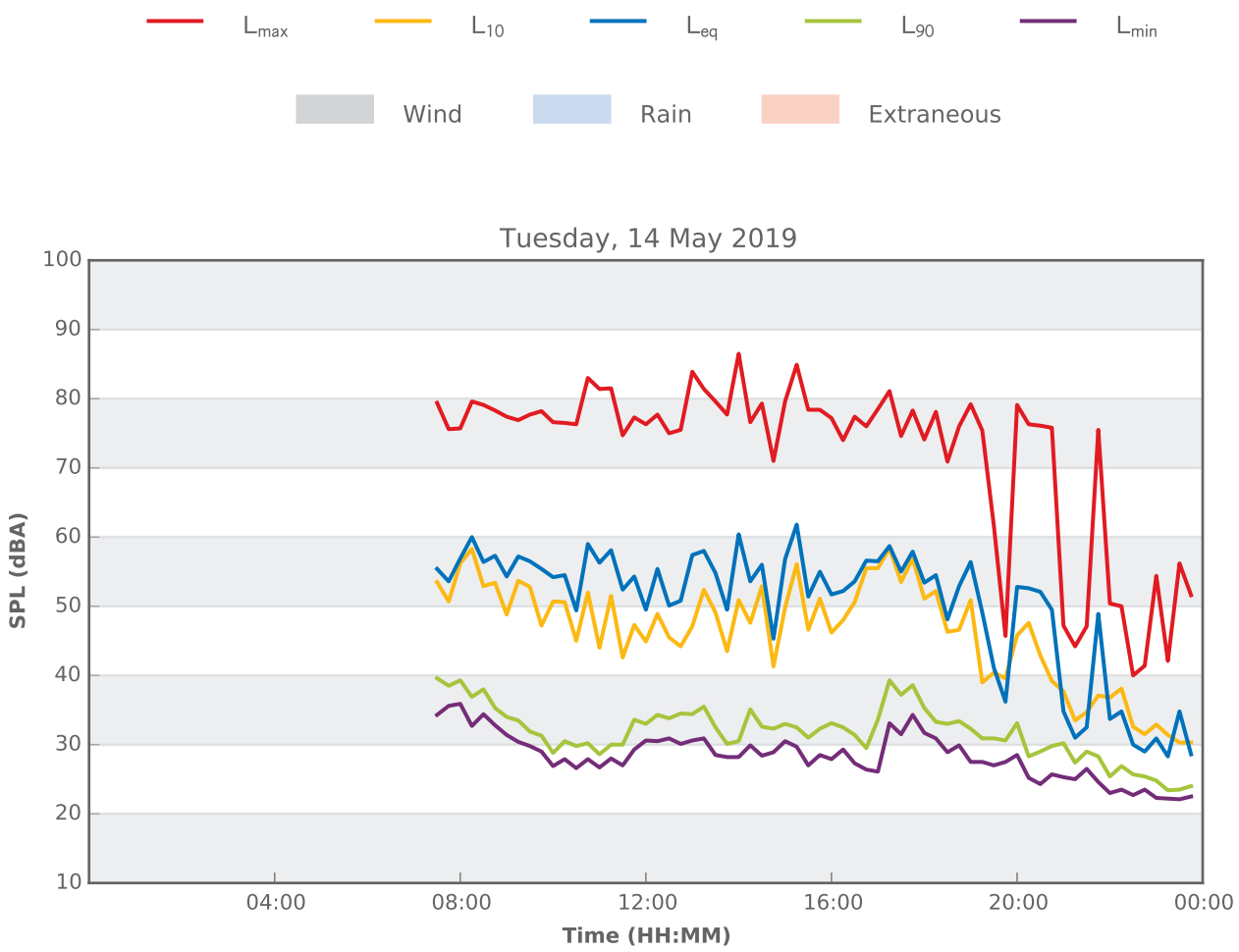
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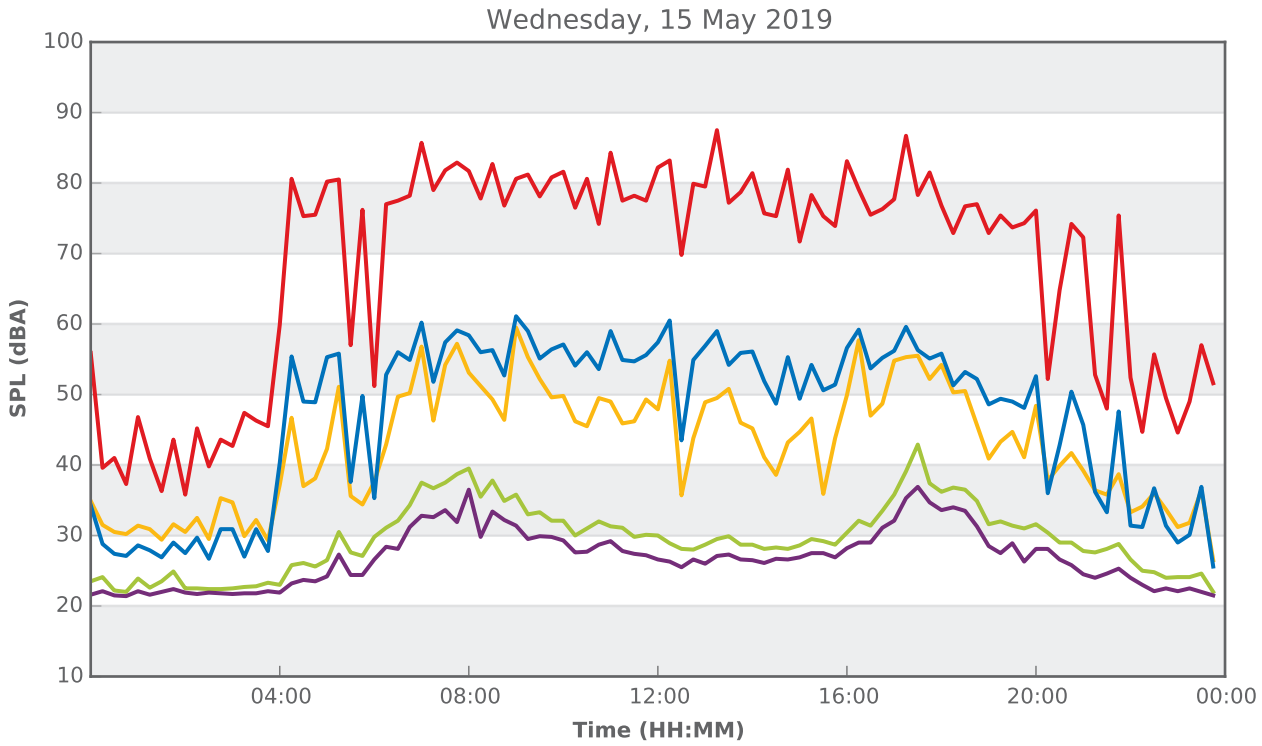
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APPENDIX B

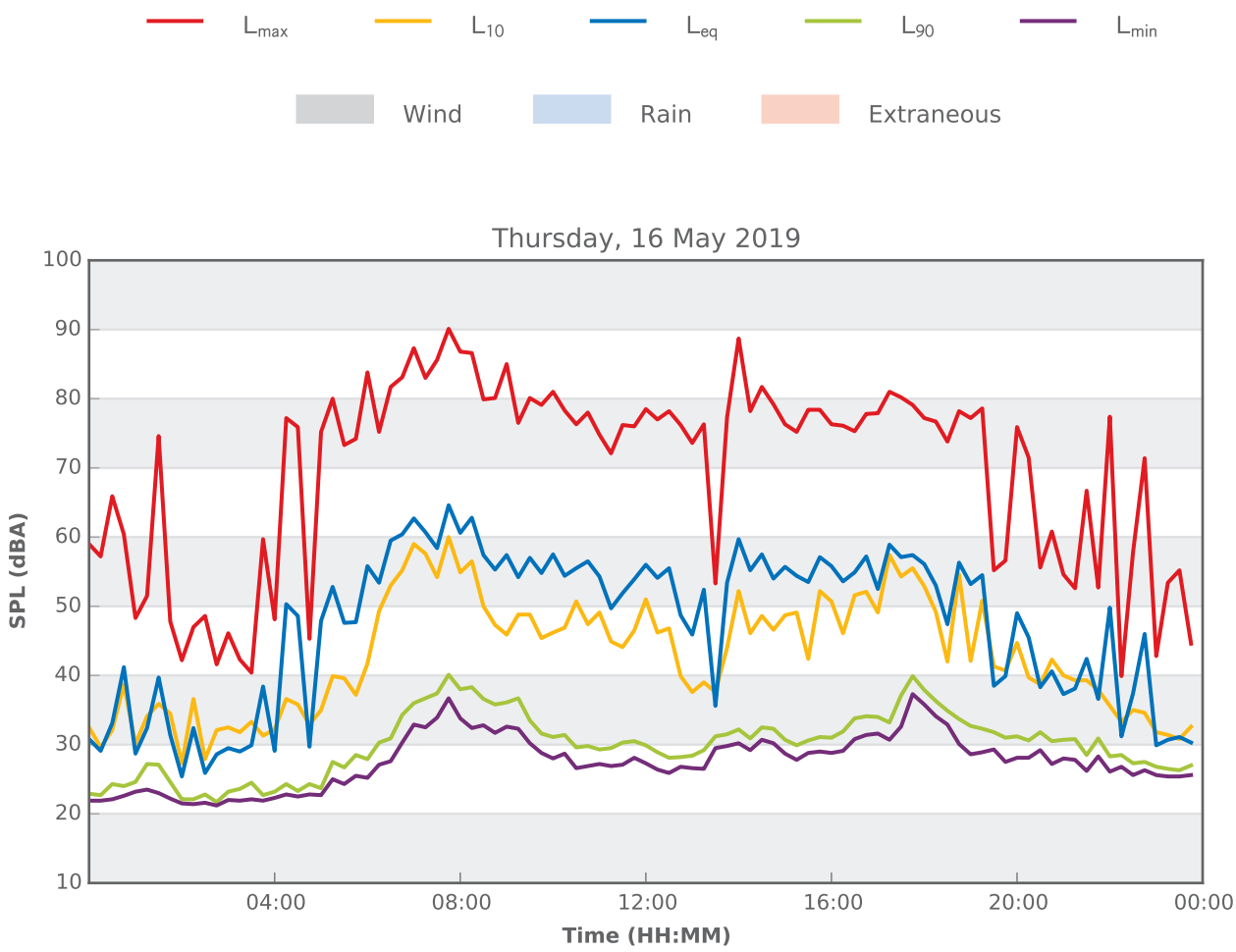
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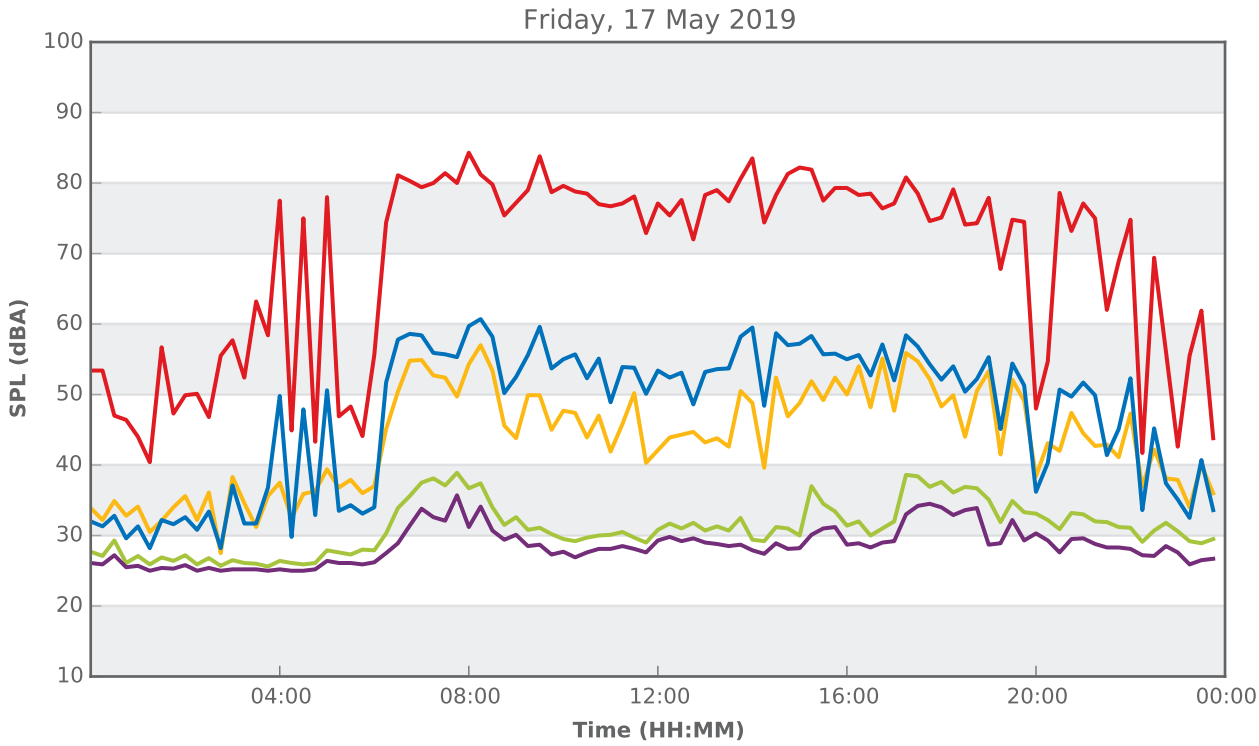
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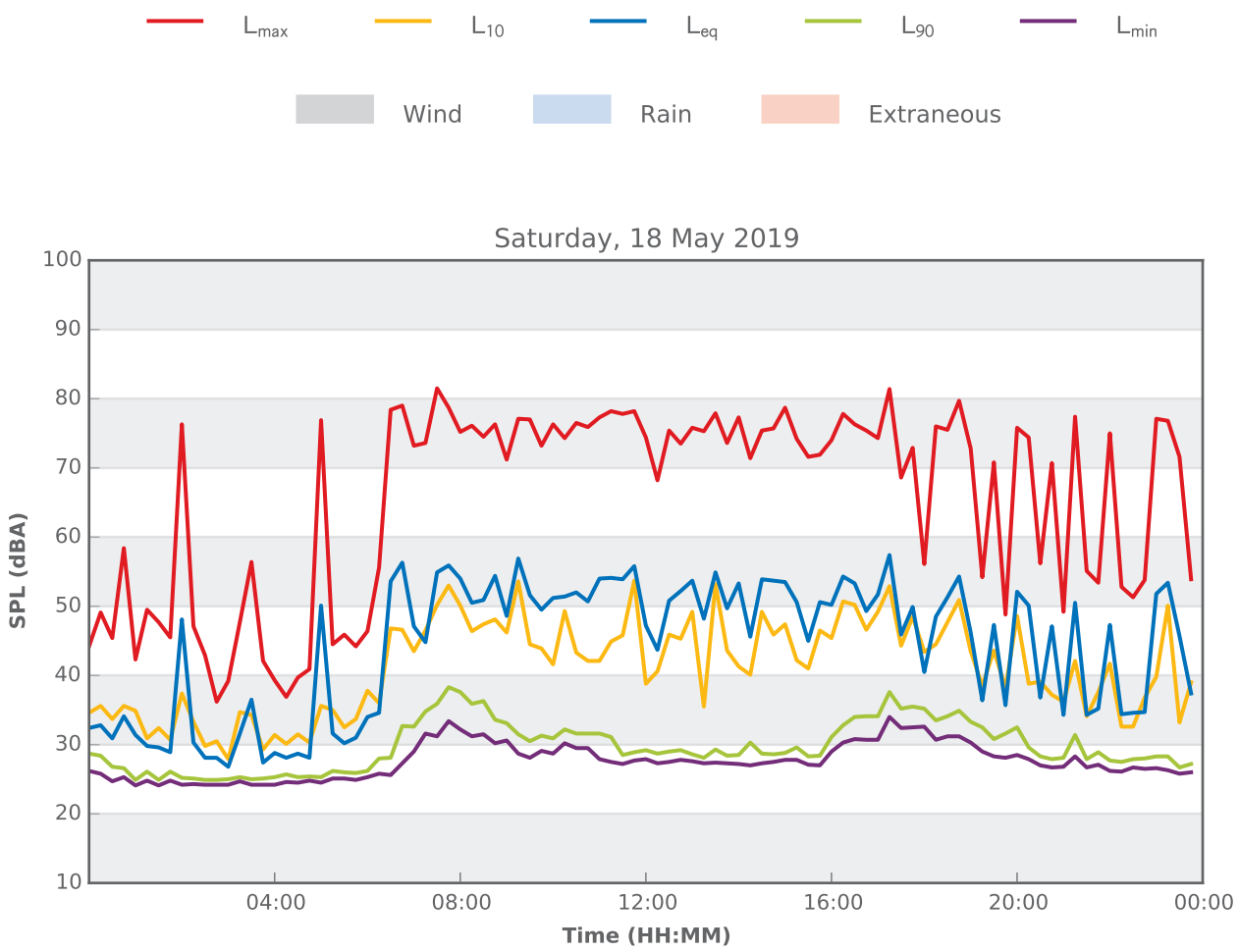


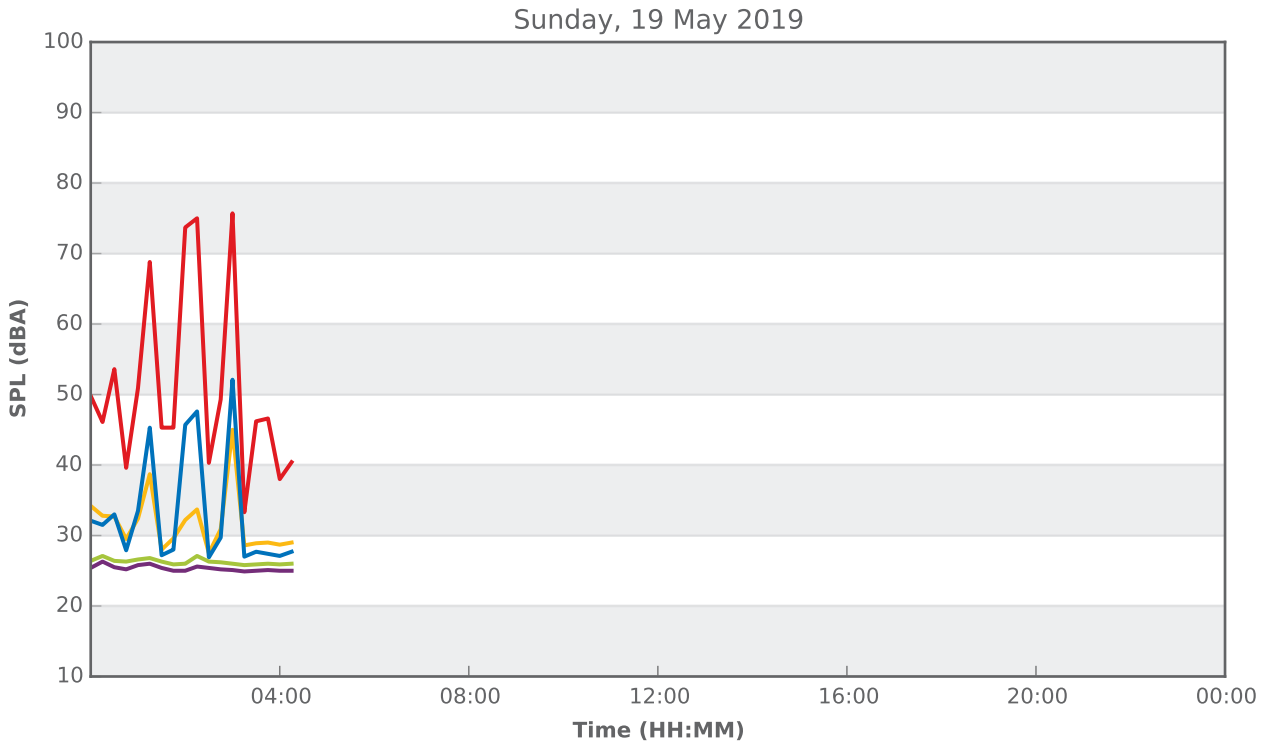
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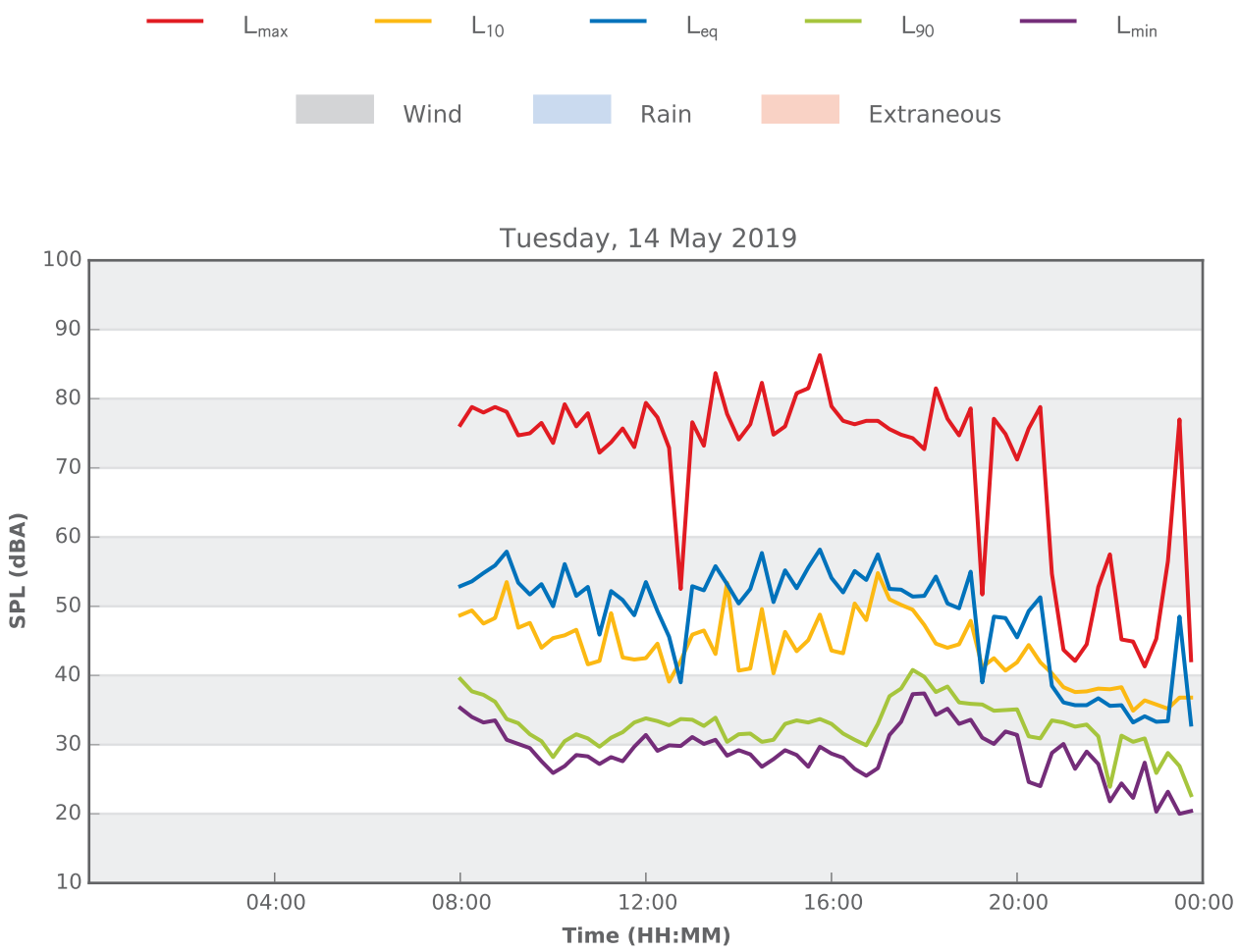


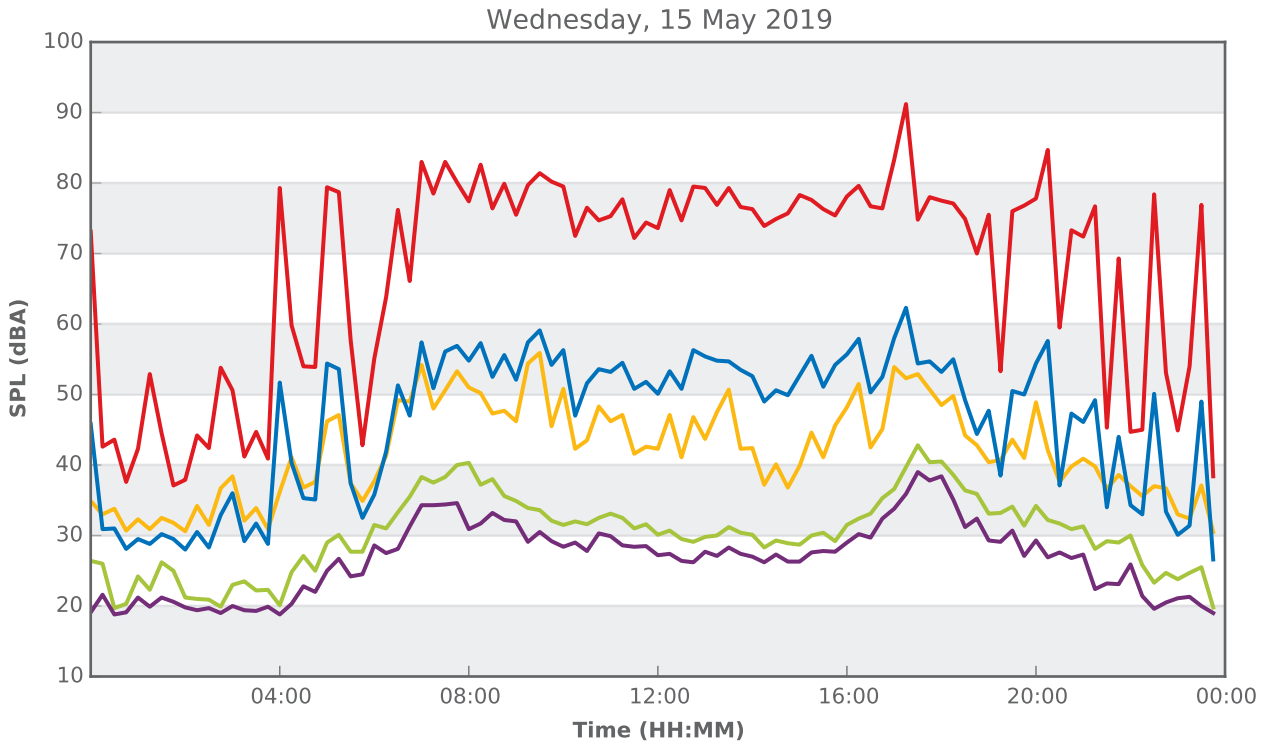
227 Bruce Road, Mudgee



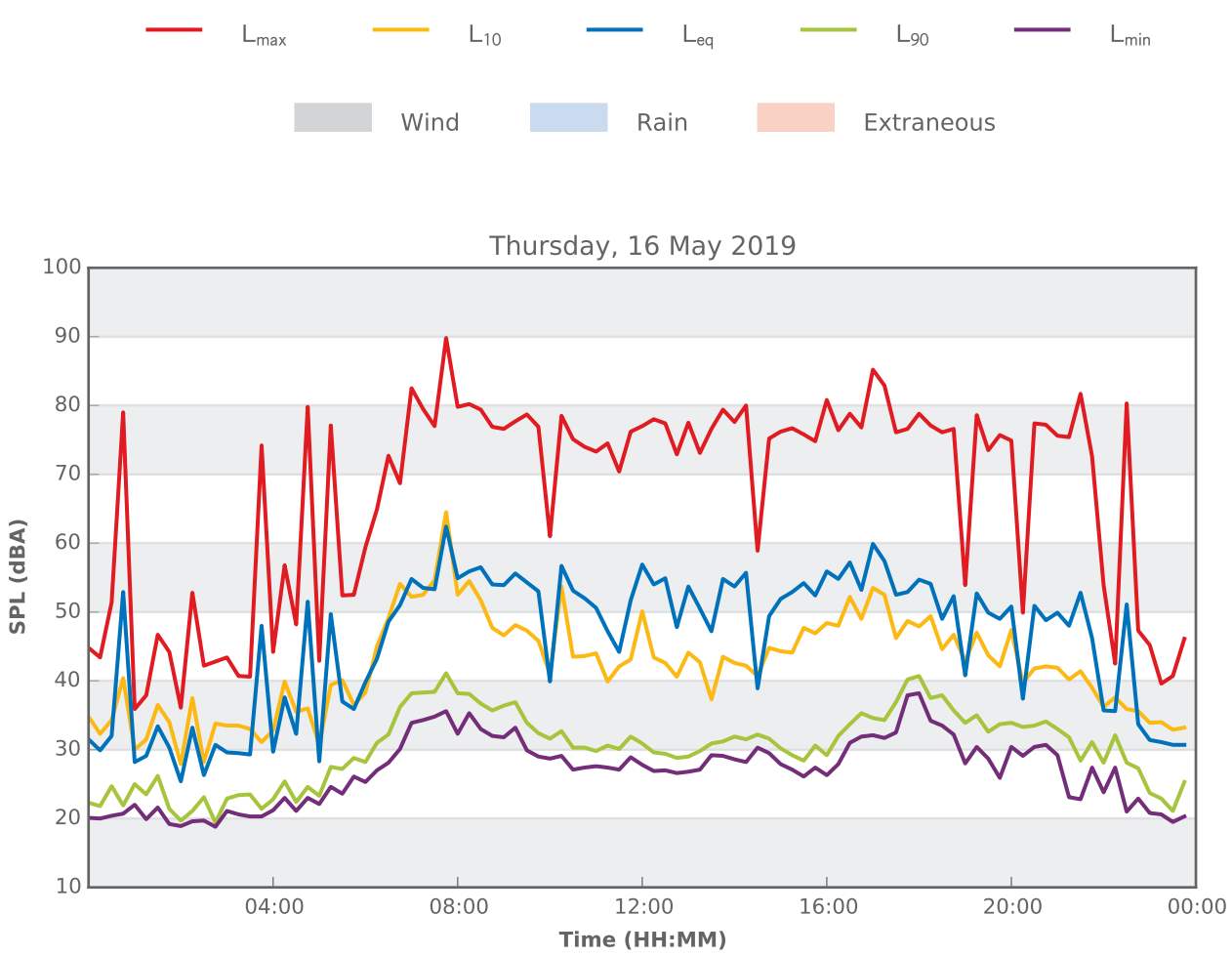


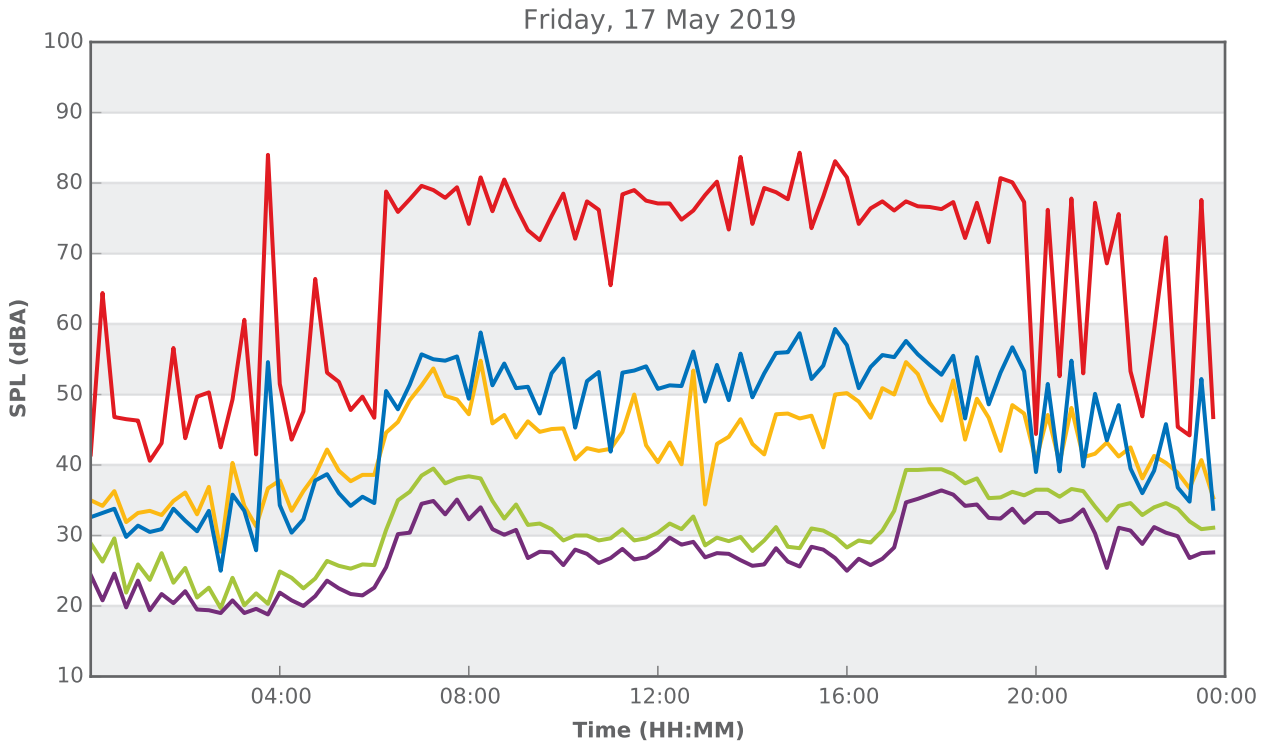
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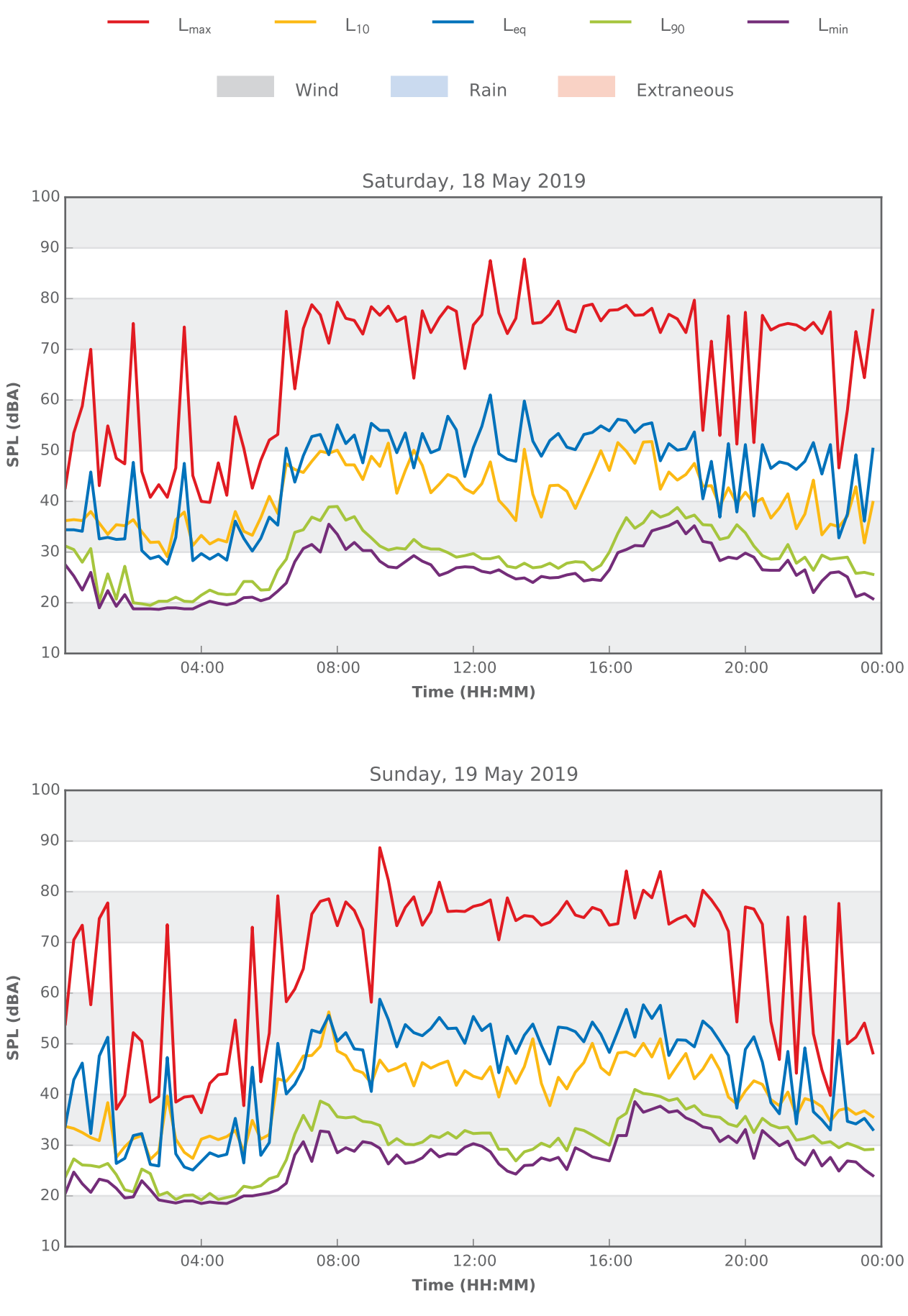


56 Broadhead Road, Mudgee



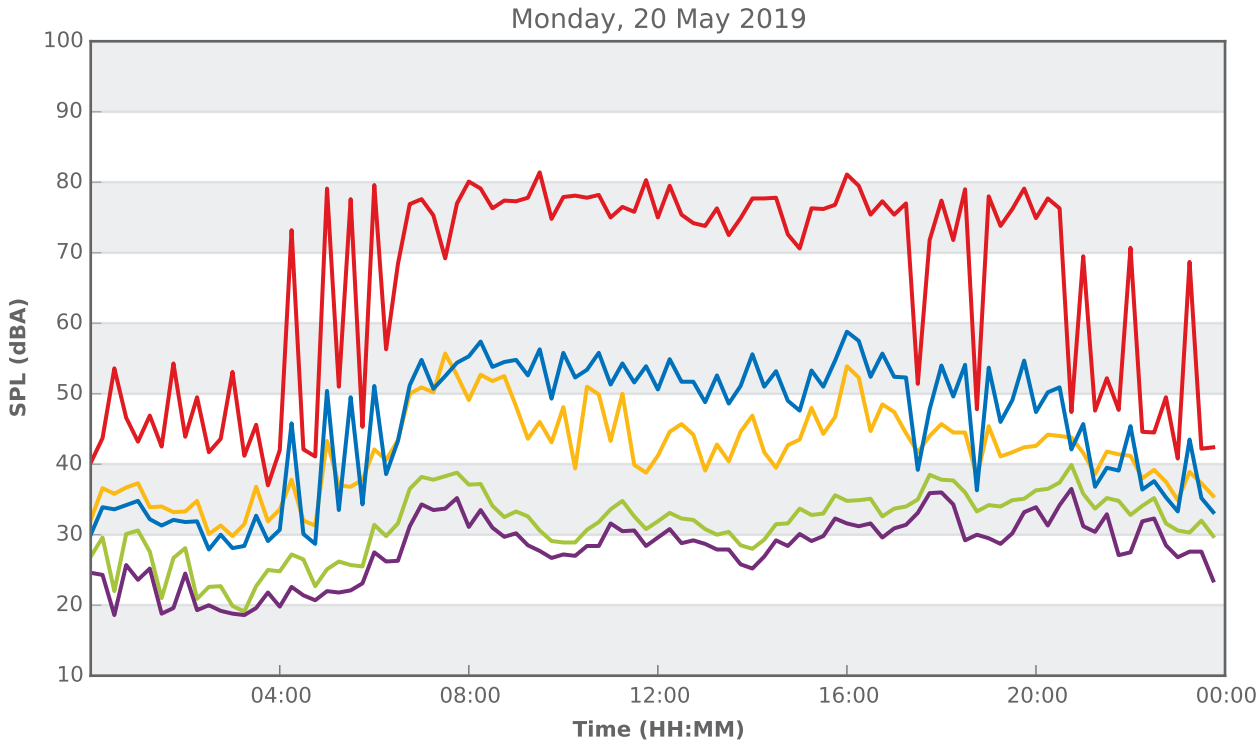


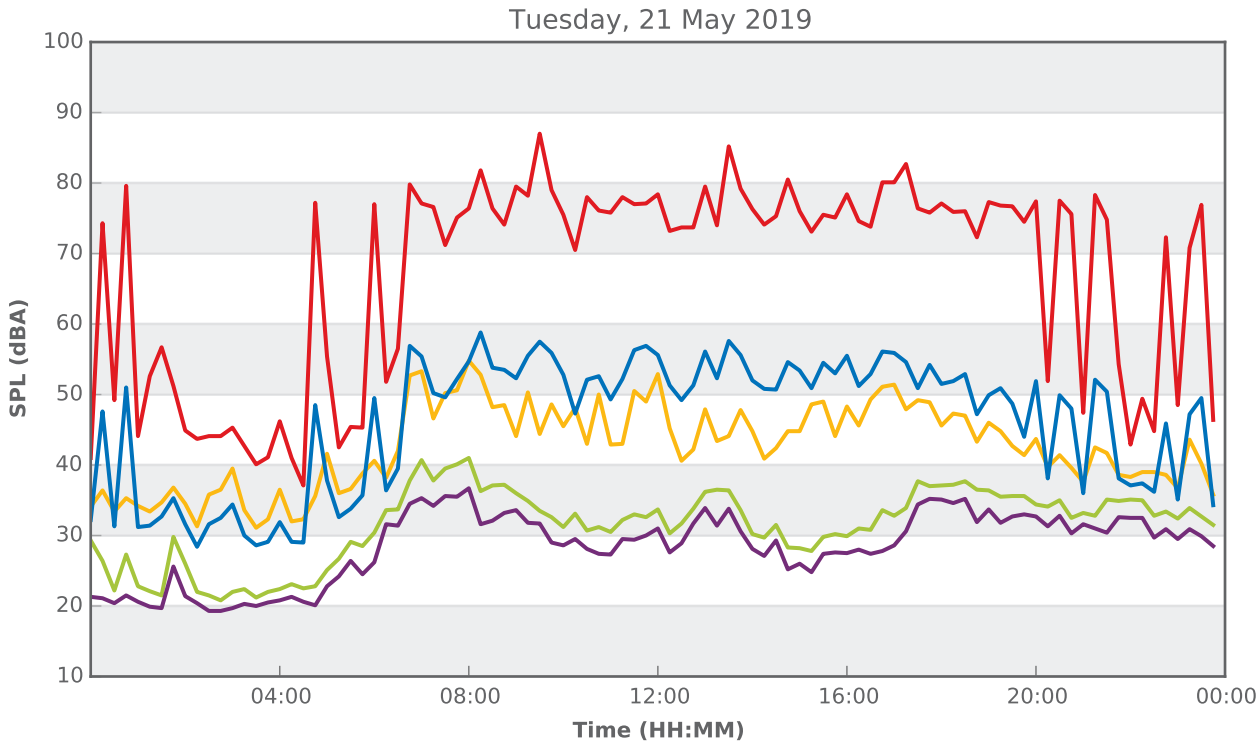
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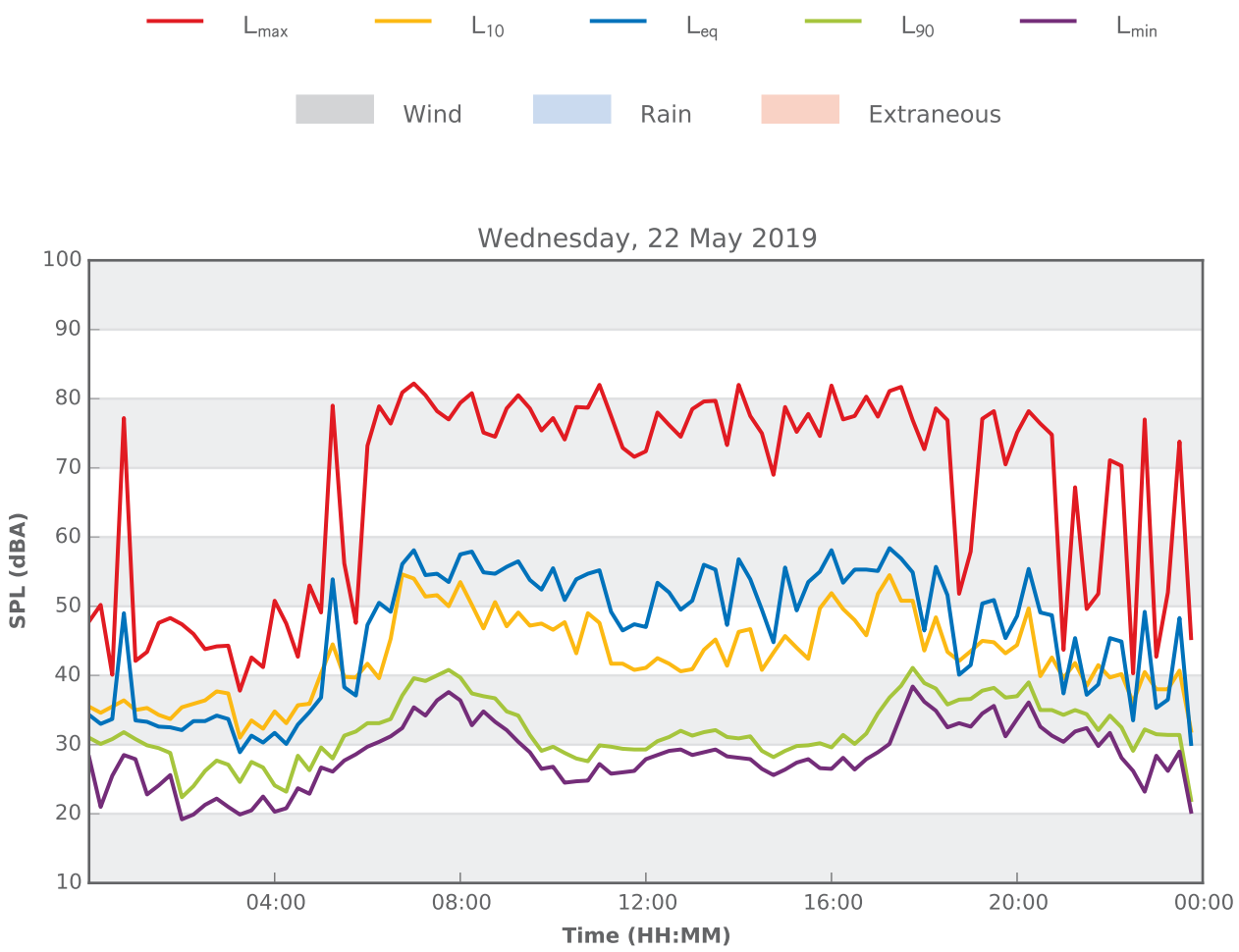
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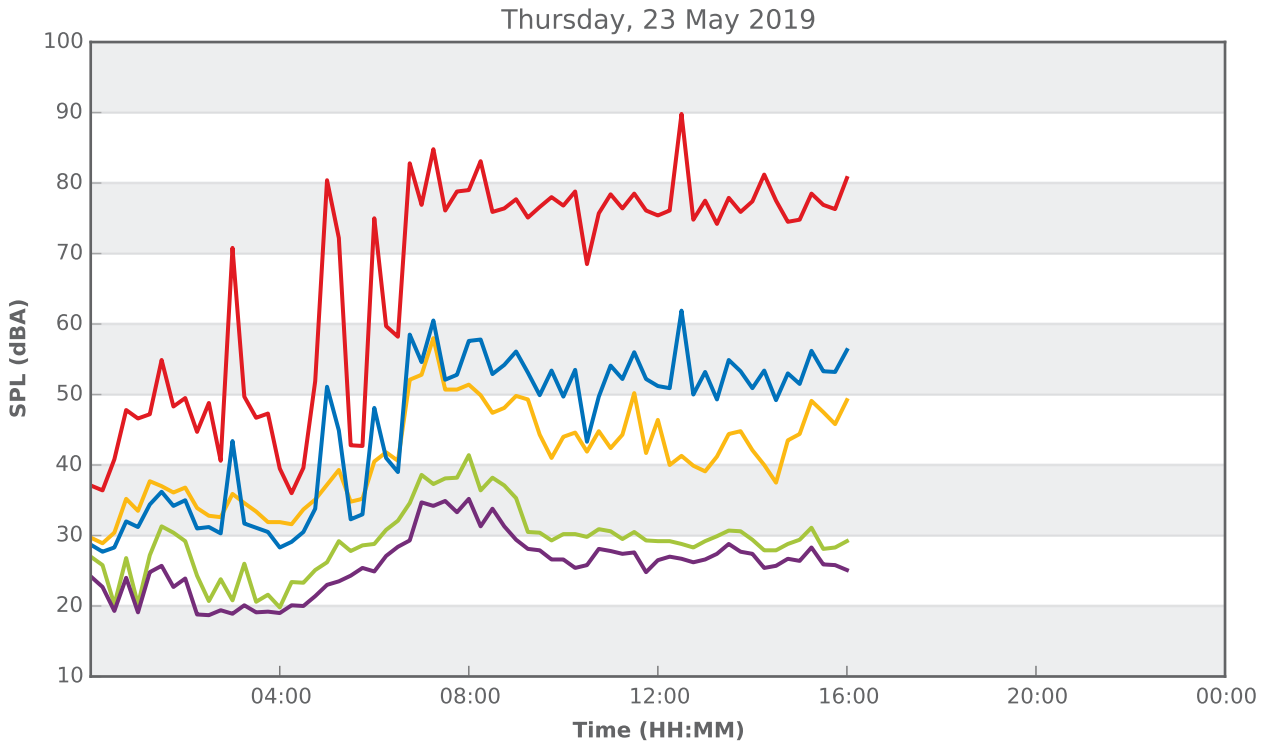






56 Broadhead Road, Mudgee





ST. MATTHEWS - BLOCK A
BROADHEAD ROAD, MUDGEE NSW 2850
STRUCTURAL DRAWINGS

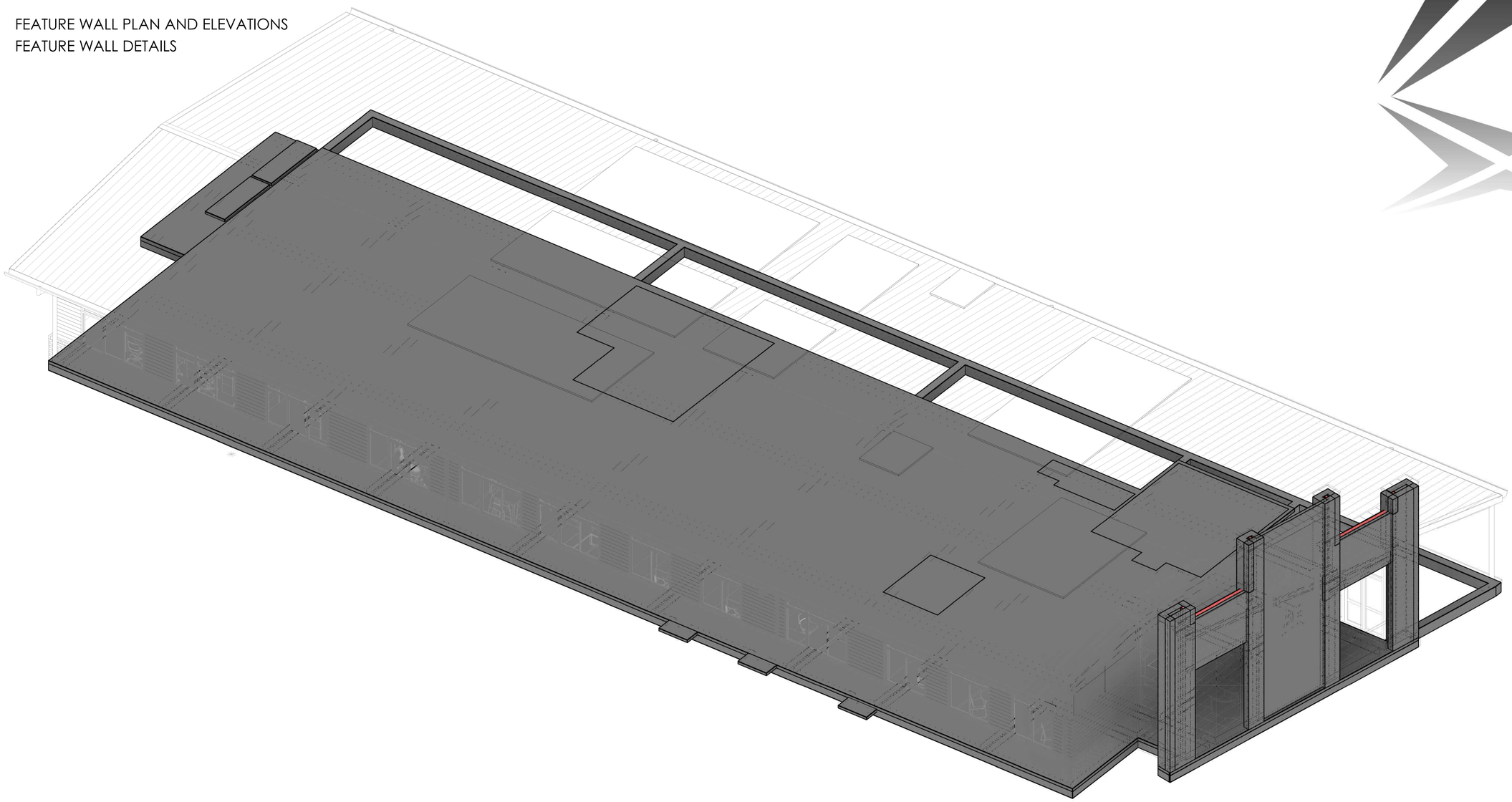
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S10.00 COVER SHEET

S11.01 FOOTING & GROUND FLOOR PLAN
S11.51 FOOTING & GROUND FLOOR DETAILS SHEET 1
S11.52 FOOTING & GROUND FLOOR DETAILS SHEET 2

S13.02 BRACING PLAN
S13.51 FRAMING DETAILS SHEET 1

S14.51 FEATURE WALL PLAN AND ELEVATIONS
S14.52 FEATURE WALL DETAILS



AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	09.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	F	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	E	CH.W
ISSUED FOR CLIENT REVIEW	31.07.20	D	MA.C
RE-ISSUED FOR 60% DOCUMENTATION	26.02.20	C	MA.C

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259

PROJECT
ST. MATTHEWS - BLOCK A
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	OCT 2019	A1	TX13843.01-S01-R18

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COMPLEX PROBLEMS RESOLVED SIMPLY

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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

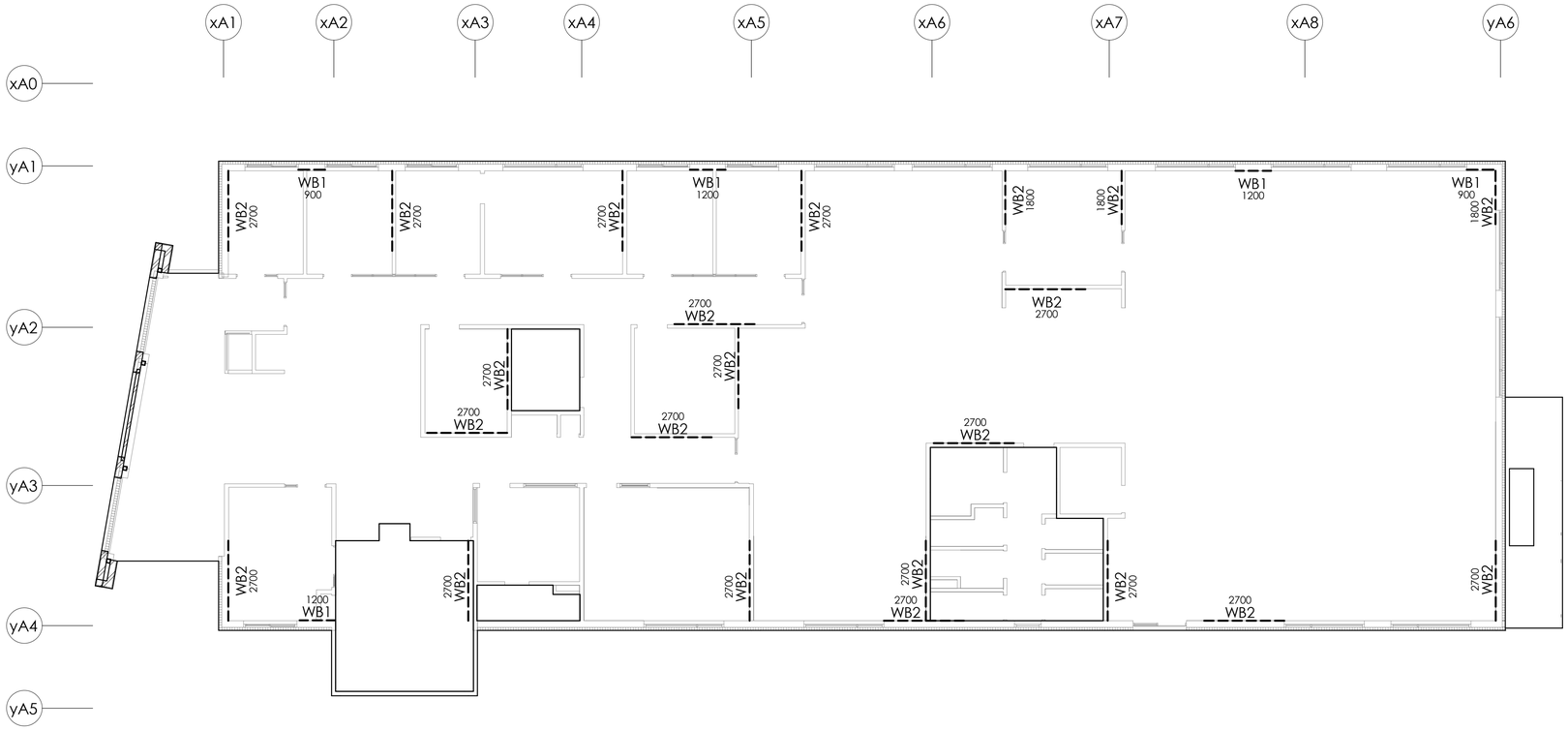
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DRAWING TITLE
BLOCK A
COVER SHEET

PROJECT No TX13843.01 - DRAWING No S10.00 ISSUE 0

LEGEND:

LENGTH WB1	PLYWOOD BRACING CAPACITY 3.4kN/m
LENGTH WB2	STRAP BRACING CAPACITY 3kN/m



BRACING PLAN

SCALE 1 : 100 AT A1

NOTE:

- CEILING SHALL BE FIXED DIRECTLY TO ROOF TRUSSES/RAFTERS AS PER THE REQUIREMENTS OF AS 1684.2-2010. THE ENGINEER SHALL BE CONSULTED FOR FURTHER ADVICE IF SUSPENDED CEILING IS TO BE INSTALLED.

0 1 2 3 4 5 6 7 8 9 10m

SCALE 1:100 AT A1 SHEET | 1:200 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	09.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	D	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	C	CH.W
ISSUED FOR CLIENT REVIEW	31.07.20	B	MA.C
RE-ISSUED FOR 60% DOCUMENTATION	26.02.20	A	MA.C

FOR CONSTRUCTION

ARCHITECT
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LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259

PROJECT
ST. MATTHEWS - BLOCK A
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	FEB 2020	A1	TX13843.01-S01-R18

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COMPLEX PROBLEMS RESOLVED SIMPLY

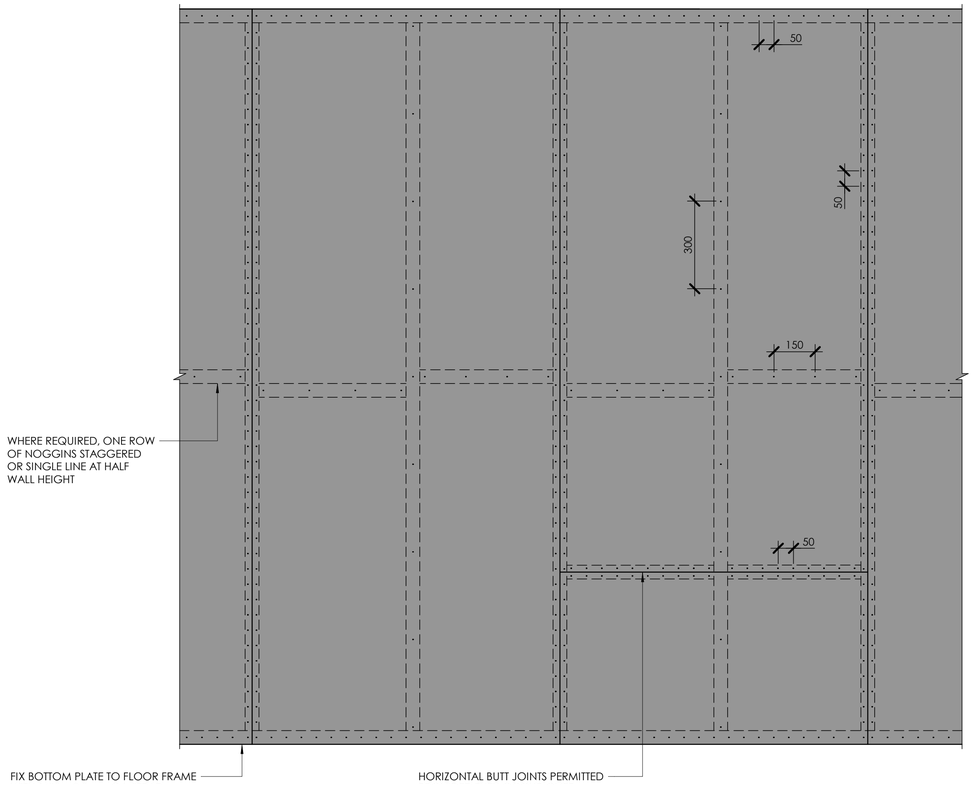
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PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK A
BRACING PLAN

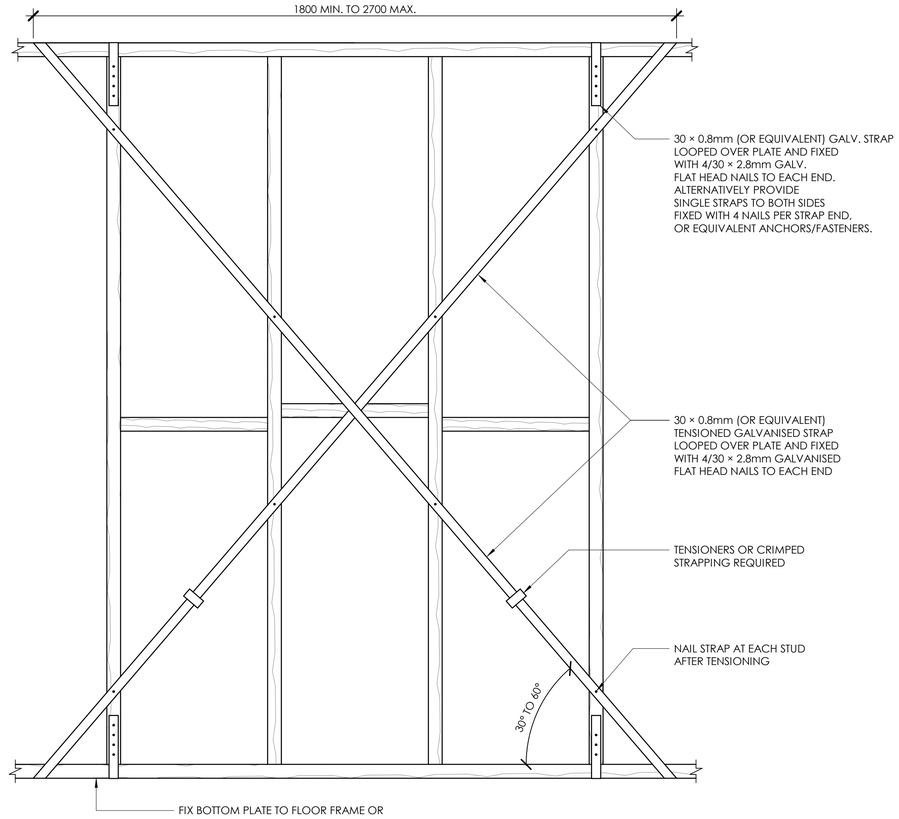
PROJECT No TX13843.01 - DRAWING No S13.02 ISSUE 0



PLYWOOD BRACING CAPACITY 6.0kN/m		
MINIMUM PLYWOOD THICKNESS (mm)		
STRESS GRADE	STUD SPACING (mm)	
	450	600
F8	7	9
F11	4.5	7
F14	4	6
F27	3	4.5
PLYWOOD TO BE NAILED WITH 30 × 2.8mm GALVANISED FLAT HEAD NAILS, 7MM MIN. FROM ALL SHEET EDGES		

WB1 - PLYWOOD WALL BRACING DETAIL

N.T.S.



WB2 - TENSIONED STRAP WALL BRACING DETAIL

SCALE 1:10 AT A1

0 200 400 600 800 1000mm

SCALE 1:10 AT A1 SHEET | 1:20 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	09.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	B	CH.W
ISSUED FOR CLIENT REVIEW	31.07.20	A	MA.C

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000
ALLEANZA ARCHITECTURE

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000
TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north
BUILDING WITH TRUST®

PROJECT
ST. MATTHEWS - BLOCK A
BROADHEAD ROAD, MUDGEE NSW 2850

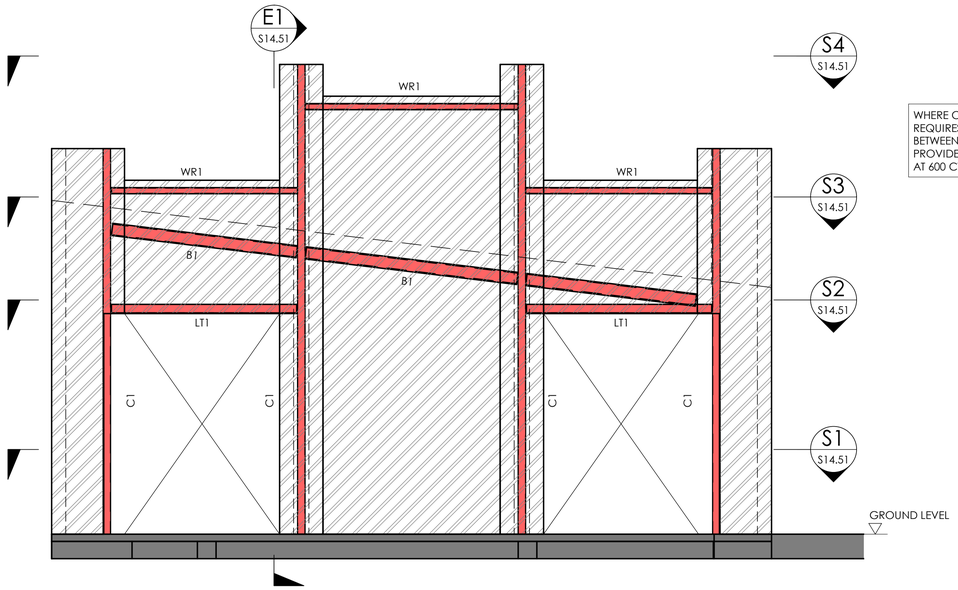
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TRIAXIAL CONSULTING
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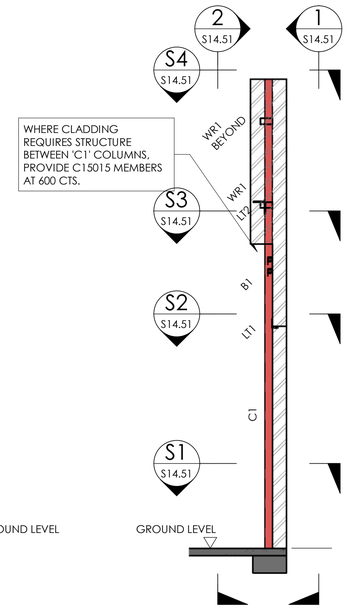
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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235
ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK A
FRAMING DETAILS SHEET 1

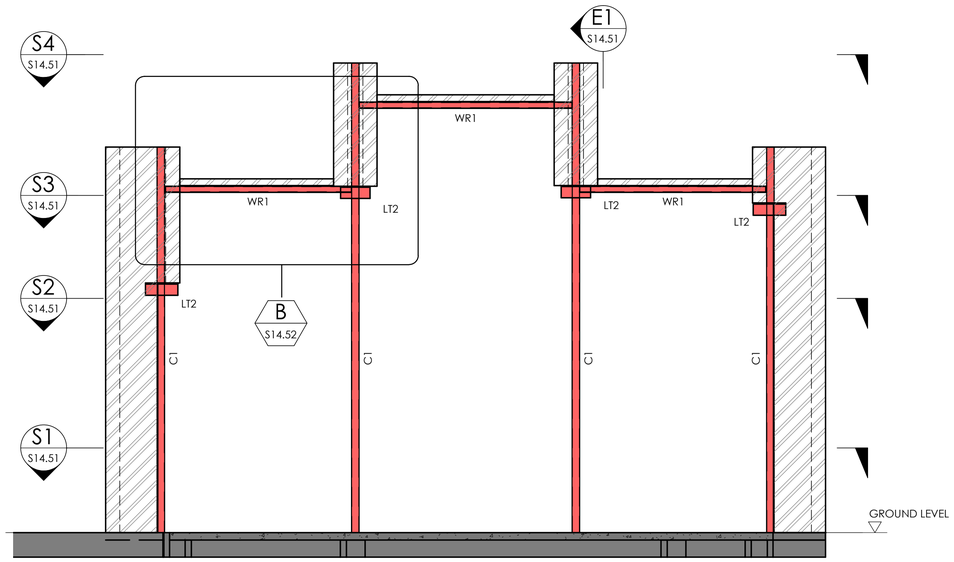
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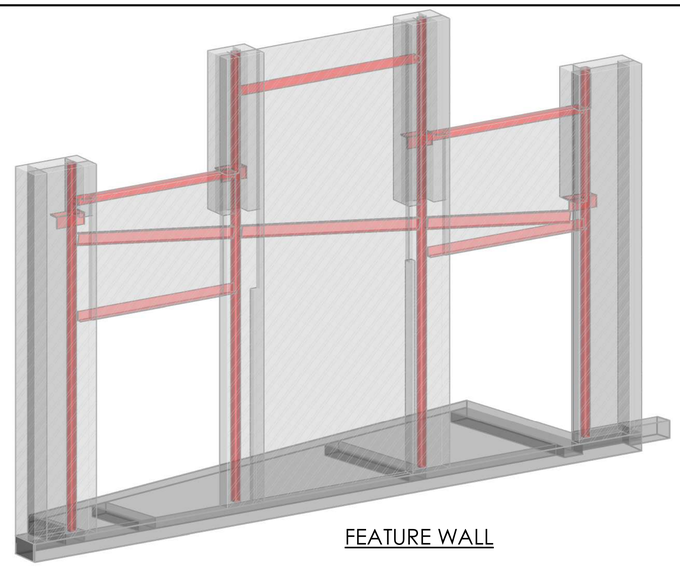
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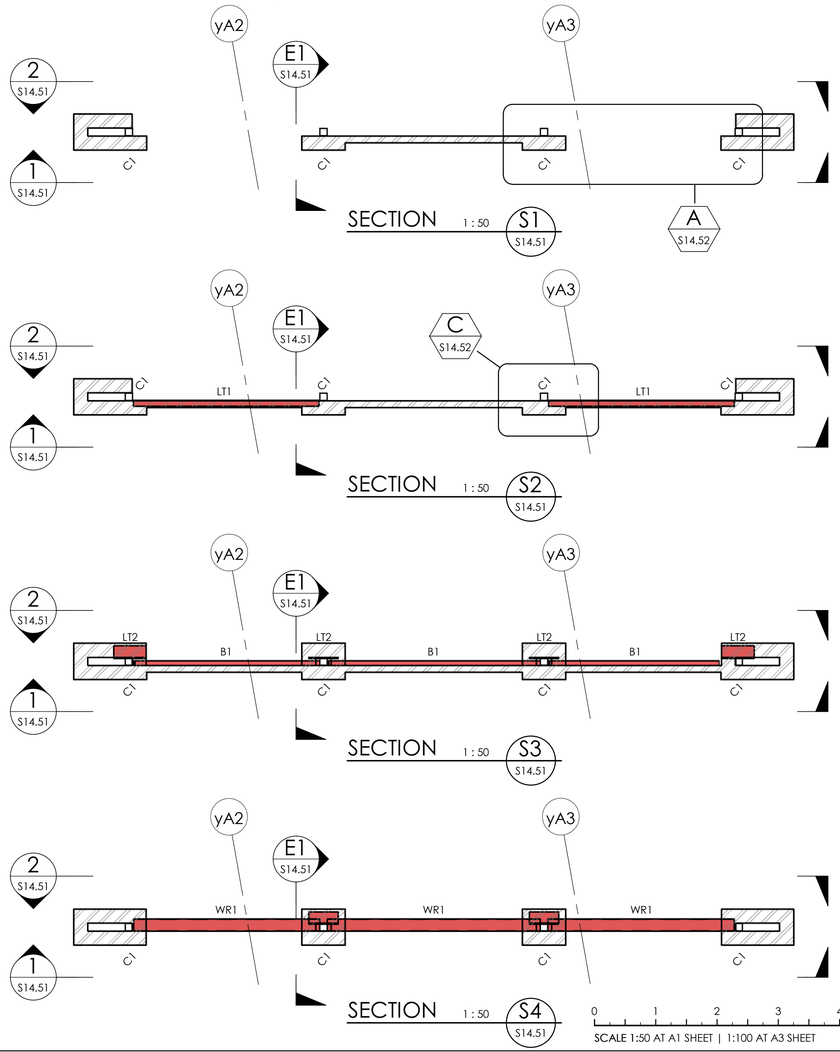
SECTION 1 : 50 — E1 S14.51



SECTION 1 : 50 — 2 S14.51 — FEATURE WALL ELEVATION (INTERNAL FACE)



FEATURE WALL



SECTION 1 : 50 — S1 S14.51

SECTION 1 : 50 — S2 S14.51

SECTION 1 : 50 — S3 S14.51

SECTION 1 : 50 — S4 S14.51

0 1 2 3 4 5m

SCALE 1:50 AT A1 SHEET | 1:100 AT A3 SHEET

WALL SCHEDULE

MARK	TYPE	THICKNESS	REMARKS
BK1	BRICKWORK	110	
BK2	BRICKWORK	230	

STEELWORK MEMBER SCHEDULE

MARK	MEMBER	SIZE	REMARKS
B1	BEAM	200PFC	
C1	STEEL COLUMN	125x125x9.0SHS	
LT1	LINTEL	150x100x16UA ⌊	# REFER NOTE BELOW
LT2	LINTEL	200x200x16EA	
WR1	WALL RESTRAINT	200x100x4.0RHS	

- ANGLE LINTEL TO PICK UP BRICK EXTERNAL LEAF ONLY. ROOF TO BE SUPPORTED BY INTERAL TIMBER LINTEL

AMENDMENTS	DATE	ISSUE	BY
ISSUE FOR CONSTRUCTION	29.04.21	1	CH.W
ISSUED FOR CONSTRUCTION	09.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	B	CH.W
ISSUED FOR CLIENT REVIEW	31.07.20	A	MA.C

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000
ALLEANZA ARCHITECTURE

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000
TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north BUILDING WITH TRUST®

PROJECT
ST. MATTHEWS - BLOCK A
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
HE.C	MA.C	JUL 2020	A1	TX13843.01-S01-R18

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

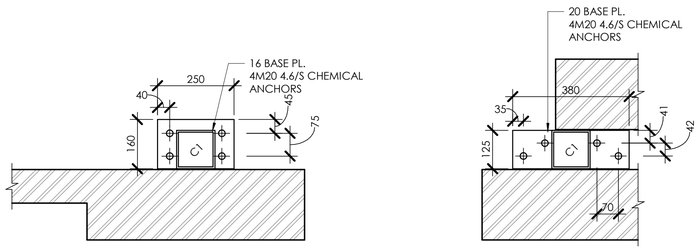
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PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

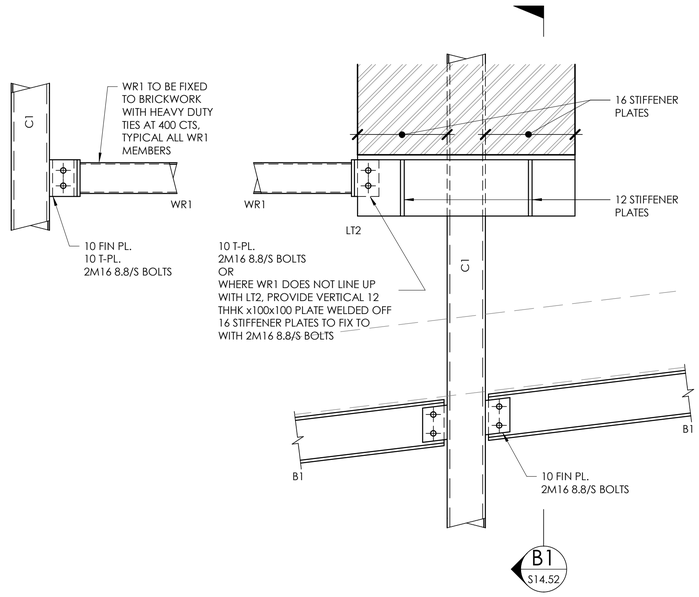
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BLOCK A
FEATURE WALL PLAN AND ELEVATIONS

PROJECT No TX13843.01 - DRAWING No S14.51 ISSUE 1

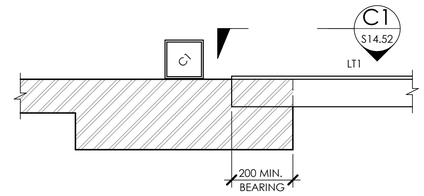


BASE PLATE DETAILS

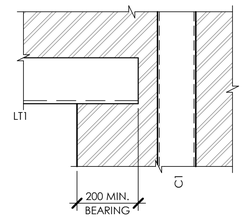
SCALE 1 : 10 AT A1

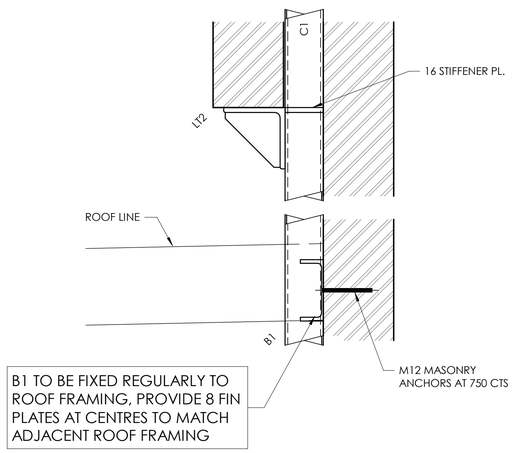


DETAIL 1 : 10 B S14.51



DETAIL 1 : 10 C S14.51





SECTION 1 : 10 C1 S14.52

SECTION 1 : 10 B1 S14.52

ISSUED FOR CONSTRUCTION 09.03.21 0 CH.W
AMENDMENTS DATE ISSUE BY

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000
ALLEANZA ARCHITECTURE

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000
TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north
BUILDING WITH TRUST®

PROJECT
ST. MATTHEWS - BLOCK A
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
HE.C	MA.C		A1	TX13843.01-S01-R18

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK A
FEATURE WALL DETAILS

PROJECT No TX13843.01 - DRAWING No S14.52 ISSUE 0

DRAWING LIST

S30.00 COVER SHEET

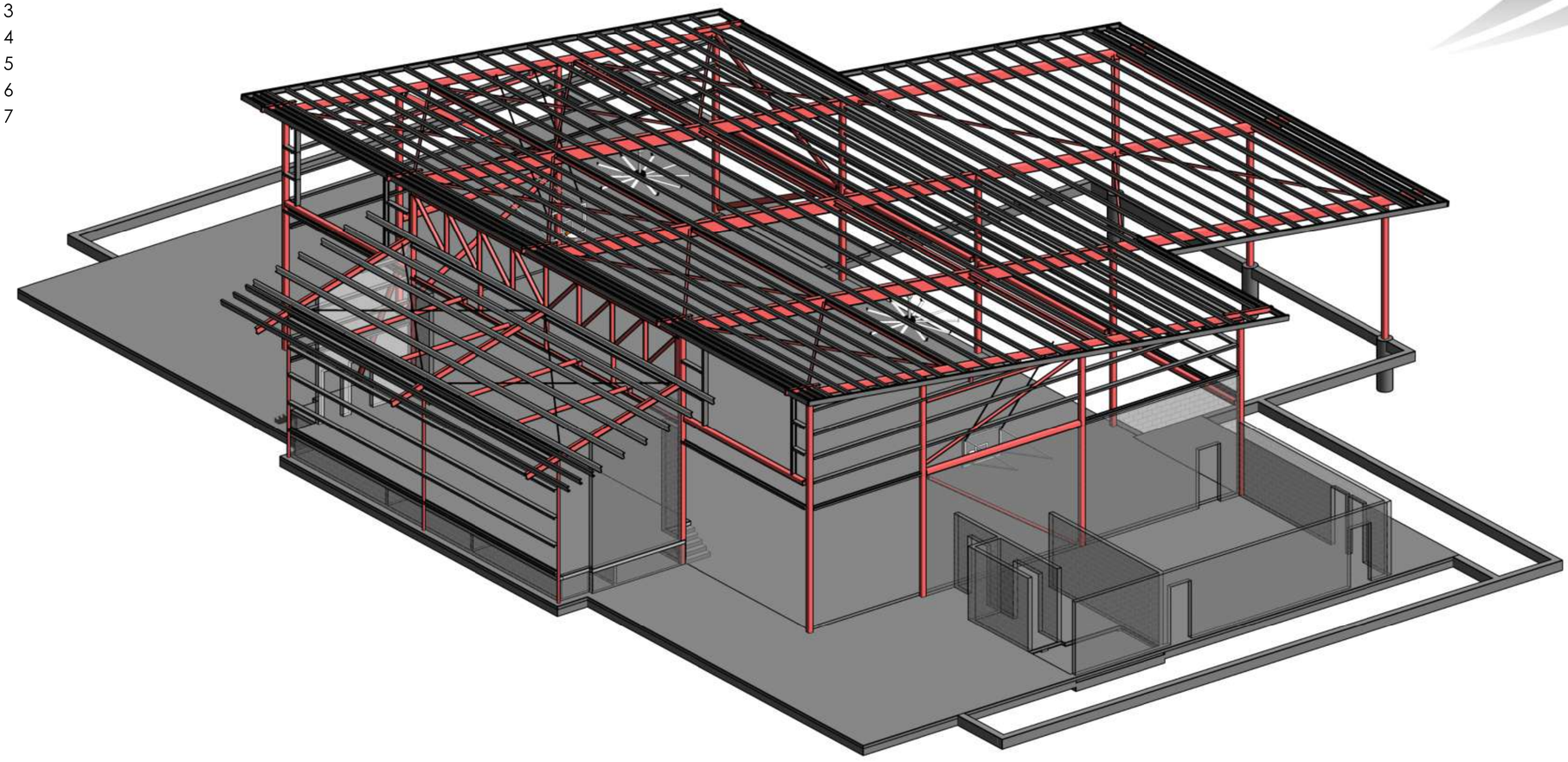
S31.01 FOOTING & GROUND FLOOR PLAN
S31.51 FOOTING & GROUND FLOOR DETAILS SHEET 1
S31.52 FOOTING & GROUND FLOOR DETAILS SHEET 2
S31.53 FOOTING & GROUND FLOOR DETAILS SHEET 3

S32.02 BONDEK SLAB PLAN

S33.01 ROOF STEELWORK PLAN
S33.02 LOWER ROOF STEELWORK PLAN
S33.11 ELEVATIONS & SECTIONS SHEET 1
S33.12 ELEVATIONS & SECTIONS SHEET 2
S33.13 ELEVATIONS & SECTIONS SHEET 3
S33.51 STEELWORK DETAILS SHEET 1
S33.52 STEELWORK DETAILS SHEET 2
S33.53 STEELWORK DETAILS SHEET 3
S33.54 STEELWORK DETAILS SHEET 4
S33.55 STEELWORK DETAILS SHEET 5
S33.56 STEELWORK DETAILS SHEET 6
S33.57 STEELWORK DETAILS SHEET 7

S35.51 WALLS DETAILS

ST MATTHEWS - BLOCK C
BROADHEAD ROAD, MUDGEE NSW 2850
STRUCTURAL DRAWINGS



AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	22.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	F	CH.W
RE-ISSUED FOR 80% DOCUMENTATION	30.09.20	E	MA.C
ISSUED FOR 80% DOCUMENTATION	26.08.20	D	CH.W
RE-ISSUED FOR 60% DOCUMENTATION	26.02.20	C	MA.C

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259

PROJECT
ST MATTHEWS - BLOCK C
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	SEPT 2019	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

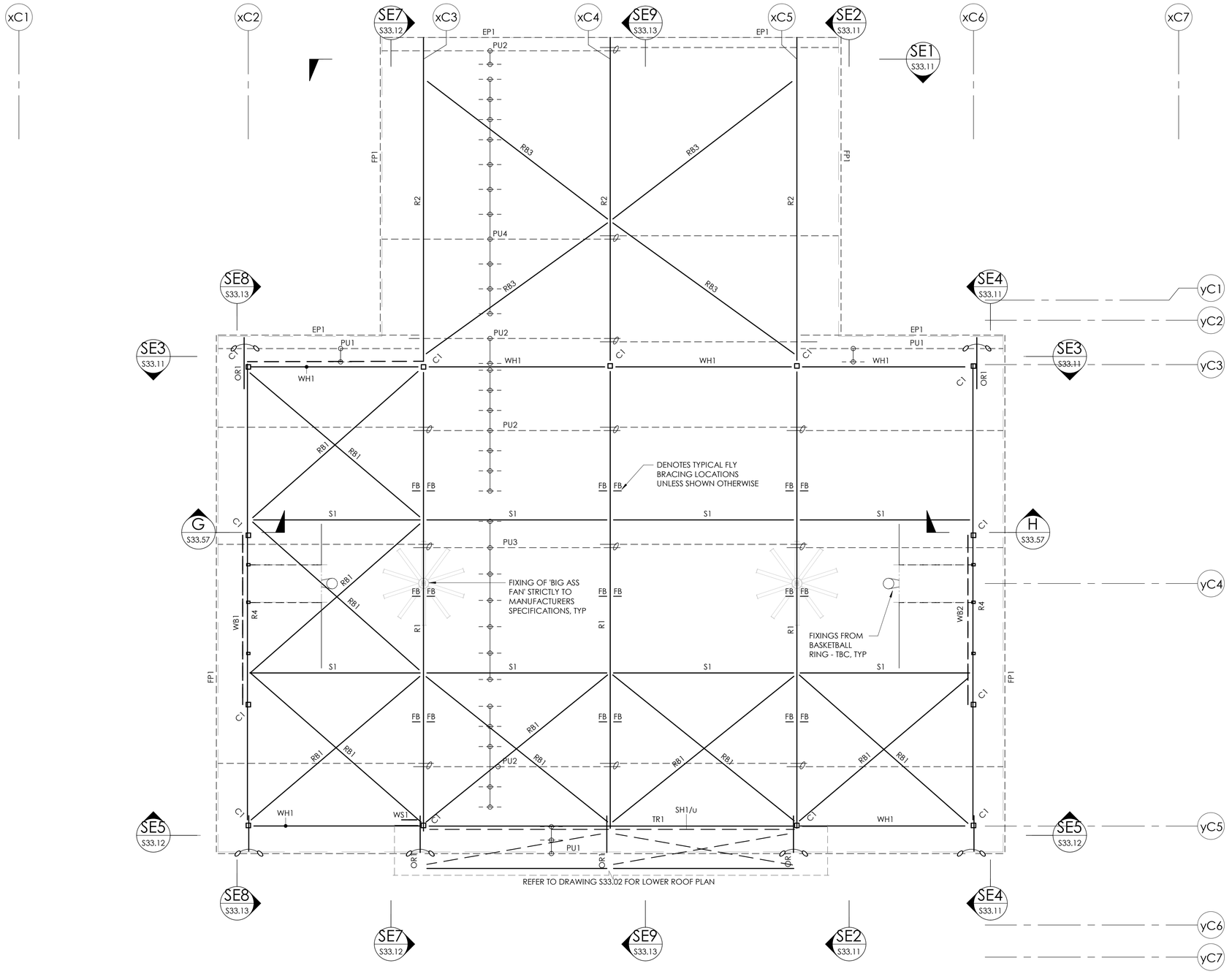
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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK C
COVER SHEET

PROJECT No TX13843.01 - DRAWING No S30.00 ISSUE 0



STEELWORK MEMBER SCHEDULE

MARK	MEMBER	SIZE	REMARKS
BB1	BASKETBALL HOOP SUPPORT	200x100x6.0RHS	
BH1	BASKETBALL HOOP HANGAR	150x100x6.0RHS	
BT1	TRIMMER BEAM	200PFC	6 CFW TO COLUMN
BT2	TRIMMER BEAM	200PFC	
C1	COLUMN	200x200x6.0SHS	
C2	COLUMN	200UB22.3	
OR1	OUTRIGGER	200UB25.4	
R1	RAFTER	530UB92.4	60mm PRE-CAMBER
R2	RAFTER	350x250x8.0RHS	
R3	RAFTER	250UB25.7	
R4	RAFTER	250x150x5.0RHS	
RB1	ROOF BRACING	90x90x6EA	
RB2	ROOF BRACING	16ROD	TO BOTTOM FLANGE
RB3	ROOF BRACING	50x2.5 FLAT PLATE	
S1	STRUT	150UC37.2	
S2	STRUT	114.3x4.5CHS	
SH1	STAGE HEADER	150x100x6.0RHS	
SH2	STAGE HANGAR	150x100x6.0RHS	
WB1	WALL BRACING	200x100x6.0RHS	
WB2	WALL BRACING	100x100x5.0SHS	
WH1	WINDOW HEADER	200x100x5.0RHS	LAID FLAT
WH2	WINDOW HEADER	200x200x5.0SHS	
WH3	HEADER	125x125x4.0SHS	
WH4	HEADER	200PFC	6 CFW TO COLUMN
WS1	WALL STRUT	150x150x9.0SHS	

PURLIN & GIRT SCHEDULE

MARK	MEMBER	SIZE	MAX CTS	LAP	BRIDGING
EP1	PURLIN	C200-24	600		2 ROWS
FP1	PURLIN	C200-24	600		2 ROWS
GT1	GIRT TRIMMER	C200-19	-		-
GU1	GIRT	C200-19	1200		2 ROWS
PU1	PURLIN	C200-24	600		2 ROWS
PU2	PURLIN	Z200-24	900	900	1 ROW
PU3	PURLIN	Z200-19	1200	900	1 ROW
PU4	PURLIN	Z200-19	1200 (U.N.O. ON PLAN)	900	1 ROW
PU5	PURLIN	Z200-24	1200	900	2 ROWS

ROOF STEELWORK PLAN

SCALE 1 : 100 AT A1

0 1 2 3 4 5 6 7 8 9 10m

SCALE 1:100 AT A1 SHEET | 1:200 AT A3 SHEET

ISSUED FOR CONSTRUCTION	16.04.21	I	CH.W
ISSUED FOR CONSTRUCTION	22.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	F	CH.W
RE-ISSUED FOR 80% DOCUMENTATION	30.09.20	E	MA.C
ISSUED FOR 80% DOCUMENTATION	26.08.20	D	CH.W
AMENDMENTS	DATE	ISSUE	BY

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259

PROJECT
ST MATTHEWS - BLOCK C
BROADHEAD ROAD, MUDGEE NSW 2850

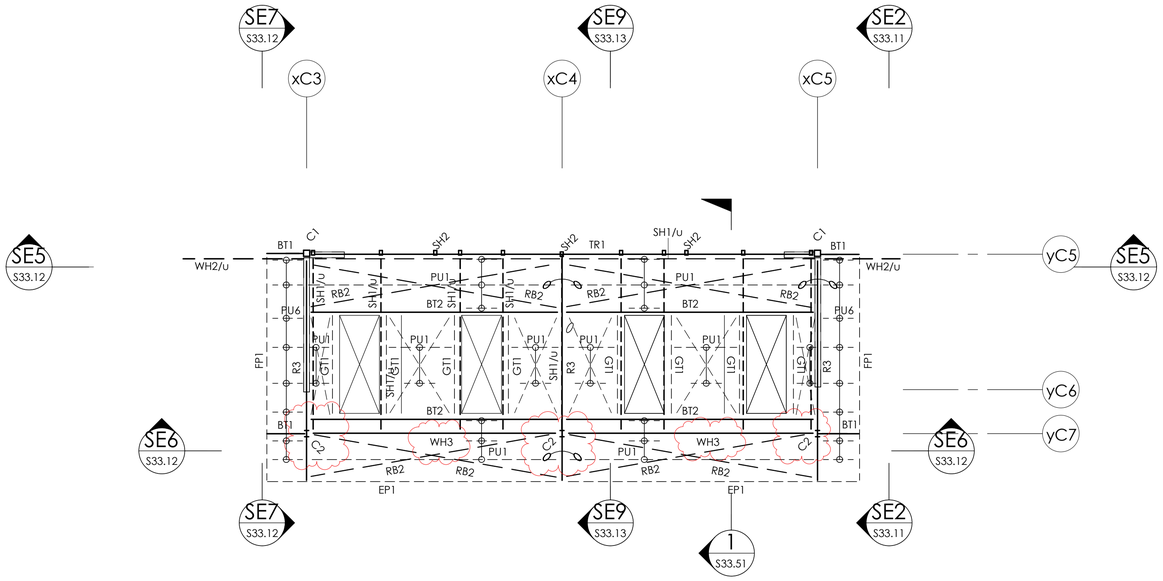
DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	SEPT 2019	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

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PO BOX A203, SYDNEY SOUTH NSW 1235
ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK C
ROOF STEELWORK PLAN

PROJECT No TX13843.01 - DRAWING No S33.01 ISSUE 1



LOWER ROOF STEELWORK PLAN

SCALE 1 : 100 AT A1

STEELWORK MEMBER SCHEDULE

MARK	MEMBER	SIZE	REMARKS
BB1	BASKETBALL HOOP SUPPORT	200x100x6.0RHS	
BH1	BASKETBALL HOOP HANGAR	150x100x6.0RHS	
BT1	TRIMMER BEAM	200PFC	6 CFW TO COLUMN
BT2	TRIMMER BEAM	200PFC	
C1	COLUMN	200x200x6.0SHS	
C2	COLUMN	200UB22.3	
OR1	OUTRIGGER	200UB25.4	
R1	RAFTER	530UB92.4	60mm PRE-CAMBER
R2	RAFTER	350x250x8.0RHS	
R3	RAFTER	250UB25.7	
R4	RAFTER	250x150x5.0RHS	
RB1	ROOF BRACING	90x90x6EA	
RB2	ROOF BRACING	16ROD	TO BOTTOM FLANGE
RB3	ROOF BRACING	50x2.5 FLAT PLATE	
S1	STRUT	150UC37.2	
S2	STRUT	114.3x4.5CHS	
SH1	STAGE HEADER	150x100x6.0RHS	
SH2	STAGE HANGAR	150x100x6.0RHS	
WB1	WALL BRACING	200x100x6.0RHS	
WB2	WALL BRACING	100x100x5.0SHS	
WH1	WINDOW HEADER	200x100x5.0RHS	LAID FLAT
WH2	WINDOW HEADER	200x200x5.0SHS	
WH3	HEADER	125x125x4.0SHS	
WH4	HEADER	200PFC	6 CFW TO COLUMN
WS1	WALL STRUT	150x150x9.0SHS	

PURLIN & GIRT SCHEDULE

MARK	MEMBER	SIZE	MAX CTS	LAP	BRIDGING
EP1	PURLIN	C200-24	600		2 ROWS
FP1	PURLIN	C200-24	600		2 ROWS
GT1	GIRT TRIMMER	C200-19	-		-
GU1	GIRT	C200-19	1200		2 ROWS
PU1	PURLIN	C200-24	600		2 ROWS
PU2	PURLIN	Z200-24	900	900	1 ROW
PU3	PURLIN	Z200-19	1200	900	1 ROW
PU4	PURLIN	Z200-19	1200 (U.N.O. ON PLAN)	900	1 ROW
PU5	PURLIN	Z200-24	1200	900	2 ROWS

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	16.04.21	1	CH.W
ISSUED FOR CONSTRUCTION	31.03.21	0	CH.W

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259

PROJECT
ST MATTHEWS - BLOCK C
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C		A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

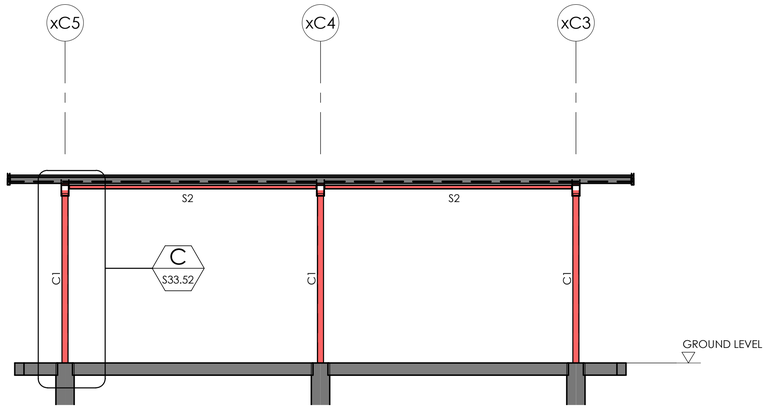
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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

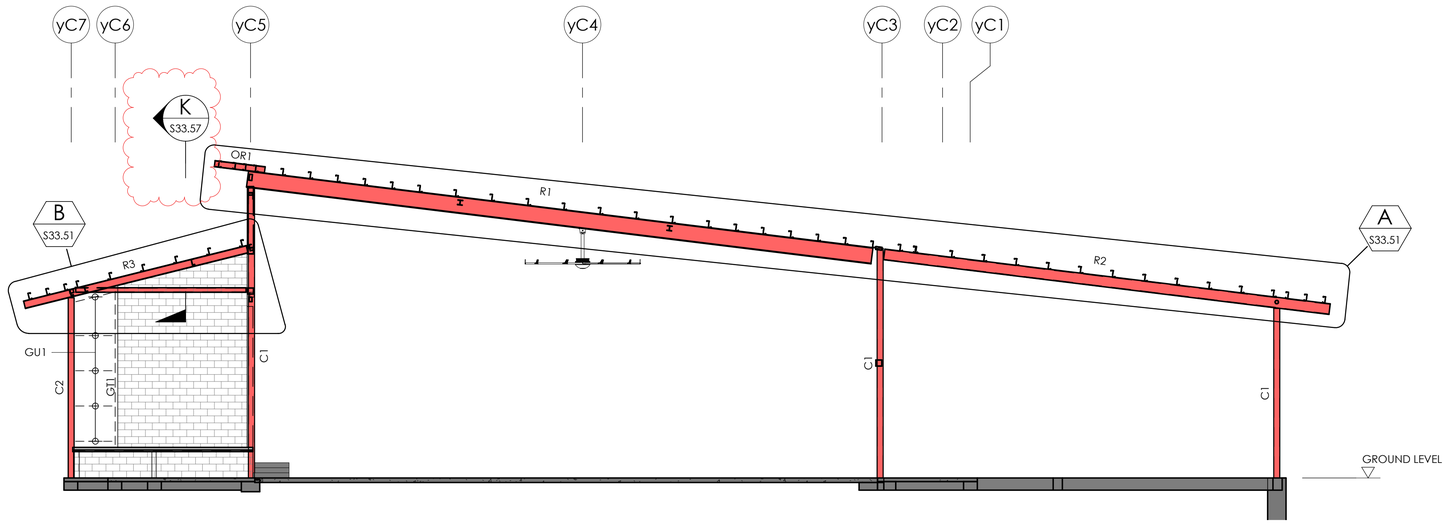
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BLOCK C
LOWER ROOF STEELWORK PLAN

PROJECT No TX13843.01 - DRAWING No S33.02 ISSUE 1



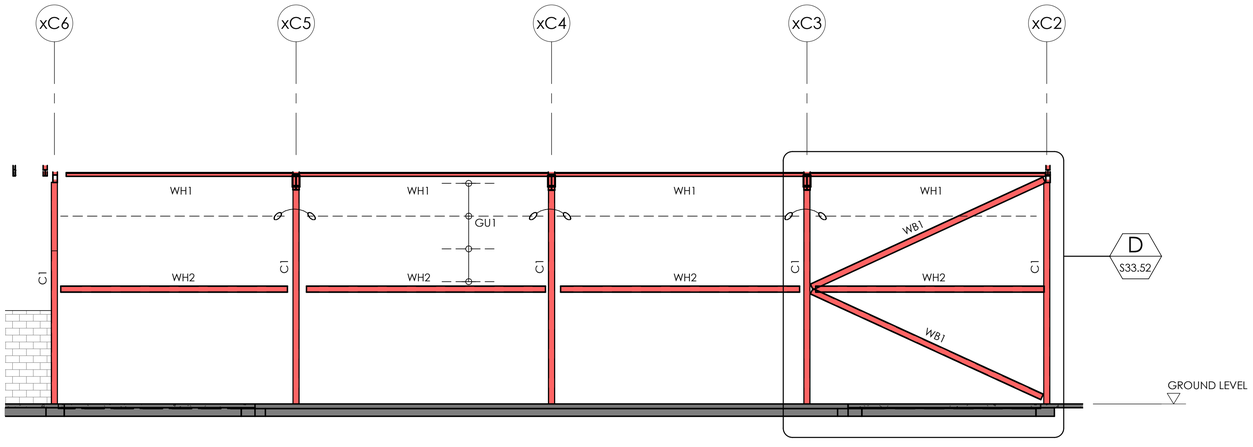
SE1 - STEELWORK ELEVATION

SCALE 1 : 100 AT A1



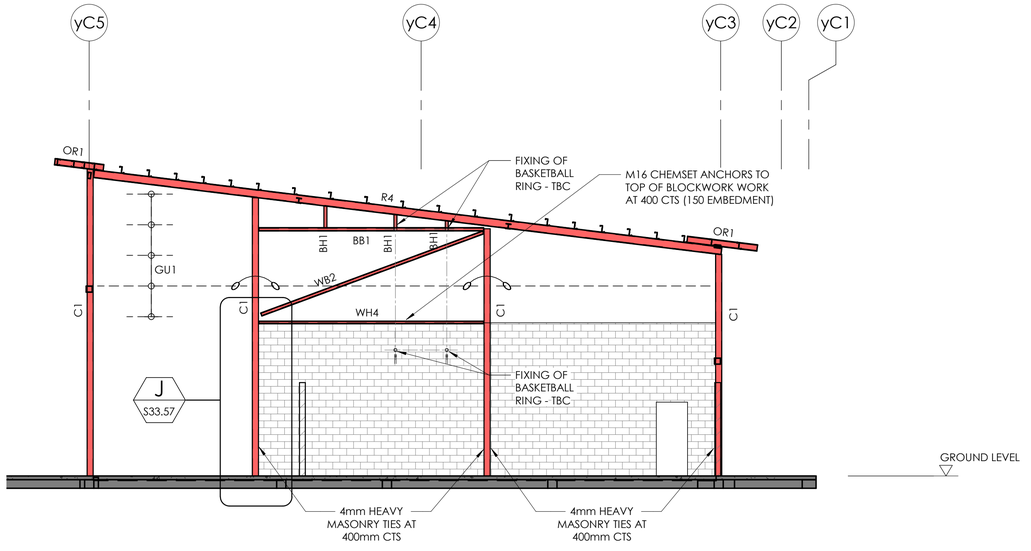
SE2 - STEELWORK ELEVATION

SCALE 1 : 100 AT A1



SE3 - STEELWORK ELEVATION

SCALE 1 : 100 AT A1



SE4 - STEELWORK ELEVATION

SCALE 1 : 100 AT A1

0 1 2 3 4 5 6 7 8 9 10m

SCALE 1:100 AT A1 SHEET | 1:200 AT A3 SHEET

ISSUED FOR CONSTRUCTION	28.04.21	3	CH.W
ISSUED FOR CONSTRUCTION	16.04.21	2	CH.W
ISSUED FOR CONSTRUCTION	31.03.21	1	CH.W
ISSUED FOR CONSTRUCTION	22.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	F	CH.W
AMENDMENTS	DATE	ISSUE	BY

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
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SYDNEY NSW 2000

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259

PROJECT
ST MATTHEWS - BLOCK C
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	SEPT 2019	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

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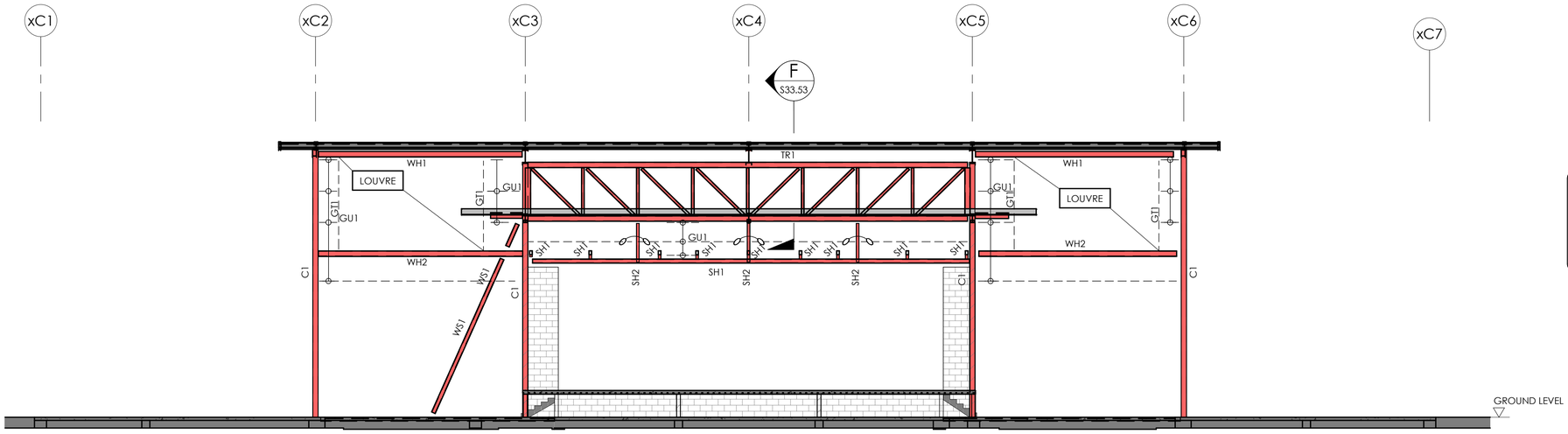
SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK C
ELEVATIONS & SECTIONS SHEET 1

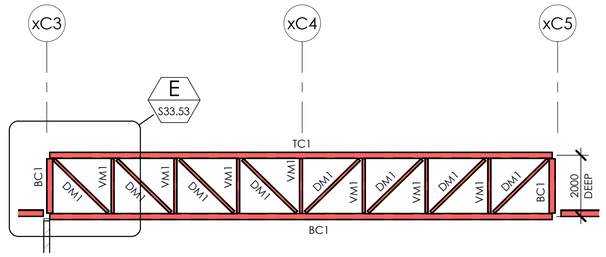
PROJECT No TX13843.01 - DRAWING No S33.11 ISSUE 3

TRUSS MEMBER SCHEDULE			
MARK	MEMBER	SIZE	REMARKS
BC1	BOTTOM CHORD	200x200x6.0SHS	
DM1	DIAGONAL MEMBER	150x100x6.0RHS	
TC1	TOP CHORD	200x200x6.0SHS	
VM1	VERTICAL MEMBER	150x100x6.0RHS	



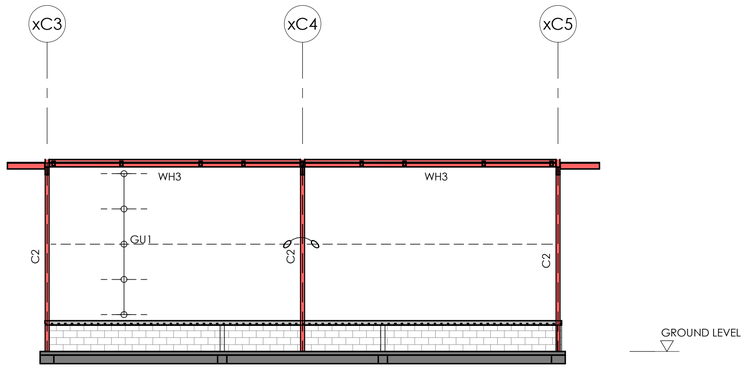
SE5 - STEELWORK ELEVATION

SCALE 1 : 100 AT A1



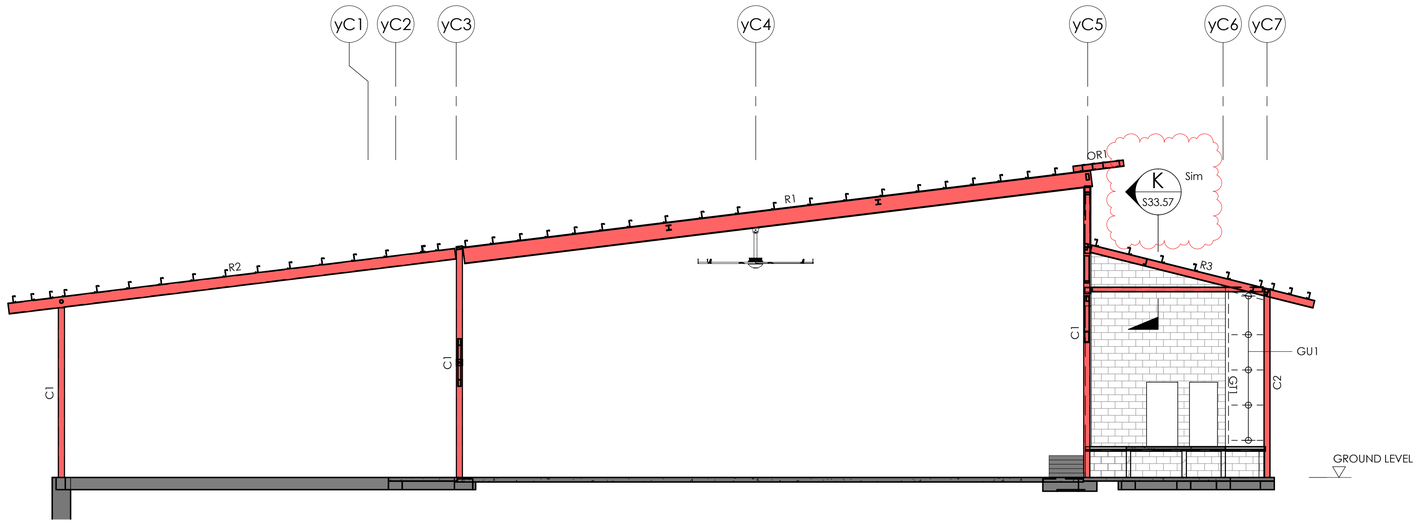
TR1 - TRUSS ELEVATION

SCALE 1 : 100 AT A1



SE6 - STEELWORK ELEVATION

SCALE 1 : 100 AT A1



SE7 - STEELWORK ELEVATION

SCALE 1 : 100 AT A1

0 1 2 3 4 5 6 7 8 9 10m

SCALE 1:100 AT A1 SHEET | 1:200 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	28.04.21	3	CH.W
ISSUED FOR CONSTRUCTION	16.04.21	2	CH.W
ISSUED FOR CONSTRUCTION	31.03.21	1	CH.W
ISSUED FOR CONSTRUCTION	22.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	F	CH.W

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
BUILDING WITH TRUST®

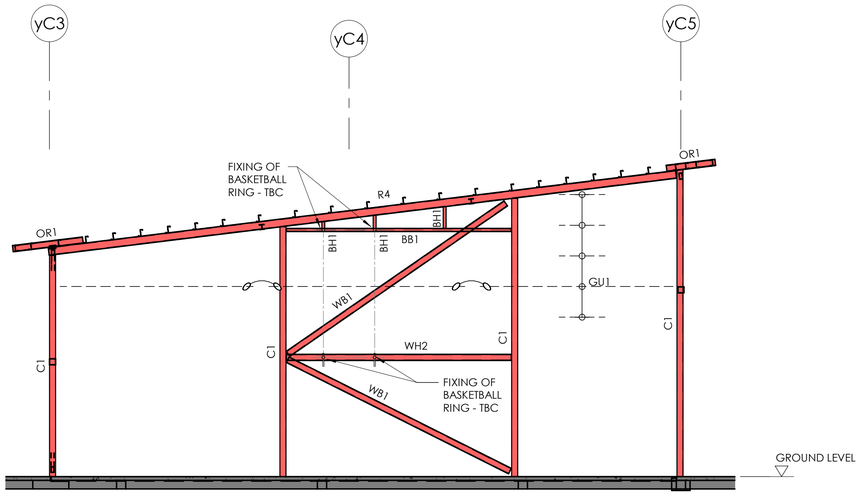
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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235
ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

PROJECT
ST MATTHEWS - BLOCK C
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	SEPT 2019	A1	TX13843.01-S01

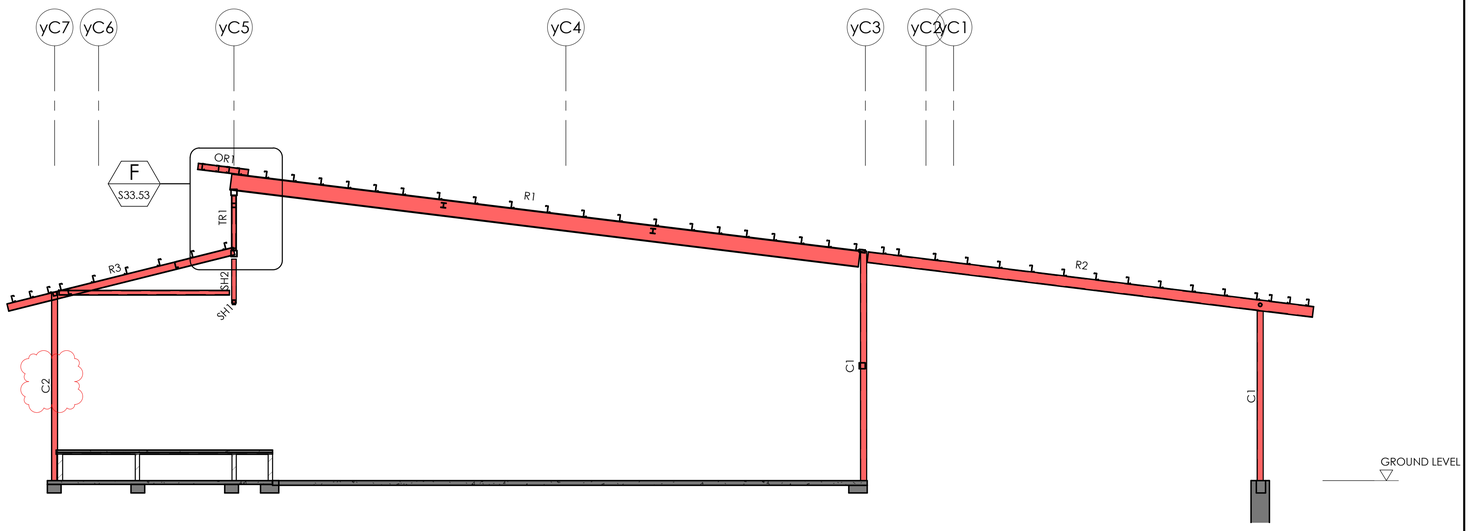
DRAWING TITLE
BLOCK C
ELEVATIONS & SECTIONS SHEET 2

PROJECT No TX13843.01 - DRAWING No S33.12 ISSUE 3



SE8 - STEELWORK ELEVATION

SCALE 1 : 100 AT A1



SE9 - STEELWORK ELEVATION

SCALE 1 : 100 AT A1

0 1 2 3 4 5 6 7 8 9 10m

SCALE 1:100 AT A1 SHEET | 1:200 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	16.04.21	1	CH.W
ISSUED FOR CONSTRUCTION	22.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	F	CH.W
RE-ISSUED FOR 80% DOCUMENTATION	30.09.20	E	MA.C
ISSUED FOR 80% DOCUMENTATION	26.08.20	D	CH.W

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000
ALLEANZA ARCHITECTURE

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000
TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north
BUILDING WITH TRUST®

PROJECT
ST MATTHEWS - BLOCK C
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	SEPT 2019	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

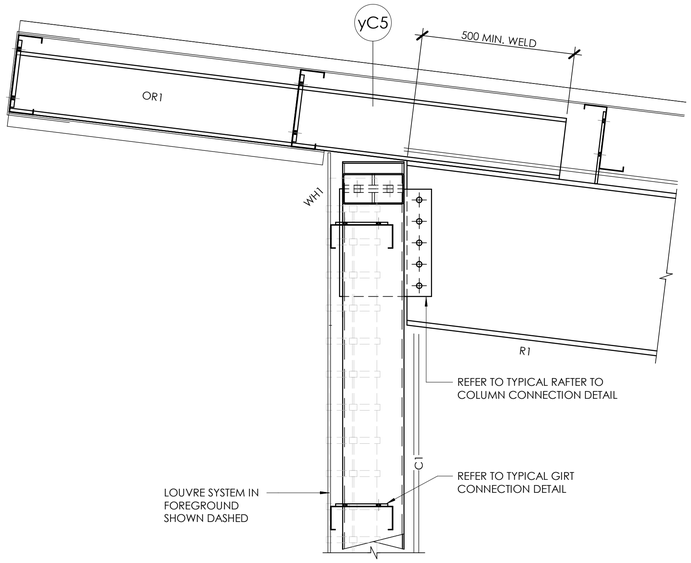
1300 874 294 | TRIAXIAL.COM.AU

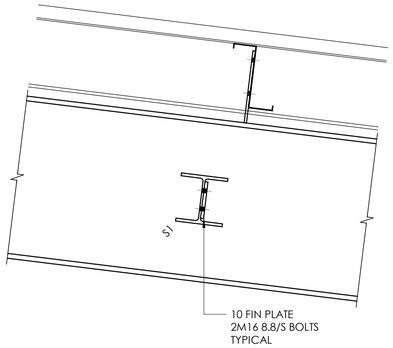
SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

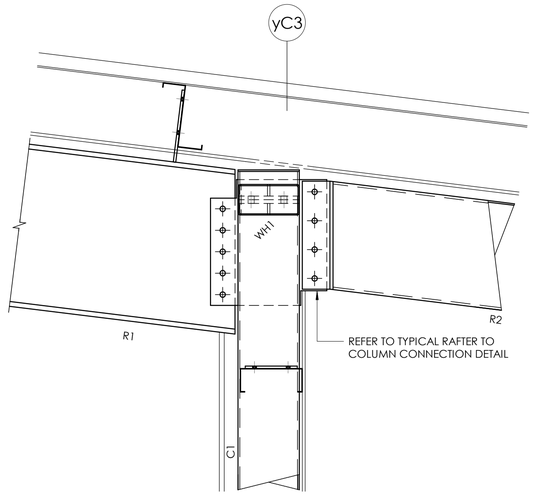
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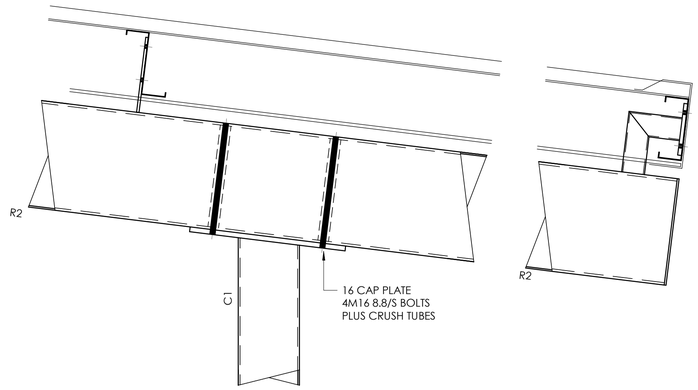
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BLOCK C
ELEVATIONS & SECTIONS SHEET 3

PROJECT No TX13843.01 - DRAWING No S33.13 ISSUE 1

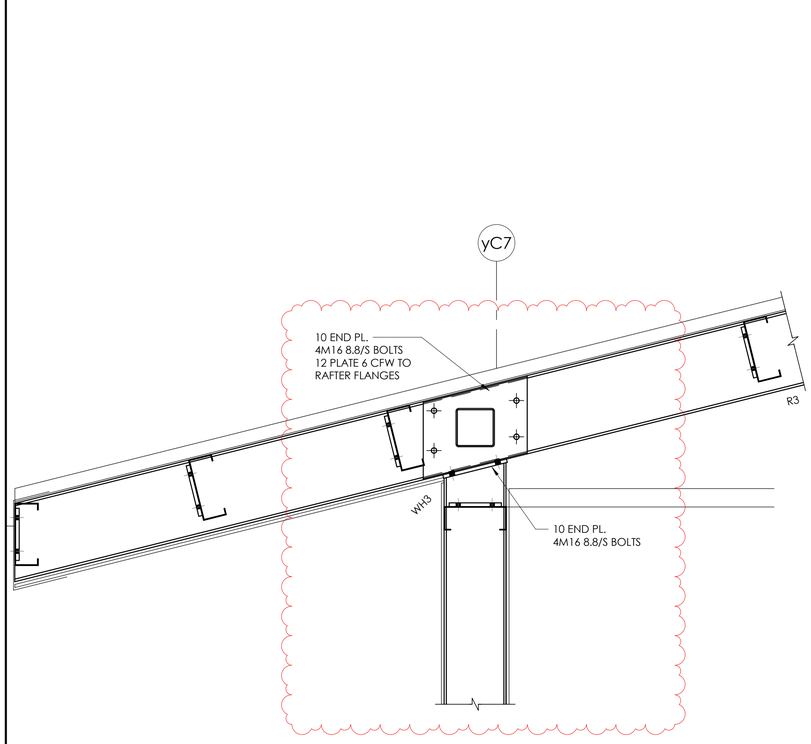




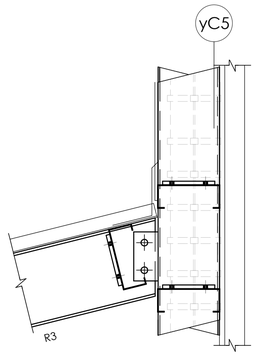


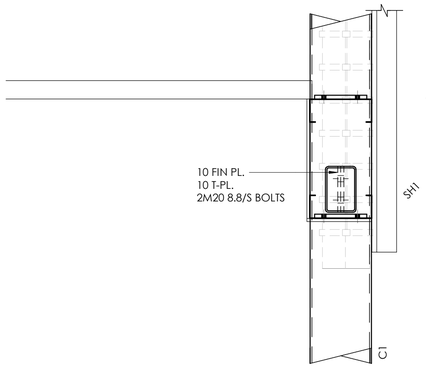


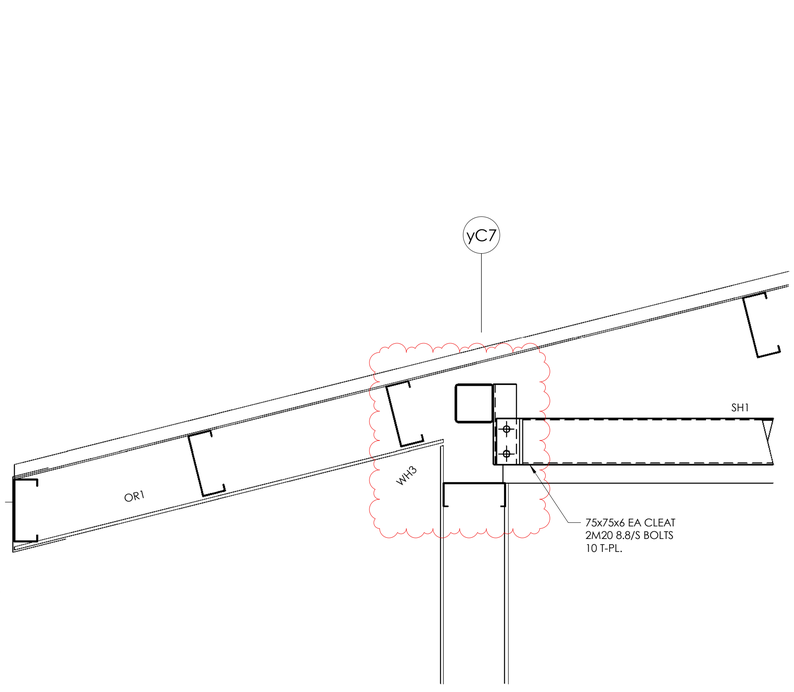
DETAIL 1 : 10 A S33.11



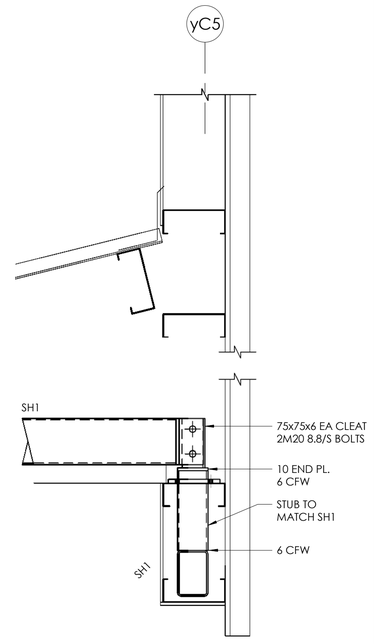
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DETAIL 1 : 10 1 S33.02



0 200 400 600 800 1000mm

SCALE 1:10 AT A1 SHEET | 1:20 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	16.04.21	1	CH.W
ISSUED FOR CONSTRUCTION	22.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
RE-ISSUED FOR 80% DOCUMENTATION	30.09.20	B	MA.C
ISSUED FOR 80% DOCUMENTATION	26.08.20	A	CH.W

FOR CONSTRUCTION

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SYDNEY NSW 2000
TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north BUILDING WITH TRUST®

PROJECT
ST MATTHEWS - BLOCK C
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C		A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

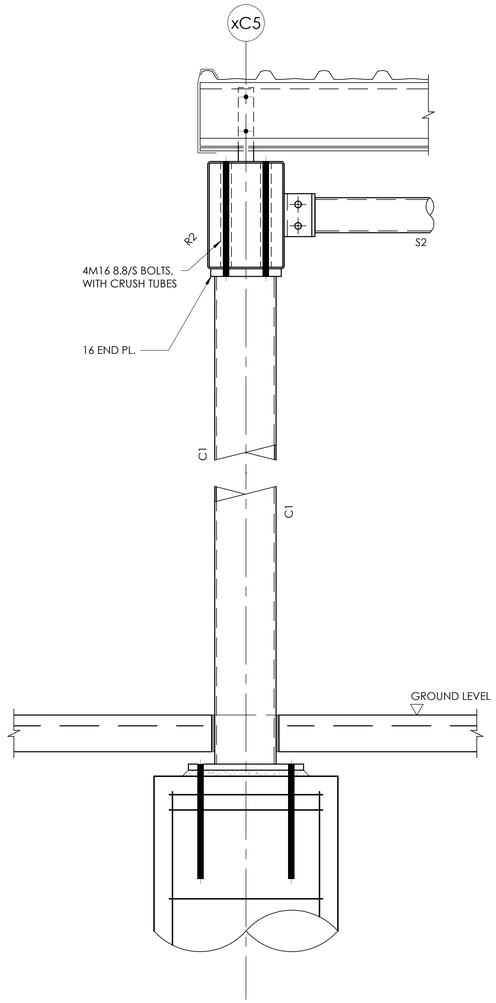
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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

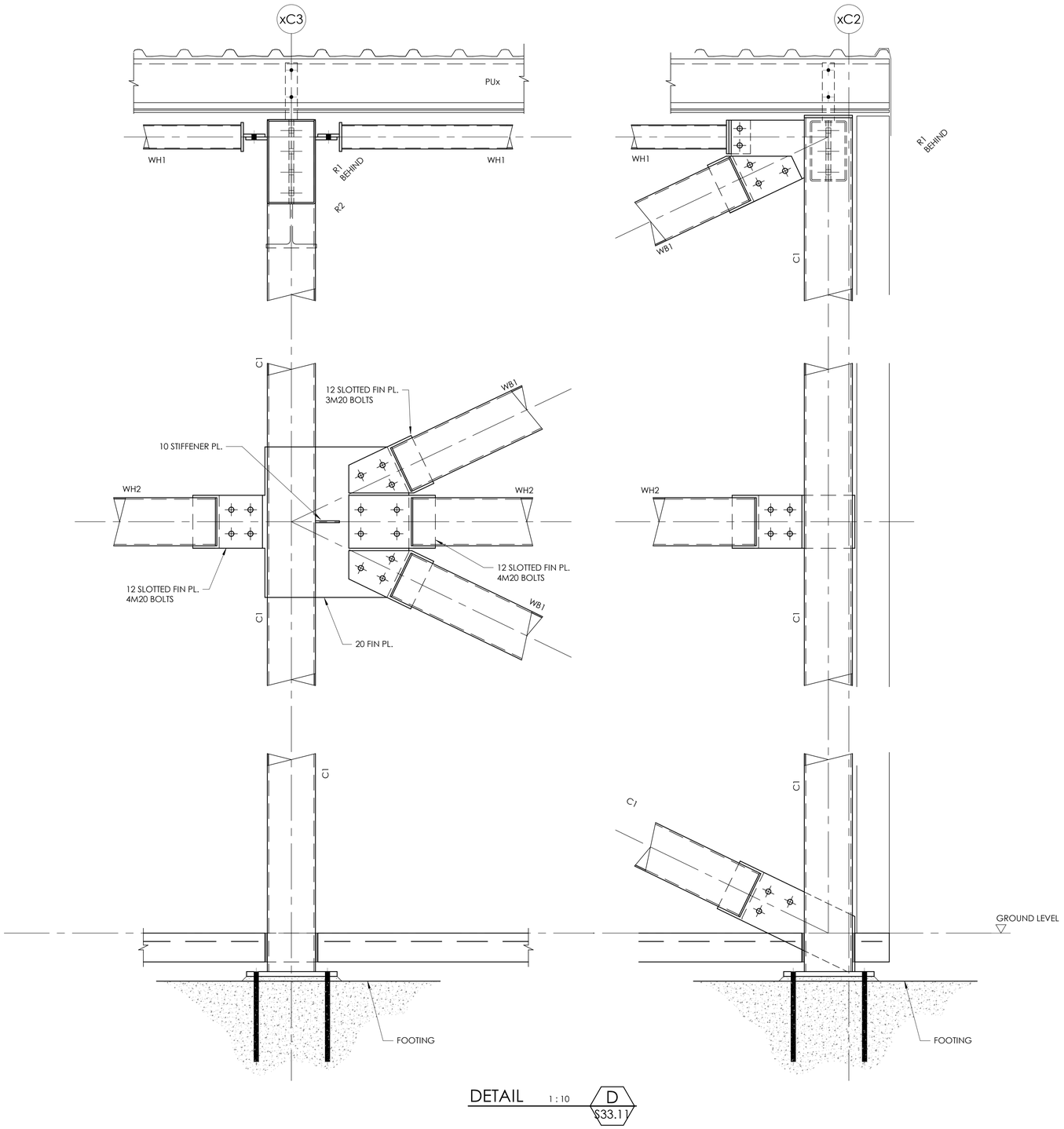
ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK C
STEELWORK DETAILS SHEET 1

PROJECT No TX13843.01 - DRAWING No S33.51 ISSUE 1



DETAIL 1 : 10 C §33.11



DETAIL 1 : 10 D §33.11

0 200 400 600 800 1000mm

SCALE 1:10 AT A1 SHEET | 1:20 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	22.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
RE-ISSUED FOR 80% DOCUMENTATION	30.09.20	B	MA.C
ISSUED FOR 80% DOCUMENTATION	26.08.20	A	CH.W

FOR CONSTRUCTION

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NORTH CONSTRUCTIONS
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TUGGERAH NSW 2259
north
BUILDING WITH TRUST®

PROJECT
ST MATTHEWS - BLOCK C
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	JULY 2020	A1	TX13843.01-S01

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COMPLEX PROBLEMS RESOLVED SIMPLY

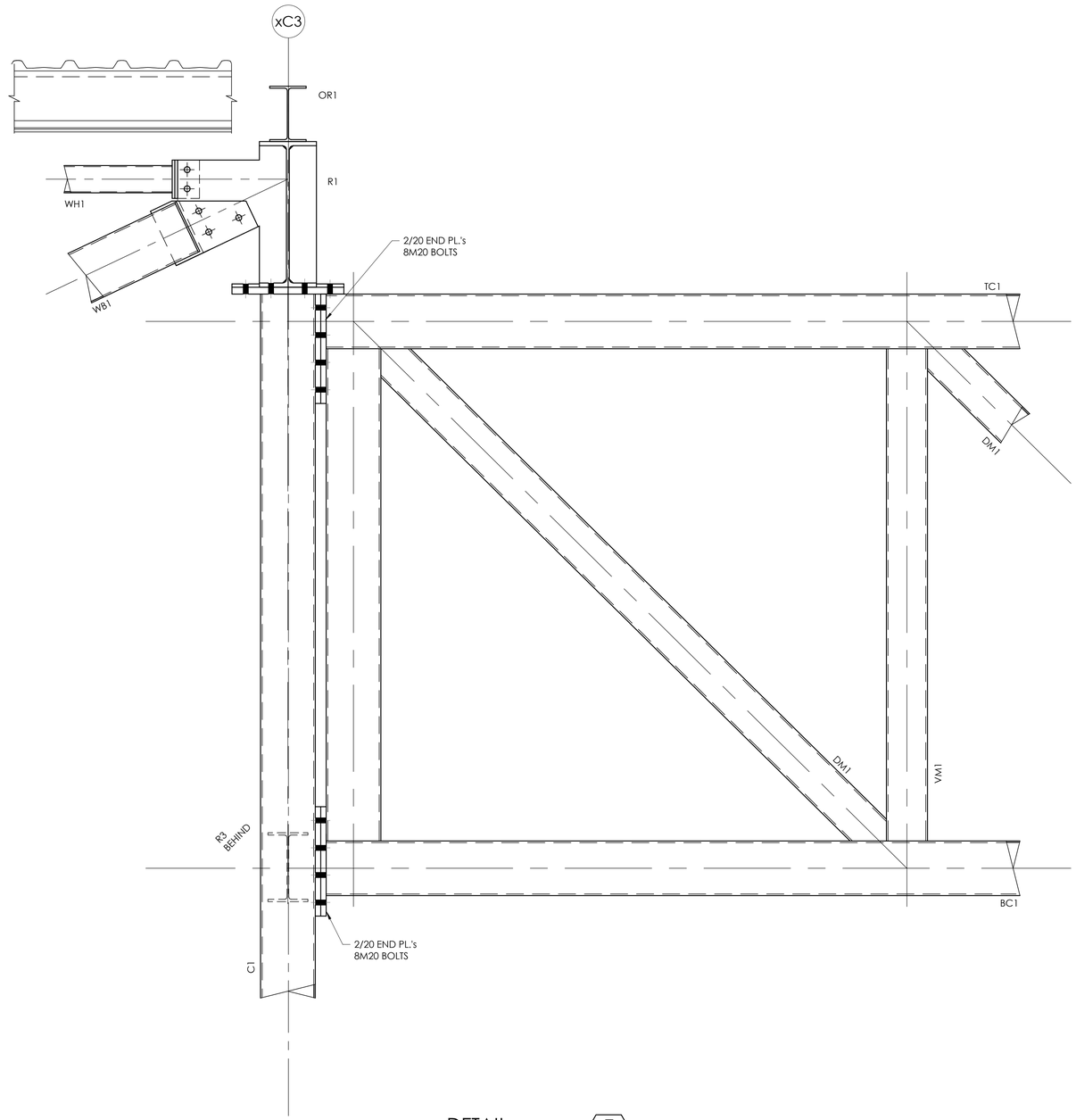
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PO BOX A203, SYDNEY SOUTH NSW 1235

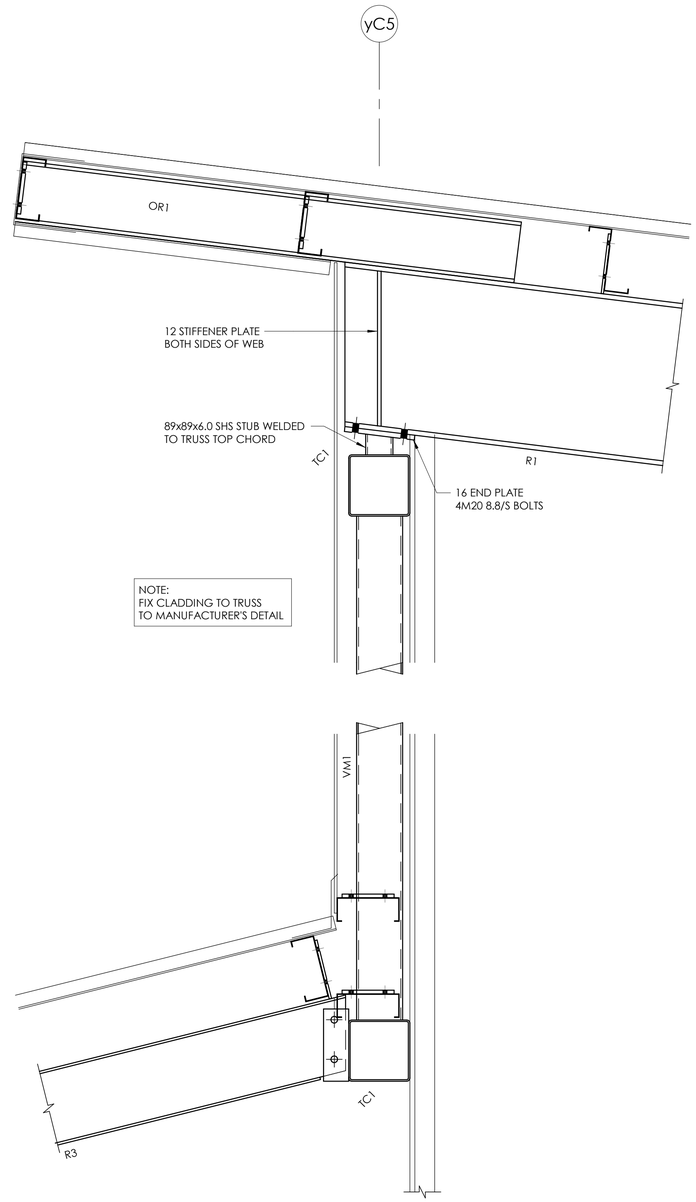
ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK C
STEELWORK DETAILS SHEET 2

PROJECT No TX13843.01 - DRAWING No S33.52 ISSUE 0



DETAIL 1 : 10 E S33.12



DETAIL 1 : 10 F S33.12

0 200 400 600 800 1000mm

SCALE 1:10 AT A1 SHEET | 1:20 AT A3 SHEET

ISSUED FOR CONSTRUCTION	22.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
RE-ISSUED FOR 80% DOCUMENTATION	30.09.20	B	MA.C
ISSUED FOR 80% DOCUMENTATION	26.08.20	A	CH.W
AMENDMENTS	DATE	ISSUE	BY

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TUGGERAH NSW 2259
north
BUILDING WITH TRUST®

PROJECT
ST MATTHEWS - BLOCK C
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	JULY 2020	A1	TX13843.01-S01

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COMPLEX PROBLEMS RESOLVED SIMPLY

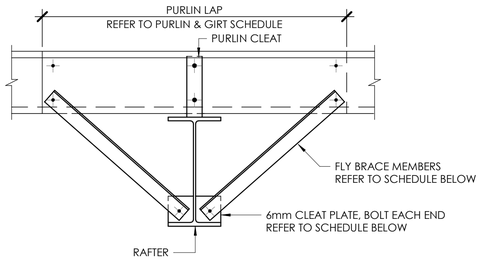
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DRAWING TITLE
BLOCK C
STEELWORK DETAILS SHEET 3

PROJECT No TX13843.01 - DRAWING No S33.53 ISSUE 0



FLY BRACING TO RAFTER DETAIL.
HORIZONTAL FLY BRACING TO GIRTS AT COLUMNS SIMILAR

FLY BRACING SCHEDULE

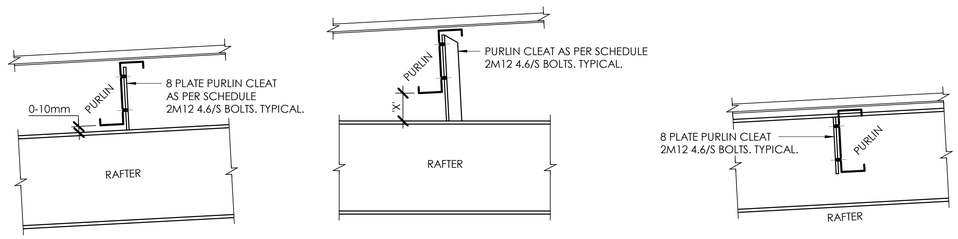
RAFTER/COLUMN	FLY BRACE (G300)	FLY BRACE (DURAGAL)	BOLTS
≤ 410UB	50×50×3 EA	50×50×4.0 CA	M12 8.8/S

FLY BRACING NOTE:

THE FLY BRACING IS A CRITICAL ELEMENT PROVIDING STABILITY TO THE STRUCTURE.
FLY BRACING MUST BE INSTALLED AT THE TIME OF INSTALLATION OF THE PURLINS, GIRTS & WALL SYSTEM.
THERE SHALL BE NO ADDITIONAL LOAD (OTHER THAN PURLINS) PLACED ON RAFTERS
UNTIL ALL RAFTER & COLUMN FLY BRACING IS INSTALLED.
REFER ANY ALTERATION FROM THIS REQUIREMENT TO TRIAXIAL CONSULTING.

FLY BRACING DETAILS (FB)

SCALE 1:10 AT A1



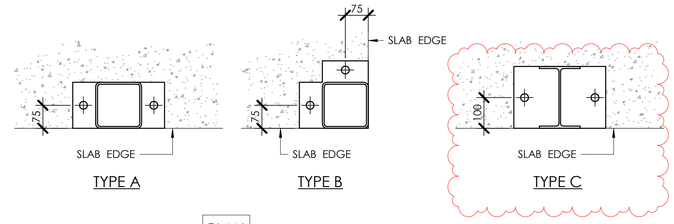
GIRT DETAIL AT COLUMNS SIMILAR

PURLIN & GIRT CLEAT SCHEDULE

PITCH	'X' (mm)	CLEAT SIZE
<5°	0 - 10	60 × 8 PLATE
	11 - 40	60 × 10 PLATE
	41 - 100	75 × 10 PLATE
SCHEDULE APPLICABLE TO PURLINS & GIRTS UP TO Z/C250 SIZE ONLY		

TYPICAL PURLIN/GIRT CONNECTION DETAIL

NOT TO SCALE



PLAN

NOTE:

6 C.F.W. CATEGORY SP TO COLUMN (U.N.O.)
ALL BASE PLATE GROUT TO BE HIGH-STRENGTH, NON-SHRINK GROUT (>50MPa)

COLUMN BASE PLATE SCHEDULE

MEMBER	BASE PLATE			ANCHORS		REMARKS
	TYPE	THICKNESS	GROUT	ANCHOR BOLTS	TYPE (REFER SPEC.)	
C1	A/B	20mm	20mm	4M20	CHEMICAL ANCHOR	
C2	A	20mm	20mm	2M20	CHEMICAL ANCHOR	

ANCHOR SPECIFICATIONS

TYPE	ANCHOR	EMBEDMENT	REMARKS
CHEMICAL ANCHOR	M12	110	CHEMSET 801 OR APPROVED EQUIVALENT. REFER TO MANUFACTURER FOR HOLE PREPARATION AND MINIMUM CURING TIMES.
	M16	125	
	M20	150	
	M24	200	

BASE PLATE BOLTS HOLE SPECIFICATIONS

ANCHOR SIZE (mm)	HOLE DIA.	WASHERS (MIN.) #
M12	18	Ø42mm × 4mm THICK
M16	22	Ø50mm × 4mm THICK
M20	26	Ø58mm × 4mm THICK
M24	30	Ø66mm × 4mm THICK
M30	36	Ø78mm × 4mm THICK
M36	42	Ø90mm × 4mm THICK
# ALTERNATIVE: USE SQUARE WASHERS CUT FROM FLAT PLATE, G250 MIN.		

COLUMN BASE PLATE DETAILS

SCALE 1:10 AT A1

0 200 400 600 800 1000mm

SCALE 1:10 AT A1 SHEET | 1:20 AT A3 SHEET

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5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north
BUILDING WITH TRUST®

PROJECT
ST MATTHEWS - BLOCK C
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	JULY 2020	A1	TX13843.01-S01

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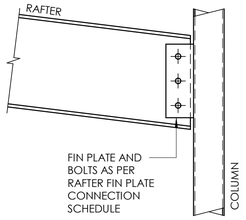
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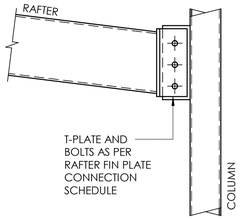
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PO BOX A203, SYDNEY SOUTH NSW 1235

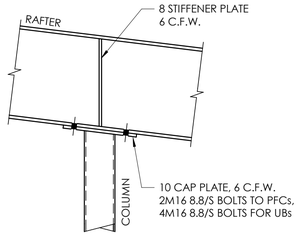
ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

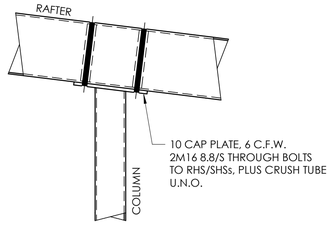
DRAWING TITLE
BLOCK C
STEELWORK DETAILS SHEET 4

PROJECT No: TX13843.01
DRAWING No: S33.54
ISSUE: 1



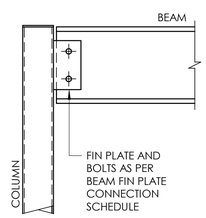




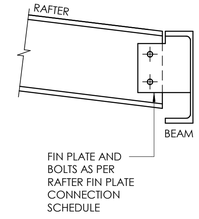


RAFTER FIN PLATE CONNECTION SCHEDULE		
MEMBER	FIN PLATE (6 C.F.W.)	BOLT SPEC 8.8/S
R1	16mm	5M20
R2	12mm (T-PLATE)	4M20
R3	10mm	2M16
R4	10mm	2M16

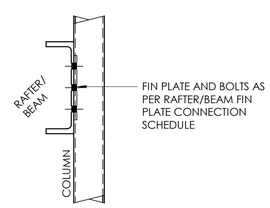
TYPICAL RAFTER TO COLUMN CONNECTION DETAILS
SCALE 1:10 AT A1



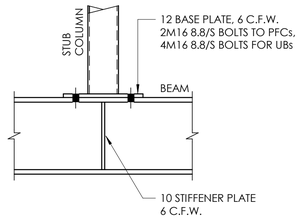
TYPICAL BEAM TO COLUMN CONNECTION DETAILS
SCALE 1:10 AT A1



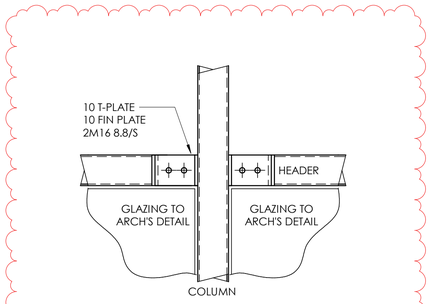
TYPICAL RAFTER TO BEAM CONNECTION DETAILS
SCALE 1:10 AT A1



OFFSET RAFTER/BEAM TO COLUMN CONNECTION
SCALE 1:10 AT A1



TYPICAL STUB COLUMN TO BEAM CONNECTION DETAILS
SCALE 1:10 AT A1



WINDOW SILL CONNECTION SIMILAR

TYPICAL WINDOW HEADER CONNECTION DETAIL
SCALE 1:10 AT A1

0 200 400 600 800 1000mm

SCALE 1:10 AT A1 SHEET | 1:20 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	22.03.21	0	CH.W
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TUGGERAH NSW 2259
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PROJECT
ST MATTHEWS - BLOCK C
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	JULY 2020	A1	TX13843.01-S01

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COMPLEX PROBLEMS RESOLVED SIMPLY

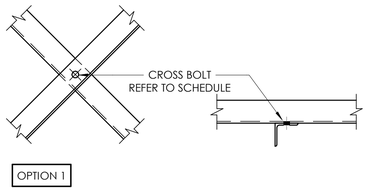
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PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK C
STEELWORK DETAILS SHEET 5

PROJECT No	DRAWING No	ISSUE
TX13843.01 -	S33.55	0

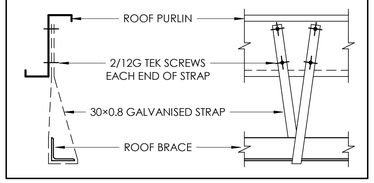


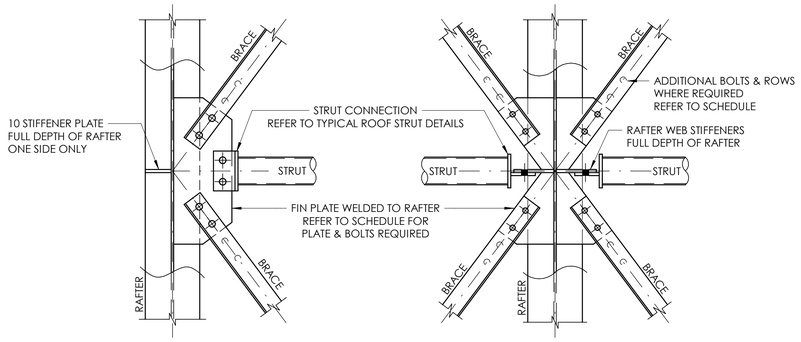
TYPICAL CROSS BRACING DETAIL

SCALE 1:10 AT A1

ANGLE BRACING SUPPORT NOTE:

ALL ANGLE BRACING TO BE SUPPORTED OFF ROOF PURLINS, REMOVE ANY SAG IN BRACING & STRAP TO PURLINS AT 1/4 POINTS NOMINAL, AS FOLLOWS:

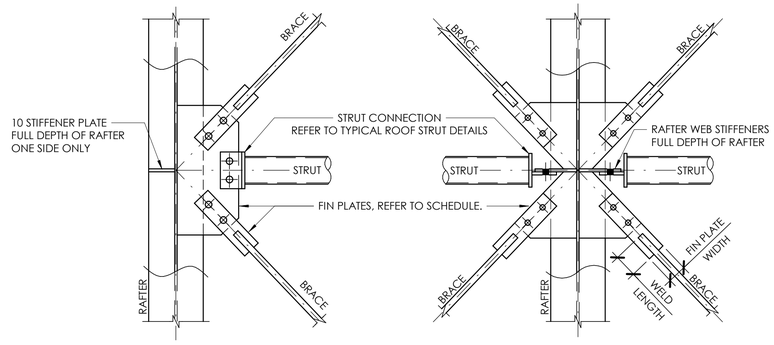




TYPICAL ROOF BRACING DETAIL

SCALE 1:10 AT A1

ANGLE CROSS BRACING SCHEDULE							
MEMBER	BOLTS (GRADE 8.8/S)			CROSS PLATE (G250)			
	BOLT SIZE	BOLTS PER ROW	ROWS	PLATE SIZE	LAP LENGTH	WELD	BOLT (8.8/S)
65×65×5 EA	M16	2	1	75×10	100	5 C.F.W.	M16



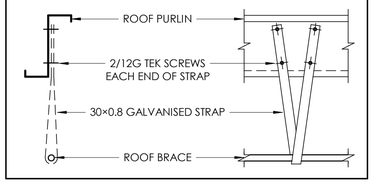
TYPICAL ROD BRACING DETAIL

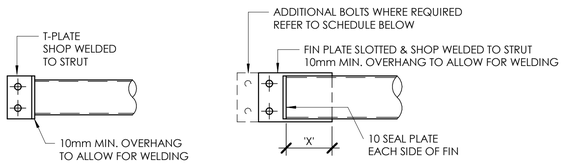
SCALE 1:10 AT A1

ROD BRACING CONNECTION DETAIL				
MEMBER SIZE	BOLTS REQ'D.	WELD LENGTH	FIN PLATE	FIN PLATE WIDTH
Ø16 ROD	2M16 8.8/S	100	10mm	60

ROD BRACING SUPPORT NOTE:

ALL ROD BRACING TO BE SUPPORTED OFF ROOF PURLINS, REMOVE ANY SAG IN BRACING & STRAP TO PURLINS AT 1/4 POINTS NOMINAL, AS FOLLOWS:

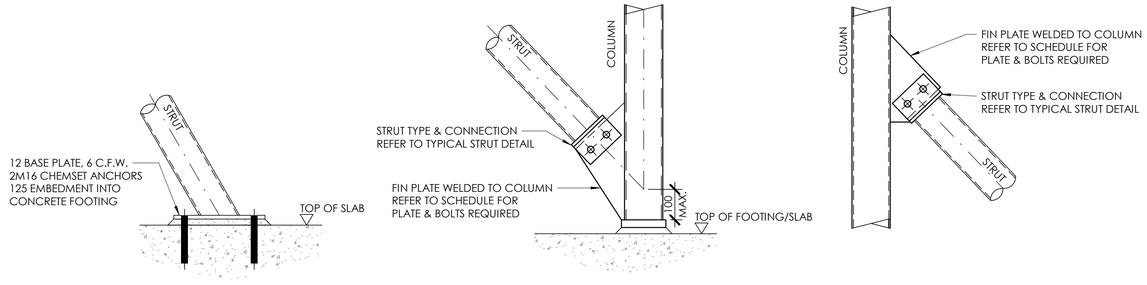




TYPICAL ROOF & WALL STRUT DETAIL

SCALE 1:10 AT A1

ROOF STRUT SCHEDULE						
MEMBER	T-PLATE/FIN PLATE (G250)			BOLT (GRADE 8.8/S)		
	TYPE	THICKNESS	WELD	BOLT SIZE	BOLTS PER ROW	ROWS
S1	REFER DETAIL A ON DRAWING S33.51 FOR CONNECTION DETAIL					
S2	A	10	6 C.F.W.	M16	2	1
WB1	B	12	6 C.F.W.	M20	3/4	1
WB2	A	12	6 C.F.W.	M20	2	1



TYPICAL WALL STRUT BRACING DETAIL

SCALE 1:10 AT A1

0 200 400 600 800 1000mm

SCALE 1:10 AT A1 SHEET | 1:20 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	22.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
RE-ISSUED FOR 80% DOCUMENTATION	30.09.20	B	MA.C
ISSUED FOR 80% DOCUMENTATION	26.08.20	A	CH.W

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000
ALLEANZA ARCHITECTURE

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000
TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north BUILDING WITH TRUST®

PROJECT
ST MATTHEWS - BLOCK C
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	JULY 2020	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

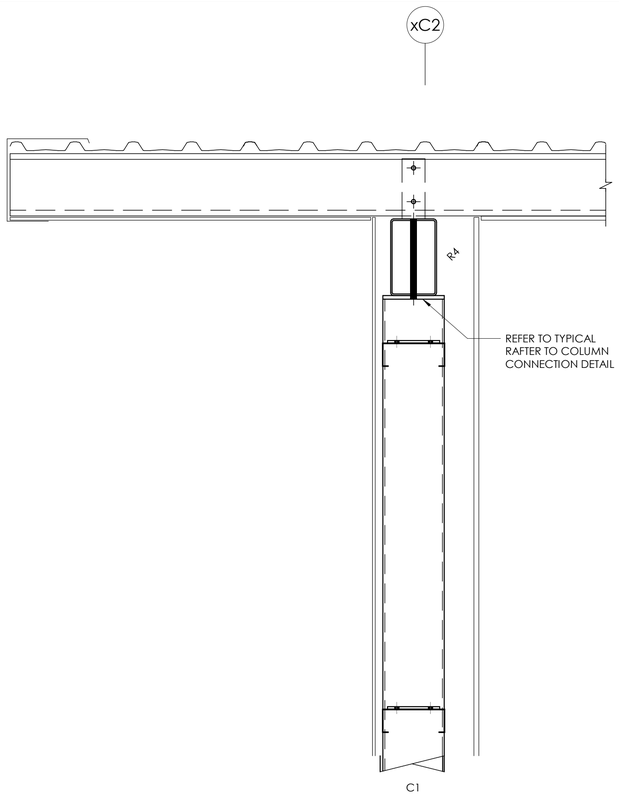
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PO BOX A203, SYDNEY SOUTH NSW 1235

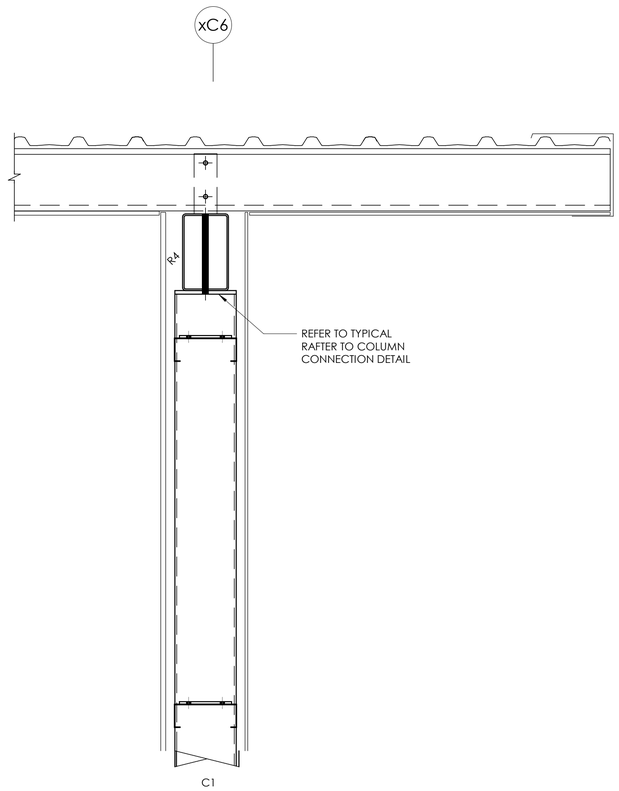
ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK C
STEELWORK DETAILS SHEET 6

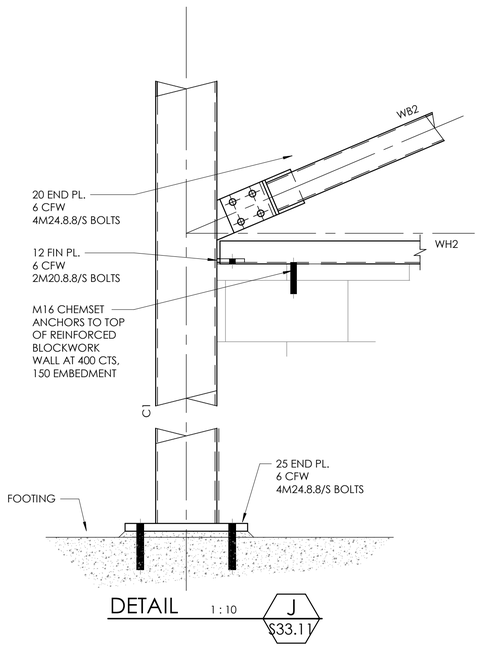
PROJECT No: TX13843.01 - | DRAWING No: S33.56 | ISSUE: 0



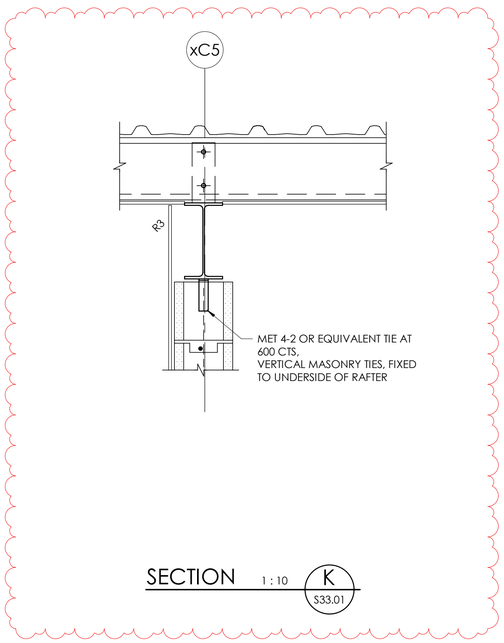
DETAIL 1 : 10 G S33.01



DETAIL 1 : 10 H S33.01



DETAIL 1 : 10 J S33.11



SECTION 1 : 10 K S33.01

0 200 400 600 800 1000mm

SCALE 1:10 AT A1 SHEET | 1:20 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	28.04.21	3	CH.W
ISSUED FOR CONSTRUCTION	16.04.21	2	CH.W
ISSUED FOR CONSTRUCTION	31.03.21	1	CH.W
ISSUED FOR CONSTRUCTION	22.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	B	CH.W

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259

PROJECT
ST MATTHEWS - BLOCK C
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	JULY 2020	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

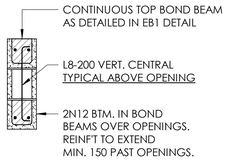
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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

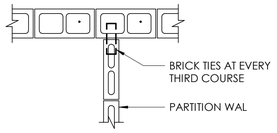
DRAWING TITLE
BLOCK C
STEELWORK DETAILS SHEET 7

PROJECT No TX13843.01 - DRAWING No S33.57 ISSUE 3

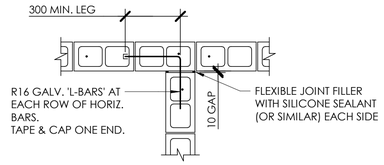


WHERE OPENING IS GREATER THAN 2700,
PROVIDE 2N12 VERT. AT ADJACENT CORES TO OPENING.

BLOCKWORK OVER OPENINGS DETAIL

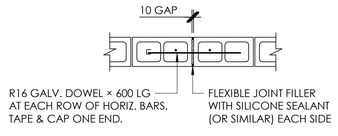


PARTITION WALL



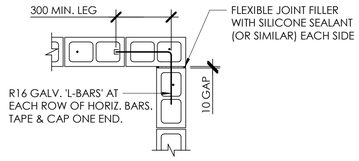
CJ - BLOCKWORK CONTROL JOINT DETAIL

NOTE: BOND BEAM REINFORCEMENT TO BE CONTINUOUS OVER JOINTS



VERTICAL JOINT DETAIL

PROVIDE VERTICAL JOINTS IN
BLOCKWORK 8.0m MAX. CENTRES



CORNER DETAIL

BLOCKWORK JOINTING DETAILS

SCALE 1 : 20 AT A1

REINFORCED BLOCKWORK SPECIFICATIONS:

RB1 SPECIFICATION TO BE READ IN CONJUNCTION WITH GENERAL NOTES

RB2 REINFORCEMENT
REINFORCEMENT BLOCKWORK SPECIFICATION U.N.O.
- VERTICAL BARS: N16-400
- HORIZONTAL BARS: N12-400
- TOP COURSE BOND BEAM: 2N12
- LINTEL BOND BEAM: 2N12
- JAMBS: 1N12

RB3 PROVIDE ADDITIONAL REINFORCEMENT AT THE FOLLOWING LOCATIONS:
- CORNERS
- INTERSECTIONS
- ENDS
- EITHER SIDE OF CONTROL JOINTS

RB4 PROVIDE STARTER BARS TO MATCH VERTICAL BARS AT ALL REINFORCED CORES, EMBED INTO FOOTING WITH LAP & COG AS NOTED:

SIZE	LAP	COG	MIN. EMBED.
N12	600	180	300
N16	750	200	300
N20	950	240	350

RB5 GROUT
ALL REINFORCED CORES FULLER GROUTED

RB6 GROUT SPECIFICATION:
- 20MPa
- MAX 10mm AGGREGATE SIZE
- 120mm SLUMP

RB7 USE CLEANOUT BLOCKS TO BASE COURSE

RB8 EXTERNAL BLOCKWORK & BLOCKWORK BELOW GROUND LEVEL SHALL BE CONSTRUCTED USING MORTAR DAMP-PROOF ADMIXTURE SUCH AS 'CEMENT AID CALBLACK' OR SIMILAR FOR THE FIRST 3 COURSES ABOVE FINISHED FLOOR LEVEL.

0 500 1000 1500 2000mm

SCALE 1:20 AT A1 SHEET | 1:40 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	22.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
RE-ISSUED FOR 80% DOCUMENTATION	30.09.20	B	MA.C
ISSUED FOR 80% DOCUMENTATION	26.08.20	A	CH.W

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
BUILDING WITH TRUST®

PROJECT
ST MATTHEWS - BLOCK C
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	JULY 2020	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

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DRAWING TITLE
BLOCK C
WALLS DETAILS

PROJECT No TX13843.01 - DRAWING No S35.51 ISSUE 0

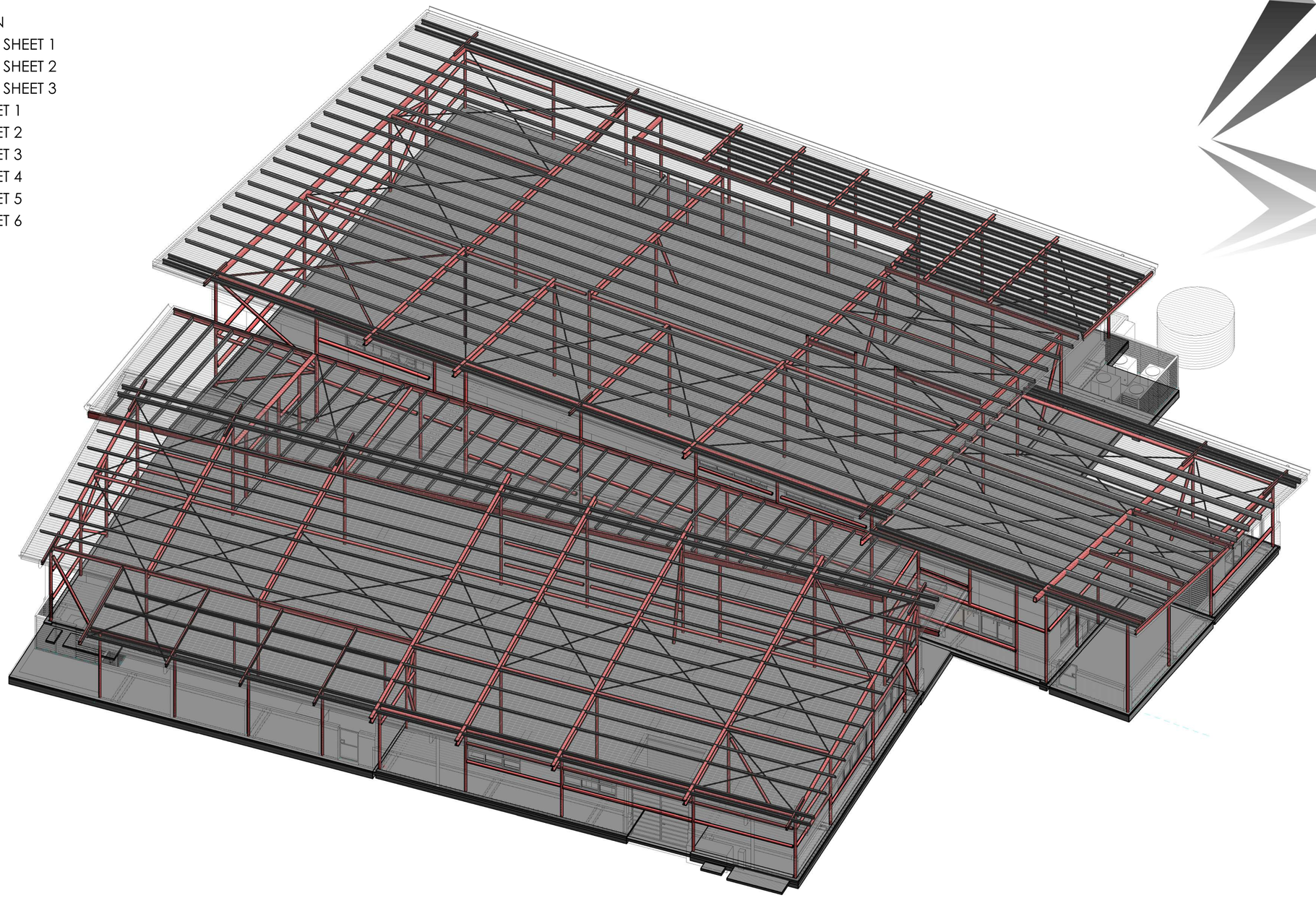
DRAWING LIST

S40.00 COVER SHEET

S41.01 FOOTING & GROUND FLOOR PLAN
S41.51 FOOTING & GROUND FLOOR DETAILS SHEET 1
S41.52 FOOTING & GROUND FLOOR DETAILS SHEET 2

S43.01 ROOF STEELWORK PLAN
S43.02 LOWER STEELWORK PLAN
S43.11 ELEVATIONS & SECTIONS SHEET 1
S43.12 ELEVATIONS & SECTIONS SHEET 2
S43.13 ELEVATIONS & SECTIONS SHEET 3
S43.51 STEELWORK DETAILS SHEET 1
S43.52 STEELWORK DETAILS SHEET 2
S43.53 STEELWORK DETAILS SHEET 3
S43.54 STEELWORK DETAILS SHEET 4
S43.55 STEELWORK DETAILS SHEET 5
S43.56 STEELWORK DETAILS SHEET 6

ST. MATTHEWS - BLOCK D
BROADHEAD ROAD, MUDGEE NSW 2850
STRUCTURAL DRAWINGS



AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	22.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	E	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	D	MA.C
ISSUED FOR CLIENT REVIEW	31.07.20	C	MA.C
ISSUED FOR 60% DOCUMENTATION	20.11.19	B	CH.W

FOR CONSTRUCTION

ARCHITECT
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SYDNEY NSW 2000

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259

PROJECT
ST. MATTHEWS - BLOCK D
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	SEPT 2019	A1	TX13843.01-S01-R18

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

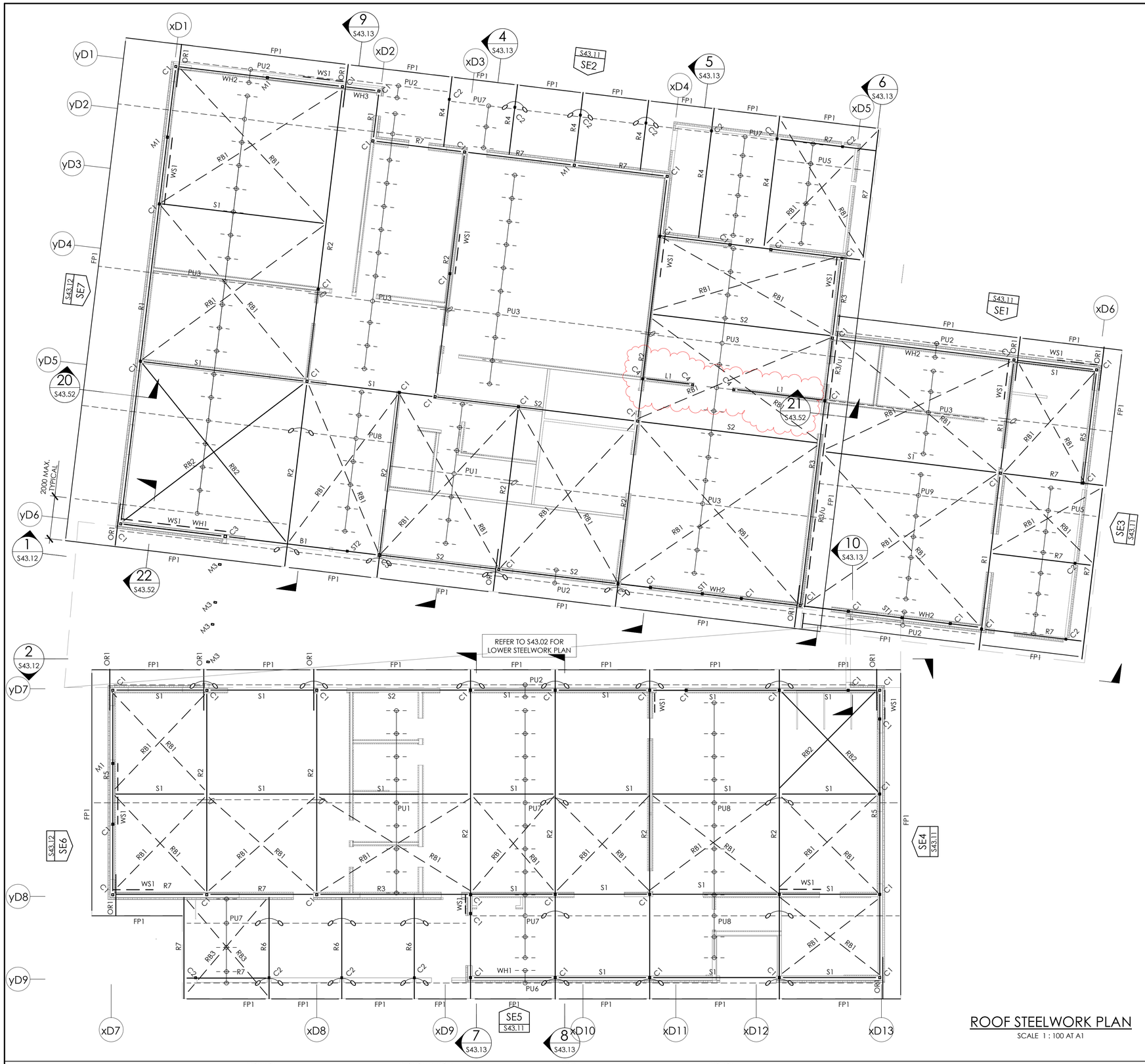
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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK D
COVER SHEET

PROJECT No TX13843.01 - DRAWING No S40.00 ISSUE 0



STEELWORK MEMBER SCHEDULE

MARK	MEMBER	SIZE	REMARKS
B1	BEAM	380PFC	
B2	BEAM	300PFC	
B3	BEAM	250PFC	
C1	COLUMN	100x100x6.0SHS	
C2	COLUMN	89x89x5.0SHS	
C3	COLUMN	125x125x6.0SHS	
C4	COLUMN	89x89x3.5SHS	
L1	LINTEL BEAM	200PFC	
M1	MULLION	100x100x5.0SHS	
M2	MULLION	100x50x6.0RHS	
M3	MULLION	125x75x4.0RHS	
OR1	OUTRIGGER	150UB14.0	
R1	RAFTER	250x150x6.0RHS	
R2	RAFTER	310UB40.4	FLY BRACING AT EVERY 3RD PURLIN
R3	RAFTER	300PFC	FLY BRACING AT EVERY 3RD PURLIN
R4	RAFTER	200UB22.3	
R5	RAFTER	200x100x6.0RHS	
R6	RAFTER	150UB14.0	
R7	RAFTER	200PFC	
RB1	ROOF BRACING	16 DIA. ROD	
RB2	ROOF BRACING	65x65x5EA	
RB3	ROOF BRACING	38×1.2mm STRAP	
S1	STRUT	100x100x4.0SHS	
S2	STRUT	125x125x4.0SHS	
ST1	STUB COLUMN	100x100x6.0SHS	
ST2	STUB COLUMN	89x89x5.0SHS	
WH1	WINDOW HEADER	150x100x6.0RHS	LAID FLAT
WH2	WINDOW HEADER	200x100x6.0RHS	LAID FLAT ALTERNATIVE SIZE TO FIT WITHIN WALL: 150x150x9 SHS C350
WH3	WINDOW HEADER	100x100x6.0SHS	
WH4	WINDOW HEADER	100x100x4.0SHS	
WH5	WINDOW HEADER	125x125x4.0SHS	
WH6	WINDOW HEADER	125x75x4.0RHS	
WS1	WALL STRUT	100x100x6.0SHS	

PURLIN/GIRT SCHEDULE

MARK	MEMBER	SIZE	CENTRES (MAX.)	LAP (MIN.)	BRIDGING
FP1	FASCIA PURLIN	C250-19	-	-	TO MATCH ADJACENT PURLINS
PU1	PURLIN	Z150-24	1200	900	1 ROW
PU2	PURLIN	C200-24	600	-	2 ROWS
PU3	PURLIN	Z200-24	1200	900	2 ROWS
PU4	PURLIN	C200-24	1200	-	2 ROWS
PU5	PURLIN	C150-19	1200	-	1 ROW
PU6	PURLIN	C150-15	600	-	1 ROW
PU7	PURLIN	C150-15	1200	-	1 ROW
PU8	PURLIN	C200-15	1200	-	2 ROWS
PU9	PURLIN	C250-19	1200	-	2 ROWS

ROOF STEELWORK PLAN

SCALE 1 : 100 AT A1

0 1 2 3 4 5 6 7 8 9 10m

SCALE 1:100 AT A1 SHEET | 1:200 AT A3 SHEET

ISSUED FOR CONSTRUCTION	22.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	E	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	D	MA.C
ISSUED FOR CLIENT REVIEW	31.07.20	C	MA.C
ISSUED FOR 60% DOCUMENTATION	20.11.19	B	CH.W
AMENDMENTS	DATE	ISSUE	BY

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
BUILDING WITH TRUST®

PROJECT
ST. MATTHEWS - BLOCK D
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	SEPT 2019	A1	TX13843.01-S01-R18

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

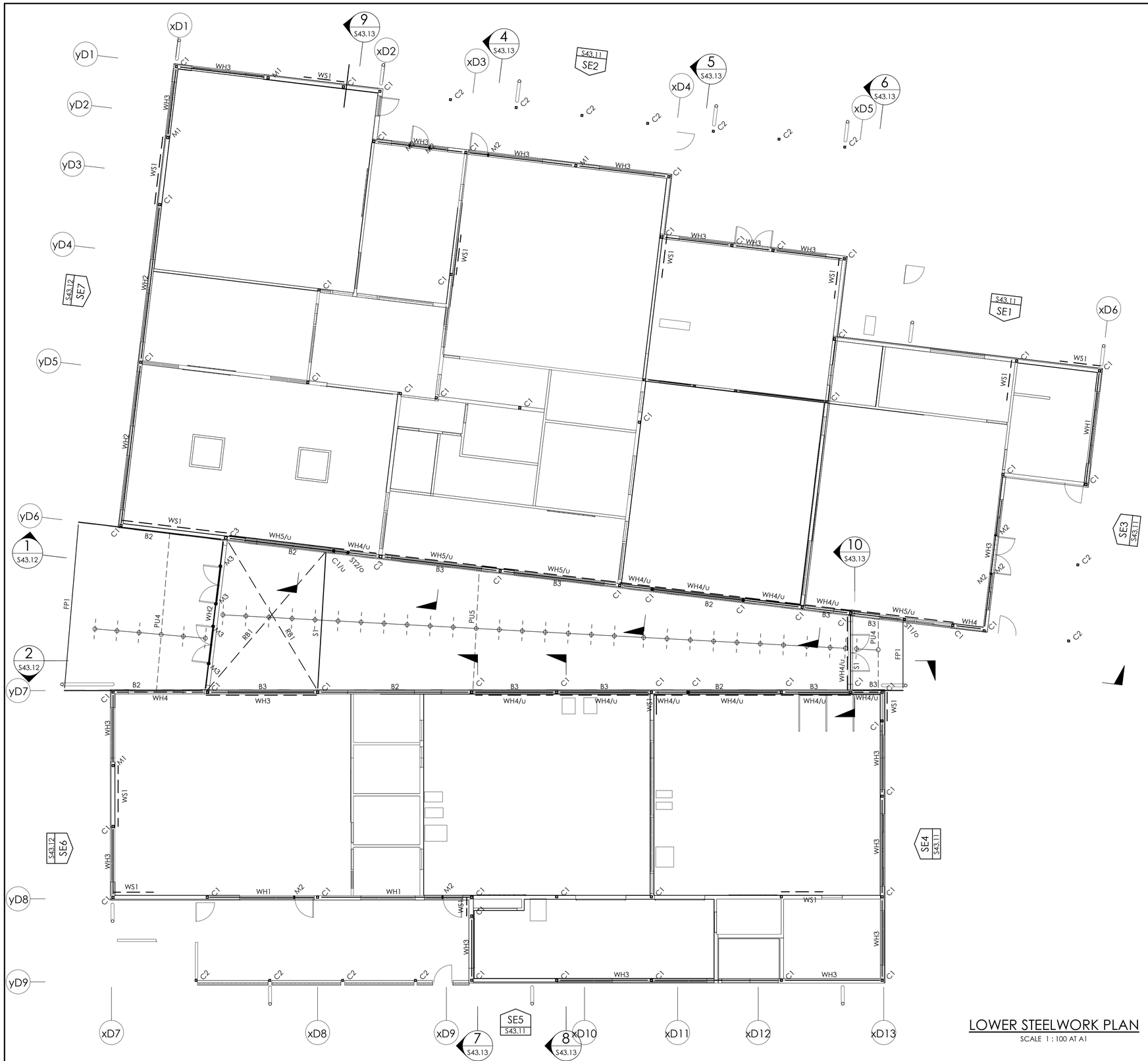
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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK D
ROOF STEELWORK PLAN

PROJECT No TX13843.01 - DRAWING No S43.01 ISSUE 0



STEELWORK MEMBER SCHEDULE

MARK	MEMBER	SIZE	REMARKS
B1	BEAM	380PFC	
B2	BEAM	300PFC	
B3	BEAM	250PFC	
C1	COLUMN	100x100x6.0SHS	
C2	COLUMN	89x89x5.0SHS	
C3	COLUMN	125x125x6.0SHS	
C4	COLUMN	89x89x3.5SHS	
L1	LINTEL BEAM	200PFC	
M1	MULLION	100x100x5.0SHS	
M2	MULLION	100x50x6.0RHS	
M3	MULLION	125x75x4.0RHS	
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R1	RAFTER	250x150x6.0RHS	
R2	RAFTER	310UB40.4	FLY BRACING AT EVERY 3RD PURLIN
R3	RAFTER	300PFC	FLY BRACING AT EVERY 3RD PURLIN
R4	RAFTER	200UB22.3	
R5	RAFTER	200x100x6.0RHS	
R6	RAFTER	150UB14.0	
R7	RAFTER	200PFC	
RB1	ROOF BRACING	16 DIA. ROD	
RB2	ROOF BRACING	65x65x5EA	
RB3	ROOF BRACING	38×1.2mm STRAP	
S1	STRUT	100x100x4.0SHS	
S2	STRUT	125x125x4.0SHS	
ST1	STUB COLUMN	100x100x6.0SHS	
ST2	STUB COLUMN	89x89x5.0SHS	
WH1	WINDOW HEADER	150x100x6.0RHS	LAID FLAT
WH2	WINDOW HEADER	200x100x6.0RHS	LAID FLAT ALTERNATIVE SIZE TO FIT WITHIN WALL: 150x150x9 SHS C350
WH3	WINDOW HEADER	100x100x6.0SHS	
WH4	WINDOW HEADER	100x100x4.0SHS	
WH5	WINDOW HEADER	125x125x4.0SHS	
WH6	WINDOW HEADER	125x75x4.0RHS	
WS1	WALL STRUT	100x100x6.0SHS	

PURLIN/GIRT SCHEDULE

MARK	MEMBER	SIZE	CENTRES (MAX.)	LAP (MIN.)	BRIDGING
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PU4	PURLIN	C200-24	1200	-	2 ROWS
PU5	PURLIN	C150-19	1200	-	1 ROW
PU6	PURLIN	C150-15	600	-	1 ROW
PU7	PURLIN	C150-15	1200	-	1 ROW
PU8	PURLIN	C200-15	1200	-	2 ROWS
PU9	PURLIN	C250-19	1200	-	2 ROWS

LOWER STEELWORK PLAN

SCALE 1 : 100 AT A1

0 1 2 3 4 5 6 7 8 9 10m

SCALE 1:100 AT A1 SHEET | 1:200 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	22.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	B	MA.C
ISSUED FOR CLIENT REVIEW	31.07.20	A	MA.C

FOR CONSTRUCTION

ARCHITECT
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ALLEANZA ARCHITECTURE

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000
TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north BUILDING WITH TRUST®

PROJECT
ST. MATTHEWS - BLOCK D
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
HE.C.	MA.C	JUL 2020	A1	TX13843.01-S01-R18

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

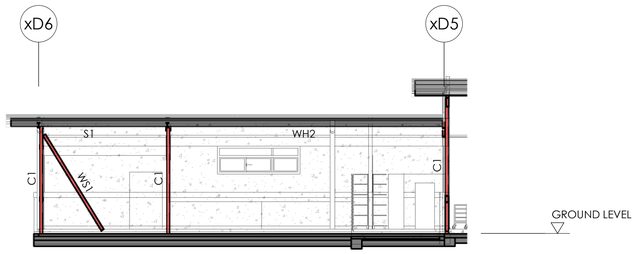
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PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

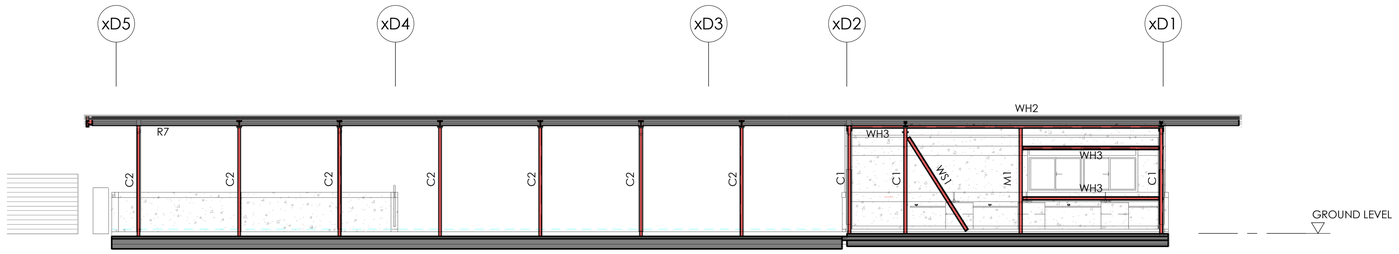
DRAWING TITLE
BLOCK D
LOWER STEELWORK PLAN

PROJECT No: TX13843.01 - DRAWING No: S43.02 ISSUE: 0



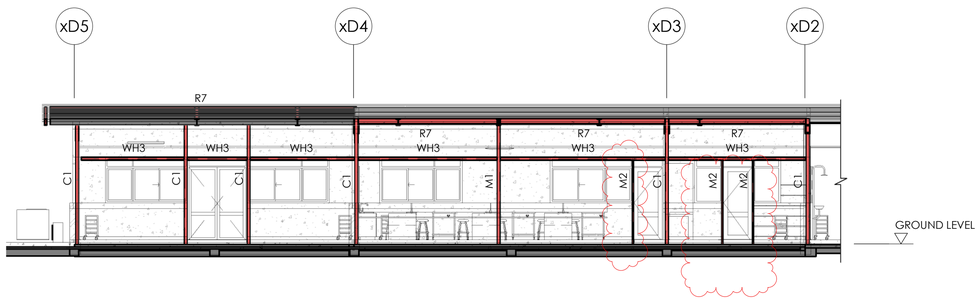
SE1 - STEELWORK ELEVATION (ALONG GRID yD4)

SCALE 1 : 100 AT A1



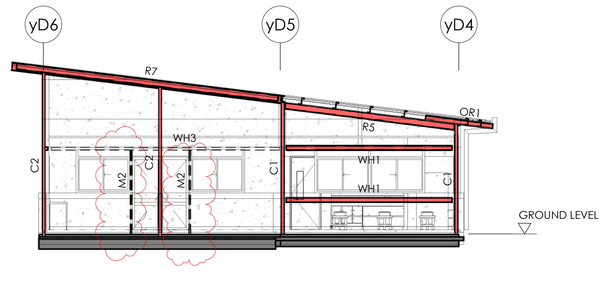
SE2 - STEELWORK ELEVATION (ALONG GRID yD1)

SCALE 1 : 100 AT A1



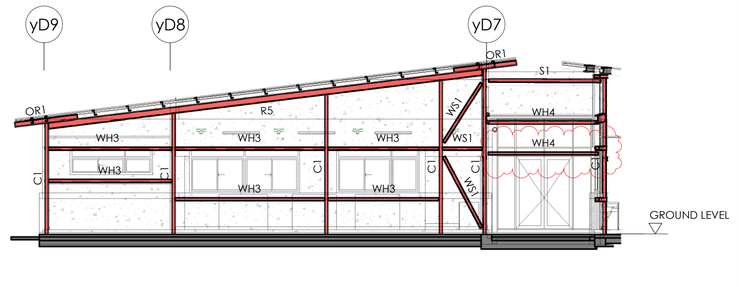
SE2 - STEELWORK ELEVATION (ALONG GRIDS yD2-yD3)

SCALE 1 : 100 AT A1



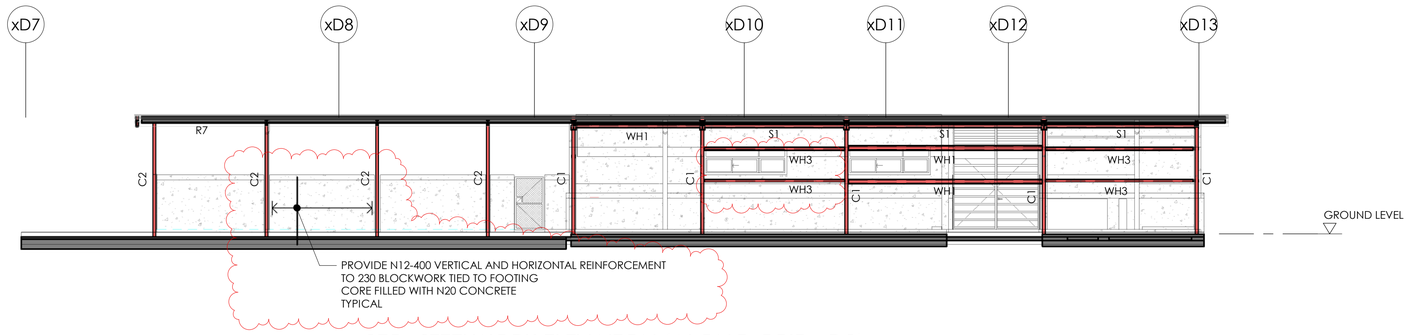
SE3 - STEELWORK ELEVATION (ALONG GRID xD6)

SCALE 1 : 100 AT A1



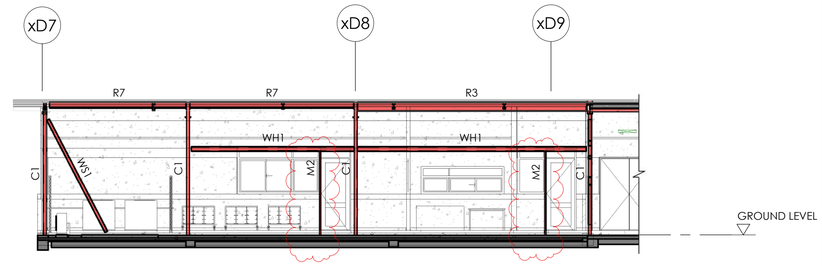
SE4 - STEELWORK ELEVATIONS (ALONG GRID xD13)

SCALE 1 : 100 AT A1



SE5 - STEELWORK ELEVAITON (ALONG GRID yD9)

SCALE 1 : 100 AT A1



SE5 - STEELWORK ELEVATION (ALONG GRID yD8)

SCALE 1 : 100 AT A1

0 1 2 3 4 5 6 7 8 9 10m

SCALE 1:100 AT A1 SHEET | 1:200 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	22.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	E	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	D	MA.C
ISSUED FOR CLIENT REVIEW	31.07.20	C	MA.C
ISSUED FOR 60% DOCUMENTATION	20.11.19	B	CH.W

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259

PROJECT
ST. MATTHEWS - BLOCK D
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	SEPT 2019	A1	TX13843.01-S01-R18

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

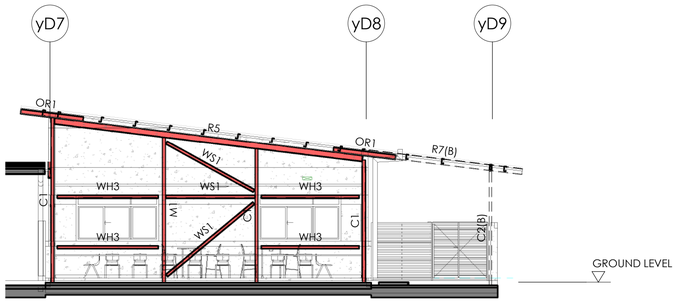
1300 874 294 | TRIAXIAL.COM.AU

SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

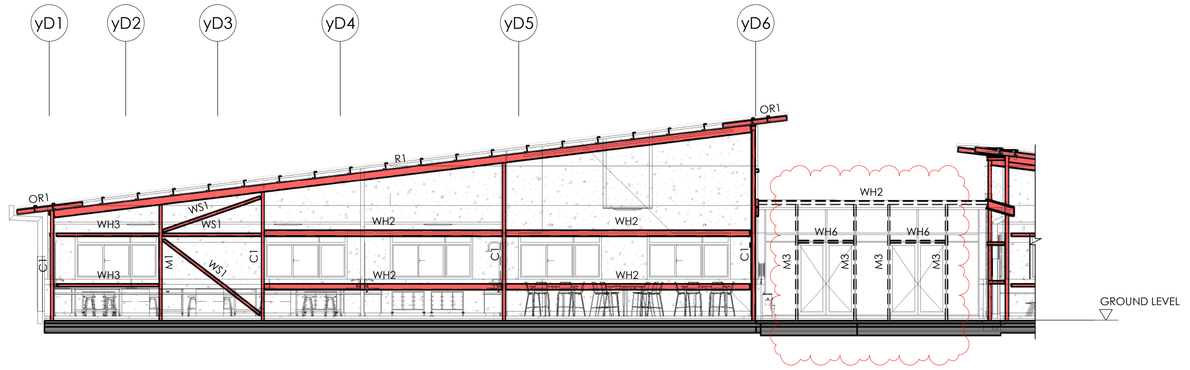
DRAWING TITLE
BLOCK D
ELEVATIONS & SECTIONS SHEET 1

PROJECT No TX13843.01 - DRAWING No S43.11 ISSUE 0



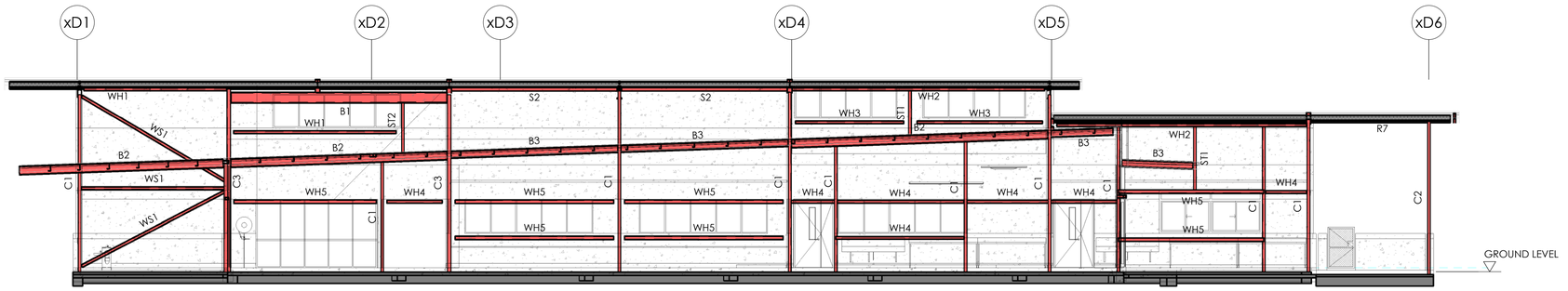
SE6 - STEELWORK ELEVATION (ALONG GRID xD7)

SCALE 1 : 100 AT A1

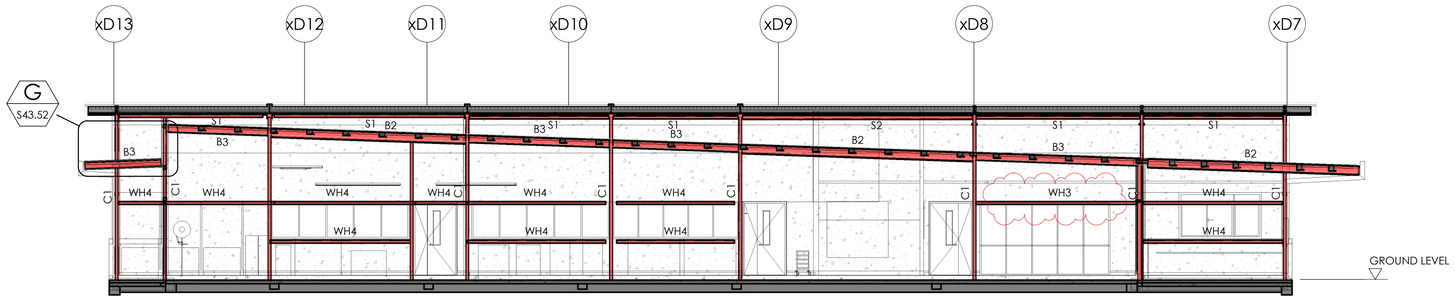


SE7 - STEELWORK ELEVATION (ALONG GRID xD1)

SCALE 1 : 100 AT A1



SECTION 1 : 100 — 1 — S43.01



SECTION 1 : 100 — 2 — S43.01

0 1 2 3 4 5 6 7 8 9 10m

SCALE 1:100 AT A1 SHEET | 1:200 AT A3 SHEET

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ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	E	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	D	MA.C
ISSUED FOR CLIENT REVIEW	31.07.20	C	MA.C
ISSUED FOR 60% DOCUMENTATION	20.11.19	B	CH.W

FOR CONSTRUCTION

ARCHITECT
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LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259

PROJECT
ST. MATTHEWS - BLOCK D
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	SEPT 2019	A1	TX13843.01-S01-R18

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

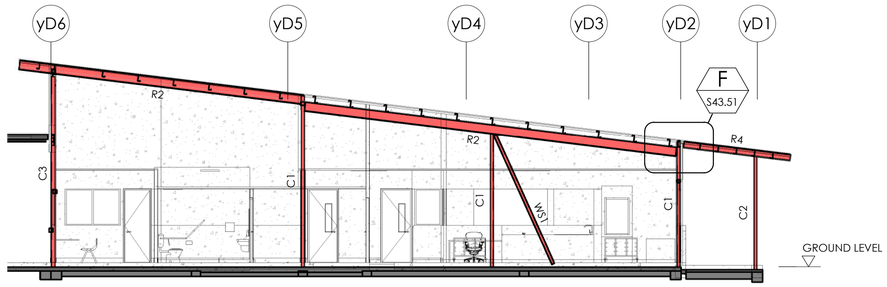
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PO BOX A203, SYDNEY SOUTH NSW 1235

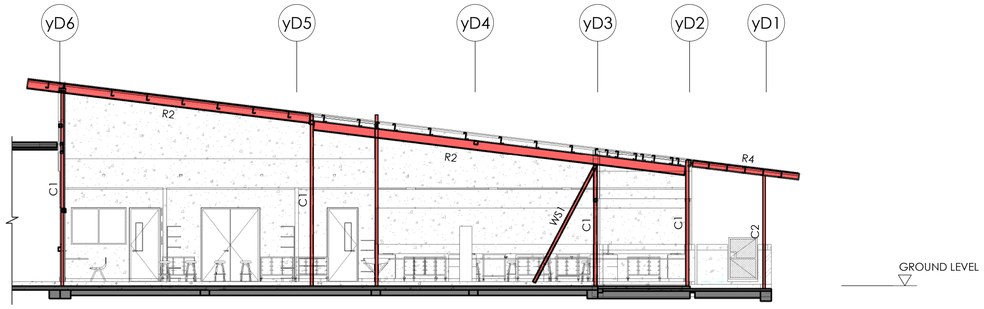
ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK D
ELEVATIONS & SECTIONS SHEET 2

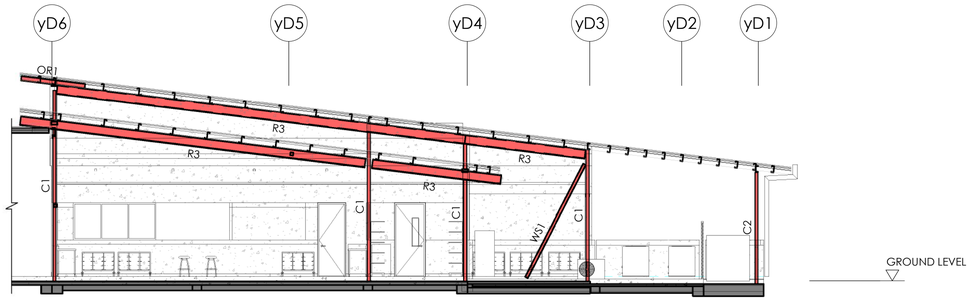
PROJECT No TX13843.01 - DRAWING No S43.12 ISSUE 0



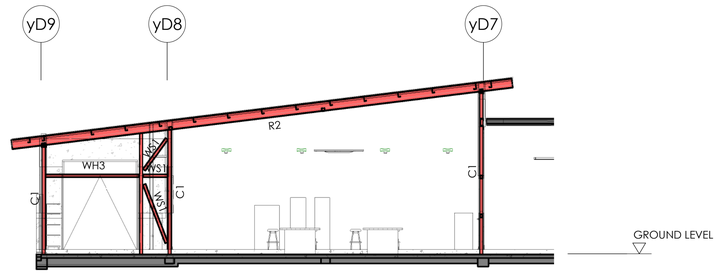
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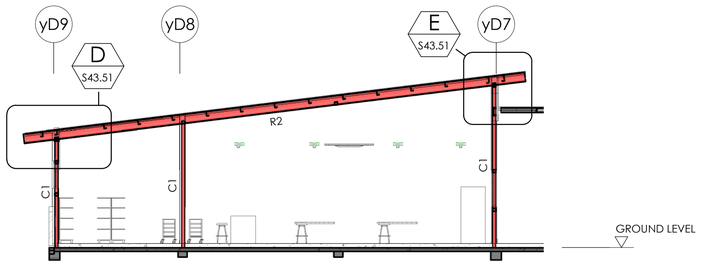
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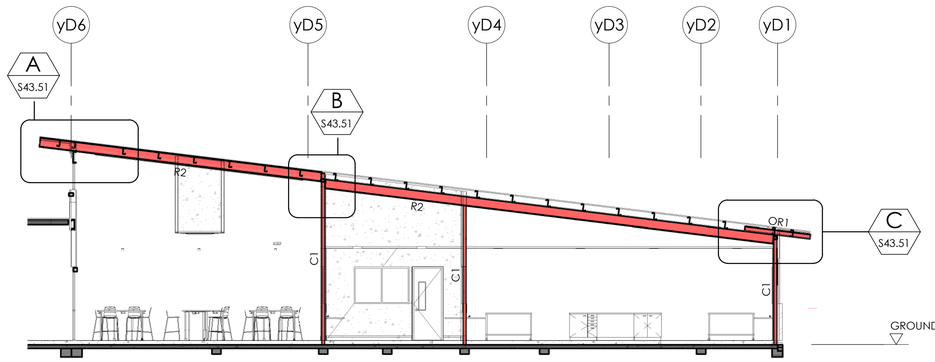
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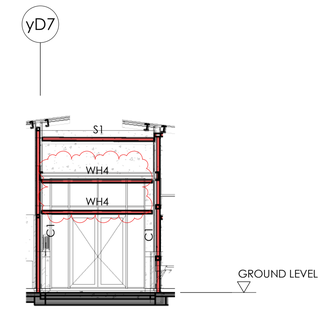
SECTION 1 : 100 7 S43.01



SECTION 1 : 100 8 S43.01



SECTION 1 : 100 9 S43.01



SECTION 1 : 100 10 S43.01

0 1 2 3 4 5 6 7 8 9 10m

SCALE 1:100 AT A1 SHEET | 1:200 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	22.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	E	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	D	MA.C
ISSUED FOR CLIENT REVIEW	31.07.20	C	MA.C
ISSUED FOR 60% DOCUMENTATION	20.11.19	B	CH.W

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000

ALLEANZA ARCHITECTURE

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000

TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259

north
BUILDING WITH TRUST®

PROJECT
ST. MATTHEWS - BLOCK D
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	SEPT 2019	A1	TX13843.01-S01-R18

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

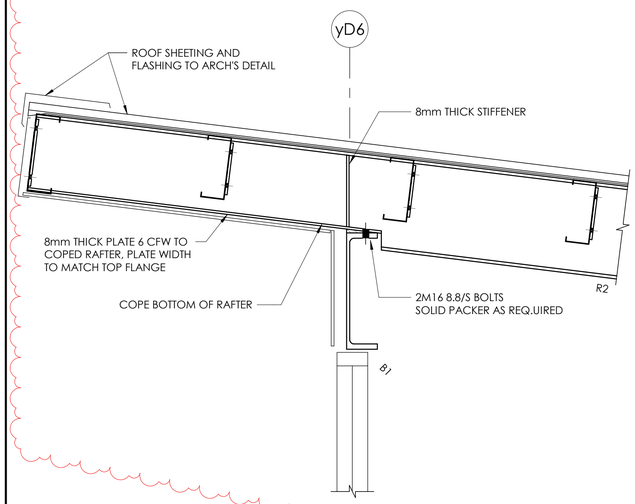
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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

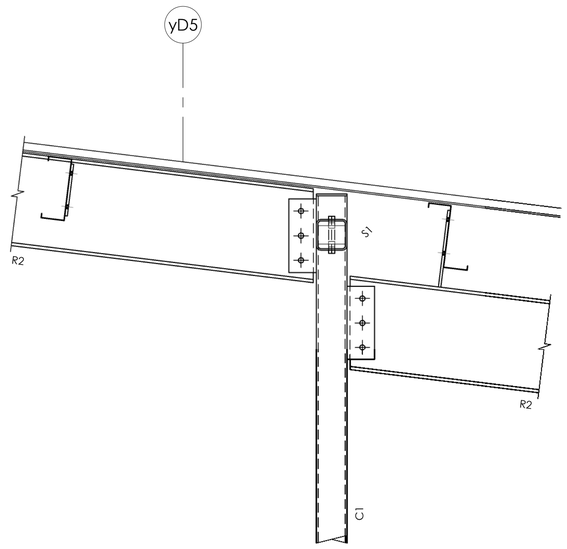
ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK D
ELEVATIONS & SECTIONS SHEET 3

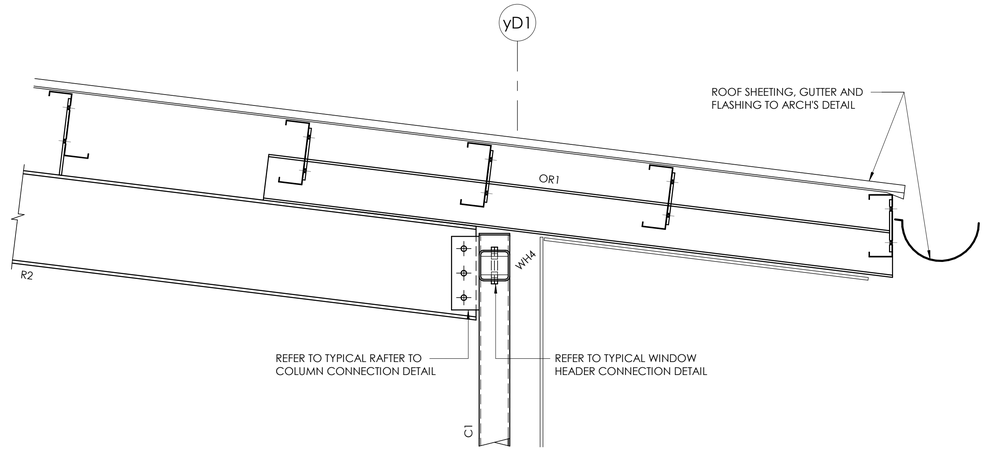
PROJECT No TX13843.01 - DRAWING No S43.13 ISSUE 0



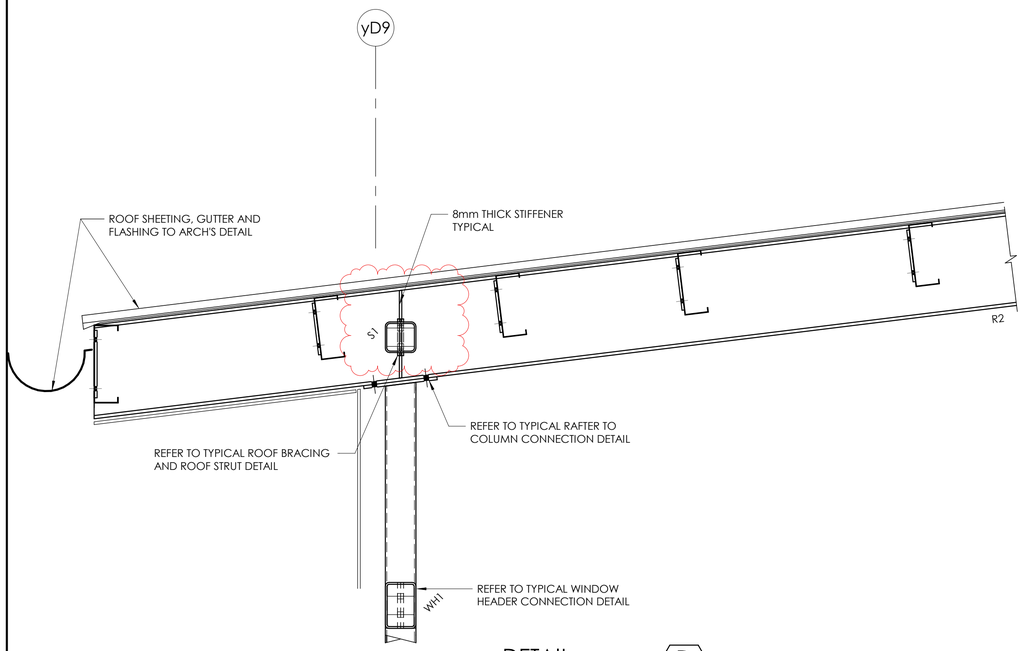
DETAIL 1 : 10 A S43.13



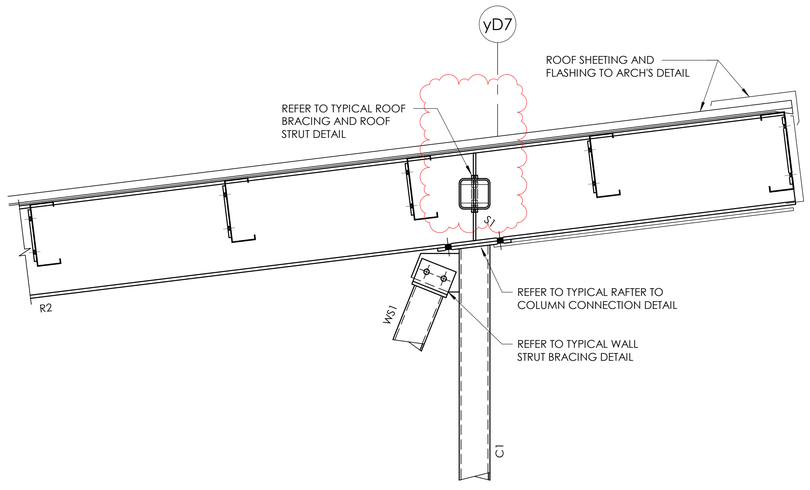
DETAIL 1 : 10 B S43.13



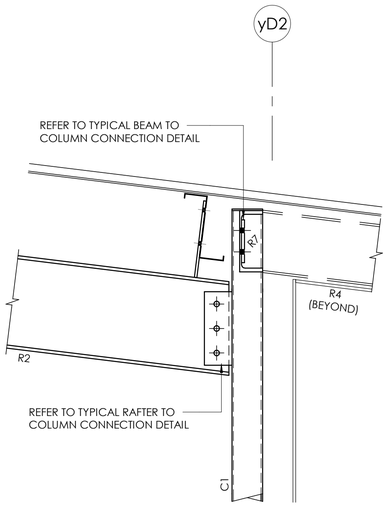
DETAIL 1 : 10 C S43.13



DETAIL 1 : 10 D S43.13



DETAIL 1 : 10 E S43.13



DETAIL 1 : 10 F S43.13

0 200 400 600 800 1000mm

SCALE 1:10 AT A1 SHEET | 1:20 AT A3 SHEET

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ISSUED FOR CONSTRUCTION	22.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	B	MA.C
ISSUED FOR CLIENT REVIEW	31.07.20	A	MA.C

FOR CONSTRUCTION

ARCHITECT
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SYDNEY NSW 2000
ALLEANZA ARCHITECTURE

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000
TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north BUILDING WITH TRUST®

PROJECT
ST. MATTHEWS - BLOCK D
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
HE.C.	MA.C	JUL 2020	A1	TX13843.01-S01-R18

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

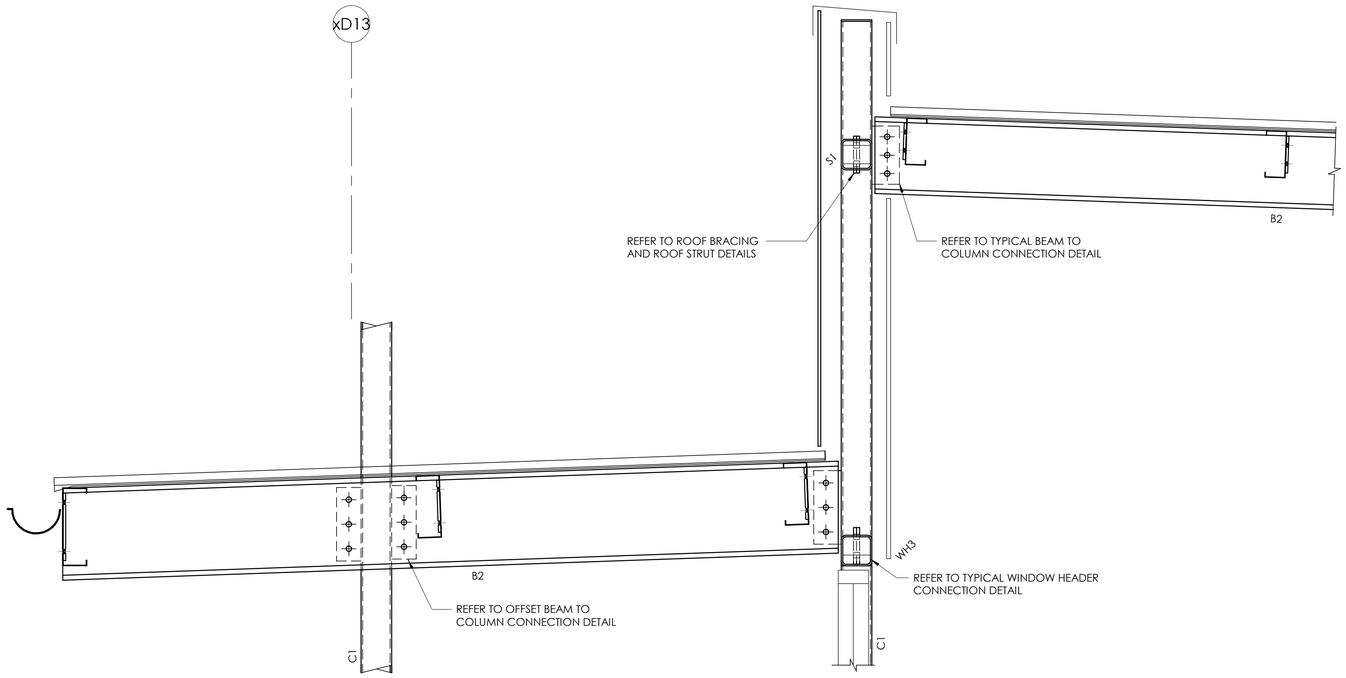
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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

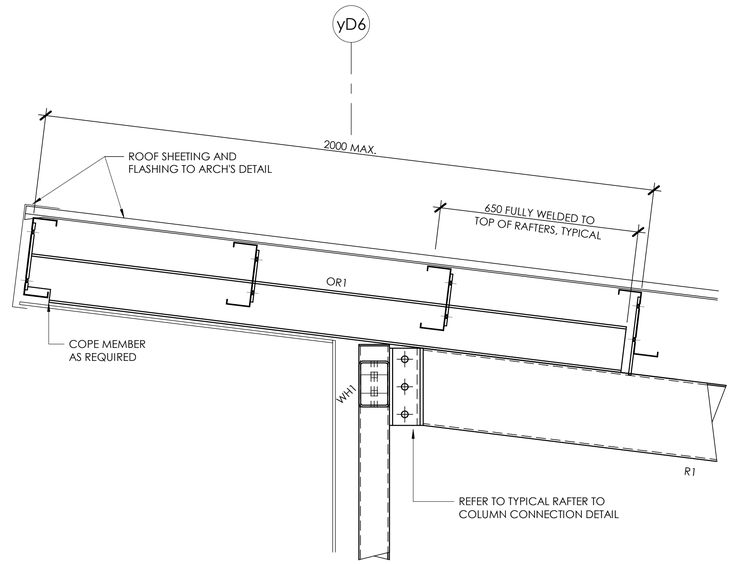
ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK D
STEELWORK DETAILS SHEET 1

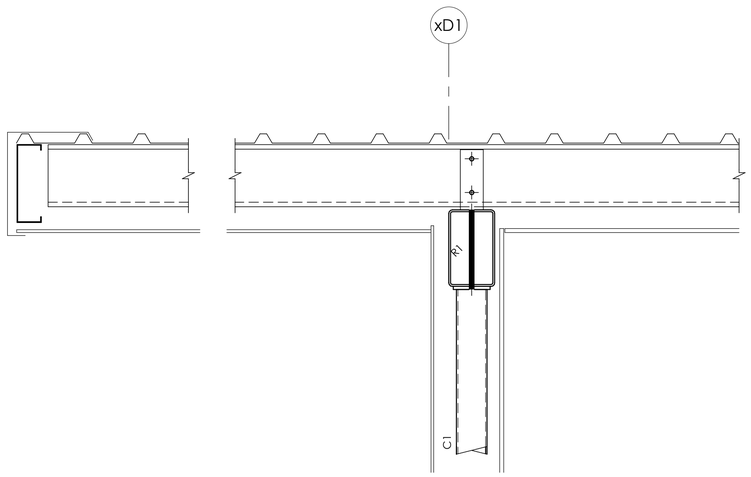
PROJECT No TX13843.01 - DRAWING No S43.51 ISSUE 0



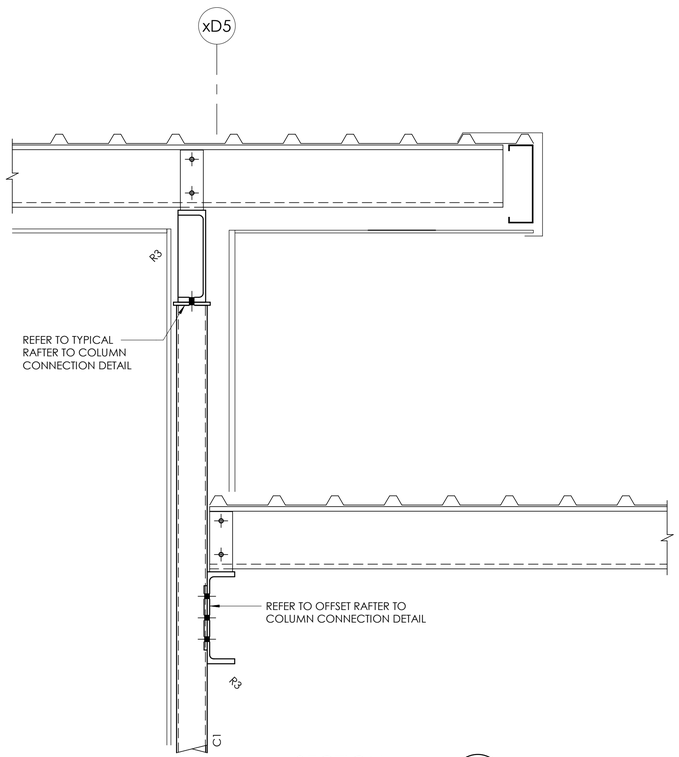
DETAIL 1 : 10 — G — S43.12



SECTION 1 : 10 — 22 — S43.01



SECTION 1 : 10 — 20 — S43.01



SECTION 1 : 10 — 21 — S43.01

0 200 400 600 800 1000mm

SCALE 1:10 AT A1 SHEET | 1:20 AT A3 SHEET

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ISSUED FOR CONSTRUCTION	22.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	B	MA.C
ISSUED FOR CLIENT REVIEW	31.07.20	A	MA.C

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000

ALLEANZA ARCHITECTURE

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000

TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259

north
BUILDING WITH TRUST®

PROJECT
ST. MATTHEWS - BLOCK D
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
HE.C.	MA.C	JUL 2020	A1	TX13843.01-S01-R18

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

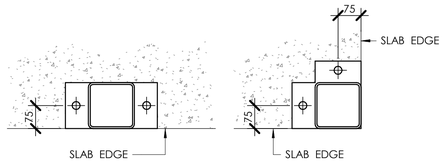
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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK D
STEELWORK DETAILS SHEET 2

PROJECT No TX13843.01 - DRAWING No S43.52 ISSUE 0



TYPE A TYPE B

PLAN

NOTE:
6 C.F.W. CATEGORY SP TO COLUMN (U.N.O.)
ALL BASE PLATE GROUT TO BE HIGH-STRENGTH, NON-SHRINK GROUT (>50MPa)

COLUMN BASE PLATE SCHEDULE

MEMBER	BASE PLATE			ANCHORS		REMARKS
	TYPE	THICKNESS	GROUT	ANCHOR BOLTS	TYPE (REFER SPEC.)	
C1	A/B	12mm	20mm	2M20	CHEMICAL ANCHOR	
C2	A	12mm	20mm	2M20	CHEMICAL ANCHOR	
C3	A	16mm	20mm	2M20	CHEMICAL ANCHOR	
M1	A	12mm	20mm	2M16	CHEMICAL ANCHOR	

ANCHOR SPECIFICATIONS

TYPE	ANCHOR	EMBEDMENT	REMARKS
CHEMICAL ANCHOR	M12	110	CHEMSET 801 OR APPROVED EQUIVALENT. REFER TO MANUFACTURER FOR HOLE PREPARATION AND MINIMUM CURING TIMES.
	M16	125	
	M20	150	
	M24	200	

BASE PLATE BOLTS HOLE SPECIFICATIONS

ANCHOR SIZE (mm)	HOLE DIA.	WASHERS (MIN.) #
M12	18	Ø42mm × 4mm THICK
M16	22	Ø50mm × 4mm THICK
M20	26	Ø58mm × 4mm THICK
M24	30	Ø66mm × 4mm THICK
M30	36	Ø78mm × 4mm THICK
M36	42	Ø90mm × 4mm THICK
# ALTERNATIVE: USE SQUARE WASHERS CUT FROM FLAT PLATE, G250 MIN.		

COLUMN BASE PLATE DETAILS

SCALE 1:10 AT A1

0 200 400 600 800 1000mm

SCALE 1:10 AT A1 SHEET | 1:20 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	22.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
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ISSUED FOR CLIENT REVIEW	31.07.20	A	MA.C

FOR CONSTRUCTION

ARCHITECT
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SYDNEY NSW 2000
ALLEANZA ARCHITECTURE

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000
TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north
BUILDING WITH TRUST®

PROJECT
ST. MATTHEWS - BLOCK D
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
HE.C.	MA.C	JUL 2020	A1	TX13843.01-S01-R18

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

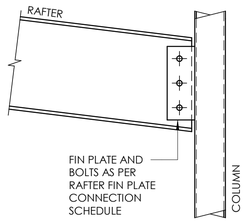
1300 874 294 | TRIAXIAL.COM.AU

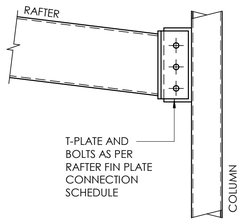
SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

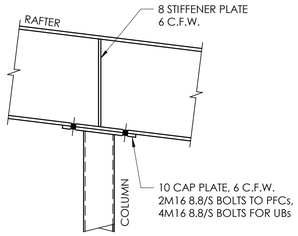
ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

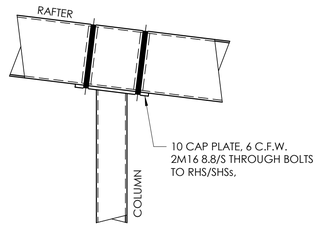
DRAWING TITLE
BLOCK D
STEELWORK DETAILS SHEET 3

PROJECT No TX13843.01 - DRAWING No S43.53 ISSUE 0



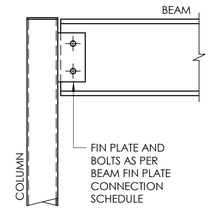






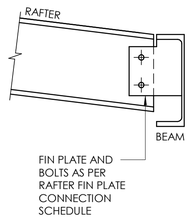
RAFTER FIN PLATE CONNECTION SCHEDULE		
MEMBER	FIN PLATE (6 C.F.W.)	BOLT SPEC 8.8/S
R1	10mm	2M16
R2	10mm	3M16
R3	10mm	3M16
R4	10mm	2M16
R5	10mm	2M16
R6	10mm	2M16
R7	10mm	2M16

TYPICAL RAFTER TO COLUMN CONNECTION DETAILS
SCALE 1:10 AT A1

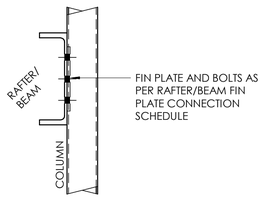


TYPICAL BEAM TO COLUMN CONNECTION DETAILS
SCALE 1:10 AT A1

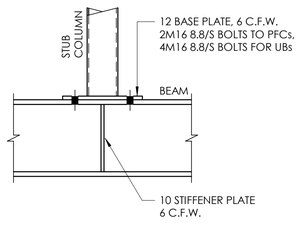
BEAM FIN PLATE CONNECTION SCHEDULE		
MEMBER	FIN PLATE (6 C.F.W.)	BOLT SPEC 8.8/S
B1	10mm	3M16
B2	10mm	3M16
B3	10mm	2M16



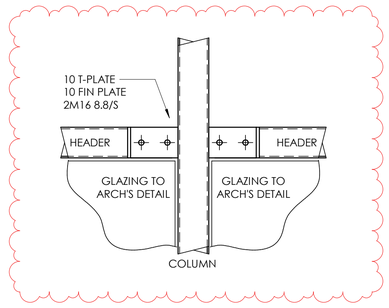
TYPICAL RAFTER TO BEAM CONNECTION DETAILS
SCALE 1:10 AT A1



OFFSET RAFTER/BEAM TO COLUMN CONNECTION
SCALE 1:10 AT A1



TYPICAL STUB COLUMN TO BEAM CONNECTION DETAILS
SCALE 1:10 AT A1



WINDOW SILL CONNECTION SIMILAR

TYPICAL WINDOW HEADER CONNECTION DETAIL
SCALE 1:10 AT A1

0 200 400 600 800 1000mm

SCALE 1:10 AT A1 SHEET | 1:20 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	22.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	B	MA.C
ISSUED FOR CLIENT REVIEW	31.07.20	A	MA.C

FOR CONSTRUCTION

ARCHITECT
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SYDNEY NSW 2000
ALLEANZA ARCHITECTURE

PROJECT MANAGER
TSA MANAGEMENT
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SYDNEY NSW 2000
TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north BUILDING WITH TRUST®

PROJECT
ST. MATTHEWS - BLOCK D
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
HE.C.	MA.C	JUL 2020	A1	TX13843.01-S01-R18

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COMPLEX PROBLEMS RESOLVED SIMPLY

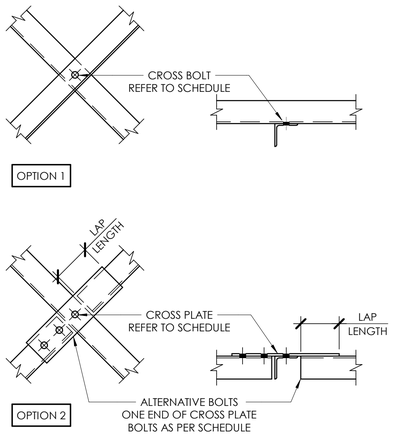
1300 874 294 | TRIAXIAL.COM.AU

SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK D
STEELWORK DETAILS SHEET 4

PROJECT No TX13843.01 - DRAWING No S43.54 ISSUE 0

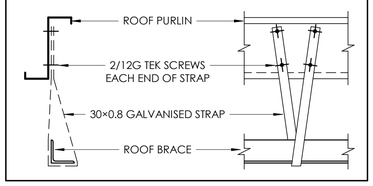


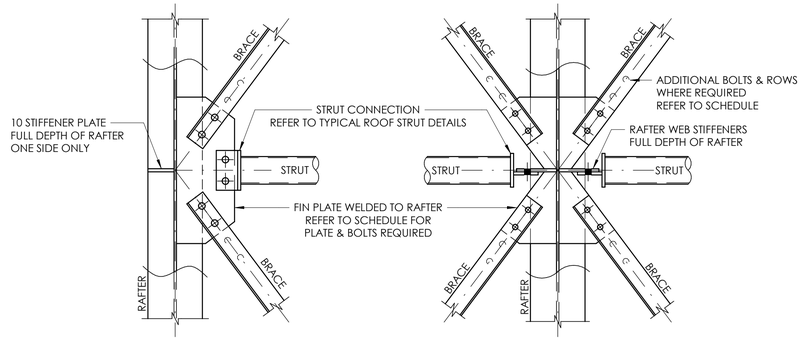
TYPICAL CROSS BRACING DETAIL

SCALE 1:10 AT A1

ANGLE BRACING SUPPORT NOTE:

ALL ANGLE BRACING TO BE SUPPORTED OFF ROOF PURLINS, REMOVE ANY SAG IN BRACING & STRAP TO PURLINS AT 1/4 POINTS NOMINAL, AS FOLLOWS:

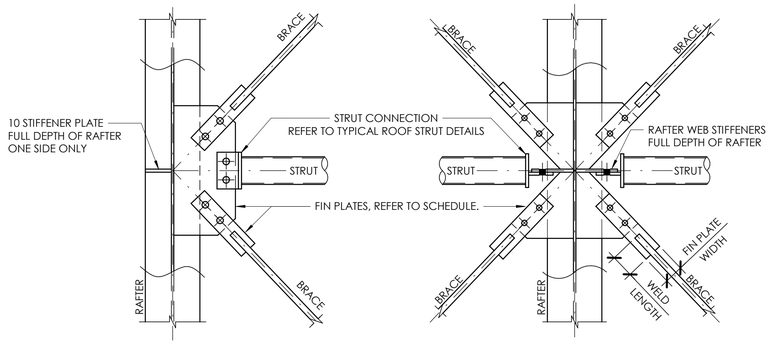




TYPICAL ROOF BRACING DETAIL

SCALE 1:10 AT A1

ANGLE CROSS BRACING SCHEDULE							
MEMBER	BOLTS (GRADE 8.8/S)			CROSS PLATE (G250)			
	BOLT SIZE	BOLTS PER ROW	ROWS	PLATE SIZE	LAP LENGTH	WELD	BOLT (8.8/S)
65×65×5 EA	M16	2	1	75×10	100	5 C.F.W.	M16



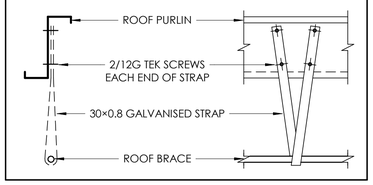
TYPICAL ROD BRACING DETAIL

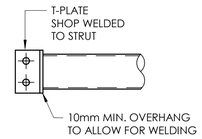
SCALE 1:10 AT A1

ROD BRACING CONNECTION DETAIL				
MEMBER SIZE	BOLTS REQ'D.	WELD LENGTH	FIN PLATE	FIN PLATE WIDTH
Ø16 ROD	2M16 8.8/S	100	10mm	60

ROD BRACING SUPPORT NOTE:

ALL ROD BRACING TO BE SUPPORTED OFF ROOF PURLINS, REMOVE ANY SAG IN BRACING & STRAP TO PURLINS AT 1/4 POINTS NOMINAL, AS FOLLOWS:



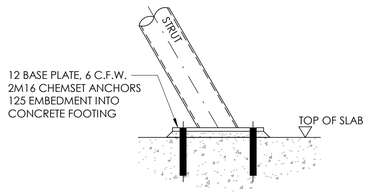


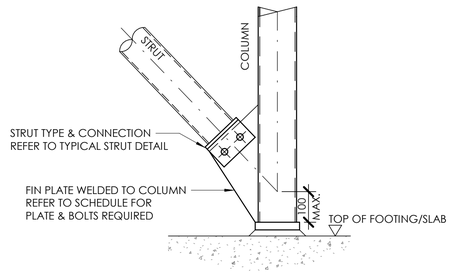
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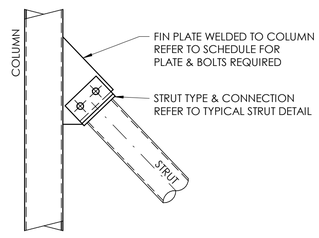
TYPICAL ROOF & WALL STRUT DETAIL

SCALE 1:10 AT A1

ROOF STRUT SCHEDULE						
MEMBER	T-PLATE/FIN PLATE (G250)			BOLT (GRADE 8.8/S)		
	TYPE	THICKNESS	WELD	BOLT SIZE	BOLTS PER ROW	ROWS
S1	A	10	6 C.F.W.	M16	2	1
S2	A	10	6 C.F.W.	M16	2	1
S3	A	10	6 C.F.W.	M16	2	1
WS1	A	10	6 C.F.W.	M16	2	1







TYPICAL WALL STRUT BRACING DETAIL

SCALE 1:10 AT A1

0 200 400 600 800 1000mm

SCALE 1:10 AT A1 SHEET | 1:20 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	22.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	B	MA.C
ISSUED FOR CLIENT REVIEW	31.07.20	A	MA.C

FOR CONSTRUCTION

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PROJECT MANAGER
TSA MANAGEMENT
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SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259

PROJECT
ST. MATTHEWS - BLOCK D
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
HE.C.	MA.C	JUL 2020	A1	TX13843.01-S01-R18

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

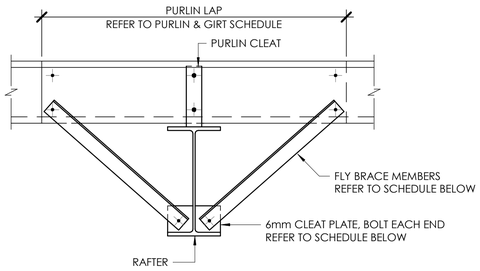
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PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK D
STEELWORK DETAILS SHEET 5

PROJECT No TX13843.01 - DRAWING No S43.55 ISSUE 0



FLY BRACING TO RAFTER DETAIL.
HORIZONTAL FLY BRACING TO GIRTS AT COLUMNS SIMILAR

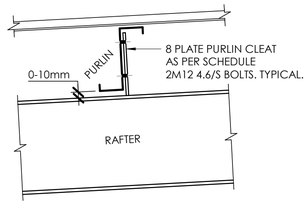
FLY BRACING SCHEDULE			
RAFTER/COLUMN	FLY BRACE (G300)	FLY BRACE (DURAGAL)	BOLTS
≤ 410UB	50×50×3 EA	50×50×4.0 CA	M12 8.8/S

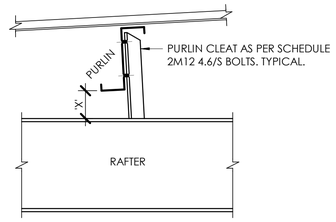
FLY BRACING DETAILS (FB)

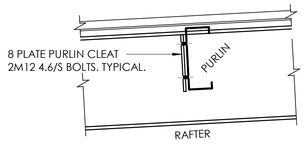
SCALE 1:10 AT A1

FLY BRACING NOTE:

THE FLY BRACING IS A CRITICAL ELEMENT PROVIDING STABILITY TO THE STRUCTURE.
FLY BRACING MUST BE INSTALLED AT THE TIME OF INSTALLATION OF THE PURLINS, GIRTS & WALL SYSTEM.
THERE SHALL BE NO ADDITIONAL LOAD (OTHER THAN PURLINS) PLACED ON RAFTERS
UNTIL ALL RAFTER & COLUMN FLY BRACING IS INSTALLED.
REFER ANY ALTERATION FROM THIS REQUIREMENT TO TRIAXIAL CONSULTING.







GIRT DETAIL AT COLUMNS SIMILAR

TYPICAL PURLIN/GIRT CONNECTION DETAIL

NOT TO SCALE

PURLIN & GIRT CLEAT SCHEDULE		
PITCH	'X' (mm)	CLEAT SIZE
<5°	0 - 10	60 × 8 PLATE
	11 - 40	60 × 10 PLATE
	41 - 100	75 × 10 PLATE
SCHEDULE APPLICABLE TO PURLINS & GIRTS UP TO Z/C250 SIZE ONLY		

0 200 400 600 800 1000mm
SCALE 1:10 AT A1 SHEET | 1:20 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	22.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	B	MA.C
ISSUED FOR CLIENT REVIEW	31.07.20	A	MA.C

FOR CONSTRUCTION

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TSA MANAGEMENT
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SYDNEY NSW 2000
TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north
BUILDING WITH TRUST®

PROJECT
ST. MATTHEWS - BLOCK D
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
HE.C.	MA.C	JUL 2020	A1	TX13843.01-S01-R18

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK D
STEELWORK DETAILS SHEET 6

PROJECT No TX13843.01 - DRAWING No S43.56 ISSUE 0

DRAWING LIST

S50.00 COVER SHEET

S51.02 FOOTING & LEVEL 1 PLAN SHEET 1
S51.03 FOOTING & LEVEL 1 PLAN SHEET 2
S51.04 FOOTING & LEVEL 1 PLAN SHEET 3
S51.05 LEVEL 1 HEADER & BRACING PLAN SHEET 1
S51.06 LEVEL 1 HEADER & BRACING PLAN SHEET 2
S51.07 LEVEL 1 HEADER & BRACING PLAN SHEET 3
S51.51 FOOTING & LEVEL 1 DETAILS SHEET 1
S51.52 FOOTING & LEVEL 1 DETAILS SHEET 2

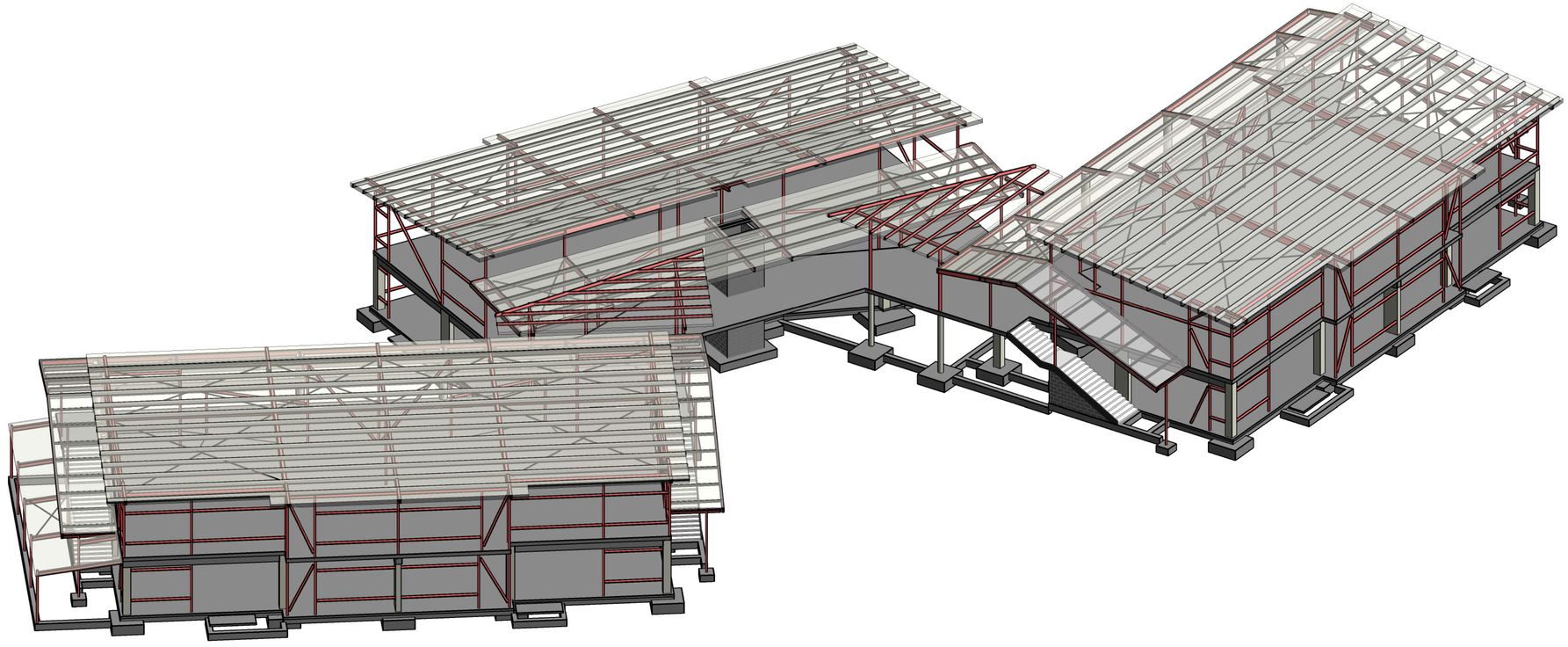
S52.02 LEVEL 2 PLAN SHEET 1
S52.03 LEVEL 2 PLAN SHEET 2
S52.04 LEVEL 2 PLAN SHEET 3
S52.05 LEVEL 2 HEADER & BRACING PLAN SHEET 1
S52.06 LEVEL 2 HEADER & BRACING PLAN SHEET 2
S52.07 LEVEL 2 HEADER & BRACING PLAN SHEET 3

S53.02 ROOF STEELWORK PLAN SHEET 1
S53.03 ROOF STEELWORK PLAN SHEET 2
S53.04 ROOF STEELWORK PLAN SHEET 3
S53.05 ROOF STEELWORK PLAN SHEET 4
S53.11 ELEVATIONS & SECTIONS SHEET 1
S53.12 ELEVATIONS & SECTIONS SHEET 2
S53.13 ELEVATIONS & SECTIONS SHEET 3
S53.51 STEELWORK DETAILS SHEET 1
S53.52 STEELWORK DETAILS SHEET 2
S53.53 STEELWORK DETAILS SHEET 3
S53.54 STEELWORK DETAILS SHEET 4
S53.55 STEELWORK DETAILS SHEET 5
S53.56 STEELWORK DETAILS SHEET 6
S53.57 STEELWORK DETAILS SHEET 7

S54.51 CONCRETE DETAILS SHEET 1

S55.51 WALL DETAILS
S55.52 STAIR DETAILS

ST MATTHEWS - BLOCK E
BROADHEAD ROAD, MUDGEE NSW 2850
STRUCTURAL DRAWINGS



AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	29.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	E	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	D	MA.C
ISSUED FOR CLIENT REVIEW	18.08.20	C	MA.C
ISSUED FOR 60% DOCUMENTATION	22.11.19	B	CH.W

FOR CONSTRUCTION

ARCHITECT
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PROJECT MANAGER
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LVL 15, 207 KENT STREET,
SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
BUILDING WITH TRUST®

PROJECT
ST MATTHEWS - BLOCK E
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	SEPT 2019	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

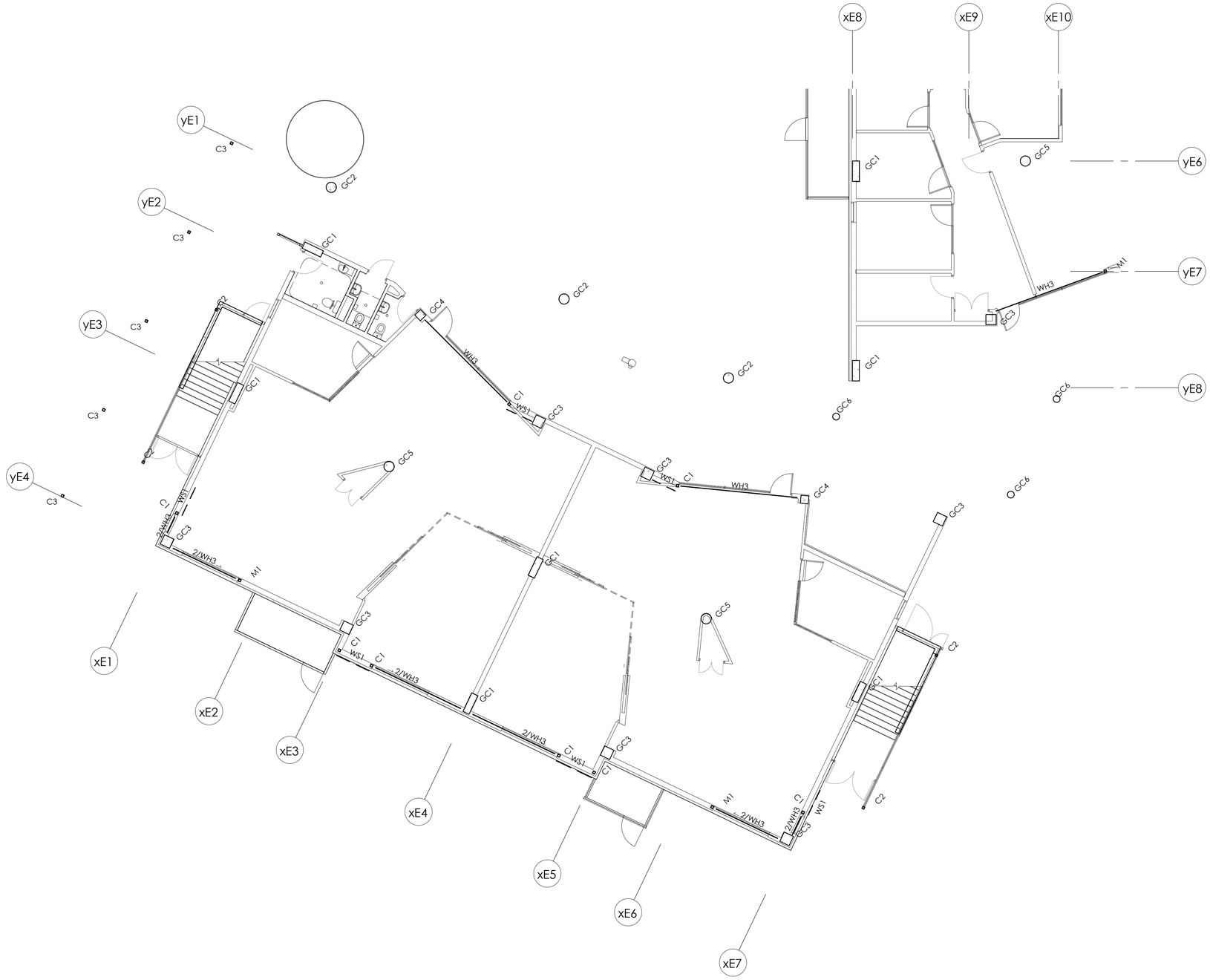
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PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK E
COVER SHEET

PROJECT No TX13843.01 - DRAWING No S50.00 ISSUE 0



STEELWORK MEMBER SCHEDULE

MARK	MEMBER	SIZE	REMARKS
B1	BEAM	250x150x9.0RHS	
B2	BEAM	250PFC	
B3	BEAM	300PFC	
B4	BEAM	200PFC	
C1	STEEL COLUMN	100x100x6.0SHS	
C2	STEEL COLUMN	89x89x5.0SHS	
C3	STEEL COLUMN	100x100x6.0SHS	
C4	STEEL COLUMN	165.1x5.0CHS	
M1	MULLION	100x100x6.0SHS	
OR1	OUTRIGGER	200UB25.4	
OR2	OUTRIGGER	100x100x6.0SHS	
OR3	OUTRIGGER	101.6x4.0CHS	
R1	RAFTER	410UB59.7	
R2	RAFTER	200x100x6.0RHS	
R3	RAFTER	230PFC	
R4	RAFTER	250PFC	
R5	RAFTER	150x100x6.0RHS	
R6	RAFTER	150x100x6.0RHS	
R7	RAFTER	200UB25.4	
R8	RAFTER	150PFC	
R9	RAFTER	200UB22.3	
RB1	ROOF BRACING	16ROD	
S1	STRUT	100x100x4.0SHS	
S2	STRUT	89x89x3.5SHS	
ST1	STUB COLUMN	100x100x6.0SHS	
WH1	WINDOW/WALL HEADER	150x100x4.0RHS	
WH2	WINDOW/WALL HEADER	100x100x4.0SHS	
WH3	WINDOW/WALL HEADER	100x100x6.0SHS	
WS1	WALL STRUT	100x100x6.0SHS	

CONCRETE COLUMN SCHEDULE

MARK	MEMBER	SIZE	REMARKS
GC1	CONCRETE COLUMN	300 x 900	10N12 VERT BARS, N12-300 TIES
GC2	CONCRETE COLUMN	450 DIA.	6N20 VERT BARS, N12-300 TIES
GC3	CONCRETE COLUMN	450 x 450	6N20 VERT BARS, N12-300 TIES
GC4	CONCRETE COLUMN	350 x 350	4N20 VERT BARS, N12-300 TIES
GC5	CONCRETE COLUMN	450 DIA.	6N20 VERT BARS, N12-300 TIES
GC6	CONCRETE COLUMN	300 DIA.	4N20 VERT BARS, N12-300 TIES

LEVEL 1 HEADER PLAN - BUILDING 1

SCALE 1 : 100 AT A1

SCALE 1:100 AT A1 SHEET | 1:200 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	29.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	B	MA.C
ISSUED FOR CLIENT REVIEW	18.08.20	A	MA.C

FOR CONSTRUCTION

ARCHITECT
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TSA MANAGEMENT
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SYDNEY NSW 2000
TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north BUILDING WITH TRUST®

PROJECT
ST MATTHEWS - BLOCK E
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	AUG 2020	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

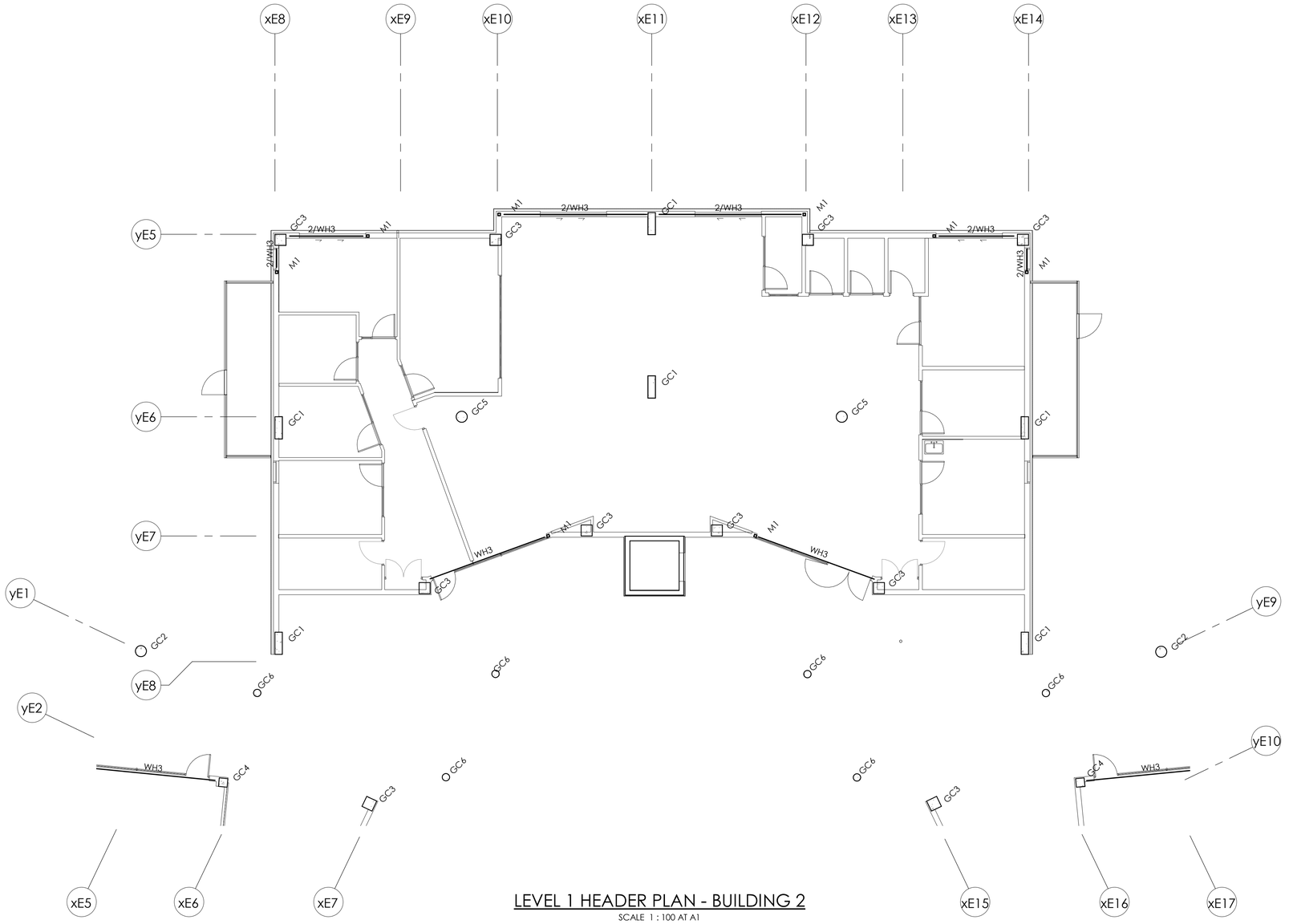
1300 874 294 | TRIAXIAL.COM.AU

SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK E
LEVEL 1 HEADER & BRACING PLAN SHEET 1

PROJECT No TX13843.01 - DRAWING No S51.05 ISSUE 0



LEVEL 1 HEADER PLAN - BUILDING 2

SCALE 1 : 100 AT A1

STEELWORK MEMBER SCHEDULE

MARK	MEMBER	SIZE	REMARKS
B1	BEAM	250x150x9.0RHS	
B2	BEAM	250PFC	
B3	BEAM	300PFC	
B4	BEAM	200PFC	
C1	STEEL COLUMN	100x100x6.0SHS	
C2	STEEL COLUMN	89x89x5.0SHS	
C3	STEEL COLUMN	100x100x6.0SHS	
C4	STEEL COLUMN	165.1x5.0CHS	
M1	MULLION	100x100x6.0SHS	
OR1	OUTRIGGER	200UB25.4	
OR2	OUTRIGGER	100x100x6.0SHS	
OR3	OUTRIGGER	101.6x4.0CHS	
R1	RAFTER	410UB59.7	
R2	RAFTER	200x100x6.0RHS	
R3	RAFTER	230PFC	
R4	RAFTER	250PFC	
R5	RAFTER	150x100x6.0RHS	
R6	RAFTER	150x100x6.0RHS	
R7	RAFTER	200UB25.4	
R8	RAFTER	150PFC	
R9	RAFTER	200UB22.3	
RB1	ROOF BRACING	16ROD	
S1	STRUT	100x100x4.0SHS	
S2	STRUT	89x89x3.5SHS	
ST1	STUB COLUMN	100x100x6.0SHS	
WH1	WINDOW/WALL HEADER	150x100x4.0RHS	
WH2	WINDOW/WALL HEADER	100x100x4.0SHS	
WH3	WINDOW/WALL HEADER	100x100x6.0SHS	
WS1	WALL STRUT	100x100x6.0SHS	

CONCRETE COLUMN SCHEDULE

MARK	MEMBER	SIZE	REMARKS
GC1	CONCRETE COLUMN	300 x 900	10N12 VERT BARS, N12-300 TIES
GC2	CONCRETE COLUMN	450 DIA.	6N20 VERT BARS, N12-300 TIES
GC3	CONCRETE COLUMN	450 x 450	6N20 VERT BARS, N12-300 TIES
GC4	CONCRETE COLUMN	350 x 350	4N20 VERT BARS, N12-300 TIES
GC5	CONCRETE COLUMN	450 DIA.	6N20 VERT BARS, N12-300 TIES
GC6	CONCRETE COLUMN	300 DIA.	4N20 VERT BARS, N12-300 TIES

0 1 2 3 4 5 6 7 8 9 10m

SCALE 1:100 AT A1 SHEET | 1:200 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	29.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	B	MA.C
ISSUED FOR CLIENT REVIEW	18.08.20	A	MA.C

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259

PROJECT
ST MATTHEWS - BLOCK E
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	AUG 2020	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

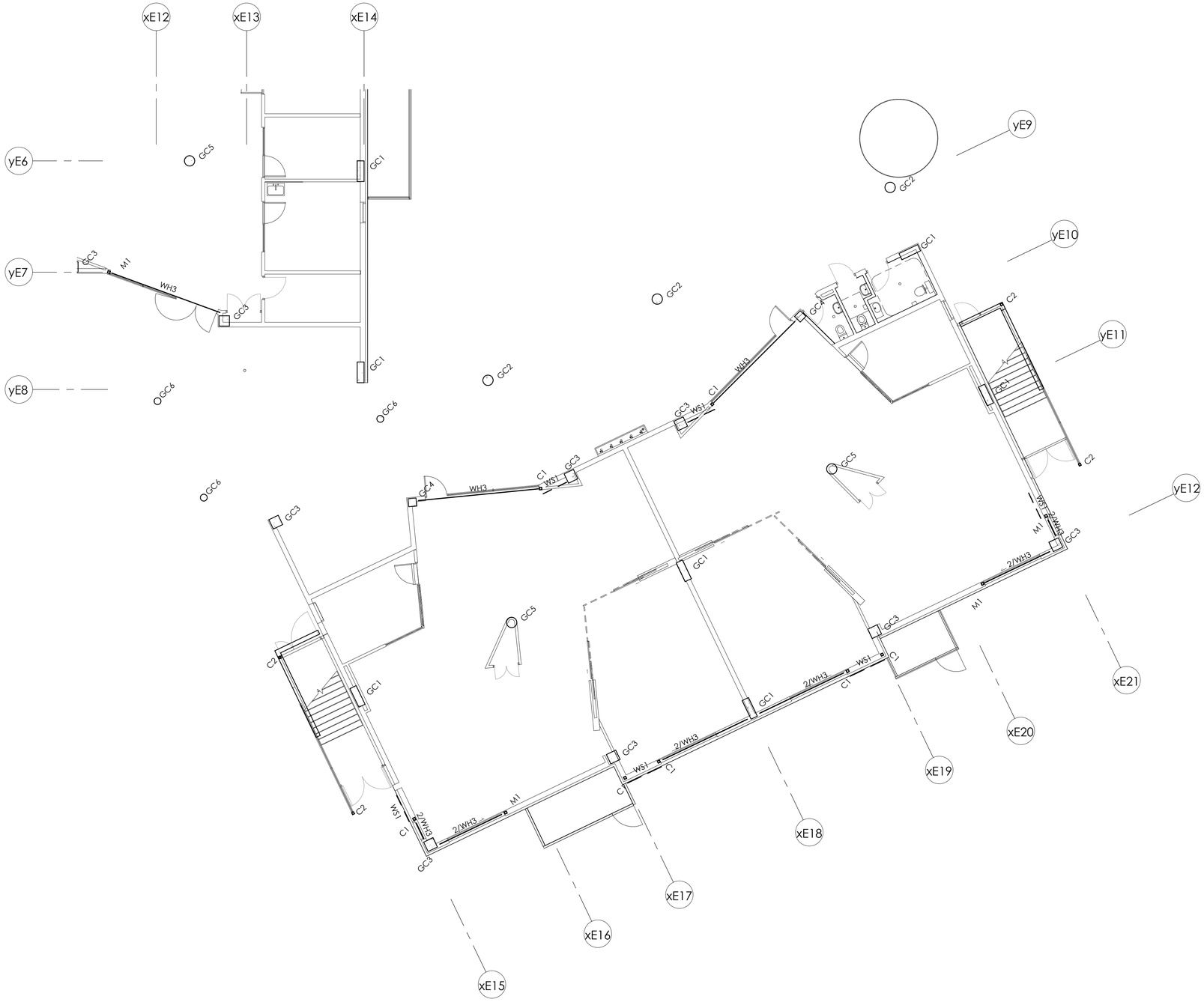
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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK E
LEVEL 1 HEADER & BRACING
PLAN SHEET 2

PROJECT No TX13843.01 - DRAWING No S51.06 ISSUE 0



P LEVEL 1 HEADER LEVEL - Dependent 3

SCALE 1 : 100 AT A1

STEELWORK MEMBER SCHEDULE

MARK	MEMBER	SIZE	REMARKS
B1	BEAM	250x150x9.0RHS	
B2	BEAM	250PFC	
B3	BEAM	300PFC	
B4	BEAM	200PFC	
C1	STEEL COLUMN	100x100x6.0SHS	
C2	STEEL COLUMN	89x89x5.0SHS	
C3	STEEL COLUMN	100x100x6.0SHS	
C4	STEEL COLUMN	165.1x5.0CHS	
M1	MULLION	100x100x6.0SHS	
OR1	OUTRIGGER	200UB25.4	
OR2	OUTRIGGER	100x100x6.0SHS	
OR3	OUTRIGGER	101.6x4.0CHS	
R1	RAFTER	410UB59.7	
R2	RAFTER	200x100x6.0RHS	
R3	RAFTER	230PFC	
R4	RAFTER	250PFC	
R5	RAFTER	150x100x6.0RHS	
R6	RAFTER	150x100x6.0RHS	
R7	RAFTER	200UB25.4	
R8	RAFTER	150PFC	
R9	RAFTER	200UB22.3	
RB1	ROOF BRACING	16ROD	
S1	STRUT	100x100x4.0SHS	
S2	STRUT	89x89x3.5SHS	
ST1	STUB COLUMN	100x100x6.0SHS	
WH1	WINDOW/WALL HEADER	150x100x4.0RHS	
WH2	WINDOW/WALL HEADER	100x100x4.0SHS	
WH3	WINDOW/WALL HEADER	100x100x6.0SHS	
WS1	WALL STRUT	100x100x6.0SHS	

CONCRETE COLUMN SCHEDULE

MARK	MEMBER	SIZE	REMARKS
GC1	CONCRETE COLUMN	300 x 900	10N12 VERT BARS, N12-300 TIES
GC2	CONCRETE COLUMN	450 DIA.	6N20 VERT BARS, N12-300 TIES
GC3	CONCRETE COLUMN	450 x 450	6N20 VERT BARS, N12-300 TIES
GC4	CONCRETE COLUMN	350 x 350	4N20 VERT BARS, N12-300 TIES
GC5	CONCRETE COLUMN	450 DIA.	6N20 VERT BARS, N12-300 TIES
GC6	CONCRETE COLUMN	300 DIA.	4N20 VERT BARS, N12-300 TIES

SCALE 1:100 AT A1 SHEET | 1:200 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	29.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	B	MA.C
ISSUED FOR CLIENT REVIEW	18.08.20	A	MA.C

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
BUILDING WITH TRUST®

PROJECT
ST MATTHEWS - BLOCK E
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	AUG 2020	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

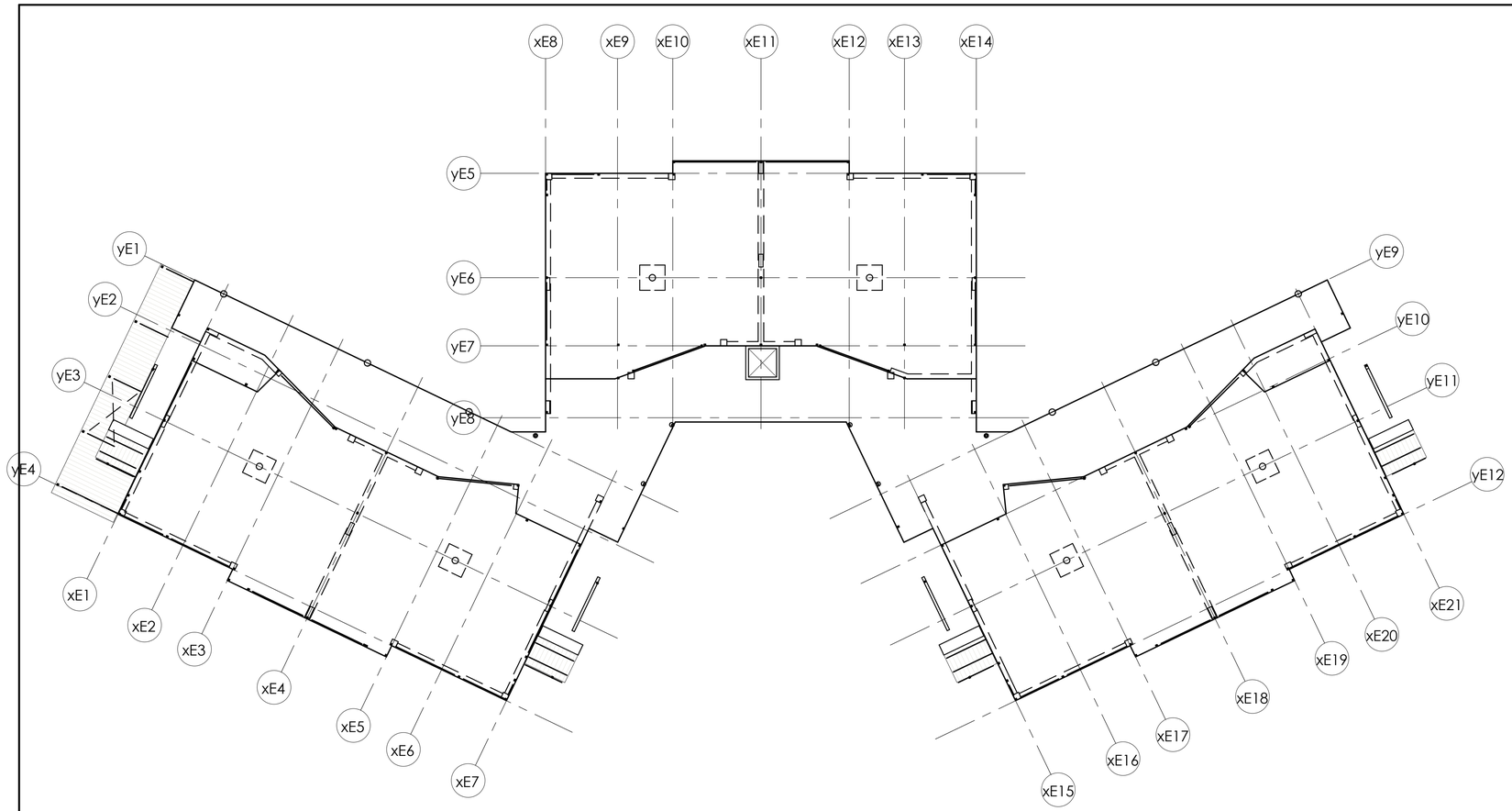
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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK E
LEVEL 1 HEADER & BRACING
PLAN SHEET 3

PROJECT No TX13843.01 - DRAWING No S51.07 ISSUE 0



LEVEL 2 OVERALL

SCALE 1 : 200 AT A1

0 5 10 15 20mm

SCALE 1:200 AT A1 SHEET | 1:400 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	29.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	B	CH.W
ISSUED FOR 60% DOCUMENTATION	22.11.19	A	CH.W

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259

PROJECT
ST MATTHEWS - BLOCK E
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	SEPT 2019	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

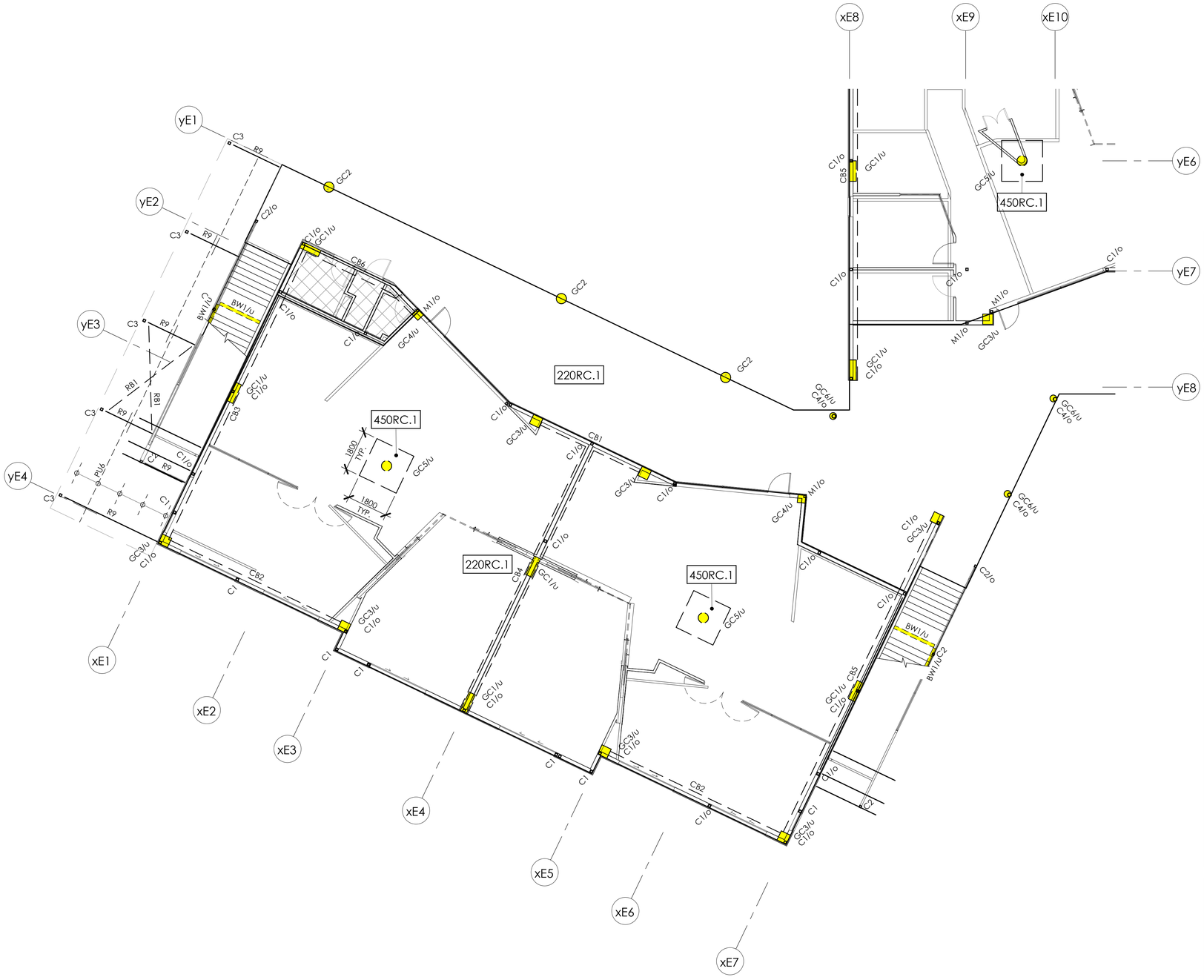
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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK E
LEVEL 2 PLAN OVERALL

PROJECT No TX13843.01 - DRAWING No S52.01 ISSUE 0



LEVEL 2 PLAN - BUILDING 1

SCALE 1 : 100 AT A1

LEGEND:

- ××RC.× — REINFORCED CONCRETE SLAB AS NOTED IN SLAB SPECIFICATION TABLE
- SET-DOWN FOR WET AREAS TO ARCH'S DETAILS. REFER TO DETAILS SHEET. PROVIDE TRIMMERS AT CORNERS FOR SET-DOWN >50mm U.N.O. ON PLAN
- STEP IN SLAB TO ARCH'S DETAILS
- 2N16 x 2000 LONG TRIMMERS TIED TO UNDERSIDE OF TOP MESH

SLAB SPECIFICATIONS TABLE

MARK	SLAB TYPE	THICKNESS (MIN)	REINFORCEMENT
120RS.1	RAFT SLAB	120	SL82 MESH (30 TOP COVER)
220RC.1	REINFORCED CONCRETE	220	N16-200 EACH WAY, TOP & BOTTOM
450RC.1	REINFORCED CONCRETE	450	N16-200 EACH WAY, TOP & BOTTOM

WALL SCHEDULE

MARK	TYPE	THICKNESS	REMARKS
BW1	BLOCKWORK	190	REFER TO WALL DETAILS
BW2	BLOCKWORK	190	REFER TO LIFT SHAFT WALL DETAIL

CONCRETE MEMBER SCHEDULE

MARK	MEMBER	SIZE	REMARKS
CB1	CONCRETE BEAM	300 WIDE x 600 DEEP	3N24 TOP & BOTTOM, N12-300 TIES
CB2	CONCRETE BEAM	350 WIDE x 600 DEEP	3N24 TOP & BOTTOM, N12-300 TIES
CB3	CONCRETE BEAM	350 WIDE x 600 DEEP	3N24 TOP & BOTTOM, N12-300 TIES
CB4	CONCRETE BEAM	400 WIDE x 600 DEEP	3N24 TOP & BOTTOM, N12-300 TIES
CB5	CONCRETE BEAM	350 WIDE x 600 DEEP	3N24 TOP & BOTTOM, N12-300 TIES
CB6	CONCRETE BEAM	350 WIDE x 600 DEEP	3N24 TOP & BOTTOM, N12-300 TIES
GC1	CONCRETE COLUMN	300 x 900	10N12 VERT BARS, N12-300 TIES
GC2	CONCRETE COLUMN	450 DIA.	6N20 VERT BARS, N12-300 TIES
GC3	CONCRETE COLUMN	450 x 450	6N20 VERT BARS, N12-300 TIES
GC4	CONCRETE COLUMN	350 x 350	4N20 VERT BARS, N12-300 TIES
GC5	CONCRETE COLUMN	450 DIA.	6N20 VERT BARS, N12-300 TIES
GC6	CONCRETE COLUMN	300 DIA.	4N20 VERT BARS, N12-300 TIES

STEELWORK MEMBER SCHEDULE

MARK	MEMBER	SIZE	REMARKS
B1	BEAM	250x150x9.0RHS	
B2	BEAM	250PFC	
B3	BEAM	300PFC	
B4	BEAM	200PFC	
C1	STEEL COLUMN	100x100x6.0SHS	
C2	STEEL COLUMN	89x89x5.0SHS	
C3	STEEL COLUMN	100x100x6.0SHS	
C4	STEEL COLUMN	165.1x5.0CHS	
M1	MULLION	100x100x6.0SHS	
OR1	OUTRIGGER	200UB25.4	
OR2	OUTRIGGER	100x100x6.0SHS	
OR3	OUTRIGGER	101.6x4.0CHS	
R1	RAFTER	410UB59.7	
R2	RAFTER	200x100x6.0RHS	
R3	RAFTER	230PFC	
R4	RAFTER	250PFC	
R5	RAFTER	150x100x6.0RHS	
R6	RAFTER	150x100x6.0RHS	
R7	RAFTER	200UB25.4	
R8	RAFTER	150PFC	
R9	RAFTER	200UB22.3	
RB1	ROOF BRACING	16ROD	
S1	STRUT	100x100x4.0SHS	
S2	STRUT	89x89x3.5SHS	
ST1	STUB COLUMN	100x100x6.0SHS	
WH1	WINDOW/WALL HEADER	150x100x4.0RHS	
WH2	WINDOW/WALL HEADER	100x100x4.0SHS	
WH3	WINDOW/WALL HEADER	100x100x6.0SHS	
WS1	WALL STRUT	100x100x6.0SHS	

PURLIN/GIRT SCHEDULE

MARK	MEMBER	SIZE	CENTRES (MAX.)	LAP (MIN.)	BRIDGING	REMARKS
FP1	FASCIA PURLIN	C250-19	-	-	TO MATCH ADJACENT PURLINS	
PU1	PURLIN	Z200-19	1200	900	2 ROWS	
PU2	PURLIN	C200-24	1000	-	2 ROWS	
PU3	PURLIN	150x50x4.0RHS	1000			
PU4	PURLIN	C100-15	1200	-		
PU5	PURLIN	C200-15	1000	-	2 ROWS	
PU6	PURLIN	Z150-19	1200	900	1 ROW	
TP1	TRIMMER PURLIN	C200-24	-	-	-	

CONCRETE QUALITY - LEVEL 2

ELEMENT	AS3600 EXPOSURE CLASSIFICATION	AS1379 CONCRETE CLASS	f'c (MPa) CHARACTERISTIC COMPRESSIVE STRENGTH	f'ct.f (MPa) FLEXURAL TENSILE STRENGTH	CEMENT TYPE	ADMIXTURES	MAX AGGREGATE SIZE (mm)	SLUMP	REMARKS
SUSPENDED SLAB	A2	N	40	-	GP	NIL	20	80	

0 1 2 3 4 5 6 7 8 9 10m

SCALE 1:100 AT A1 SHEET | 1:200 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	29.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	E	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	D	MA.C
ISSUED FOR CLIENT REVIEW	18.08.20	C	MA.C
ISSUED FOR 60% DOCUMENTATION	22.11.19	B	CH.W

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259

PROJECT
ST MATTHEWS - BLOCK E
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	SEPT 2019	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

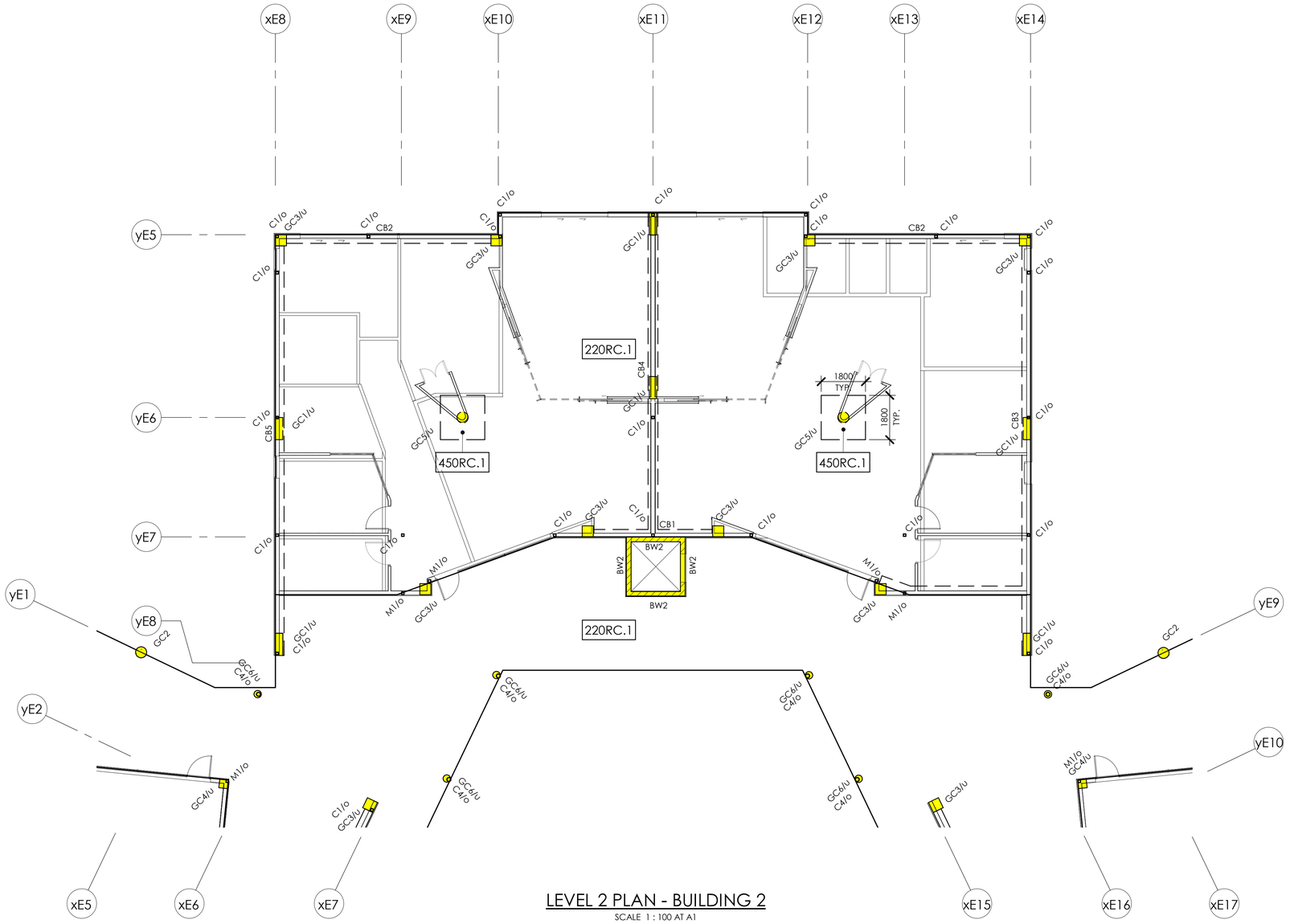
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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK E
LEVEL 2 PLAN SHEET 1

PROJECT No TX13843.01 - DRAWING No S52.02 ISSUE 0



LEVEL 2 PLAN - BUILDING 2

SCALE 1 : 100 AT A1

LEGEND:

- ××RC.× — REINFORCED CONCRETE SLAB AS NOTED IN SLAB SPECIFICATION TABLE
- SET-DOWN FOR WET AREAS TO ARCH'S DETAILS. REFER TO DETAILS SHEET. PROVIDE TRIMMERS AT CORNERS FOR SET-DOWN >50mm U.N.O. ON PLAN
- STEP IN SLAB TO ARCH'S DETAILS
- 2N16 x 2000 LONG TRIMMERS TIED TO UNDERSIDE OF TOP MESH

SLAB SPECIFICATIONS TABLE

MARK	SLAB TYPE	THICKNESS (MIN)	REINFORCEMENT
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450RC.1	REINFORCED CONCRETE	450	N16-200 EACH WAY, TOP & BOTTOM

WALL SCHEDULE

MARK	TYPE	THICKNESS	REMARKS
BW1	BLOCKWORK	190	REFER TO WALL DETAILS
BW2	BLOCKWORK	190	REFER TO LIFT SHAFT WALL DETAIL

CONCRETE MEMBER SCHEDULE

MARK	MEMBER	SIZE	REMARKS
CB1	CONCRETE BEAM	300 WIDE x 600 DEEP	3N24 TOP & BOTTOM, N12-300 TIES
CB2	CONCRETE BEAM	350 WIDE x 600 DEEP	3N24 TOP & BOTTOM, N12-300 TIES
CB3	CONCRETE BEAM	350 WIDE x 600 DEEP	3N24 TOP & BOTTOM, N12-300 TIES
CB4	CONCRETE BEAM	400 WIDE x 600 DEEP	3N24 TOP & BOTTOM, N12-300 TIES
CB5	CONCRETE BEAM	350 WIDE x 600 DEEP	3N24 TOP & BOTTOM, N12-300 TIES
CB6	CONCRETE BEAM	350 WIDE x 600 DEEP	3N24 TOP & BOTTOM, N12-300 TIES
GC1	CONCRETE COLUMN	300 x 900	10N12 VERT BARS, N12-300 TIES
GC2	CONCRETE COLUMN	450 DIA.	6N20 VERT BARS, N12-300 TIES
GC3	CONCRETE COLUMN	450 x 450	6N20 VERT BARS, N12-300 TIES
GC4	CONCRETE COLUMN	350 x 350	4N20 VERT BARS, N12-300 TIES
GC5	CONCRETE COLUMN	450 DIA.	6N20 VERT BARS, N12-300 TIES
GC6	CONCRETE COLUMN	300 DIA.	4N20 VERT BARS, N12-300 TIES

STEELWORK MEMBER SCHEDULE

MARK	MEMBER	SIZE	REMARKS
B1	BEAM	250x150x9.0RHS	
B2	BEAM	250PFC	
B3	BEAM	300PFC	
B4	BEAM	200PFC	
C1	STEEL COLUMN	100x100x6.0SHS	
C2	STEEL COLUMN	89x89x5.0SHS	
C3	STEEL COLUMN	100x100x6.0SHS	
C4	STEEL COLUMN	165.1x5.0CHS	
M1	MULLION	100x100x6.0SHS	
OR1	OUTRIGGER	200UB25.4	
OR2	OUTRIGGER	100x100x6.0SHS	
OR3	OUTRIGGER	101.6x4.0CHS	
R1	RAFTER	410UB59.7	
R2	RAFTER	200x100x6.0RHS	
R3	RAFTER	230PFC	
R4	RAFTER	250PFC	
R5	RAFTER	150x100x6.0RHS	
R6	RAFTER	150x100x6.0RHS	
R7	RAFTER	200UB25.4	
R8	RAFTER	150PFC	
R9	RAFTER	200UB22.3	
RB1	ROOF BRACING	16ROD	
S1	STRUT	100x100x4.0SHS	
S2	STRUT	89x89x3.5SHS	
ST1	STUB COLUMN	100x100x6.0SHS	
WH1	WINDOW/WALL HEADER	150x100x4.0RHS	
WH2	WINDOW/WALL HEADER	100x100x4.0SHS	
WH3	WINDOW/WALL HEADER	100x100x6.0SHS	
WS1	WALL STRUT	100x100x6.0SHS	

PURLIN/GIRT SCHEDULE

MARK	MEMBER	SIZE	CENTRES (MAX.)	LAP (MIN.)	BRIDGING	REMARKS
FP1	FASCIA PURLIN	C250-19	-	-	TO MATCH ADJACENT PURLINS	
PU1	PURLIN	Z200-19	1200	900	2 ROWS	
PU2	PURLIN	C200-24	1000	-	2 ROWS	
PU3	PURLIN	150x50x4.0RHS	1000			
PU4	PURLIN	C100-15	1200	-		
PU5	PURLIN	C200-15	1000	-	2 ROWS	
PU6	PURLIN	Z150-19	1200	900	1 ROW	
TP1	TRIMMER PURLIN	C200-24	-	-	-	

CONCRETE QUALITY - LEVEL 2

ELEMENT	AS3600 EXPOSURE CLASSIFICATION	AS1379 CONCRETE CLASS	f'c (MPa) CHARACTERISTIC COMPRESSIVE STRENGTH	f'ct.f (MPa) FLEXURAL TENSILE STRENGTH	CEMENT TYPE	ADMIXTURES	MAX AGGREGATE SIZE (mm)	SLUMP	REMARKS
SUSPENDED SLAB	A2	N	40	-	GP	NIL	20	80	

0 1 2 3 4 5 6 7 8 9 10m

SCALE 1:100 AT A1 SHEET | 1:200 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	29.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	E	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	D	MA.C
ISSUED FOR CLIENT REVIEW	18.08.20	C	MA.C
ISSUED FOR 60% DOCUMENTATION	22.11.19	B	CH.W

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259

PROJECT
ST MATTHEWS - BLOCK E
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	SEPT 2019	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

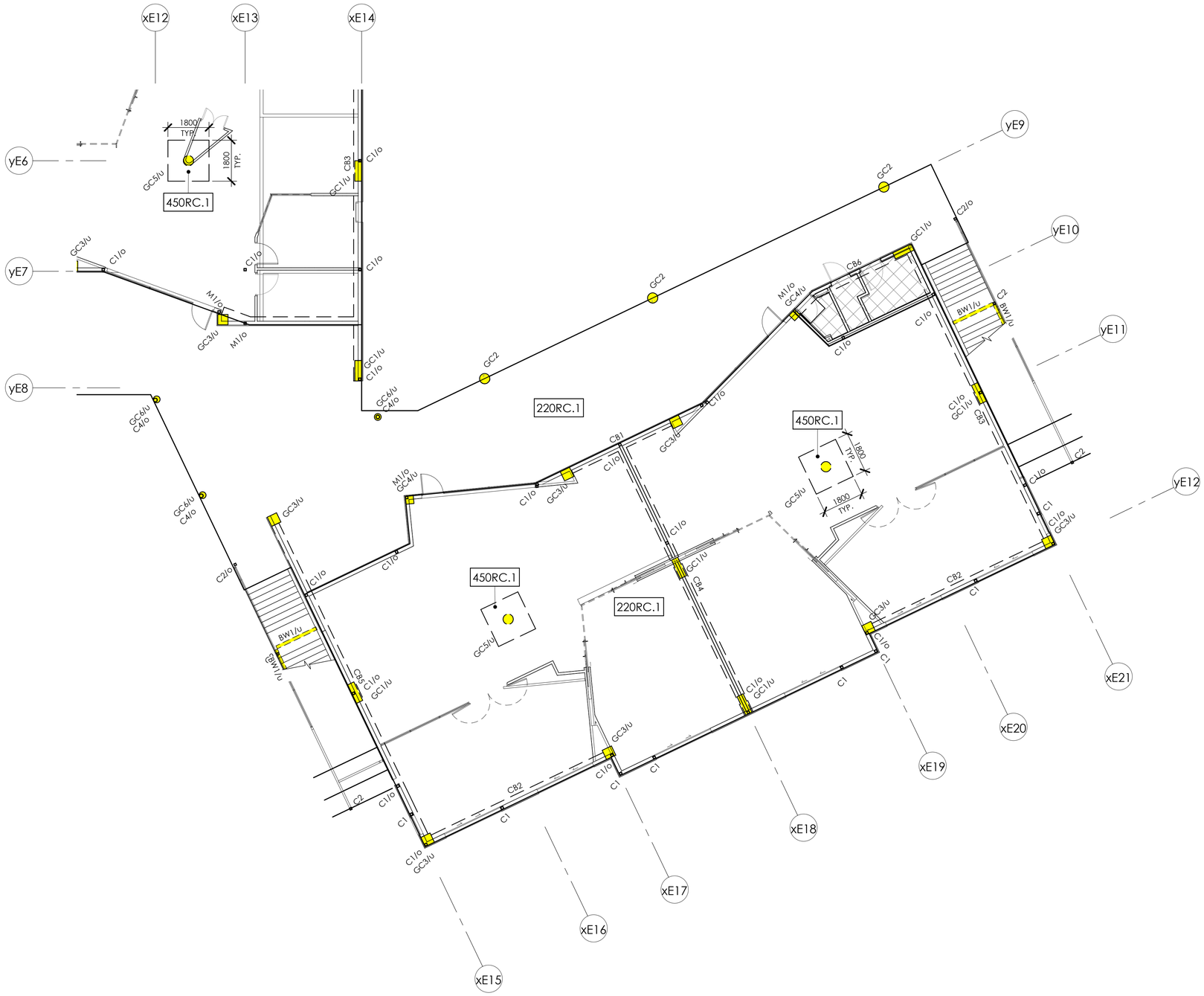
1300 874 294 | TRIAXIAL.COM.AU

SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK E
LEVEL 2 PLAN SHEET 2

PROJECT No TX13843.01 - DRAWING No S52.03 ISSUE 0



LEVEL 2 PLAN - BUILDING 3

SCALE 1 : 100 AT A1

LEGEND:

- ××RC.× — REINFORCED CONCRETE SLAB AS NOTED IN SLAB SPECIFICATION TABLE
- SET-DOWN FOR WET AREAS TO ARCH'S DETAILS. REFER TO DETAILS SHEET. PROVIDE TRIMMERS AT CORNERS FOR SET-DOWN >50mm U.N.O. ON PLAN
- STEP IN SLAB TO ARCH'S DETAILS
- 2N16 x 2000 LONG TRIMMERS TIED TO UNDERSIDE OF TOP MESH

SLAB SPECIFICATIONS TABLE

MARK	SLAB TYPE	THICKNESS (MIN)	REINFORCEMENT
120RS.1	RAFT SLAB	120	SL82 MESH (30 TOP COVER)
220RC.1	REINFORCED CONCRETE	220	N16-200 EACH WAY, TOP & BOTTOM
450RC.1	REINFORCED CONCRETE	450	N16-200 EACH WAY, TOP & BOTTOM

WALL SCHEDULE

MARK	TYPE	THICKNESS	REMARKS
BW1	BLOCKWORK	190	REFER TO WALL DETAILS
BW2	BLOCKWORK	190	REFER TO LIFT SHAFT WALL DETAIL

CONCRETE MEMBER SCHEDULE

MARK	MEMBER	SIZE	REMARKS
CB1	CONCRETE BEAM	300 WIDE x 600 DEEP	3N24 TOP & BOTTOM, N12-300 TIES
CB2	CONCRETE BEAM	350 WIDE x 600 DEEP	3N24 TOP & BOTTOM, N12-300 TIES
CB3	CONCRETE BEAM	350 WIDE x 600 DEEP	3N24 TOP & BOTTOM, N12-300 TIES
CB4	CONCRETE BEAM	400 WIDE x 600 DEEP	3N24 TOP & BOTTOM, N12-300 TIES
CB5	CONCRETE BEAM	350 WIDE x 600 DEEP	3N24 TOP & BOTTOM, N12-300 TIES
CB6	CONCRETE BEAM	350 WIDE x 600 DEEP	3N24 TOP & BOTTOM, N12-300 TIES
GC1	CONCRETE COLUMN	300 x 900	10N12 VERT BARS, N12-300 TIES
GC2	CONCRETE COLUMN	450 DIA.	6N20 VERT BARS, N12-300 TIES
GC3	CONCRETE COLUMN	450 x 450	6N20 VERT BARS, N12-300 TIES
GC4	CONCRETE COLUMN	350 x 350	4N20 VERT BARS, N12-300 TIES
GC5	CONCRETE COLUMN	450 DIA.	6N20 VERT BARS, N12-300 TIES
GC6	CONCRETE COLUMN	300 DIA.	4N20 VERT BARS, N12-300 TIES

STEELWORK MEMBER SCHEDULE

MARK	MEMBER	SIZE	REMARKS
B1	BEAM	250x150x9.0RHS	
B2	BEAM	250PFC	
B3	BEAM	300PFC	
B4	BEAM	200PFC	
C1	STEEL COLUMN	100x100x6.0SHS	
C2	STEEL COLUMN	89x89x5.0SHS	
C3	STEEL COLUMN	100x100x6.0SHS	
C4	STEEL COLUMN	165.1x5.0CHS	
M1	MULLION	100x100x6.0SHS	
OR1	OUTRIGGER	200UB25.4	
OR2	OUTRIGGER	100x100x6.0SHS	
OR3	OUTRIGGER	101.6x4.0CHS	
R1	RAFTER	410UB59.7	
R2	RAFTER	200x100x6.0RHS	
R3	RAFTER	230PFC	
R4	RAFTER	250PFC	
R5	RAFTER	150x100x6.0RHS	
R6	RAFTER	150x100x6.0RHS	
R7	RAFTER	200UB25.4	
R8	RAFTER	150PFC	
R9	RAFTER	200UB22.3	
RB1	ROOF BRACING	16ROD	
S1	STRUT	100x100x4.0SHS	
S2	STRUT	89x89x3.5SHS	
ST1	STUB COLUMN	100x100x6.0SHS	
WH1	WINDOW/WALL HEADER	150x100x4.0RHS	
WH2	WINDOW/WALL HEADER	100x100x4.0SHS	
WH3	WINDOW/WALL HEADER	100x100x6.0SHS	
WS1	WALL STRUT	100x100x6.0SHS	

PURLIN/GIRT SCHEDULE

MARK	MEMBER	SIZE	CENTRES (MAX.)	LAP (MIN.)	BRIDGING	REMARKS
FP1	FASCIA PURLIN	C250-19	-	-	TO MATCH ADJACENT PURLINS	
PU1	PURLIN	Z200-19	1200	900	2 ROWS	
PU2	PURLIN	C200-24	1000	-	2 ROWS	
PU3	PURLIN	150x50x4.0RHS	1000			
PU4	PURLIN	C100-15	1200	-		
PU5	PURLIN	C200-15	1000	-	2 ROWS	
PU6	PURLIN	Z150-19	1200	900	1 ROW	
TP1	TRIMMER PURLIN	C200-24	-	-	-	

CONCRETE QUALITY - LEVEL 2

ELEMENT	AS3600 EXPOSURE CLASSIFICATION	AS1379 CONCRETE CLASS	f'c (MPa) CHARACTERISTIC COMPRESSIVE STRENGTH	f'ct.f (MPa) FLEXURAL TENSILE STRENGTH	CEMENT TYPE	ADMIXTURES	MAX AGGREGATE SIZE (mm)	SLUMP	REMARKS
SUSPENDED SLAB	A2	N	40	-	GP	NIL	20	80	

0 1 2 3 4 5 6 7 8 9 10m

SCALE 1:100 AT A1 SHEET | 1:200 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	29.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	B	MA.C
ISSUED FOR CLIENT REVIEW	18.08.20	A	MA.C

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000
ALLEANZA ARCHITECTURE

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000
TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north BUILDING WITH TRUST®

PROJECT
ST MATTHEWS - BLOCK E
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	AUG 2020	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

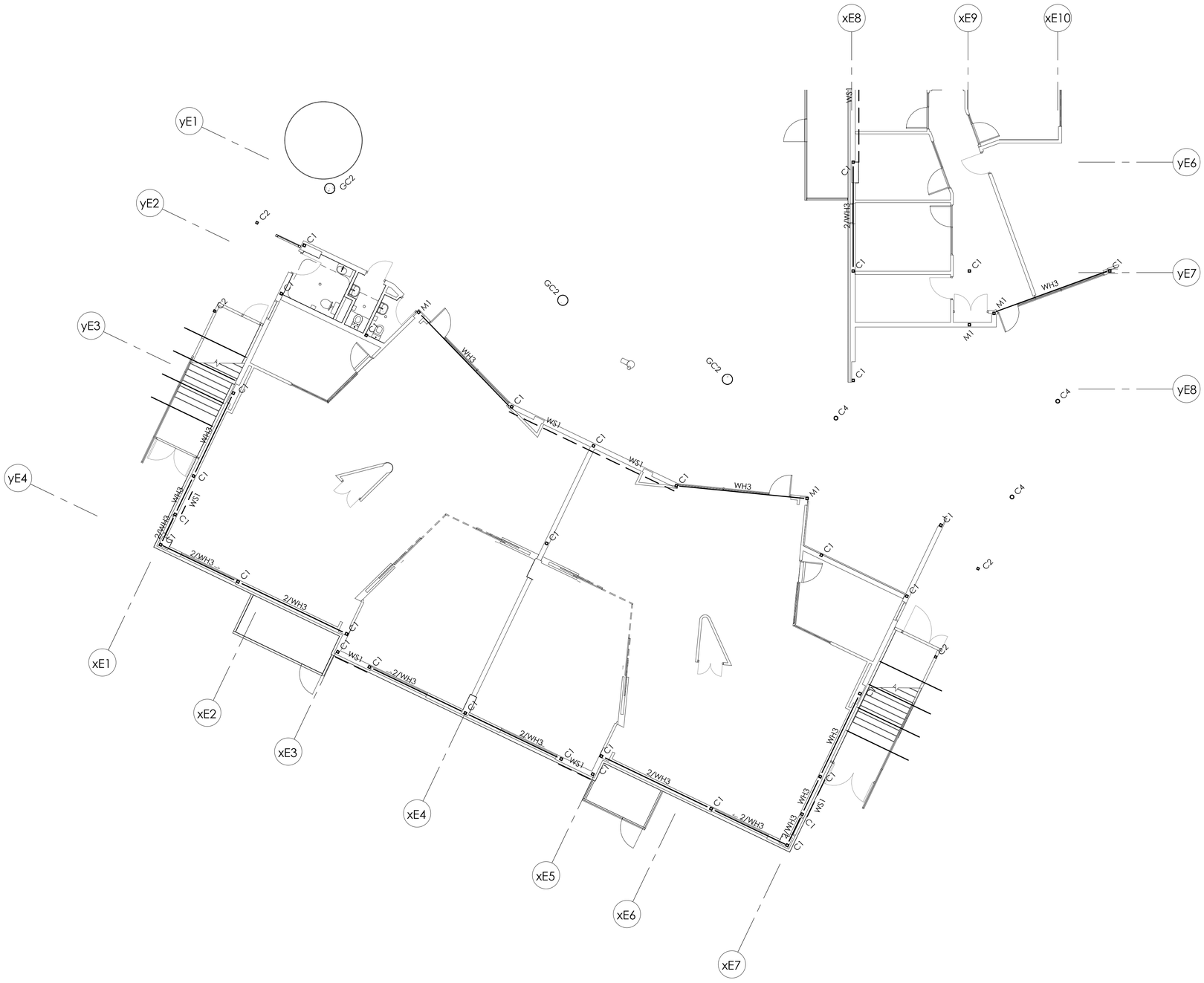
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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK E
LEVEL 2 PLAN SHEET 3

PROJECT No TX13843.01 - DRAWING No S52.04 ISSUE 0



STEELWORK MEMBER SCHEDULE

MARK	MEMBER	SIZE	REMARKS
B1	BEAM	250x150x9.0RHS	
B2	BEAM	250PFC	
B3	BEAM	300PFC	
B4	BEAM	200PFC	
C1	STEEL COLUMN	100x100x6.0SHS	
C2	STEEL COLUMN	89x89x5.0SHS	
C3	STEEL COLUMN	100x100x6.0SHS	
C4	STEEL COLUMN	165.1x5.0CHS	
M1	MULLION	100x100x6.0SHS	
OR1	OUTRIGGER	200UB25.4	
OR2	OUTRIGGER	100x100x6.0SHS	
OR3	OUTRIGGER	101.6x4.0CHS	
R1	RAFTER	410UB59.7	
R2	RAFTER	200x100x6.0RHS	
R3	RAFTER	230PFC	
R4	RAFTER	250PFC	
R5	RAFTER	150x100x6.0RHS	
R6	RAFTER	150x100x6.0RHS	
R7	RAFTER	200UB25.4	
R8	RAFTER	150PFC	
R9	RAFTER	200UB22.3	
RB1	ROOF BRACING	16ROD	
S1	STRUT	100x100x4.0SHS	
S2	STRUT	89x89x3.5SHS	
ST1	STUB COLUMN	100x100x6.0SHS	
WH1	WINDOW/WALL HEADER	150x100x4.0RHS	
WH2	WINDOW/WALL HEADER	100x100x4.0SHS	
WH3	WINDOW/WALL HEADER	100x100x6.0SHS	
WS1	WALL STRUT	100x100x6.0SHS	

CONCRETE COLUMN SCHEDULE

MARK	MEMBER	SIZE	REMARKS
GC1	CONCRETE COLUMN	300 x 900	10N12 VERT BARS, N12-300 TIES
GC2	CONCRETE COLUMN	450 DIA.	6N20 VERT BARS, N12-300 TIES
GC3	CONCRETE COLUMN	450 x 450	6N20 VERT BARS, N12-300 TIES
GC4	CONCRETE COLUMN	350 x 350	4N20 VERT BARS, N12-300 TIES
GC5	CONCRETE COLUMN	450 DIA.	6N20 VERT BARS, N12-300 TIES
GC6	CONCRETE COLUMN	300 DIA.	4N20 VERT BARS, N12-300 TIES

LEVEL 2 HEADER PLAN - BUILDING 1

SCALE 1 : 100 AT A1

0 1 2 3 4 5 6 7 8 9 10m

SCALE 1:100 AT A1 SHEET | 1:200 AT A3 SHEET

ISSUED FOR CONSTRUCTION	29.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	B	MA.C
ISSUED FOR CLIENT REVIEW	18.08.20	A	MA.C
AMENDMENTS	DATE	ISSUE	BY

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000
ALLEANZA ARCHITECTURE

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000
TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north BUILDING WITH TRUST®

PROJECT
ST MATTHEWS - BLOCK E
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	AUG 2020	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

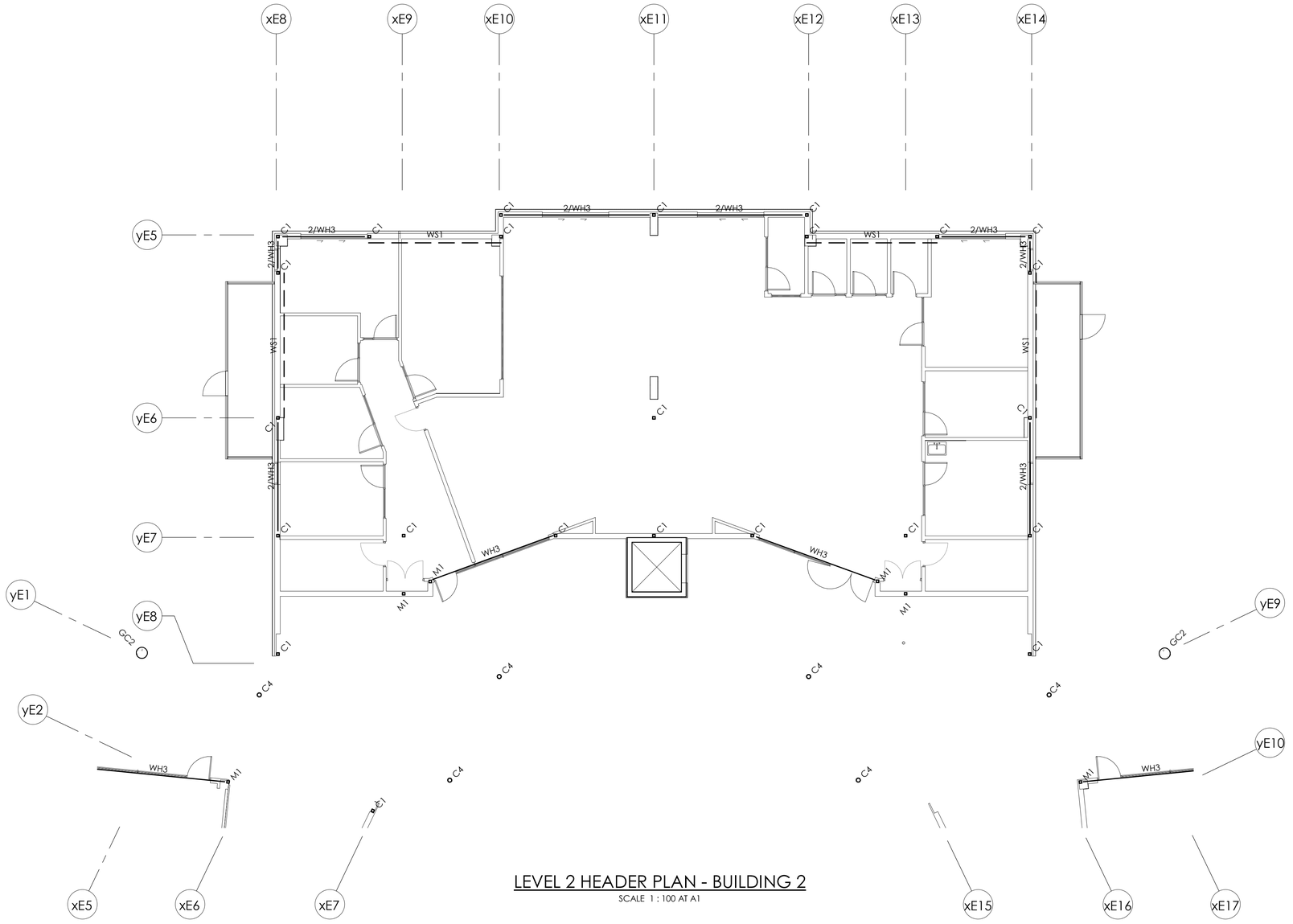
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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK E
LEVEL 2 HEADER & BRACING PLAN SHEET 1

PROJECT No TX13843.01 - DRAWING No S52.05 ISSUE 0



LEVEL 2 HEADER PLAN - BUILDING 2

SCALE 1 : 100 AT A1

STEELWORK MEMBER SCHEDULE

MARK	MEMBER	SIZE	REMARKS
B1	BEAM	250x150x9.0RHS	
B2	BEAM	250PFC	
B3	BEAM	300PFC	
B4	BEAM	200PFC	
C1	STEEL COLUMN	100x100x6.0SHS	
C2	STEEL COLUMN	89x89x5.0SHS	
C3	STEEL COLUMN	100x100x6.0SHS	
C4	STEEL COLUMN	165.1x5.0CHS	
M1	MULLION	100x100x6.0SHS	
OR1	OUTRIGGER	200UB25.4	
OR2	OUTRIGGER	100x100x6.0SHS	
OR3	OUTRIGGER	101.6x4.0CHS	
R1	RAFTER	410UB59.7	
R2	RAFTER	200x100x6.0RHS	
R3	RAFTER	230PFC	
R4	RAFTER	250PFC	
R5	RAFTER	150x100x6.0RHS	
R6	RAFTER	150x100x6.0RHS	
R7	RAFTER	200UB25.4	
R8	RAFTER	150PFC	
R9	RAFTER	200UB22.3	
RB1	ROOF BRACING	16ROD	
S1	STRUT	100x100x4.0SHS	
S2	STRUT	89x89x3.5SHS	
ST1	STUB COLUMN	100x100x6.0SHS	
WH1	WINDOW/WALL HEADER	150x100x4.0RHS	
WH2	WINDOW/WALL HEADER	100x100x4.0SHS	
WH3	WINDOW/WALL HEADER	100x100x6.0SHS	
WS1	WALL STRUT	100x100x6.0SHS	

CONCRETE COLUMN SCHEDULE

MARK	MEMBER	SIZE	REMARKS
GC1	CONCRETE COLUMN	300 x 900	10N12 VERT BARS, N12-300 TIES
GC2	CONCRETE COLUMN	450 DIA.	6N20 VERT BARS, N12-300 TIES
GC3	CONCRETE COLUMN	450 x 450	6N20 VERT BARS, N12-300 TIES
GC4	CONCRETE COLUMN	350 x 350	4N20 VERT BARS, N12-300 TIES
GC5	CONCRETE COLUMN	450 DIA.	6N20 VERT BARS, N12-300 TIES
GC6	CONCRETE COLUMN	300 DIA.	4N20 VERT BARS, N12-300 TIES

0 1 2 3 4 5 6 7 8 9 10m

SCALE 1:100 AT A1 SHEET | 1:200 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	29.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	B	MA.C
ISSUED FOR CLIENT REVIEW	18.08.20	A	MA.C

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
BUILDING WITH TRUST®

PROJECT
ST MATTHEWS - BLOCK E
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED DA.W | DRAWN MA.C | DATE AUG 2020 | SIZE A1 | CAD REF TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

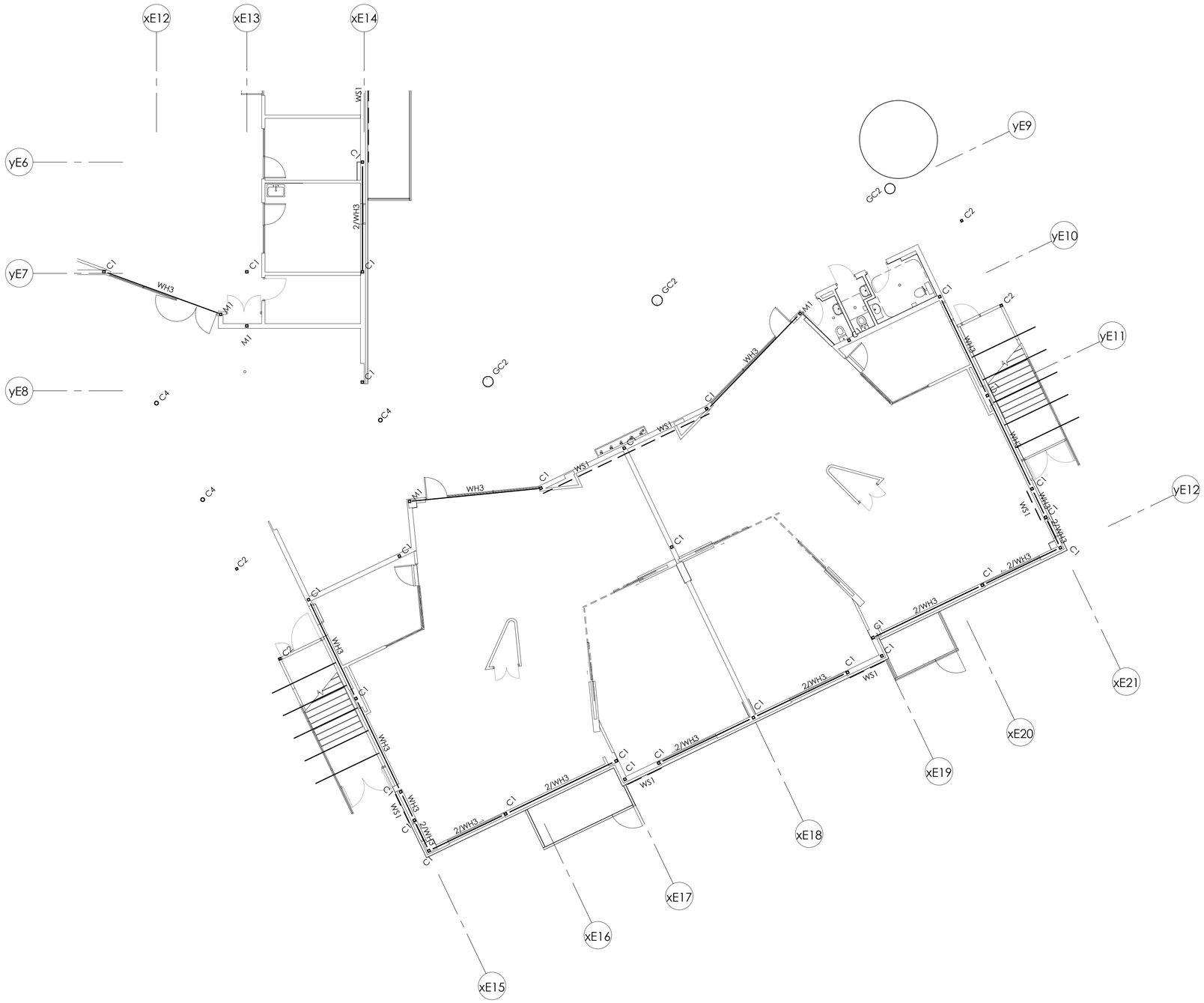
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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK E
LEVEL 2 HEADER & BRACING PLAN SHEET 2

PROJECT No TX13843.01 - | DRAWING No S52.06 | ISSUE 0



LEVEL 2 HEADER PLAN - BUILDING 3

SCALE 1 : 100 AT A1

STEELWORK MEMBER SCHEDULE

MARK	MEMBER	SIZE	REMARKS
B1	BEAM	250x150x9.0RHS	
B2	BEAM	250PFC	
B3	BEAM	300PFC	
B4	BEAM	200PFC	
C1	STEEL COLUMN	100x100x6.0SHS	
C2	STEEL COLUMN	89x89x5.0SHS	
C3	STEEL COLUMN	100x100x6.0SHS	
C4	STEEL COLUMN	165.1x5.0CHS	
M1	MULLION	100x100x6.0SHS	
OR1	OUTRIGGER	200UB25.4	
OR2	OUTRIGGER	100x100x6.0SHS	
OR3	OUTRIGGER	101.6x4.0CHS	
R1	RAFTER	410UB59.7	
R2	RAFTER	200x100x6.0RHS	
R3	RAFTER	230PFC	
R4	RAFTER	250PFC	
R5	RAFTER	150x100x6.0RHS	
R6	RAFTER	150x100x6.0RHS	
R7	RAFTER	200UB25.4	
R8	RAFTER	150PFC	
R9	RAFTER	200UB22.3	
RB1	ROOF BRACING	16ROD	
S1	STRUT	100x100x4.0SHS	
S2	STRUT	89x89x3.5SHS	
ST1	STUB COLUMN	100x100x6.0SHS	
WH1	WINDOW/WALL HEADER	150x100x4.0RHS	
WH2	WINDOW/WALL HEADER	100x100x4.0SHS	
WH3	WINDOW/WALL HEADER	100x100x6.0SHS	
WS1	WALL STRUT	100x100x6.0SHS	

CONCRETE COLUMN SCHEDULE

MARK	MEMBER	SIZE	REMARKS
GC1	CONCRETE COLUMN	300 x 900	10N12 VERT BARS, N12-300 TIES
GC2	CONCRETE COLUMN	450 DIA.	6N20 VERT BARS, N12-300 TIES
GC3	CONCRETE COLUMN	450 x 450	6N20 VERT BARS, N12-300 TIES
GC4	CONCRETE COLUMN	350 x 350	4N20 VERT BARS, N12-300 TIES
GC5	CONCRETE COLUMN	450 DIA.	6N20 VERT BARS, N12-300 TIES
GC6	CONCRETE COLUMN	300 DIA.	4N20 VERT BARS, N12-300 TIES

0 1 2 3 4 5 6 7 8 9 10m

SCALE 1:100 AT A1 SHEET | 1:200 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	29.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	B	MA.C
ISSUED FOR CLIENT REVIEW	18.08.20	A	MA.C

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000
ALLEANZA ARCHITECTURE

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000
TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north BUILDING WITH TRUST®

PROJECT
ST MATTHEWS - BLOCK E
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	AUG 2020	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

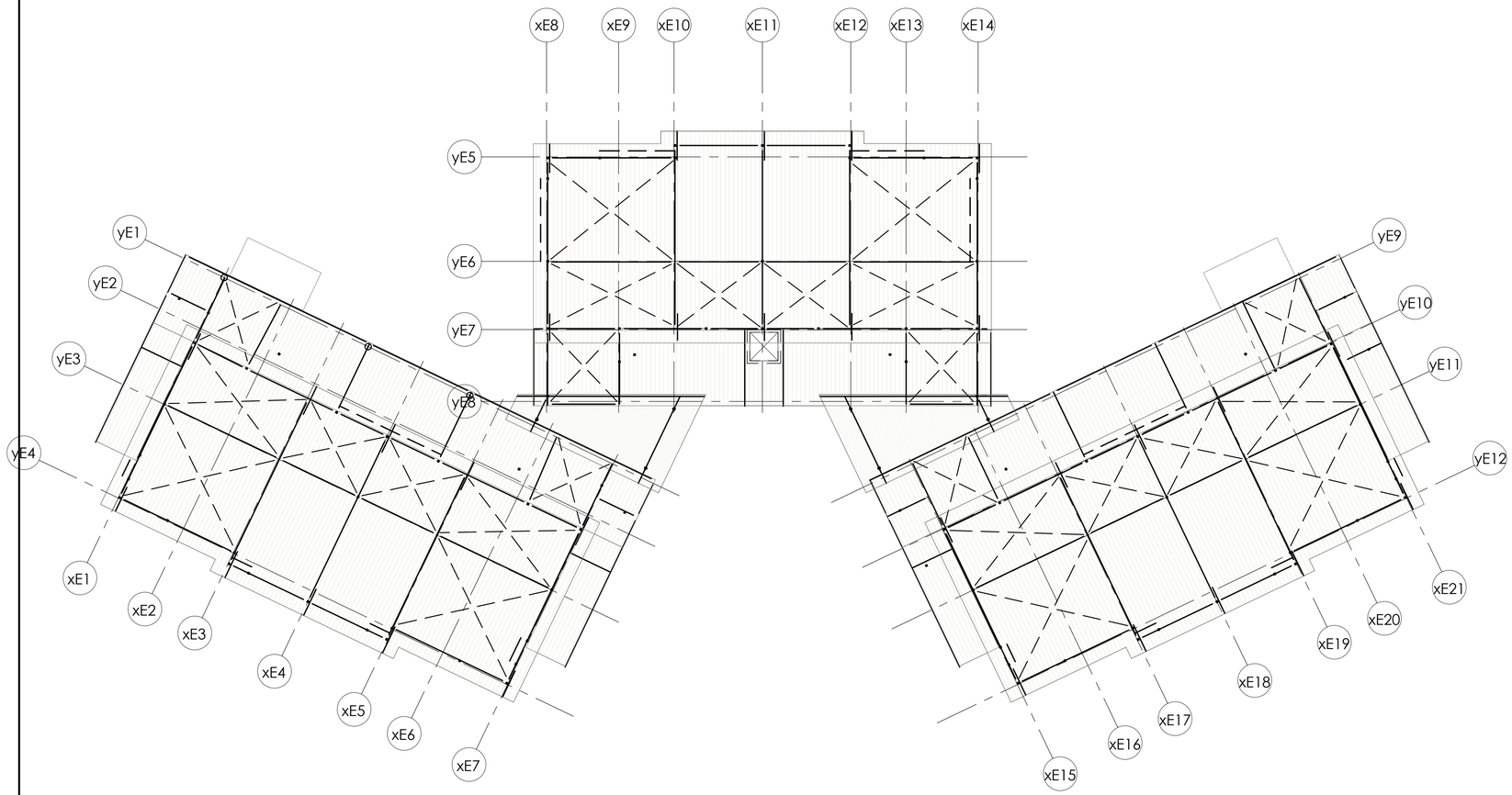
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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK E
LEVEL 2 HEADER & BRACING PLAN SHEET 3

PROJECT No: TX13843.01 - DRAWING No: S52.07 ISSUE: 0



ROOF STEELWORK PLAN OVERALL

SCALE 1 : 200 AT A1

0 5 10 15 20mm

SCALE 1:200 AT A1 SHEET | 1:400 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	29.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	B	CH.W
ISSUED FOR 60% DOCUMENTATION	22.11.19	A	CH.W

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000
ALLEANZA ARCHITECTURE

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000
TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north
BUILDING WITH TRUST®

PROJECT
ST MATTHEWS - BLOCK E
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	SEPT 2019	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

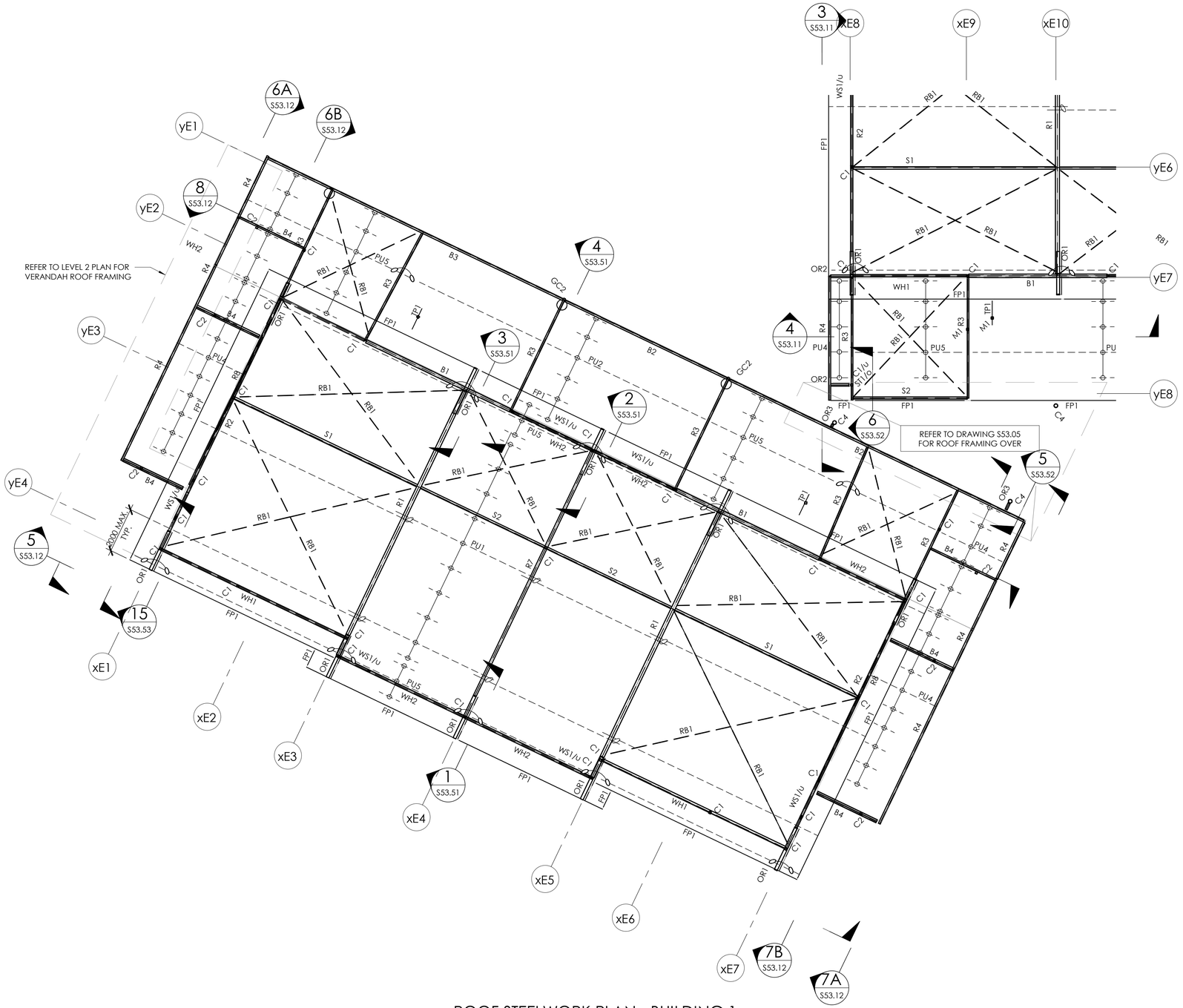
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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK E
ROOF STEELWORK PLAN
OVERALL

PROJECT No TX13843.01 - DRAWING No S53.01 ISSUE 0



ROOF STEELWORK PLAN - BUILDING 1

SCALE 1 : 100 AT A1

CONCRETE COLUMN SCHEDULE

MARK	MEMBER	SIZE	REMARKS
GC1	CONCRETE COLUMN	300 x 900	10N12 VERT BARS, N12-300 TIES
GC2	CONCRETE COLUMN	450 DIA.	6N20 VERT BARS, N12-300 TIES
GC3	CONCRETE COLUMN	450 x 450	6N20 VERT BARS, N12-300 TIES
GC4	CONCRETE COLUMN	350 x 350	4N20 VERT BARS, N12-300 TIES
GC5	CONCRETE COLUMN	450 DIA.	6N20 VERT BARS, N12-300 TIES
GC6	CONCRETE COLUMN	300 DIA.	4N20 VERT BARS, N12-300 TIES

WALL SCHEDULE

MARK	TYPE	THICKNESS	REMARKS
BW1	BLOCKWORK	190	REFER TO WALL DETAILS
BW2	BLOCKWORK	190	REFER TO LIFT SHAFT WALL DETAIL

STEELWORK MEMBER SCHEDULE

MARK	MEMBER	SIZE	REMARKS
B1	BEAM	250x150x9.0RHS	
B2	BEAM	250PFC	
B3	BEAM	300PFC	
B4	BEAM	200PFC	
C1	STEEL COLUMN	100x100x6.0SHS	
C2	STEEL COLUMN	89x89x5.0SHS	
C3	STEEL COLUMN	100x100x6.0SHS	
C4	STEEL COLUMN	165.1x5.0CHS	
M1	MULLION	100x100x6.0SHS	
OR1	OUTRIGGER	200UB25.4	
OR2	OUTRIGGER	100x100x6.0SHS	
OR3	OUTRIGGER	101.6x4.0CHS	
R1	RAFTER	410UB59.7	
R2	RAFTER	200x100x6.0RHS	
R3	RAFTER	230PFC	
R4	RAFTER	250PFC	
R5	RAFTER	150x100x6.0RHS	
R6	RAFTER	150x100x6.0RHS	
R7	RAFTER	200UB25.4	
R8	RAFTER	150PFC	
R9	RAFTER	200UB22.3	
RB1	ROOF BRACING	16ROD	
S1	STRUT	100x100x4.0SHS	
S2	STRUT	89x89x3.5SHS	
ST1	STUB COLUMN	100x100x6.0SHS	
WH1	WINDOW/WALL HEADER	150x100x4.0RHS	
WH2	WINDOW/WALL HEADER	100x100x4.0SHS	
WH3	WINDOW/WALL HEADER	100x100x6.0SHS	
WS1	WALL STRUT	100x100x6.0SHS	

PURLIN/GIRT SCHEDULE

MARK	MEMBER	SIZE	CENTRES (MAX.)	LAP (MIN.)	BRIDGING	REMARKS
FP1	FASCIA PURLIN	C250-19	-	-	TO MATCH ADJACENT PURLINS	
PU1	PURLIN	Z200-19	1200	900	2 ROWS	
PU2	PURLIN	C200-24	1000	-	2 ROWS	
PU3	PURLIN	150x50x4.0RHS	1000			
PU4	PURLIN	C100-15	1200	-		
PU5	PURLIN	C200-15	1000	-	2 ROWS	
PU6	PURLIN	Z150-19	1200	900	1 ROW	
TP1	TRIMMER PURLIN	C200-24	-	-	-	

0 1 2 3 4 5 6 7 8 9 10m

SCALE 1:100 AT A1 SHEET | 1:200 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	29.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	E	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	D	MA.C
ISSUED FOR CLIENT REVIEW	18.08.20	C	MA.C
ISSUED FOR 60% DOCUMENTATION	22.11.19	B	CH.W

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000
ALLEANZA ARCHITECTURE

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000
TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north BUILDING WITH TRUST®

PROJECT
ST MATTHEWS - BLOCK E
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	SEPT 2019	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

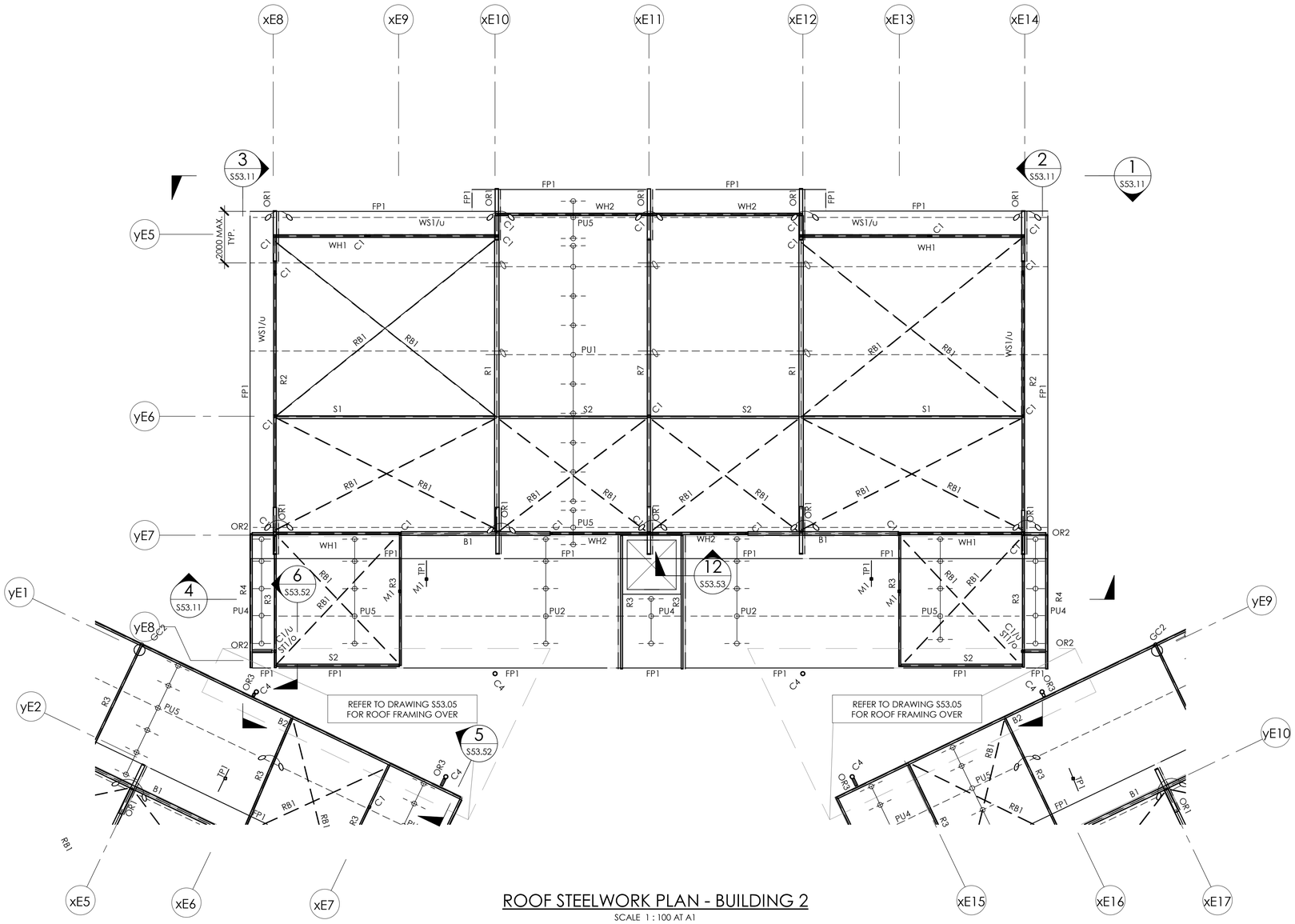
1300 874 294 | TRIAXIAL.COM.AU

SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK E
ROOF STEELWORK PLAN SHEET 1

PROJECT No: TX13843.01 - DRAWING No: S53.02 ISSUE: 0



ROOF STEELWORK PLAN - BUILDING 2

SCALE 1 : 100 AT A1

CONCRETE COLUMN SCHEDULE

MARK	MEMBER	SIZE	REMARKS
GC1	CONCRETE COLUMN	300 x 900	10N12 VERT BARS, N12-300 TIES
GC2	CONCRETE COLUMN	450 DIA.	6N20 VERT BARS, N12-300 TIES
GC3	CONCRETE COLUMN	450 x 450	6N20 VERT BARS, N12-300 TIES
GC4	CONCRETE COLUMN	350 x 350	4N20 VERT BARS, N12-300 TIES
GC5	CONCRETE COLUMN	450 DIA.	6N20 VERT BARS, N12-300 TIES
GC6	CONCRETE COLUMN	300 DIA.	4N20 VERT BARS, N12-300 TIES

WALL SCHEDULE

MARK	TYPE	THICKNESS	REMARKS
BW1	BLOCKWORK	190	REFER TO WALL DETAILS
BW2	BLOCKWORK	190	REFER TO LIFT SHAFT WALL DETAIL

STEELWORK MEMBER SCHEDULE

MARK	MEMBER	SIZE	REMARKS
B1	BEAM	250x150x9.0RHS	
B2	BEAM	250PFC	
B3	BEAM	300PFC	
B4	BEAM	200PFC	
C1	STEEL COLUMN	100x100x6.0SHS	
C2	STEEL COLUMN	89x89x5.0SHS	
C3	STEEL COLUMN	100x100x6.0SHS	
C4	STEEL COLUMN	165.1x5.0CHS	
M1	MULLION	100x100x6.0SHS	
OR1	OUTRIGGER	200UB25.4	
OR2	OUTRIGGER	100x100x6.0SHS	
OR3	OUTRIGGER	101.6x4.0CHS	
R1	RAFTER	410UB59.7	
R2	RAFTER	200x100x6.0RHS	
R3	RAFTER	230PFC	
R4	RAFTER	250PFC	
R5	RAFTER	150x100x6.0RHS	
R6	RAFTER	150x100x6.0RHS	
R7	RAFTER	200UB25.4	
R8	RAFTER	150PFC	
R9	RAFTER	200UB22.3	
RB1	ROOF BRACING	16ROD	
S1	STRUT	100x100x4.0SHS	
S2	STRUT	89x89x3.5SHS	
ST1	STUB COLUMN	100x100x6.0SHS	
WH1	WINDOW/WALL HEADER	150x100x4.0RHS	
WH2	WINDOW/WALL HEADER	100x100x4.0SHS	
WH3	WINDOW/WALL HEADER	100x100x6.0SHS	
WS1	WALL STRUT	100x100x6.0SHS	

PURLIN/GIRT SCHEDULE

MARK	MEMBER	SIZE	CENTRES (MAX.)	LAP (MIN.)	BRIDGING	REMARKS
FP1	FASCIA PURLIN	C250-19	-	-	TO MATCH ADJACENT PURLINS	
PU1	PURLIN	Z200-19	1200	900	2 ROWS	
PU2	PURLIN	C200-24	1000	-	2 ROWS	
PU3	PURLIN	150x50x4.0RHS	1000			
PU4	PURLIN	C100-15	1200	-		
PU5	PURLIN	C200-15	1000	-	2 ROWS	
PU6	PURLIN	Z150-19	1200	900	1 ROW	
TP1	TRIMMER PURLIN	C200-24	-	-	-	

0 1 2 3 4 5 6 7 8 9 10m

SCALE 1:100 AT A1 SHEET | 1:200 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	29.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	E	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	D	MA.C
ISSUED FOR CLIENT REVIEW	18.08.20	C	MA.C
ISSUED FOR 60% DOCUMENTATION	22.11.19	B	CH.W

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259

PROJECT
ST MATTHEWS - BLOCK E
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	SEPT 2019	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

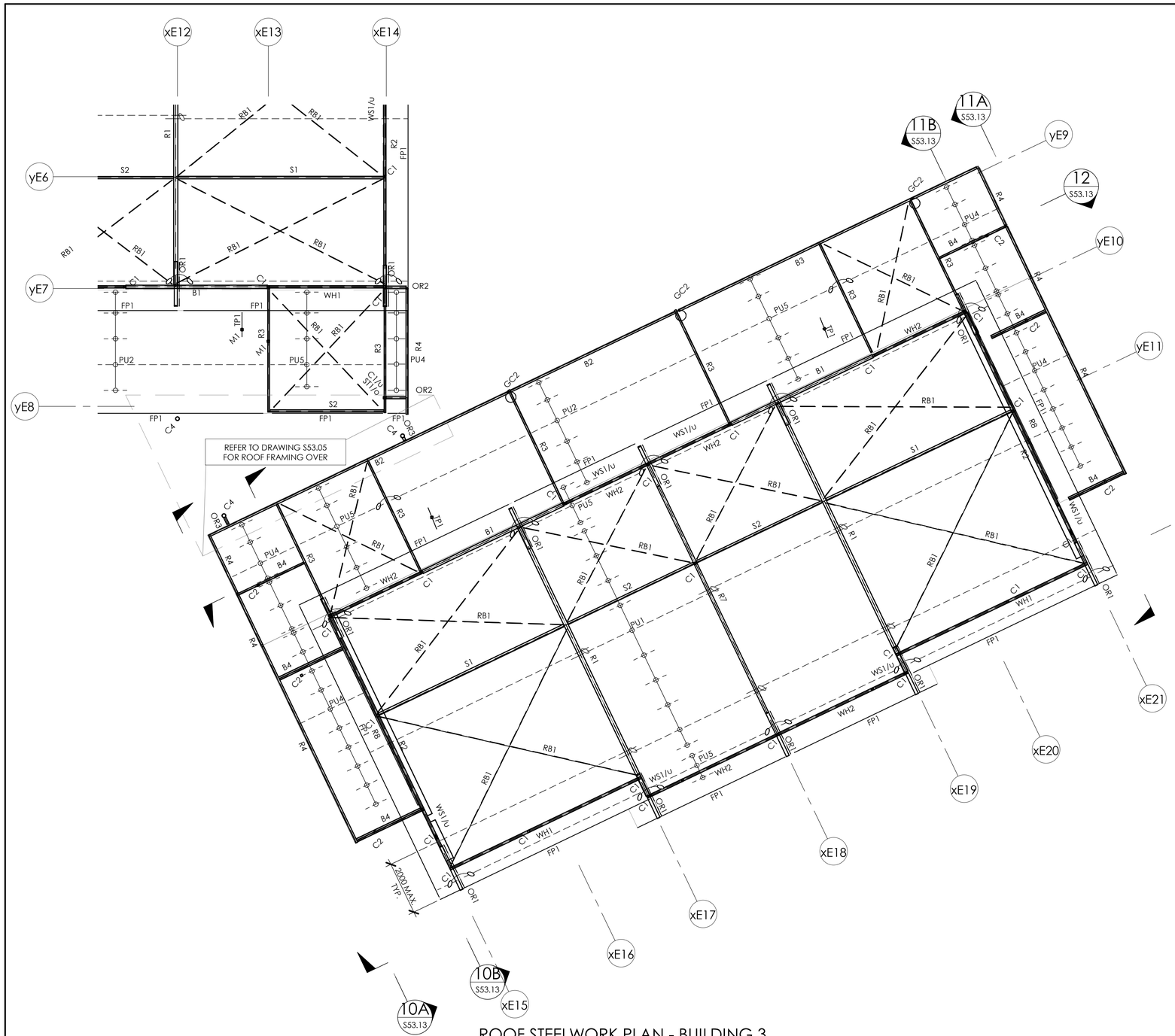
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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK E
ROOF STEELWORK PLAN SHEET 2

PROJECT No TX13843.01 - DRAWING No S53.03 ISSUE 0



ROOF STEELWORK PLAN - BUILDING 3

SCALE 1 : 100 AT A1

CONCRETE COLUMN SCHEDULE

MARK	MEMBER	SIZE	REMARKS
GC1	CONCRETE COLUMN	300 x 900	10N12 VERT BARS, N12-300 TIES
GC2	CONCRETE COLUMN	450 DIA.	6N20 VERT BARS, N12-300 TIES
GC3	CONCRETE COLUMN	450 x 450	6N20 VERT BARS, N12-300 TIES
GC4	CONCRETE COLUMN	350 x 350	4N20 VERT BARS, N12-300 TIES
GC5	CONCRETE COLUMN	450 DIA.	6N20 VERT BARS, N12-300 TIES
GC6	CONCRETE COLUMN	300 DIA.	4N20 VERT BARS, N12-300 TIES

WALL SCHEDULE

MARK	TYPE	THICKNESS	REMARKS
BW1	BLOCKWORK	190	REFER TO WALL DETAILS
BW2	BLOCKWORK	190	REFER TO LIFT SHAFT WALL DETAIL

STEELWORK MEMBER SCHEDULE

MARK	MEMBER	SIZE	REMARKS
B1	BEAM	250x150x9.0RHS	
B2	BEAM	250PFC	
B3	BEAM	300PFC	
B4	BEAM	200PFC	
C1	STEEL COLUMN	100x100x6.0SHS	
C2	STEEL COLUMN	89x89x5.0SHS	
C3	STEEL COLUMN	100x100x6.0SHS	
C4	STEEL COLUMN	165.1x5.0CHS	
M1	MULLION	100x100x6.0SHS	
OR1	OUTRIGGER	200UB25.4	
OR2	OUTRIGGER	100x100x6.0SHS	
OR3	OUTRIGGER	101.6x4.0CHS	
R1	RAFTER	410UB59.7	
R2	RAFTER	200x100x6.0RHS	
R3	RAFTER	230PFC	
R4	RAFTER	250PFC	
R5	RAFTER	150x100x6.0RHS	
R6	RAFTER	150x100x6.0RHS	
R7	RAFTER	200UB25.4	
R8	RAFTER	150PFC	
R9	RAFTER	200UB22.3	
RB1	ROOF BRACING	16ROD	
S1	STRUT	100x100x4.0SHS	
S2	STRUT	89x89x3.5SHS	
ST1	STUB COLUMN	100x100x6.0SHS	
WH1	WINDOW/WALL HEADER	150x100x4.0RHS	
WH2	WINDOW/WALL HEADER	100x100x4.0SHS	
WH3	WINDOW/WALL HEADER	100x100x6.0SHS	
WS1	WALL STRUT	100x100x6.0SHS	

PURLIN/GIRT SCHEDULE

MARK	MEMBER	SIZE	CENTRES (MAX.)	LAP (MIN.)	BRIDGING	REMARKS
FP1	FASCIA PURLIN	C250-19	-	-	TO MATCH ADJACENT PURLINS	
PU1	PURLIN	Z200-19	1200	900	2 ROWS	
PU2	PURLIN	C200-24	1000	-	2 ROWS	
PU3	PURLIN	150x50x4.0RHS	1000			
PU4	PURLIN	C100-15	1200	-		
PU5	PURLIN	C200-15	1000	-	2 ROWS	
PU6	PURLIN	Z150-19	1200	900	1 ROW	
TP1	TRIMMER PURLIN	C200-24	-	-	-	

0 1 2 3 4 5 6 7 8 9 10m

SCALE 1:100 AT A1 SHEET | 1:200 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	29.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	B	MA.C
ISSUED FOR CLIENT REVIEW	18.08.20	A	MA.C

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000
ALLEANZA ARCHITECTURE

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000
TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north BUILDING WITH TRUST®

PROJECT
ST MATTHEWS - BLOCK E
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	AUG 2020	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

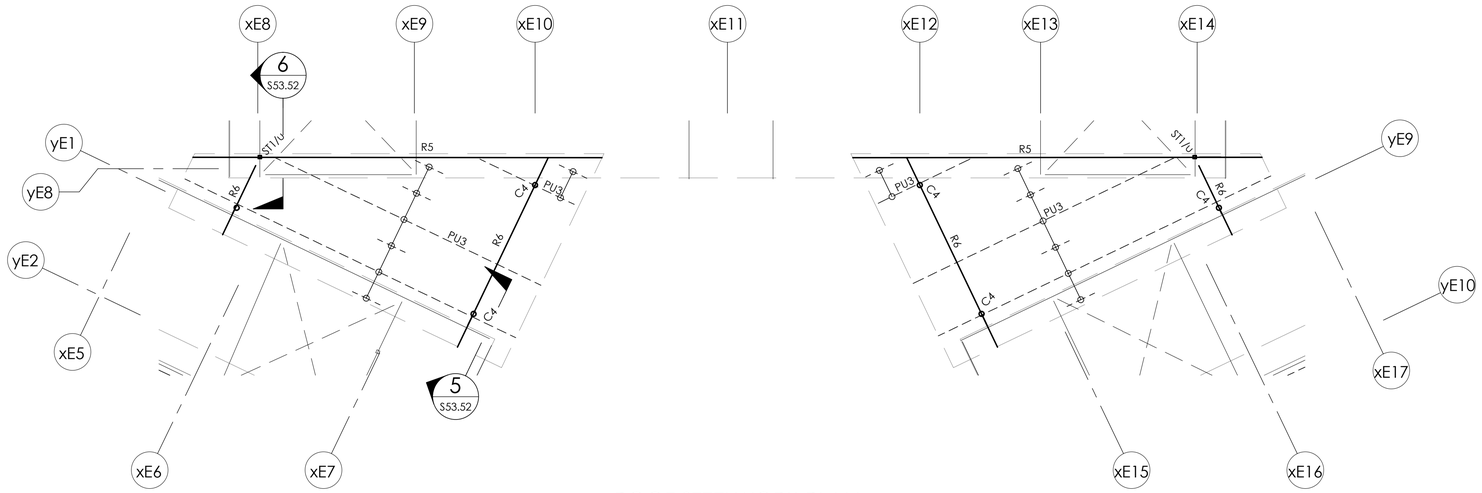
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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK E
ROOF STEELWORK PLAN SHEET 3

PROJECT No: TX13843.01 - | DRAWING No: S53.04 | ISSUE: 0



ROOF STEELWORK PLAN

SCALE 1 : 100 AT A1

CONCRETE COLUMN SCHEDULE

MARK	MEMBER	SIZE	REMARKS
GC1	CONCRETE COLUMN	300 x 900	10N12 VERT BARS, N12-300 TIES
GC2	CONCRETE COLUMN	450 DIA.	6N20 VERT BARS, N12-300 TIES
GC3	CONCRETE COLUMN	450 x 450	6N20 VERT BARS, N12-300 TIES
GC4	CONCRETE COLUMN	350 x 350	4N20 VERT BARS, N12-300 TIES
GC5	CONCRETE COLUMN	450 DIA.	6N20 VERT BARS, N12-300 TIES
GC6	CONCRETE COLUMN	300 DIA.	4N20 VERT BARS, N12-300 TIES

WALL SCHEDULE

MARK	TYPE	THICKNESS	REMARKS
BW1	BLOCKWORK	190	REFER TO WALL DETAILS
BW2	BLOCKWORK	190	REFER TO LIFT SHAFT WALL DETAIL

STEELWORK MEMBER SCHEDULE

MARK	MEMBER	SIZE	REMARKS
B1	BEAM	250x150x9.0RHS	
B2	BEAM	250PFC	
B3	BEAM	300PFC	
B4	BEAM	200PFC	
C1	STEEL COLUMN	100x100x6.0SHS	
C2	STEEL COLUMN	89x89x5.0SHS	
C3	STEEL COLUMN	100x100x6.0SHS	
C4	STEEL COLUMN	165.1x5.0CHS	
M1	MULLION	100x100x6.0SHS	
OR1	OUTRIGGER	200UB25.4	
OR2	OUTRIGGER	100x100x6.0SHS	
OR3	OUTRIGGER	101.6x4.0CHS	
R1	RAFTER	410UB59.7	
R2	RAFTER	200x100x6.0RHS	
R3	RAFTER	230PFC	
R4	RAFTER	250PFC	
R5	RAFTER	150x100x6.0RHS	
R6	RAFTER	150x100x6.0RHS	
R7	RAFTER	200UB25.4	
R8	RAFTER	150PFC	
R9	RAFTER	200UB22.3	
RB1	ROOF BRACING	16ROD	
S1	STRUT	100x100x4.0SHS	
S2	STRUT	89x89x3.5SHS	
ST1	STUB COLUMN	100x100x6.0SHS	
WH1	WINDOW/WALL HEADER	150x100x4.0RHS	
WH2	WINDOW/WALL HEADER	100x100x4.0SHS	
WH3	WINDOW/WALL HEADER	100x100x6.0SHS	
WS1	WALL STRUT	100x100x6.0SHS	

PURLIN/GIRT SCHEDULE

MARK	MEMBER	SIZE	CENTRES (MAX.)	LAP (MIN.)	BRIDGING	REMARKS
FP1	FASCIA PURLIN	C250-19	-	-	TO MATCH ADJACENT PURLINS	
PU1	PURLIN	Z200-19	1200	900	2 ROWS	
PU2	PURLIN	C200-24	1000	-	2 ROWS	
PU3	PURLIN	150x50x4.0RHS	1000			
PU4	PURLIN	C100-15	1200	-		
PU5	PURLIN	C200-15	1000	-	2 ROWS	
PU6	PURLIN	Z150-19	1200	900	1 ROW	
TP1	TRIMMER PURLIN	C200-24	-	-	-	

0 1 2 3 4 5 6 7 8 9 10m

SCALE 1:100 AT A1 SHEET | 1:200 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	29.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	B	MA.C
ISSUED FOR CLIENT REVIEW	18.08.20	A	MA.C

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000
ALLEANZA ARCHITECTURE

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000
TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north BUILDING WITH TRUST®

PROJECT
ST MATTHEWS - BLOCK E
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	AUG 2020	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

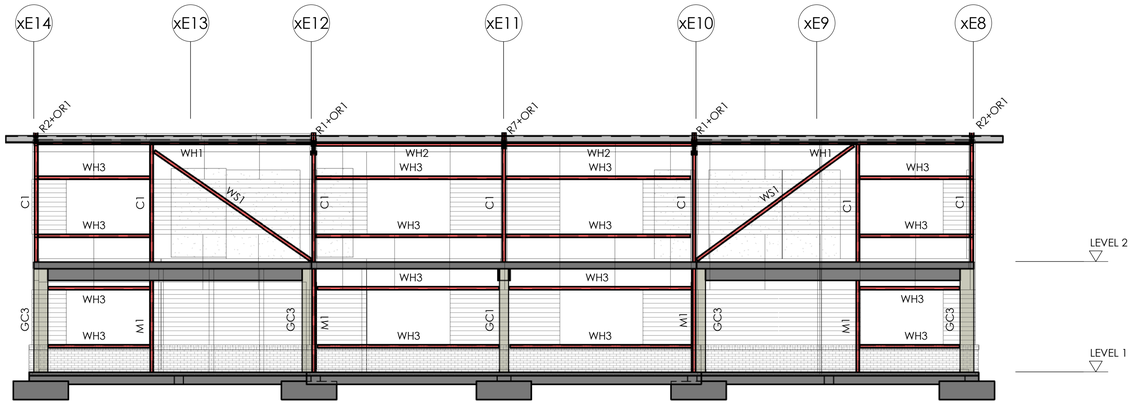
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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

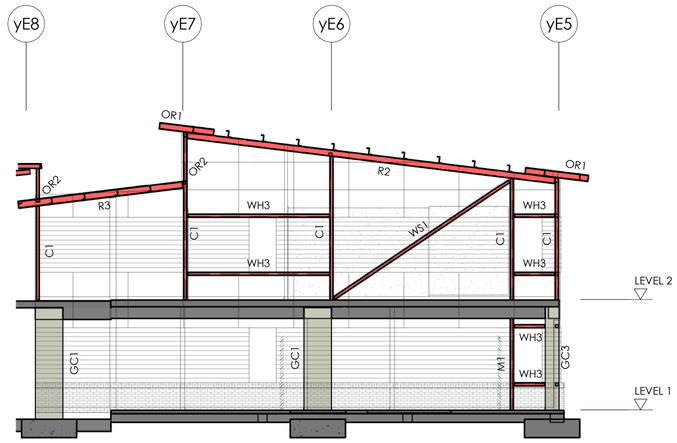
ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK E
ROOF STEELWORK PLAN SHEET 4

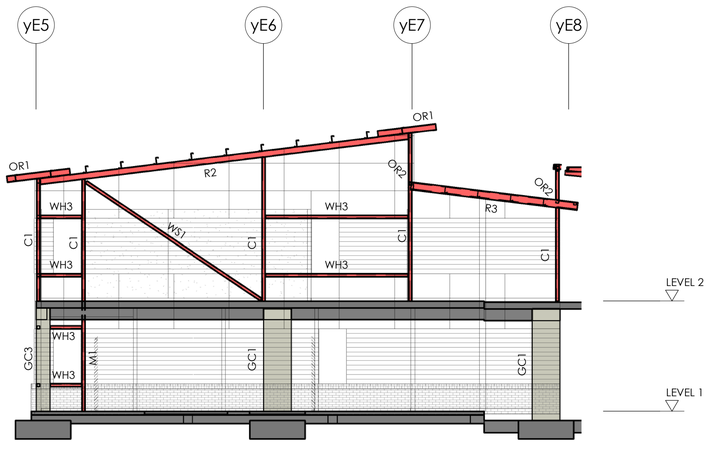
PROJECT No: TX13843.01 - | DRAWING No: S53.05 | ISSUE: 0



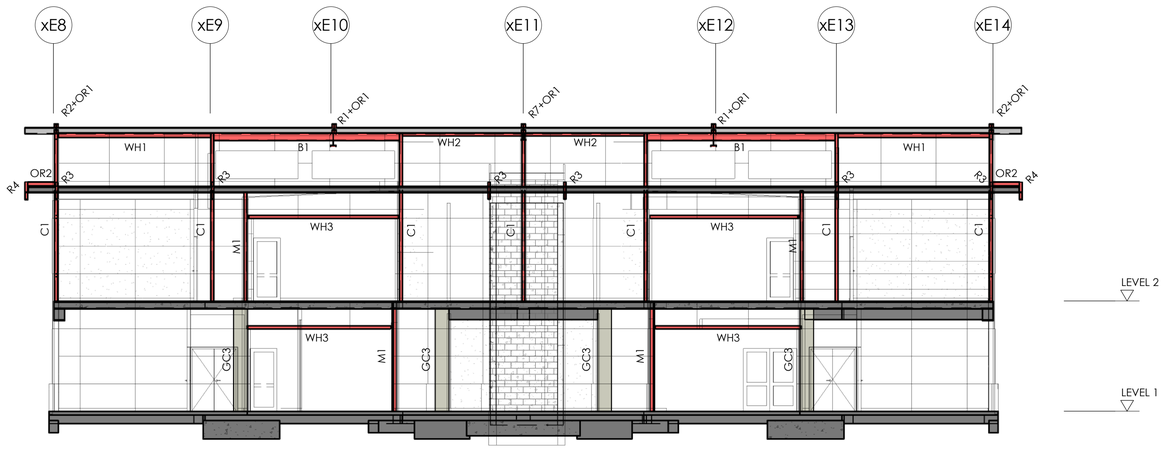
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SECTION 1 : 100 2 S53.03



SECTION 1 : 100 3 S53.02



SECTION 1 : 100 4 S53.02

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SCALE 1:100 AT A1 SHEET | 1:200 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	29.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	E	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	D	MA.C
ISSUED FOR CLIENT REVIEW	18.08.20	C	MA.C
ISSUED FOR 60% DOCUMENTATION	22.11.19	B	CH.W

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000

ALLEANZA ARCHITECTURE

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000

TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259

north
BUILDING WITH TRUST®

PROJECT
ST MATTHEWS - BLOCK E
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	SEPT 2019	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

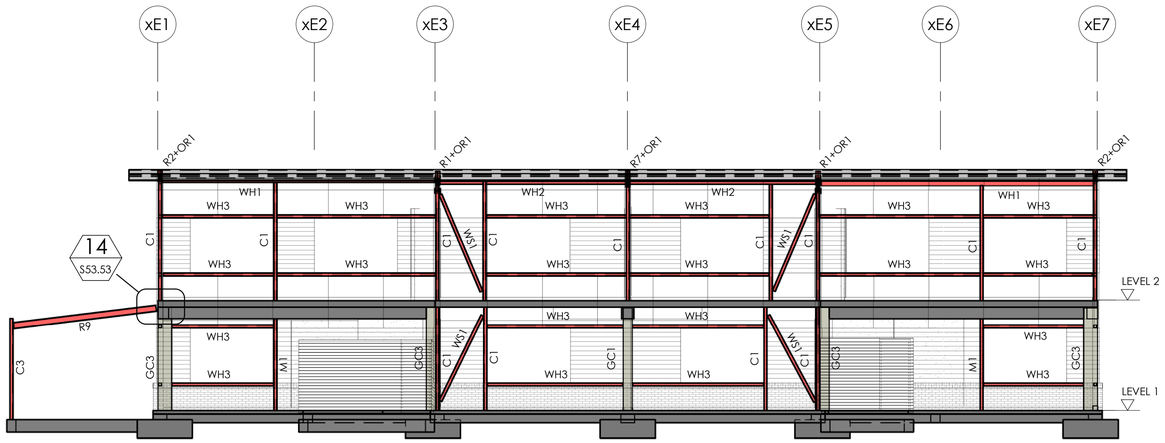
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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

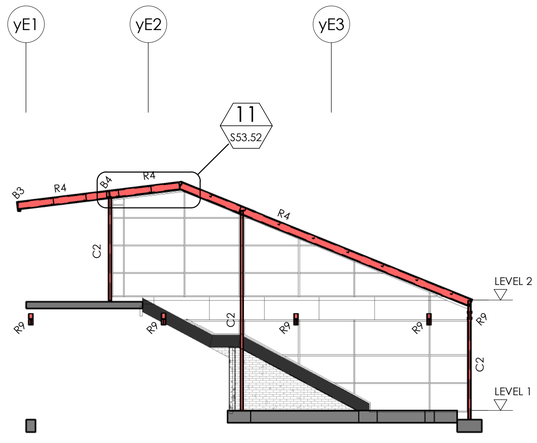
ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK E
ELEVATIONS & SECTIONS SHEET 1

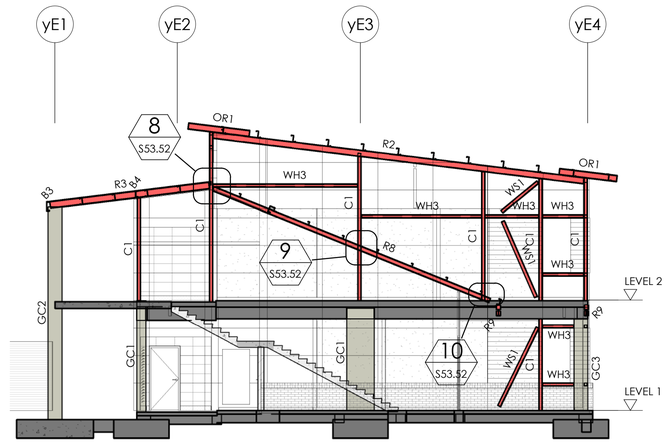
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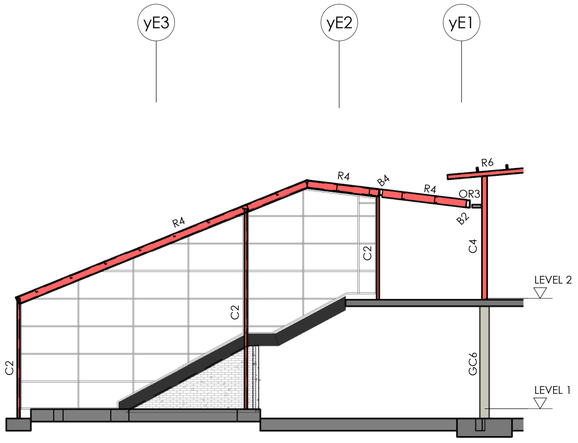
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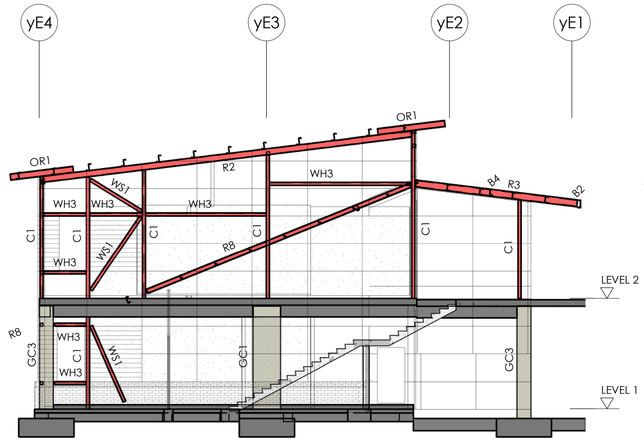
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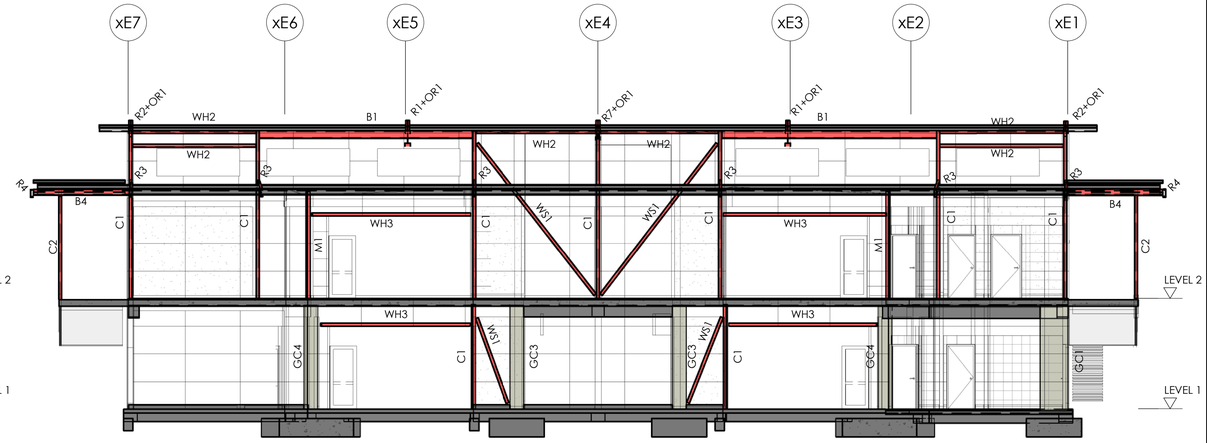
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SECTION 1 : 100 — 7A — S53.02



SECTION 1 : 100 — 7B — S53.02



SECTION 1 : 100 — 8 — S53.02

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SCALE 1:100 AT A1 SHEET | 1:200 AT A3 SHEET

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ISSUED FOR 60% DOCUMENTATION	22.11.19	B	CH.W

FOR CONSTRUCTION

ARCHITECT
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SYDNEY NSW 2000

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259

PROJECT
ST MATTHEWS - BLOCK E
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	SEPT 2019	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

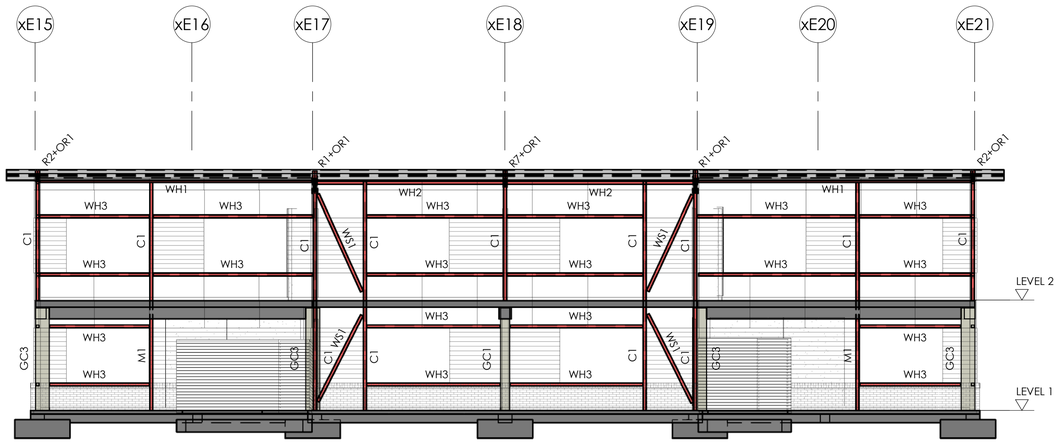
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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

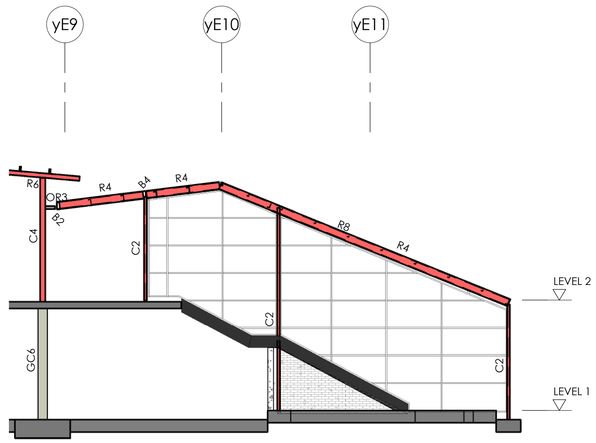
ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK E
ELEVATIONS & SECTIONS SHEET 2

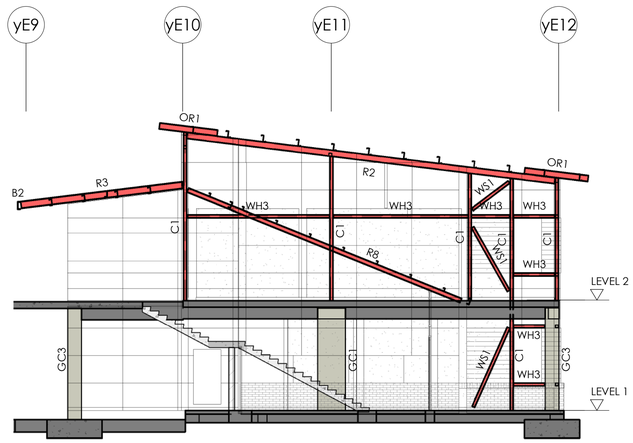
PROJECT No TX13843.01 - DRAWING No S53.12 ISSUE 0



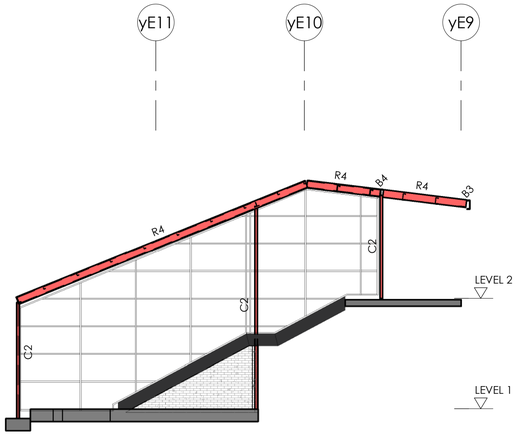
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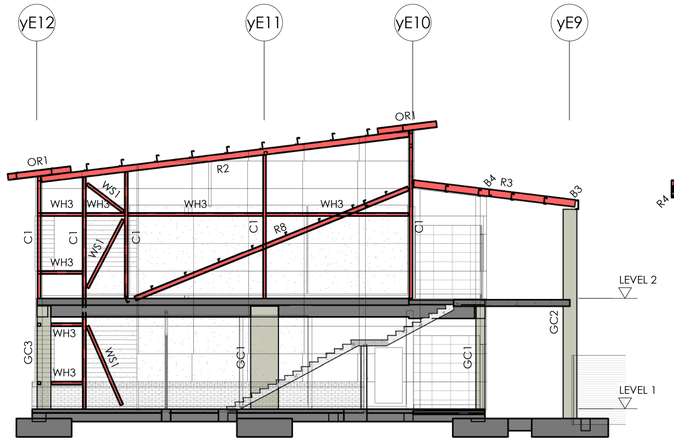
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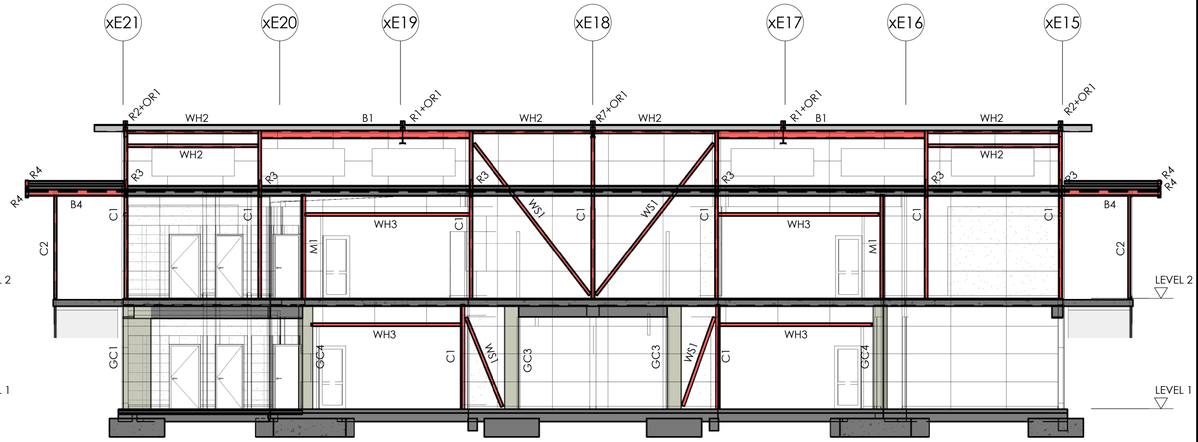
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SECTION 1 : 100 11A S53.04



SECTION 1 : 100 11B S53.04



SECTION 1 : 100 12 S53.04

0 1 2 3 4 5 6 7 8 9 10m

SCALE 1:100 AT A1 SHEET | 1:200 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	29.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	E	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	D	MA.C
ISSUED FOR CLIENT REVIEW	18.08.20	C	MA.C
ISSUED FOR 60% DOCUMENTATION	22.11.19	B	CH.W

FOR CONSTRUCTION

ARCHITECT
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PROJECT MANAGER
TSA MANAGEMENT
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SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259

PROJECT
ST MATTHEWS - BLOCK E
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	SEPT 2019	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

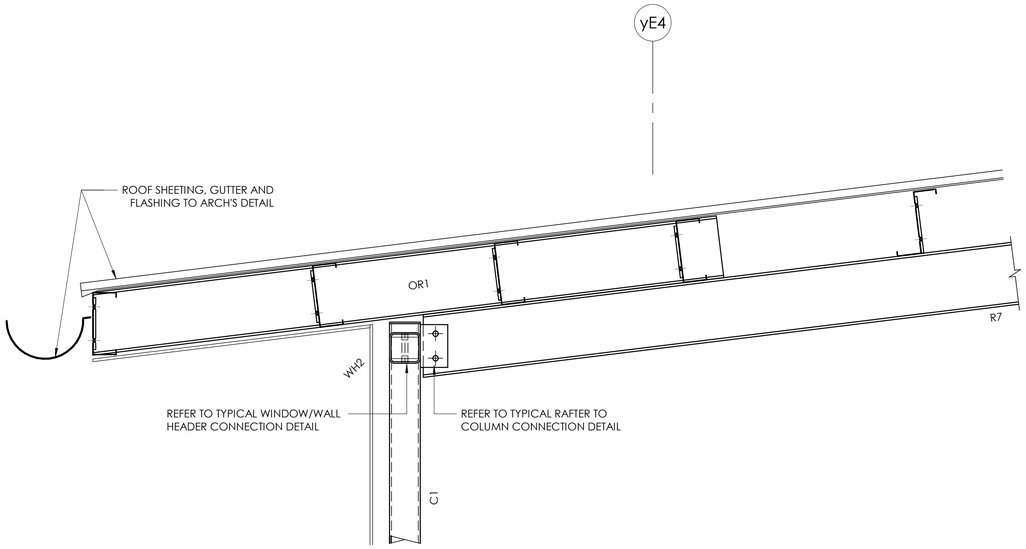
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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

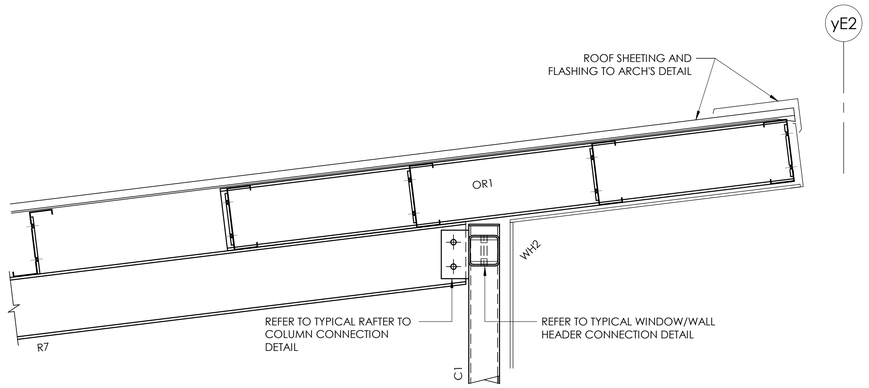
ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK E
ELEVATIONS & SECTIONS SHEET 3

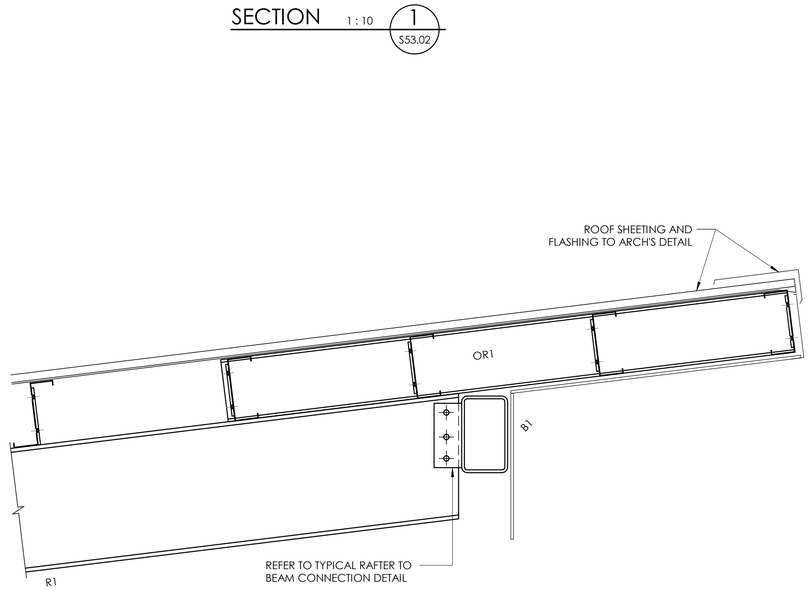
PROJECT No TX13843.01 - DRAWING No S53.13 ISSUE 0



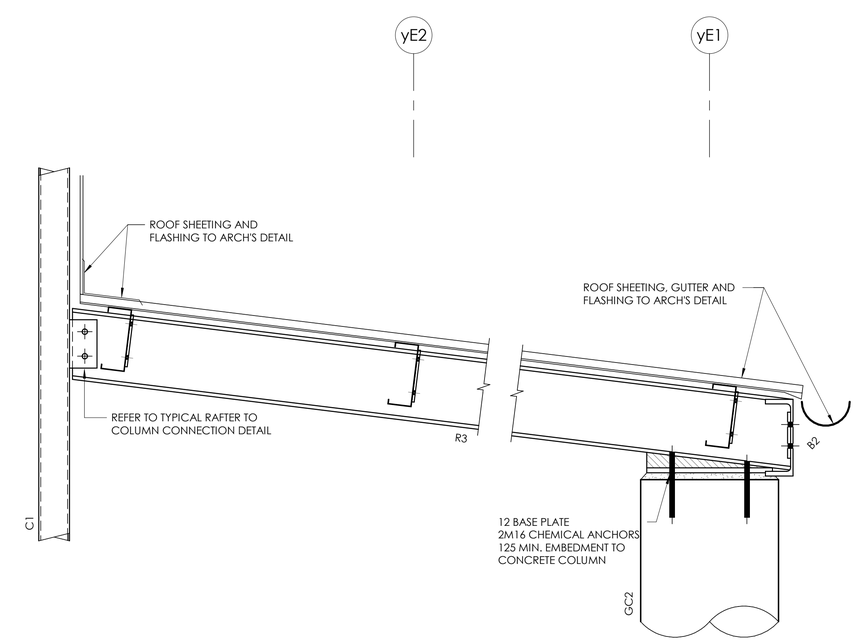
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SECTION 1 : 10 — 2 — S53.02



SECTION 1 : 10 — 3 — S53.02



SECTION 1 : 10 — 4 — S53.02

0 200 400 600 800 1000mm

SCALE 1:10 AT A1 SHEET | 1:20 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	29.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	B	MA.C
ISSUED FOR CLIENT REVIEW	18.08.20	A	MA.C

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000
ALLEANZA ARCHITECTURE

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000
TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north
BUILDING WITH TRUST®

PROJECT
ST MATTHEWS - BLOCK E
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	AUG 2020	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

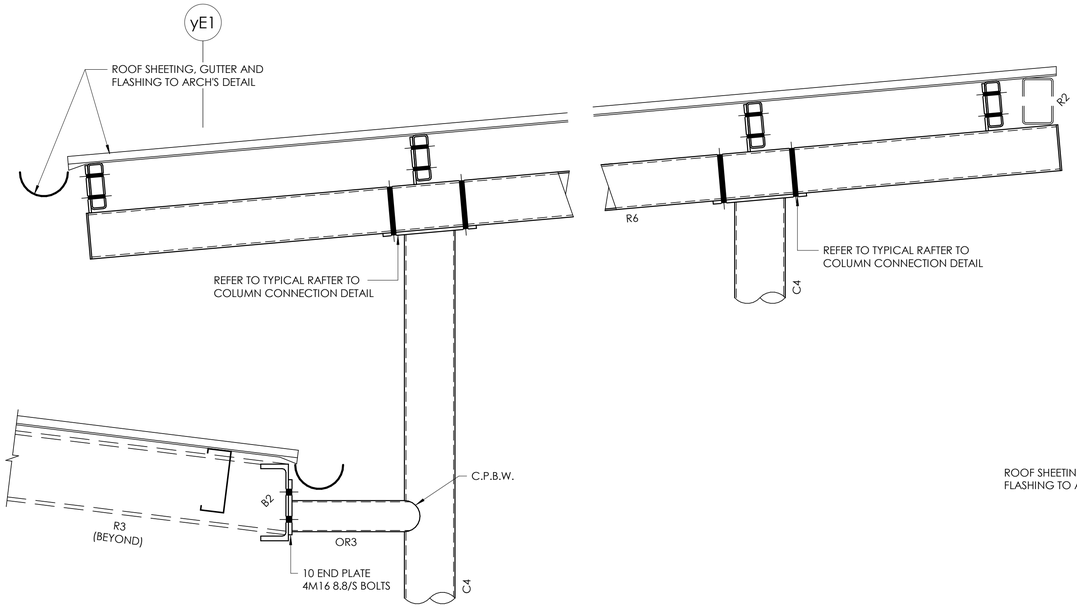
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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

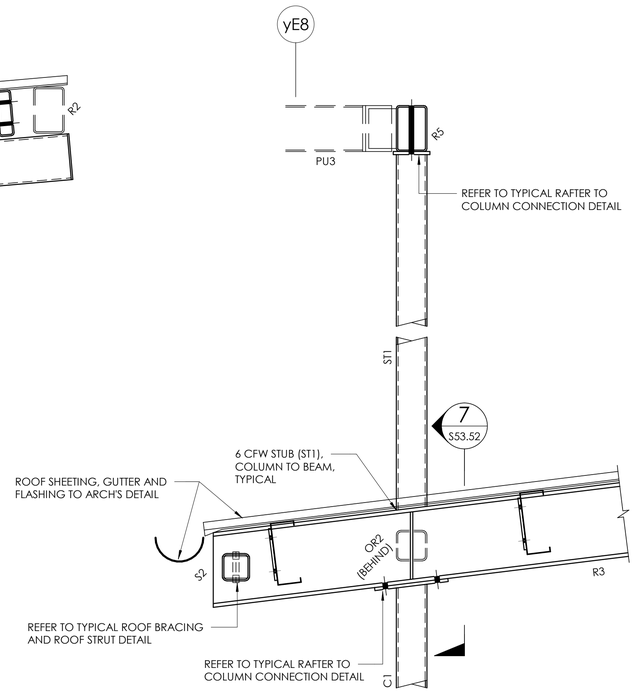
ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK E
STEELWORK DETAILS SHEET 1

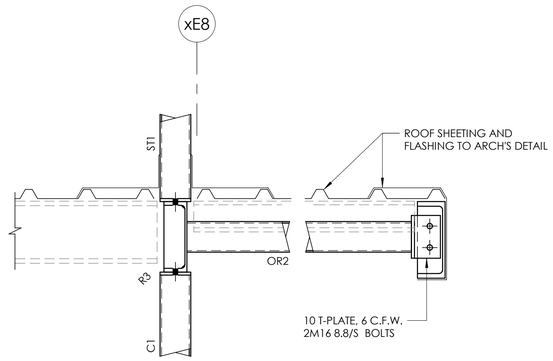
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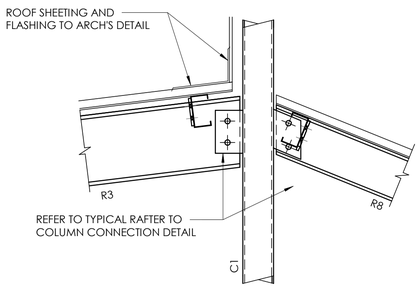
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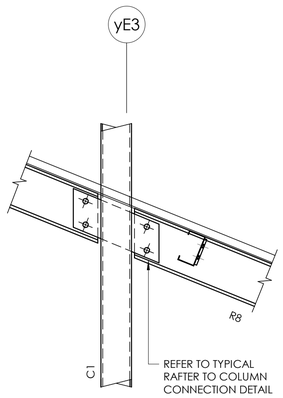
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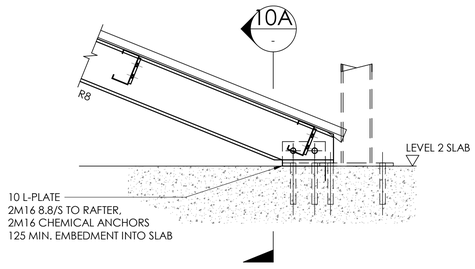
SECTION 1 : 10 — 7 / S53.52



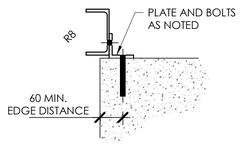
DETAIL 1 : 10 — 8 / S53.12



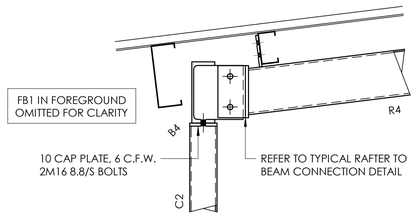
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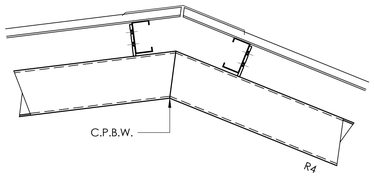


DETAIL 1 : 10 — 10 / S53.12



SECTION 1 : 10 — 10A / -





DETAIL 1 : 10 — 11 / S53.12

0 200 400 600 800 1000mm

SCALE 1:10 AT A1 SHEET | 1:20 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	29.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	B	MA.C
ISSUED FOR CLIENT REVIEW	18.08.20	A	MA.C

FOR CONSTRUCTION

ARCHITECT
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LVL 1, 695 GEORGE STREET,
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ALLEANZA ARCHITECTURE

PROJECT MANAGER
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LVL 15, 207 KENT STREET,
SYDNEY NSW 2000
TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north BUILDING WITH TRUST®

PROJECT
ST MATTHEWS - BLOCK E
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	AUG 2020	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

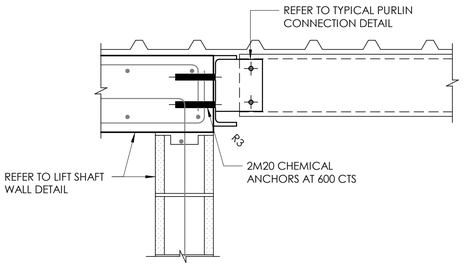
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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

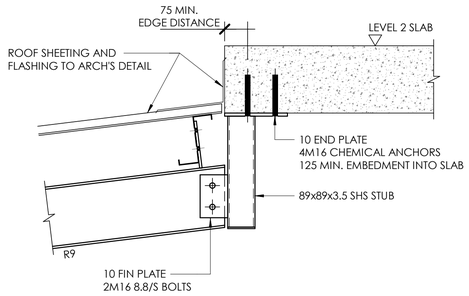
ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK E
STEELWORK DETAILS SHEET 2

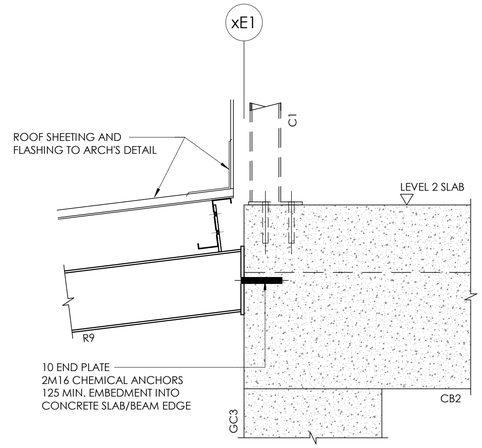
PROJECT No TX13843.01 - DRAWING No S53.52 ISSUE 0



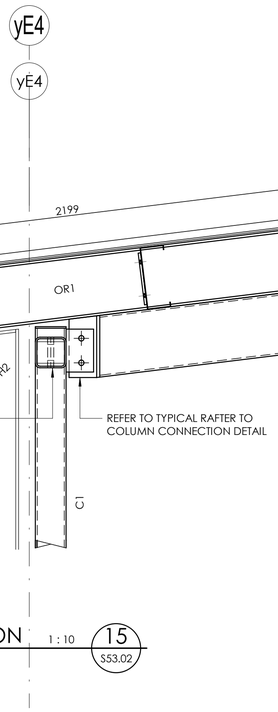
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SECTION 1 : 10 — 13 — S52.02



DETAIL 1 : 10 — 14 — S53.12



SECTION 1 : 10 — 15 — S53.02

0 200 400 600 800 1000mm

SCALE 1:10 AT A1 SHEET | 1:20 AT A3 SHEET

ISSUED FOR CONSTRUCTION	29.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	B	MA.C
ISSUED FOR CLIENT REVIEW	18.08.20	A	MA.C
AMENDMENTS	DATE	ISSUE	BY

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000
ALLEANZA ARCHITECTURE

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000
TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north
BUILDING WITH TRUST®

PROJECT
ST MATTHEWS - BLOCK E
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	AUG 2020	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

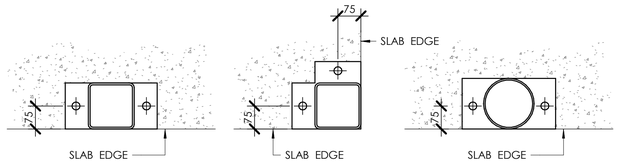
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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK E
STEELWORK DETAILS SHEET 3

PROJECT No: TX13843.01 - DRAWING No: S53.53 ISSUE: 0



TYPE A TYPE B TYPE C

PLAN

NOTE:
6 C.F.W. CATEGORY SP TO COLUMN (U.N.O.)
ALL BASE PLATE GROUT TO BE HIGH-STRENGTH, NON-SHRINK GROUT (>50MPa)

COLUMN BASE PLATE SCHEDULE

MEMBER	BASE PLATE			ANCHORS		REMARKS
	TYPE	THICKNESS	GROUT	ANCHOR BOLTS	TYPE (REFER SPEC.)	
C1	A/B	12mm	20mm	2M20	CHEMICAL ANCHOR	
C2	A	12mm	20mm	2M16	CHEMICAL ANCHOR	
C3	C	12mm	20mm	2M20	CHEMICAL ANCHOR	
M1	A	12mm	20mm	2M20	CHEMICAL ANCHOR	

ANCHOR SPECIFICATIONS

TYPE	ANCHOR	EMBEDMENT	REMARKS
CHEMICAL ANCHOR	M12	110	CHEMSET 801 OR APPROVED EQUIVALENT. REFER TO MANUFACTURER FOR HOLE PREPARATION AND MINIMUM CURING TIMES.
	M16	125	
	M20	150	
	M24	200	

BASE PLATE BOLTS HOLE SPECIFICATIONS

ANCHOR SIZE (mm)	HOLE DIA.	WASHERS (MIN.) #
M12	18	Ø42mm × 4mm THICK
M16	22	Ø50mm × 4mm THICK
M20	26	Ø58mm × 4mm THICK
M24	30	Ø66mm × 4mm THICK
M30	36	Ø78mm × 4mm THICK
M36	42	Ø90mm × 4mm THICK
# ALTERNATIVE: USE SQUARE WASHERS CUT FROM FLAT PLATE, G250 MIN.		

COLUMN BASE PLATE DETAILS

SCALE 1:10 AT A1

0 200 400 600 800 1000mm

SCALE 1:10 AT A1 SHEET | 1:20 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	29.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	B	MA.C
ISSUED FOR CLIENT REVIEW	18.08.20	A	MA.C

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000
ALLEANZA ARCHITECTURE

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000
TSA MANAGEMENT

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BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	AUG 2020	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

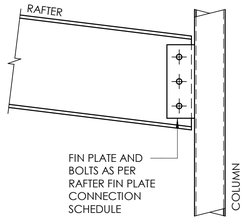
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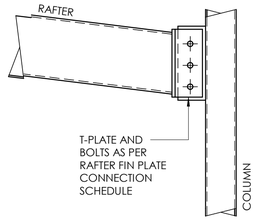
SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

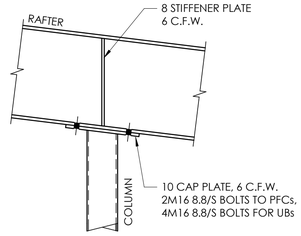
ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

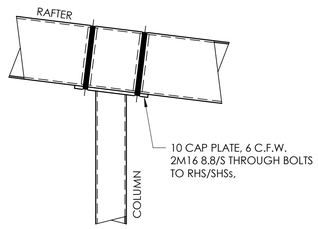
DRAWING TITLE
BLOCK E
STEELWORK DETAILS SHEET 4

PROJECT No TX13843.01 - DRAWING No S53.54 ISSUE 0



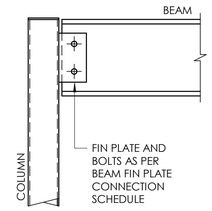


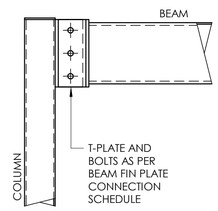




RAFTER FIN PLATE CONNECTION SCHEDULE		
MEMBER	FIN PLATE (6 C.F.W.)	BOLT SPEC 8.8/S
R1	10mm	3M16
R2	10mm (T-PLATE)	2M16
R3	10mm	2M16
R4	10mm (T-PLATE)	2M16
R5	10mm (T-PLATE)	2M16
R6	10mm (T-PLATE)	2M16
R7	10mm	2M16
R8	10mm	2M16

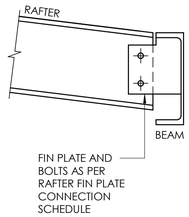
TYPICAL RAFTER TO COLUMN CONNECTION DETAILS
SCALE 1:10 AT A1



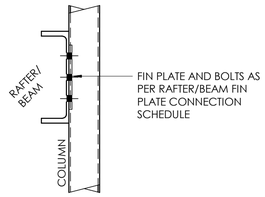


BEAM FIN PLATE CONNECTION SCHEDULE		
MEMBER	FIN PLATE (6 C.F.W.)	BOLT SPEC 8.8/S
B1	10mm (T-PLATE)	3M16
B2	10mm	2M16
B3	10mm	3M16
B4	10mm	2M16

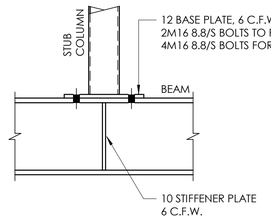
TYPICAL BEAM TO COLUMN CONNECTION DETAILS
SCALE 1:10 AT A1



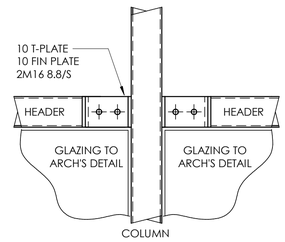
TYPICAL RAFTER TO BEAM CONNECTION DETAILS
SCALE 1:10 AT A1



OFFSET RAFTER/BEAM TO COLUMN CONNECTION
SCALE 1:10 AT A1

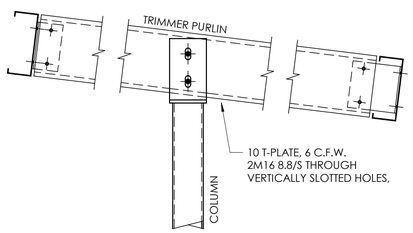


TYPICAL STUB COLUMN TO BEAM CONNECTION DETAILS
SCALE 1:10 AT A1



WINDOW SILL CONNECTION SIMILAR

TYPICAL WINDOW HEADER CONNECTION DETAIL
SCALE 1:10 AT A1



TYPICAL COLUMN TO TRIMMER PURLIN CONNECTION DETAIL
SCALE 1:10 AT A1

0 200 400 600 800 1000mm

SCALE 1:10 AT A1 SHEET | 1:20 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	29.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	B	MA.C
ISSUED FOR CLIENT REVIEW	18.08.20	A	MA.C

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000
ALLEANZA ARCHITECTURE

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000
TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north BUILDING WITH TRUST®

PROJECT
ST MATTHEWS - BLOCK E
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	AUG 2020	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

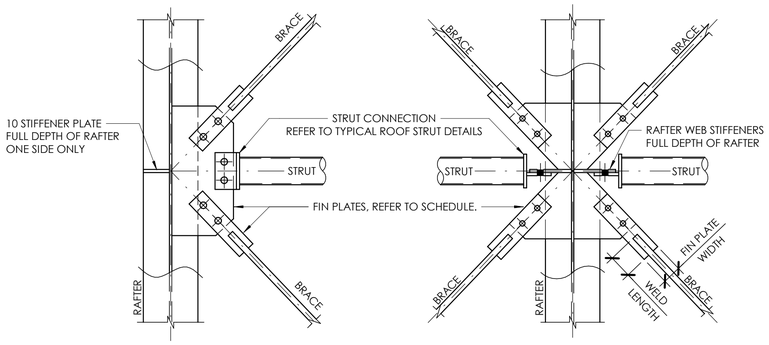
1300 874 294 | TRIAXIAL.COM.AU

SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK E
STEELWORK DETAILS SHEET 5

PROJECT No	DRAWING No	ISSUE
TX13843.01 -	S53.55	0



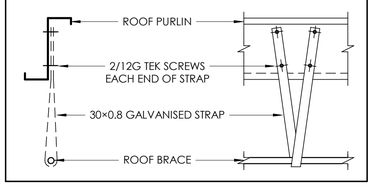
TYPICAL ROD BRACING DETAIL

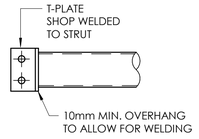
SCALE 1:10 AT A1

ROD BRACING CONNECTION DETAIL				
MEMBER SIZE	BOLTS REQ'D.	WELD LENGTH	FIN PLATE	FIN PLATE WIDTH
Ø16 ROD	2M16 8.8/S	100	10mm	60

ROD BRACING SUPPORT NOTE:

ALL ROD BRACING TO BE SUPPORTED OFF ROOF PURLINS, REMOVE ANY SAG IN BRACING & STRAP TO PURLINS AT 1/4 POINTS NOMINAL, AS FOLLOWS:



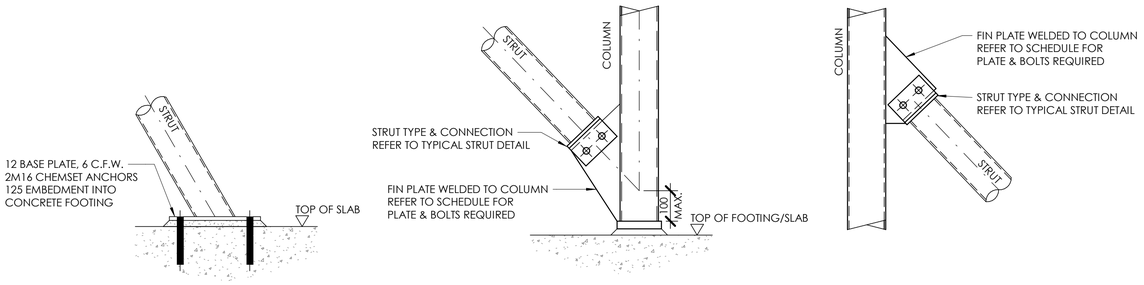


TYPE A

TYPICAL ROOF & WALL STRUT DETAIL

SCALE 1:10 AT A1

ROOF STRUT SCHEDULE						
MEMBER	T-PLATE/FIN PLATE (G250)			BOLT (GRADE 8.8/S)		
	TYPE	THICKNESS	WELD	BOLT SIZE	BOLTS PER ROW	ROWS
S1	A	10	6 C.F.W.	M16	2	1
S2	A	10	6 C.F.W.	M16	2	1
WS1	A	10	6 C.F.W.	M16	2	1



TYPICAL WALL STRUT BRACING DETAIL

SCALE 1:10 AT A1

0 200 400 600 800 1000mm

SCALE 1:10 AT A1 SHEET | 1:20 AT A3 SHEET

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ISSUED FOR CLIENT REVIEW	18.08.20	A	MA.C

FOR CONSTRUCTION

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SYDNEY NSW 2000

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259

PROJECT
ST MATTHEWS - BLOCK E
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	AUG 2020	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

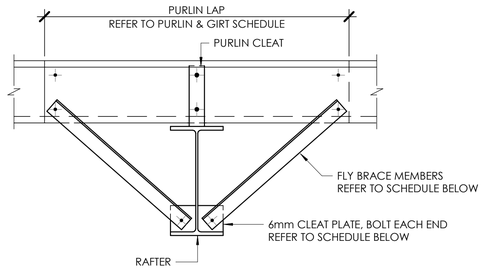
1300 874 294 | TRIAXIAL.COM.AU

SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK E
STEELWORK DETAILS SHEET 6

PROJECT No TX13843.01 - DRAWING No S53.56 ISSUE 0



FLY BRACING TO RAFTER DETAIL.
HORIZONTAL FLY BRACING TO GIRTS AT COLUMNS SIMILAR

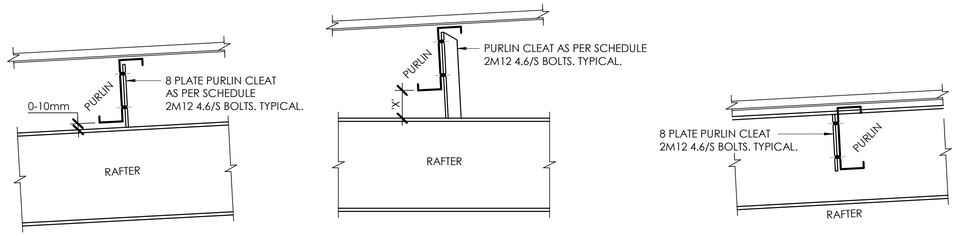
FLY BRACING SCHEDULE			
RAFTER/COLUMN	FLY BRACE (G300)	FLY BRACE (DURAGAL)	BOLTS
≤ 410UB	50×50×3 EA	50×50×4.0 CA	M12 8.8/S

FLY BRACING DETAILS (FB)

SCALE 1:10 AT A1

FLY BRACING NOTE:

THE FLY BRACING IS A CRITICAL ELEMENT PROVIDING STABILITY TO THE STRUCTURE.
FLY BRACING MUST BE INSTALLED AT THE TIME OF INSTALLATION OF THE PURLINS, GIRTS & WALL SYSTEM.
THERE SHALL BE NO ADDITIONAL LOAD (OTHER THAN PURLINS) PLACED ON RAFTERS
UNTIL ALL RAFTER & COLUMN FLY BRACING IS INSTALLED.
REFER ANY ALTERATION FROM THIS REQUIREMENT TO TRIAXIAL CONSULTING.



GIRT DETAIL AT COLUMNS SIMILAR

TYPICAL PURLIN/GIRT CONNECTION DETAIL

NOT TO SCALE

PURLIN & GIRT CLEAT SCHEDULE		
PITCH	'X' (mm)	CLEAT SIZE
<5°	0 - 10	60 × 8 PLATE
	11 - 40	60 × 10 PLATE
	41 - 100	75 × 10 PLATE
SCHEDULE APPLICABLE TO PURLINS & GIRTS UP TO Z/C250 SIZE ONLY		

0 200 400 600 800 1000mm

SCALE 1:10 AT A1 SHEET | 1:20 AT A3 SHEET

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ISSUED FOR CLIENT REVIEW	18.08.20	A	MA.C

FOR CONSTRUCTION

ARCHITECT
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LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000
ALLEANZA ARCHITECTURE

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000
TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north
BUILDING WITH TRUST®

PROJECT
ST MATTHEWS - BLOCK E
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	AUG 2020	A1	TX13843.01-S01

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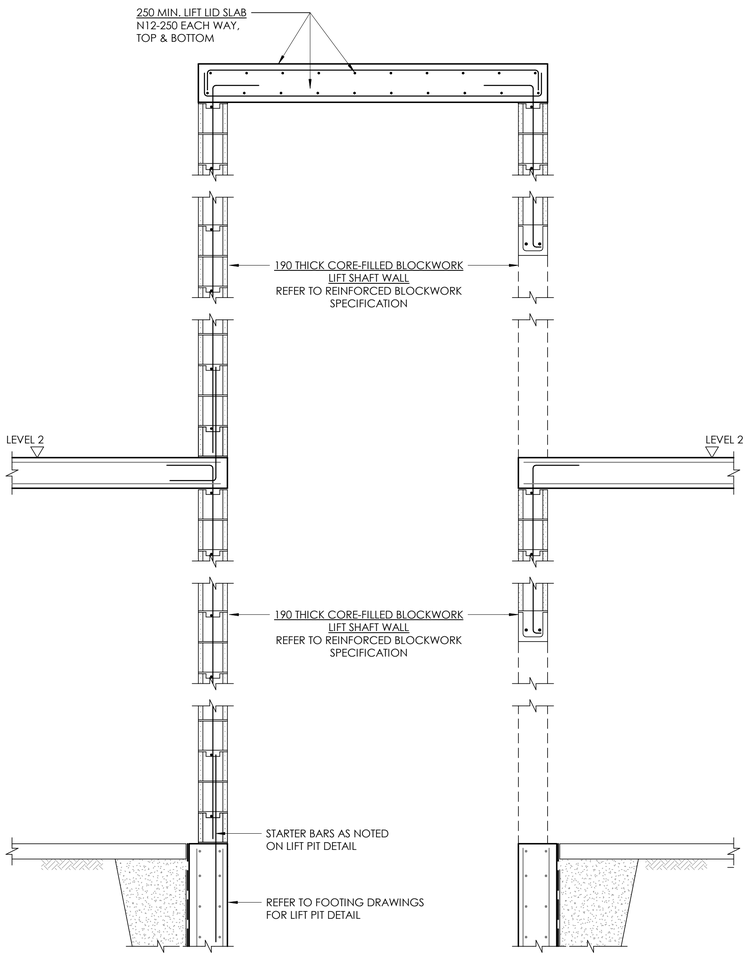
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PO BOX A203, SYDNEY SOUTH NSW 1235

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

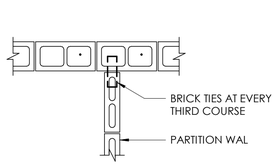
DRAWING TITLE
BLOCK E
STEELWORK DETAILS SHEET 7

PROJECT No TX13843.01 - DRAWING No S53.57 ISSUE 0

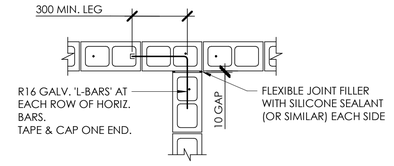


LIFT SHAFT WALL DETAIL

SCALE 1:20 AT A1

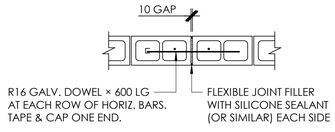


PARTITION WALL



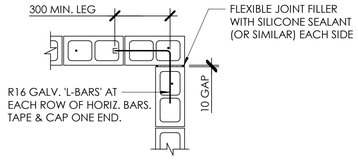
CJ - BLOCKWORK CONTROL JOINT DETAIL

NOTE: BOND BEAM REINFORCEMENT TO BE CONTINUOUS OVER JOINTS



VERTICAL JOINT DETAIL

PROVIDE VERTICAL JOINTS IN
BLOCKWORK 8.0m MAX. CENTRES



CORNER DETAIL

REINFORCED BLOCKWORK SPECIFICATIONS:

RB1 SPECIFICATION TO BE READ IN CONJUNCTION WITH GENERAL NOTES

RB2 REINFORCEMENT
REINFORCEMENT BLOCKWORK SPECIFICATION U.N.O.

- VERTICAL BARS:	N16-400
- HORIZONTAL BARS:	N12-400
- TOP COURSE BOND BEAM:	2N12
- LINTEL BOND BEAM:	2N12
- JAMBS:	1N12

RB3 PROVIDE ADDITIONAL REINFORCEMENT AT THE FOLLOWING LOCATIONS:
- CORNERS
- INTERSECTIONS
- ENDS
- EITHER SIDE OF CONTROL JOINTS

RB4 PROVIDE STARTER BARS TO MATCH VERTICAL BARS AT ALL REINFORCED CORES, EMBED INTO FOOTING WITH LAP & COG AS NOTED:

SIZE	LAP	COG	MIN. EMBED.
N12	600	180	300
N16	750	200	300
N20	950	240	350

RB5 GROUT
ALL REINFORCED CORES FULLER GROUTED

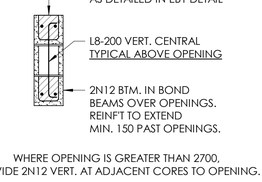
RB6 GROUT SPECIFICATION:
- 20MPa
- MAX 10mm AGGREGATE SIZE
- 120mm SLUMP

RB7 USE CLEANOUT BLOCKS TO BASE COURSE

RB8 EXTERNAL BLOCKWORK & BLOCKWORK BELOW GROUND LEVEL SHALL BE CONSTRUCTED USING MORTAR DAMP-PROOF ADMIXTURE SUCH AS 'CEMENT AID CALBLACK' OR SIMILAR FOR THE FIRST 3 COURSES ABOVE FINISHED FLOOR LEVEL.

BLOCKWORK JOINTING DETAILS

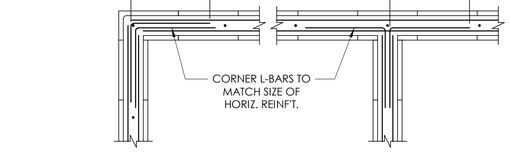
SCALE 1 : 20 AT A1



WHERE OPENING IS GREATER THAN 2700,
PROVIDE 2N12 VERT. AT ADJACENT CORES TO OPENING.

TYPICAL BOND BEAM OVER OPENINGS DETAIL

SCALE 1 : 20 AT A1



LINTEL & BOND BEAM REINF'T AT CORNERS & INTERSECTIONS

SCALE 1 : 20 AT A1

0 500 1000 1500 2000mm

SCALE 1:20 AT A1 SHEET | 1:40 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
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ISSUED FOR CLIENT REVIEW	18.08.20	A	MA.C

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000
ALLEANZA ARCHITECTURE

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LVL 15, 207 KENT STREET,
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TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north BUILDING WITH TRUST®

PROJECT
ST MATTHEWS - BLOCK E
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	MA.C	AUG 2020	A1	TX13843.01-S01

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

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SUITE 7, 110 GEORGE STREET, PARRAMATTA NSW 2150
PO BOX A203, SYDNEY SOUTH NSW 1235
ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK E
WALL DETAILS

PROJECT No TX13843.01 - DRAWING No S55.51 ISSUE 0

DRAWING LIST

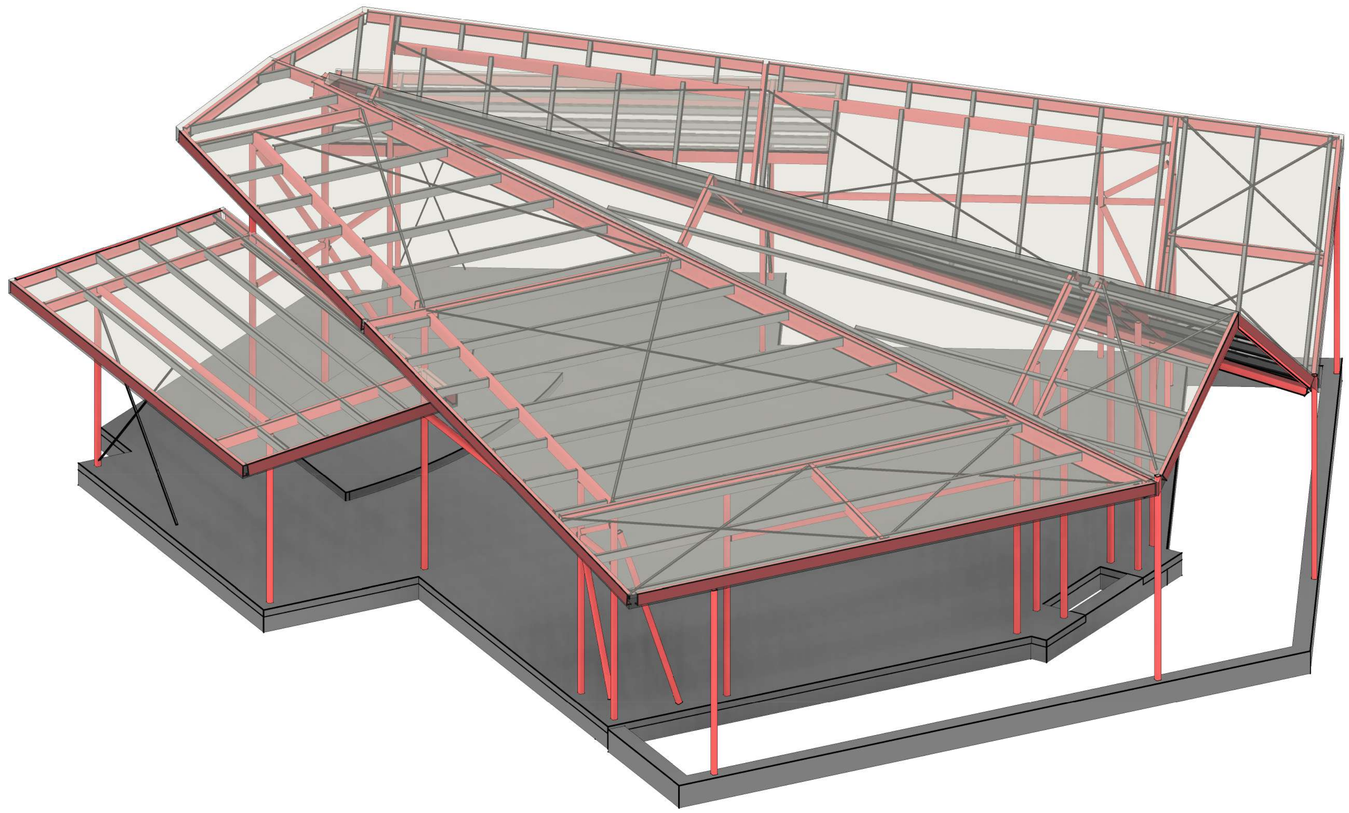
S60.00 COVER SHEET

S61.01 FOOTING & GROUND FLOOR PLAN
S61.51 FOOTING & GROUND FLOOR DETAILS SHEET 1
S61.52 FOOTING & GROUND FLOOR DETAILS SHEET 2

S63.01 ROOF STEELWORK PLAN
S63.11 ELEVATIONS & SECTIONS SHEET 1
S63.12 ELEVATIONS & SECTIONS SHEET 2

S63.51 STEELWORK DETAILS SHEET 1
S63.52 STEELWORK DETAILS SHEET 2
S63.53 STEELWORK DETAILS SHEET 3
S63.54 STEELWORK DETAILS SHEET 4
S63.55 STEELWORK DETAILS SHEET 5
S63.58 WALL BRACING DETAILS

ST. MATTHEWS - BLOCK B
BROADHEAD ROAD, MUDGEE NSW 2850
STRUCTURAL DRAWINGS



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FOR CONSTRUCTION

ARCHITECT
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TSA MANAGEMENT
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SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
BUILDING WITH TRUST®

PROJECT
ST. MATTHEWS - BLOCK B
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	FR.N	AUG 2020	A1	TX13843.01-S01-R18

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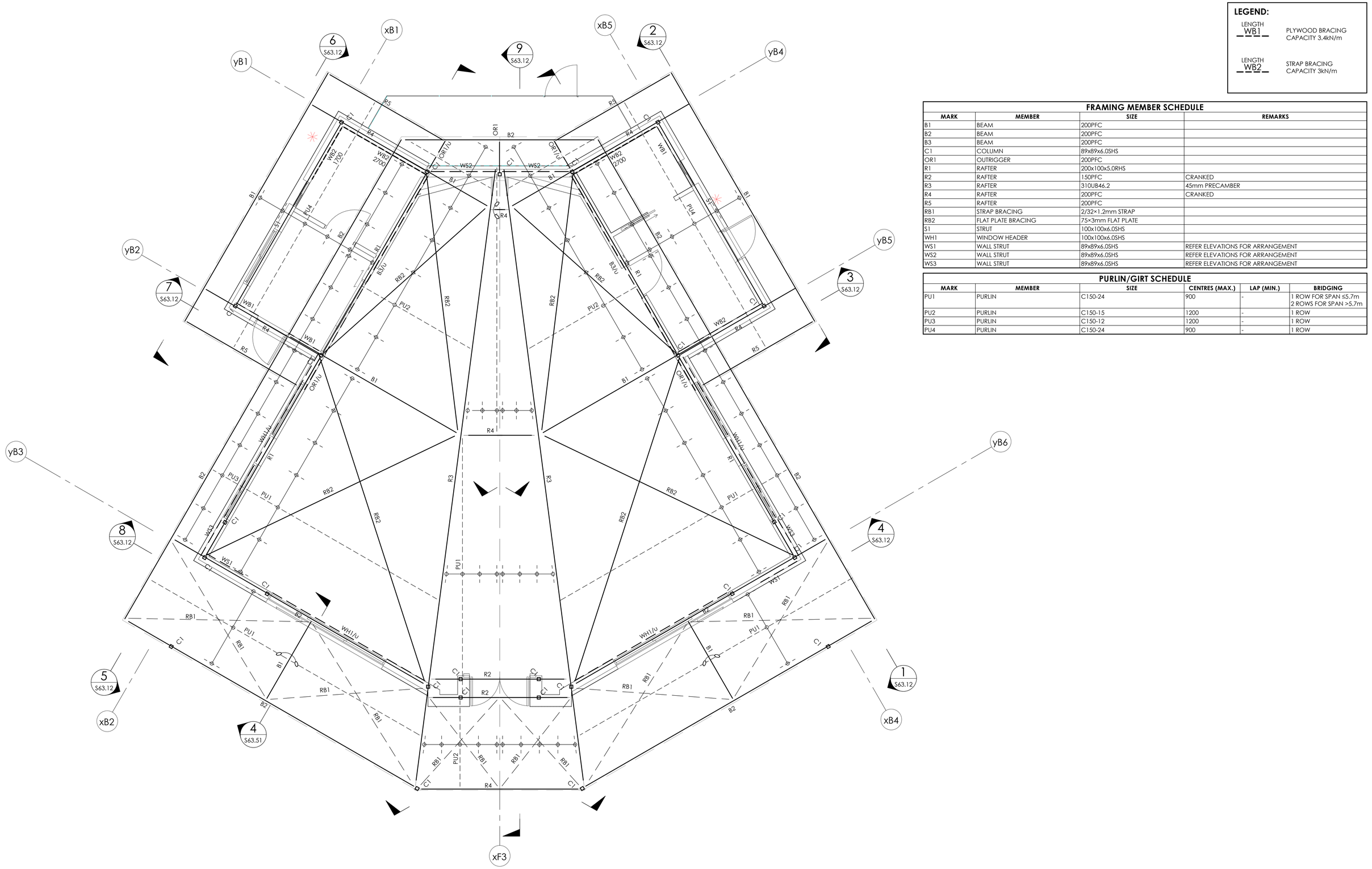
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46 MARKET STREET, MUDGEE NSW 2850
PO BOX 1075, MUDGEE NSW 2850

ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK B
COVER SHEET

PROJECT No TX13843.01 - DRAWING No S60.00 ISSUE 0



ROOF STEELWORK PLAN

SCALE 1 : 50 AT A1

LEGEND:

LENGTH WB1 — PLYWOOD BRACING CAPACITY 3.4kN/m

LENGTH WB2 — STRAP BRACING CAPACITY 3kN/m

FRAMING MEMBER SCHEDULE

MARK	MEMBER	SIZE	REMARKS
B1	BEAM	200PFC	
B2	BEAM	200PFC	
B3	BEAM	200PFC	
C1	COLUMN	89x89x6.0SHS	
OR1	OUTRIGGER	200PFC	
R1	RAFTER	200x100x5.0RHS	
R2	RAFTER	150PFC	CRANKED
R3	RAFTER	310UB46.2	45mm PRECAMBER
R4	RAFTER	200PFC	CRANKED
R5	RAFTER	200PFC	
RB1	STRAP BRACING	2/32×1.2mm STRAP	
RB2	FLAT PLATE BRACING	75×3mm FLAT PLATE	
S1	STRUT	100x100x6.0SHS	
WH1	WINDOW HEADER	100x100x6.0SHS	
WS1	WALL STRUT	89x89x6.0SHS	REFER ELEVATIONS FOR ARRANGEMENT
WS2	WALL STRUT	89x89x6.0SHS	REFER ELEVATIONS FOR ARRANGEMENT
WS3	WALL STRUT	89x89x6.0SHS	REFER ELEVATIONS FOR ARRANGEMENT

PURLIN/GIRT SCHEDULE

MARK	MEMBER	SIZE	CENTRES (MAX.)	LAP (MIN.)	BRIDGING
PU1	PURLIN	C150-24	900	-	1 ROW FOR SPAN ≤5.7m 2 ROWS FOR SPAN >5.7m
PU2	PURLIN	C150-15	1200	-	1 ROW
PU3	PURLIN	C150-12	1200	-	1 ROW
PU4	PURLIN	C150-24	900	-	1 ROW

0 1 2 3 4 5m

SCALE 1:50 AT A1 SHEET | 1:100 AT A3 SHEET

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SYDNEY NSW 2000
ALLEANZA ARCHITECTURE

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TSA MANAGEMENT
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SYDNEY NSW 2000
TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north BUILDING WITH TRUST®

PROJECT
ST. MATTHEWS - BLOCK B
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
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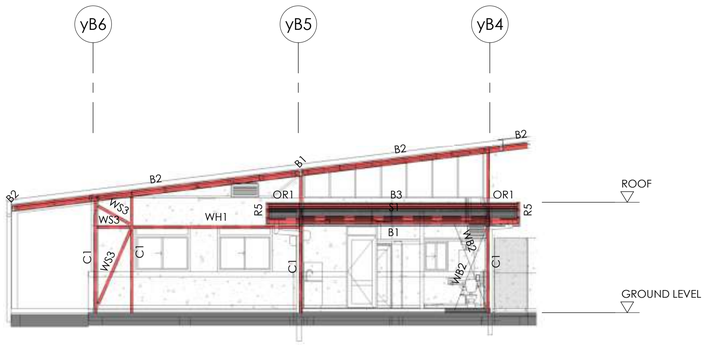
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46 MARKET STREET, MUDGEE NSW 2850
PO BOX 1075, MUDGEE NSW 2850

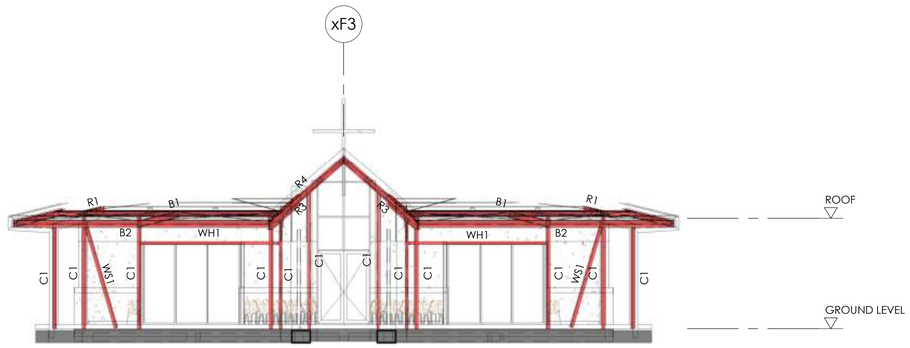
ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK B
ROOF STEELWORK PLAN

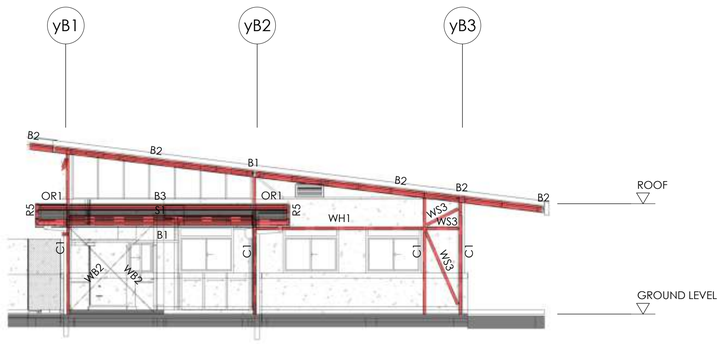
PROJECT No: TX13843.01 - DRAWING No: S63.01 ISSUE: 0



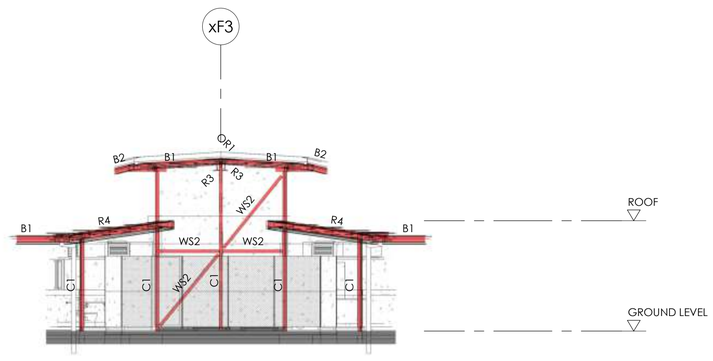
NORTHERN ELEVATION
SCALE 1 : 100 AT A1



EASTERN ELEVATION
SCALE 1 : 100 AT A1



SOUTHER ELEVATION
SCALE 1 : 100 AT A1



WESTERN ELEVATION
SCALE 1 : 100 AT A1

0 1 2 3 4 5 6 7 8 9 10m
SCALE 1:100 AT A1 SHEET | 1:200 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	09.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	B	MA.C
ISSUED FOR CLIENT REVIEW	18.08.20	A	MA.C

FOR CONSTRUCTION

ARCHITECT
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SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
BUILDING WITH TRUST®

PROJECT
ST. MATTHEWS - BLOCK B
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
DA.W	FR.N	AUG 2020	A1	TX13843.01-S01-R18

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

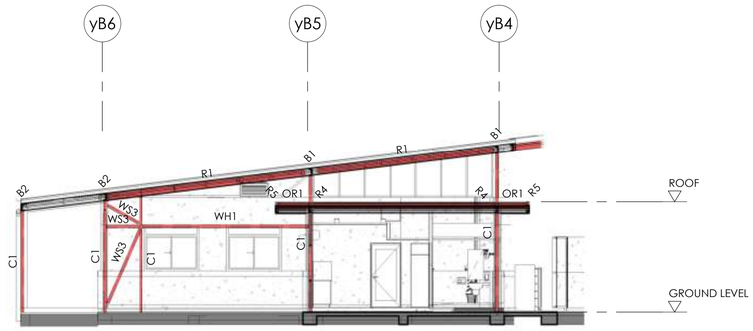
1300 874 294 | TRIAXIAL.COM.AU

46 MARKET STREET, MUDGEE NSW 2850
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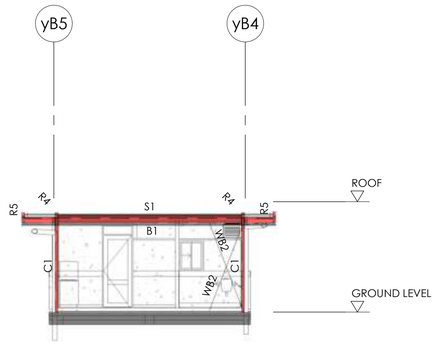
ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK B
ELEVATIONS & SECTIONS SHEET 1

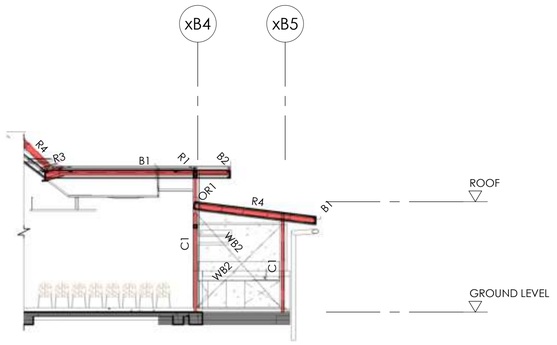
PROJECT No	DRAWING No	ISSUE
TX13843.01 -	S63.11	0



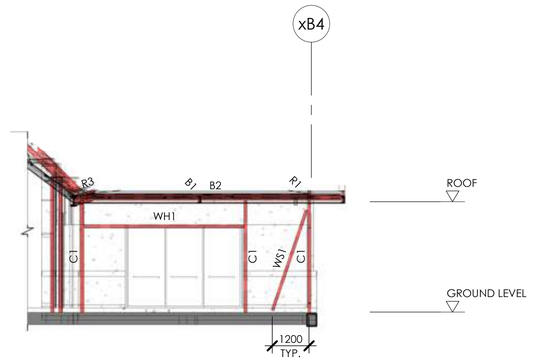
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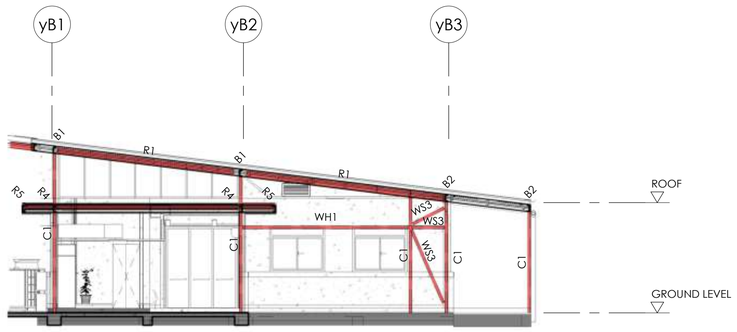
SECTION 1 : 100 2 S63.01



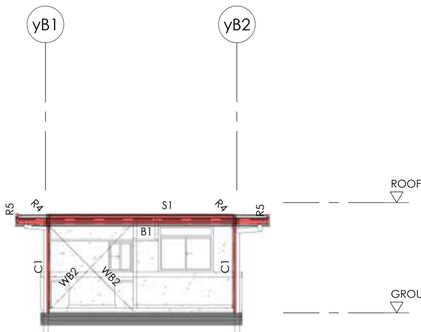
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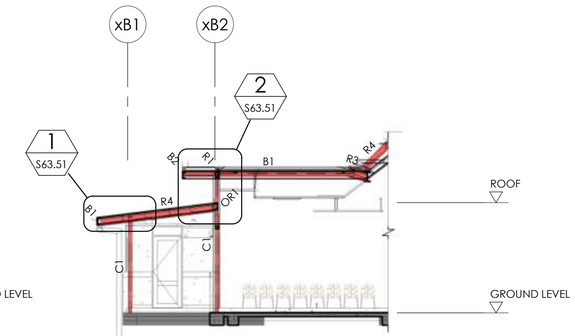
SECTION 1 : 100 4 S63.01



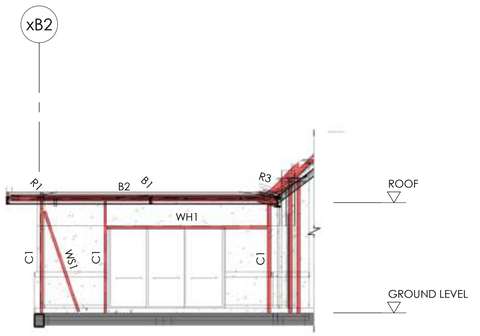
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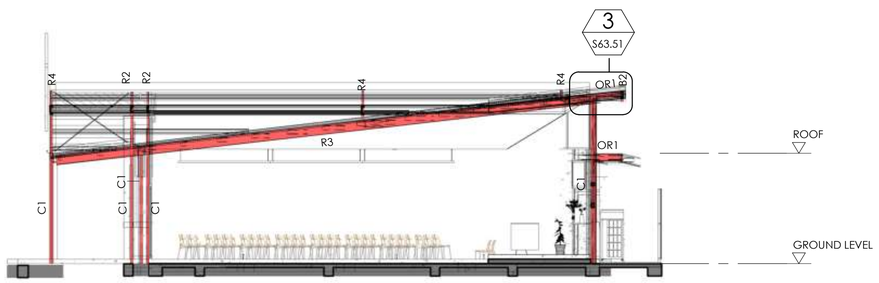
SECTION 1 : 100 6 S63.01



SECTION 1 : 100 7 S63.01



SECTION 1 : 100 8 S63.01



SECTION 1 : 100 9 S63.01

0 1 2 3 4 5 6 7 8 9 10m

SCALE 1:100 AT A1 SHEET | 1:200 AT A3 SHEET

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ISSUED FOR CLIENT REVIEW	18.08.20	A	MA.C

FOR CONSTRUCTION

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TUGGERAH NSW 2259
north
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PROJECT
ST. MATTHEWS - BLOCK B
BROADHEAD ROAD, MUDGEE NSW 2850

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TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

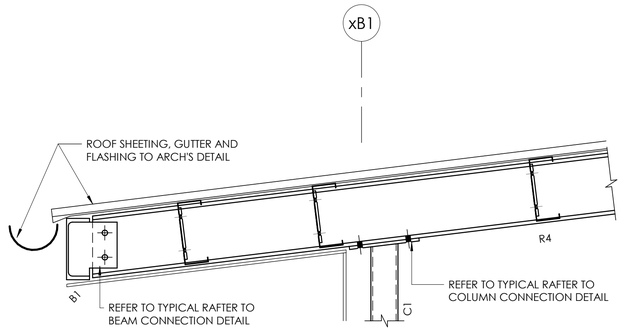
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46 MARKET STREET, MUDGEE NSW 2850
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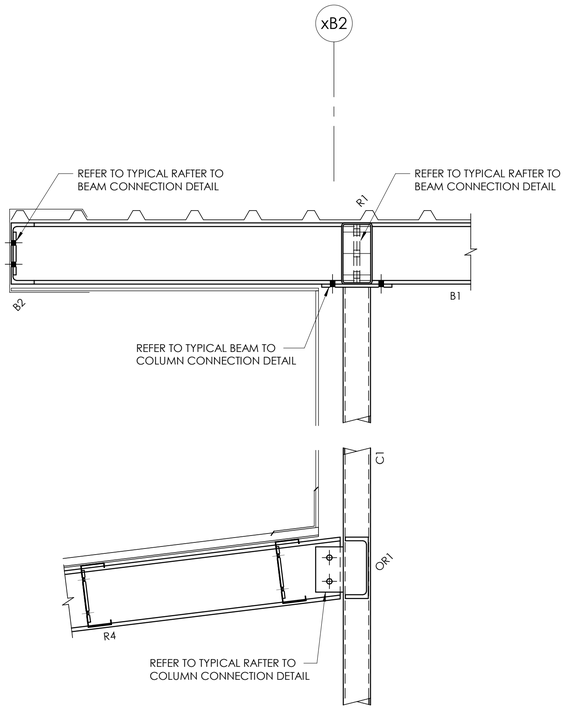
ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK B
ELEVATIONS & SECTIONS SHEET 2

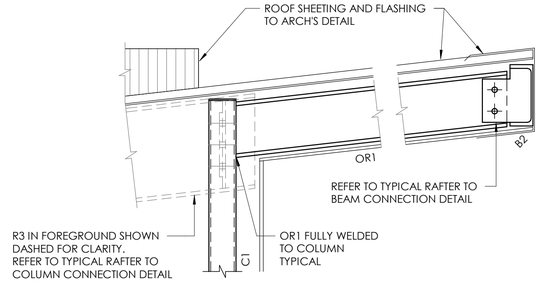
PROJECT No TX13843.01 - DRAWING No S63.12 ISSUE 0



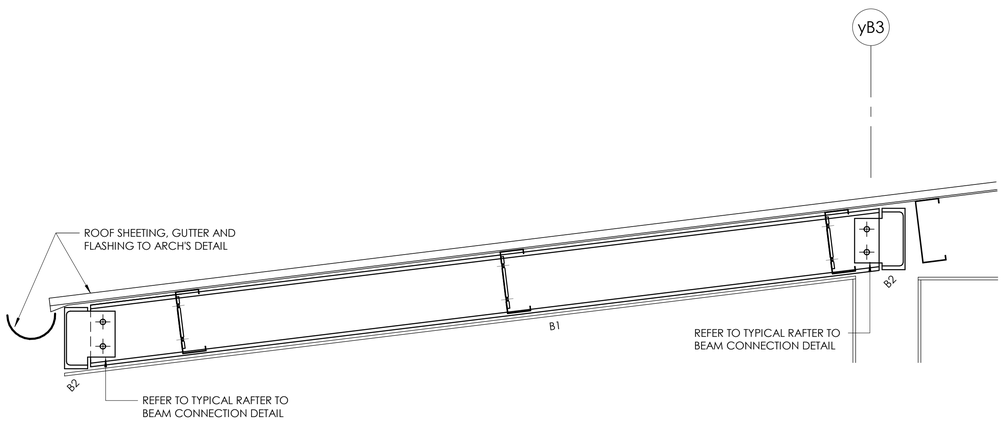
DETAIL 1 : 10 — 1 / S63.12



DETAIL 1 : 10 — 2 / S63.12



DETAIL 1 : 10 — 3 / S63.12



SECTION 1 : 10 — 4 / S63.01

0 200 400 600 800 1000mm

SCALE 1:10 AT A1 SHEET | 1:20 AT A3 SHEET

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ISSUED FOR CLIENT REVIEW	18.08.20	A	MA.C

FOR CONSTRUCTION

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PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259

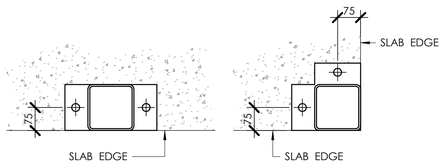
PROJECT
ST. MATTHEWS - BLOCK B
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
HE.C	MA.C	AUG 2020	A1	TX13843.01-S01-R18

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DRAWING TITLE
BLOCK B
STEELWORK DETAILS SHEET 1

PROJECT No TX13843.01 - DRAWING No S63.51 ISSUE 0



TYPE A TYPE B

PLAN

NOTE:
6 C.F.W. CATEGORY SP TO COLUMN (U.N.O.)
ALL BASE PLATE GROUT TO BE HIGH-STRENGTH, NON-SHRINK GROUT (>50MPa)

COLUMN BASE PLATE SCHEDULE

MEMBER	BASE PLATE			ANCHORS		REMARKS
	TYPE	THICKNESS	GROUT	ANCHOR BOLTS	TYPE (REFER SPEC.)	
C1	A/B	12mm	20mm	2M16	CHEMICAL ANCHOR	

ANCHOR SPECIFICATIONS

TYPE	ANCHOR	EMBEDMENT	REMARKS
CHEMICAL ANCHOR	M12	110	CHEMSET 801 OR APPROVED EQUIVALENT. REFER TO MANUFACTURER FOR HOLE PREPARATION AND MINIMUM CURING TIMES.
	M16	125	
	M20	150	
	M24	200	

BASE PLATE BOLTS HOLE SPECIFICATIONS

ANCHOR SIZE (mm)	HOLE DIA.	WASHERS (MIN.) #
M12	18	Ø42mm × 4mm THICK
M16	22	Ø50mm × 4mm THICK
M20	26	Ø58mm × 4mm THICK
M24	30	Ø66mm × 4mm THICK
M30	36	Ø78mm × 4mm THICK
M36	42	Ø90mm × 4mm THICK
# ALTERNATIVE: USE SQUARE WASHERS CUT FROM FLAT PLATE, G250 MIN.		

COLUMN BASE PLATE DETAILS

SCALE 1:10 AT A1

0 200 400 600 800 1000mm

SCALE 1:10 AT A1 SHEET | 1:20 AT A3 SHEET

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ISSUED FOR CLIENT REVIEW	18.08.20	A	MA.C

FOR CONSTRUCTION

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ALLEANZA ARCHITECTURE

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SYDNEY NSW 2000
TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north
BUILDING WITH TRUST®

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ST. MATTHEWS - BLOCK B
BROADHEAD ROAD, MUDGEE NSW 2850

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TRIAXIAL CONSULTING
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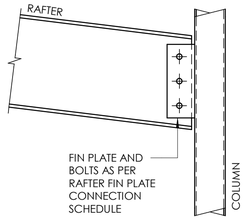
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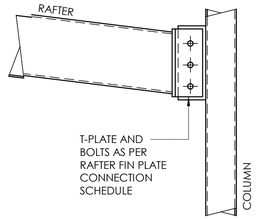
46 MARKET STREET, MUDGEE NSW 2850
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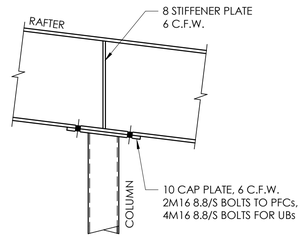
ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

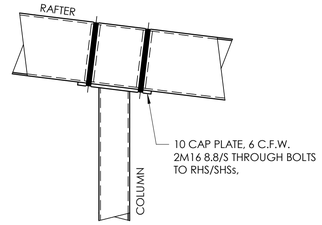
DRAWING TITLE
BLOCK B
STEELWORK DETAILS SHEET 2

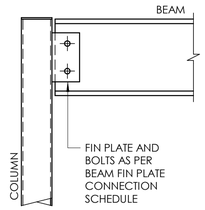
PROJECT No TX13843.01 - | DRAWING No S63.52 | ISSUE 0

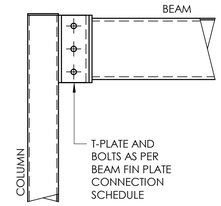












RAFTER FIN PLATE CONNECTION SCHEDULE		
MEMBER	FIN PLATE (6 C.F.W.)	BOLT SPEC 8.8/S
R1	10mm (PLATE)	2M16
R2	10mm	2M16
R3	10mm	3M16
R4	10mm	2M16
R5	10mm	2M16

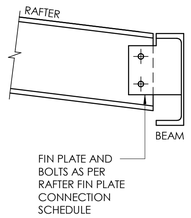
TYPICAL RAFTER TO COLUMN CONNECTION DETAILS

SCALE 1:10 AT A1

TYPICAL BEAM TO COLUMN CONNECTION DETAILS

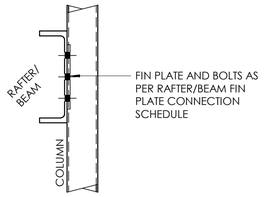
SCALE 1:10 AT A1

BEAM FIN PLATE CONNECTION SCHEDULE		
MEMBER	FIN PLATE (6 C.F.W.)	BOLT SPEC 8.8/S
B1	10mm	2M16
B2	10mm	2M16
B3	10mm	2M16



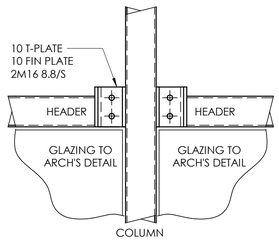
TYPICAL RAFTER TO BEAM CONNECTION DETAILS

SCALE 1:10 AT A1



OFFSET RAFTER/BEAM TO COLUMN CONNECTION

SCALE 1:10 AT A1



WINDOW SILL CONNECTION SIMILAR

TYPICAL WINDOW HEADER CONNECTION DETAIL

SCALE 1:10 AT A1

0 200 400 600 800 1000mm

SCALE 1:10 AT A1 SHEET | 1:20 AT A3 SHEET

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TSA MANAGEMENT
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SYDNEY NSW 2000
TSA MANAGEMENT

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north
BUILDING WITH TRUST®

PROJECT
ST. MATTHEWS - BLOCK B
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
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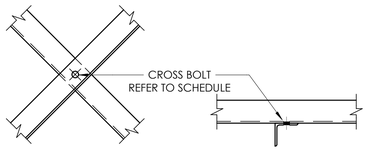
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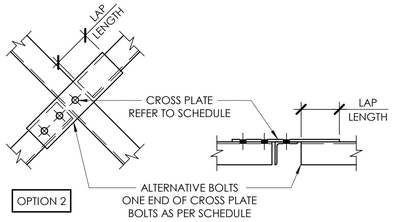
ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK B
STEELWORK DETAILS SHEET 3

PROJECT No: TX13843.01 - DRAWING No: S63.53 ISSUE: 0



OPTION 1



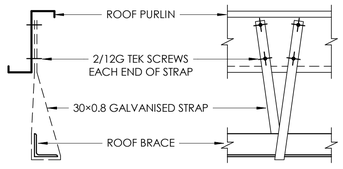
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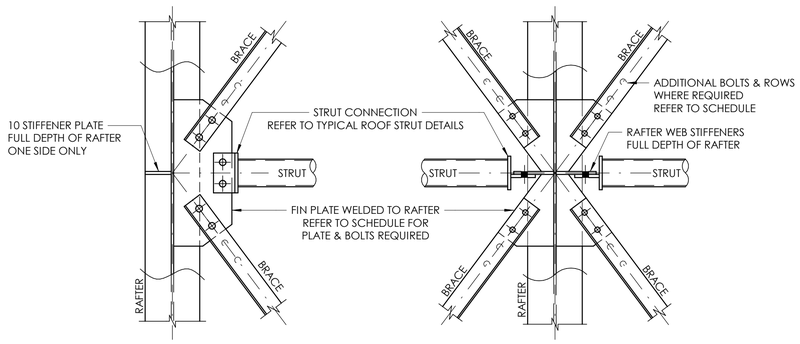
TYPICAL CROSS BRACING DETAIL

SCALE 1:10 AT A1

ANGLE BRACING SUPPORT NOTE:

ALL ANGLE BRACING TO BE SUPPORTED OFF ROOF PURLINS, REMOVE ANY SAG IN BRACING & STRAP TO PURLINS AT 1/4 POINTS NOMINAL, AS FOLLOWS:

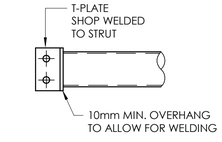




TYPICAL ROOF BRACING DETAIL

SCALE 1:10 AT A1

ANGLE CROSS BRACING SCHEDULE							
MEMBER	BOLTS (GRADE 8.8/S)			CROSS PLATE (G250)			
	BOLT SIZE	BOLTS PER ROW	ROWS	PLATE SIZE	LAP LENGTH	WELD	BOLT (8.8/S)
75×75×5 EA	M20	2	1	90×10	100	6 C.F.W.	M20

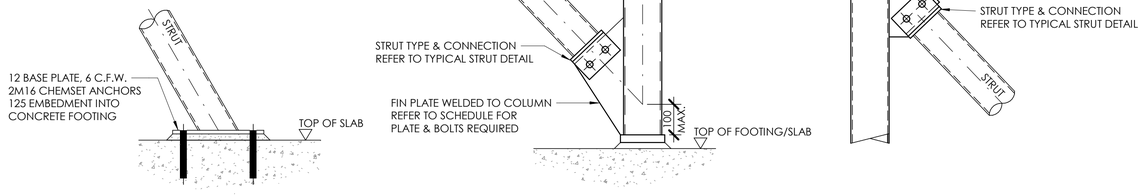


TYPE A

TYPICAL ROOF & WALL STRUT DETAIL

SCALE 1:10 AT A1

ROOF STRUT SCHEDULE						
MEMBER	T-PLATE/FIN PLATE (G250)			BOLT (GRADE 8.8/S)		
	TYPE	THICKNESS	WELD	BOLT SIZE	BOLTS PER ROW	ROWS
S1	A	10	6 C.F.W.	M16	2	1
WS1	A	10	6 C.F.W.	M16	2	1
WS2	A	10	6 C.F.W.	M16	2	1
WS3	A	10	6 C.F.W.	M16	2	1



TYPICAL WALL STRUT BRACING DETAIL

SCALE 1:10 AT A1

0 200 400 600 800 1000mm

SCALE 1:10 AT A1 SHEET | 1:20 AT A3 SHEET

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5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259

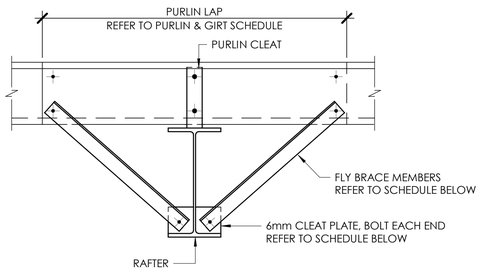
PROJECT
ST. MATTHEWS - BLOCK B
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
HE.C	MA.C	AUG 2020	A1	TX13843.01-S01-R18

TRIAXIAL CONSULTING
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ADELAIDE | BAROSSA | DARWIN | MUDGEE | PARRAMATTA | SYDNEY

DRAWING TITLE
BLOCK B
STEELWORK DETAILS SHEET 4

PROJECT No TX13843.01 - DRAWING No S63.54 ISSUE 0



FLY BRACING TO RAFTER DETAIL.
HORIZONTAL FLY BRACING TO GIRTS AT COLUMNS SIMILAR

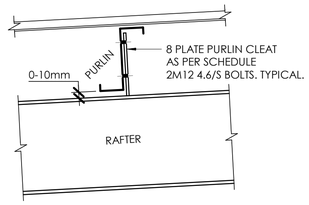
FLY BRACING SCHEDULE			
RAFTER/COLUMN	FLY BRACE (G300)	FLY BRACE (DURAGAL)	BOLTS
≤ 410UB	50×50×3 EA	50×50×4.0 CA	M12 8.8/S

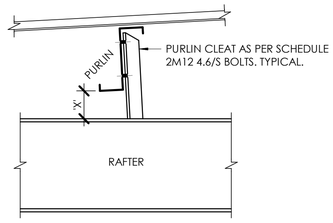
FLY BRACING DETAILS (FB)

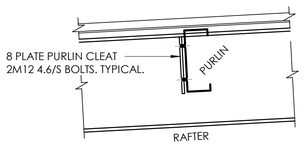
SCALE 1:10 AT A1

FLY BRACING NOTE:

THE FLY BRACING IS A CRITICAL ELEMENT PROVIDING STABILITY TO THE STRUCTURE.
FLY BRACING MUST BE INSTALLED AT THE TIME OF INSTALLATION OF THE PURLINS, GIRTS & WALL SYSTEM.
THERE SHALL BE NO ADDITIONAL LOAD (OTHER THAN PURLINS) PLACED ON RAFTERS
UNTIL ALL RAFTER & COLUMN FLY BRACING IS INSTALLED.
REFER ANY ALTERATION FROM THIS REQUIREMENT TO TRIAXIAL CONSULTING.







GIRT DETAIL AT COLUMNS SIMILAR

TYPICAL PURLIN/GIRT CONNECTION DETAIL

NOT TO SCALE

PURLIN & GIRT CLEAT SCHEDULE		
PITCH	'X' (mm)	CLEAT SIZE
<5°	0 - 10	60 × 8 PLATE
	11 - 40	60 × 10 PLATE
	41 - 100	75 × 10 PLATE
SCHEDULE APPLICABLE TO PURLINS & GIRTS UP TO Z/C250 SIZE ONLY		

0 200 400 600 800 1000mm

SCALE 1:10 AT A1 SHEET | 1:20 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
ISSUED FOR CONSTRUCTION	09.03.21	0	CH.W
ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
ISSUED FOR 80% DOCUMENTATION	21.08.20	B	MA.C
ISSUED FOR CLIENT REVIEW	18.08.20	A	MA.C

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
LVL 1, 695 GEORGE STREET,
SYDNEY NSW 2000

PROJECT MANAGER
TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
BUILDING WITH TRUST®

PROJECT
ST. MATTHEWS - BLOCK B
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
HE.C	MA.C	AUG 2020	A1	TX13843.01-S01-R18

TRIAXIAL CONSULTING
COMPLEX PROBLEMS RESOLVED SIMPLY

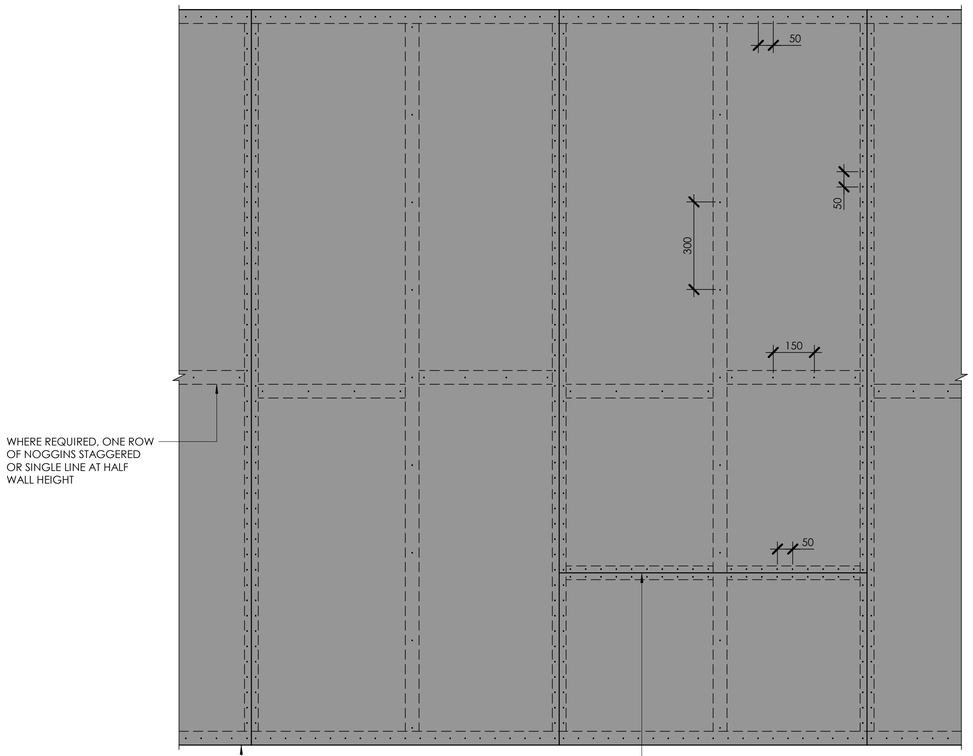
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DRAWING TITLE
BLOCK B
STEELWORK DETAILS SHEET 5

PROJECT No TX13843.01 - DRAWING No S63.55 ISSUE 0

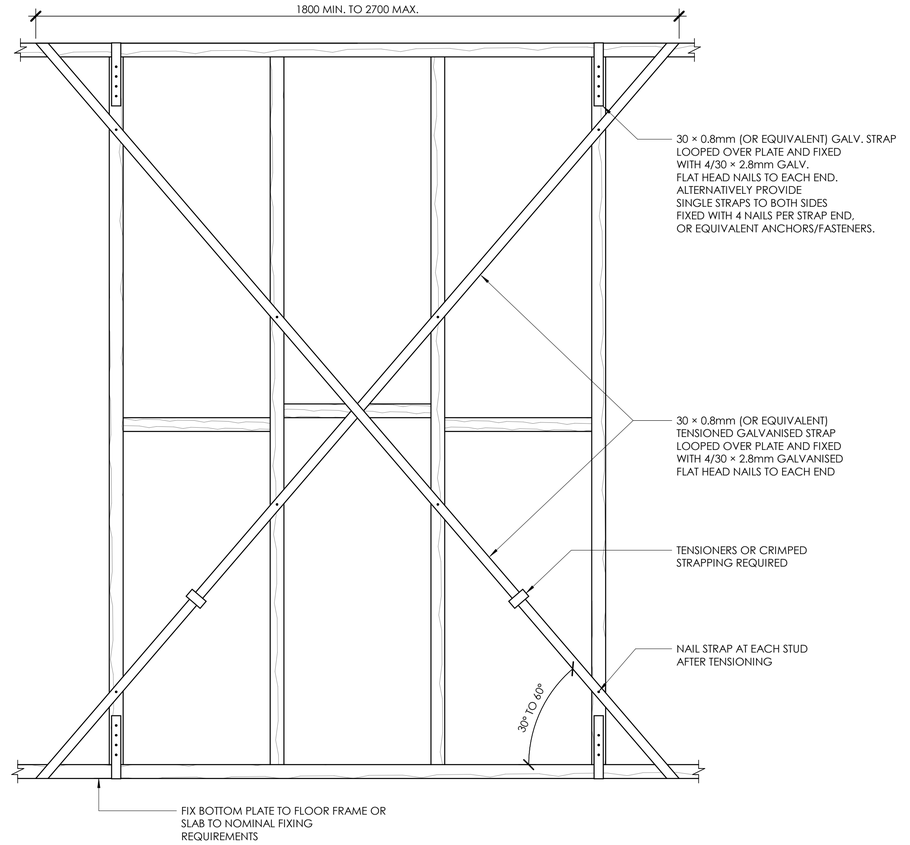


PLYWOOD BRACING CAPACITY 6.0kN/m

MINIMUM PLYWOOD THICKNESS (mm)

STRESS GRADE	STUD SPACING (mm)	
	450	600
F8	7	9
F11	4.5	7
F14	4	6
F27	3	4.5

PLYWOOD TO BE NAILED WITH 30 × 2.8mm GALVANISED FLAT HEAD NAILS, 7MM MIN. FROM ALL SHEET EDGES



WB1 - PLYWOOD WALL BRACING DETAIL
N.T.S.

WB2 - TENSIONED STRAP WALL BRACING DETAIL
SCALE 1:10 AT A1

0 200 400 600 800 1000mm
SCALE 1:10 AT A1 SHEET | 1:20 AT A3 SHEET

AMENDMENTS	DATE	ISSUE	BY
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ISSUED FOR CONSTRUCTION CERTIFICATE	17.02.21	C	CH.W
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ISSUED FOR CLIENT REVIEW	18.08.20	A	MA.C

FOR CONSTRUCTION

ARCHITECT
ALLEANZA
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SYDNEY NSW 2000

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TSA MANAGEMENT
LVL 15, 207 KENT STREET,
SYDNEY NSW 2000

BUILDER
NORTH CONSTRUCTIONS
5/ 1 BRYANT DRIVE,
TUGGERAH NSW 2259
north
BUILDING WITH TRUST®

PROJECT
ST. MATTHEWS - BLOCK B
BROADHEAD ROAD, MUDGEE NSW 2850

DESIGNED	DRAWN	DATE	SIZE	CAD REF
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DRAWING TITLE
BLOCK B
WALL BRACING DETAILS

PROJECT No TX13843.01 - DRAWING No S63.58 ISSUE 0

CALIBRE PROFESSIONAL SERVICES PTY LTD
PO Box 846 | North Sydney, New South Wales 2059
Level 13, 54 Miller Street | North Sydney, New South Wales 2060
+61 2 9004 8855 | 55 070 683 037 | www.calibregroup.com

Our Ref: 21-000048

24 May 2021

Principal Certifying Authority
Blackett Maguire + Goldsmith Pty Ltd
PO Box 167
Broadway NSW 2007

Attention: Michael Potts

Dear Michael

RE: St Matthews Catholic School Mudgee, Secondary Campus – Certificate of Design – Mechanical Services

SUBJECT PREMISES: 48 Broadhead Road, Spring Flat DEVELOPMENT CONSENT: SSD 9872

This design statement relates to the mechanical services documentation and specifications for the proposed new St Matthews Catholic School Mudgee – Secondary Campus located at 48 Broadhead Road, Spring Flat.

Relevant Construction Certificate stages covered by this certificate includes:

- CC2 – Structure and Services

Pursuant to the provisions of Clause A5.2 of the Building Code of Australia 2019 Amendment 1, we certify that we have taken reasonable care to design the mechanical elements listed in the Description of Works below in accordance with the Building Code of Australia 2019 Amendment 1, relevant Australian Standards, the Environmental Planning and Assessment Regulation, Noise and Vibration Impact Assessment Report dated April 2020 & RWDI Memorandum (reference # 2102338) dated 24 May 2021, relevant conditions of the Development Consent and accepted engineering principals. A Schedule of Applicable Documentation is appended to this certificate.

Description of Works	BCA Clause / DA Condition	Applicable Australian Standard
Outdoor Air to Air Conditioning Systems in the following Blocks: • Block A • Block B – Limited to Hall only • Block C – Limited to Music, Drama & Practice Rooms only • Block E2 – Limited to Staff Offices, Workrooms and Meeting Rooms on Level 1. Outdoor air has not been provided to air conditioned rooms not listed above as it is our understanding that these rooms have been designed to meet the requirements of NCC F4.6 - Natural Ventilation provision by the project architect.	F4.5	AS1668.2-2012 – Table A1
Ventilation – Toilets, Cleaner, Print Room & Laundry and General Room Exhaust Ventilation	F4.5 and F4.6	AS1668.2-2012 – Table B1
Block C – Automatic “Smoke-and-Heat Vents” to the Stage	E2.2, NSW H101.22	AS1668.1-2015 and AS1668.2-2012

Block C - Hospitality Kitchen Exhaust Ventilation (Kitchen exhaust hoods certified by others)	F4.5	AS1668.1-2015 and AS1668.2-2012
Block D – Fume Cupboard Exhaust Ventilation	F4.5	AS1668.2-2012 and AS2243.8-2014
Block D – Chemical Cabinets and Store Room Exhaust Ventilation	F4.5	AS1668.2-2012, AS1940-2017 and AS2243.10-2004
Block D – Kiln and Welding Exhaust Ventilation	F4.5	AS1668.2-2012
Mechanical and Electrical Services have fire alarm signals documented to Block A, B, C and E2 for the following: • Shut down air handling systems and ducted supply air fans when building general fire alarm in the respective building is activated • Activate Smoke-and-Heat Vents when Building C general fire alarm is activated	NSW Table E2.2b	AS1668.1-2015
Energy Efficiency	Part J3.4 (d) & J3.5 (a)(i) Part J5.2, J5.3, J5.4, J5.5, J5.8 and J5.11	N/A
Noise and Vibration Impact Assessment	DA Condition B2 & CC21	Refer to Wilkinson Murray Noise and Vibration Impact Assessment Report dated April 2020 & RWDI Memorandum (reference # 2102338) dated 24 May 2021

I am appropriately qualified and experienced professional engineer as defined by the NCC Part A5.2 and are competent in the relevant field as applicable to provide this certificate, and as such can certify that the design and performance of the design systems comply with the above.

We possess Indemnity Insurance to the satisfaction of the building owner or my principal.

Full name of Designer: Kiat Chin
Qualifications: BEng (Hons), RPEQ (Mechanical), VBA Practitioner (Mechanical), MIEAust, M.Airah
Address of Designer: Level 3, 545 Queen Street, Brisbane QLD 4000
Business Telephone No: +61 7 3895 3444
Email: kiat.chin@calibregroup.com

Yours faithfully
Calibre Professional Services Pty Ltd



Kiat Chin
Senior Engineer - Building Services & Renewables
BEng (Hons), RPEQ (Mechanical), VBA Practitioner (Mechanical), MIEAust, M.Airah

ATTACHMENTS

1. Schedule of Applicable Documentation

SCHEDULE OF APPLICABLE DOCUMENTATION

Electrical Drawings	Electrical Specifications
21-000048 - BR-M5000	21-000048 - MSPEC
21-000048 - BR-M5001	
21-000048 - BR-M5002	
21-000048 - BR-M5003	
21-000048 - BR-M5004	
21-000048 - BR-M5005	
21-000048 - BR-M5006	
21-000048 - BR-M5007	
21-000048 - BR-M5008	
21-000048 - BR-M5009	
21-000048 - BR-M5010	
21-000048 - BR-M5011	
21-000048 - BR-M5012	
21-000048 - BR-M5100	
21-000048 - BR-M5101	
21-000048 - BR-M5102	
21-000048 - BR-M5103	
21-000048 - BR-M5104	
21-000048 - BR-M5105	
21-000048 - BR-M5106	
21-000048 - BR-M5107	
21-000048 - BR-M5108	
21-000048 - BR-M5203	
21-000048 - BR-M5204	

All documentation is the latest revision at the date of this certificate

LIGHTING

SYMBOL		DESCRIPTION
	1R	32W, 4000K, UGR19, IP40, RECESSED, 1200MMX300MM, DALI DIMMABLE DRIVER, PIERLITE SLENDER LED PANEL GEN 2. PROVIDE ADDITIONAL PLASTER RECESSED KIT WHEN INSTALLED IN PLASTER CEILINGS
	2R	20W, 4000K, CRI 90+, IP20, RECESSED LED DOWNLIGHT, 45 DEGREE BEAM, MATT REFLECTOR, DALI DIMMABLE DRIVER, EAGLE LIGHTING PLEIAD G3 COMFORT
	3R	22W, 4000K, IP44, RECESSED LED DOWNLIGHT, WHITE FINISH, 75 DEGREE BEAM, DALI DIMMABLE DRIVER, EAGLE LIGHTING V-SERIES FIXED TYPE 2
	4R	16W, 3000K, IP66, RECESSED LED EXTERIOR DOWNLIGHT, SYMMETRICAL WIDE BEAM DISTRIBUTION, STAINLESS STEEL FINISH, ELECTRONIC CONTROL GEAR, VERSALUX LEILA 135 GF
	5R	32W, 4000K, UGR19, IP40,RECESSED LED PANEL, 600MMX600MM, DALI DIMMABLE 900MA DRIVER, PIERLITE SLENDER LED PANEL GEN 2. PROVIDE ADDITIONAL PLASTER RECESSED KIT WHEN INSTALLED IN PLASTER CEILINGS
	6R	40W, 4000K, CRI 90+, IP65, PLASTER RECESSED LED TROFFER, 1200MMX300MM, SUITABLE FOR CLEANROOMS, DALI DIMMABLE DRIVER, EAGLE LIGHTING CLEANROOM IP 65 LED
	7R	12W, 4000K, UGR19, IP20, RECESSED LED PANEL, 600MMX300MM, DALI DIMMABLE DRIVER, PIERLITE SLENDER LED PANEL GEN 2. PROVIDE ADDITIONAL PLASTER RECESSED KIT WHEN INSTALLED IN PLASTER CEILINGS
	8R	21W/m DIRECT,1000 LM/M DOWN, 4000K, PLASTER RECESSED LED EXTRUSION, LENGTHS AS SHOWN, LEDOPTEK DIFFUSER, WHITE FINISH, INTEGRAL DALI CONTROL GEAR AND INSTALLED WITH MANUFACTURER'S RECESS MOUNTING BRACKET, KLIK KALLI 060 BEAM DRS
	9R	31W, 4000K, CRI 90+, IP20, RECESSED LED DOWNLIGHT, 45 DEGREE BEAM, MATT REFLECTOR, DALI DIMMABLE DRIVER, EAGLE LIGHTING PLEIAD G3 COMFORT
	1P	22.7W/m DIRECT & 4.2W/m INDIRECT, 2250LM/M DOWN, 500 LM/ UP, 4000K, LED SUSPENDED EXTRUSION, LENGTHS AS SHOWN, LEDOPTEK DIFFUSERS, WHITE FINISH, INTEGRAL DALI CONTROL GEAR, PROVIDED WITH MANUFACTURERS STAINLESS STEEL WIRE SUSPENSION KIT, KLIK KALLI 080 BEAM DI
	2P	22.7W/m DIRECT, 2250LM/M DOWN, 4000K, LED SUSPENDED EXTRUSION, LENGTHS AS SHOWN, LEDOPTEK DIFFUSERS, WHITE FINISH, INTEGRAL DALI CONTROL GEAR, PROVIDED WITH STAINLESS STEEL WIRE SUSPENSION KIT, KLIK KALLI 060 BEAM DI
	3P	21W/m, 1239 LM/M, 4000K, IP20 , LED CIRCULAR EXTRUSION PENDANT, 830MM DIAMETER, POLYCARBONATE DIFFUSER, ANNODIZED SILVER FINISH, SUSPENDED WITH MANUFACTURERS WIRE SUSPENSION KIT, INTEGRAL DALI DIMMABLE DRIVER, XERO LIGHTING XTA 2.0 LOOP BEAM
	4P	PENDANT AS SELECTED BY ARCHITECT. INCLUDE PC SUM OF $500 SUPPLY ONLY EACH AND INSTALLATION COST
	1S	28W, 4000K, CRI 80+, IP 40, SURFACE MOUNTED LED BATTEN, 1200MM LENGTH, DALI DIMMABLE DRIVER, EAGLE LIGHTING RAPIDLED
	2S	15W, 4000K, CRI 80+, IP 40, SURFACE MOUNTED LED BATTEN, 600MM LENGTH, DALI DIMMABLE DRIVER, EAGLE LIGHTING RAPIDLED
	3S	30W, 4000K, CRI 80+, IP65, SURFACE MOUNTED LED BATTEN, 1280MM LENGTH, DALI DIMMABLE DRIVER, EAGLE LIGHTING DENSUS LED
	4S	39W, 4000K, CRI 80+, IP65, SURFACE MOUNTED LED BATTEN, 1280MM LENGTH, DALI DIMMABLE DRIVER, EAGLE LIGHTING DENSUS LED
	5S	89W, 4000K, CRI80+, IP65, IK10, SURFACE MOUNTED EXTERNAL LED HIGHBAY, 675MMX675MM, BLACK FINISH, DALI DIMMABLE DRIVER, EAGLE LIGHTING HERCULED
	6S	200W, 4000K, 32000 LUMENS, CRI80+, SURFACE MOUNTED LED HIGHBAY, SUPPLIED AND INSTALLED WITH MANUFACTURER'S BRACKET MOUNTING KIT, PRISMATIC REFLECTOR, DALI DIMMABLE DRIVER, ADVANCE LIGHTING TECHNOLOGY VLED HIGHBAY
	1W	12W, 3000K, IK09, IP65, SINGLE EMISSION, EXTERIOR LED WALL LIGHT, GREY FINISH, ELECTRONIC INTEGRAL DRIVER, VERSALUX MIDNA GF
	1T	26W, 2700K, CRI 90, LED TRACK LIGHT, BLACK FINISH, WIDE BEAM, INTERGRAL DALI DRIVER, FAGERHULT TWISTER
	TRACK	FAGERHALT SINGLE PHASE TRACK + DALI CONTROL TRACK TO LENGTHS AS SHOWN, TRACK TO BE COMPATIBLE WITH TYPE 1T LUMINAIRE, RECESSED AND BLACK
	1X	11W, 3000K, IP65, IK10, LED BOLLARD, 900 HEIGHT, INTERGRAL CONTROL GEAR, VERSALUX VIVIANA GF
	2X	94W, 3000K, IP66, LED STREET LIGHT, TYPE 3 MEDIUM OPTIC, CLASS 1 INSULATION, PROVIDE COMPLETE WITH 6.1m ROUND GALVANISED STEEL POLE, POWDERCOATED BLACK WITH RAGBOLT CAGE AND FOUNDATION DESIGNED TO SUIT SITE GEOTECH REPORT, FIELD ADJUSTABLE DRIVER, ADLT CREE XSP SERIES
	3X	AS PER 2X BUT DOUBLE OUTREACH AND 2X LUMINAIRES
	4X	48W, 3000K, IP66, LED STREET LIGHT, TYPE 3 MEDIUM OPTIC, CLASS 1 INSULATION, PROVIDE COMPLETE WITH 6.1m ROUND GALVANISED STEEL POLE, POWDERCOATED BLACK WITH RAGBOLT CAGE AND FOUNDATION DESIGNED TO SUIT SITE GEOTECH REPORT, FIELD ADJUSTABLE DRIVER, ADLT CREE XSP SERIES

SWITCHING

SYMBOL	DESCRIPTION
	ON/OFF PUSH BUTTON MOUNTED AT 1000 AFL UNO (CONNECTED TO AUTOMATION BUS)
	ON/OFF PUSH AND PRESS FOR DIM MOUNTED AT 1000 AFL UNO (CONNECTED TO AUTOMATION BUS)
LCP	LIGHTING CONTROL PANEL A = MIN. 7" TOUCH SCREEN B = 8 BUTTON STAINLESS STEEL PANEL (ROBUST FOR HALL)
	360° OCCUPANCY SENSOR (RANGE TO MATCH EACH SPACE)
	SWITCHING LINE
	TO SWITCH

EMERGENCY LIGHTING

SYMBOL		DESCRIPTION
	1E	2X3 WATT CIRCULAR RECESSED LED EMERGENCY LUMINAIRE, SELF CONTAINED, ZONEWORKS XT MONITORED, NON-MAINTAINED, MINIMUM CLASSIFICATION C0=D63, C90=D63, CLEVERTRONICS LP LIFELIGHT PRO
	2E	2.7W SURFACE MOUNT LED EXIT LUMINAIRE, SELF CONTAINED, ZONEWORKS XT MONITORED, MAINTAINED WITH PICTORAL ELEMENTS, MINIMUM VIEWING DISTANCE = 24m, MINIMUM CLASSIFICATION C0 =E2.5, C90=E2, CLEVERTRONICS LP CLEVERFIT EXIT
D	3E	2.7W SURFACE MOUNT LED EXIT LUMINAIRE, SELF CONTAINED, ZONEWORKS XT MONITORED, MAINTAINED WITH PICTORAL ELEMENTS AND DIRECTION ARROWN IN DIRECTION INDICATED, MINIMUM VIEWING DISTANCE = 24m, MINIMUM CLASSIFICATION C0=E2.5, C90=E2, CLEVERTRONICS LP CLEVERFIT EXIT, D = DOUBLE SIDED
	4E	2.7 WATT WEATHERPROOF SURFACE MOUNT LED EXIT LUMINAIRE, SELF CONTAINED, ZONEWORKS XT MONITORED, MAINTAINED WITH PICTORAL ELEMENTS, MINIMUM VIEWING DISTANCE = 24m, MINIMUM CLASSIFICATION C0=E2, C90=E2, CLEVERTRONICS LP WEATHERPROOF EXIT
D	5E	2.7 WATT SURFACE MOUNT WEATHERPROOF LED EXIT LUMINAIRE, SELF CONTAINED,ZONEWORKS XT MONITORED, MAINTAINED WITH PICTORAL ELEMENTS AND DIRECTION ARROW IN DIRECTION INDICATED, MINIMUM VIEWING DISTANCE = 24m, MINIMUM CLASSIFICATION C0=E2.5, C90=B12.5. D = DOUBLE SIDED
	6E	SURFACE MOUNT LED EMERGENCY LUMINAIRE, SELF CONTAINED, SINGLE POINT, NON-MAINTAINED, MINIMUM CLASSIFICATION C0=D63, C90=D63, CLEVERTRONICS LP WEATHERPROOF EXIT
	7E	0.2W WEATHERPROOF WALL MOUNT LED EMERGENCY FLOOD LUMINAIRE, IP65, SELF CONTAINED, ZONEWORKS XT MONITORED, NON-MAINTAINED, CLEVERTRONICS LP LIFELIGHT PRO IP66/IP67
	8E	2.7 SURFACE MOUNT LED EXIT LUMINAIRE, BLACK THEATRE MASK, SELF CONTAINED, ZONEWORKS XT MONITORED, MAINTAINED WITH PICTORAL ELEMENTS, MINIMUM VIEWING DISTANCE = 24m, MINIMUM CLASSIFICATION C0=E2.5, C90=B12.5, CLEVERTRONICS LP PREMIUM CLEVERFIT LED THEATRE EXIT (ZONEWORKS)

COMMUNICATIONS

SYMBOL	DESCRIPTION
	RJ45 CAT 6 COMMUNICATIONS OUTLET, MOUNT AT 300 AFL UNO
	DOUBLE RJ45 CAT 6 COMMUNICATIONS OUTLET, MOUNT AT 300 AFL UNO
	TRIPLE RJ45 CAT 6 COMMUNICATIONS OUTLET, MOUNT AT 300 AFL U.N.O
	CEILING MOUNTED DOUBLE RJ45 CAT 6A COMMUNICATIONS OUTLET FOR WIRELESS ACCESS POINT (WAP)
	COMMUNICATIONS CABINET/RACK
AMP	AUDIO AMPLIFIER RACK LOCATION
PA	PA EQUIPMENT AS NOTED ON LAYOUTS
PA	PA SPEAKER - CEILING RECESSED
PA	PA SPEAKER - HORN
EVAC	LOCKDOWN AND EVAC PANEL
DP	THEATRE PROJECTOR
SP	AUDIO SPEAKER - WALL MOUNTED (HALL)
AV	AUDIO SPEAKER - CEILING RECESSED (CHAPEL)
CO2	CARBON DIOXIDE SENSOR
TV85	TELEVISION TYPICAL ARRANGMENT (REFER DETAILS), TV SIZE AS NOTED

POWER

SYMBOL	DESCRIPTION
	SWITCHBOARD MSB = MAIN SWITCHBOARD DB = DISTRIBUTION BOARD
	SWITCHBOARD BY OTHER TRADE MSSB = MECHANICAL SERVICES SWITCHBOARD 10A SINGLE SWITCHED SOCKET OUTLET (SSO), MOUNTED 300 AFFL UNO 15A = 15 AMP OUTLET 20A = 20 AMP OUTLET CM = CEILING MOUNTED CL = CLEANER DESIGNATED OUTPUT CS = CHAIN SUSPENDED P = PENDANT CAPTIVE SOCKET TYPE WP = WEATHERPROOF IP RATED CLIPSAL 56 SERIES RCD = RCD PROTECTED. CLIPSAL C2025RC OR APPROVED EQUAL L = KEY LOCKABLE IN OFF POSITION SPD = SURGE PROTECTED OUTLET (CLIPSAL 25SF) u = OUTLET WITH USB OUTLET SW = SOFT WIRING OUTLET 10A DOUBLE SSO AS ABOVE, MOUNTED 300 AFL UNO
	SINGLE PHASE ISOLATOR, RATING AS SHOWN
	THREE PHASE ISOLATOR, RATING AS SHOWN
	THREE PHASE SOCKET OUTLET, RATING AS SHOWN
	SINGLE PHASE DIRECT CONNECTION, RATING AS SHOWN
	THREE PHASE DIRECT CONNECTION OUTLET, RATING AS SHOWN
	STAGE LIGHTING OUTLET
	SERVICE COLUMN
J	JUNCTION BOX
FB A	MILD STEEL CARPET INFILL WITH 2 x RJ45 OUTLETS AND 1 x 20A STARTER SOCKET. CMS ELECTRACOM
FB B	MILD STEEL WITH 4 x RJ45 OUTLETS, AV PLATE AND STARTER SOCKET. CMS ELECTRACOM
FB C	ANTI-SLIP STAINLESS STEEL WITH 2 x RJ45 OUTLETS, 2 x AV PLATE AND 4 x SWITCHED POWER OUTLETS. CMS ELECTRACOM
TB	DUAL LID WITH 4 x RJ-45 OUTLETS, 2 x AV MODULES AND 8 x AUTOSWITCHED SOCKETS. CMS ELECTRACOM EXECUTIVE SERIES II
	EMERGENCY MUSHROOM HEAD STOP BUTTON
K	KEY SWITCH

FIRE ALARMS

SYMBOL	DESCRIPTION
FIP	ADDRESSABLE FIRE INDICATOR PANEL, RECESS MOUNTED
SIP	FIRE SUB INDICATOR PANEL, RECESS MOUNTED
	MANUAL CALL POINT
	EXTERNAL ALARM INDICATOR (AUDIO/VISUAL)
	VISUAL INDICATING LIGHT (AMBER/RED) CEILING MOUNTED
	REMOTE VISUAL INDICATOR
F	FIRE ALARM SHUTDOWN SIGNAL
	ELECTROMAGNETIC DOOR HOLDER WITH MANUAL OVERRIDE PUSH BUTTON AND DOOR RELEASE FACILITY
FADR	FIRE ALARM DOOR RELEASE SIGNAL
	LOUD SPEAKER, FLUSH MOUNTED
	LOUD SPEAKER, SURFACE MOUNTED
	ALARM SOUNDER, SURFACE MOUNTED
	ADDRESSABLE HEAT DETECTOR (EXPOSED OR SURFACE MOUNTED)
	HEAT DETECTOR IN DUCT
	ADDRESSABLE SMOKE DETECTOR (PHOTOELECTRIC TYPE)
	SMOKE DETECTOR IN CONCEALED SPACE
WIP	WARDEN INTERNET POINT
EWIS	EMERGENCY WARNING AND INTERCOM SYSTEM

SECURITY

SYMBOL	DESCRIPTION
SAP	SECUIRTY ALARM PANEL
DGP	DATA GATHERING PANEL
CP	CYPHER PAD
M	ELECTROMAGNETIC DOOR LOCK
ES	ELECTRIC DOOR STRIKE
P	DOOR RELEASE PUSHBUTTON
	BREAK GLASS TO EXIT (FAIL SAFE)
PS	INTERNAL PIEZO SOUNDER
SS	COMBINED SIREN/STROBE
	ALARM (A = AUDIBLE, V = VISUAL)
	CARD READER (PROXIMITY TYPE)
	MOTION DETECTOR
	360 DEGREE CEILING MOUNT MOTION DETECTOR
	DOOR SENSOR (REED SWITCH)
	DURESS BUTTON
MON	VIDEO DISPLAY MONITOR
CCTV	CCTV HEAD END EQUIPMENT
	CCTV CAMERA
VID	IP VIDEO INTERCOM ENTRANCE STATION

PIT REFERENCE

PIT (REFER BELOW)

E1-(A)

PIT TYPE
ALL PITS TO BE PROVIDED WITH 2x50mm DIA DRAIN PIPE TO BE CONNECTED TO DRAINAGE SYSTEM, PROVIDE A 200x200mm CONCRETE COLLAR WHEN INSTALLED IN GRASS AREAS.

A = ACO TYPE 6 WITH CLASS B GALVANISED STEEL LID
B = MIN. 1500x1500x1200 CONCRETE WITH CLASS B GATIC LID
C = ACO TYPE 99 WITH RISERS AND CLASS B GATIC LID

PIT REFERENCE NUMBER

SERVICE
E = ELECTRICAL
C= COMMUNICATIONS
T= NBN / TELECOM PROVIDER (BUILT TO NBN SPECIFICATION)
EP = ACO EARTH PIT WITH LOCKABLE HINGED LID

HEAVY DUTY CONDUIT REFERENCE

HEAVY DUTY CONDUIT (REFER BELOW)
E-1x100

E - 1x100

NOMINAL INTERNAL DIAMETER OF CONDUIT (mm)
NUMBER OF CONDUITS
CONDUIT TYPE — LINETYPE
E = ELECTRICAL
C = COMMUNICATIONS
T = TELSTRA

SUB-CIRCUIT SCHEDULE

DB - L1

CIRCUIT REFERENCE NUMBER
SERVICE
L = LIGHTING M = MECHANICAL
P = POWER
DB DESIGNATION
WITH REFERENCE TO BUILDING DB SCHEMATICS

NBN SERVICES

SYMBOL	DESCRIPTION
NTD	NETWORK TERMINATION DEVICE
FDT	FLOOR DISTRIBUTION TERMINAL
PDH	PREMISES DISTRIBUTION TERMINAL
CTL	CABLE TRANSISTION LOCATION
AP	NBN SERVICES ACCESS PANEL

SITE WORKS, CABLE SUPPORTS AND EARTHING

SYMBOL	DESCRIPTION
	COMMUNICATIONS CABLE TRAY, SIZE AS SHOWN
	ELECTRICAL CABLE LADDER, SIZE AS SHOWN
E	ELECTRICAL PILLAR
P	PACKAGE SUBSTATION
	POLE
	POLE MOUNTED SUBSTATION
	TERMINATION HV - SWITCH/LINK
	STREET LIGHT AND BRACKET
A	AIR TERMINAL
	EARTH ROD PIT
	EARTHING BOND - CADWELD JOINT
	CONDUIT IN WALL CAVITY TO ASSESSIBLE CEILING SPACE
	2x CONDUIT IN WALL CAVITY TO ASSESSIBLE CEILING SPACE
	3x CONDUIT IN WALL CAVITY TO ASSESSIBLE CEILING SPACE
	4x CONDUIT IN WALL CAVITY TO ASSESSIBLE CEILING SPACE

SWITCHBOARD SCHEMATICS

SYMBOL	DESCRIPTION
	ONE PHASE
	TWO PHASE
	THREE PHASE
	ON LOAD ISOLATOR
	CIRCUIT BREAKER
	COMBINED RESIDUAL CURRENT DEVICE/CIRCUIT BREAKER (30mA SENSITIVITY UNO)
M	MOTOR DRIVEN CIRCUIT BREAKER
	WITHDRAWABLE CIRCUIT BREAKER
	FUSE COMBINATION UNIT (FCU)
	NORMALLY CLOSED CONTACT
	NORMALLY OPEN CONTACT
	SWITCH
A O M	AUTO/OFF/MANUAL SWITCH
kWh	SUPPLY AUTHORITY / RETAILER ENERGY METER
E	PRIVATE ENERGY METER. MODBUS CONNECTED
	E-T1 = MAIN INCOMING SUPPLY METER SPEC: COMPTON INTEGRA 1232 E-T2 = DISTRIBUTION BOARD LEVEL METER: SPEC: CROMPTON INTEGRA 0220 E-T3 = CHASSIS / SUB-BOARD LEVEL METER: SPEC: CROMPTON DRS-100-3P 100A FOR DIRECT CONNECTED (FOR CT CONNECTED ALLOW CT EQUIVALENT)
	COIL
	LINK
	CURRENT TRANSFORMER
	HRC FUSE BASE CARTRIDGE
SD	SURGE DIVERTER WITH FUSE
C	CONTACTOR
R	RELAY
TS	TIME SWITCH
T	TIME DELAY RELAY
PF	UNDER VOLTAGE RELAY - 3 PHASES (SET AT 80% NOMINAL)
	LED INDICATOR LIGHT
	EARTH
ATS	AUTOMATIC TRANSFER SWITCH
	MECHANICAL AND ELECTRICAL INTERLOCK
	GENERATING SET
	TRANSFORMER
	240V AC / 24V DC RECTIFIER

ABBREVIATIONS

GENERAL LOCATION	+1200	HEIGHT ABOVE FINISHED FLOOR LEVEL
	ab	ABOVE BENCH
	bb	BELOW BENCH
	AFL	ABOVE FLOOR LEVEL
	AFFL	ABOVE FINISHED FLOOR LEVEL
	CM	MOUNTED TO UNDERSIDE OF CEILING OR STRUCTURE
	IC	MOUNTED IN CEILING SPACE
	IJ	MOUNTED IN JOINERY.
	WM	MOUNTED TO WALL OR STRUCTURE

ABBREVIATIONS

EQUIPMENT SPECIFIC	AC	AIR CONDITIONING UNIT. LOCATE ISOLATOR FOR CONNECTION BY MECHANICAL CONTRACTOR. COORDINATE FINAL LOCATION WITH MECHANICAL CONTRACTOR.
	BSB	BRANCH SELECTOR BOX. COORDINATE AND LOCATE ISOLATOR FOR CONNECTION BY MECHANICAL CONTRACTOR.
	ZIP	CHILLED/BOILING WATER UNIT. COORDINATE FINAL LOCATION WITH HYDRAULICS CONTRACTOR AND LOCATE OUTLET IN ACCESSIBLE LOCATION TO EQUIPMENT SPECIFICATIONS. UNIT COMPLETE WITH TIMER TO BCA J6 REQUIREMENTS
	CT	COOKTOP. LOCATE OUTLET WITH ISOLATOR SWITCH IN ACCESSIBLE LOCATION COMPLYING WITH AS3000
	DW	DISHWASHER. LOCATE OUTLET IN ACCESSIBLE LOCATION WITHIN ADJACENT JOINERY
	EF	EXHAUST FAN (BY MECHANICAL SERVICES). COORDINATE AND LOCATE ISOLATOR FOR CONNECTION BY MECHANICAL CONTRACTOR
	FC	FUME CUPBOARD (BY MECHANICAL SERVICES). COORDINATE AND LOCATE ISOLATOR FOR CONNECTION BY MECHANICAL CONTRACTOR
	HD	HAND DRYER. HAND DRYER. LOCATE ISOLATOR AT HIGH LEVEL WITH HARDWIRED CONNECTION TO APPLIANCE
	HWU	HOT WATER UNIT. COORDINATE AND LOCATE ISOLATOR FOR CONNECTION BY HYDRAULICS CONTRACTOR
	INV	SOLAR INVERTER
	MW	MICROWAVE. LOCATE OUTLET IN ACCESSIBLE LOCATION WITH APPLIANCE IN PLACE
	OAF	OUTSIDE AIR FAN. COORDINATE AND LOCATE ISOLATOR FOR CONNECTION BY MECHANICAL CONTRACTOR
	OV	OVEN. LOCATE ISOLATOR IN ACCESSIBLE LOCATION WITHIN ADJACENT JOINERY WITH HARDWIRED CONNECTION TO OVEN
	REF	REFRIGERATOR. LOCATION OUTLET IN ACCESSIBLE LOCATION WITH APPLIANCE IN PLACE
	RH	RANGE HOOD. LOCATE OUTLET IN ACCESSIBLE LOCATION WITHIN ADJACENT JOINERY WHERE POSSIBLE
	WM	WASHING MACHINE

ABBREVIATIONS

GENERAL	15A	CURRENT RATING (15 AMP EXAMPLE)
	3PH	THREE PHASE (400V LINE-LINE)
	ACC	LIGHTING: SWITCHED ON ACCESS CONTROL CIRCUIT
	AV	AUDIO VISUAL
	P	PENDENT
	SEC	SECURITY SERVICE
	UNO	UNLESS NOTED OTHERWISE
	SSO	SWITCHED SOCKET OUTLET
	WP	WEATHER PROOF (MINIMUM IP 65 RATED)

REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	22.02.21	DEVELOPED DESIGN ISSUE	JW	JC	JW
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PROJECT

ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE

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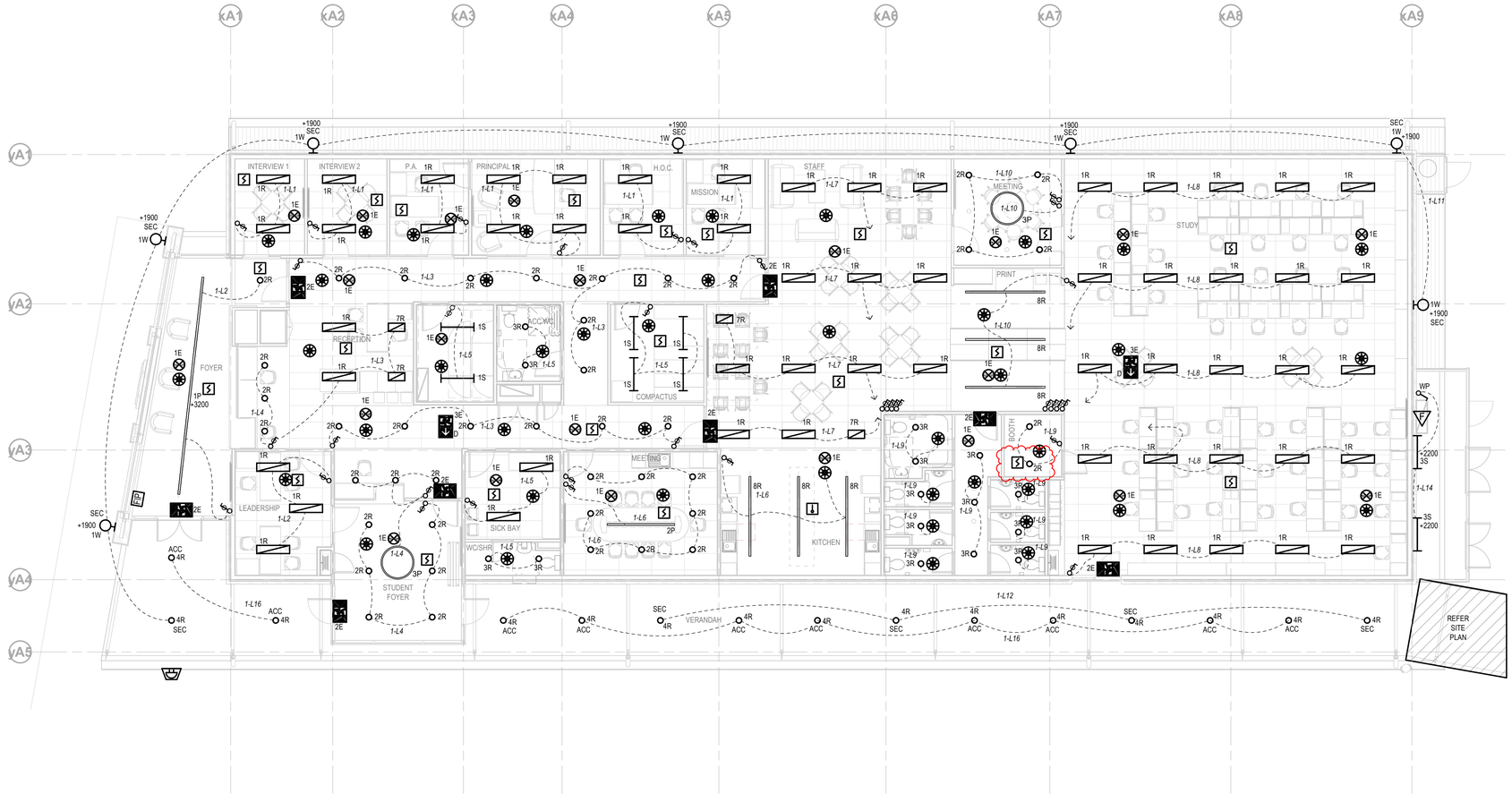
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21-000048	BR-E5251	2

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NOTES

1. PROVIDE SMOKE DETECTION SYSTEM FOR AUTOMATIC MECHANICAL SHUTDOWN SYSTEM IN ACCORDANCE WITH BCA/NCC E2.2a CLAUSE 6 AND AS1670.1
2. ENSURE ALL DETECTORS OTHER THAN OPTICAL BEAM SMOKE DETECTORS SHALL NOT BE INSTALLED CLOSER THAN 900mm TO ANY AIR SUPPLY OPENING



REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	22.02.21	DEVELOPED DESIGN ISSUE	JW	JC	JW
2	25.04.21	ISSUED FOR CONSTRUCTION	JW	JC	PP
3	27.04.21	ISSUED FOR CONSTRUCTION	JW	JC	PP

STATUS

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ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE

BLOCK A_BR-E5400_LIGHTING LAYOUT

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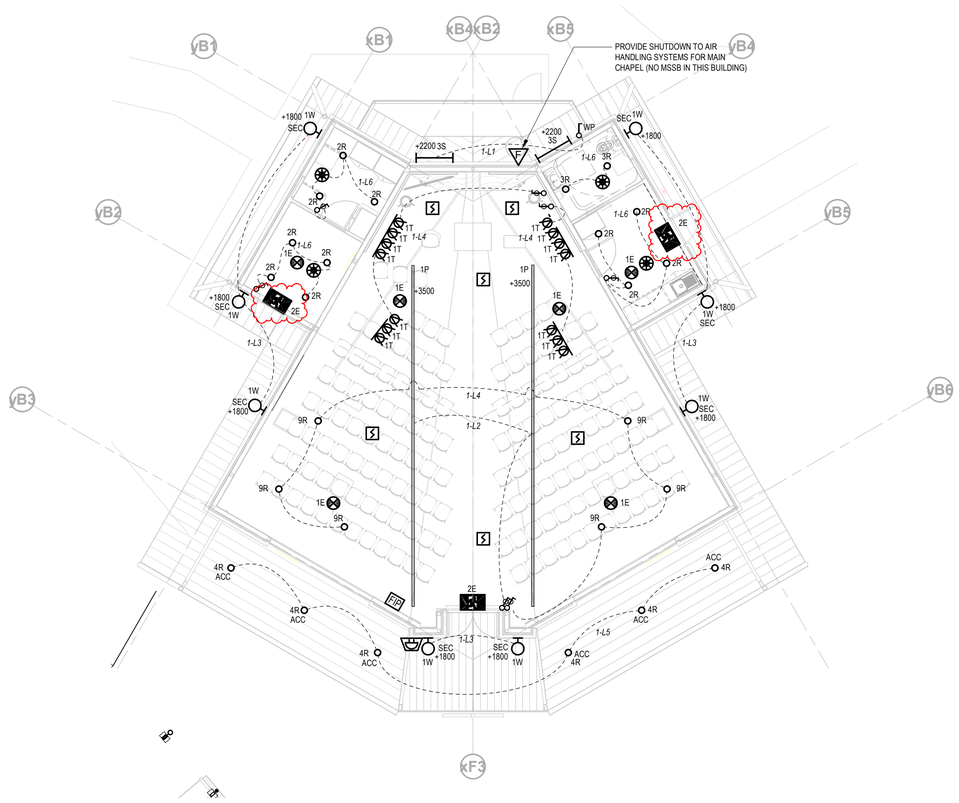
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NOTES

1. FIRE SYSTEM TO BLOCK B IS PROVIDED FOR THE SOLE PURPOSE OF SHUTTING DOWN AIR HANDLING SYSTEMS AND IS NOT REQUIRED TO ACTIWATE AN OCCUPANCY WARNING SYSTEM. NETWORK BACK TO THE MAIN FOCIE IN ADMIN.
2. PROVIDE SMOKE DETECTION SYSTEM FOR AUTOMATIC MECHANICAL SHUTDOWN SYSTEM IN ACCORDANCE WITH BCA/NCC E2.2a CLAUSE 6 AND AS1670.1
3. ENSURE ALL DETECTORS OTHER THAN OPTICAL BEAM SMOKE DETECTORS SHALL NOT BE INSTALLED CLOSER THAN 900mm TO ANY AIR SUPPLY OPENING



REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	22.02.21	DEVELOPED DESIGN ISSUE	JW	JC	JW
2	25.04.21	ISSUED FOR CONSTRUCTION	JW	JC	PP

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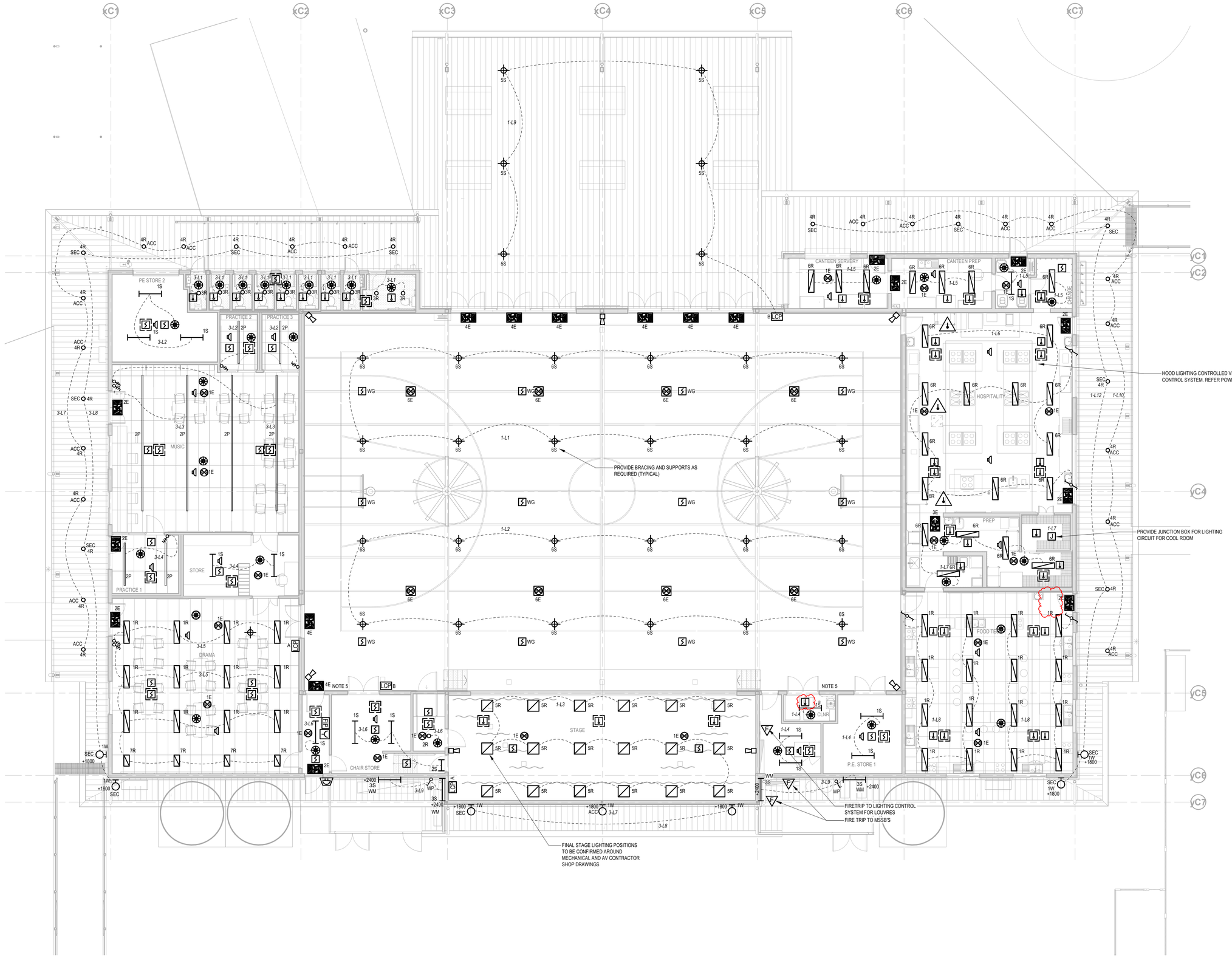
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NOTES

1. PROVIDE AN AUTOMATIC FIRE DETECTION SYSTEM IN ACCORDANCE WITH BCA E2.2a AND AS1670 REQUIREMENTS.
2. PROVIDE BUILDING OCCUPANT WARNING SYSTEM IN ACCORDANCE WITH BCA AND AS1670 REQUIREMENTS.
3. DETECTORS IN THE MULTI-PURPOSE COURT AREA TO BE PROTECTED BY WIRE GUARD
4. ENSURE ALL DETECTORS OTHER THAN OPTICAL BEAM SMOKE DETECTORS SHALL NOT BE INSTALLED CLOSER THAN 900mm TO ANY AIR SUPPLY OPENING
5. PROVIDE FIRE ALARM TRIP TO LOUVRES. LOUVRES TO OPEN IN AN EVENT OF FIRE
6. PROVIDE CONCEALED SPACE DETECTION IN ACCORDANCE WITH AS1670.1. LOCATION AND QUANTITIES OF CONCEALED DETECTORS TO BE COORDINATED ON SITE. ALLOW FOR ADDITIONAL 5 OFF CONCEALED DETECTORS FOR COORDINATION ON SITE
7. PROVIDE ALARM SIGNALLING EQUIPMENT AT THE FIRE INDICATOR PANEL FOR MONITORING BACK TO BASE IN ACCORDANCE WITH AS1670.3. ALLOW FOR TELEPHONE LINES, SIM BASED ASE AND ASSOCIATED ACCESSORIES TO ACHIEVE THESE REQUIREMENTS.



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1	22.02.21	DEVELOPED DESIGN ISSUE	JW	JC	JW
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3	27.04.21	ISSUED FOR CONSTRUCTION	JW	JC	
4	19.05.21	CONSTRUCTION AMENDMENT	JW	JC	PP
5	20.05.21	CONSTRUCTION AMENDMENT	JW	JC	PP

STATUS

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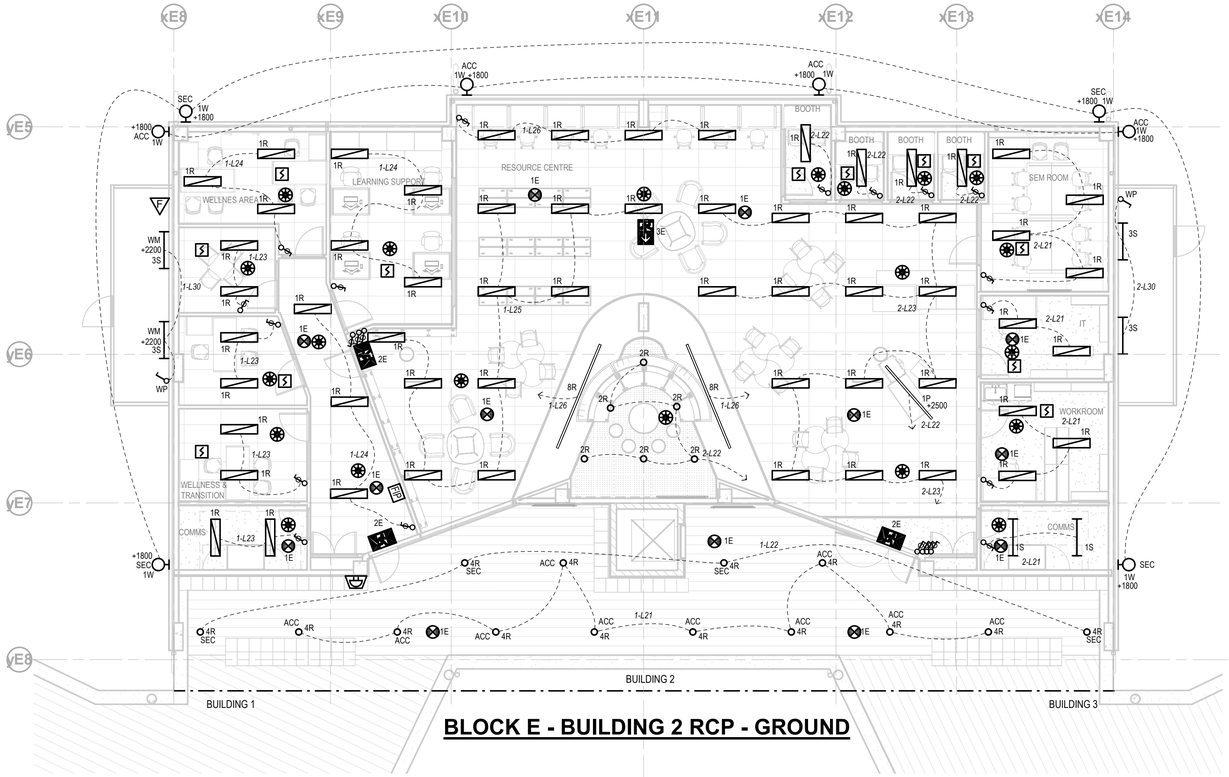
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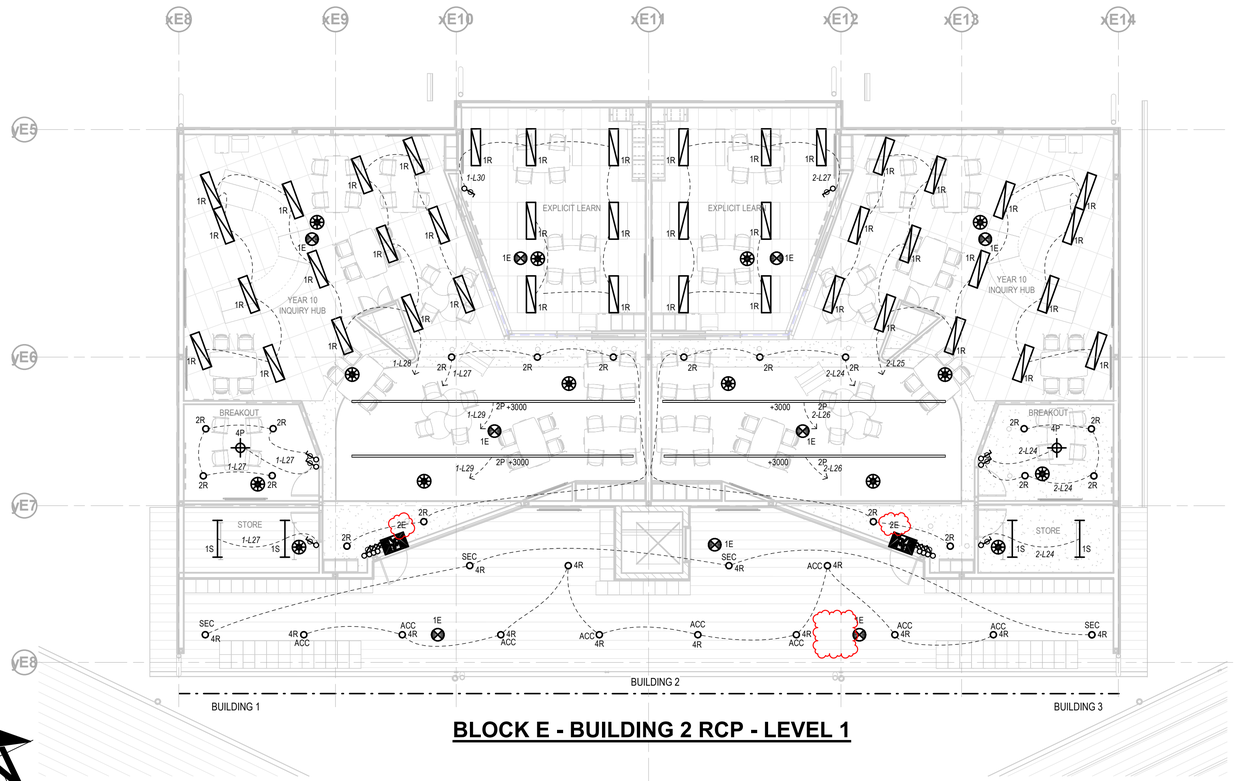
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BLOCK E - BUILDING 2 RCP - GROUND



BLOCK E - BUILDING 2 RCP - LEVEL 1

NOTES

1. FIRE SYSTEM TO GROUND FLOOR WELLNESS AND RESOURCE CENTRE IS PROVIDED FOR THE SOLE PURPOSE OF SHUTTING DOWN AIR HANDLING SYSTEMS AND IS NOT REQUIRED TO ACTIVATE AN OCCUPANCY WARNING SYSTEM. NETWORK BACK TO THE MAIN FDCIE IN ADMIN.
2. PROVIDE SMOKE DETECTION SYSTEM FOR AUTOMATIC MECHANICAL SHUTDOWN SYSTEM IN ACCORDANCE WITH BCA/NCC E2.2a CLAUSE 6 AND AS1670.1
3. ENSURE ALL DETECTORS OTHER THAN OPTICAL BEAM SMOKE DETECTORS SHALL NOT BE INSTALLED CLOSER THAN 900mm TO ANY AIR SUPPLY OPENING

REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	22.02.21	DEVELOPED DESIGN ISSUE	JW	JC	JW
2	25.04.21	ISSUED FOR CONSTRUCTION	JW	JC	PP

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ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE

BLOCK E_BR-E5406_BUILDING 2 LIGHTING LAYOUT

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21-000048	BR-E5406	2

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Hydraulic Services Specification

St. Matthew's Catholic School Mudgee



PREPARED FOR CATHOLIC EDUCATION DIOCESE OF BATHURST

21-000048 | 26 April 2021

Calibre Professional Services Pty Ltd
55 070 683 037

DOCUMENT CONTROL

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2	25.05.21	CONSTRUCTION AMENDMENT 1	CM	JW	CM

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1 Scope

1.1 General

The work carried out shall comprise the manufacture, supply, delivery, installation, testing, commissioning and maintenance of the Hydraulic Services for this project.

All work shall be carried out in accordance with the specification, drawings and such details and instructions as are issued by the Superintendent or their representative during the progress of the work.

This specification shall be read in conjunction with the drawings, all of which are intended to be mutually explanatory. All work called for by the one even if not by the other, shall be fully executed.

The Drawings and Specification are intended to show the general intent and do not necessarily show all equipment required to complete the whole hydraulic works. Minor items as used in normally accepted trade practice with installations of this type and which are not specifically mentioned, shall be included in the tender and installation.

1.2 Extent of Work

The work includes but is not limited to the following:

- Investigations identifying location of existing services and latent conditions.
- Storm water drainage to connection points provided by Civil Engineer.
- Temporary and permanent storm water drainage provisions to site during all stages of construction.
- Identification of hydraulic services.
- Flushing and testing of pressure piping system
- Testing of entire installation
- Commissioning of equipment and issue of reports
- Pressure and flow test, hydrostatic testing of the fire hydrant/ sprinkler system.
- Preparation of the fire hydrant and hose reel block plan.
- Training of the building users
- Liaise with the Mechanical, electrical and fire services to ensure all interfaces between trades have been correctly tendered.
- Instruction of the Client in the operation and use of the hydraulic services systems.
- Supply and installation of plumbing fixtures and tapware
- Excavation for pipe trenches and pits and backfilling
- Landscape irrigation provisional water connection points
- Insulation of pipework for thermal and acoustic purposes.
- Site and sub-water meter installations to Local Authority requirements.
- Chasing into masonry walls for the passage of pipes.
- Plinths for hydraulic services plant.
- All equipment testing, commissioning and maintenance for the specified period after the Date of Practical Completion.
- Supply of operating and maintenance manuals and "as installed" drawings. Labelling of all plant and systems.
- Twelve months service warranty maintenance period.
- Any additional work necessary to provide a complete, operative installation in accordance with performance requirements and miscellaneous work as specified or shown on the drawings.

General Scope Items

1.3 Works by Other Trades under Head Contractor

Related work in connection with the Hydraulic Services (performed by other trades) includes the following:

1.3.1 Builder's Work

- Cut all holes in finished surfaces, timber, cupboards, false ceilings, vanity units, shelves, etc, as required by the Hydraulics Contractor.
- Delivery and hoisting into place equipment, plant and materials
- Plinths as required for the proper installation of the Hydraulic plant.
- Provide access panels to all ducts and ceilings where required.
- Provide water proof membranes in all wet areas and roof areas.
- Fire hose reel cupboards and required signage
- Fire hydrant booster enclosure
- Bollards and mechanical protection to pipework, stacks and equipment.
- Provide all in-situ concrete structures and drains that form part of the structural or landscape slab.
- Grading or set down of floors in wet areas.
- Non fire rated and fire rated plumbing ducts/ shafts to conceal plumbing as shown/ co-ordinated with the Architectural drawings
- Construction of fire rated walls/ cupboards to where required for protection of fire hydrants/ fire booster assembly.

1.3.2 Mechanical Contractor

The position of cold water, drainage and floor waste points serving mechanical plant are indicative only. The Contractor shall co-ordinate with the Mechanical Contractor on-site to ensure the correct final position of hydraulic service points to mechanical plant/ equipment.

The hydraulics contractor shall co-ordinate with the Mechanical contractor and ensure the following works are co-ordinated.

- Provide final connections to terminal strips supplied on relevant hydraulic equipment required to be connected to the Building Management System. The Hydraulic Subcontractor and Mechanical Subcontractor are to liaise with each other to ensure enough inputs and outputs are allowed for the hydraulic services equipment alarm requirements.
- Final connection of water supply to Mechanical Equipment from valves provided in area by Hydraulic subcontractor.
- Reticulation of condensate drain pipework from Mechanical equipment to discharge over tundish drains provided by Hydraulic Subcontractor.
- Co-ordinate the final location of the floor wastes and tundishes required.

1.3.3 Electrical Contractor

Provide power, wiring and final connection to the relevant hydraulic equipment and plant as specified in the contract documents. The hydraulic contractor shall co-ordinate with the electrical contractor and organise all temporary electrical power required during the construction period.

The Electrical Contractor shall allow to terminate all electrical connections adjacent hydraulics control panels, and then liaise with the hydraulic contractor to make all final connections.

The hydraulic services contractor shall provide hydraulic services switchboards and control panels and all outgoing wiring and conduits from the hydraulic switchboards/ control panels to all hydraulic services equipment.

Supply electrical power for the following;

- Dishwashers. 10A GPO by electrical contractor
- Hot water circulating pumps. 2 No. 10A GPO at each hot water unit location by electrical contractor
- Automatic Backwash Filtration Unit. 10A GPO by electrical contractor.
- Boiling & Chilled water unit. 10A GPO by electrical contractor
- Hot Water plant. Electrical contractor to provide 40A 3PH isolator adjacent each heat pump unit. Blocks C & D
- Hot Water plant. Electrical contractor to provide 15A 1PH isolator adjacent each heat pump unit. Blocks A & B
- Rainwater Pressure pump system control panel. Electrical supply 15A GPO terminated adjacent control panel.
- Fire hydrant pressure pumps. 10A 1PH Isolator. Electrical supply terminated adjacent control panel.
- Provide central monitoring system to interface with the water sub meters.

1.3.4 Roof Installation Works

All Gutters, Sumps, Overflows, Roof Flashings and downpipe outlets shall be installed by the roofing contractor. The hydraulic contractor shall co-ordinate the locations of the Downpipe outlets at ground level with the roofing contractor.

1.3.5 Landscape works

Provide detailed information on the irrigation water times of use, station scheduling and water usage.

Water filters, piping, valves, sprayers, drippers and wiring controls and all other equipment associated with the operation of the Irrigation system

Connection to the provisional irrigation connection provided by the Hydraulic Sub-Contractor.

1.4 Supporting Project Documents

Where supporting project documents are nominated, they form part of the contract. They may affect the scope of the electrical works and must be read in conjunction with the electrical documentation. They may include, but are not limited to project, client, application or system specific information required for the completion of the works. If the Tender package does not include these documents, it is incomplete.

For this project, the following supporting project documents apply;

- Architectural design documentation
- Landscape design documentation
- Hydraulic services documentation
- Civil engineering documentation
- Mechanical services documentation
- Structural engineering documentation
- Acoustic engineering report
- ESD report
- Greenstar schedule
- NCC report
- Development Approval Conditions
- Any Other documents included in the project contract including client specific design guidelines or requirements

1.5 Greenstar

All the requirements of the Greenstar schedule are not replicated in this document.

Ensure the Greenstar points schedule is reviewed and all aspects affecting electrical services included such as the commissioning, tuning, materials, building information, logbooks to CIBSE TM31, user guides, metering and monitoring, reporting, lighting comfort, lifecycle and sustainability.

2 General

2.1 Standards

All Work shall comply with the requirements of the relevant Australian standards, codes and guidelines including, but not limited to:

The edition of the Australian Standard shall be nominated in the National Construction Code (NCC). Where the standard is not nominated, the latest edition of the standard, including all relevant parts and amendments, shall be used.

Table 2-1 General Applicable Standards, Codes and Regulations

Standard	Title
National Construction Code 2019 Amendment 1	National Construction Code Volumes 1 & 3
AS/NZS 3500.1:2018	Plumbing and Drainage – Water Services
AS/NZS 3500.2:2018	Plumbing and Drainage – Sanitary Plumbing and Drainage
AS/NZS 3500.3:2018	Plumbing and Drainage – Stormwater Drainage
AS/NZS 3500.4:2018	Plumbing and Drainage – Heated Water Services
AS 1851 - 2012	Routine Service of Fire Protection Systems and Equipment
AS 2419.1-2005	Fire Hydrant Installations
AS 2441 - 2005	Installation of Fire Hose Reels
AS 2941 - 2013	Fixed Fire Protection Installations – Pumpset Systems
AS 2444 - 2001	Portable Fire Extinguishers and Fire Blankets – Selection and Location
AS/NZS 1598:2008	The Storage and Handling of LP Gas
AS/NZS 5601.1:2013	Gas Installations
	All other relevant Acts and Regulations, Local Authority Requirements, Australian Standards and Codes having jurisdiction.

2.2 Authorities and Approvals

Authorities: The relevant Local Government Authority's (regulatory Authority) requirements shall apply to the work covered within this specification in accordance with the General Conditions, and the ordinances, regulations, by-laws and the like specifying those requirements. Allow for payment of all fees associated with inspection of temporary and permanent works by the Local Authority.

Works by Authority: If the regulatory Authority, pursuant to statutory powers vested in it, elects to perform or supply part of the Works, make the necessary arrangements with the Authority and pay and bear the fees payable in connection therewith.

2.3 Drawings and Dimensions

Diagrammatic layouts: Hydraulic design drawings showing pipe work layouts are diagrammatic only. Before commencing work, verify the exact positions of fixtures, plant, appliances and the like to which the pipe work is to be connected. Refer to the Architectural drawings for the set out of fixtures and fittings.

Variation drawings: If it is proposed to change the installation from that shown on the drawings, or if a change is required by a regulatory Authority, prepare and submit a variation drawing showing the proposed change, and obtain approval prior to commencement of installation.

2.4 Site Visit

Visit the site before submitting the final tender to assess the 'on site' conditions and include for all 'on site' conditions in the tender.

2.5 Work Outside the Site

Requirement: Any work that has to be undertaken outside the site shall be reported to the principal in order that the necessary arrangements can be made with adjoining property owners and the relevant authorities. Work shall not commence until the appropriate approval has been given to proceed.

2.6 Acoustic Installation

Provide acoustic insulation to all internal sanitary drainage pipework, trade waste drainage pipework and storm water downpipes.

All acoustic wrap shall be "Thermotec NuWrap 5" acoustic pipe and duct lagging and a barium loaded limp polymer with a mass 5kg per square meter with a scrim reinforced fire resistant aluminium foil and bonded to high performance polyether – polyurethane de-coupling open cell foam.

To permit installation the material should be cut to size and fixed in place, with no gaps, using a self-adhesive aluminium foil faced tape of 72mm wide foil tape. All material surfaces to be cleaned prior to affixing tape.

2.7 Execution

Support of ground level plant and equipment, Ground level: If the ground slope is 15° or over, or the area of the plant and equipment is extensive, obtain the advice of a professional engineer for the documentation of a suitable slab or platform.
In all other cases, provide proprietary plastic or concrete supports installed with falls that achieve a raised, impervious and water shedding bearing surface.

2.8 Supervision

Work shall be carried out by or under the direct supervision of appropriately licensed personnel.

2.9 Drainage Installations

Requirement: Give 48 hours' notice so that inspections may be made at the following stages:

- Trenches excavated and ready for pipe bedding;
- Work ready for specified testing; and
- Underground or enclosed work ready to be covered up or concealed.

2.10 Operation and Maintenance Manuals

The manuals should be produced in accordance with the general requirements contained within the Architectural Specification and the following:

2.10.1 Scope

Provide comprehensive operation and maintenance manuals and work as executed drawings for all hydraulic services as detailed on the drawings and specification. The manuals should be presented in hard and electronic copies, in A4 size loose leaf bound ring binders, each indexed, divided and titled with the electronic copy on a CD/DVD inside the hard copy.

2.10.2 Requirements

The manuals shall include the following sections:

- Cover page
  - Project name and relevant site / building details
  - Plumbing contractors name, licence number and contact details
- System Description
  - General description of each separate service installed, written to ensure the user fully understands the scope and facilities provided.

- Service and Maintenance
  - List of periodic service requirements, to be carried out by the building owner, for the relevant plant/ equipment supplied as part of the completed works.
  - Detailed recommendations for preventative maintenance frequency and procedures which should be adopted by the principal to ensure the most efficient operation of the systems installed.
  - Schedule of spares recommended to be held onsite.
  - Emergency procedures, including telephone numbers for service and procedures for fault finding.
- Fire Collar Register
  - A register of the installed fire penetration collars shall be provided showing the relevant compliance certificates, each penetration identification number and should reference or be accompanied with a schematic drawing showing each fire compartment and location of fire penetration collars.
- Manufacturer's Literature
  - List of all the suppliers with name, address and contact phone numbers
  - A copy of all supplier's instruction manuals and maintenance instructions as supplied with each piece of equipment.
  - A copy of manufacturer's warranties.
- Approvals
  - local authority final certificates
- Certificates
  - Fire system flow and pressure tests
  - Certification of the installed hydraulic services system
  - Fire hose reel and hydrant test reports
  - Certification of TMV's
  - Certification of backflow devices
- Drawings
  - A3 set of the works as executed hydraulic services drawings folded to fit into each manual
  - A1 set as per general requirements
  - Electronic copy of the manual and works as executed drawings saved to a flash drive in PDF & DWG/REVIT Format.

2.11 Work As Executed Drawings

These shall be produced in accordance with any general requirements in the Architect's specification and as per the following:

Requirement: Prepare progressively throughout the Works, and furnish to the Principal Contractor as soon as possible after completion of the works, 'As Built' drawings showing the locations of pipes and pits, and the depths of underground pipework. Drawings are to show true plan positions of pipework, fittings, etc. Where pipework is not readily accessible the location shall be dimensioned off building elements.

Three full sized hardcopy prints and a CD containing electronic copies of drawings in Auto-cad and PDF format shall be provided by the Trade Contractor of each of the 'As Built' drawings. The standard of drafting and quality of print produced shall be at least equal to the standard of Contract Documentation supplied.

2.12 Completion

2.12.1 Commissioning

After satisfactory completion, turn on control and isolating valves and leave the services in full operational condition. Subject all systems to a commissioning and testing procedure before being used.

Provide a minimum of two weeks' notice of the commissioning of any system. Submit a programme of testing procedures for each system.

Contractors shall carry out all necessary and required tests including the payment of fees, provision of labour and test equipment. All tests shall be carried out to the applicable Australian Standard, the requirements of any Act or Authority having jurisdiction or this specification, whichever is the greatest.

No piping work, fixtures or equipment shall be concealed or covered by any means before they have been pressure tested, flow tested and inspected by the Superintendent. All work shall be completely installed and tested as required by this Section and the Code requirements and shall be leak tight before inspection of the particular work is requested.

Tests shall be repeated to the satisfaction of the Authorities having jurisdiction.

All defects shall be remedied immediately and tests reapplied to the satisfaction of the Superintendent and the Authorities.

Notice shall be given at least 72 hours prior to the carrying out of tests. Where construction vehicles or similar equipment is used on site, allowance shall be made for retesting pipelines under concrete slabs on ground immediately prior to placing membrane and reinforcing steel.

Hold points are to be provided for the following – covering up of drains, wall sheeting over services and covering of water and fire services.

All test results shall be recorded and included in the maintenance manuals

2.12.2 Inspection Test Plan

Prepare a detailed inspection test plan (ITP) prior to commissioning and testing. The ITP plan shall ensure all items that should be checked are checked.

Produce a permanent record of the commissioning checks carried out.

2.12.3 Defects liability Period

The defects liability period shall commence at practical completion and cover a 12 month period where the trade contractor shall be required to return to site to complete any omissions in the works and to make good any defective work or materials. The Contractor shall also be responsible for any mandatory periodic testing of the all relevant systems during that 12 month period, and shall provide the managing contractor with all the necessary reports and testing certification.

3 Sanitary Drainage

3.1 Pipework

3.1.1 uPVC pipework

uPVC sewer pipes and fittings: (un-plasticised polyvinyl chloride): To AS/NZS 1260:2009, suitable for the jointing method specified in the contract drawings.

Pipe class: SN 4 for 150 dia. and larger. SN 6 for 100 dia. In-ground drains subject to vehicular traffic shall be class SN8 and SN10

Solvent cement joints: To AS/NZS 2032:2006 Clause 3.2.1. All pipes and fittings used for joints shall be thoroughly cleaned using a priming fluid prior to solvent cement application.

Rubber ring joints: To AS/NZS 2032:2006 Clause 3.2.2.

Pipeline construction: To AS/NZS 2032:2006, Part 5.

3.1.2 High Density Polyethylene Pipework

General: HDPE pipework shall not be installed within 1.5m of an ignition source. In situations where this may be un-avoidable, the HPDE pipework must be fire-rated to a FRL of -/30/30 to prevent the fire spread of ignited droplets to other fire compartments. This fire rating is in addition to fire collars at floor level.

Materials: The pipes and fittings shall be produced with High density polyethylene (HDPE) in accordance with AS/NZS 4401

Density: 0.95g/cm3.

Melting Index MFI: 190/5 <=0.8g/10min.

Fittings: The fittings must be free of blisters, bubbles and sink marks. The end must be cut vertically to the fitting axis and be free of burrs. The fitting must have a smooth inner and outer surface. Insignificant wavy grooves and irregularities in the wall thickness caused by these are only allowed, if they do not fall short of the minimum thickness. Not allowed in any case are sharp-edged grooves.

The deviation between the largest and the smallest diameter of the outer diameter of the fitting may not exceed the following values:

- Dia. 32-50 max 1 mm
- Dia. 56 and above max 2%

Joints: Electro weld sleeve coupling joints shall be used and installed in accordance with the manufacturer's recommendations.

Pipes: The pipes must be free of blisters, bubbles and sink marks. The end must be cut vertically to the pipe axis and be free of burrs. The pipe must have a smooth inner and outer surface. Insignificant wavy grooves and irregularities in the wall thickness caused by these are only allowed, if they do not fall short of the minimum thickness. Not allowed in any case are sharp-edged grooves.

3.2 Pipework testing

Requirement: Supply apparatus and materials necessary for, and carry out the tests required by the Sewerage and Water Supply Act and the regulatory Authority, in the presence of the Principal Contractor and the regulatory Authority for the service under test.

Concealed work: Do not cover or conceal underground or enclosed work until it has been inspected and tested, in sections where necessary, to the approval of the relevant Local Authority. Leave pipe joints exposed to enable observation during the tests.

Hydrostatic tests: As required by the Sewerage and Water Supply Act and the regulatory Authority. Hydrostatic tests shall be performed in accordance with AS/NZS 3500.2 – Section 13.2.

3.3 Materials

3.3.1 Pipe Bedding Material

Type: Granular material (clean sharp washed river sand or clean un-weathered hard basaltic or sedimentary crushed rock, free of salt, clay or organic contaminants).

Requirement: Bed pipes on 75 millimetres of material specified above. Side support material and overlay material 150 millimetres above the pipe shall be pipe bedding material.

3.4 Workmanship

3.4.1 Excavation

Specification reference: General open trench excavation is specified in Service Trenches – Refer to Groundworks section of this specification.

3.5 Unstable Foundations

Specification reference: Bad Ground - Groundworks shall apply to trench floors discovered to be unstable for specified pipe bedding.

3.6 Pipe Laying

Generally: Lay pipelines to uniform gradients falling to the outlets, straight between required changes of direction, properly supported, with watertight joints aligned flush at internal surfaces, and with spigot ends pointed in the direction of flow. Provide the necessary fittings and accessories, including junctions, branches, inspection and cleaning openings, expansion joints, and the like. If work is not continuous, cap open ends to prevent entry of foreign matter.

Identification: Lay a detectable strip of polyethylene marker tape with a S/s wire trace in the trench identifying the service, 200mm above the obvert of the pipe. The Trade Contractor shall provide a sample of the proposed product to be supplied for approval.

Finishes: Finish exposed piping, including fittings and supports, as follows:

- In internal locations such as toilet and kitchen areas: chrome plate copper piping to AS 1192 service condition 2, bright
- In concealed but accessible places: Leave copper and plastic unpainted except for identification marking.

3.7 Bedding Fittings

Concrete bedding: Bed fittings, including junctions, traps, gullies, and the like, on concrete bedding.

3.8 Elevated Drainage

Requirement: Comply with the requirements of Sanitary Plumbing Specification.

3.9 Maintenance and inspection chambers

3.9.1 Construction

Requirement: Construct maintenance and inspection chambers and the like as shown on the drawings, in accordance with AS.3500.2 section 4.8 and as follows, unless otherwise specified.

Size of Inspection Chambers: Maintenance and Inspection chambers shall be sized as shown on the drawings and in accordance with AS.3500 table 4.7.

Floors and walls: In-situ concrete: 32MPa, not reinforced unless otherwise shown. Thickness not less than 100mm, unless otherwise shown or specified. Pre-fabricated inspection chambers shall be of a type authorized by the local authority.

Finish to exposed surfaces: Smooth, seamless, equal to steel trowelled render or concrete cast in steel forms. Cove or splay internal corners. Bench floors and fall to drain.

Render: 1 cement: 3 sand, minimum thickness 20mm.

Reinforcement: If depth of the chamber exceeds 1500mm: F718 mesh to AS1304 in floor, and in walls from depth 1200mm downward. Cover 50mm from inner face of walls and lower face of floor. Place main wires in walls horizontally.

Ladders: Where an inspection chamber or well exceeds 1.2m deep, a rung type ladder complying with AS 1657 and AS/NZS 4680 shall be installed. Individual rung ladders shall only be used in chambers with a maximum depth of 3m and chambers without pre-fabricated walls. Steel ladders must be hot-dip zinc galvanised.

Covers: Rebate the top of the pit walls to suit the cover frame or provide a precast rebated surround, and grout the frame into the rebate with infill concrete. The access cover must be gas-tight and of a suitable class for the applied loading.

Levels: Top level of cover or grating, including frame:

- In paved areas, flush with the paving surface;
- In landscaped areas, 25mm above finished surface.

Pipe connections: Build inlet and outlet pipes into the pit walls during construction. In existing pits, make openings of the correct size and pack the joint around the pipe to the full thickness of the wall with 1:3 mortar.

Pipe conduits and channels: When pipe channels are required in pit floors, form the channel to the full width and depth of the pipe. The floor of the chamber shall slope towards the channel on a grade of approximately 8%. Formed junctions and bends shall have a centre line radius of not less than 300mm. A fall of 30mm shall be provided in the invert of every channel that curves through 45 degrees or more.

Jump-ups: Jump-ups installed in chambers shall be clipped to the wall and terminate at each end with a 90 degree bend, the higher one incorporating an inspection opening. Where more than 1 jump-up is installed in a chamber, the chamber shall be a minimum of 1.2m deep

3.10 Completion

3.10.1 Clearance Certificate

Requirement: Before issue of the 'Practical Completion Certificate' the Trade Contractor shall supply a copy of the Clearance Certificate from the Local Authority which confirms that all required inspections have been performed by the Local Authority and the works as installed are satisfactory.

3.10.2 Cleaning

Requirement: On completion, clean and flush the whole installation.

3.10.3 Pre-completions tests

Requirement: Test to AS/NZS 3500.2 Section 13, before backfilling or concealing.

Leaks: If leaks are found, rectify and re-test.

4 Sanitary plumbing

4.1 Pipework

4.1.1 Copper Pipework

Copper tubes: To AS1432 type 'B'.

Fittings: Copper or copper alloy to AS1589 unless otherwise specified.

Silver Brazed Joints: Use low temperature silver brazing alloy rods to AS1167 classification B2 and oxyacetylene heating.

4.1.2 uPVC Pipework

Pipes and fittings: To AS1260, Class DWV. Installation to AS2032.

Solvent cement: To AS2032 and manufacturer's instructions. (High bond solvent cement) All pipes and fittings used for joints shall be thoroughly cleaned using a priming fluid prior to solvent cement application.

Jointing: Use fully moulded fittings only. Glue on Boss or saddle type clamp or strapped on joints shall not be used.

Waste traps: To AS1260.

The burning out of fittings for re-use is unacceptable.

PVC pipes shall not be used for any trade waste discharge or discharges above 50 degrees centigrade unless noted on the hydraulic drawings.

4.1.3 High Density Polyethylene Pipework

General: HDPE pipework shall not be installed within 1.5m of an ignition source. In situations where this may be un-avoidable, the HPDE pipework must be fire-rated to a FRL of -/30/30 to prevent the fire spread of ignited droplets to other fire compartments. This fire rating is in addition to fire collars at floor level. Refer to QUT DSG section 25.5 for more information.

Materials: The pipes and fittings shall be produced with High density polyethylene (HDPE) in accordance with AS4401.

Density: 0.95g/cm^3

Melting Index MFI: 190/5 <=0.8g/10min

Fittings: The fittings must be free of blisters, bubbles and sink marks. The end must be cut vertically to the fitting axis and be free of burrs. The fitting must have a smooth inner and outer surface. Insignificant wavy grooves and irregularities in the wall thickness caused by these are only allowed, if they do not fall short of the minimum thickness. Not allowed in any case are sharp-edged grooves.

The deviation between the largest and the smallest diameter of the outer diameter of the fitting may not exceed the following values:

- Dia. 32-50 max 1 mm
- Dia. 56 and above max 2%

Joints: The following joining methods shall be used in accordance with the manufacturer's recommendations. Electro-weld sleeve couplings.

Pipes: The pipes must be free of blisters, bubbles and sink marks. The end must be cut vertically to the pipe axis and be free of burrs. The pipe must have a smooth inner and outer surface. Insignificant wavy grooves and irregularities in the wall thickness caused by these are only allowed, if they do not fall short of the minimum thickness. Not allowed in any case are sharp-edged grooves.

4.2 Installation

Generally: Install pipework to uniform gradients falling to the outlets, straight between required changes of direction, properly supported, with watertight joints aligned flush at internal surfaces. Provide the necessary fittings and accessories, including junctions, branches, inspection and cleaning openings, expansion joints, and the like. Keep the number of joints to a minimum.

Cleaning out: Flush each pipeline with clean water and leave it clean and free from debris on completion.

4.3 Accessibility

Fittings: Locate in accessible positions, with adequate clearance, pipe fittings requiring maintenance or servicing, including inspection openings, cleaning points, joints designed to enable removal of pipes, and the like.

Concealment: Where practicable, conceal pipework so that it is accessible within ducts or non-habitable enclosed spaces and does not appear on external walls. Obtain prior approval for the location of exposed pipework.

Test gates: Provide test gates of the same diameter as the pipe in the following locations:

- At the base of all new stacks;
- Above every second floor level on the stack riser; and
- At the end of all group vented branch lines.

Enclosed pipework: If pipework is proposed to be enclosed so as to be not accessible after completion, obtain prior approval for the location of pipe runs and pipe fittings, and record the actual locations on work as executed drawings.

4.4 Core Holes

Approval: Set out core holes and sleeves in floors, walls, beams and columns and obtain approval of the set out prior to cutting.

4.5 Sleeves

Requirement: Where pipes pass through walls, floors, beams, or columns, provide purpose made metal or plastic sleeves with 6mm clearance all round pipes, packed with gunned silicone rubber joint sealer (self-extinguishing grade).

4.6 Capping Off

Requirement: During construction, temporarily seal open ends of pipes to prevent the entry of foreign matter into pipe systems. Provide purpose made covers of pressed steel or rigid plastic.

4.7 Fire Stop Collars

Requirement: Supply and install on all proposed and existing uPVC and HDPE pipe penetrations through fire rated building elements a fire stop collar.

Collar: The fire stop collar shall be of the same fire rating as required by the building construction. Fire stop collars shall be tested and certified as conforming to the requirements of the relevant Authority.

The Trade Contractor shall provide a schedule of all the proposed fire stop collars including, but not limited to, type, rating and location. This information shall be provided within the Operation and Maintenance Manual.

4.8 Condensation

Requirement: Provide pipe insulation to drainage pipework from refrigeration equipment, ice making machines and plant room fixtures consisting of 10mm Armaflex or approved equal with aluminium foil fire retardant sisalation as an external vapour barrier. Each section of insulation shall be retained on the pipework with 2 aluminium bands. All joints shall be glued and taped with a minimum 75mm wide reinforced tape such as PPC 482.

4.9 Fastenings

4.9.1 Supports

Generally: Provide supports including hangers, saddles, bolted clips and the like, sufficient to secure the pipework to adjacent surfaces and to support it at joints, at changes of direction, and at intervals suitable to the size and type of pipe and as necessary to prevent sagging of pipework. Make provision for adjustment of gradient as required.

Support material: The same material as the pipe, for galvanised or non-ferrous metals, with bonded PVC or fibreglass woven tape sleeves to separate dissimilar metals. Provide fixings of compatible material

Fixing to masonry: Galvanised steel or non-ferrous metal bolts or screws into expanding metal masonry anchors. Do not use explosive powered fixings.

Copper: As per Sewerage and Water Supply Act.

4.10 Finishes

4.10.1 Pipework Finishes

Requirement: All exposed plumbing including wastes, traps and fixings shall be chrome plated copper pipework. Chromium plating shall comply with AS1192 for minimum coating mass equivalent to service condition Number 2.

Laboratory Areas: All exposed sanitary plumbing work within laboratory areas shall be installed in S/s pipe work with Mapress connection fittings.

4.10.2 Pipe Identification

Colours: Basic identification colours to AS1345.

Extent: Apply basic identification colours to the pipework in all above ground locations. If that pipework is scheduled to be painted, paint the full length in the appropriate identification colour. If the pipework is not scheduled to be painted, apply the identification colour in bands at intervals to AS1345 Clause 6, or as self-adhesive markers to AS1345, Clause 6 and figs. 1 and 2, showing service direction flow. Lettering on markers shall be a minimum height of 20mm.

4.11 Fixtures

4.11.1 Sanitary Ware

Generally: Supply and install sanitary fixtures, including baths, basins, sinks, WC's, urinals and the like as specified and as shown on the drawings. Supply and fix accessories, including bolts, brackets, putty, mastic, mortar, and the like, necessary for the correct installation for the fixtures.

Installation: To Manufacturer's recommendations.

Refer to the hydraulic services fixtures and fittings schedule for details of specified fixtures and fittings.

4.11.2 Standards

Comply with the requirements of the following standards:

- Wash basins: AS 1730
- Shower bases and shower modules: AS 3588
- Water closet pans: AS 1172.1
- Water closet cisterns: AS 1172.2
- Toilet seats of moulded plastics: AS 1371
- Cisterns: AS 1218
- Urinals: AS 3982

4.12 Sanitary Plumbing

4.12.1 Branches

Connection: When a branch line enters a vertical pipe, the branch fitting shall be wholly outside the vertical pipe so that the internal bore is maintained at all places.

Vertical branches: Form a 25mm radius at the throat of the bend in branches up to 80mm diameter, and 50mm radius in branches above 80mm diameter.

Waste from urinals: Do not discharge through any copper pipe or fittings.

4.12.2 Penetrations

Pipes in walls and floors: No pipework shall be built in with direct contact between the structure and the pipework. Pipe passing through structural elements (including framed and sheeted partitions, etc.) shall be separated by plastic bushes or approved equivalent to steel framing, etc., and by built in metal sleeves elsewhere (including in plasterboard). Pack the interstices as appropriate, to preserve fire rating; to maintain air conditioning barrier; to maintain insulation; to weatherproof; to prevent rattling; and to separate dissimilar metals.

Outlets: All floor outlets shall be set at levels to ensure correct drainage of floor. Membranes shall be sealed to flanges of floor wastes and shower wastes where applicable.

Floor wastes and shower outlets shall be 100 x 80, 100 x 65, or 100 x 50mm (as shown), self cleansing 'P' traps with 100mm diameter risers extended to floor level with CP cast brass screwed removable gratings and integral flange. Drill four 5mm holes through outlet immediately above flange.

Floor wastes in vinyl or similar finished floors shall be fitted with CP Brass grate, vinyl clamping ring and cast iron body, refer to contract drawings for details.

4.12.3 Tundishes

Requirement: Bell the inlet of the tundish waste to provide an inlet of twice the diameter of the nominated waste pipe. Tundish wastes shall be trapped except where connected to the drainage via a trapped floor waste.

Finish: All tundishes in exposed areas, except Plant rooms, shall be manufactured from Chrome plated copper. Tundishes within Plant rooms shall be uPVC pipework.

4.12.4 Vent Pipes

Staying to roof: Stay vent pipe as necessary to adequately restrain pipe. If fixings for stays must penetrate the roof covering, seal the penetrations and make watertight by an approved method.

Flashing above roof: Flash and seal vent pipe penetrations to ensure watertight installation.

Terminations: Provide approved type vent cowls, of material to match the vent pipe.

4.13 Completion

4.13.1 Clearance Certificate

Requirement: Before issue of the 'Practical Completion Certificate' the Contractor shall supply a copy of the Clearance Certificate from the Local Authority which confirms that all required inspections have been performed by the Authority and the works as installed are satisfactory.

4.13.2 Cleaning

Requirement: On completion clean and flush the whole installation.

4.13.3 Pre-completions tests

Requirement: Test to AS/NZS 3500.2 Section 13, before backfilling or concealing.

Leaks: If leaks are found, rectify and re-test.

5 Roof water Drainage

5.1 Pipework

5.1.1 uPVC Pipework

uPVC storm water pipes and fittings: To AS1260. SN 4 for 150 dia. and larger. SN 6 for 100 dia.

Pipe Class: Class HD or SH as shown on the drawings.

Jointing method: Solvent cement joints to AS2032, Clause 3.2.1.

Pipeline construction: To AS2032, Part 7.

5.2 Materials Testing

Certificate: Where required or requested by the Superintendent, provide test certificates prepared by an independent testing Authority to show that materials comply with the relevant standards.

5.2.1 Pipework Testing

Requirement: Supply apparatus and materials necessary for, and carry out the tests required by the Specification or regulatory Authority, in the presence of the Superintendent and the Local Authority for the service under test.

Concealed work: Do not cover or conceal underground or enclosed work until it has been inspected and tested, in sections where necessary, to the approval of the Superintendent and the Local Authority. Leave pipe joints exposed to enable observation during the tests.

uPVC Pipework: Ensure solvent cement joints have been cured for at least 24 hours before testing.

Hydrostatic tests: Fill the pipework with water and test at the pressure and for the duration stated in the Hydrostatic Test Tables, unless overridden by regulatory Authority requirements.

Rejection: Pipework is liable to rejection if the water loss exceeds the limit permitted by the relevant test.

5.2.2 Hydrostatic Test Tables

Storm water pipelines: Testing shall be carried out in accordance with the requirements of AS/NZS 3500.3 Section 9.

5.3 Materials

Pipe Bedding Material

Type: Granular material (clean sharp washed river sand or clean un-weathered hard basaltic or sedimentary crushed rock, free of salt, clay or organic contaminants).

5.3.1 Filter Material

Surround to sub-soil drains: Crushed stone with the following grading:

Table 5-1 Filter Material Gradings

AS Metric Sieve	Percentage Padding by Weight
9.50 mm	100
4.75mm	0-10
2.36mm	0-2

5.4 Workmanship

5.4.1 Excavation

Specification reference: General open trench excavation is specified in Service Trenches - Groundworks.

5.4.2 Unstable Foundations

Specification reference: Bad Ground - Groundworks shall apply to trench floors discovered to be unsuitable for pipe bedding unless stabilised.

5.4.3 Pipe Laying

Generally: Lay pipelines to uniform gradients falling to the outlets, straight between required changes of direction, properly supported, with watertight joints aligned flush at internal surfaces, and with spigot ends pointed in the direction of flow. Provide the necessary fittings and accessories. If the installation is not continuous and carried out in stages, cap open ends to prevent entry of foreign matter.

Cleaning out: Flush the pipeline with clean water and leave it clean and free from debris on completion.

Identification: Lay a detectable strip of plastic marker tape in the trench identifying the service, 200mm above the Obvert of the pipe.

5.5 Downpipes

Direct Connections to Stormwater Drainage: All downpipe connections to in-ground stormwater shall be completely sealed. The connections shall be either a solvent weld joint, or Fernco drainage couplings.

5.6 Underground Installation

5.6.1 Standards

Concrete pipe system: To AS3725, Appendix B; and

uPVC pipe systems: To AS2032, Parts 5 and 7.

Pipe bedding: Unless otherwise specified bed the pipework on a continuous underlay of pipe bedding material of minimum thickness after compaction of not less than 75mm. Grade the bedding evenly to the required gradient of the pipework.

Chases: Form chases where necessary to prevent sockets, flanges or the like from bearing on the trench bottom or the bedding. Fill and compact the chases with granular bedding material after the laying and testing of the pipes.

Side support and overlay: Fill with pipe bedding material to not less than one quarter of pipe diameter above the invert for concrete pipes and 150mm above the top of the pipes for UPVC pipes. Compact in layers of not more than 150mm loose thickness without damage to the pipework.

Backfilling above overlay: Specified in Filling Schedule - Groundworks.

Compaction: As specified in Compaction – Groundworks.

Minimum cover over pipe: Minimum cover over pipes shall apply:

- Pipes not subject to vehicular loading 300mm
- Pipes subject to vehicular loading:
  - Not in roadways 450mm
  - Under sealed roadways 600mm
  - Under unsealed roadways 750mm
- Pipes in embankments or subject to construction equipment loading 750mm

5.6.2 Connections to Existing

To street gutter: (Storm water lines where shown): Enter the pipe into an opening made in the kerb, to finish flush with the kerb face, and seal by pointing in 1 cement to 3 sand mortar. Restore the kerb and pavement as necessary, to match existing.

Gullies and manholes: Make good existing structure and seal by pointing with one cement to three sand mortar.

5.7 Storm water System

Extent: Lay storm water drains to the outlets shown on the drawings or specified.

Downpipe connections: Refer detail on the drawings, otherwise turn up the drain branch pipeline with a suitable bend to meet the downpipe to finish 50mm above finished ground or pavement surface. Jointing to downpipe as specified elsewhere.

5.8 Sumps, gullies and pits

5.8.1 Pit Construction

Requirement: Construct pits, sumps, tanks, wells and the like as shown on the drawings and as follows, unless otherwise specified.

Floors and walls: In situ concrete: 32 MPa, not reinforced unless otherwise shown. Thickness not less than 100mm, unless otherwise shown or specified.

Finish to exposed surfaces: Smooth, seamless, equal to steel trowelled render or concrete cast in steel forms. Cove or splay internal corners. Bench floors and fall to drain.

Render: 1 cement: 3 sand, minimum thickness 20mm.

Reinforcement: If depth of pit exceeds 1500mm: F718 mesh to AS1304 in floor, and in walls from depth 1200mm downward. Cover 50mm from inner face of walls and lower face of floor. Place main wires in walls horizontally.

Covers: Rebate the top of the pit walls to suit the cover frame or provide a precast rebated surround, and grout the frame into the rebate with infill concrete.

Levels: Top level of cover or grating, including frame:

- In paved areas, flush with the paving surface;
- In landscaped areas, 25mm above finished surface; and
- Gratings taking surface water run-off. As necessary to receive the run off without ponding.

Pipe connections: Build inlet and outlet pipes into the pit walls during construction. In existing pits, make openings of the correct size and pack the joint around the pipe to the full thickness of the wall with 1:3 mortar.

Pipe channels: When pipe channels are required in pit floors, form the channel to the full depth of the pipe.

5.8.2 Pit Covers

Requirements: Provide each pit with a pit cover as shown on the drawings of a size appropriate to the pit.

5.9 Sub-soil Drainage

5.9.1 Sub-Soil Drains

Pipes and fittings: 150mm mega-flow drainage system with filter sock as supplied by Geo-fabrics Australia.

Pipe bedding: Grade the trench floor uniformly to the required gradient of the pipework. If the trench floor is rock, place and compact a layer of fine filter material not less than 50mm thick, and similarly correct any irregularities which would cause ponding deeper than 20mm. Lay the pipes on the graded floor with one line of slots at the bottom.

Overlay: Crushed stone as specified in Filter Material, compacted in 250-300mm layers to the required compaction density in Compaction – Groundworks.

Depth of overlay: Whichever of the following is applicable;

- To the underside of the bases of overlying structures such as pavements, slabs, channels and the like; and
- To within 150mm of the finished surface of unpaved or landscaped areas.

Filter fabric: Permeable polypropylene fabric of approved manufacture capable of retaining 0.25mm particles. Place filter fabric between the filter material and topsoil or similar fine grained overlying material.

6 Hot and Cold Water

6.1 Pipework

6.1.1 Copper Pipework

Tubes: To AS1432, Type B.

Identification: Marking to AS1432. Install the tube so that the marking is visible for inspection.

Fittings: Shall be dezincification resistant.

Capillary fittings: To AS3688, for use with silver brazed joints. Do not use soft solder or solder insert capillary fittings unless approved by the regulatory Authority and the Superintendent.

Screwed fittings: To AS3688.

Flanges: To AS4087.

Jointing methods: Silver solder containing not less than 15% silver, or press-fit fittings.

Silver brazed joints: Use low temperature silver brazing alloy rods to AS1167, classification B2, and oxyacetylene heating.

Screwed joints: To AS3688

Making slip joints: Using a proper tool, soften and expand the pipe to form a slip joint of not less than the following lengths:

6.1.2 Copper Pipework – Press Fit

Where copper pipework is to be installed in a mechanical press fit system, the installation shall be carried out with "Viega" compression fittings only, installed in accordance with the manufacturer's recommendations.

Water connection with press-fit fitting made of copper or gunmetal. Inspection of un-pressed fittings utilise a positive leak path for the whole range 2.2kPa to 300kPa when a dry pressure test is performed and 100kPa to 650kPa with a wet pressure test. This warranted safety function is facilitated by a channel in the metallic body of the fitting. After pressing, the connection is permanent and inseparable. The seal is made of EPDM, with performance characteristics allowing the use in solar applications. The fitting body has a cylindrical pipe guide in front of the seal Fittings carry the Watermark approval.

VIEGA PRESS-FIT FITTINGS WILL ONLY BE ACCCEPTED. PRESS-FIT FITTINGS OTHER THAN VIEGA WILL NEED TO BE REPLACED AT THE CONTRACTORS EXPENSE.

Table 6-1 Slip Joint Lengths

Nominal Pipe Size	Length of Slip Joint
0-20mm	10mm
25-32mm	12mm
40-65mm	16mm
80-100mm	20mm

6.1.3 Galvanised Mild Steel Pipework (Internal Fire Service)

Requirement: Above ground pipes 80mm diameter and larger for fire services shall be galvanized medium grade steel tube with victaulic joints, to comply with the following:

Steel tube and pipes: AS1074, AS1579, AS4041. Pipes shall be at least equivalent to medium grade steel tube complying with AS1579. AS4041 or with AS1074.

Supports: Pipe supports for above ground pipework shall be of materials which provide a fire resistance rating of 60/-/-. While maintaining a pipe support temperature of not less than 500° when tested in accordance with AS1530.4.

6.1.4 PVC-O Polyvinyl Chloride (For Pressure Pipe)

Pipe: To AS/NZS 4441

Class and type: Class 16 rated, series 2

In-ground pipe system shall be spigot and socket type with rubber ring joint system, class 16 rated.

Fittings: Fittings shall be Crevet (or equal) ductile iron fittings (Series 2) complying with AS/NZS 2280 with rubber ring sockets (Series 2) for in-ground installations, or table E flange joints for above ground installation. All Class 18 rated.

Allow for expansion and contraction as recommended by the Manufacturer. In-ground fittings shall be protected from corrosion by a thermal bonded polymeric coating both inside and outside.

Provide concrete thrust blocks to prevent movement to all required pipe fittings, as recommended by the Manufacturer.

6.1.5 Polyethylene Pipework (In-ground Potable Water)

Pipe: To AS/NZS 4130.

Class and type: Class 12.5, Medium Density Type 100, Blueline (Supplied by Iplex)

Joints: Electro-fusion weld fittings only.

Installation: To AS2033, Parts 1 - 4 inclusive

6.1.6 Polyethylene Pipework (In-ground Fire Service)

Pipe: To AS/NZS 4130.

Class and type: Class 16, Medium Density Type 100, Blueline (Supplied by Iplex)

Joints: Electro-fusion weld fittings only.

Installation: To AS2033, Parts 1 - 4 inclusive

6.2 Testing

Tests: Supply apparatus and materials necessary for, and carry out the tests required by AS3500 and the regulatory Authority, in the presence of the Managing Contractor and the regulatory Authority for the service under test.

Concealed work: Do not cover or conceal enclosed work until it has been inspected and tested, in sections where necessary, to the approval of the Managing Contractor and the regulatory Authority. Leave pipe joints exposed to enable observation during the tests.

Hydrostatic tests: Test pipework at the pressure and for the duration as required by the AS3500 and the Regulatory Authority. Hydrostatic tests shall be performed with a 1700 kPa minimum head for 30 minutes with no water loss permitted for copper pipes and 1 litre per hundred metre per hour for rubber ring jointed pipes.

On completion: Check pipe joints, valve seats, tap washers and the like. Replace if damaged, and retest.

Rejection: Pipework which fails a required test, or which vibrates or is noisy because of insufficient support or loose fixings, is liable to rejection.

Backflow Prevention Devices: Testable Devices such as double check valves and Reduced Pressure Zone Valves shall be tested in accordance with AS3500 by an authorised person and a certificate confirming the suitability of the installation shall be included in the maintenance manuals.

6.3 Completion

Commissioning: After satisfactory completion, turn on control and isolating valves and leave the service in full operational condition.

6.4 Workmanship

6.4.1 Installation

Generally: Install pipework in straight lines and uniform grades without sags. Provide bends and sets as required, and sufficient unions, flanges and isolating valves for satisfactory removal of piping and fittings for maintenance. Take off branches at right angles.

Dissimilar metals: Do not install copper in contact with steel, zinc, or other materials likely to generate electrolytic, galvanic or corrosive action. Make junctions between dissimilar metals with special fittings manufactured in suitable compatible material.

Changes of direction: Use bends where practicable in preference to elbows.

Joints: Fit joints tightly, seal and make leak proof, with no internal projections, burrs or obstructions.

Valves: Arrange together where practicable in operational grouping, in convenient and readily accessible positions unless otherwise shown on the drawings or directed by the Managing Contractor.

Concealed pipework: Arrange adjacent to, and parallel with each other and with walls, beams, and the like. Keep at least 150mm above ground surface if under suspended ground floors. Provide adequate spacing of at least 25mm between pipes or pipe insulation, 50mm between pipes or pipe insulation and electrical cables.

6.4.2 Accessibility

Fittings: Locate in accessible positions, with adequate clearance to pipe fittings requiring maintenance or servicing, including control valves, joints designed to enable removal of pipes, and the like.

Removability: As far as practicable, install plumbing work inside buildings so that it is removable without damage to the building structure or finishes.

Concealment: Where practicable, conceal pipework so that it is accessible within ducts or non-habitable enclosed spaces and does not appear on external walls. Where concealment is not possible, the pipework shall be metal, finished as specified, mounted on metal brackets. Obtain prior approval for the location of exposed pipework.

Enclosed pipework: If pipework is proposed to be enclosed so as to be not accessible after completion, obtain prior approval for the location of pipe runs and pipe fittings, and record the actual locations on work as executed drawings.

6.4.3 Underground Installation

Excavation: General open trench excavation is specified in Service Trenches – Groundworks

Bedding on trench bottom: Metal pipes, and plastic pipes of less than 80mm nominal diameter, may be laid without underlay provided that the trench is free from hard objects such as stones, sharp projecting rocks, or tree roots, and providing the trench bottom is trimmed to provide continuous, uniform, and adequate support to the pipe, including chases where necessary to prevent sockets, flanges or the like from bearing on the trench bottom.

Bedding on underlay: If the excavation is excessive or is in unstable ground or rock, or if the pipes are uPVC or polyethylene of 80mm nominal diameter or larger, bed the pipes on a continuous cushion of underlay material of minimum thickness 75mm.

Underlay material: Granular material (clean sharp washed river sand or clean un-weathered hard basaltic or sedimentary crushed rock, free of salt, clay or organic contaminants).

Chases: Form chases where necessary to prevent sockets, flanges or the like from bearing on the trench bottom or the bedding. Fill and compact the chases after the laying and testing of the pipes.

Side support and overlay: Fill to 150mm above the top of the pipes with underlay material and compact.

Backfilling above overlay: Specified in Filling Schedule - Groundworks.

Minimum cover over pipe: Unless overridden by regulatory Authority requirements, the following shall apply:

- Pipes not subject to vehicular loading 450mm
- Pipes subject to vehicular loading:
  - Not in roadways 450mm

- Under sealed roadways	600mm
- Under unsealed roadways	750mm
• Pipes in embankments or subject to construction equipment loading	750mm

Pipework under slabs: If copper pipework is to be laid in the ground beneath a concrete floor slab, protect it by encasing in PVC coated tube sealed to prevent ingress of moisture.

Identification: Lay a detectable strip of polyethylene marker tape with a S/s wire trace in the trench identifying the service, 200mm above the obvert of the pipe. The Trade Contractor shall provide a sample of the proposed product to be supplied for approval.

6.4.4 Samples

Requirement: Provide samples of accessories specified prescriptively or by performance (i.e. not specified as proprietary items), or accessories offered as equivalent to specified proprietary items, including but not necessarily limited to:

- Valves;
- Instruments (gauges, thermostats, and the like);
- Means of identification (adhesive labels, engraved disks or plates, etc.); and
- Fittings such as cover plates, purpose made sealing covers, valve boxes, couplings and the like.

Incorporation into the works: Make samples approved for the purpose available for incorporation into the Works in identified locations.

6.4.5 Anchorages

Location: Install 15 MPa concrete anchor blocks to restrain movement of tees, valves, blank ends, reducers and vertical or horizontal bends on pipework exceeding 80mm diameter or on pipework with rubber ring joints. Bear anchor blocks against the body of the fitting only, clear of joints, and against firm undisturbed ground, compacted filling or building elements.

6.4.6 Cleaning Out

Requirement: Clean piping of loose scale and dirt before erection, and again after erection and sealing of joints. Flush piping system through with clear water at a velocity sufficient to remove foreign matter, and until only clean water is discharged at outlets. Leave the system free of foreign matter on completion.

6.4.7 Core Holes

Approval: Set out core holes and sleeves in floors, walls and masonry and obtain approval of set out prior to cutting.

6.4.8 Sleeves

Requirement: Where pipes pass through walls, floors, beams, or columns, provide purpose made metal or plastic sleeves with 6mm clearance all round pipes, packed with gunned silicone rubber joint sealer (self-extinguishing grade).

6.4.9 Chases and Encasing

Approvals: Cut chases with a power saw unless otherwise approved. Do not chase reinforced concrete work without approval.

Expansion and Contraction: Pipes chases into masonry or encased in concrete shall not cross any movement joint, and shall be insulated as noted on the drawings so that expansion and contraction can take place without damage to the pipe or to the material or surface finish of the surrounding element.

6.4.10 Capping Off

Requirement: During construction, temporarily seal open ends of pipes and valves to prevent the entry of foreign matter into pipe systems. Provide purpose made covers of pressed steel or rigid plastic.

6.4.11 Building Penetrations

Sleeves: Where pipes pass through building elements provide purpose made metal or plastic sleeves (in fire rated elements, metal only) formed from pipe sections. Prime paint ferrous surfaces. If the building element is fire rated or acoustic rated, maintain the rating by packing the annular space with suitable insulation or fire stopping material and, if necessary by insulating the pipe on both sides of the penetration.

Approval: Obtain approval for the location of sleeves or core holes in concrete building elements.

6.5 Fastenings

6.5.1 Supports

Generally: Provide supports including hangers, saddles, bolted clips and the like, sufficient to secure the pipework to adjacent surfaces, to restrain the internal forces of pressure piping, and to support it at joints, at changes of direction, and at intervals suitable to the size and type of pipe, and as necessary to prevent sagging of pipework.
Maximum spacing of supports to be as shown in the table below:

Table 6-2 Support Spacing

Pipe Material	Pipe Size	Horizontal Intervals	Vertical Intervals
Copper	10 – 15 mm	900 mm	900 mm
Copper	20 – 25 mm	1200 mm	1200 mm
Copper	32 – 100 mm	1200 mm	1800 mm
PVC/PP-R	20mm	700mm	1400mm
PVC/PP-R	25mm	750mm	1500mm
PVC/PP-R	32 – 50 mm	900 mm	1200 mm
PVC/PP-R	65 – 100 mm	1200 mm	2500 mm
Ductile Iron	100 mm	2400 mm	2400 mm
Ductile Iron	150 mm	2400 mm	2400 mm
Galvanised Steel	25mm	2000mm	2000mm
Galvanised Steel	32 - 40mm	2500mm	2500mm
Galvanised Steel	50 – 65mm	3000mm	3000mm
Galvanised Steel	80 - 150mm	4000mm	4000mm

For other pipe materials refer to the Manufacturer's recommendations.

Support material: The same material as the pipe for galvanised or non-ferrous metals, with bonded PVC or fibreglass woven tape sleeves to separate dissimilar metals. Provide fixings of compatible material.

Fixing to masonry: Galvanised steel or non-ferrous metal bolts or screws into expanding metal masonry anchors. Do not use explosive powered fixings.

Insulated pipe: Support the pipe directly, not by the insulation.

6.5.2 Cover Plates

Requirement: Where water lines emerge from wall, floor or ceiling surfaces, provide cover plates with a diameter 50mm larger than the pipe made from non-ferrous metal, finished to match the pipe, or of stainless steel.

6.6 Finishes

6.6.1 Pipework Finishes

Requirement: All exposed hot and cold water pipework including taps, valves, cover plates and fixings shall be chrome plated. Chromium plating shall comply with AS1192 for minimum coating mass equivalent to service condition Number 2. Do not insulate piping specified to be chromium plated.

6.6.2 Protection of Finished Surfaces

Temporary protection: Protect stainless steel and chromium plated exposed surfaces during construction by an application of a strippable polyethylene coating. Apply the coating as soon as practicable and do not remove until completion of the job. On removal, clean the surface with methylated spirits and polish with a soft dry cloth.

6.6.3 Pipe Identification

Colours: Basic identification colours to AS1345, and as follows:

Valve Bodies: To match pipe

Valve Hand wheels: Black

Extent: Apply basic identification colours to the pipework in above ground locations. If that pipework is scheduled to be painted, paint the full length in the appropriate identification colour. If the pipework is not scheduled to be painted, apply the identification colour in bands at intervals to AS1345 or as self-adhesive markers to AS1345, showing service and direction flow. Lettering on markers shall be a minimum height of 15mm.

Valve identification: Use brass discs or engraved melamine laminate plates (white lettering on black background) screw fixed to hand wheel, or clipped to the valve to identify the area of building that the valve isolates.

6.7 Valves and Outlets

6.7.1 Accessories

Requirement: Provide each fixture with the accessories, including taps, valves, outlets, and the like, necessary for the proper functioning of the fixture, compatible with the fixtures they serve, and of types as selected and/or described in the Specification.

6.7.2 Valves

Gate and non-return valves:

- Sizes less than 65mm: Brass -To AS1628
- Sizes 65mm and larger: Cast Iron -To AS2638 and AS3578

Valve spindles: Non-rising type. Install valves with spindles in a vertical position where practicable.

Valves in visible positions: Match finish to that of adjoining visible pipework.

Connection: Screwed valves shall be provided with union connections to pipework.

Valves located above the ceiling: Valves above the ceiling shall be located directly above a 300mm x 300mm access panel, to be accessible without entering the ceiling space.

Valves located above the ceiling: Valves above the ceiling shall be located directly adjacent a 600mm x 600mm access panel.

6.7.3 Valve Selection Table

Table 6-3 Valve Selections

Location	Size	Type	Material	Connections

All locations	Less than 65mm	Ball	Brass	Screwed
Above ground and in pits	Less than 65mm	Swing check	Bronze	Screwed
	65mm or larger	Full bore gate, or swing check	Cast iron	Flanged
Below ground	65mm or larger	Full bore sluice	Cast iron	Flanged

6.7.4 Mini Stop Valves

At each wall connection for both hot and cold water to all Basins, Sink Mixers and WCs, supply and install chrome plated 15mm right angled, mini stop valves.

6.7.5 Pressure Reduction Valves

Types: Reduction valves, pressure limiting valves, or ratio valves, to produce reduction in pressure as required by fitting Manufacturer. Prior to installation, obtain a guarantee from the Manufacturer stating the reduction in pressure and flow rates obtained under test conditions.

6.7.6 Non Return Valves

Types: Manufactured and tested in accordance with AS 1718. Horizontal pattern with a gunmetal swing check fitted with limit stop to prevent sticking in the open position (have a non-water hammer characteristic incorporating spring loaded bronze valve and seat). The body shall be fitted with screw headed inspection cap, and the fitting shall be constructed of brass materials.

6.7.7 Fire Service Mains

Types: Valves shall be resilient seated epoxy coated locked open and appropriately tagged in accordance with AS2419.

6.8 Pits

6.8.1 Valve Boxes

Generally: Provide cast iron valve boxes with removable covers for access to underground valves.

6.9 Water meters

Cold Water Meters: Provide suitably sized sub-water meters located bracketed to the wall at a maximum of 1600mm AFFL to the top of the meter assembly in a location readily accessible for reading and maintenance, in a vertical orientation downstream of a suitable isolation valve.

Building A

- Sub-water meters shall be installed as follows;
    - In-coming potable water supply to the building. 1 No.
    - Potable water service connection to the Hot water system. 1 No.
    - Potable water service connection to the rainwater mains back-up. 1 No.

Building B

- Sub-water meters shall be installed as follows;
    - In-coming potable water supply to the building. 1 No.
    - Potable water service connection to the Hot water system. 1 No.
    - Potable water service connection to the rainwater mains back-up. 1 No.

Building C

- Sub-water meters shall be installed as follows;

- In-coming potable water supply to the building. 2 No.
- Potable water service connection to the Hot water system. 1 No.
- Potable water service connection to the rainwater mains back-up. 1 No.

Building D

- Sub-water meters shall be installed as follows;
  - In-coming potable water supply to the building. 1 No.
  - Potable water service connection to the Hot water system. 1 No.
  - Potable water service connection to the rainwater mains back-up. 1 No.

Building E

- Sub-water meters shall be installed as follows;
  - In-coming potable water supply to the building. 2 No.
  - Potable water service connection to the rainwater mains back-up. 2 No.

6.10 Pressure Reduction Valves

Suitable sized pressure reduction valves shall be installed in all new and existing mains cold water branch supplies into the new buildings from the cold water ring main. Pressure reduction valves shall be fixed to the wall in a suitable location allowing for maintenance and service and should have the downstream pressure set to 500kPa.

6.11 Hot Water Installation

6.11.1 Reticulation

Standard: To AS3500.4 Supply and install hot water piping to connect the heater to the draw off points or fixtures shown on the drawings or specified. Comply with the requirements of previous sections of specification.

6.11.2 Hot Water Units

Requirement: Hot water units shall be as shown on the drawings and shall be installed in accordance with the Manufacturer's instructions and in accordance with AS3500.4 and the regulatory Authority requirements.

6.11.3 Fittings Generally

Requirement: Provide the necessary fittings for the proper functioning of the hot water system, including taps, valves, pressure and temperature control devices, strainers, gauges, automatic controls, alarms and the like.

6.11.4 Flexible Pipe Insulation

Proprietary Item: Kemlag

Pre-lagged pipe: An approved proprietary system in which the pipe is factory sheathed with a flexible sheath type pipe insulation of the modified vinyl foam plastic formulation.

Extent: Use on dead leg runs in walls only.

6.11.5 Rigid Pipe Insulation

General: Provide a fire retardant closed cell pre-formed polyethylene foam thermal insulation with a heat laminated, factory fitted, reinforced aluminium foil face, with a 25mm overlap, with a minimum thickness of 25mm.

Application: Form the insulation to fit the pipe. Butt joints firmly and fasten insulation to pipe with metal straps 450mm apart approximately, and not less than two straps to each section. All joints and gaps shall be taped using a 48mm wide pressure sensitive adhesive aluminium foil tape. The pre-formed sections shall be cut and mitred, to ensure a tight fit around elbows and tees.

Where supports and spacer blocks are used to support the pipework, the pipe insulation shall be butted tightly up to the spacer blocks and sealed using a silicon sealant.

Extent: Provide on all recirculating pipework from hot water unit outlet to hot water unit return inlet.

Outer jacket: Where exposed to the elements, cover the surface of rigid pipe insulation with an outer jacket consisting of sheet metal sheathing with beaded joints and fasten sheathing with metal straps at 300mm centres. Sheathing material shall be 0.5 mm zincalume.

6.11.6 Air Release Valves

Requirement: To the uppermost point on the hot water flow and return risers supply and install air release valves.

6.11.7 Balancing of Hot Water System

Requirement: Supply and install sufficient valves and carry out necessary adjustments to enable the system to be balanced so as to ensure that all sections of the pipework designed for continuous flow to operate satisfactorily.

Valves: Globe valves shall be used for balancing the system. The system shall be balanced to the approval of the Managing Contractor.

6.11.8 Hot Water Pipework Expansion

Requirement: Provision shall be made for expansion and contraction in the hot water system by means of suitable lagging, the expansion bends, conduits or sleeves or any combination of such methods to the satisfaction of the Managing Contractor and to allow for the free movement of pipes and fittings without undue stress.

Pipe brackets: The pipes shall be supported using 'Unistrut' fittings or equal.

Horizontal lines: Pipe brackets shall have a wooden spacer with the internal diameter equal to the external diameter of the pipe and the external diameter of the spacer equal to the overall diameter of the pipe plus insulation.

Vertical lines: Pipe brackets shall have a copper pipe sleeve with the internal diameter of the pipe plus 1.5mm to 3mm clearance when bracket is tightened to allow for expansion. The length of sleeve shall be equal to twice the width of the bracket.

6.11.9 Pressure Control Valves

Requirement: The relief drain from the temperature pressure relief valves shall be in copper tube discharging to the tundish. The overflow drain line shall fall continuously to an approved location to Council's satisfaction.

6.11.10 Mixer Valves

Standard: To AS3500.4 and AS4032.

Type: Adjustable thermostatic type mixing tap or valve.

Description: Fittings mixing hot and cold water, regulating both water temperature and volume with a single hand control, capable of delivering water at the temperature of either of the supply systems and at any temperature in between, and suitable for controlling single or multiple outlets as required by the installation. Incorporate the following:

- An adjustable device for balancing unequal supply pressure, capable of dealing satisfactorily with the actual supply pressures encountered.
- A temperature sensitive automatic control which maintains temperature at the selected setting and shuts down the flow within 0.5 seconds if either supply system fails or if the normal discharge water temperature is exceeded.
- Hot water flush facility.
- The valve shall be supplied installed in a S/s recessed lockable box as specified on the contract drawings.

6.11.11 Recirculating Pumps

General: Supply, install and commission in locations as indicated on drawings dual hot water circulating pumps with all pipework and associated valves and fittings to types and duties as scheduled.

Starting and stopping: The duty pump shall operate on a continual basis, should the duty pump fail to operate, then the standby pump shall be started. Should either of the pumps fail to operate, then a visual and audible alarm shall indicate which pump had failed.

A duty standby selector switch shall be supplied for each pump set to allow the duty and standby pump to be alternated manually. An auto manual selector switch shall be provided for each pump unit for testing purposes.

Installation: The pipework layout system on the drawings shall be regarded as diagrammatic and should be modified where necessary to suit the pumping plant. The pumping plant shall be installed in accordance with the approved shop drawings. All pipework, valves and fittings shall be supported so that no weight is transmitted to the pump casing and the pump can be removed without disturbing valves and connections.

7 Fire Service (Hydrants and Hose Reels)

7.1 Pipework

7.1.1 Installation Complete

Sections 6.1 to 6.6 inclusive of the Cold and Hot Water Specification shall apply to the supply and installation of the fire supply.

7.1.2 External Fire Hose Reels

Fire hose reels installed external to the building shall be installed within a galvanised steel cabinet. The cabinet shall comply with the requirements of the fire hose reel standard – AS2441, section 10.4.4.

7.1.3 Valves

Requirement: Secure in open position by a means approved by the Regulatory Authority and affix to the valve a melamine laminate plate inscribed with the words "FIRE MAIN VALVE - SECURE OPEN" in uppercase letters not less than 10mm high.

7.2 Fire Supply

7.2.1 General

Requirement: The Trade Contractor shall carry out tests in the presence of the Managing Contractor or his representative.

7.2.2 Fire Hose Reel Tests

Leakage: Test the assembly for leakage by fully extending the hose, closing the nozzle and pressurising to 1.7MPa for three minutes. No leakage is permitted.

Withdrawal: Test the hose for ease of withdrawal while pressurised to 1MPa with a maximum pull of 100N in any accessible direction.

Flow rate: Test for a minimum rate of flow of 0.45 litres/sec. At an inlet flow pressure of 210kPa + or - 5kPa with the nozzle set to jet.

Authorities: Carry out any other tests as may be required by the Local Authority, and as stated in AS1221.

7.3 Fire Hydrant Tests

Requirement: Comply with the testing requirements of AS2419. Test the two most hydraulically disadvantaged hydrants. Total system flow to be 20 l/s at 700kPa minimum residual pressure. Other tests and recording of tests to be as outlined in AS2419. Supply a copy of the test record to the Managing Contractor.

7.4 Certificates

Requirement: On completion of the fire service installation, it is the responsibility of the Trade Contractor to provide, at his own expense, all necessary tests as required by the Specification, Council and the State Fire Services Department.

The results of these tests are to be formulated into a certificate stating the system has been tested, the results of the flow and pressure tests are to the standard required by the Building Act and that there is no operating irregularities within the system.

This certificate is to be signed by a registered fire system certifier and issued to the Principal Contractor before Practical Completion.

The certificate is to be forwarded to the Principal Contractor by the date nominated on the 'Building Program'.

7.5 Defects Liability Period

Requirement: Test the fire hose reels and hydrants in accordance with AS1851, Part 2 and Part 4. Before the end of the Defects Liability Period the Contractor shall supply the Principal Contractor with a copy of a testing report for the period and supply evidence that the report has been forwarded to the Commissioner, Queensland Fire and Rescue Service.

7.6 Fire Brigade Booster Connection

Requirement: Comply with the requirements of AS2419.

7.7 Block plan

Requirement: Comply with the requirements of AS2419.

7.8 Portable Fire Extinguishers

7.8.1 General

Provide portable fire extinguishers in accordance with AS2444 and as indicated on the contract drawings. Refer Architectural Drawings for locations.

7.8.2 Portable Fire Extinguishers

Portable fire extinguishers shall comply as follows:

- Classified rated in accordance with AS1850
- General requirements in accordance with AS1841.1
- Foam type shall be in accordance with AS1841.4
- Dry chemical powder type shall by in accordance with AS1841.5
- Indicator signs shall be in accordance with AS2444

The fire extinguisher shall be mounted on a bracket so that the top is not more than 1200mm AFFL and the bottom is not less than 100mm AFFL.

Where an extinguisher is available with two or more product weights for the same rating the larger product weight extinguisher shall be selected.

7.8.3 Maintenance

Maintain the portable fire extinguishers during the defects liability period in accordance with AS1851. Provide gold coloured maintenance tags to comply with AS1851 and provide and complete a log book.

Provide a plan showing the extinguisher types and locations.

7.8.4 Signage

Signage shall be provided at each location in accordance with AS1851.

8 Pumping Equipment

8.1 Diesel Fire Hydrant Pump Set (CONTRACTOR TO ALLOW A PROVISIONAL SUM FOR PUMP)

Model: diesel fire hydrant pump set to AS 2941.2013

Duty: 10L/sec @ 60m Head.

Diesel Pump: One (1) 100x65-250 end suction centrifugal pump with cast iron housing, bronze impeller and stainless steel shaft. Pump shall be direct flexibly coupled to a 45kW 2,900rpm heat exchanger cooled diesel engine, mounted on a fabricated hot dip galvanised steel base plate. Fitted to unit shall be a diesel control panel with instrumentation and interconnecting engine wiring, self-bunded fuel tank with 6 hour capacity, muffler and flexible connector.

Power requirement: 240 volts, 1.5kW & 15amps

Jacking Pump: One (1) 240 volt automatic pressure maintenance pump capable of 50l/m @ 80m, complete with control and monitoring panel, pressure switch, pressure gauge and pressure vessel. Pump shall be mounted on a galvanised steel baseplate and wired to a dedicated control panel. Jacking pump shall be fully pre-piped with check valves and isolating valves fitted as required.

Power requirement: 240 volts, 1.5kW & 8.9amps

General: Installed pump sets shall comply with the requirements of AS2941-2013

Construction: The pumping units shall be stable in operation from zero quantity up to full discharge at zero head and within this range shall not cause the motor to be overloaded or the rated current to be exceeded under any conditions.

Accessories: Each pump shall be provided with pressure gauges and gauge cocks at the suction and delivery pipes, all other necessary appliances and fittings, including control valve on suction side and control valve and reflux valve on the delivery side.

Work testing: Witnessed tests at the manufacturer's works are required prior to delivery to site. Supply certificate of performance testing. Verify duty and performance requirements with guarantee of the manufacturer against pump and motor failure with normal usage and performance. The performance of all pumps shall be verified by an approved testing authority in accordance with the provisions of AS2417.

Site testing: Comply with the requirements of AS2941. Test in the presence of the Managing Contractor.

Gauges: Pressure gauges shall have a 100mm diameter face, graduated in metres head and kilopascals and be of waterproof construction.

Installation: The pipework layout shown on the drawings shall be regarded as diagrammatic and should be modified where necessary to suit the pumping plant. The pumping plant shall be installed in accordance with the approved shop drawings. The plant shall be securely bolted down via spring mountings, to concrete plinths. Plant installation shall not be commenced until the plinth concrete is adequately cured.

Install 15mm nominal diameter copper drainage pipeline from the pump drip wells across the floor to discharge to the pump room floor waste provided. Protect copper pipe on floor with full length cover of 32 x 32 x 3 steel angle with welded fixing lugs, all hot dip galvanised.

Pumps shall be mounted on "POWERSORB" vibration isolators type "S.L.". The size of each mount shall be in accordance with manufacturer's recommendations.

All pipework, valves and fittings shall be supported so that no weight is transmitted to the pump casing and the pump can be removed without disturbing valves and connections.
Install in the inlet and outlet pipework immediately adjacent to the pump appropriately selected, flexible connections equal to "Mason".

Engine Exhaust System: Exhaust shall be piped to a point external to the building, where it will not cause a nuisance to the general public or buildings. Comply with the pump supplier's requirements in regards to installation and length of exhaust pipe.

A seamless or welded corrugated flexible connection shall be made between the engine exhaust outlet and the exhaust pipe. The exhaust pipe shall be as short as possible and shall not exceed 4.5m, unless the exhaust pipe size is increased one pipe size for every additional 1.5m in length. The exhaust pipe shall be insulated against combustible materials. Where it is installed outside of the plant room the insulation shall be metal sheathed to protect against mechanical damage.

Tools: Supply a complete set of single or double ended spanners, keys and special tools necessary for all on site maintenance of each unit, engrave each item with proprietor's name, and fit in a neat wall mounted rack adjacent to the unit.

Pump Control: The pumps shall be controlled automatically through a pressure switch installed in the delivery pipework. The pumps shall maintain a static pressure of 800kPa at the pump. The pumps shall be the type and duties as shown on the drawings.

An auto-manual selector switch, lockable in auto position, shall be provided for each pump set to be used only for testing purposes.

A duty standby selector switch shall be provided for each pump set to select the lead pump.

Starting: Hydrant pump start shall be when the pressure in the system drops to 650kPa. Jacking pump start shall be when the pressure in the system drops to 750kPa.

Jacking pump: Shall de-energise when the hydrant pump operates.

Pressure relief: Install an approved type pressure relief valve with test bypass and pipework to adjacent test drain. Set pressure relief valve at 50kPa above pump cut out pressure.

Control panels and wiring: Supply and install the control panels and associated wiring and the wiring from the control panel to the pumps. All wiring essential to operation of the pumps shall be in glanded M.I.M.S. (Pyro Tenax). Provide for connection of all visual and audible alarms and controls to the automatic controls as required. Provide pump run and fault indicators on the control panel.

Control cubicle: Shall be of ventilated construction with air intakes insect proofed. Each motor shall be protected by its own individual 3 phase fuses, and all control circuits shall operate at not more than 240 volts. An overload relay with external reset and alarm contacts shall be provided for each motor contactor. Should the motor come out on fault, an overall alarm fault indication light shall be illuminated.

Maintenance manuals: The manuals shall be in accordance with the general requirements contained within the Architectural specification and include the details following.

The instructions shall be in International A4 format with all data photo reduced or enlarged to this size. Where drawings would be illegible when reduced to this size, fold out drawings shall be provided such that the whole drawing folds out clear of the book. The length of the short side of fold out drawings shall preferably accord A4 size.

All information shall be in the English language and all dimensions in metric measurement.

Complete listing of the plant, equipment, valves, pipes, etc., supplied and installed including model and serial numbers:

- Full specification for each individual item of equipment;
- Operating instructions;
- Detailed service and maintenance instructions for each item of equipment;
- A tabulation of weekly, monthly and yearly maintenance tasks covering all items of equipment;
- Required grades of lubricants necessary for each item including the trade names of the recommended products and alternatives;
- General layout and sectional drawings of the equipment;
- Replacement parts listed with part stock numbers;
- A comprehensive index for each volume; and
- Addresses, telephone and facsimile numbers of suppliers and local agents for all items of equipment.

The Contractor shall provide the Managing Contractor with three (3) sets of fully detailed plans showing "as constructed" dimensions, layout and levels and wiring diagrams covering all items of equipment throughout, including switchboards and control panels.

The Contractor shall provide the Managing Contractor with four (4) sets of "as constructed" wiring diagrams. Three (3) sets of these are those required for inclusion in the manuals, whilst the fourth set shall be mounted inside the main switchboard retained by means of a fabricated drawing holder or a mechanically attached plastic wallet. The diagrams shall be of the complete electrical installation using Australian Standard Symbols to AS1102 Parts 1 - 15, with numbered reference. The diagram(s) shall show the complete circuiting of the automatic starters, relays, etc., coded to match the actual wiring.

Alarms: Control panel indicators shall be provided for pump and motor fault indication

Diesel Exhaust: The diesel exhaust from the pump shall exit the pump room through the ceiling and terminate above the roof with a suitable muffler installed to reduce the noise when the pump is running.

9 Gas Supply

9.1 Standard

Carry out the gas installation in accordance with the requirements of the regulatory authorities

9.2 Authorities' Approvals

Requirement: Provide documents evidencing approval of regulatory authorities before Practical Completion or other specified date.

Works by Authority: If the responsible authority elects to perform or supply part of the Works, make the necessary arrangements with the authority and pay and bear the fees payable in connection therewith.

9.3 Abbreviations

AGA: The Australian Gas Association.

ALPGA: The Australian Liquefied Petroleum Gas Association.

9.4 Inspection

Notice: Give sufficient notice so that inspection may be made at the following stages, where applicable:

- Trenches excavated and ready for pipe laying;
- Works ready for specified testing; and
- Enclosed work ready to be covered up or concealed.

9.5 Quality

9.5.1 Data Submissions

Before installation commences, obtain and submit the following data:

- **Manufacturer's Data**: The manufacturer's published product data, including
  - Technical specifications;
  - Recommendations for installation; and
  - Type test or factory test data.
- **Testing Authority's reports**: Test reports certified by an independent testing authority showing compliance with the test criteria;
- **Product warranties**: The manufacturer's written statement certifying that the product complies with the specification and is suitable for the intended use; and
- **Approval of Installer**: If the installation is not by the manufacturer, and the manufacturer's warranty is conditional on his approval of the installer, the manufacturer's written approval of the specialist installing firm.

9.6 Testing

9.6.1 Testing

Requirement: Carry out the required tests in the presence of the Managing Contractor and an authorized representative of the relevant authority. Supply the apparatus and materials necessary. Submit the test results in writing. Replace and retest components, which fail the required test.

Storage tanks: Deliver storage tanks with a current certificate showing that the tank has been tested to AS1210.

Preparation for Testing: Seal off items of equipment not designed to withstand the test pressure. Securely anchor pipes and fittings in position to prevent movement during the tests.

Concealed Work: Do not cover or conceal work until it has been tested. Leave pipe joints exposed to enable observation during the tests.

9.6.2 Completion

Commissioning: On completion of installation and testing, turn on isolating and control valves, and purge and charge the installation.

Supply of Gas: Hand over the installation fully charged with gas.

9.7 Installation

9.7.1 Installation

Concealment: Where practicable install pipework so that it is concealed within ducts or non-habitable enclosed spaces and does not appear on external walls. If concealment is not practicable use metal pipework mounted on metal brackets and fitted with metal cover plates at entry points into other building elements. Obtain prior approval for the location of exposed pipework.

9.7.2 Accessibility

Location: Locate pipe fittings requiring maintenance or servicing, including control valves, joints designed to enable removal of pipes, and the like, in accessible positions with adequate clearance and ventilation.

Removability: As far as practicable install components such as pipe fittings so that they are removable without damage either to themselves or to the building structure or finishes.

Inaccessible Pipework: If pipework is proposed to be enclosed in such a manner as to be not accessible after completion, obtain prior approval for the location of pipe runs and pipe fittings.

9.7.3 Underground Installation

Location Marking: During backfilling lay warning tape 300mm above, and for the full length of, buried gas pipes.

Warning Tape: Minimum 100mm width, of durable plastic identification tape, with "GAS PIPE UNDER" marked continuously 200mm above the obvert of the pipe.

Identification: Lay a detectable strip of polyethylene marker tape with a S/s wire trace in the trench identifying the service, 300mm above the obvert of the pipe. The Trade Contractor shall provide a sample of the proposed product to be supplied for approval.

Marker Plates: Provide galvanized steel or brass marker plates at ground level at each change of direction in the underground pipeline, engraved to show the direction of the line and name of the service. Inset the marker in a 150 x 150 x 150mm concrete block, with the top set flush with ground level.

Reinstatement: Reinstate the ground surface to the original condition and to match adjacent surfaces, where applicable.

9.7.4 Embedded Pipework

Approval: Obtain approval before embedding pipes in concrete walls or floors, or chasing into concrete or masonry walls. Cut chases with a power tool designed for the purpose.

Embedded Pipes: Install pipes embedded in concrete in continuous lengths, without fittings, which do not cross any movement joint or joint between two adjoining sections of reinforced concrete through which reinforcement does not extend.
Minimum Cover: 25mm

Expansion and Contraction: Sheath or sleeve pipework chased into masonry or encased in concrete so that expansion or contraction can take place without damage to the pipe or to the material or surface finish of the surrounding element.

9.7.5 Building Penetrations

Sleeves: Where pipes pass through building elements provide purpose made metal or plastic sleeves (in fire-rated elements, metal only) formed from pipe sections. Prime paint ferrous surfaces. If the building element is fire rated or acoustic rated, maintain the rating by packing the annular space with suitable insulation or fire stopping material and, if necessary, by insulating the pipe on both sides of the penetration.

9.8 Finishes

9.8.1 Corrosion Protection

Protection methods for underground ferrous pipe and other pipework liable to external corrosion:

- **Sheathing**: Wrap the pipework in high impact resistant 250 micrometre polyethylene film to AS3680, secured at 1m intervals by 55mm wide adhesive polyethylene tapes to AS1599; or provide proprietary pipe with equivalent factory applied sheathing;
- **Sleeves**: Polyethylene sleeving to AS3680 and AS3681; and
- **Cathodic protection**: A system using sacrificial anodes or impressed current. Incorporate a facility for periodic testing.

9.8.2 Pipework

Copper tubes: To AS1432 type 'B'.

Fittings: Copper or copper alloy to AS1589 unless otherwise specified.

Silver Brazed Joints: Use low temperature silver brazing alloy rods to AS1167 classification B2 and oxyacetylene heating.

Gas connection with press-fit fitting made of copper or gunmetal. Inspection of un-pressed fittings utilise a positive leak path for the whole range 2.2kPa to 300kPa when a dry pressure test is performed and 100kPa to 650kPa with a wet pressure test. This warranted safety function is facilitated by a channel in the metallic body of the fitting. After pressing, the connection is permanent and inseparable. The seal is made of HNBR, and the fitting body has a cylindrical pipe guide in front of the seal Fittings carry conformance certifications to international Gas standards DVGW VP 614 and ANSI LC4.

9.8.3 Pipework Finishes

Requirement: Finish exposed pipework, including fittings, supports and the like as follows:

- Copper and copper alloy pipework in internal locations such as ablution, toilet and kitchen areas: Chrome plate to AS1192 service condition 2, bright;
- Metal pipework including metallic protective coatings except chrome plating: A full gloss solvent borne paint system or equivalent (interior or exterior as appropriate), colour to match adjacent surfaces; and
- Pipework in concealed but accessible spaces (including ducts and non-habitable enclosed spaces): Leave unpainted except for required identification marking.

Pipework Identification: To AS/NZS 5601.1 clause 5.1.12.

Pipework Finishes Schedule: Finish valves to match connected pipework. Valve hand wheel colour to be black.

9.8.4 Pipe Fittings and Supports

9.8.5 Pipe Supports

Support Materials: Use the same materials as the pipe, or galvanized or non-ferrous metals. Separate dissimilar metals with bonded PVC or glass fibre woven tape sleeves. Provide fixings of compatible material.

Fixing to Masonry: Galvanized steel or non-ferrous metal bolts or screws into metal masonry anchors. Do not use explosive powered fixings.

9.8.6 Pipe Support System

To allow movement of pipework the following components shall be allowed for in the gas installation.

Pipe Anchor: Shall be installed at the centre of the gas riser. The installation shall be in accordance with the requirements of AS/NZS 5601.1 Appendix K.

Pipe Riser Clamp: Pipe riser clamps shall be installed at every 7 levels. Installation at bottom, top and middle of the gas riser should be allowed. The installation shall be in accordance with the requirements of AS/NZS 5601.1 Appendix K.

Pipe Guides: Shall be installed at max 3m spacing to hold the pipework in position and in-line, to allow the pipe clip to move in it's bracket as the pipe moves. The installation shall be in accordance with the requirements of AS/NZS 5601.1 Appendix K.

Spring Clips: Spring clips shall be installed in the horizontal sections of pipework to allow for vertical movement. The spacing of the spring clips shall be in accordance with AS/NZS 5601.1 Clause 5.8.2. The installation shall be in accordance with the requirements of AS/NZS 5601.1 Appendix K.

The contractor must allow for adequate thermal expansion and building shrinkage. Expansion due to thermal expansion is expected to be approximately 12-15mm across the 10 storeys. Allow for an expansion loop installed in the centre of the pipe riser.

A durable, permanent plan of the gas installation is to be fixed to the inside of the Gas Meter room, in accordance with the requirements of AS/NZS 5601.1

9.8.7 Gas Valves

Type: Shall be manufactured and tested in conformity with AS 4617 Manual Shut off gas Valves. The valve shall have a spherical ball type with approved lubricant.

9.8.8 Cover Plates

Requirement: Where exposed gas lines emerge from wall, floor or ceiling surfaces other than in plant rooms and the like, provide cover plates compatible with the pipe materials and which comply with the following table.
Cover plate size table:

Table 9-1 Cover Plate Requirements

Pipe size (mm)	Cover Plate Diameter (mm)
up to 20	65
21 - 50	100
larger than 50	pipe diameter +50

Finish: To match the pipeline finish.

9.9 Pits and Boxes

9.9.1 Valve Boxes

Requirement: Provide valve boxes for access to underground valves.

Construction: Standard cast iron boxes with hinged covers. Set tops flush with pavement surfaces, or 15mm above unpaved surfaces. Provide an in situ concrete surround 150mm thick, to the top, bottom and sides of the box, with exposed surface steel trowelled. Set a shaft of UPVC pipe beneath each box to give access to the valve.

Identification: Stamp the box cover with the word "GAS".

9.9.2 Wall Boxes

Requirement: Provide wall boxes to accommodate above ground valves, regulators and the like.

Construction: Body: 1.2mm galvanized steel plate continuous welded box construction with leading edge folded twice at 90° to form 25 x 25mm frontal surround.

Fixing: Fix to masonry backing with four 10mm galvanized masonry bolts.

Drainage and ventilation relief: Set the bottom of the box to fall outward. Form four 10mm diameter holes in the frontal surround section at box floor level.

Sleeves: Provide, to the box floor inlet and outlet pipes, sleeves formed of 1.2mm thick steel tube with 1.2mm galvanized flanges to pipe diameter plus 50mm. Bed each flange on epoxy mortar and rivet to the floor of the box with four 3mm diameter rivets.

Doors to boxes: Metal frame with 2.5mm clear float glass glazing. Affix to the glass with adhesive a white laminated plastic label 200 x 100mm, engraved with red letters "IN CASE OF EMERGENCY BREAK GLASS AND SHUT VALVES". Provide lock, keys and two 100mm brass hinges.

9.9.3 Access Pits

Requirement: Provide concrete access pits with removable pit covers to house control valves, regulators, and the like, if installed below ground.

Internal Dimensions: To give 300mm clear space below and on all sides of the fittings in the pit.

Sides and Floor: 20MPa concrete, 100mm thick, reinforced with F82 fabric.

Pit Cover: Galvanized mild steel floor plate 5mm thick, with lifting holes, hinged to a galvanized steel angle frame with lugs for casting in.

Identification: Stamp the pit cover with the word "GAS".

Installation: Grade the floor to a point on one side and provide a gravity drain to remove water from the pit. Do not connect the drain to any other substructures or drains. Carry the pit walls up to 50mm above finished ground level. Cast in the pit cover frame flush with the top. Trowel the top smooth.

9.10 Gas Supply and Appliances

9.10.1 Connection To Main Supply

Requirement: For natural gas installations advise the local authority as to the additional gas loadings required to the site and allow for any fees, costs or provisions that the local authority may have to undertake to upgrade the existing connection.

By-pass: If a by-pass is required provide a valved by-pass to the main meter.

9.10.2 Appliances

Requirement: Install and commission the gas appliances in accordance with the requirements of the regulatory authorities and AS/NZS 5601.1.

Certificate of Appliance Approval: Supply a certificate from the manufacturer stating that the appliance meets with AGA/ALPGA approval for operation with the type of gas to be used.

Operating Instructions: Before practical completion supply a copy of the operating instructions for each gas appliance.

10 Ground Works

10.1 Service Trenches

10.1.1 General

Excavation: Excavate to the lines, levels and grades as required for soil waste and storm water drainage, inspection chambers and cold water specified in the relevant Sections of the Specification.

Trenches: Excavate trenches truly straight and with uniform grades unless otherwise directed. Trench sides shall be as near to vertical as possible.

Commence excavation at the downstream end of the proposed pipeline and proceed upstream not excavating further than will be able to be backfilled, following the pipe laying operation, in that day of work.

Trench depths shall be to the underside of pipe bedding. Take out joint holes as required to accommodate pipe sockets and to relieve them of any load when the pipes are bedded and the trenches backfilled.

De-water when necessary as specified in "Dewatering".

Foreign matter: Cut back roots encountered in trenches to not less than 600mm clear of the pipe, conduit, cable, etc. Remove such other roots, stumps or obstructions which may, in the opinion of the Superintendent, interfere with the proper functioning of the service.

Sewerage and water supply: Unless otherwise specified, or as shown on the drawings, trench widths shall be in accordance with the Sewerage and Water Supply Act 1949-1985.

Storm water: The width of storm water drainage trenches having vertical sides shall be, as shown on the drawing or the internal diameter of the pipe plus 150mm on each side with a minimum width of 600mm overall.

Extra width: Allow for any extra width needed for shoring. Increase trench widths where necessary to permit the construction of manholes and pits.

Rock: The hydraulic sub-contractor shall allow for all excavation of rock, unless noted otherwise. The contractor shall carry out a site inspection and utilise the information from the soil report to make an assessment of the nature of the existing soil conditions beneath the surface.

Blasting is not permitted for excavation work.

Additional payment for rock in trench excavation shall only be considered where material cannot be removed by a 20 tonne hydraulic excavator fitted with a single tooth ripper and/ or tiger teeth or boulders with a min. dimension of 1m.

10.2 Clay Plug for Trenches

Service trenches in an “H” or “E” soil classification shall be sloped away from the building and be backfilled with clay in the top 300mm within 1.5m of the building. The clay used for backfilling shall be compacted.

Where pipe trenches pass under the footing system, in any soil classification, the trench shall be backfilled at the line of the external wall with a 500mm long impervious material, clay or concrete, to ‘plug’ the trench and restrict the ingress of water beneath the footing system.

10.3 Excavation in Existing Road Pavements

Requirement: Obtain approval of all relevant Authorities before excavating any public road or footpath including alternative traffic arrangements. Saw through existing pavements in the way of excavation with parallel cuts through the full thickness of pavement. Restore to original condition on completion of backfilling.

10.4 Boring

Where required as noted on the drawings, provide boring by an approved specialist sub-contractor. Make the bored dimension slightly less than the relevant service pipe to ensure a tight fit. If voids are encountered, or the bore over-sized, then fill it by pressure grouting with not less than 3% stabilised sand.

10.5 Bedding of Services

Requirement: Bed services as specified elsewhere.

10.6 Excavation

10.6.1 Bad Ground

Notify Managing Contractor: Should unsuitable foundation material be encountered or soft, wet and unstable areas develop during excavation and filling, that are not a result of the Trade Contractor's inability to dewater the excavation as specified in "Dewatering" Clause or not as a result of maintaining the performance of work to the specified standard, obtain instructions from the Managing Contractor before carrying out any further work.

10.7 Compaction

10.7.1 General

Optimum moisture content: Ensure that material to be compacted is at or within 2% of the optimum moisture content. If necessary, add water or allow to dry, as appropriate, to achieve this condition.

Compact each layer of filling as it is placed to the required relative compaction.
Hand tamp against ground beams, perimeter beams and walls. Ensure that partially completed structures can withstand compaction loadings. Prop if necessary.

10.7.2 Compaction Schedule

Table 10-1 Compaction Schedule

Area	Under Buildings & Pavements		Under Unpaved Areas	
Material Type	**A**	**B**	**A**	**B**
Fill more than 300 mm below PL	95%	75%	95%	75%
Fill less than 300 mm below PL	100%	80%	95%	75%
Excavated and stripped areas	100%	80%	95%	75%
Special Fill	95%	80%	---	---

Material type A: Cohesive material which shall be compacted to the above dry density ratio of the maximum dry density. All dry density ratios relate to AS1289 with Standard compaction energy input, except for special fill where modified compaction energy input is required.

Material type B: Cohesion-less material which shall be compacted to the above dry density index as determined in accordance with AS1289.

10.8 Dewatering

Requirement: Maintain excavations, levelled and filled areas free of water by temporary catch drains, sumps, pumping, bailing or whatever means are suitable and effective.

Free water: Immediately before placing concrete, masonry or pipe bedding on ground remove all free water and foreign matter.

PREVENT any water flow over freshly laid work.

TAKE PRECAUTIONS to prevent inconvenience or damage to adjoining properties from dewatering activities

10.9 Soil Report and Classification

Obtain a copy of the soil report and take into account any soil conditions likely to affect the in-ground installation and extent of this contract. The contractor shall be aware of the soil classification and where required in ground piping to allow for movement.

10.10 Excavation Security

Ensure against collapse with adequate shoring. Provide all warning lights, barriers, planking, etc, to ensure the safe working conditions. If excavating adjacent structures, determine the depth of structure footing and stability of walls, etc. Ensure that excavations do not undermine footings and other structures.

11 Building Management System

11.1 Fire Hydrant Pressure Pump

Table 11-1 BMS - Fire Hydrant Pressure Pump

Description	Termination	Location	Signal	Trend	Alarm
Pump run/status		Control Panel	Digital	No	No
Pump Fault		Control Panel	Digital	No	Yes

11.2 Fire Hose Reel Jacking Pump

Table 11-2 BMS - Fire Hose Reel Jacking Pump

Description	Termination	Location	Signal	Trend	Alarm
Pump run/status		Control Panel	Digital	No	No
Pump Fault		Control Panel	Digital	No	Yes

11.3 Pulse Water Meters (connected to the EMS System)

Table 11-3 BMS - Pulse Water Meters

Description	Termination	Location	Signal	Trend	Alarm
Status	Terminal Strip		Digital	No	Yes
Meter Reading	Terminal Strip		Digital	Yes	No

11.4 Rainwater Pumps and Mains Water Changeover System

Table 11-4 BMS - Rainwater Pumps and Mains Water Changeover System

Description	Termination	Location	Signal	Trend	Alarm
Pump run/status		Control Panel	Digital	No	No
Pump Fault		Control Panel	Digital	No	Yes

ST. MATTHEW'S CATHOLIC SCHOOL MUDGEE

Click to enter Appendix heading

CATHOLIC EDUCATION DIOCESE OF BATHURST



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EXTERNAL WALL SYSTEM DISCLOSURE STATEMENT (DESIGN)
EXTERNAL WALL COMPONENTS (TYPE A & B CONSTRUCTION)

Project Name	*St Matthew's Catholic School*
Address	*48 Broadhead Road, Spring Flat*
Part of Building	*Block E*
BCA referred to	BCA 2019 Amendment 1

- I confirm that the table provided overleaf identifies all the proposed external wall systems and wall elements designed for the subject development, including the component elements of those systems, and any attachments thereto.
- I have undertaken reasonable investigations to ascertain that these systems and components comply with the non-combustibility requirements of Clause C1.9 of the BCA, such as reviewing product technical information, fire test reports, code mark certificates, fire-engineer's reports and external consultant advice.
- I have undertaken reasonable investigations to ascertain that any sarking-type materials associated with the external wall system design comply with Clause C1.9 of the BCA insofar as these materials do not exceed 1 mm in thickness and have a Flammability Index not greater than 5.
- Supporting documents that demonstrate compliance for each wall type with the relevant sections of the BCA are provided and attached.
- I am a suitably qualified person and my qualifications and accreditations are listed below.
- The information contained in this statement is true and accurate to the best of my knowledge.

Relevant qualifications and accreditations: Registered Architect NSW reg 3130

Name: Charles Glanville

Company: Alleanza Architecture

Address: Level 1 695-699 George St, Haymarket NSW 2000

Phone No. 8039 8822 *Email* Charles.glanville@alleanza.com.au



24.05.21

Signature **Date**

EXTERNAL WALL ELEMENTS TABLE The table below must be completed for all wall types.

LINING / CLADDING MATERIAL *(Note. Nominate every type of external cladding and/or wall material)*

External/Cladding Material (E.g. Fibre cement sheeting, prefinished metal sheeting, masonry etc)	**Elevation(s)**	**Structural frame material**	**Manufacturer** (E.g., Fairview, CSP, HVG etc)	**Product Name** (E.g., MondoClad, Vitradual, Styrum. Alfrex Solid etc)	**Test certificate, Codemark certificate or Fire Engineering Report** (List all documents evidencing compliance)	**Nominated or proprietary installation requirements** (relevant installation details or guidelines must be listed below and attached)
Face Brick	All	Steel frame	PGH	Smooth Volcanic	20_06_30 Compliance of PGH bricks for fire safety	Proprietary
Fibre Cement Sheeting	All	Steel Frame	CSR	Express Panel	wfra-45759_11	Proprietary
Metal Sheeting	All	Steel Frame	Lysaght	Spandek	FNE11605_-_COLORBOND(R)_steel_PE – 210311 Lysaught roofing and walling - Roofing and Walling_WEB	Proprietary

INSULATION *(list all types of non-combustible insulation that is proposed to be incorporated in the external wall system)*

Product Name (E.g. Mineral Wool, Glass Wool etc)	**Manufacture**	**Elevation**	**Test certificate reference**	**Nominated or proprietary installation requirements**
Glass Wool	CSR Bradford	All	CSIRO Report FCO-2805 Rev D - Issued to Ben Cooper. Alleanza Architecture. 21.04.2021 CSIRO Report FNC-9694 - Issued to Ben Cooper. Alleanza	Proprietary

			Architecture. 21.04.2021	

SARKING *(list all types of sarking that is proposed to be incorporated in the external wall system)*

Product Name	Manufacture	Elevation	Test certificate reference	Nominated or proprietary installation requirements
Proctor Wrap Commercial Wall	CSR Bradford	All	AWTA Test Number 16-006359 - Issued to Ben Cooper. Alleanza Architecture. 21.04.2021	Proprietary

PACKERS *(list all types of non-combustible packers that are proposed to be incorporated in the external wall system)*

Product Name (E.g. aluminium packers etc)	Manufacture	Elevation	Test certificate reference	Nominated or proprietary installation requirements
Steel furring channels	Rondo	All	GALVABOND_G2_G2S_	Proprietary
TBA Firefly Vulcan 0.2 Thermal Break	TBA Firefly	All	AS1530.1 TEST TBA FIREFLY VULCAN THERMAL BREAK ALFOIL LAYER	Proprietary

ATTACHMENTS *(list all types of attachments that is proposed to be incorporated in the external wall system)*

Product Name	Manufacture	Elevation	Test certificate reference	Nominated or proprietary installation requirements

ANCILLARY ELEMENTS *(list all types of ancillary elements that are proposed to be incorporated within the external wall system i.e., packers, insulation to pipes etc)*

Product Name	**Manufacture**	**Elevation**	**Test certificate reference**	**Nominated or proprietary installation requirements**
Aluminium Window suites	Alspec	All		Proprietary

APPENDIX A – FAÇADE MATERIAL DATA SHEETS

Materials in external walls comprise:

1. PGH smooth volcanic-	20_06_30 Compliance of PGH bricks for fire safety
2. CSR Cemintel ExpressPanel commercial -	wfra-45759_11
3. Metal Sheet cladding –	Lysaght Spandek Colorbond - FNE11605_-_COLORBOND(R)_steel_PE – 210311
	Lysaught roofing and walling - Roofing and Walling_WEB
4 CSR Bradford -	CSIRO Report FCO-2805 Rev D - Issued to Ben Cooper. Alleanza Architecture. 21.04.2021
	CSIRO Report FNC-9694 - Issued to Ben Cooper. Alleanza
5.Proctor Wrap Commercial Wall -	AWTA Test Number 16-006359 - Issued to Ben Cooper. Alleanza Architecture. 21.04.2021
6. Light weight steel framing –	GALVABOND_G2_G2S
7.Thermal Break -	TBA Firefly Vulcan 0.2 Thermal Break

To whom it may concern,

Subject: Compliance of PGH Bricks and Paver products (clay masonry units).

Thank you for providing the opportunity to explain how PGH products (clay masonry units) comply with the requirements of the National Construction Code (NCC) for fire safety.

Fire Resistance Level's (FRL's).

In accordance with the National Construction Code (NCC) Schedule 5, AS 3700 'Masonry Structures' (2018) is an acceptable construction manual for deriving the Fire Resistance Level (FRL) of masonry building elements (i.e. walls comprised of clay masonry units) for meeting the NCC's FRL requirements, which are then, in part, deemed to satisfy the NCC's performance requirement CP1 and CP4 (Volume 1), as well as P2.3.1 (Volume 2).

Under AS 3700 (2018), for its provisions to apply, clay masonry units must be manufactured in accordance with AS/NZS 4455. Note that PGH manufactures all units in accordance with AS/NZS 4455.1 – tested to the AS/NZS 4456 suite of standards at PGH's NATA accredited laboratory, and therefore AS 3700 can be used to derive the FRL of walls comprising of PGH clay masonry units

Fire resistance levels (FRL's) are expressed in minutes by - structural-adequacy/integrity/insulation.

FRL (insulation)

The FRL for insulation for masonry walls is determined in accordance with section 6.5 of AS 3700 (2018) and is a function of the wall's material thickness.

When the masonry units used in the wall have a coring percentage of less than 30%, the material thickness is taken as the walls thickness. For a cavity wall, the material thickness is taken as the sum of the material thicknesses of the separate leaves.

Accordingly, when designed and constructed in accordance with AS 3700 (2018), a 110mm thick masonry wall/leaf, constructed from 110mm thick clay masonry units with a core percentage of less than 30% will provide a wall thickness of 110mm and an FRL of 90 minutes (table 6.3, AS 3700).

As such, masonry walls constructed from any 110mm thick PGH bricks with 30% coring or less, are deemed to provide an FRL for insulation of 90mins.

Additionally, under section 6.5.2 of AS 3700 (2018), render applied to a face not exposed to fire can be considered to contribute to the wall's material thickness (and increase the FRL) for up to a maximum thickness of 20mm.

FRL (structural adequacy)

The FRL for structural adequacy is required of loadbearing masonry walls/leaves only.

The FRL for structural adequacy of a masonry cavity wall system (i.e. two masonry leaves), is provided by the internal loadbearing leaf only.

As the outer masonry leaf in brick veneer walls is non-loadbearing, the masonry leaf is not required to demonstrate structural adequacy as this is the responsibility of the structural frame it is supported by, which needs to be designed accordingly, though the masonry leaf must still be designed and constructed to meet the other requirements of AS 3700 (2018).

Note that, under the NCC (volume 2) section 3.7.2.4(b)(ii), a clay masonry veneer wall in residential housing, of at least 90mm thickness, designed and installed in accordance with AS 3700 (2018) is deemed to provide an FRL of 60/60/60.

The FRL for structural adequacy of loadbearing masonry walls/leaves is determined via Section 6.3 of AS 3700 (2018), and depends on several factors, namely the walls slenderness ratio which depends on the wall thickness, height, length, and support conditions. As the FRL for structural adequacy depends on how each wall being assessed is assembled, each walls FRL for structural adequacy must be assessed and determined independently by the Project Engineer.

Due to the above, the following information is provided on an informative basis only and cannot be used as certification that particular walls on specific projects meet the FRL's stated; the Project Engineer must satisfy themselves that the wall's designed and as constructed, conform to the requirements of AS 3700 (2018) and meet the required FRL's for structural adequacy. Nonetheless, in accordance with Section 6.3 AS 3700 (2018), provided that a loadbearing 110mm thick masonry wall/leaf has been designed and constructed in accordance with AS 3700 (2018), with a height no greater than 3m and adequate lateral support on its top loadbearing edge, it will deliver an FRL (structural adequacy) of at least 90 minutes. The FRL for structural adequacy of this wall will increase to 120 minutes for lengths less than 4m but greater than 3m, and 180 minutes for walls less than 3m in length.

FRL (integrity)

The FRL for integrity of masonry walls is determined in accordance with Section 6.4 of AS 3700 and is taken as being the lesser of the above two values, structural adequacy and insulation.

Non-combustibility.

According to the NCC performance requirement CP2(a)(iii) "A building must have elements which will, to the degree necessary, avoid the spread of fire between buildings". Under the deemed to satisfy pathway for compliance with CP2(a)(iii), external walls are not necessarily required to be non-combustible for class 1 and 10 buildings, or class 2-9 buildings that are of type C construction. For class 2-9 buildings, internal fire-resisting walls in buildings of type A and B construction, external walls and spandrels in type A construction as well as certain external walls of buildings of type B construction are, however, required to be non-combustible under the deemed to satisfy pathway of compliance.

Under the NCC, by definition a wall is non-combustible if it is constructed wholly of materials that are not deemed combustible when tested in accordance with the combustibility test for materials AS 1530.1 or unless materials are given an exemption by being listed in C1.9 of NCC (volume 1).

It is generally accepted that fired clay masonry units are non-combustible and will remain stable during a fire (addressing CP1), they will not contribute to the spread of fire spread (addressing CP2 and CP4)) or produce smoke or toxic gases (addressing CP3 and CP4). This is because during the manufacture of PGH bricks, they are fired in kilns at in excess of 1100°C without combusting. Any organic material or combustible components in the raw clay is burnt out during this process. Note that when a material is tested in accordance with AS 1530.1, the furnace temperature stabilises at 750°C +/- 5°C. Considering that clay masonry units are fired to temperatures almost double what is required to pass the AS 1530.1 test, and do not combust during the manufacturing process, clay masonry units (including those manufactured by PGH) are considered as being non-combustible.

Reaction to fire – fire hazard properties.

C1.10 of the NCC contains deemed to satisfy fire hazard requirements for certain materials used in/as linings fire hazard. C1.10(c) lists several materials which are deemed to comply with the requirements and are not required to prove their fire hazard properties through testing. On this list, C1.10(c)(i), is 'plaster, cement render, concrete, terrazzo, ceramic tile or the like'. Both brick and mortar fall under this category, therefore brick and mortar are deemed to comply with the NCC's fire hazard properties.

Appropriateness for use in Bushfire Prone Areas.

Under the NCC, compliance with AS 3959 'Construction in bushfire prone areas' is deemed to satisfy GP5.1 (NCC -vol1) and P2.7.5 (NCC -vol2). In accordance with AS 3959 Section 9.4.1(a), walls constructed in bushfire-prone areas with a Bushfire Attack Level (BAL) up to flame zone (FZ), the exposed elements of the walls must be comprised of non-combustible materials which AS 3959 Section 9.4.1(a)(i) includes as being full masonry or masonry veneer walls with an outer leaf of clay that is at least 90mm thick. As such, 110mm thick PGH bricks are appropriate in all BAL's. Attention must still be made to the AS 3959 detailing requirements of walls constructed in bushfire areas, for example the treatment of joints, weep holes, vents, etc…

Disclaimer.

All PGH clay fired masonry units conform to the unit requirements of AS 3700 via AS/NZS 4455.1 'Masonry units, pavers, flags and retaining wall units; Part 1: Masonry units' and testing to AS/NZS 4456 'Masonry unit, pavers and flags – Method of test' at PGH's NATA accredited laboratory. Masonry walls constructed from PGH bricks must be designed and constructed in accordance with, and to meet the requirements of, the National Construction Code (NCC), as verified by the Project Design Professionals. PGH does not accept responsibility for the adequacy of any buildings or walls designed or constructed using PGH units. The Project Design Professionals must satisfy themselves that information herein is acceptable for the intended application, and that the building/structure is designed and constructed to conform with the requirements of the NCC.

Please contact me should you require further clarification.

Kind regards,

Jake Ring BE, BComm, MIEAust
Innovation Engineer (Structures, Facades, Compliance)

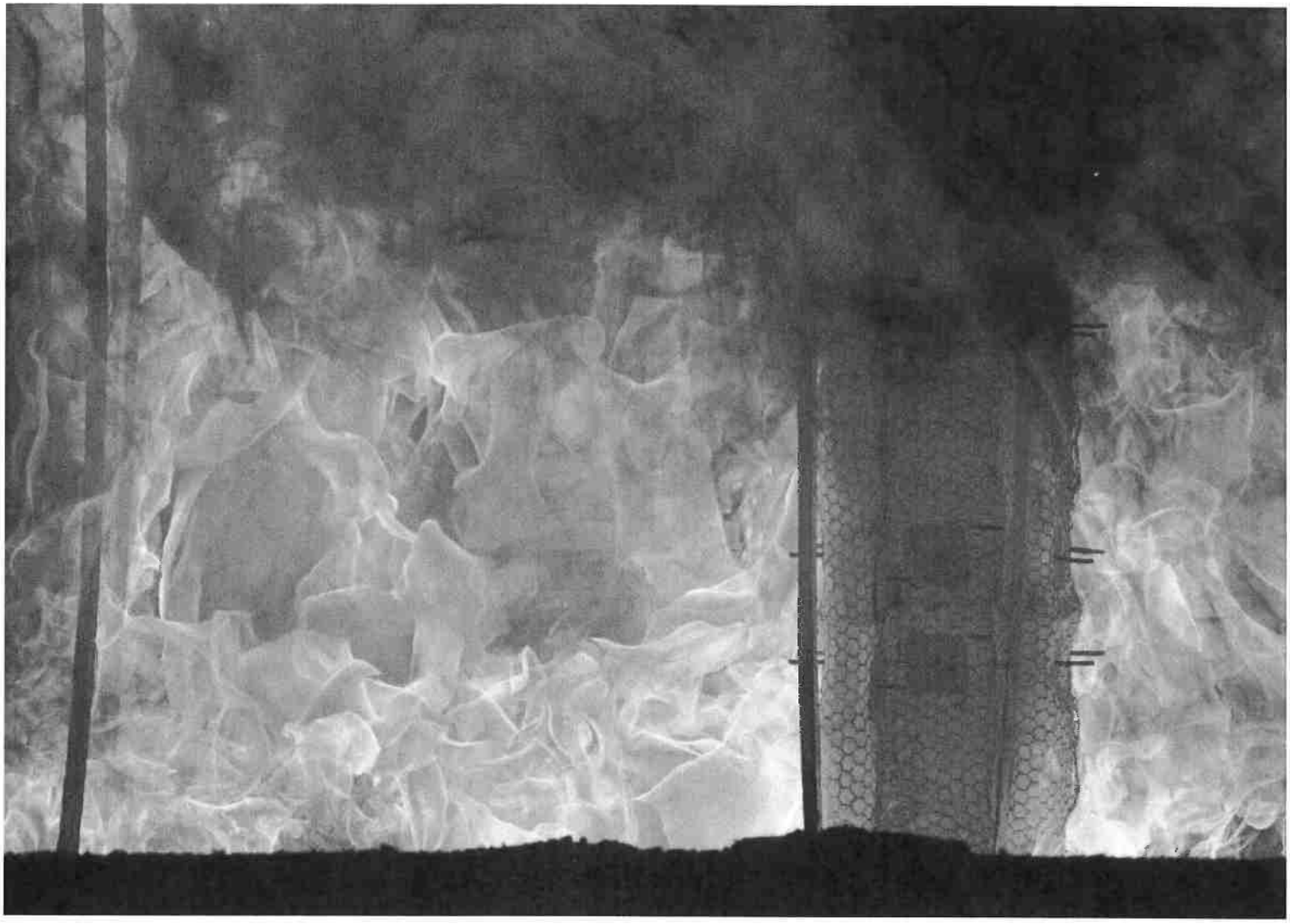
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Fire assessment report

CSR Gyprock plasterboard and CSR Cemintel fibre cement products assessed with Group numbers

Client: CSR Gyprock

Product: plasterboard and fibre cement products

Project reference number: FAS190252 Report number: 45759 Revision: R11.0

Issue date: 11 August 2020 Expiry date: 30 November 2024

Quality Management

Version	Date	Description	Prepared by	Reviewed by
45759.1	13/08/2004	Initial issue	J P England	Leong Poon
45759.2	19/08/2004	Typographic correction	J P England	Leong Poon
45759.3	12/06/2009	Revised to include average specific extinction area.	J P England	J Richardson
45759.4	06/01/2010	Revised to include EC08 products	K Nicholls	M Kamal
45759.5	30/09/2013	Revised to include various fibre cement based products	K Nicholls	S Hu
45759.6	28/05/2014	Revised to include various fibre cement based products	K Nicholls	D Nicholson
45759.7	21/11/2014	Revised to include various plasterboard products	K Nicholls	D Nicholson
45759.8	06/09/2017	Revised to include various plasterboard products	O Saad	C McLean
45759.9	20/09/2018	Revised to extend the validity for five years and addition of new products	R Aldarwish	O Saad

Version	Date	Information relating to report			
45759 R10.0	Issue: 12/11/2019	Reason for issue	Report issued to CSR Gyprock for review and comment.		
			Prepared by	Reviewed by	Approved by
	Expiry: 30/11/2024	Name	Hon Wong	Omar Saad	Omar Saad
45759 R10.1	Issue: 15/11/2019	Reason for issue	Minor changes and amendments to clients comments		
			Prepared by	Reviewed by	Approved by
	Expiry: 30/11/2024	Name	Hon Wong	Omar Saad	Omar Saad
45759 R11.0	Issue: 11/08/2020	Reason for issue	Addition of new plasterboards including Gyprock Habito H and test data		
			Prepared by	Reviewed by	Approved by
	Expiry: 31/08/2025	Name	Hon Wong	Mahmoud Akl	Mahmoud Akl
		Signature			

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Executive summary

This assessment considers the performance of a range of CSR wall and ceiling linings when assessed against the criteria of Specification C1.10 of the National Construction Code of Australia (NCC) 2019 and AS 5637.1:2015[1].

This report documents the findings of the assessment undertaken to determine the likely fire hazard properties of the CSR wall and ceiling lining products if tested in accordance with AS ISO 9705-2003 (R2016)[2] and AS 5637.1:2015. The majority of the previously assessed products were based on data from tests conducted in accordance with AS 1530.3:1999 (R2016)[3] and AS/NZS 3837:1998 (R2016)[4] The sponsor had subsequent re-testing conducted on representative samples of the range of products to establish new baseline data in accordance with the current requirements to AS 5637.1:2015 and AS ISO 9705-2003 (R2016).

The analysis conducted in section 5 to section 6 of this report found that the proposed variations are likely to achieve Group number and information on smoke production rates as shown in Table 1, if tested in accordance with AS ISO 9705-2003 (R2016) and AS 5637.1:2015.

Table 1 Variations and assessment outcome

Product	Reference test and assessment report	Assessment classification - group number
CSR Gyprock plasterboard products		
10~13 mm Gyprock Plus	RTF190098.1 and associated assessment report- FAS190127 R1.0	**Group No. = 1** **$SMOGRA_{RC}$ (in $m^2 \cdot s^{-2} \times 1000$) = 0.5** **In accordance with AS ISO 9705-2003 (R2016) and AS 5637.1 :2015 for compliance with NCC 2019 in Australia** **and** **Group No. =1-S** **Average smoke production rate (0 to 20 minutes) = 0.16 $m^2 \cdot s^{-1}$** **In accordance with C/VM2 – Verification Method: Framework for Fire Safety Design (for applications in New Zealand).**
10~13 mm Supaceil		
10~13 mm Sensitive		
10~16 mm Standard plasterboard		
10~13 mm Soundchek		
10~13 mm Aquachek		
Flexible- 6.5mm (used in two layers)		
Impactchek- 13mm		
Superchek- 10mm		
25 mm ShaftLiner MR panel		
25 mm ShaftLiner MP panel		
25 mm ShaftLiner panel		
13~16 mm Fyrchek		
13~16 mm Fyrchek MR		
13 mm EC08 Partition		
13~16 mm EC08 Complete		
13 mm EC08 Impact		
13 mm EC08 Impact MR		
Gyprock perforated plasterboard panels: - 13 mm perforated panel 6 mm Round		

[1] Standards Australia, Determination of fire hazard properties Wall and ceiling linings, 2015

[2] Standards Australia, Fire tests - Full-scale room test for surface products, 2003 (R2016)

[3] Standards Australia, Methods for fire tests on building materials, components and structures Simultaneous determination of ignitability, flame propagation, heat release and smoke release, 1999 (R2016)

[4] Standards Australia, Method of test for heat and smoke release rates for materials and products using an oxygen consumption calorimeter , 1998 (R2016)

Product	Reference test and assessment report	Assessment classification - group number
- 12.5 mm Gyptone perforated ceiling panels- 12mm Square, 13 mm Square Minigrid, Slotted Minigrid - 12.5 mm Rigitone perforated ceiling panels- Matrix 8mm round, Astral, Matrix 12 mm Square, Galaxy - 6.5 mm Gyptone perforated panels- Flexible 12 mm Square, Flexible Slotted Minigrid Gyptone Access Panels- Frame-600 mm × 600 mm Hatch- 510 mm × 510 mm		
Gyprock plasterboard tiles: - Supatone- 10 mm - Arctic White- 13 mm - Perforated Tile- 13 mm		
Gyprock Habito H plasterboard of 12.5 mm thickness	RTF200198 R1.0 and ASCRRTF200198 R1.0	**Group No. = 1** **Average Specific Extinction Area (ASEA) = 7.3 m^2/kg** **In accordance with AS/NZS 3837:1998 and AS 5637.1:2015**
CSR Cemintel fibre cement products		
6~12 mm CeminSeal Wallboard	RTF190235.1	**Group No. = 1** **$SMOGRA_{RC}$ (in $m^2 \cdot s^{-2} \times 1000$) =0.2** **In accordance with AS ISO 9705-2003(R2016) and AS 5637.1:2015 for compliance with NCC 2019 in Australia** **and** **Group No. =1-S** **Average smoke production rate (0 to 20 minutes) = 0.1 $m^2 \cdot s^{-1}$** **In accordance with C/VM2 – Verification Method: Framework for Fire Safety Design (for applications in New Zealand).**
6~9 mm Rigid Air Barrier		
7.5~9 mm Texture Base Sheet		
8~12 mm Rendaline		
6 mm Cladding sheet		
9 mm Simpleline		
6 mm Eaves lining		
9~24 mm Compressed Sheet		
9~12 mm Expresspanel		
9~12 mm Barestone Exterior with colour options/ 9~12 mm Barestone Bark		
9~12 mm Barestone Interior with colour options/ 9~12 mm Barestone Bark		
8 mm Edge		
8 mm Mosaic		
7.5 mm Plank – Smooth and Woodgrain		
10 mm Headland Weatherboard		
12 mm and 16 mm Scarborough Weatherboard		
10 mm Endeavour Weatherboard		
16 mm Balmoral Weatherboard		
6 mm Soffitline		
18~22 mm Constructafloor Interior		
18~22 mm Constructafloor Exterior		

Product	Reference test and assessment report	Assessment classification - group number
16 mm Territory		
8 mm Surround		

Notes:

1. The perforated plasterboard panels may include acoustic fabric backing
2. The plasterboard panels with vinyl facings are not included in the assessment.
3. Mineral wool or glasswool panels are excluded from this assessment.
4. All fibre cement products shall have the same or similar % by weight composition of cellulosic fibres embedded in the cement base as the tested 6mm specimen.

The variations and outcome of this assessment are subject to the limitations and requirements described in section 2, 4 and 7 of this report. The results of this report are valid until 30 November 2024.

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1. Introduction

This assessment considers the performance of a range of CSR wall and ceiling linings when assessed against the criteria of Specification C1.10 of the National Construction Code of Australia (NCC) 2019 and AS 5637.1:2015.

This report documents the findings of the assessment undertaken to determine the likely fire hazard properties of the CSR wall and ceiling lining products if tested in accordance with AS ISO 9705-2003 (R2016) and AS 5637.1:2015. The majority of the previously assessed products were based on data from tests conducted in accordance with AS 1530.3:1999 (R2016) and AS/NZS 3837:1998 (R2016) .The sponsor had subsequent re-testing conducted on representative samples of the range of products to establish new baseline data in accordance with the current requirements to AS 5637.1:2015 and AS ISO 9705-2003 (R2016).

This assessment was carried out at the request of CSR Gyprock. The sponsor details are included in Table 2.

Table 2 Sponsor details

Sponsor	Address
CSR Gyprock	376 Victoria Street Wetherill Park NSW 2164 Australia

2. Framework for the assessment

An assessment is an opinion about the likely performance of a component or element of structure if it were subject to a standard fire test.

No specific framework, methodology, standard or guidance documents exists in Australia for doing these assessments. Therefore, we have followed the Guide to Undertaking Assessments In Lieu of Fire Tests prepared by the Passive Fire Protection Federation (PFPF) in the UK[5].

This guide provides a framework to undertake assessments in the absence of specific fire test results. *'Some areas where assessments may be offered are:*

- *Where a modification is made to a construction which has already been tested*
- *Interpolation or extrapolation of results of a series of fire resistance tests, or utilisation of a series of fire test results to evaluate a range of variables in a construction design or a product*
- *Where, for various reasons – eg size or configuration – it is not possible to subject a construction or a product to a fire test.'*

Assessments will vary from relatively simple judgements on small changes to a product or construction through to detailed and often complex engineering assessments of large or sophisticated constructions.

2.1 Limitations of assessment

The assessment is limited to products with no added facings such as, but not limited to, vinyl facing or combustible coatings other than those already tested and assessed.

2.2 Declaration

The guide to undertaking assessments in lieu of fire tests prepared by the PFPF in the UK requires a declaration from the client. By accepting our fee proposal dated 15 June 2020, CSR Gyprock confirmed that

[5] Guide to Undertaking Assessments In Lieu of Fire Test - The Passive Fire Protection Federation (PFPF), June 2000, UK.

- To their knowledge the component or element of structure, which is the subject of this assessment, has not been subjected to a fire test to the standard against which this assessment is being made.
- They agree to withdraw this assessment from circulation if the component or element of structure is the subject of a fire test by a test authority in accordance with the standard against which this assessment is being made and the results are not in agreement with this assessment.
- They are not aware of any information that could adversely affect the conclusions of this assessment and – if they subsequently become aware of any such information, they agree to ask the assessing authority to withdraw the assessment.

3. Description of the specimens and variations

3.1 Specimens description

There are two ranges of CSR specimens tested and assessed, namely:

- CSR Gyprock plasterboard wall and ceilings products and plasterboard ceiling tiles and access panels; and
- CSR Cemintel fibre cement products

As advised by the sponsor, the mineral fibre and glass fibre ceiling and wall tiles will be dropped from this assessment. Plasterboard with vinyl facing have also been dropped due to insufficient supporting test data.

3.2 Referenced test data

The assessment of the variations to the tested specimens and the determination of the likely performance is based on the results of the fire test/s documented in the reports summarised in Table 3. Further details of the tested system are described in Appendix A.

Table 3 Referenced test data

Report number	Test sponsor	Test date	Testing authority
RTF190235.1	CSR Gyprock	14/10/2019	Warringtonfire Australia
RTF190098.1 and associated assessment report- FAS190127 R1.0	CSR Gyprock	15/06/2019	Warringtonfire Australia
RTF200198 R1.0 and classification report ASCRRTF299198 R1.0	CSR Gyprock	25/06/2020	Warringtonfire Australia

3.3 Variations to tested specimens

An identical system has not been subject to a standard fire test. We have therefore assessed the products using baseline test information for similar products. The variations to the tested specimens together with the referenced baseline standard fire tests – are described in Table 4.

Table 4 Variation to tested CSR Gyprock plasterboard specimens

Item and thickness	Item and thickness
10~13mm Gyprock Plus	25mm ShaftLiner MR panel
10~13mm Supaceil	25mm ShaftLiner panel
10~13 mm Sensitive	25 mm ShaftLiner MP
10~16 mm Standard plasterboard	13~16 mm Fyrchek
10~13 mm Soundchek	13~16 mm Fyrchek MR
10~13 mm Aquachek	13 mm EC08 Partition
Flexible- 6.5 mm (used in two layers)	13~16mm EC08 Complete
Impactchek- 13 mm	13 mm EC08 Impact
Superchek- 10 mm	13 mm EC08 Impact MR
12.5 mm Habito H	
Gyprock perforated plasterboard panels: - 13 mm perforated panel 6mm Round - 12.5 mm Gyptone perforated ceiling panels- 12 mm Square, 13mm Square Minigrid, Slotted Minigrid - 12.5 mm Rigitone perforated ceiling panels- Matrix 8mm round, Astral, Matrix 12 mm Square, Galaxy - 6.5 mm Gyptone perforated panels- Flexible 12 mm Square, Flexible Slotted Minigrid - Gyptone Access Panels- Frame-600 mm × 600 mm Hatch- 510 mm × 510 mm	Gyprock plasterboard tiles: - Supatone- 10 mm - Arctic White- 13 mm - Perforated Tile- 13 mm
Notes: 1. The perforated plasterboard panels may include acoustic fabric backing 2. The plasterboard panels with vinyl facings are not included in the assessment.	

Table 5 Variation to tested CSR Cemintel fibre cement products

Item and description	Item and description
6~12 mm CeminSeal Wallboard	8 mm Edge
6~9 mm Rigid Air Barrier	8 mm Mosaic
7.5~9 mm Texture Base Sheet	7.5 mm Plank – Smooth and Woodgrain
8~12 mm Rendaline	10 mm Headland Weatherboard
6 mm Cladding sheet	12 mm & 16 mm Scarborough Weatherboard
9 mm Simpleline	10 mm Endeavour Weatherboard
6 mm Eaves lining	16 mm Balmoral Weatherboard
9~24 mm Compressed Sheet	6 mm Soffitline
9~12 mm Expresspanel	18~22mm Constructafloor Interior
9~12 mm Barestone Exterior with optional colour finishes in Ash, Lunar and Graphite	18~22mm Constructafloor Exterior
9~12 mm Barestone Interior with optional colour finishes in Ash, Lunar and Graphite	16mm Territory
9~12 mm Barestone Bark	8mm Surround

3.4 Purpose of the test

The test was performed in accordance with the requirements of AS ISO 9705:2003 (R2016) and AS 5637.1:2015 to determine the group number that may be assigned to the material using the classification schemes given in AS 5637.1:2015 and C/VM2 – Verification Method: Framework for Fire Safety Design

AS 5637.1:2015 sets out procedures for the assessment of internal wall and ceiling linings according to their tendency to ignite, release heat, cause flashover, release smoke and contribute to fire growth.

3.5 Requirements of NCC 2019- Specification C1.10 part 4. "Wall and ceiling linings"

Part 4 of Specification C1.10 in NCC 2019 "Walls and ceiling linings" states that –

a. A wall or ceiling lining system must comply with the group number specified in Table 3 and for buildings not fitted with a sprinkler system complying with Specification E1.5 have-
    i a smoke growth rate index not more than 100; or
    ii an average specific extinction area of less than 250 m^2/kg.
b. A group number of a wall or ceiling lining and the smoke growth rate index or average specific extinction area must be determined in accordance with AS 5637.1:2015.

4. Scope, objective and assumptions

- The scope of this report is limited to an assessment of the variations to the tested systems described in section 3.3.
- This report details the methods of construction, test conditions and assessed results that would have been expected if the specific elements of construction described here had been tested in accordance with AS ISO 9705:2003 (R2016) and AS 5637.1:2015.
- The results of this assessment are applicable to plasterboard and fibre cement wall and ceiling lining, including plasterboard ceiling tiles.
- This report is only valid for the assessed products. Any changes with respect to size, construction details, loads, stresses, edge or end conditions, other than those identified in this report, may invalidate the findings of this assessment. If there are changes to the products, a reassessment will be needed to verify consistency with the assessment in this report.
- The data, methodologies, calculations and conclusions documented in this report specifically relate to the assessed system/s and must not be used for any other purpose.
- This report has been prepared based on information provided by others. Warringtonfire has not verified the accuracy and/or completeness of that information and will not be responsible for any errors or omissions that may be incorporated into this report as a result.

5. Assessment 1 – Assessment of CSR Gyprock plasterboard products

This revised assessment supersedes all previous discussion points with new test data based on test and assessment in accordance with AS 5637.1:2015 on representative product samples. All previous tests were conducted only in accordance with AS 1530.3 and are now deemed as obsolete as there were no tests carried out in accordance with AS ISO 9705-2003 (R2016) to establish the baseline data. However, the old test data in accordance with AS 1530.3 have been retained for future reference on the combustibility of the products.

5.1 Description of variations

The group number of a material or a system is based on its 'time to flashover' in the AS ISO 9705-2003 (R2016) room burn test. Flashover usually occurs when the fire is fully developed and all combustible items in the room are involved in the fire. In AS 5637.1:2015, flashover is said to occur when the total heat release rate exceeds 1 MW (1000 kW). For example, the fire hazard properties of timber are dependent on multiple factors such as density, thickness, microstructure and chemical composition. For veneered timber materials, additional factors such as the type and thickness of the adhesive layer also contribute to the fire.

In accordance with the procedures and requirements in AS 5637:2015, the variations to the tested specimen plasterboard product will be mainly in the changes in thickness or size and minor variations in the material composition of the plasterboard products.

Products with a combustible facing and with different core material other than that of plasterboard are therefore removed from this report and may be reinstated when new supporting test data in accordance with AS 5637:2015 are available.

This assessment was undertaken to determine the likely performance of the CSR Gyprock plasterboard products, as outlined in Table 4

based on the data from referenced test report RTF190098.1 and assessment report FAS190127 R1.0 with details provided in the Appendix A.3.

Based on recent tests conducted in accordance with AS ISO 9705-2003 (R2016) fire test on standard gypsum plasterboard samples, there were sufficient evidence of correlation between the various plasterboard samples from CSR Gyprock. Therefore, the test conducted on the CSR Gyprock Habito H in accordance with AS/NZS 3837:1998 provided acceptable data for classification in accordance with AS 5637.1:2015.

5.2 Methodology

The approach and method of assessment used for this assessment is summarised in Table 6.

Table 6 Method of assessment

Assessment method	
Level of complexity	Simple assessment –based purely on analysing data provided in the referenced fire test and comparing the physical properties of products.
Type of assessment	Comparative

5.3 Assessment of variations to tested CSR Gyprock plasterboard specimen

In test RTF190098, the tested specimen in the AS ISO 9705-2003 (R2016) fire test, was perforated plasterboard with a cloth (polyester) backing on the unexposed side.

The tested plasterboard being perforated would be more onerous when exposed to fire compared with a solid plasterboard panel. It allowed oxygen and flames to infiltrate the back of the plasterboard, enabling both surfaces to burn simultaneously. It would have resulted in a higher peak heat release rate than if the panels were to be solid with the front exposed surface to burn through the paper lining and up to 10 minutes before the plasterboard back lining starts to combust.

It is noted from the test that:

- It appears that the paper lining of the perforated plasterboard including the added fabric backing material played only a small or insignificant part in the total heat release rate.
- The burning rate of the plasterboard specimen was measured from the subtraction of the burner's heat release rate from the total measured heat release rate. It represented no more than 25% of the total heat release rate and the specimen burn at a steady rate without much spiking in the heat release. From the test data the total heat release rate peaked at about 410 kW when the burner was rammed up to 300 kW.
- Smoke generation was minimal during the test.

The discussion in assessment report FAS190127 R1.0 concluded that the specimen plasterboard would perform similarly if the amount of free area in the perforations of the plasterboard were to be varied or if the plasterboard were to be decreased or increased in thickness.

Since the perforated plasterboard tested was the most onerous, it is considered that solid plasterboard panels would perform equally or better if subjected to a fire test in accordance with AS ISO 9705:2003 (R2016) and would likely attain the same Group No.1.

The above assessment could be extended to cover all thicknesses plasterboard with the same fabric lining as that tested. The main constituents that contributed to combustion in the fire test were the paper facing of the plasterboard and the fabric backing for the perforated plasterboard panels. Increasing the thickness of the plasterboard does not lead to additional facing material. The thicker panels will likely perform similarly to the tested specimen and achieve the same group number in accordance with AS 5637:2015.

It would also extend to other plasterboard panels with composition mix of the core material which includes fire rated plasterboard. It was evident from the test observations that the core plasterboard material provided minimal combustion and any variation in the core mix would only have a marginal variance in the rate of combustion as the core is virtually non-combustible.

The 25 mm ShaftLiner MP plasterboard panel has the same core gypsum material composition as the tested standard 12 mm ShaftLiner plasterboard panel except for an added fungicide. The additive is of minimal contribution by mass to the overall core material and based on tests on similar plasterboard samples, the ShaftLiner MP is expected to perform to the same level and be assigned a Group 1 rating along with the other plasterboard samples.

The above assessment does include lining materials such as vinyl which would melt and combust at relatively low temperatures and there is insufficient baseline test data to support the assessment.

The same exclusion applies to mineral wool or glass fibre core materials where such panels have not been subjected to a fire test in accordance with AS ISO 9705:2003 (R2016) and AS 5637.1:2015.

Following the above discussions and evidence from previous tests confirming minimal variance in performance between different mix of plasterboards, the 12.5 mm Gyprock Habito H plasterboard specimen tested in RTF200198 in accordance with AS/NZS 3837:1998 and AS 5637.1:2015 is provided a Group 1 classification.

The list of plasterboard products positively assessed in FAS190127 R1.0 has been appended to the list of plasterboard products in Table 4

5.4 Conclusion

This assessment demonstrates that the range of plasterboard products as listed in Table 4 is likely to achieve Group 1 classification if it were tested in accordance with AS ISO 9705:2003 (R2016) and AS 5637.1:2015.

6. Assessment 2 – Assessment of CSR Cemintel fibre cement products

This revised assessment supersedes all previous discussion points with new test data based on test and assessment in accordance with AS 5637.1:2015 on representative product samples. All previous tests were conducted only in accordance with AS 1530.3 and are now deemed as obsolete as there were no tests carried out in accordance with AS ISO 9705-2003 (R2016) to establish the baseline data. However, the old test data in accordance with AS 1530.3 have been retained for future reference on the combustibility of the products.

6.1 Description of variations

The group number of a material or a system is based on its 'time to flashover' in the AS ISO 9705-2003 (R2016) room burn test. Flashover usually occurs when the fire is fully developed and all combustible items in the room are involved in the fire. In AS 5637.1:2015, flashover is said to occur when the total heat release rate exceeds 1 MW (1000 kW). For example, the fire hazard properties of timber are dependent on multiple factors such as density, thickness, microstructure and chemical composition. For veneered timber materials, additional factors such as the type and thickness of the adhesive layer also contribute to the fire.

In accordance with the procedures and requirements in AS 5637:2015, the variations to the tested specimen fibre cement product will be mainly in the thickness and density such as compressed fibre cement.

This assessment was undertaken to determine the likely performance of the CSR Cemintel fibre cement products, as outlined in Table 5 based on the data from referenced test report RTF190235.1 with CSR Cemintel fibre cement specimen panels and with details provided in the A.4

6.2 Methodology

The approach and method of assessment used for this assessment is summarised in Table 7.

Table 7 Method of assessment

Assessment method	
Level of complexity	Simple assessment –based purely on analysing data provided in the referenced fire test and comparing the physical properties of products.
Type of assessment	Comparative

6.3 Assessment of CSR Cemintel fibre cement products based on tested fibre cement specimen

In test RTF190235, the tested specimen in the AS ISO 9705-2003 (R2016) fire test consisted of fibre cement panels mounted on a series of steel battens or an AFS Logicwall® system.

The tested fibre cement panels would be considered to be more onerous compared with compressed fibre cement panels.

The components that are likely to combust when tested are the embedded cellulose fibres. The fibres in the compressed fibre cement panels are harder to combust as the compressed cement would have a slightly higher thermal storage mass, less porous for air or oxygen ingress and hence takes longer to heat up the fibres and combust.

The embedded fibres are relatively low compared to the total moss of the panel and hence contribute only minimal fuel for combustion in the test.

From observation of the test data in RTF190235.1 with 6mm fibre cement sheets, there was virtually no combustion in the specimen fibre cement panels when the burner output was at 100 kW.

Ten minutes into the test when the burner heat release rate was turned up to 300kW, the total heat release rate was only averaging 350 kW which equates to a contribution of aa steady 50kW from the combustion of the fibre cement panels. The peak total heat release rate was below 400kW with no sharp peaks throughout the test duration.

It is noted from the test that:

- There was minimal burning of the fibre cement panels during initial 10minutes when the burner was on 100 kW output. There was no lateral flame spread.
- When the burner was rammed up to 300 kW, there was some lateral flame spread along the ceiling but minimal along the wall.
- Even though the fibre cement sheets cracked and fell off at the completion of the test, there was no continual burning of the debris.
- Smoke generation was minimal.

Based on the test data on a 6mm fibre cement sample, the contribution to the total heat release rate during the "high fire" of 300kW during the test, a thicker sample fibre cement panel will have a proportional increase in the total heat release rate with increase in thickness. The deduction is based on the uniform nature of the combustion where the tested panels provided a flat heat release rate throughout the test. It can therefore be considered that if the panels were thicker in the test, the total heat release rate would be elevated in proportion to the thickness and at a steady combustion rate. It is assumed that the cellulosic fibres in the thicker panels would have be of the same concentration or percentage by weight. This has been confirmed in writing by the sponsor.

The thickest fibre cement panel provided by the sponsor is 24 mm which is four times the thickness of the 6 mm tested specimen. If the 24 mm fibre cement panel were tested in accordance with AS ISO 9705-2003 (R2016), the equivalent contribution to the total heat release rate from the burning of the panels would be 4 × 50kW or a total heat release rate of 500 kW (200 kW from specimen + 300 kW from burner) which would still be within the limits of 1 MW, ie. the specimen would unlikely cause a flashover for the full duration of the test.

The thickest fibre cement panel would likely achieve the same Group 1 rating in accordance with AS 5637:2015.

Compressed fibre with the same percentage cellulosic fibres embedded in the cement base would likely perform equally or better in that it would have a comparatively higher thermal storage mass than the normal fibre cement and being denser it would make it harder for oxygen to permeate the panels and hence would likely burn at a slower rate.

The Barestone weatherboard panels have been provided with additional colour finishes with the addition of trace carbon elements to the core material, namely 0.2% for Ash colour, 0.6% for Lunar and 2.0% for Graphite. The Barestone Bark weather panels, which are basically sanded samples of the basic Barestone weatherboard panels. The addition of the trace elements of carbon is unlikely to cause any variance to the performance of the original base fibre cement core material.

The above assessment could be extended to cover all fibre cement panels up to 24 mm thick, provided that there is minimal variance in the composition of the embedded cellulosic fibres.

6.4 Conclusion

This assessment demonstrates that the range of CSR Cemintel fibre cement products as outlined in Table 5 is likely to achieve Group 1 classification if it were tested in accordance with AS ISO 9705:2003 (R2016) and AS 5637.1:2015.

7. Validity

Warringtonfire Australia does not endorse the tested or assessed product in any way. The conclusions of this assessment may be used to directly assess fire hazard, but it should be recognised that a single test method will not provide a full assessment of fire hazard under all conditions.

Due to the nature of fire testing and the consequent difficulty in quantifying the uncertainty of measurement, it is not possible to provide a stated degree of accuracy. The inherent variability in test procedures, materials and methods of construction, and installation may lead to variations in performance between elements of similar construction.

This assessment is based on information and experience available at the time of preparation. The published procedures for the conduct of tests and the assessment of test results are subject to constant review and improvement. It is therefore recommended that this report be reviewed on or, before, the stated expiry date.

This assessment represents our opinion about the performance likely to be demonstrated on a test in accordance with AS ISO 9705-2003 (R2016) and AS 5637.1:2015, based on the evidence referred to in this report.

This assessment is provided to the CSR Gyprock for its own purposes and we cannot express an opinion on whether it will be accepted by building certifiers or any other third parties for any purpose.

Appendix A Summary of supporting test data

A.1 Material properties for CSR products

Table 8 CSR Gyprock plasterboard products

Product	Thickness mm	Mass kg/m²	AS 1530.3 indices			
			I I	SOF	HE	SDI
CD Gyprock	10	6.5	13	0	1	2
	13	8.5				
Supacell	10	7.2	14	0	1	1
Soundchek	10	9.3	0	0	0	3
	13	13				
Aquachek	10	8	13	0	2	3
	13	10.4				
Flexible	6	4.3	13	0	1	2
Perforated	13	10	0	0	0	3
Fyrchek	13	10.5	0	0	0	3
	16	12.5				
Fyrechek MR	13	10.7	13	0	2	2
	16	13.5				
Shafteliner	25	19.8	0	0	0	3
Flamechek	10		13	0	2	2
Impactchek	10	8.0	0	0	0	3
	13	10.5				

Notes -

1. Gyprock Plasterboard is machine made sheet composed of a gypsum core encased in heavy duty paper linerboard
2. The linerboard face and back 170-180 gsm.
3. Aquachek and Fyrchek MR contain Paraffin wax emulsion.
4. The mesh in Impactchek is located adjacent to the back linerboard.

Table 9 CSR fibre cement products

Product	Thickness mm	Mass kg/m²	AS 1530.3 indices			
			I I	SOF	HE	SDI
Fibre cement panel coated with polyurethane (GBKS 261)	10	1196	0	0	0	1

Table 10 Ceiling panels

Product description	Thickness mm	Mass kg/m²	EFH AS 1530.3
10 mm Supaceil Gyprock lay in panels with paint or vinyl facings	-	-	-
CSR Gyprock Freshtone Supatone (painted plasterboard)	10	7.3	0,0,0,4
CSR Gyprock Diamond White (Vinyl faced)			
CSR Gyprock Ultra Matt (Vinyl faced)			
Arctic White ceiling	10	65	

A.2 Test results for ceiling panels, Gyprock Giptone, Gyprock Rigitone and Gyprock Plus.

Table 11 Test results ceiling panels in general accordance with AS 5637.1:2015

Material	Test Reference	Group Number	Average Specific Extinction Area (m²/kg)
Supaceil 10 mm thick	136806	1	46
Aquachek 10 mm thick	136808	1	38
Supaceil 10 mm thick faced with Vinyl Facing (Ultra matt)	136811	1	80
Cement-bonded fibrous wood particle panel- 16 mm thick	FNK 10457	1	41.3
Gyprock Perforated Plasterboard with Viledon fabric backing	FH 5549	1	10.1
Arctic white ceiling	18-002907	1	70.3

Notes -

1. The above results have been superseded by new tests in accordance with AS 5637.1:2015 and are no longer valid.
2. These results will be referenced for guidance on the combustibility of the materials as required.

Table 12 Test results for Gyprock Gyptone, Gyprock Rigitone and Gyprock Plus in accordance with AS 3837:1998

Material	Test Reference	Group Number	Average Specific Extinction Area (m²/kg)
Gyptone Big Quattro 41	15-005762	1	4.9
Gyprock Rigitone 10/23	15-005760	1	8.5
Gyprock Plus	16-002226	1	7.6

A.3 Test report – RTF190098.1 and summary of assessment report FAS190127 R1.0

Table 13 Information about test report

Item	Information about test report
Report sponsor	CSR Gyprock
Test laboratory	Warringtonfire Australia, Unit 2, 409-411 Hammond Road, Dandenong, Victoria 3175, Australia.
Test date	The fire resistance test was completed on 25/06/2019.
Test standards	The test was done in accordance with AS ISO 9705-2003 (R2016) and AS 5637.1:2015.
Variation to test standards	None
General description of tested specimen	The tested system consisted of a 28 mm thick metal framing, incorporating J-tracks, clips and furring channels, which was clad with 12 mm Rigitone Matrix 12 Square acoustic panel. The panels were screw fixed to the furring channels using 25 mm plasterboard screws. The J-tracks were first screw fixed to the room walls and ceiling and the furring channels slotted into the tracks. The furring channels were also secured in place using clips that were installed along the length of the channels. The panels were then screw fixed on to the furring channels. Panel to panel joints were sealed using Rigitone sealant.
Instrumentation	The test report states that the instrumentation was in accordance with AS ISO 9705-2003 (R2016).

The test specimen achieved the following result:

Table 14 Classification for AS ISO 9705-2003 (R2016) and AS 5637.1:2015 (for applications in Australia).

Criteria	Results
Group number	1
$SMOGRA_{RC}$ (in $m^2 \cdot s^{-2} \times 1000$)	0.5

Table 15 Classification for C/VM2 – Verification Method: Framework for Fire Safety Design (for applications in New Zealand).

Criteria	Results
Group number	1-S
Average smoke production rate (0 to 20 minutes)	0.16 $m^2 \cdot s^{-1}$

Table 16 Assessment outcome from FAS190127 R1.0 to Australian Building Code requirements

Item	Panel thickness	Description of Variations	Assessed Classification for AS ISO 9705-2003 (R2016) and AS 5637.1:2015	
			Group No.	$SMOGRA_{RC}$ (in $m^2 \cdot s^{-2} \times 1000$)
Gyprock Rigitone Matrix 12 mm Square	12.5 mm	As tested. Perforated plasterboard with 12 mm square holes at 23% total free open area and black fabric backing	1	0.5

Item	Panel thickness	Description of Variations	Assessed Classification for AS ISO 9705-2003 (R2016) and AS 5637.1:2015	
			Group No.	SMOGRA$_{RC}$ (in $m^2 \cdot s^{-2} \times 1000$)
Gyprock Rigitone Matrix 8 mm Round	12.5 mm	8mm round holes with 15.5% total free open area		
Gyprock Rigitone Astral	12.5 mm	Staggered pattern 12 mm and 20 mm round hoes with 16.6% total free open area		
Gyprock Rigitone Galaxy	12.5 mm	Scattered pattern 15 mm and 20 mm round holes with 10% total free open area.		
Gyprock Gyptone 12 mm Square	12.5 mm	12 mm square holes with 16.0% total free open area		
Gyprock Gyptone 12 mm Square Minigrid	12.5 mm	12 mm square holes with 6% total free open area in a mini grid layout		
Gyprock Gyptone Slotted Minigrid	12.5 mm	6 mm x 80 mm rectangular holes with 13% total free open area		
Gyprock Gyptone Flexible 12 mm Square	6.5 mm	12 mm square holes with 16.0% total free open area		
Gyprock Gyptone Flexible Slotted Minigrid	6.5 mm	6 mm × 80 mm rectangular holes with 13% total free open area		
Gyprock Gyptone Access Panels	-	Frame- 600mm × 600mm Hatch- 510mm × 510mm All of perforated plasterboard from one of 3 patterns from Gyprock Gyptone 12mm S, Gyprock Gyptone 12mm Square Minigrid and Gyprock Gyptone Slotted Minigrid		
Gyprock 6 m Round	13 mm	6 mm diameter holes of 8.3% total free open area		

Table 17 Assessment outcome from FAS190127 R1.0 to New Zealand Building Code requirements

Item	Panel thickness	Description of Variations
Gyprock Rigitone Matrix 12 mm Square	12.5 mm	As tested. Perforated plasterboard with 12 mm square holes at 23% total free open area and black fabric backing
Gyprock Rigitone Matrix 8 mm Round	12.5 mm	8 mm round holes with 15.5% total free open area
Gyprock Rigitone Astral	12.5 mm	Staggered pattern 12 mm and 20 mm round hoes with 16.6% total free open area
Gyprock Rigitone Galaxy	12.5 mm	Scattered pattern 15 mm and 20 mm round holes with 10% total free open area.
Gyprock Gyptone 12 mm Square	12.5 mm	12 mm square holes with 16.0% total free open area
Gyprock Gyptone 12 mm Square Minigrid	12.5 mm	12 mm square holes with 6% total free open area in a mini grid layout
Gyprock Gyptone Slotted Minigrid	12.5 mm	6 mm × 80 mm rectangular holes with 13% total free open area
Gyprock Gyptone Flexible 12mm Square	6.5 mm	12 mm square holes with 16.0% total free open area
Gyprock Gyptone Flexible Slotted Minigrid	6.5 mm	6 mm × 80 mm rectangular holes with 13% total free open area

A.4 Test report – RTF190235.1

Table 18 Information about test report

Item	Information about test report
Report sponsor	CSR Gyprock
Test laboratory	Warringtonfire Australia, Unit 2, 409-411 Hammond Road, Dandenong, Victoria 3175, Australia.
Test date	The fire resistance test was completed on 14/10/2019.
Test standards	The test was done in accordance with AS ISO 9705-2003 (R2016) and AS 5637.1:2015.
Variation to test standards	None
General description of tested specimen	The test specimen consisted of 6 mm fibre cement sheet panels that were fixed onto a steel framing system. The steel framing system lined the internal face of the test room walls and ceiling.
Instrumentation	The test report states that the instrumentation was in accordance with AS ISO 9705-2003 (R2016).

The test specimen achieved the following result:

Table 19 Classification for AS ISO 9705:2003 (R2016) and AS 5637.1:2015

Criteria	Results
Group number	1
$SMOGRA_{RC}$ (in $m^2/s^2 \times 1000$)	0.2

Table 20 Classification for C/VM2 – Verification Method: Framework for Fire Safety Design

Criteria	Results
Group number	**1-S**
Average smoke production rate (0 to 20 minutes) (in m^2/s)	**0.1**

A.5 Test report – RTF200198.1 (& classification report ASCRRTF 200198.1)

Table 21 Information about test report

Item	Information about test report
Report sponsor	CSR Gyprock
Test laboratory	Warringtonfire Australia, Unit 2, 409-411 Hammond Road, Dandenong, Victoria 3175, Australia.
Test date	The fire resistance test was completed on 25/06/2019.
Test standards	The test was done in accordance with AS/NZ 3837.1:1998.
Variation to test standards	None
General description of tested specimen	Three test samples of the specimen consisting of 12.6 mm (measured) plasterboard panels of gypsum plaster encased in paper liners. All specimens were wrapped in a single layer of aluminium foil, covering the sides and bottom prior to testing.
Instrumentation	The test report states that the instrumentation was in accordance with AS/NZ 3837.1:1998.

The test specimen achieved the following result:

Table 22 Classification for AS/NZS 3837:1998 and AS 5637.1:2015

Criteria	Results
Group number	**1**
Average Specific Extinction Area (ASEA)	**7.3 m^2/kg**

LYSAGHT

UNDERSTANDING COMPLIANCE

The NCC outlines deem-to-satisfy requirements for metal claddings based on compliance to Australian Standards. Whilst the applicable Australian Standards differ between Residential and Non-Residential buildings the underlying common tenants are;

a) that installed metal claddings must be able to meet expected Structural, Wind and Installation loads as per the Australian Standards,

b) that installed metal claddings must be sufficiently durable to meet the amenity and sustainability requirements of the Australian Standards.

To determine a metal cladding's capacities and ability to comply with Australian design standards, metal cladding products must be tested in accordance with AS 4040.1. Metal cladding products that cannot demonstrate testing to AS 4040.1 and compliance with other relevant Australian Standards do not meet the deemed-to-comply provisions of the NCC.

LYSAGHT® steel building products have been tested in Lysaght's own NATA accredited testing facility to meet all relevant Australian Standards as outlined in this document.

CHAIN OF RESPONSIBILITY

It is the primary responsibility of each person in the value chain, from designer to supplier to installer to builder to ensure that products used on a building are;

a) Suitable for the intended use, and

b) Comply with relevant Australian Standards and NCC provisions

Increasingly regulatory authorities are requiring documentary evidence of a products compliance to the requirements of the NCC. Recent Queensland legislation goes further placing an onus on all members in the chain of responsibility to report the use of any non-conforming product.

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Lysaght's range of steel building products are manufactured using Australia's leading coated steel and prepainted aluminium materials.

COLORBOND® prepainted steel and ZINCALUME® aluminium/zinc/magnesium alloy coated steel are supplied to Lysaght in large coils. Lysaght then shapes and forms these materials (through the process known as rollforming) into our range of roofing profiles, gutters, fascias and downpipes, plus products for fencing systems and home additions such as verandahs, patios and carports.

Similarly, PERMALITE® prepainted aluminium is used to manufacture a range of roofing, walling and structural products ideally suited to the most aggressive of environments.

YOUR COMPLIANCE CHECKLIST

- ☑ Fully specify LYSAGHT® Profile, Finish & Coating class
- ☑ Check all details when you receive order confirmation
- ☑ On-Site - check delivery docket and product branding

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LYT0146 - 11/2019

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NCCB01

NATIONAL CONSTRUCTION CODE OF AUSTRALIA COMPLIANCE BULLETIN

NOVEMBER 2019 | REV 02 | This version supersedes all previous issues.

ROOFING & WALLING



THIS BULLETIN DETAILS RELEVANT NCC OF AUSTRALIA COMPLIANCE INFORMATION RELEVANT TO THE FOLLOWING LYSAGHT® STEEL AND PERMALITE® ALUMINIUM CLADDING PRODUCTS.

- LYSAGHT CUSTOM ORB®
- LYSAGHT CUSTOM ORB ACCENT® 21
- LYSAGHT CUSTOM ORB ACCENT® 35
- LYSAGHT TRIMDEK®
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- LYSAGHT KLIP-LOK® 406
- LYSAGHT FLATDEK®
- LYSAGHT FLATDEK® II
- LYSAGHT FLATDEK® 310
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LYSAGHT® – YOUR GUARANTEE OF COMPLIANCE

The National Construction Code of Australia (NCC) details the minimum necessary requirements for safety, health, amenity and sustainability that need to be met in the design and construction of new buildings (and new building work in existing buildings) throughout Australia.

Using products that do not conform to the NCC requirements can leave installers, builders and suppliers liable for cost of replacement, rectification and consequential damages.

Lysaght's range of Australian-made steel and aluminium building products has been developed, tested and manufactured to not only meet our country's demanding climatic and geographic requirements but also to provide building designers, builders and owners with the confidence that comes from using guaranteed compliant products.

The compliance statements overleaf outline compliance of Lysaght's roofing and walling products with both the National Construction Code of Australia and the relevant Australian Standards for both Residential and Non-residential buildings.

Colorbond®

NATIONAL CONSTRUCTION CODE OF AUSTRALIA (NCC) COMPLIANCE STATEMENT
LYSAGHT ROOFING AND WALLING PRODUCT RANGE

Issuing entity:		**BlueScope Steel Limited**		**Ref #: LYS-NCC- R&W**	**Version: V2.0**		**Issue date: 26/11/2019**
Application		Roofing for class 2 to 9 Buildings (Non-Residential) and for class 1 and 10 Buildings (Residential)					
Scope of Use		All products noted below may be used as roof cladding and/or walling when designed using the individual technical data available for each product at www.lysaght.com for Lysaght products or www.permalite.com.au for PERMALITE® products					
		ROOFING - WALLING		**ROOFING**	**WALLING - CEILING - SOFFIT**		**ROOFING - WALLING**
		LYSAGHT CUSTOM ORB® LYSAGHT CUSTOM ORB ACCENT® 21 LYSAGHT CUSTOM ORB ACCENT® 35	LYSAGHT TRIMDEK® LYSAGHT SPANDEK® LYSAGHT KLIP-LOK 700 HI-STRENGTH® LYSAGHT KLIP-LOK CLASSIC® 700 LYSAGHT KLIP-LOK® 406	LYSAGHT FLATDEK® LYSAGHT FLATDEK® II LYSAGHT FLATDEK® 310	LYSAGHT PANELRIB® LYSAGHT MINI ORB® LYSAGHT MULTICLAD® LYSAGHT TRIMWALL®	LYSAGHT WALLCLAD® LYSAGHT WEATHERLINE® LYSAGHT EASYCLAD® 2P300	PERMALITE LT7® PERMALITE V-Rib® PERMALITE ALSPAN® PERMALITE WAVELINE®
Product Attributes	**Base Metal Thickness Range**	Roofing: 0.42mm - 0.48mm			Walling: 0.35mm - 0.42mm		0.7mm -1.2mm
	Min Yield Strength	550 MPa			550 MPa		220-225 MPa
Base Material Brand Name		Zincalume®	Colorbond®	Colorbond® MATT	Colorbond®	Colorbond®	Colorbond®	permalite
		ZINCALUME® steel	COLORBOND® steel	COLORBOND® steel Matt	COLORBOND® Metallic steel	COLORBOND® Ultra steel	COLORBOND® Stainless steel	PERMALITE® pre-painted aluminium
Typical Environments		For Low to High corrosive environments; >200m from breaking surf > 100m from calm marine	For Low to High corrosive environments; >200m from breaking surf > 100m from calm marine	For Low to High corrosive environments; >200m from breaking surf > 100m from calm marine	For Low to High corrosive environments; >200m from breaking surf > 100m from calm marine	For Very High to High corrosive environments; >100m from breaking surf > 0m from calm marine	For Very High corrosive environments; > 0m from breaking surf	For Very High corrosive environments; < 0m from breaking surf
Material Specification	**Coating**	AM125	AM100	AM100	AM100	AM150	Grade 430 SS	5251 / 5052 marine grade aluminium alloy
		125 g/m² minimum metallic coating mass, (aluminium/zinc/magnesium alloy) with Activate® technology to AS 1397-2011	100 g/m² minimum metallic coating mass, (aluminium/zinc/magnesium alloy) with Activate® technology to AS 1397-2011	100 g/m² minimum metallic coating mass, (aluminium/zinc/magnesium alloy) with Activate® technology to AS 1397-2011	100 g/m² minimum metallic coating mass, (aluminium/zinc/magnesium alloy) with Activate® technology to AS 1397-2011	150 g/m² minimum metallic coating mass, (aluminium/zinc/magnesium alloy) with Activate® technology to AS 1397-2011	N/A	
	Paint	N/A	Paint Coating to AS 2728-2013 includes Thermatech® solar reflectance technology*	Paint Coating to AS 2728-2013 includes Thermatech® solar reflectance technology*	Paint Coating to AS 2728-2013 Type 3	Paint Coating to AS 2728-2013 Type 4 includes Thermatech® solar reflectance technology*	Paint Coating to AS 2728-2013 Type 6	Paint Coating to AS 2728-2013
	Solar Absorptance Value		Range from 0.32 to 0.96	Range from 0.35 to 0.79	Range from 0.34 to 0.93	Range from 0.32 to 0.73	Range from 0.32 to 0.73	0.26 for unpainted weathered aluminium
Warranty**	**Roofing**	Up to 36 years**	Up to 36 years**	Up to 36 years**	Up to 30 years**	Up to 36 years**	Up to 36 years**	up to 40 years***
	Walling	Up to 18 years** (Non - residential)	Up to 20 years** (Non - residential) Up to 15 years** (Residential)	Up to 20 years** (Non - residential) Up to 15 years** (Residential)	Up to 20 years** (Non - residential) Up to 10 years** (Residential)	Up to 20 years** (Non - residential) Up to 15 years** (Residential)	Up to 20 years** (Non - residential) Up to 15 years** (Residential)	Up to 30 years***
Combustibility		LYSAGHT® products manufactured from COLORBOND® steel, ZINCALUME® steel or galvanised steel materials all have an ignitability index, Spread of Flame index and Heat Evolved Index of 0 (zero) and as such may be used wherever a non-combustible material is required as per the National Construction Code clauses C1.9.(e).(v) and 3.7.1.1.(e). PERMALITE® products manufactured from pre-painted aluminium materials have a Spread-of-Flame index of 0 (zero) and as such are considered non-combustible materials in accordance with the National Construction Code clauses C1.9.(e).(v) and 3.7.1.1.(e).						
Compliance with the deemed-to-satisfy provision of the NCC		NCC Volume 1 - For class 2 to 9 Buildings (Non-Residential) - Section B1.4 Structural Resistance (j) (iv) Metal roofing: AS 1562.1-2018 (except in cyclonic areas) Section F1.0 Deemed-to-Satisfy Provisions - F1.5 Roof coverings Metal Sheet roofing complying with AS 1562.1-2018						
		NCC Volume 2 - For class 1 and 10 Buildings (Housing Provisions) - 3.5.1 Roof cladding Published Capacity tables in reference manuals noted below are suitable to determine structural adequacy and serviceability of nominated products for individual projects referencing the following Australian Standards and NCC requirements: NCC, Volume One, Section B - Structure, Part B1 -Structural provisions (Deemed-to-Satisfy Provisions), Clause B1.1 Resistance to actions, and Clause B1.2 Determination of individual actions NCC, Volume One, Section B - Structure, Specification B1.2 - Design of Buildings in Cyclonic Areas						
Acceptable Construction Manuals		AS 1562.1-2018 Design and Installation of sheet and wall cladding - Metal						
		LYSAGHT® Roofing & Walling Installation Manual for Design and Installation professionals LYSAGHT® Cyclonic Area Design Manual for Design and Installation professionals LYSAGHT® Architectural Detailing and Flashing Manual for Architects and Detailing professionals LYSAGHT TOPSPAN® Design & Installation Guide LYSAGHT TOPSPAN® Quick Selection Guide and Quick Selection Guide Addendums 1, 2, 3 LYSAGHT® Maintenance Manual for Roofing Walling and Rainwater Goods LYSAGHT CUSTOM ORB® Design & Installation Guide LYSAGHT TRIMDEK® Design & Installation Guide LYSAGHT CUSTOM ORB ACCENT® 21 Design & Installation Guide LYSAGHT CUSTOM ORB ACCENT® 35 Design & Installation Guide LYSAGHT SPANDEK® Design & Installation Guide LYSAGHT KLIP-LOK 700 HI-STRENGTH® Design & Installation Guide	LYSAGHT KLIP-LOK CLASSIC® 700 Design & Installation Guide LYSAGHT KLIP-LOK® 406 Design & Installation Guide LYSAGHT FLATDEK® Design & Installation Guide LYSAGHT FLATDEK® 310 Design & Installation Guide LYSAGHT FLATDEK® II Design & Installation Guide LYSAGHT® Product Advisory Bulletins Guides and Technical materials available at www.lysaght.com	BlueScope Technical Bulletin 1A Steel roofing products - selection guide available at http://steelproducts.bluescopesteel.com.au			PERMALITE® Aluminium Roofing Solutions PERMALITE® Aluminium Residential Solutions available at www.permalite.com.au
Australian Standards Compliance		lysaght published Limit State Capacities for Strength and Serviceability have been determined from testing at NATA[1] accredited facilities in compliance with the following standards; AS 1562.1-2018 Design and installation of sheet roof and wall cladding. Part 1: Metal AS 4040.0-1992 (Reconfirmed 2016) Methods of testing sheet roof and wall cladding. Method 0: Introduction, list of methods and general requirements AS 4040.1-1992 (Reconfirmed 2016) Methods of testing sheet roof and wall cladding. Method 1: Resistance to concentrated loads AS 4040.2-1992 (Reconfirmed 2016) Methods of testing sheet roof and wall cladding. Method 2: Resistance to wind pressures for non-cyclonic regions AS 4040.3-2018 Methods of testing sheet roof and wall cladding. Method 3: Resistance to wind pressures for cyclonic regions						
		Limit state capacities contained within the Acceptable Construction & Design Manuals are suitable to determine structural and serviceability in accordance with; AS/NZS 1170.0:2002 Structural design actions, Part 0: General principles AS/NZS 1170.1:2002 (Reconfirmed 2016) Structural design actions, Part 1: Permanent, imposed and other actions AS/NZS 2728:2013 (Reconfirmed 2016) Structural design actions, Part 2: Wind actions AS/NZS 1170.3:2011 (Reconfirmed 2016) Structural design actions, Part 3: Snow and ice actions						
		AS 1562.1-2018 Design and Installation of sheet and wall cladding Part 1: Metal Section 2.1.3 Steel: Requires metallic coated products to comply with; AS 1397-2011 Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium and Pre-painted products to comply with; AS/NZS 2728:2013 Prefinished/prepainted sheet metal products for interior/exterior building applications - Performance requirements AS 1397-2011 Defines the coating types and classes and steel grades for hot-dip metallic coated steel. Product made to other standards may not meet the ductility or strength requirements assumed by design standards or the minimum coating class requirements critical to building durability.			LYSAGHT® product coating compliance is nominated at "Coating" above. AS/NZS 2728 specifies requirements for the physical properties and long-term durability of pre-finished/pre-painted sheet metal products. LYSAGHT® pre-painted compliance is nominated at "Paint" above for Performance requirement 1.3.1 Metal products Hot dipped metallic coated steel (types Z, ZM, AZ, AM) complying with AS 1397, stainless steel, aluminium or aluminium alloy in the form of sheet, coil or strip. PERMALITE® aluminium feed coil complies to AS/NZS 1734:1997 Aluminium and Aluminium alloys - Flat sheet, coil sheet and plate. PERMALITE® pre-painted aluminium complies with AS/NZS 2728 Pre-finished /pre-painted sheet metal products for interior/ exterior applications		

Please note that not all products are available in all finishes or in each state. Please refer to your local Lysaght service centre for product availability for your region.
*Thermatech® solar reflectance technology is incorporated in the standard COLORBOND® steel colour range, however excludes Night Sky®.
** Warranties subject to application and eligibility criteria. For full terms and conditions and to determine the eligibility of your product for a warranty visit www.bluescopesteel.com.au/warranties and www.lysaght.com/warranties.
*** visit Permalite.com.au/warranties to obtain an indicative warranty period for your project.
1. National Association of Testing Authorities.

Certificate of Test

Quote No.: NE7500 **REPORT No.: FNE11605**

AS/NZS 1530.3:1999 SIMULTANEOUS DETERMINATION OF IGNITABILITY, FLAME PROPAGATION, HEAT RELEASE AND SMOKE RELEASE

TRADE NAME: BlueScope COLORBOND Steel

SPONSOR: Bluescope Steel Limited
Innovations Lab
Old Port Road
PORT KEMBLA NSW 2505
AUSTRALIA

DESCRIPTION OF SAMPLE: The sponsor described the tested specimen as a polyester painted steel sheet with aluminium-zinc-magnesium alloy coating on both sides.

Nominal thickness of steel sheet:	0.35 mm
Nominal thickness of aluminium-zinc-magnesium coating:	30 µm
Nominal thickness of paint layer:	50 µm
Nominal total thickness:	0.45 mm
Nominal total mass:	5.5 kg/m^2
Nominal total density:	7700 kg/m^3
Colour:	dark grey (Woodland Grey)/brown

TEST PROCEDURE: Six samples were tested in accordance with Australian Standard 1530, Method for fire tests on building components and structures, Part 3: Simultaneous determination of ignitability, flame propagation, heat release and smoke release, 1999. For the test, each sample was clamped to the specimen holder in four places.

RESULTS: The following means and standard errors were obtained:

Parameter	Mean	Standard Error
Ignition Time (min)	N/A	N/A
Flame Spread Time (s)	N/A	N/A
Heat Release Integral (kJ/m^2)	N/A	N/A
Smoke Release ($\log_{10}$D)	-1.560	0.072

For regulatory purposes these figures correspond to the following indices:

Ignitability Index (0-20)	Spread of Flame Index (0-10)	Heat Evolved Index (0-10)	Smoke Developed Index (0-10)
0	0	0	2

The results of this fire test may be used to directly assess fire hazard, but it should be recognised that a single test method will not provide a full assessment of fire hazard under all fire conditions.

DATE OF TEST: 11 February 2016

Issued on the 3rd day of March 2016 without alterations or additions.

Heherson Alarde
Testing Officer

Brett Roddy
Team Leader, Fire Testing and Assessments

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NATA ACCREDITATION

NATA Accredited Laboratory Number: 165
Corporate Site No 3625
Accredited for compliance with ISO/IEC 17025

CSIRO INFRASTRUCTURE TECHNOLOGIES

14 Julius Avenue, Riverside Corporate Park, North Ryde NSW 2113 AUSTRALIA
Telephone: 61 2 9490 5444 Facsimile: 61 2 9490 5555 www.csiro.au

Certificate of Test

QUOTE No.: NC6040

REPORT No.: FNC9694

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COMBUSTIBILITY TEST FOR MATERIALS

TRADE NAME: Bradford Gold Insulation R1.5 Water-repellent Wall & Floor batts

SPONSOR:
CSR Building Products Limited
CSR Performance System
376 Victoria Street
WETHERILL PARK NSW
AUSTRALIA

DESCRIPTION OF TEST SAMPLE: The sponsor described the tested specimen as glass-fibre insulation batt bonded with thermosetting resin.

Nominal mass: 657 g/m²
Nominal thickness: 75 mm
Colour: light golden yellow

TEST PROCEDURE: Five (5) samples were tested in accordance with Australian Standard 1530 Methods for fire tests on building materials, components and structures, Part 1- 1994: Combustibility Test for Materials.

RESULTS:

Mean furnace thermocouple temperature rise	26.0°C
Mean specimen centre thermocouple temperature rise	3.8°C
Mean specimen surface thermocouple temperature rise	0°C
Mean duration of sustained flaming	0 seconds
Mean mass loss	19.5 %

DESIGNATION: The material is NOT deemed COMBUSTIBLE according to the test criteria specified in Clause 3.4 of AS 1530.1-1994.

These test results relate only to the behaviour of the test specimens of the material under the particular conditions of the test and they are not intended to be the sole criterion for assessing the potential fire hazard of the material in use.

DATE OF TEST: 6 March 2010

Issued on the 8th day of March 2010 without alterations or additions.

Russell Collins
Testing Officer

Garry E Collins
Manager, Fire Testing and Assessments

NATA

This document is issued in accordance with NATA's accreditation requirements.
Accreditation No. 165 – Corporate Site No. 3625

CSIRO

CSIRO Materials Science and Engineering
14 Julius Avenue, Riverside Corporate Park, North Ryde NSW 2113 AUSTRALIA
Telephone: 61 2 9490 5444 Facsimile:61 2 9490 5555

Reaction to fire performance of faced glasswool and rockwool when tested to AS/NZS 1530.3-1999

Assessment Report

Author: Keith Nicholls

Assessment Number: FCO-2805

Quote Number: CO4552

Date: 25th July 2018

Version: Revision D

Client: CSR Building Products Limited

Commercial-in-confidence

Issued to: Ben Cooper
Company: Alleanza Architecture
St Matthews Catholic School
Mudgee NSW
Issued On: 21st April 2021

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Fire Testing and Assessments	Author	The Client
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Assessment Report Details

Report CSIRO Reference number: FCO-2805/4552

Report Status and Revision History

VERSION	STATUS	DATE	DISTRIBUTION	ISSUE NUMBER
Revision A	Final for issue	02/05/2016	CSIRO; Client	FCO-2805
Revision B	Final for issue	01/06/2018	CSIRO; Client	FCO-2805 Rev B
Revision C	Final for issue	11/7/2018	CSIRO; Client	FCO-2805 Rev C
Revision D	Final for issue	11/7/2018	CSIRO; Client	FCO-2805 Rev D

Test Report Authorisation

AUTHOR	REVIEWED BY	AUTHORISED BY
Keith Nicholls	Jing Xu	Brett Roddy
25th July 2018	25th July 2018	25th July 2018

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Issued to: Ben Cooper
Company: Allegra Architecture
Re: St Matthews Catholic School
Mudgee NSW
Issued On: 21st April 2021

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1 Introduction

This report provides the reaction to fire performance of faced glasswool and rockwool when tested to AS/NZS 1530.3-1999.

This report confirms the extent to which the referenced reaction to fire tests listed in Section 2 meet the requirements of the fire test standards listed in Section 4 of the report. The proposed variations to the tested construction presented in Section 3 are subject to an analysis in Appendix B and the conclusions are presented in Section 5 of this report subject to the validity and limitations in Section 6 and 7.

2 Supporting Data

This assessment report refers to various test reports to support the analysis and conclusions of this report. They are listed below in Table 1.

Table 1 – Referenced Tests

Report Reference	Test Standard	Outline of Test Specimen
FNE9785	AS/NZS 1530.3-1999	Ultraphon-faced Bradford Glasswool Ultratel
FNE9787		Medium duty foil-faced Bradford Glasswool Ultratel
FNE9788		Heavy Duty foil-faced Bradford Glasswool Ultratel
FNE9790		BMF-faced Bradford Glasswool Ultratel
FNE10360		Bradford 50mm Supertel Board faced with HDP foil
FNE10361		Bradford 50mm Supertel Board faced with Acoustituff
FNE10364		Bradford 50mm Ultratel Board faced with Acoustituff
FNE11429		Bradford Enviroseal Roof Tile Plus, foil faced (Ultratel glasswool board)
7-574195-CN		CSR Bradford Thermoplast 993 White (Antiglare)
7-574196-CN		CSR Bradford Thermoplast 990 White
FNE12136		Bradford Glasswool Ultratel faced with BMF Bostik HT adhesive
FNE12137		Thermoseal 750P heavy duty perforated foil (HDP) faced Bradford Glasswool Supertel with Bostik HT adhesive
FNE 9690		Rockwool Building Grade Granulated
FNE 11527		CSR Bradford Rockwool Granulated
FNE 11655		CSR Rockwool Fibertex - 820
FNE 9589		Bradford Glasswool Quietel
FNC 9595	AS 1530.1-1994	Bradford Rockwool Fibertex 450
FNC 9596		Bradford Rockwool Fibertex HD
FNC 9693		Soundscreen Plus R3.0
FNC 9770		Rockwool Granulated Cavity Wall
FNC 9771		Rockwool Building Grade Granulated

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Report Reference	Test Standard	Outline of Test Specimen
FNC 10324	AS 1530.1-1994	CSR Bradford R3.6 Building Blanket glass-fibre insulation batt
FNC 0354		Glasswool Partition Batts glass-fibre insulation
FNC 9594		Bradford Gold Insulation R2.0 Ceiling batts glass-fibre
FNC 9694		Bradford Gold Insulation R1.5 Water-repellent Wall & Floor batts
FNC 9695		Bradford Gold Insulation R5.0 High Performance Ceiling batts glass-fibre insulation
FNC 9749		Bradford Glasswool Partition Batts
NR-15003		CSR Fireseal Party Wall Roof Sealer
NR-15004		CSR Fireseal Party Wall Batts
NR-15005		CSR Rockwool Fibertex 820
NR-15006		CSR Bradford New Generation SoundScreen R2.0 Wall Floor Batts glass-fibre insulation
NR-15007		Bradford Rockwool Granulated Industrial (502)

The test reports listed above were undertaken by CSIRO, AWTA or CSR Building Products Limited and were sponsored by CSR Building Products Limited.

3 Proposed Variations

The proposed construction shall be rockwool and glasswool tested products listed in Section 2, subject to the following variations;

- The density of the tested rockwool may vary from that tested up to 110 kg/m³
- The density of the tested glasswool may vary from that tested up to 130 kg/m³
- The facings may vary from that tested to one of the following:
  - Ultraphon
  - Medium duty foil
  - Heavy duty foil
  - Black matt facing (BMF)
  - Heavy duty perorated foil (HDP foil)
  - Acoustituff
  - Enviroseal Roof Tile Plus foil
  - Thermoplast Decorative facing 993
  - Thermoplast Decorative facing 990
- The facings may be adhered with either Bostik Rapidset 4725 or Bostik HT insulation adhesive.

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4 Referenced Standard

Standards:

AS/NZS 1530.3-1999	Australian/New Zealand Standard 1530: Method for fire tests on building materials, components and structures, Part 3: Simultaneous determination of ignitability, flame propagation, heat release and smoke release, 1999

5 Conclusion

On the basis of the analysis presented in this report, it is the opinion of this Testing Authority that the tested prototypes described in Section 2 when varied as described in Section 3 will achieve the classification indices for ignitability, heat evolved, spread of flame, and smoke developed stated below in accordance with the method referenced in Section 4 and subject to the validity and limitations in section 6 and 7.

Table 1: AS/NZS 1530.3 performance of the rockwool or glasswool insulation with various facings

Facing	Adhesive	Ignitability Index (0-20)	Spread of Flame Index (0-10)	Heat Evolved Index (0-10)	Smoke Developed Index (0-10)
Unfaced	None	0	0	0	1
Ultraphon	Bostik Rapidset 4725 or Bostik HT adhesive when applied at a rate of 25gsm (dry weight)	0	0	0	3
Medium duty foil		0	0	0	0-1
Heavy duty foil		0	0	0	0-1
BMF		18	0	0	3
HDP foil		0	0	0	3
Acoustituff		0	0	0	1
Enviroseal Roof Tile Plus foil		0	0	0	1
Thermoplast Decorative facing 993		0	0	0	0-1
Thermoplast Decorative facing 990		0	0	0	0-1

6 Term of Validity

This assessment report will lapse on 30th June 2023. Should you wish us to re-examine this report with a view to the possible extension of its term of validity, would you please apply to us three to four months before the date of expiry. This Division reserves the right at any time to amend or withdraw this assessment in the light of new knowledge.

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7 Limitations

The conclusions of this assessment report may be used to directly assess the fire performance under such conditions, but it should be recognised that a single test method will not provide a full assessment of the fire hazard under all fire conditions.

This assessment report does not provide an endorsement by CSIRO of the actual products supplied to industry. This assessment can therefore only relate only to the actual prototype test specimens, testing conditions and methodology described in the supporting data, and does not imply any performance abilities of construction of subsequent manufacture.

This assessment is based on information and experience available at the time of preparation. The published procedures for the conduct of tests and the assessment of test results are the subject of constant review and improvement and it is recommended that this report is reviewed on or, before, the stated expiry date.

The information contained in this assessment report shall not be used for the assessment of variations other than those stated in the conclusions above. The assessment is valid provided no modifications are made to the systems detailed in this report. All details of construction should be consistent with the requirements stated in the relevant test reports and all referenced documents.

Issued to: Bradley Hyperfect
Company: Alleanza Australia
Re: St Matthews Catholic School
Mudgee NSW
Issued On: 21st April 2021

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Appendix A Supporting Test Data

A.1 CSIRO Certificate of Tests numbered FNE 9785, FNE 9787, FNE 9788, FNE 9790, FNE 10360, FNE 10361, FNE 10364 and FNE 11429

Certificate of Tests numbered FNE9785, FNE9787, FNE9788, and FNE9790, issued on 14th June 2010 by CSIRO, FNE10360 issued on 21st December 2011 by CSIRO, FNE10361 and FNE10364 issued on 22nd December 2011 by CSIRO, and FNE 11429, issued on 23rd July by CSIRO, details the test results for Ultraphon-faced Bradford Glasswool Ultratel , Medium duty foil-faced Bradford Glasswool Ultratel, Heavy Duty foil-faced Bradford Glasswool Ultratel, BMF-faced Bradford Glasswool Ultratel, Bradford 50mm Supertel Board faced with HDP foil, Bradford 50mm Supertel Board faced with Acoustituff, Bradford 50mm Ultratel Board faced with Acoustituff, and Bradford Glasswool Ultratel - Faced with Enviroseal roof tile plus respectively, when tested to AS/NZS 1530.3:1999. All of the test specimens comprised various facings, Bostik Rapidset 4725 adhesive and backed with Bradford Glasswool Ultratel or Supertel glass-fibre insulation with a nominal density of either 32 kg/m^3 or 48 kg/m^3. All the test specimens achieved an Ignitability Index, Spread of Flame Index, Heat Evolved Index and Smoke Developed Index of 18, 0, 0, 3 respectively or better.

A.2 AWTA Product Testing Test Reports numbered 7-574195-CN and 7-574196-CN

Test Reports numbered 7-574195-CN and 7-574196-CN, issued on 12th August 2010 by AWTA Product Testing, detail the test results for CSR Bradford Thermoplast 993 White (Antiglare) and CSR Bradford Thermoplast 990 White respectively, when tested to AS/NZS 1530.3:1999. The test specimens comprised facings backed with glass-fibre insulation. The total mass of the specimens was 1030-g/m^2 and 960-g/m^2 respectively. The density of the glass-fibre insulation was not reported. Both test specimens achieved an Ignitability Index, Spread of Flame Index, Heat Evolved Index and Smoke Developed Index of 0, 0, 0, 0-1 respectively.

A.3 CSIRO Certificate of Test numbered FNE 12136

Certificate of Test numbered FNE 12136, issued on 12th April 2018 by CSIRO. The specimen comprised Bradford Glasswool Ultratel glass-fibre insulation batt bonded with thermosetting resin and a thickness of 50 mm and nominal density of 48 kg/m^3. The specimen was faced on one side with Black Matt Facing (BMF). When tested in accordance with AS/NZS 1530.3-1999 the Ignitability Index, Spread of Flame Index, Heat Evolved Index and Smoke Developed Index achieved were 0, 0, 0, 2 respectively.

A.4 CSIRO Certificate of Test numbered FNE 12137

Certificate of Test numbered FNE 12137, issued on 12th April 2018 by CSIRO, details the test results for Bradford Glasswool Supertel glass-fibre insulation batt bonded with thermosetting resin and a thickness of 50 mm and nominal density of 32 kg/m^3. The specimen was faced on one side with 750P Heavy Duty Perforated Foil (HDP). When tested in accordance with AS/NZS 1530.3-1999 the Ignitability Index, Spread of Flame Index, Heat Evolved Index and Smoke Developed Index achieved were 0, 0, 0, 2 respectively.

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A.5 CSIRO Certificate of Test numbered FNE 9690

Certificate of Test numbered FNE 9690, issued on 6 April 2010 by CSIRO, details the test results for Rockwool Building Grade Granulated loose fill granulated rockwool mineral-fibre insulation, with a thickness of 100 mm and a nominal density of 20 kg/m³ and 100 kg/m³, tested in accordance with AS/NZS 1530.3 1999. The Ignitability Index, Spread of Flame Index, Heat Evolved Index and Smoke Developed Index achieved were 0, 0, 0, 0-1 respectively.

A.6 CSIRO Certificate of Test numbered FNE 11527

Certificate of Test numbered FNE 11527, issued on 8 April 2016 by CSIRO, details the test results for CSR Bradford Rockwool Granulated loose-fill granulated rockwool mineral-fibre insulation, with a thickness of 100 mm and a nominal density of 100 kg/m³, tested in accordance with AS/NZS 1530.3 1999. The Ignitability Index, Spread of Flame Index, Heat Evolved Index and Smoke Developed Index achieved were 0, 0, 0, 1 respectively.

A.7 CSIRO Certificate of Test numbered FNE 11655

Certificate of Test numbered FNE 11655, issued on 8 April 2016 by CSIRO, details the test results for CSR Bradford Rockwool Fibertex - 820 rockwool mineral-fibre insulation board, with a thickness of 100 mm and a nominal density of 110 kg/m³, tested in accordance with AS/NZS 1530.3 1999. The Ignitability Index, Spread of Flame Index, Heat Evolved Index and Smoke Developed Index achieved were 0, 0, 0, 1 respectively.

A.8 CSIRO Certificate of Test numbered FNE 9589

Certificate of Test numbered FNE 9589 was issued on 11 February 2010 by CSIRO. The specimen comprised Bradford Glasswool Quietel glass-fibre insulation batt bonded with thermosetting resin and a thickness of 25 mm and nominal density of 130 kg/m³. When tested in accordance with AS/NZS 1530.3-1999 the Ignitability Index, Spread of Flame Index, Heat Evolved Index and Smoke Developed Index achieved were 0, 0, 0, 1 respectively.

A.9 CSIRO Certificate of Test numbered FNC 9595

Certificate of Test numbered FNC 9595, issued on 12 February 2010 by CSIRO, details the test results for Bradford Rockwool Fibertex 450 rockwool mineral-fibre insulation batt with a thickness of 50 mm and a nominal density of 80 kg/m³ when tested in accordance with AS 1530.1 1994. The material was not deemed combustible according to the test criteria specified in Clause 3.4 of AS 1530.1-1994.

A.10 CSIRO Certificate of Test numbered FNC 9596

Certificate of Test numbered FNC 9596, issued on 12 February 2010 by CSIRO, details the test results for Bradford Rockwool Fibertex HD rockwool mineral-fibre insulation batt with a thickness of 50 mm and a nominal density of 197 kg/m³ when tested in accordance with AS 1530.1 1994. The material was not deemed combustible according to the test criteria specified in Clause 3.4 of AS 1530.1-1994.

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A.11 CSIRO Certificate of Test numbered FNC 9693

Certificate of Test numbered FNC 9693, issued on 8 March 2010 by CSIRO, details the test results for Soundscreen Plus R3.0 rockwool mineral-fibre insulation batt with a thickness of 50 mm and a nominal density of 30 kg/m³ when tested in accordance with AS 1530.1 1994. The material was not deemed combustible according to the test criteria specified in Clause 3.4 of AS 1530.1-1994.

A.12 CSIRO Certificate of Test numbered FNC 9770

Certificate of Test numbered FNC 9770, issued on 11 June 2010 by CSIRO, details the test results for Rockwool Granulated Cavity Wall loose fill granulated rockwool mineral-fibre insulation with a nominal density of 20 kg/m³ when tested in accordance with AS 1530.1 1994. The material was not deemed combustible according to the test criteria specified in Clause 3.4 of AS 1530.1-1994.

A.13 CSIRO Certificate of Test numbered FNC 9771

Certificate of Test numbered FNC 9771, issued on 11 June 2010 by CSIRO, details the test results for Rockwool Building Grade Granulated loose fill granulated rockwool mineral-fibre insulation with a nominal density of 100 kg/m³ when tested in accordance with AS 1530.1 1994. The material was not deemed combustible according to the test criteria specified in Clause 3.4 of AS 1530.1-1994.

A.14 CSIRO Certificate of Test numbered FNC 10324

Certificate of Test numbered FNC 10324, issued on 21 November 2011 by CSIRO, details the test results for CSR Bradford R3.6 Building Blanket glass-fibre insulation batt bonded with thermosetting resin, with a thickness of 145 mm and a nominal density of 15.9 kg/m³ when tested in accordance with AS 1530.1 1994. The material was not deemed combustible according to the test criteria specified in Clause 3.4 of AS 1530.1-1994.

A.15 CSIRO Certificate of Test numbered FNC 0354

Certificate of Test numbered FNC 0354, issued on 25 October 2005 by CSIRO, details the test results for Glasswool Partition Batts glass-fibre insulation batt bonded with thermosetting resin, with a thickness of 50 mm and a nominal density of 11 kg/m³ when tested in accordance with AS 1530.1 1994. The material was not deemed combustible according to the test criteria specified in Clause 3.4 of AS 1530.1-1994.

A.16 CSIRO Certificate of Test numbered FNC 9594

Certificate of Test numbered FNC 9594, issued on 12 February 2010 by CSIRO, details the test results for Bradford Gold Insulation R2.0 Ceiling batts glass-fibre insulation batt bonded with thermosetting resin, with a thickness of 115 mm and a nominal mass of 728 g/m² (a density of 6.3 kg/m³) when tested in accordance with AS 1530.1 1994. The material was not deemed combustible according to the test criteria specified in Clause 3.4 of AS 1530.1-1994.

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A.17 CSIRO Certificate of Test numbered FNC 9694

Certificate of Test numbered FNC 9694, issued on 8 March 2010 by CSIRO, details the test results for Bradford Gold Insulation R1.5 Water-repellent Wall & Floor batts glass-fibre insulation batt bonded with thermosetting resin, with a thickness of 75 mm and a nominal mass of 657 g/m^2 (a density of 8.76 kg/m^3) when tested in accordance with AS 1530.1 1994. The material was not deemed combustible according to the test criteria specified in Clause 3.4 of AS 1530.1-1994.

A.18 CSIRO Certificate of Test numbered FNC 9695

Certificate of Test numbered FNC 9695, issued on 19 March 2010 by CSIRO, details the test results for Bradford Gold Insulation R5.0 High Performance Ceiling batts glass-fibre insulation batt bonded with thermosetting resin, with a thickness of 210 mm and a nominal mass of 2800 g/m^2 (a density of 13.3 kg/m^3) when tested in accordance with AS 1530.1 1994. The material was not deemed combustible according to the test criteria specified in Clause 3.4 of AS 1530.1-1994.

A.19 CSIRO Certificate of Test numbered FNC 9749

Certificate of Test numbered FNC 9749, issued on 11 June 2010 by CSIRO, details the test results for Bradford Glasswool Partition Batts (14 kg/m^3) glass-fibre insulation batt bonded with thermosetting resin, with a thickness of 50 mm and a nominal density of 14 kg/m^3 when tested in accordance with AS 1530.1 1994. The material was not deemed combustible according to the test criteria specified in Clause 3.4 of AS 1530.1-1994.

A.20 CSR Test Report NR-15003

Test Report numbered NR-15003, issued on 25th May 2015 by CSR Building Products Insulation Research Laboratory, details the test results for CSR Fireseal Party Wall Roof Sealer rockwool mineral-fibre insulation batt with a thickness of 50 mm and a nominal density of 50 kg/m^3 when tested in accordance with AS 1530.1 1994. The material was not deemed combustible according to the test criteria specified in Clause 3.4 of AS 1530.1-1994.

A.21 CSR Test Report NR-15004

Test Report numbered NR-15004, issued on 25th May 2015 by CSR Building Products Insulation Research Laboratory, details the test results for CSR Fireseal Party Wall Batts rockwool mineral-fibre insulation batt with a thickness of 50 mm and a nominal density of 70 kg/m^3 when tested in accordance with AS 1530.1 1994. The material was not deemed combustible according to the test criteria specified in Clause 3.4 of AS 1530.1-1994.

A.22 CSR Test Report NR-15005

Test Report numbered NR-15005, issued on 10th July 2015 by CSR Building Products Insulation Research Laboratory, details the test results for CSR Rockwool Fibertex 820 rockwool mineral-fibre insulation batt with a thickness of 50 mm and a nominal density of 110 kg/m^3 when tested in accordance with AS 1530.1 1994. The material was not deemed combustible according to the test criteria specified in Clause 3.4 of AS 1530.1-1994.

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A.23 CSR Test Report NR-15006

Test Report numbered NR-15006, issued on 10th July 2015 by CSR Building Products Insulation Research Laboratory, detail the test results for CSR Bradford New Generation SoundScreen R2.0 Wall Floor Batts glass-fibre insulation batt bonded with thermosetting resin, with a thickness of 70 mm and a tested density of 26.8 kg/m^3 and binder content of 5%, when tested to AS 1530.1-1994. The material was not deemed combustible according to the test criteria specified in Clause 3.4 of AS 1530.1-1994.

A.24 CSR Test Report NR-15007

Test Report numbered NR-15007, issued on 15th September 2015 by CSR Building Products Insulation Research Laboratory, details the test results for Bradford Rockwool Granulated Industrial (502) loose fill granulated rockwool mineral-fibre insulation with a nominal density of 200 kg/m^3 when tested in accordance with AS 1530.1 1994. The material was not deemed combustible according to the test criteria specified in Clause 3.4 of AS 1530.1-1994.

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Re: St Matthews Catholic School
Mudgee NSW
Issued On: 21st April 2021

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Appendix B Analysis of Variations

B.1 Variation in density and thickness of tested rockwool

The principle used in this assessment uses the performance of a large range of rockwool materials tested in accordance with AS 1530.1-1994 to predict the variation in reaction to fire performance in AS/NZS 1530.3-1999.

With reference to the requirements of AS 1530.1-1994. Samples are placed in a tube furnace at 750°C. The furnace and/or specimen surface temperatures should not show a rise of more than 50°C above their final equilibrium temperatures AND specimens must not show continuous flaming for more than five seconds to not be deemed combustible. Both density and binder content of the tested rockwool mineral-fibre insulation test specimens may affect the performance when tested to AS 1530.1. When tested the following rockwool products were not deemed combustible according to the test criteria specified in AS 1530.1-1994.

- Bradford Rockwool Fibertex 450 at 80 kg/m³ density;
- Bradford Rockwool Fibertex HD at 197 kg/m³ density;
- Soundscreen Plus R3.0 at 30 kg/m³ density;
- Rockwool Granulated Cavity Wall at 20 kg/m³ density;
- Rockwool Building Grade Granulated at 100 kg/m³ density;
- CSR Fireseal Party Wall Roof Sealer at 50 kg/m³ density;
- CSR Fireseal Party Wall Batts at 70 kg/m³ density;
- CSR Rockwool Fibertex 820 at 110 kg/m³ density; and
- Bradford Rockwool Granulated Industrial (502) at 200 kg/m³ density;

It is apparent the density of the rockwool up to 110kg/m³ does not affect the classification of combustibility when tested to the requirements of AS 1530.1-1994.

CSR Building Products Limited provided the percentage of thermosetting resin binder combustible content for each of the products listed above. The combustible content of the mineral-fibre insulation comprised up to 3.4% binder by mass for densities up to 110 kg/m³.

The test specimens required for AS 1530.1 are cylindrical, of 45-mm diameter and 50-mm thick. Consequently, as the test specimen dimensions are definite, the thickness of the rockwool mineral-fibre insulation used in practice would not affect the performance when tested to AS 1530.1-1994.

The significance of the above results indicates that all proposed products have the same classification of non-combustibility indicating a very low level of combustible materials present in any of the compositions tested.

With reference to AS/NZS 1530.3-1999 tests FNE 9690, FNE 11527 and FNE 11655, the specimens comprised Rockwool Building Grade Granulated, CSR Bradford Rockwool Granulated and CSR Rockwool Fibertex 820 at 20 kg/m³, 100 kg/m³ and 110 kg/m³ density respectively. When tested they achieved indices of 0, 0, 0, 1 showing a very low reaction to fire response for this material.

The significance of this results is that three of the proposed materials have very low reaction to fire indices when tested to AS/NZS 1530.3-1999. When this is considered on balance with the non-combustibility classification for the proposed range of products it is considered reasonable and conservative to apply the test results from tests FNE 9690, FNE11655 and FNE 11527 to the proposed range of materials.

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AS/NZS 1530.3 is a surface exposure test; consequently, the thickness of a test specimen does not necessarily have an important effect on the performance of a product when tested to this standard. This is particularly true for products which do not ignite during the test, which was the case for Rockwool Building Grade Granulated, CSR Bradford Rockwool Granulated and CSR Rockwool Fibertex 820 at 20 kg/m^3, 100 kg/m^3 and 110 kg/m^3 density respectively. The AS/NZS 1530.3 standard specifies that loose fill insulation products are tested at a thickness of 100-mm. The range of thicknesses used in practice would not influence the test results for these products.

B.2 Variation in density and thickness of tested glasswool

Similarly, as for rockwool discussed in Section B1 of this report, the density and binder content of the tested glasswool insulation may affect the performance when tested to AS 1530.1. When tested the following glasswool products were not deemed combustible according to the test criteria specified in AS 1530.1-1994.

- Glasswool Partition Batts Test on Bradford Gold Insulation R2.0 Ceiling batts
- Bradford Gold Insulation R1.5 Water-repellent Wall & Floor batts
- Bradford Gold Insulation R5.0 High-Performance Ceiling batts
- Bradford Glasswool Partition Batts (14 kg/m^3)
- CSR Bradford R3.6 Building Blanket
- CSR Bradford New Generation SoundScreen R2.0 Wall Floor Batts

It is apparent the density of the Glasswool up to 26.8 kg/m^3 does not affect the classification of combustibility when tested to the requirements of AS 1530.1-1994.

The performance of glass-fibre insulation batts with the same composition as those tested and densities ranging between 6.3 kg/m^3 and 26.8 kg/m^3 would be equivalent in performance to Glasswool Partition Batts, Bradford Gold Insulation R2.0 Ceiling batts, Bradford Gold Insulation R1.5 Water-repellent Wall & Floor batts, Bradford Gold Insulation R5.0 High Performance Ceiling batts, Bradford Glasswool Partition Batts (14 kg/m^3), CSR Bradford R3.6 Building Blanket, and CSR Bradford New Generation SoundScreen R2.0 Wall Floor Batts when tested to the requirements of AS 1530.1-1994.

CSR Building Products Limited provided a percentage of thermosetting resin binder combustible content for each of the products. The combustible content of the glass-fibre insulation comprised up 5% binder by mass for densities up to 26.8 kg/m^3, up to 7% binder by mass for densities up to 14 kg/m^3, and up to 9% binder by mass for densities up to 11 kg/m^3.

The test specimens required for AS 1530.1 are cylindrical, of 45-mm diameter and 50-mm thick. Consequently, as the test specimen dimensions are definite, the thickness of your glass-fibre insulation batts used in practice would not affect the performance when tested to AS 1530.1-1994.

The significance of the above results indicates that all proposed products have the same classification of non-combustibility indicating a very low level of combustible materials present in any of the compositions tested.

With reference to AS/NZS 1530.3-1999 test FNE 9589 which comprised glasswool glass-fibre insulation boards of the density of 130 kg/m^3 and 13% binder content by mass. When tested they achieved indices of 0, 0, 0, 1 showing a very low reaction to fire response for this material.

The significance of this results is that the proposed material, when tested at high density and binder content, has a very low reaction to fire indices when tested to AS/NZS 1530.3-1999. When this is considered on balance with the non-combustibility classification for the proposed range of products of lower density and binder content it is considered reasonable and conservative to apply the test results from tests FNE 9589 to the proposed range of glasswool materials.

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AS/NZS 1530.3-1999 is a surface exposure test; consequently, the thickness of a test specimen does not necessarily have an important effect on the performance of a product when tested to this standard. This is particularly true for products which do not ignite during the test and as such the range of thicknesses used in practice would not influence the test results for these products.

B.3 Variation in facing for the proposed insulation materials

The principle of the assessment of the performance of various facings when tested to AS/NZS 1530.3-1999 is formed on the basis the underlying insulation material when tested in accordance with AS 1530.1-1994 has been found to be non-combustible and when tested in accordance with AS/NZS 1530.3-1999 and found to have reaction to fire indices of 0, 0, 0, 0-1 which is the least reactive result possible.

The significance of this finding is it makes it reasonable and conservative to conclude that when the insulation materials discussed in Section B1 and B2 of this report are faced, the performance when tested AS/NZS 1530.3-1999, would be dominated by the facing and adhesive used.

The significance of this finding is that the results for the faced insulation material tests may be applied to other insulation materials without measurably affecting their reaction to fire performance in accordance with AS/NZS 1530.3-1999.

The proposed facing and adhesive materials are all based on tests on the CSR glasswool or CSR rockwool products listed below in Table B1.

Table B1- Various facings and adhesives

Facing	Adhesive	Test reference	Ignitability Index	Spread of Flame Index	Heat Evolved Index	Smoke Dev. Index
Ultraphon	Bostik Rapidset 4725	FNE 9785	0	0	0	3
Medium duty foil	Bostik Rapidset 4725	FNE 9787	0	0	0	0-1
Heavy duty foil	Bostik Rapidset 4725	FNE 9788	0	0	0	0-1
BMF	Bostik Rapidset 4725	FNE 9790	18	0	0	3
BMF	Bostik HT adhesive	FNE 12136	0	0	0	2
HDP foil	Bostik Rapidset 4725	FNE 10360	0	0	0	3
HDP foil	Bostik HT adhesive	FNE 12137	0	0	0	2
Acoustituff	Bostik Rapidset 4725	FNE 10361	0	0	0	1
Acoustituff	Bostik Rapidset 4725	FNE 10364	0	0	0	1
Enviroseal Roof Tile Plus foil	Bostik Rapidset 4725	FNE11429	0	0	0	1
Thermoplast Decorative facing 993	Bostik Rapidset 4725	7-574195-CN	0	0	0	0-1
Thermoplast Decorative facing 990	Bostik Rapidset 4725	7-574196-CN	0	0	0	0-1

The highest results occur in the tests that include facings which include perforations or some degree of permeability such as Ultraphon (woven glass fibre), BMF (randomly felted glass fibre tissue) and HDP (an aluminium foil with 2.4 mm diameter perforations and 10% open area). The difference in the performance of each adhesive is expected to be demonstrated with these facings.

With reference to Tests FNE 9790 and FNE 12136 which comprised Bradford glasswool Ultratel with

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BMF facing adhered with Bostik Rapidset 4725 adhesive and Bostik HT insulation adhesive respectively.

With reference to Tests FNE10360 and FNE 12137 which comprised Bradford glasswool Supertel with HDP facing adhered with Bostik Rapidset 4725 adhesive and Bostik HT insulation adhesive respectively.

In both cases specimens with Bostik HT adhesive demonstrated lower or equal results on all four early fire hazard indices. Based on these results is reasonable and conservative to conclude that Bostik HT insulation adhesive and Bostik Rapidset 4725 adhesive when used to apply the previously tested facings will not detrimentally affect the four early fire hazard indices when tested in accordance with AS/NZS 1530.3-1999. A summary of the resulting performance is presented in Table B2.

Table B2- Assessed Fire Hazard Performance

Facing	Adhesive	Ignitability Index	Spread of Flame Index	Heat Evolved Index	Smoke Developed Index
Ultraphon	Bostik Rapidset 4725 or Bostik HT adhesive when applied at a rate of 25gsm (dry weight)	0	0	0	3
Medium duty foil		0	0	0	0-1
Heavy duty foil		0	0	0	0-1
BMF		18	0	0	3
HDP foil		0	0	0	3
Acoustituff		0	0	0	1
Enviroseal Roof Tile Plus foil		0	0	0	1
Thermoplast Decorative facing 993		0	0	0	0-1
Thermoplast Decorative facing 990		0	0	0	0-1

Issued to: Company: Allianza Architecture Re: St Matthews Catholic School Mudgee NSW Issued On: 21st April 2021

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Issued On: 21st April 2021

AWTA PRODUCT TESTING

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Phone (03) 9371 2400 Fax (03) 9371 2499

TEST REPORT

Client : Proctor Group Australia
Unit 8, 171-175 Newton Road
Wetherill Park NSW 2164

Test Number : 16-006359
Issue Date : 12/12/2016
Print Date : 13/12/2016
Order Number : 00016232

Sample Description

Clients Ref : "ProctorWrap Commercial Wall (CW)"
3 Ply Spun bonded polyolefin membrane
Colour : Grey/White
End Use : Pliable building membrane
Nominal Mass per Unit Area/Density : 132g/m2
Nominal Thickness : 0.5mm

AS 1530.2-1993 **Methods for Fire Tests on Building Materials, Components and Structures. Part 2: Test for Flammability of Materials**

Date Tested		12/12/2016	
Flammability Index		1	
	Length	Width	
Spread Factor	0	0	
Heat Factor	1	1	
Maximum height (d)			
Mean	1.5	1.6	
Coefficient of Variation	0.0	12.9	%
Heat (a)			
Mean	1.5	1.5	°C.min
Coefficient of Variation	0.0	0.0	%
Number of Specimens Tested	6	6	
Observation	Visible smoke, melting dripping debris		

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Project: Matthews Catholic School
Mudgee NSW
Issued On: 21st April 2021

These test results relate only to the behaviour of the test specimens of the material under the particular conditions of the test, and they are not intended to be the sole criterion for assessing the potential fire hazard of the material in use.

Specimens were tested face,back,face,back.

78614 16452

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Accredited for compliance with ISO/IEC 17025
- Chemical Testing : Accreditation No. 983
- Mechanical Testing : Accreditation No. 985
- Performance & Approvals Testing : Accreditation No. 1356

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APPROVED SIGNATORY

MICHAEL A JACKSON B.Sc.(Hons)
MANAGING DIRECTOR

0204/11/06

Coated Steel – Metallic

Data Sheet

October 2020. This literature supersedes all previous issues



GALVABOND® steel G2 / G2S

General Description

GALVABOND® G2 steel is a hot-dipped zinc-coated commercial forming steel with a spangled surface, suitable for general manufacturing, widely available as distributor stock. Product is suitable for moderate drawing applications and is suitable for lockseaming up to 1.6mm thick. GALVABOND® G2S steel is skinpassed to improve surface quality. Under normal storage conditions it will be free of fluting for 3 months after galvanising

Typical uses

Tube, airconditioning ducts, airconditioning panels, meter boxes, trailers, partitioning systems, cable trays, scaffolding planks, rendering mesh, feeder troughs.

Australian and International Standards

AS/NZS 1365:1996 (R2016)
AS 1397-2011
ISO 9001:2015 Quality System certified

Guaranteed properties of steel base

Mechanical properties	Guaranteed minimum
Elongation on 80mm (≥ 0.60mm) % (transverse tensile)	27
180° Transverse Bend (L axis)	0t
Pittsburgh lock-seam (≤ 1.6mm)	Pass

Chemical composition of steel base

Chemical properties	Guaranteed maximum %
Carbon - C	0.10
Manganese - Mn	0.45
Phosphorus - P	0.025
Sulfur - S	0.030

Metal coating adhesion – 180˚ bend test

Coating class	Result
Z100	0t
Z200	0t
Z275	0t
Z450	1t
Z600	2t

Where t = the diameter of mandrel in terms of thickness of product.

Dimensional capabilities

Thickness range (mm)	Max Width(mm)
0.30 - 0.319	1000
0.32 – 0.349	1100
0.35 – 0.399	1220
0.40 – 0.419	1300
0.42 – 0.499	1390
0.45 – 0.500	1510
0.501 – 2.00	1530
2.01 – 3.20	1220 (G2 only)
3.201 – 3.50	1000 (G2 only)

Notes: Not every combination of thickness and width may be available. Supply conditions may be subject to dimensional restrictions and are subject to BlueScope Sales and Marketing confirmation. Slitting and shearing available on request from BlueScope Sales Offices. For requirements outside the standard product range please contact your local Sales Office. To determine maximum mill edge width available, subtract 30mm from the maximum width.

Fire hazard properties

Test & Evaluation Methods	Range	Result
Simultaneous determination of ignitability, flame propagation, heat release and smoke release (AS/NZS 1530.3:1999 (R2016))	Ignitability Index (0 – 20)	0
	Spread of Flame Index (0 – 10)	0
	Heat Evolved Index (0 – 10)	0
	Smoke Developed Index (0 – 10)	2
NCC non-combustible material concessions (NCC 2019; AS/NZS 1530.3:1999 (R2016))	National Construction Code, Building Code of Australia 2019; Volume 1: Part C1.9.e, and Volume 2: Part 3.7.1.1.e	May be used wherever a non-combustible material is required
	AS/NZS 1530.3:1999 (R2016)	
Combustibility test for materials (steel substrate) (AS 1530.1-1994 (R2016))	AS 1530.1-1994 (R2016)	Not deemed combustible (steel substrate)

Supply conditions

Attribute	Normal	Optional
Coating Class	Z275	Z100, Z200, (Z450 >0.35mm; Z600 >0.40mm)
Surface Condition	Spangled	Minimised spangle
Surface Treatment	Passivated	Unpassivated (oiled)
Branding	Branded	-
Tolerance - Dimensions	Class A	B Class
Tolerance - Flatness	Class A	B Class

Important Notes: Optional supply conditions may be subject to dimensional restrictions

Fabricating performance

Method	Rating
Bending	5
Drawing	3
Pressing	3
Roll Forming	5
Lock-Forming	5
Welding (design must allow for some strength reduction near welds)	5
Painting Pre-treatment	5

Where: 1 = Limited to 5 = Excellent or NR = Not Recommended
The ratings in this table are general indicators only, given as a guide to fabricating performance.

Important information

Material should be used promptly (within six months) to avoid the possibility of a storage related corrosion. For selection of the most appropriate metallic coated steel, please refer to technical bulletins TB1a, TB1b, CTB21 and CTB22. For storage, rollforming lubricants and other information please refer to the Technical Bulletins.

The information contained in this datasheet is provided by way of general information about this product only, and has not been prepared with your specific needs in mind. We recommend that you seek BlueScope Steel Limited's advice as to the suitability of this product for the purpose(s) for which you propose to use it. To contact BlueScope Steel Limited for advice about your proposed use of this product, please contact Steel Direct. GALVABOND®, BlueScope and the BlueScope brand mark are registered trade marks of BlueScope Steel Limited.
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Certificate of Test

Quote No.: NC7891

REPORT No.: FNC12071

COMBUSTIBILITY TEST FOR MATERIALS IN ACCORDANCE WITH AS 1530.1-1994

TRADE NAME: Aluminium Foil used in the following products:
TBA Firefly Non-Combustible Sarking (Breathable)
TBA Firefly Non-Combustible Sarking (Non-Breathable)
TBA Firefly Phoenix EA Sarking (Non-Breathable)
TBA Firefly Class 0 Foil Tape
TBA Firefly Vulcan (6 mm thick) Fire Barrier
TBA Firefly Plus 60 (10 mm thick) Fire Barrier
TBA Firefly Titan (15 mm thick) Fire Barrier

SPONSOR: TBA Textiles Pty Ltd
Unit 12, 6 Leighton Place
HORNSBY NSW 2077
AUSTRALIA

DESCRIPTION OF TEST SAMPLE: The sponsor described the tested specimen as an uncoated solid aluminium cylinder representative of the aluminium foil used in the products listed under the Trade Name section of this report.

Nominal thickness:	50 mm
Nominal total density:	2700 kg/m^3
Colour:	silver (uncoated aluminium)

TEST PROCEDURE: Five (5) samples were tested in accordance with Australian Standard 1530 Methods for fire tests on building materials, components and structures, Part 1- 1994: Combustibility Test for Materials.

An alternative suitable insulating material was used to fill the annular space between the furnace tubes, as specified in Clause 4.2 of ISO 1182:2010.

RESULTS:

Mean furnace thermocouple temperature rise	7.8°C
Mean specimen centre thermocouple temperature rise	7.2°C
Mean specimen surface thermocouple temperature rise	14.2°C
Mean duration of sustained flaming	0 seconds
Mean mass loss	0.19 %

DESIGNATION: The material is NOT deemed COMBUSTIBLE according to the test criteria specified in Clause 3.4 of AS 1530.1-1994.

These test results relate only to the behaviour of the test specimens of the material under the particular conditions of the test and they are not intended to be the sole criterion for assessing the potential fire hazard of the material in use.

DATE OF TEST: 1 December 2017

Issued on the 12th day of December 2017 without alterations or additions.

Faustin Molina
Testing Officer

Brett Roddy
Team Leader, Fire Testing and Assessments

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NATA

NATA Accredited Laboratory
Number: 165
Corporate Site No 3625
Accredited for compliance with ISO/IEC 17025 - Testing.

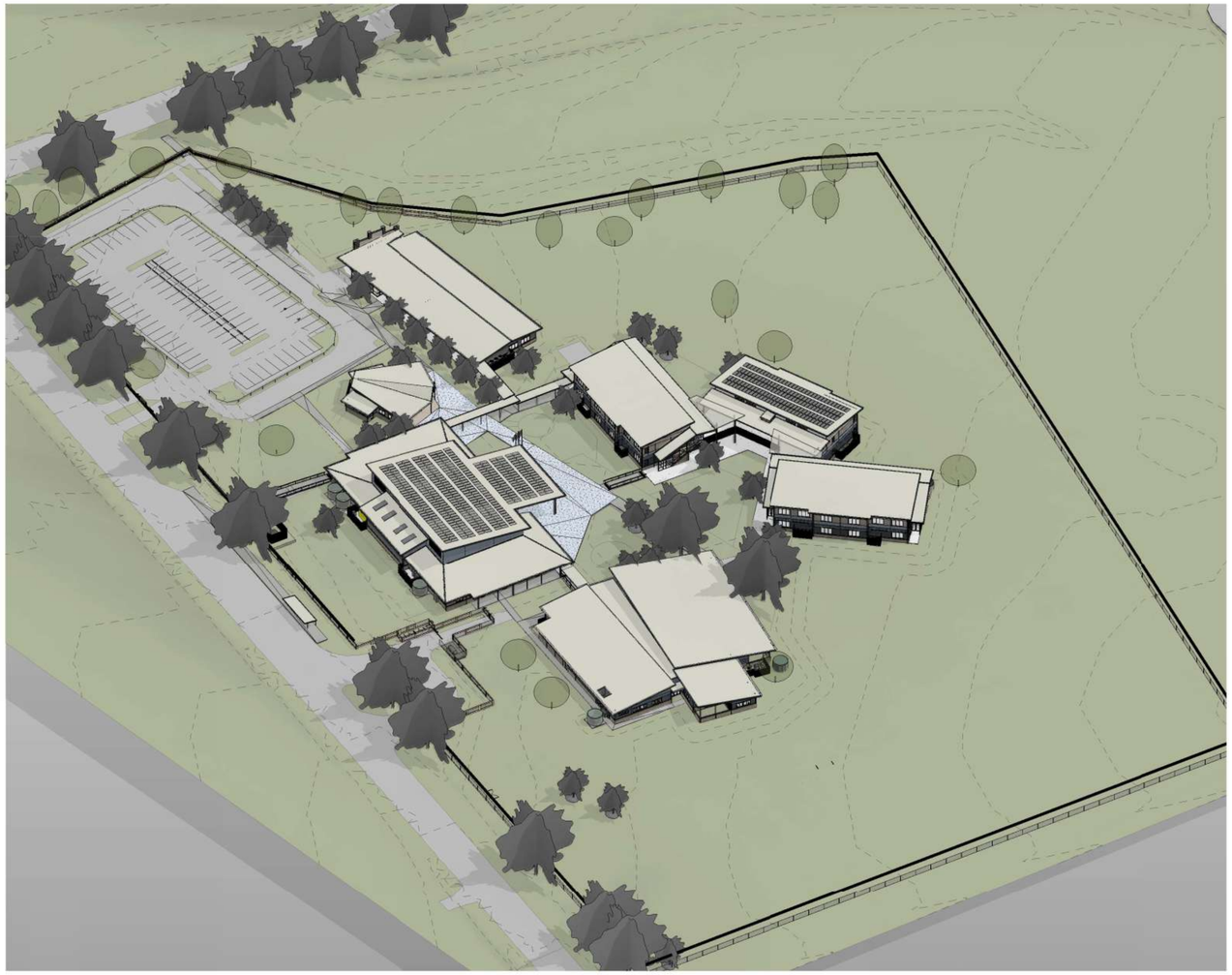
CSIRO INFRASTRUCTURE TECHNOLOGIES

14 Julius Avenue, Riverside Corporate Park, North Ryde NSW 2113 AUSTRALIA
Telephone: 61 2 9490 5444 Facsimile: 61 2 9490 5555 www.csiro.au

ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD
MUDGEE, NSW 2850

MECHANICAL SERVICES



DRAWING LIST MECHANICAL	
BR-M5000	SITE_BR-M5000_COVER SHEET & DRAWING LIST
BR-M5001	SITE_BR-M5001_LEGEND AND NOTES
BR-M5002	SITE_BR-M5002_DETAILS SHEET 1
BR-M5003	SITE_BR-M5003_DETAILS SHEET 2
BR-M5004	SITE_BR-M5004_DETAILS SHEET 3
BR-M5005	SITE_BR-M5005_BUILDING A EQUIPMENT SCHEDULES
BR-M5006	SITE_BR-M5006_BUILDING B EQUIPMENT SCHEDULES
BR-M5007	SITE_BR-M5007_BUILDING C EQUIPMENT SCHEDULES
BR-M5008	SITE_BR-M5008_BUILDING D EQUIPMENT SCHEDULES
BR-M5009	SITE_BR-M5009_BUILDING E1 EQUIPMENT SCHEDULES
BR-M5010	SITE_BR-M5010_BUILDING E2 EQUIPMENT SCHEDULES
BR-M5011	SITE_BR-M5011_BUILDING E3 EQUIPMENT SCHEDULES
BR-M5012	SITE_BR-M5012_FLEXIBLE DUCT, LOUVRE AND GRILLE SCHEDULES
BR-M5100	BLOCK A_BR-M5100_HVAC LAYOUT
BR-M5101	BLOCK B_BR-M5101_HVAC LAYOUT
BR-M5102	BLOCK C_BR-M5102_HVAC LAYOUT
BR-M5103	BLOCK C_BR-M5103_ROOF HVAC LAYOUT
BR-M5104	BLOCK D_BR-M5104_HVAC LAYOUT
BR-M5105	BLOCK D_BR-M5105_ROOF HVAC LAYOUT
BR-M5106	BLOCK E_BR-M5106_BUILDING 1 HVAC LAYOUT
BR-M5107	BLOCK E_BR-M5107_BUILDING 2 HVAC LAYOUT
BR-M5108	BLOCK E_BR-M5108_BUILDING 3 HVAC LAYOUT
BR-M5203	BLOCK C_BR-M5203_ SECTIONS
BR-M5204	BLOCK D_BR-M5204_ SECTIONS



LOCALITY PLAN

REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	23.04.21	ISSUED FOR CONSTRUCTION	KC	MM	KC

STATUS

ISSUED FOR CONSTRUCTION

SCALE @ A1

NOT TO SCALE

CLIENT

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PROJECT

ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE

SITE_BR-M5000_COVER SHEET & DRAWING LIST

PROJECT No.	DRAWING No.	REVISION
21-000048	BR-M5000	1

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DUCTWORK LEGEND

SYMBOL	DESCRIPTION
	UNINSULATED DUCT
	FLEXIBLE CONNECTION - EXTERNALLY INSULATED TO MATCH INSULATION THICKNESS ON ADJACENT DUCTWORK
	25mm EXTERNALLY INSULATED DUCTWORK
	50mm EXTERNALLY INSULATED DUCTWORK
	R2.0 APPROXIMATELY 75mm EXTERNALLY INSULATED DUCT TO NCC SPECIFICATION
	100mm EXTERNALLY INSULATED DUCTWORK
	25mm THICK INTERNALLY INSULATED DUCTWORK
	50mm THICK INTERNALLY INSULATED DUCTWORK
	R2.0 APPROXIMATELY 75mm THICK INTERNALLY INSULATED DUCT TO NCC SPECIFICATION
	R3.0 APPROXIMATELY 100mm THICK INTERNALLY INSULATED DUCT TO NCC SPECIFICATION
	FIRE RATED DUCTWORK
	EXISTING DUCTWORK TO REMAIN
	EXISTING DUCTWORK TO BE DEMOLISHED
	ROUND DUCT REFER TO RECTANGULAR DUCTWORK FOR INSULATION TYPE AND THICKNESS

AIR TERMINAL LEGEND

SYMBOL	DESCRIPTION
	LINEAR SLOT OR BAR DIFFUSER
T	4 WAY CEILING SUPPLY AIR REGISTER - BLANKED OFF TO PROVIDE BLOW PATTERN AS REQUIRED T = THERMAFUSER
	EXHAUST/RETURN AIR GRILLE
	SWIRL DIFFUSER
	CIRCULAR DIFFUSER
	DOUBLE DEFLECTION SIDEWALL REGISTER COMPLETE WITH OBD BEHIND
	HALF CHEVRON WALL GRILLE COMPLETE WITH OBD BEHIND
	HALF CHEVRON CEILING RETURN GRILLE COMPLETE WITH OBD BEHIND
	WEATHERPROOF LOUVRE

TAGS

SYMBOL	DESCRIPTION
	EQUIPMENT TAG - REFER TO EQUIPMENT SCHEDULE
(REF No.)	= EQUIPMENT REFERENCE NUMBER (Parameter)
	AIR TERMINAL TAG - REFER TO AIR TERMINAL SCHEDULE
S-1	'TOP' = REFERENCE NUMBER (REF No. - Parameter)
100	'BOTTOM' = AIR QUANTITY (L/s)

DAMPER LEGEND

SYMBOL	DESCRIPTION
	BUTTERFLY DAMPER OPERATED THROUGH GRILLE FACE
	SPIGOT WITH BUTTERFLY DAMPER
VCD/NRD	DUCT MOUNTED DAMPER TYPES NRD - NON RETURN DAMPER VCD - VOLUME CONTROL DAMPER
M MCD	MCD - MOTORISED CONTROL DAMPER
	FIRE DAMPER TYPES
MFD	MOTORISED FIRE DAMPER
FD	NON-MOTORISED FIRE DAMPER
	SMOKE DAMPER TYPES
M MSD	MOTORISED SMOKE DAMPER
SD	NON-MOTORISED SMOKE DAMPER

MISCELLANEOUS LEGEND

SYMBOL	DESCRIPTION
	FILTER UNIT - REFER TO AIR FILTER SCHEDULE
	EXISTING PIPEWORK TO BE DEMOLISHED
	EXISTING PIPEWORK TO REMAIN
A/P A/P	DUCT MOUNTED ACCESS PANEL
A/P	600x600 CEILING OR WALL MOUNTED ACCESS PANEL - BY BUILDER
A/P	ACCESS PANEL UNDERSIDE OF DUCT - BY BUILDER
CCP ■ CP ■ EF ■ SF ■	CONTROL PANEL 1500 AFFL TYPICALLY, OR AS NOTED CCP = AC CENTRAL CONTROL PANEL CP = AC CONTROL PANEL EF = EXHAUST FAN SF = SUPPLY FAN
H T CO CO P	SENSOR LOCATION @1500 AFFL OR AS NOTED H = HUMIDITY T = TEMPERATURE CO = CARBON MONOXIDE CO_2 = CARBON DIOXIDE P = PRESSURE
F	FIRE SHUT DOWN SIGNAL
DG	DOOR GRILLE - REFER DOOR GRILLE SCHEDULE
	FAN - WITH SQUARE TO ROUND DUCTS. REFER TO FAN SCHEDULE
	AIR FLOW DIRECTION
	FLEXIBLE DUCTWORK - REFER TO FLEXIBLE DUCT SCHEDULE
TD	TUNDISH (BY HYDRAULIC SERVICES)
IW	IN-WALL TUNDISH (BY HYDRAULIC SERVICES)
	RECTANGULAR DUCT RISER
PA @1000 AFFL	COMPRESSED AIR DOUBLE OUTLET COMPLETE WITH PRESSURE REGULATOR @ 1000 AFFL UNLESS OTHERWISE NOTED
PA FS	COMPRESSED AIR PENDANT OUTLET COMPLETE WITH PRESSURE REGULATOR FS=FLOOR SWEEP
	25mm DOOR UNDERCUT (BY BUILDER)
	SINGLE PHASE ELECTRICAL SUPPLY (BY ELECTRICAL SERVICES)
	THREE PHASE ELECTRICAL SUPPLY (BY ELECTRICAL SERVICES)
MSSB	MECHANICAL SERVICES SWITCHBOARD
MSB	MECHANICAL SUB-BOARD

DUCT SYSTEM

KEY	DESCRIPTION
	SUPPLY AIR
	RETURN AIR
	TOILET EXHAUST
	GENERAL EXHAUST
	OUTSIDE AIR
	TRANSFER AIR
	MAKEUP AIR
	CARPARK EXHAUST
	KITCHEN EXHAUST
	HAZARDOUS EXHAUST
	SMOKE EXHAUST
	PRESSURISATION AIR

AC PIPING SYSTEM

KEY	DESCRIPTION
	CHILLED WATER FLOW
	CHILLED WATER RETURN
	HOT WATER FLOW
	HOT WATER RETURN
	CONDENSER WATER FLOW
	COMPRESSED AIR
	REFRIGERANT PIPEWORK
	CONDENSATE DRAIN

KEY	DESCRIPTION
1	TO ENSURE CORRECT INTERPRETATION, THESE DRAWINGS MUST BE PRINTED IN COLOUR.
2	DO NOT SCALE FROM THESE DRAWINGS.
3	THESE DRAWINGS ARE FOR GUIDANCE ONLY. THE INFORMATION PRESENTED IS INDICATIVE AND DIAGRAMMATIC AND SERVES ONLY TO COMMUNICATE A DESIGN INTENT AND TO ENABLE PRICING. THE CONTRACTOR BEARS THE SOLE RESPONSIBILITY FOR THE DESIGN, SUPPLY AND INSTALLATION OF THE MECHANICAL SERVICES AS DEPICTED IN THESE DRAWINGS TO MEET THE MINIMUM PERFORMANCE CRITERIA AND WORKMANSHIP PRESCRIBED IN THE MECHANICAL SERVICES PERFORMANCE BRIEF.
4	THE CONTRACTOR BEARS THE SOLE RESPONSIBILITY FOR THE PRODUCTION OF COORDINATED SHOP DRAWINGS TO THE LEVEL OF DETAIL NECESSARY TO ENABLE THE INSTALLATION OF THE MECHANICAL SERVICES. NO WORK SHALL COMMENCE ON SITE WITHOUT HAVING HARD COPIES OF CONSULTANT REVIEWED SUPERINTENDENT ACCEPTED DRAWINGS IN POSSESSION OF THE MECHANICAL SERVICES CONTRACTOR. THE DRAWINGS SHALL BE UPDATED WITH ALL DEVIATIONS AND CHANGES DUE TO SITE CONDITIONS AS THE WORK PROGRESSES AND UPON PRACTICAL COMPLETION SUBMIT A FULL SET OF "AS BUILT" DRAWINGS OF A STANDARD IN EXCEEDANCE TO THE CONTRACT DRAWINGS.
5	IT IS NOT INTENDED THAT THESE DRAWINGS SHALL SHOW ALL PIPES, DUCTS, FITTINGS AND EQUIPMENT. IF NECESSARY, ALL SUCH ITEMS WHETHER ESPECIALLY MENTIONED OR NOT (OR INDICATED ON THE DRAWING) SHALL BE FURNISHED AND INSTALLED TO COMPLETE THE SYSTEM TO THE SATISFACTION OF THE SUPERINTENDENT AND SHALL NOT CONSTITUTE A VARIATION.
6	THE MECHANICAL SERVICES CONTRACTOR SHALL ENSURE THAT THE INSTALLATION IS IN COMPLIANCE WITH THE REQUIREMENT OF ALL RELEVANT CODES, STANDARDS, SPECIFICATIONS, EQUIPMENT SCHEDULES AND REGULATIONS, INCLUDING BUT NOT LIMITED TO: - THE MECHANICAL SERVICES SPECIFICATION - NATIONAL CONSTRUCTION CODE OF AUSTRALIA (NCC) - AS 1668.1 - AS 1668.2 - AS3000 - AS3600 NOTE THAT THE MECHANICAL SERVICES SPECIFICATION IS NOT A GENERIC DOCUMENT AND CONTAINS INSTRUCTIONS CRITICAL TO THE COMPLIANT INSTALLATION OF THESE WORKS.
7	THESE DRAWINGS MUST BE READ IN CONJUNCTION WITH THE OTHER RELEVANT ARCHITECTURAL, STRUCTURAL, HYDRAULICS, ELECTRICAL AND FIRE AS BUILT DRAWINGS, ALL RELEVANT SECTIONS OF SPECIFICATIONS AND RELEVANT DESIGN STANDARDS. LIAISON WITH THE BUILDER, ELECTRICAL CONTRACTOR, HYDRAULIC CONTRACTOR AND FIRE CONTRACTOR AS NECESSARY FORMS PART OF THE MECHANICAL SERVICES CONTRACT. WORKS BORN OUT OF FAILURE TO COORDINATE WITH OTHER TRADES SHALL NOT CONSTITUTE A VARIATION.
8	ANY DISCREPANCIES IN THE CONTRACT DOCUMENTS ARE TO BE BROUGHT TO THE ATTENTION OF THE SUPERINTENDENT FOR CLARIFICATION FROM THE CONSULTANT DURING THE TENDER PERIOD PRIOR TO THE COMMENCEMENT OF ANY WORK; WHERE DISCREPANCIES EXIST AND ARE NOT RAISED BY THE CONTRACTOR FOR CLARIFICATION PRIOR TO THE COMMENCEMENT OF WORK. THE CONTRACTOR ACKNOWLEDGES THAT THEY HAVE ALLOWED FOR THE MOST EXPENSIVE OPTION.
9	ALL ASSOCIATED WORKS BY THE BUILDER, ELECTRICAL CONTRACTOR, HYDRAULIC CONTRACTOR AND FIRE CONTRACTOR WITHIN THE CONTRACTORS SCOPE OF WORKS ARE TO BE DOCUMENTED IN THE MECHANICAL SERVICES SHOP DRAWINGS.
10	ALL WORKMANSHIP SHALL BE OF A SUITABLY HIGH STANDARD AND BE COMPLETED NEATLY.
11	PRIOR TO THE COMMENCEMENT OF THE WORKS, THE MECHANICAL SERVICES CONTRACTOR IS TO PROVIDE THE BUILDER WITH A CONSTRUCTION PROGRAM FOR THE WORKS, WITH MILESTONES, INSPECTIONS AND HOLD POINTS CLEARLY IDENTIFIED.
12	ALL DIMENSIONS NOTED ON THE DRAWINGS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.
13	THE POSITION OF EQUIPMENT SHOWN ON THE DRAWINGS IS NOMINAL ONLY. EQUIPMENT, DUCTWORK, PIPEWORK AND THE LIKE SHALL BE LOCATED TO SUIT THE SPATIAL CONSTRAINTS ON SITE, BE COORDINATED WITH OTHER SERVICES AND BE POSITIONED TO ALLOW FOR ALL NECESSARY ACCESS.
14	WHEREVER GIVEN, THE ELECTRICAL SUPPLY REQUIREMENTS AND RATINGS OF MECHANICAL EQUIPMENT IN THESE DOCUMENTS ARE INDICATIVE ONLY. IT IS THE RESPONSIBILITY OF THE MECHANICAL SERVICES CONTRACTOR TO LIAISE WITH THE ELECTRICAL SERVICES CONTRACTOR ON THE FINAL SELECTED EQUIPMENT'S ELECTRICAL REQUIREMENTS TO ENSURE THE CORRECT SUPPLY AND PROTECTIVE DEVICES ARE INSTALLED.
15	TEXT SHOWN BOXED ARE ASSOCIATED WORKS BY OTHER TRADES WITHIN THE CONTRACTORS SCOPE OF WORKS.
16	ALL SERVICES PENETRATIONS THROUGH FIRE RATED WALLS, SLABS OR THE LIKE SHALL BE FIRE RATED TO MAINTAIN THE REQUIRED LEVEL OF FIRE RATING. PROVIDE FIRE & SMOKE DAMPERS AS INDICATED ON THE DRAWINGS.
17	THE MECHANICAL SERVICES CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND CONSTRUCTION OF SUITABLE SEISMIC BRACINGS AND RESTRAINTS FOR ALL MECHANICAL SERVICES PLANT AND ANCILLARIES AS REQUIRED UNDER THE RELEVANT STANDARDS AND CODES. ALLOW TO ENGAGE SUITABLY QUALIFIED PERSONNEL AS MAY BE REQUIRED TO ENSURE THE PROVISION OF COMPLETE AND COMPLIANT SOLUTIONS.

REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	23.04.21	ISSUED FOR CONSTRUCTION	KC	MM	KC

STATUS

ISSUED FOR CONSTRUCTION

SCALE @ A1

NOT TO SCALE

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PROJECT

ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

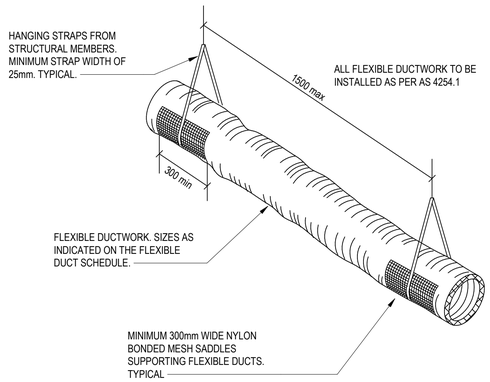
DRAWING TITLE

SITE_BR-M5001_LEGEND AND NOTES

PROJECT No.	DRAWING No.	REVISION
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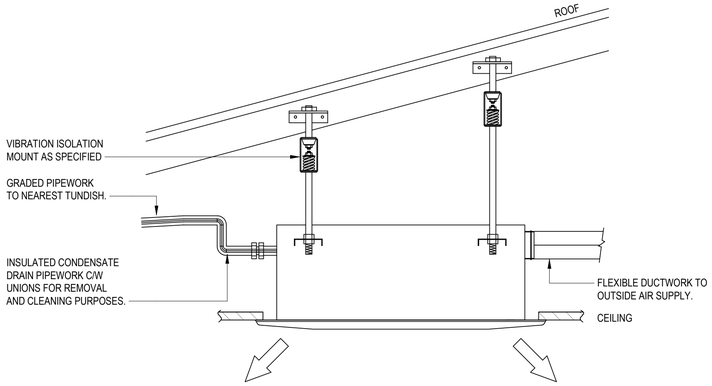
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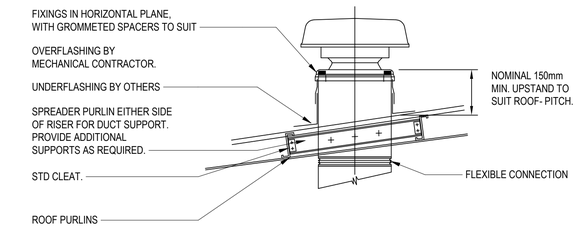
FLEXIBLE DUCT SUPPORT DETAIL (TYPICAL)

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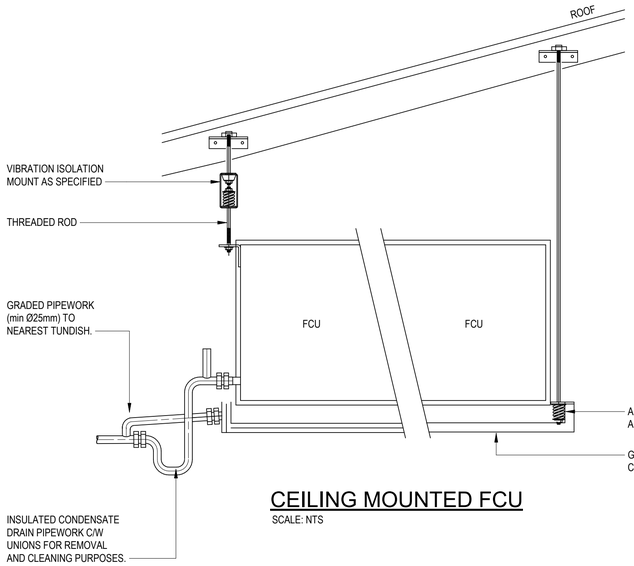
CEILING MOUNTED CASSETTE DETAIL

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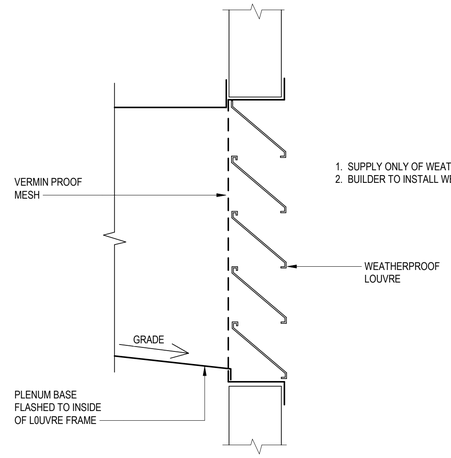
ROOF PENETRATION DETAIL

NOT TO SCALE



CEILING MOUNTED FCU

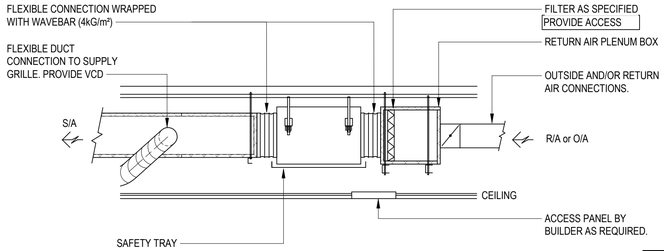
SCALE: NTS



1. SUPPLY ONLY OF WEATHERPROOF LOUVRE
2. BUILDER TO INSTALL WEATHERPROOF LOUVRE

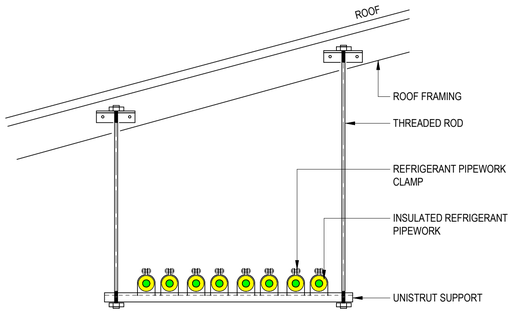
LOUVRE/PLENUM CONNECTION DETAIL

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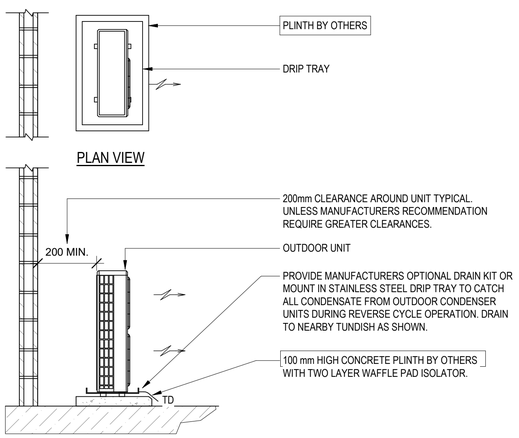
TYPICAL FAN COIL DUCTED UNIT MOUNTING ARRANGEMENT

NOT TO SCALE



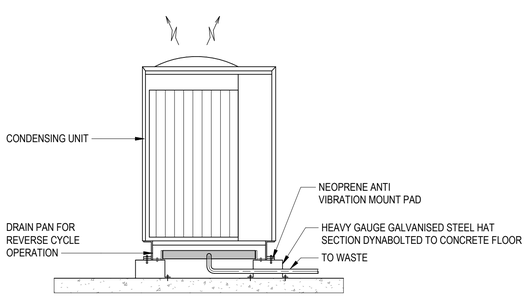
REFRIGERANT PIPEWORK SUPPORT TYPICAL DETAIL

NOT TO SCALE



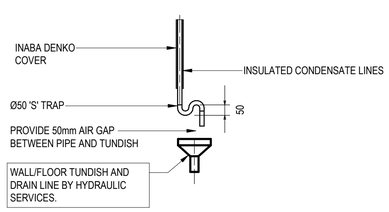
OUTDOOR CONDENSING UNIT DETAIL (Single Split)

NOT TO SCALE



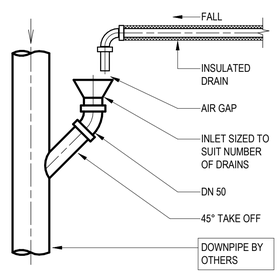
OUTDOOR CONDENSING UNIT

NOT TO SCALE



FLOOR MOUNTED TUNDISH DETAIL

NOT TO SCALE



DOWNPIPE MOUNTED TUNDISH DETAIL

NOT TO SCALE

REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	23.04.21	ISSUED FOR CONSTRUCTION	KC	MM	KC

STATUS

ISSUED FOR CONSTRUCTION

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PROJECT

ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE

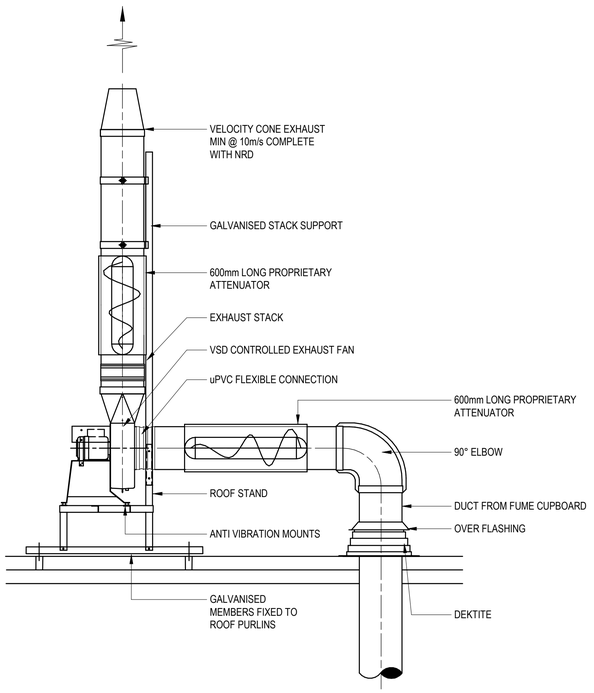
SITE_BR-M5002_DETAILS SHEET 1

PROJECT No.	DRAWING No.	REVISION
21-000048	BR-M5002	1

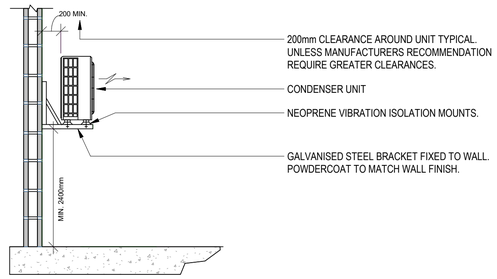
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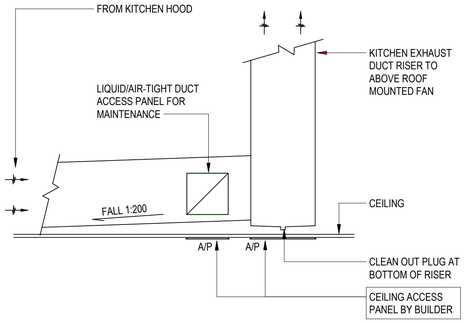


ROOF MOUNTED EXHAUST FAN & STACK ASSEMBLY DETAIL



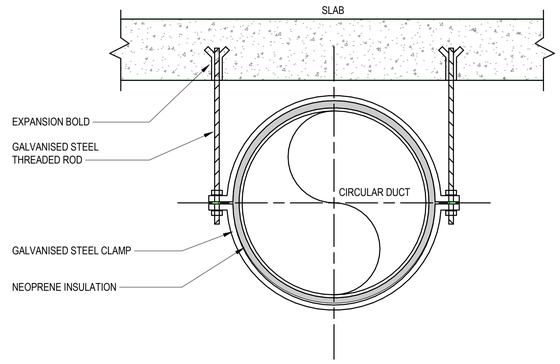
OUTDOOR CONDENSER UNIT DETAIL (SMALL SPLIT)

NOT TO SCALE



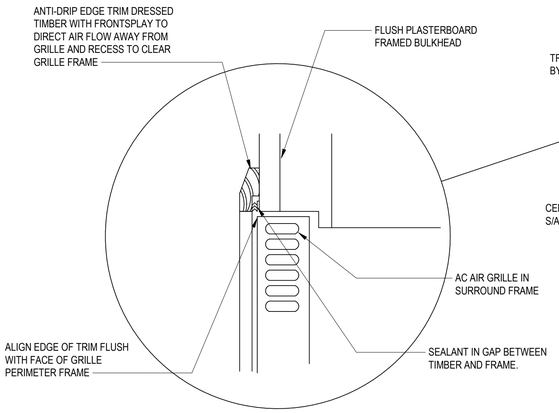
KITCHEN EXHAUST RISER DETAILS

SCALE: NTS

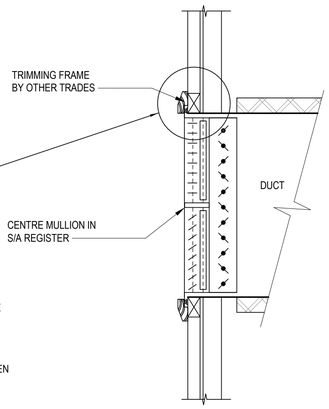


TYPICAL ROUND DUCT HANGER DETAIL

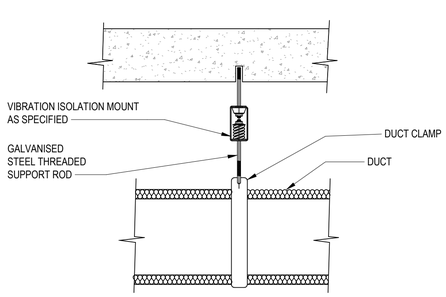
NOT TO SCALE



TYPICAL FRAME EDGE TRIM DETAIL

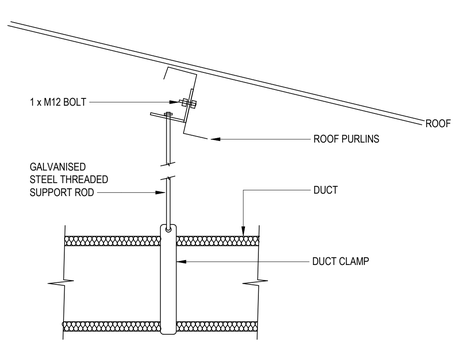


TYPICAL SIDEWALL S/A REGISTER MOUNTING DETAIL (HORIZONTALLY DIVIDED TYPE)



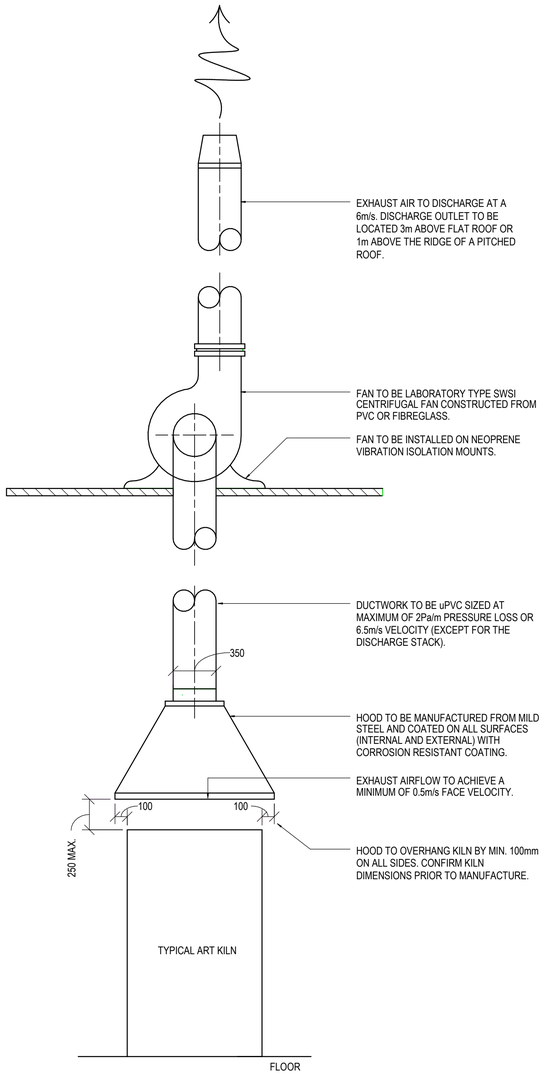
DUCT SUPPORT DETAIL - UNDER SLAB

SCALE: NTS



DUCT SUPPORT DETAIL - UNDER ROOF

SCALE: NOT TO SCALE



KILN EXHAUST HOOD TYPICAL DETAIL

NOT TO SCALE

REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	23.04.21	ISSUED FOR CONSTRUCTION	KC	MM	KC

STATUS

ISSUED FOR CONSTRUCTION

SCALE @ A1

NOT TO SCALE

CLIENT

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ARCHITECT

ALLEANZA ARCHITECTURE

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PROJECT

ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

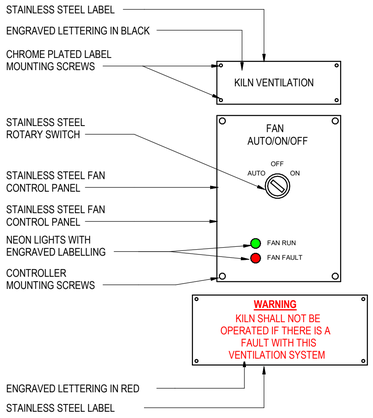
DRAWING TITLE

SITE_BR-M5003_DETAILS SHEET 2

PROJECT No.	DRAWING No.	REVISION
21-000048	BR-M5003	1

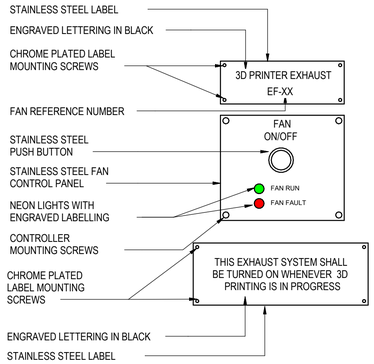
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22/04/2021 11:20:32 PM

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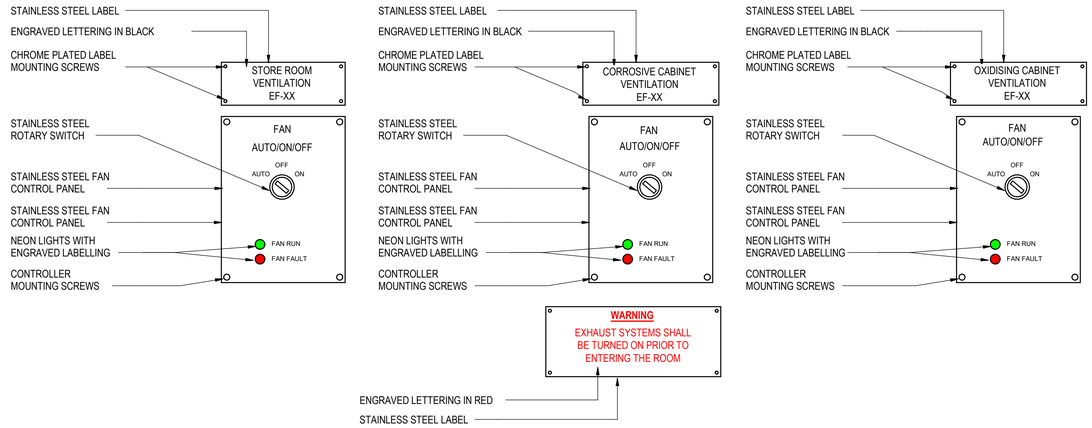
KILN EXHAUST FAN SWITCH DETAIL

NOT TO SCALE



3D PRINTER EXHAUST FAN SWITCH DETAIL

NOT TO SCALE

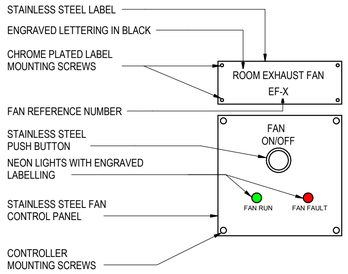


SCIENCE STORE EXHAUST FAN SWITCH DETAILS IN A LOCKABLE ENCLOSURE

NOT TO SCALE

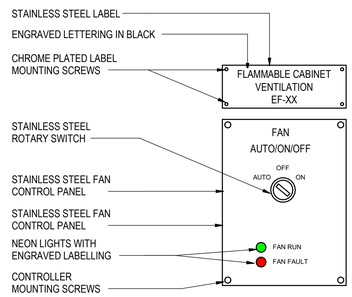
KITCHEN EXHAUST CONTROL PANEL DETAIL

NOT TO SCALE



GENERAL ROOM EXHAUST FAN CONTROL DETAIL

NOT TO SCALE



FLAMMABLE CABINET EXHAUST FAN SWITCH DETAILS

NOT TO SCALE

REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	23.04.21	ISSUED FOR CONSTRUCTION	KC	MM	KC

STATUS

ISSUED FOR CONSTRUCTION

SCALE @ A1

NOT TO SCALE

CLIENT

north
BUILDING WITH TRUST®

ARCHITECT

ALLEANZA ARCHITECTURE

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PROJECT

ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE

SITE_BR-M5004_DETAILS SHEET 3

PROJECT No.	DRAWING No.	REVISION
21-000048	BR-M5004	1

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VRF CONDENSING UNITS SCHEDULE - BUILDING A

REF. No.	TYPE	TOTAL COOLING CAP. GTH(kWr)	MAX. SOUND LEVEL (dBA@3m)	FIRE MODE SHUTDOWN	REFRIGERANT TYPE	NOMINAL ELECTRICAL REQUIREMENTS					SOURCE OF POWER SUPPLY	BASIS OF DESIGN	COMMENTS
						VOLTAGE (V)	PHASE (ø)	FREQUENCY (Hz)	POWER INPUT (kW)	RUNNING CURRENT (A)		MAKE	
CU.A.GF-1	VRF HEAT PUMP	34.0	64	YES	R410A	415	3	50	10.9	18.3	MSSB-A	DAIKIN AND MITSUBISHI ELECTRIC	
CU.A.GF-2	VRF-S HEAT PUMP	10.4	51	YES	R410A	240	1	50	2.8	12.5	MSSB-A	DAIKIN AND MITSUBISHI ELECTRIC	
CU.A.GF-3	VRF-S HEAT PUMP	11.8	51	YES	R410A	240	1	50	2.8	12.5	MSSB-A	DAIKIN AND MITSUBISHI ELECTRIC	
CU.A.GF-4	VRF HEAT PUMP	50.2	64	YES	R410A	415	3	50	15.0	25.2	MSSB-A	DAIKIN AND MITSUBISHI ELECTRIC	

NOTES:
1. SELECT CONDENSERS BASED ON 35 °C AIR ON.
2. SIZED OUTDOOR UNITS AND INDOOR FAN COILS TO MEET THE TOTAL AND SENSIBLE COOLING WITH ALL UNITS RUNNING SIMULTANEOUSLY. MAX CONNECTION RATIO IS 130%.
3. CONSIDER CAPACITY LOSSES THROUGH PIPING IN THE OUTDOOR UNIT SELECTIONS.
4. UNIT SHALL BE BASED ON DAIKIN OR MITSUBISHI ELECTRIC AS SPECIFIED FOR PRICING / TENDER SUBMISSION PURPOSES. "ALTERNATIVE OFFER" WILL BE CONSIDERED / NEGOTIATED FOLLOWING CONTRACT AWARD IF COST SAVINGS CAN BE ACHIEVED. TENDERER TO COMPLETE THE ALTERNATIVE OFFER FORM AS PART OF THE TENDER SUBMISSION.

MSSB-A SCHEDULE

PHASE A	PHASE B	PHASE C
40.9	40.5	40.7

NOTE: 1. PROVIDE MINIMUM 25% SPARE CAPACITY & POLES FOR FUTURE EXPANSION

SINGLE SPLIT DX AIR CONDITIONING UNIT SCHEDULE - BUILDING A

INDOOR UNIT. NO.	OUTDOOR UNIT NO.	TYPE	AREA SERVED	MINIMUM SENSIBLE COOLING CAP. GTH (kWr)	COIL DATA		SUPPLY AIR (L/s)	AIR FILTERS (MAX VELOCITY ACROSS FILTER FACE = 2.0 m/s)	MAX. SOUND LEVEL (INDOOR) (dBA@3m)	FIRE MODE SHUTDOWN	NOMINAL ELECTRICAL REQUIREMENTS					SOURCE OF POWER SUPPLY	BASIS OF DESIGN	COMMENTS
					AIR ON COIL	AIR OFF COIL					VOLTAGE (V)	PHASE (ø)	FREQUENCY (Hz)	POWER INPUT (kW)	RUNNING CURRENT (A)		MAKE	
					°C DB/WB	°C DB/WB												
FCU.A.GF-5	CU.A.GF-5	WALL MOUNTED INVERTER SPLIT - COOLING ONLY	COMMS ROOM	5.0	21.0 / 14.5	11.8 / 10.9	350	PROPRIETARY FILTERS INTERGAL TO UNIT	49	NO	240	1	50	3.1	10.0	MSSB-A	DAIKIN AND MITSUBISHI ELECTRIC	

NOTE:
1. SELECT CONDENSERS BASED ON 38 °C AIR ON.
2. UNIT MAKE SHALL BE THE SAME AS THE VRF SYSTEMS.
3. ONLY AIR CONDITIONING SYSTEMS THAT SATISFY THE CAPACITY, SUPPLY AIR FLOW AND NOISE REQUIREMENTS WILL BE ACCEPTED.

FAN SCHEDULE - BUILDING A

REF. No.	PURPOSE	TYPE	AREA SERVED	DUTY (L/s)	ESTIMATED EXTERNAL STATIC PRESSURE (Pa)	FAN DIA (mm)	SPEED (rpm)	MAX INLET SOUND PRESSURE LEVEL dB(A) @3m	MAX OUTLET SOUND PRESSURE LEVEL dB(A) @3m	VSD	FIREMODE SHUTDOWN	OPERATION	NOMINAL ELECTRICAL REQUIREMENTS					SOURCE OF POWER SUPPLY	BASIS OF DESIGN		COMMENTS
													VOLTAGE (V)	PHASE (ø)	FREQUENCY (Hz)	POWER INPUT (kW)	RUNNING CURRENT (A)		MAKE	MODEL	
EF.A.GF-1	EXHAUST	CEILING MOUNTED HEADER BOX	GF - ACC WC	65	60	150	950	38	-	NO	NO	NOTES 1 & 3	240	1	50	0.06	0.27	MSSB-A	FANTECH	RESPF150	
EF.A.GF-2	EXHAUST	CEILING MOUNTED HEADER BOX	GF - WC / SHR	40	40	150	950	39	-	NO	NO	NOTES 1 & 3	240	1	50	0.04	0.16	MSSB-A	FANTECH	ECL29-150	
EF.A.GF-3	EXHAUST	CEILING MOUNTED HEADER BOX	GF - PRINT	100	60	250	1395	40	-	NO	NO	NOTES 1 & 5	240	1	50	0.07	0.28	MSSB-A	FANTECH	RP254	
EF.A.GF-4	EXHAUST	IN-LINE MIXED FLOW	GF - TOILETS	255	90	280	1430	41	47	NO	NO	NOTES 1 & 2	240	1	50	0.13	0.66	MSSB-A	FANTECH	PUE284ER	PROVIDE SPEED CONTROLLER FOR COMMISSIONING
SF.A.GF-1	OUTSIDE AIR	IN-LINE MIXED FLOW	GF - LEADERSHIP	50	90	150	1935	40	42	NO	YES	NOTES 1 & 4	240	1	50	0.05	0.35	MSSB-A	FANTECH	TD-500/150ECO	PROVIDE SPEED CONTROLLER FOR COMMISSIONING IF NON-EC FAN IS USED
SF.A.GF-2	OUTSIDE AIR	IN-LINE MIXED FLOW	GF - MEETING ROOM 1	75	110	150	2500	40	41	NO	YES	NOTES 1 & 4	240	1	50	0.05	0.22	MSSB-A	FANTECH	TD-500/150SIL	PROVIDE SPEED CONTROLLER FOR COMMISSIONING
SF.A.GF-3	OUTSIDE AIR	IN-LINE MIXED FLOW	GF - FCU A.GF-2.1 TO 2.3 AND 3.1 TO 3.3	130	130	200	2780	42	44	NO	YES	NOTES 1 & 4	240	1	50	0.10	0.45	MSSB-A	FANTECH	TD-800/200SIL	PROVIDE SPEED CONTROLLER FOR COMMISSIONING
SF.A.GF-4	OUTSIDE AIR	IN-LINE MIXED FLOW	GF - MEETING ROOM 2	60	110	150	2159	42	44	NO	YES	NOTES 1 & 4	240	1	50	0.05	0.35	MSSB-A	FANTECH	TD-500/150ECO	PROVIDE SPEED CONTROLLER FOR COMMISSIONING IF NON-EC FAN IS USED

NOTES:
1. VERIFY FAN STATIC PRESSURE PRIOR TO ORDERING. FANS AND MOTORS SHALL BE SELECTED WITH ALLOWANCE TO PROVIDE AIR FLOW RATES OF 10% MORE THAN THAT SPECIFIED AGAINST THE CORRESPONDING INCREASE IN SYSTEM RESISTANCE. FANS AND MOTOR SHALL ALSO COMPLY WITH RECOMMENDED NOISE RATING INSIDE BUILDINGS AND PERFORMANCE NOTED IN NCC 2019 SECTION J5.4.
2. INTERLOCK WITH BUILDING SECURITY SYSTEM, ie FAN WIRED TO "RUN" WHEN THE BUILDING IS DISARMED AND "OFF" WHEN THE BUILDING IS ARMED.
3. INTERLOCK WITH ROOM LIGHTS. LIAISE WITH ELECTRICAL SERVICES.
4. INTERLOCK WITH ASSOCIATED FAN COIL UNIT.
5. LOCAL ON/OFF SWITCH WITH GREEN NEON RUN LIGHT.

VRF FAN COIL UNITS SCHEDULE - BUILDING A

REF. NO.	OUTDOOR UNIT NO.	TYPE	AREA SERVED	TOTAL COOLING CAP. GTH (kWr)	SENSIBLE CAPACITY GTSH (kWr)	COIL DATA		SUPPLY AIR (L/s)	OUTSIDE AIR (L/s)	AIR FILTERS (MAX VELOCITY ACROSS FILTER FACE = 2.0 m/s)	MAX. SOUND LEVEL (dBA@3m)	FIRE MODE SHUTDOWN	NOMINAL ELECTRICAL REQUIREMENTS					SOURCE OF POWER SUPPLY	BASIS OF DESIGN	COMMENTS
						AIR ON COIL	AIR OFF COIL						VOLTAGE (V)	PHASE (ø)	FREQUENCY (Hz)	POWER INPUT (kW)	RUNNING CURRENT (A)		MAKE	
						°C DB/WB	°C DB/WB													
FCU.A.GF-1.1	CU.A.GF-1	DUCTED FCU	GF - FOYER	12.0	11.6	23.0 / 15.0	10.1 / 9.6	600	-	100mm THICK F5 RATED FILTERS	34	YES	240	1	50	0.19	1.24	MSSB-A	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.A.GF-1.2	CU.A.GF-1	DUCTED FCU	GF - STUDENT FOYER	6.0	5.7	23.0 / 16.1	13.2 / 12.2	400	-	100mm THICK F5 RATED FILTERS	30	YES	240	1	50	0.10	0.63	MSSB-A	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.A.GF-1.3	CU.A.GF-1	DUCTED FCU	GF - INTERNAL OFFICES / CORRIDOR	10.0	8.3	24.9 / 17.1	14.3 / 12.5	620	100	100mm THICK F5 RATED FILTERS	34	YES	240	1	50	0.16	1.10	MSSB-A	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.A.GF-1.4	CU.A.GF-1	CEILING CASSETTE - 4 WAY	GF - MEETING 1	6.0	4.9	27.7 / 18.5	12.3 / 11.1	280	75	PROPRIETARY FILTERS INTERGAL TO UNIT	32		240	1	50	0.03	0.36	MSSB-A	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.A.GF-2.1	CU.A.GF-2	COMPACT EILING CASSETTE - 4 WAY	GF - INTERVIEW 1	2.4	2.0	25.2 / 17.3	12.7 / 11.7	25	25	PROPRIETARY FILTERS INTERGAL TO UNIT	33		240	1	50	0.02	0.22	MSSB-A	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.A.GF-2.2	CU.A.GF-2	COMPACT EILING CASSETTE - 4 WAY	GF - INTERVIEW 2	2.4	2.0	25.2 / 17.3	12.7 / 11.7	150	25	PROPRIETARY FILTERS INTERGAL TO UNIT	33		240	1	50	0.02	0.22	MSSB-A	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.A.GF-2.3	CU.A.GF-2	COMPACT EILING CASSETTE - 4 WAY	GF - PA	2.3	1.9	24.6 / 17.0	13.3 / 12.2	150	20	PROPRIETARY FILTERS INTERGAL TO UNIT	33		240	1	50	0.02	0.22	MSSB-A	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.A.GF-2.4	CU.A.GF-2	CEILING CASSETTE - 4 WAY	GF - LEADERSHIP	3.3	2.6	27.2 / 18.3	12.9 / 11.7	200	50	PROPRIETARY FILTERS INTERGAL TO UNIT	31		240	1	50	0.03	0.32	MSSB-A	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.A.GF-3.1	CU.A.GF-3	CEILING CASSETTE - 4 WAY	GF - PRINCIPAL	3.2	2.8	24.1 / 16.7	13.3 / 12.2	200	20	PROPRIETARY FILTERS INTERGAL TO UNIT	31		240	1	50	0.03	0.32	MSSB-A	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.A.GF-3.2	CU.A.GF-3	COMPACT EILING CASSETTE - 4 WAY	GF - HOC	2.3	1.9	24.6 / 17.0	13.3 / 12.2	150	20	PROPRIETARY FILTERS INTERGAL TO UNIT	33		240	1	50	0.02	0.22	MSSB-A	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.A.GF-3.3	CU.A.GF-3	COMPACT EILING CASSETTE - 4 WAY	GF - MISSION	2.3	1.9	24.6 / 17.0	13.3 / 12.2	150	20	PROPRIETARY FILTERS INTERGAL TO UNIT	33		240	1	50	0.02	0.22	MSSB-A	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.A.GF-3.4	CU.A.GF-3	CEILING CASSETTE - 4 WAY	GF - MEETING 2	4.0	3.3	25.5 / 17.5	12.8 / 11.7	250	60	PROPRIETARY FILTERS INTERGAL TO UNIT	31		240	1	50	0.03	0.32	MSSB-A	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.A.GF-4.1	CU.A.GF-4	DUCTED FCU	L1 - STAFF ROOM_N	8.2	7.0	25.1 / 17.3	12.5 / 11.7	400	75	100mm THICK F5 RATED FILTERS	30	YES	240	1	50	0.1	0.63	MSSB-A	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.A.GF-4.2	CU.A.GF-4	DUCTED FCU	L1 - STAFF ROOM_S	12.0	9.6	26.1 / 17.7	13.9 / 12.1	620	150	100mm THICK F5 RATED FILTERS	34	YES	240	1	50	0.16	1.05	MSSB-A	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.A.GF-4.3	CU.A.GF-4	DUCTED FCU	L1 - STUDY_N	18.0	15.2	25.1 / 17.3	130. / 11.9	930	175	100mm THICK F5 RATED FILTERS	44	YES	240	1	50	0.42	0.74	MSSB-A	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.A.GF-4.4	CU.A.GF-4	DUCTED FCU	L1 - STUDY_S	12.0	9.7	25.7 / 17.5	13.4 / 11.8	625	125	100mm THICK F5 RATED FILTERS		YES	240	1	50	0.16	1.05	MSSB-A	DAIKIN AND MITSUBISHI ELECTRIC	

NOTES:
1. ONLY AIR CONDITIONING SYSTEMS THAT SATISFY THE CAPACITY, SUPPLY AIR FLOW AND NOISE REQUIREMENTS WILL BE ACCEPTED.
2. PROVIDE HIGH STATIC SERIES FAN COIL UNITS THAT HAS EXTERNAL STATIC PRESSURE OF (150-250) Pa.

REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	23.04.21	ISSUED FOR CONSTRUCTION	KC	MM	KC

STATUS
ISSUED FOR CONSTRUCTION

SCALE @ A1
NOT TO SCALE

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PROJECT
ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE
SITE_BR-M5005_BUILDING A EQUIPMENT SCHEDULES

PROJECT No.	DRAWING No.	REVISION
21-000048	BR-M5005	1

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FAN SCHEDULE - BUILDING B

REF. No.	PURPOSE	TYPE	AREA SERVED	MINIMUM DUTY (L/s)	ESTIMATED EXTERNAL STATIC PRESSURE (Pa)	FAN DIA (mm)	SPEED (rpm)	MAX INLET SOUND PRESSURE LEVEL dB(A) @3m	MAX OUTLET SOUND PRESSURE LEVEL dB(A) @3m	VSD	FIREMODE SHUTDOWN	OPERATION	NOMINAL ELECTRICAL REQUIREMENTS					SOURCE OF POWER SUPPLY	BASIS OF DESIGN		COMMENTS
													VOLTAGE (V)	PHASE (ø)	FREQUENCY (Hz)	POWER INPUT (kW)	RUNNING CURRENT (A)		MAKE	MODEL	
EF.B.GF-1	EXHAUST	WALL MOUNTED	ACC. WC	50	35	150	2160	42	-	NO	NO	NOTES 1 & 2	240	1	50	0.03	0.10	ISOLATOR BY ELECTRICAL SERVICES	FANTECH	SILENT DESIGN SERIES	PROVIDE WALL TUBE KIT C/W BACKDRAFT DAMPER AND EXTERNAL DISCHARGE...

NOTES:
1. VERIFY FAN STATIC PRESSURE PRIOR TO ORDERING. FANS AND MOTORS SHALL BE SELECTED WITH ALLOWANCE TO PROVIDE AIR FLOW RATES OF 10% MORE THAN THAT SPECIFIED AGAINST THE CORRESPONDING INCREASE IN SYSTEM RESISTANCE. FANS AND MOTOR SHALL ALSO COMPLY WITH RECOMMENDED NOISE RATING INSIDE BUILDINGS AND PERFORMANCE NOTED IN NCC 2019 SECTION J5.4.
2. INTERLOCK WITH ROOM LIGHTS. LIAISE WITH ELECTRICAL SERVICES.

SINGLE SPLIT DX AIR CONDITIONING UNIT SCHEDULE - BUILDING B

INDOOR UNIT. NO.	OUTDOOR UNIT NO.	TYPE	AREA SERVED	TOTAL COOLING CAP. GTH (kWr)	SENSIBLE CAPACITY GTSH (kWr)	COIL DATA		SUPPLY AIR (L/s)	OUTSIDE AIR (L/s)	AIR FILTERS (MAX VELOCITY ACROSS FILTER FACE = 2.0 m/s)	MAX. SOUND LEVEL (INDOOR) (dBA@3m)	FIRE MODE SHUTDOWN	NOMINAL ELECTRICAL REQUIREMENTS					SOURCE OF POWER SUPPLY	BASIS OF DESIGN	COMMENTS
						AIR ON COIL	AIR OFF COIL						VOLTAGE (V)	PHASE (ø)	FREQUENCY (Hz)	POWER INPUT (kW)	RUNNING CURRENT (A)		MAKE	
						°C DB/WB	°C DB/WB													
FCU.B.GF-3	CU.B.GF-3	WALL MOUNTED INVERTER SPLIT - HEAT PUMP	RECREATIONAL	1.8	1.6	23.0 / 16.1	12.5 /11.5	150	-	PROPRIETARY FILTERS INTERGAL TO UNIT	38	NO	240	1	50	0.45	2.6	REFER NOTE 3	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.B.GF-4	CU.B.GF-4	WALL MOUNTED INVERTER SPLIT - HEAT PUMP	SACRISTY	1.8	1.6	23.0 / 16.1	12.5 / 11.5	150	-	PROPRIETARY FILTERS INTERGAL TO UNIT	38	NO	240	1	50	0.45	2.6	REFER NOTE 3	DAIKIN AND MITSUBISHI ELECTRIC	

NOTE:
1. SELECT CONDENSERS BASED ON 38 ºC AIR ON.
2. ONLY AIR CONDITIONING SYSTEMS THAT SATISFY THE CAPACITY, SUPPLY AIR FLOW AND NOISE REQUIREMENTS WILL BE ACCEPTED.
3. UNIT MAKE SHALL BE THE SAME AS THE VRF SYSTEMS.
4. LOCAL ISOLATORS NEXT TO OUTDOOR UNITS PROVIDED BY ELECTRICAL SERVICES FOR FINAL CONNECTION BY MECHANICAL SERVICES.

VRF FAN COIL UNITS SCHEDULE - BUILDING B

REF. NO.	OUTDOOR UNIT NO.	TYPE	AREA SERVED	TOTAL COOLING CAP. GTH (kWr)	SENSIBLE CAPACITY GTSH (kWr)	COIL DATA		SUPPLY AIR (L/s)	OUTSIDE AIR (L/s)	AIR FILTERS (MAX VELOCITY ACROSS FILTER FACE = 2.0 m/s)	MAX. SOUND LEVEL (dBA@3m)	FIRE MODE SHUTDOWN	NOMINAL ELECTRICAL REQUIREMENTS					SOURCE OF POWER SUPPLY	BASIS OF DESIGN	COMMENTS
						AIR ON COIL	AIR OFF COIL						VOLTAGE (V)	PHASE (ø)	FREQUENCY (Hz)	POWER INPUT (kW)	RUNNING CURRENT (A)		MAKE	
						°C DB/WB	°C DB/WB													
FCU.B.GF-1.1	CU.B.GF-1	100% FRESH AIR INTAKE UNIT	GF - CHAPEL	22.0	-	-	-	375	375	100mm THICK F5 RATED FILTERS	42	YES	240	1	50	0.27	1.9	REFER NOTE 3	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.B.GF-1.2	CU.B.GF-1	100% FRESH AIR INTAKE UNIT	GF - CHAPEL	22.0	-	-	-	375	375	100mm THICK F5 RATED FILTERS	42	YES	240	1	50	0.27	1.9	REFER NOTE 3	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.B.GF-2.1	CU.B.GF-2	CEILING CASSETTE - 4 WAY	GF - CHAPEL	10.5	8.5	24.4 / 16.8	12.4 / 11.4	480	-	PROPRIETARY FILTERS INTERGAL TO UNIT	41	YES	240	1	50	0.07	0.7	REFER NOTE 3	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.B.GF-2.2	CU.B.GF-2	CEILING CASSETTE - 4 WAY	GF - CHAPEL	10.5	8.5	24.4 / 16.8	12.4 / 11.4	480	-	PROPRIETARY FILTERS INTERGAL TO UNIT	41	YES	240	1	50	0.07	0.7	REFER NOTE 3	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.B.GF-2.3	CU.B.GF-2	CEILING CASSETTE - 4 WAY	GF - CHAPEL	10.5	8.5	24.4 / 16.8	12.4 / 11.4	480	-	PROPRIETARY FILTERS INTERGAL TO UNIT	41	YES	240	1	50	0.07	0.7	REFER NOTE 3	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.B.GF-2.4	CU.B.GF-2	CEILING CASSETTE - 4 WAY	GF - CHAPEL	10.5	8.5	24.1 / 16.8	12.4 / 11.4	480	-	PROPRIETARY FILTERS INTERGAL TO UNIT	41	YES	240	1	50	0.07	0.7	REFER NOTE 3	DAIKIN AND MITSUBISHI ELECTRIC	

NOTES:
1. ONLY AIR CONDITIONING SYSTEMS THAT SATISFY THE CAPACITY, SUPPLY AIR FLOW AND NOISE REQUIREMENTS WILL BE ACCEPTED.
2. PROVIDE HIGH STATIC SERIES FAN COIL UNITS THAT HAS EXTERNAL STATIC PRESSURE OF (150-250) Pa.
3. LOCAL ISOLATORS NEXT TO INDOOR UNITS PROVIDED BY ELECTRICAL SERVICES FOR FINAL CONNECTION BY MECHANICAL SERVICES.

VRF CONDENSING UNITS SCHEDULE - BUILDING B

REF. No.	TYPE	TOTAL COOLING CAP. GTH(kWr)	MAX. SOUND LEVEL (dBA@3m)	FIRE MODE SHUTDOWN	REFRIGERANT TYPE	NOMINAL ELECTRICAL REQUIREMENTS					SOURCE OF POWER SUPPLY	BASIS OF DESIGN	COMMENTS
						VOLTAGE (V)	PHASE (ø)	FREQUENCY (Hz)	POWER INPUT (kW)	RUNNING CURRENT (A)		MAKE	
CU.B.GF-1	VRF HEAT PUMP	44.0	67	YES	R410A	415	3	50	13.7	23.1	REFER NOTE 5	DAIKIN AND MITSUBISHI ELECTRIC	
CU.B.GF-2	VRF HEAT PUMP	42.0	67	YES	R410A	415	3	50	13.7	23.1	REFER NOTE 5	DAIKIN AND MITSUBISHI ELECTRIC	

NOTES:
1. SELECT CONDENSERS BASED ON 38 ºC AIR ON.
2. SIZED OUTDOOR UNITS AND INDOOR FAN COILS TO MEET THE TOTAL AND SENSIBLE COOLING WITH ALL UNITS RUNNING SIMULTANEOUSLY. MAX CONNECTION RATIO IS 130%.
3. CONSIDER CAPACITY LOSSES THROUGH PIPING IN THE OUTDOOR UNIT SELECTIONS.
4. UNIT SHALL BE BASED ON DAIKIN OR MITSUBISHI ELECTRIC AS SPECIFIED FOR PRICING / TENDER SUBMISSION PURPOSES. "ALTERNATIVE OFFER" WILL BE CONSIDERED / NEGOTIATED FOLLOWING CONTRACT AWARD IF COST SAVINGS CAN BE ACHIEVED. TENDERER TO COMPLETE THE ALTERNATIVE OFFER FORM AS PART OF THE TENDER SUBMISSION.
5. LOCAL ISOLATORS NEXT TO OUTDOOR UNITS PROVIDED BY ELECTRICAL SERVICES FOR FINAL CONNECTION BY MECHANICAL SERVICES.

MSSB-B SCHEDULE

PHASE A	PHASE B	PHASE C
26.5	26.9	27.8

NOTE: 1. PROVIDE MINIMUM 25% SPARE CAPACITY & POLES FOR FUTURE EXPANSION

REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	23.04.21	ISSUED FOR CONSTRUCTION	KC	MM	KC

STATUS
ISSUED FOR CONSTRUCTION

SCALE @ A1
NOT TO SCALE

CLIENT
north
BUILDING WITH TRUST®

ARCHITECT
ALLEANZA ARCHITECTURE

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PROJECT
ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE
SITE_BR-M5006_BUILDING B EQUIPMENT SCHEDULES

PROJECT No.	DRAWING No.	REVISION
21-000048	BR-M5006	1

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SINGLE SPLIT DX AIR CONDITIONING UNIT SCHEDULE - BUILDING C

INDOOR UNIT. NO.	OUTDOOR UNIT NO.	TYPE	AREA SERVED	TOTAL COOLING CAP. GTH (kWr)	SENSIBLE CAPACITY GTSH (kWr)	COIL DATA		SUPPLY AIR (L/s)	OUTSIDE AIR (L/s)	AIR FILTERS (MAX VELOCITY ACROSS FILTER FACE = 2.5 m/s)	MAX. SOUND LEVEL (INDOOR) (dBA@3m)	FIRE MODE SHUTDOWN	NOMINAL ELECTRICAL REQUIREMENTS					SOURCE OF POWER SUPPLY	BASIS OF DESIGN	COMMENTS
						AIR ON COIL °C DB/WB	AIR OFF COIL °C DB/WB						VOLTAGE (V)	PHASE (ø)	FREQUENCY (Hz)	POWER INPUT (kW)	RUNNING CURRENT (A)		MAKE	
FCU.C.GF-3A	CU.C.GF-3A	WALL MOUNTED INVERTER SPLIT - HEAT PUMP	GF - PRACTICE 2	1.2	1.0	24.7 / 17.0	19.6 / 14.7	150	20	PROPRIETARY FILTERS INTERGAL TO UNIT	38	NO	240	1	50	0.92	3.5	MSSB-C		
FCU.C.GF-3B	CU.C.GF-3B	WALL MOUNTED INVERTER SPLIT - HEAT PUMP	GF - PRACTICE 3	1.2	1.0	24.7 / 17.0	19.6 / 14.7	150	20	PROPRIETARY FILTERS INTERGAL TO UNIT	38	NO	240	1	50	0.92	3.5	MSSB-C		
FCU.C.GF-6	CU.C.GF-6	WALL MOUNTED INVERTER SPLIT - HEAT PUMP	COMMS ROOM	5.8	5.8	21.0 / 14.5	11.8 / 10.9	350	-	PROPRIETARY FILTERS INTERGAL TO UNIT	51	NO	240	1	50	3.1	9.7	MSSB-C	DAIKIN AND MITSUBISHI ELECTRIC	

NOTES:
1. SELECT GENERAL ROOM CONDENSERS BASED ON 35 °C AIR ON.
2. SELECT COMMS ROOM CONDENSERS BASED ON 38 °C AIR ON.
3. ONLY AIR CONDITIONING SYSTEMS THAT SATISFY THE CAPACITY, SUPPLY AIR FLOW AND NOISE REQUIREMENTS WILL BE ACCEPTED.
4. UNIT MAKE SHALL BE THE SAME AS THE VRF SYSTEMS.

FIRE & SMOKE VENTS SCHEDULE - BUILDING C

REF. No.	PURPOSE	QTY	SOURCE OF POWER SUPPLY	BASIS OF DESIGN		COMMENTS
				MAKE	MODEL	
C.SV-1	EXHAUST AIR	1	MSSB.C-FE	AIROCLE	8FV-1230	TO MATCH ROOF COLOUR. CONFIRM WITH ARCHITECT PRIOR TO ORDERING.
C.SV-2	EXHAUST AIR	1	MSSB.C-FE	AIROCLE	8FV-1230	TO MATCH ROOF COLOUR. CONFIRM WITH ARCHITECT PRIOR TO ORDERING.
C.SV-3	EXHAUST AIR	1	MSSB.C-FE	AIROCLE	8FV-1230	TO MATCH ROOF COLOUR. CONFIRM WITH ARCHITECT PRIOR TO ORDERING.
C.SV-4	EXHAUST AIR	1	MSSB.C-FE	AIROCLE	8FV-1230	TO MATCH ROOF COLOUR. CONFIRM WITH ARCHITECT PRIOR TO ORDERING.

HIGH VOLUME LOW SPEED (HVLS) FAN SCHEDULE - BUILDING C

REF. No.	PURPOSE	TYPE	AREA SERVED	FAN DIA (m)	NUMBER OF BLADES	FIREMODE SHUTDOWN	OPERATION	NOMINAL ELECTRICAL REQUIREMENTS					SOURCE OF POWER SUPPLY	BASIS OF DESIGN		COMMENTS
								VOLTAGE (V)	PHASE (ø)	FREQUENCY (Hz)	POWER INPUT (kW)	RUNNING CURRENT (A)		MAKE	MODEL	
C.GF-1	VENTILATION	HIGH VOLUME LOW SPEED FAN	MULTIPURPOSE HALL	3.6	8	YES	NOTE 1	415	3	50	1.1	4.0	LOCAL ISOLATOR BY ELECTRICAL SERVICES	BIG ASS FAN	POWERFOIL X3.0-12	
C.GF-2	VENTILATION	HIGH VOLUME LOW SPEED FAN	MULTIPURPOSE HALL	3.6	8	YES	NOTE 1	415	3	50	1.1	4.0	LOCAL ISOLATOR BY ELECTRICAL SERVICES	BIG ASS FAN	POWERFOIL X3.0-12	

NOTE: 1. LOCAL ON/OFF SWITCH WITH GREEN NEON RUN LIGHT.

ROOF COWLS SCHEDULE - BUILDING C

REF. No.	PURPOSE	QTY	DUTY (L/s)	MAX. PRESSURE DROP (Pa)	COLOUR	BASIS OF DESIGN		COMMENTS
						MAKE	MODEL	
C.RC-01	INTAKE	1	255	15	TO MATCH ROOF COLOUR. CONFIRM WITH ARCHITECT PRIOR TO ORDERING	FANTECH	RV-1	
C.RC-02	INTAKE	1	260	15	TO MATCH ROOF COLOUR. CONFIRM WITH ARCHITECT PRIOR TO ORDERING	FANTECH	RV-1	
C.RC-03	INTAKE	1	260	15	TO MATCH ROOF COLOUR. CONFIRM WITH ARCHITECT PRIOR TO ORDERING	FANTECH	RV-1	
C.RC-04	INTAKE	1	180	15	TO MATCH ROOF COLOUR. CONFIRM WITH ARCHITECT PRIOR TO ORDERING	FANTECH	MRV-2	
DELETED								
DELETED								
DELETED								

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VRF & MULTI-HEAD CONDENSING UNITS SCHEDULE - BUILDING C

REF. No.	TYPE	MINIMUM TOTAL COOLING CAP. GTH(kWr)	MAX. SOUND LEVEL (dBA@3m)	FIRE MODE SHUTDOWN	REFRIGERANT TYPE	NOMINAL ELECTRICAL REQUIREMENTS					SOURCE OF POWER SUPPLY	BASIS OF DESIGN	COMMENTS
						VOLTAGE (V)	PHASE (ø)	FREQUENCY (Hz)	POWER INPUT (kW)	RUNNING CURRENT (A)		MAKE	
CU.C.GF-1	VRF HEAT PUMP	35.2	64	NO	R410A	415	3	50	11.3	19.0	MSSB-C	DAIKIN AND MITSUBISHI ELECTRIC	
CU.C.GF-2	MULTI-HEAD - HEAT PUMP	5.6	48	NO	R410A	240	1	50	2.3	9.8	MSSB-C	DAIKIN AND MITSUBISHI ELECTRIC	
CU.C.GF-4	MULTI-HEAD - HEAT PUMP	6.0	48	NO	R410A	240	1	50	2.9	12.2	MSSB-C	DAIKIN AND MITSUBISHI ELECTRIC	
CU.C.GF-5	VRF HEAT PUMP	53.8	67	NO	R410A	415	3	50	16.1	27.1	MSSB-C	DAIKIN AND MITSUBISHI ELECTRIC	

NOTES:
1. SELECT CONDENSERS BASED ON 35 °C AIR ON.
2. SIZED OUTDOOR UNITS AND INDOOR FAN COILS TO MEET THE TOTAL AND SENSIBLE COOLING WITH ALL UNITS RUNNING SIMULTANEOUSLY. MAX CONNECTION RATIO IS 130%.
3. CONSIDER CAPACITY LOSSES THROUGH PIPING IN THE OUTDOOR UNIT SELECTIONS.
4. UNIT SHALL BE BASED ON DAIKIN OR MITSUBISHI ELECTRIC AS SPECIFIED FOR PRICING / TENDER SUBMISSION PURPOSES. "ALTERNATIVE OFFER" WILL BE CONSIDERED / NEGOTIATED FOLLOWING CONTRACT AWARD IF COST SAVINGS CAN BE ACHIEVED. TENDERER TO COMPLETE THE ALTERNATIVE OFFER FORM AS PART OF THE TENDER SUBMISSION.

MSSB-C SCHEDULE

PHASE A	PHASE B	PHASE C
87.9	86.2	86.3

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NOTE: 1. PROVIDE MINIMUM 25% SPARE CAPACITY & POLES FOR FUTURE EXPANSION

VRF & MULTI-HEAD FAN COIL UNITS SCHEDULE - BUILDING C

REF. NO.	OUTDOOR UNIT NO.	TYPE	AREA SERVED	TOTAL COOLING CAP. GTH (kWr)	SENSIBLE CAPACITY GTSH (kWr)	COIL DATA		SUPPLY AIR (L/s)	OUTSIDE AIR (L/s)	AIR FILTERS (MAX VELOCITY ACROSS FILTER FACE = 2.0 m/s)	MAX. SOUND LEVEL (dBA@3m)	FIRE MODE SHUTDOWN	NOMINAL ELECTRICAL REQUIREMENTS					SOURCE OF POWER SUPPLY	BASIS OF DESIGN	COMMENTS
						AIR ON COIL °C DB/WB	AIR OFF COIL °C DB/WB						VOLTAGE (V)	PHASE (ø)	FREQUENCY (Hz)	POWER INPUT (kW)	RUNNING CURRENT (A)		MAKE	
FCU.C.GF-1.1	CU.C.GF-1	CEILING CASSETTE - 4 WAY	GF - MUSIC	8.8	6.9	26.7 / 18.0	12.6 / 11.5	430	225	PROPRIETARY FILTERS INTERGAL TO UNIT	41	NO	240	1	50	0.07	0.70	MSSB-C	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.C.GF-1.2	CU.C.GF-1	CEILING CASSETTE - 4 WAY	GF - MUSIC	8.8	6.9	26.7 / 18.0	12.6 / 11.5	430		PROPRIETARY FILTERS INTERGAL TO UNIT	41	NO	240	1	50	0.07	0.70	MSSB-C	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.C.GF-1.3	CU.C.GF-1	CEILING CASSETTE - 4 WAY	GF - DRAMA	8.8	6.9	26.7 / 18.0	12.6 / 11.5	430	225	PROPRIETARY FILTERS INTERGAL TO UNIT	41	NO	240	1	50	0.07	0.70	MSSB-C	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.C.GF-1.4	CU.C.GF-1	CEILING CASSETTE - 4 WAY	GF - DRAMA	8.8	6.9	26.7 / 18.0	12.6 / 11.5	430		PROPRIETARY FILTERS INTERGAL TO UNIT	41	NO	240	1	50	0.07	0.70	MSSB-C	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.C.GF-2.1	CU.C.GF-2	COMPACT EILING CASSETTE - 4 WAY	GF - PRACTICE 1	3.1	2.7	24.2 / 15.7	10.0 / 9.2	165	20	PROPRIETARY FILTERS INTERGAL TO UNIT	34	NO	240	1	50	0.02	0.25	MSSB-C	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.C.GF-2.2	CU.C.GF-2	COMPACT EILING CASSETTE - 4 WAY	GF - STORE	2.5	2.3	25.1 / 17.2	14.6 / 12.9	150	20	PROPRIETARY FILTERS INTERGAL TO UNIT	33	NO	240	1	50	0.02	0.25	MSSB-C	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.C.GF-4.1	CU.C.GF-4	CEILING CASSETTE - 4 WAY	GF - CANTEEN SERVERY	3.2	2.7	24.0 / 16.9	13.0 / 12.0	220	-	PROPRIETARY FILTERS INTERGAL TO UNIT	31	NO	240	1	50	0.03	0.32	MSSB-C	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.C.GF-4.2	CU.C.GF-4	CEILING CASSETTE - 4 WAY	GF - CANTEEN PREP	2.8	2.3	24.0 / 16.9	13.0 / 12.0	150	-	PROPRIETARY FILTERS INTERGAL TO UNIT	31	NO	240	1	50	0.03	0.32	MSSB-C	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.C.GF-5.1	CU.C.GF-5	CEILING CASSETTE - 4 WAY	GF - HOSPITALITY	8.5	6.6	26.6 / 18.2	12.9 / 11.8	430	-	PROPRIETARY FILTERS INTERGAL TO UNIT	41	NO	240	1	50	0.07	0.70	MSSB-C	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.C.GF-5.2	CU.C.GF-5	CEILING CASSETTE - 4 WAY	GF - HOSPITALITY	8.5	6.6	26.6 / 18.2	12.9 / 11.8	430	-	PROPRIETARY FILTERS INTERGAL TO UNIT	41	NO	240	1	50	0.07	0.70	MSSB-C	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.C.GF-5.3	CU.C.GF-5	CEILING CASSETTE - 4 WAY	GF - HOSPITALITY	8.5	6.6	26.6 / 18.2	12.9 / 11.8	430	-	PROPRIETARY FILTERS INTERGAL TO UNIT	41	NO	240	1	50	0.07	0.70	MSSB-C	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.C.GF-5.4	CU.C.GF-5	CEILING CASSETTE - 4 WAY	GF - PREPARATION	3.3	2.8	24.0 / 16.9	12.9 / 12.0	180	-	PROPRIETARY FILTERS INTERGAL TO UNIT	41	NO	240	1	50	0.07	0.70	MSSB-C	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.C.GF-5.5	CU.C.GF-5	CEILING CASSETTE - 4 WAY	GF - FOOD TECHNOLOGY	12.5	9.8	26.6 / 18.2	12.8 / 11.7	550	-	PROPRIETARY FILTERS INTERGAL TO UNIT	45	NO	240	1	50	0.11	1.06	MSSB-C	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.C.GF-5.6	CU.C.GF-5	CEILING CASSETTE - 4 WAY	GF - FOOD TECHNOLOGY	12.5	9.8	26.6 / 18.2	12.8 / 11.7	550	-	PROPRIETARY FILTERS INTERGAL TO UNIT	45	NO	240	1	50	0.11	1.06	MSSB-C	DAIKIN AND MITSUBISHI ELECTRIC	

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NOTES: 1. ONLY AIR CONDITIONING SYSTEMS THAT SATISFY THE CAPACITY, SUPPLY AIR FLOW AND NOISE REQUIREMENTS WILL BE ACCEPTED.

FAN SCHEDULE - BUILDING C

REF. No.	PURPOSE	TYPE	AREA SERVED	DUTY (L/s)	ESTIMATED EXTERNAL STATIC PRESSURE (Pa)	FAN DIA (mm)	SPEED (rpm)	MAX INLET SOUND PRESSURE LEVEL dB(A) @3m	MAX OUTLET SOUND PRESSURE LEVEL dB(A) @3m	VSD	FIREMODE SHUTDOWN	OPERATION	NOMINAL ELECTRICAL REQUIREMENTS					KSF	BASIS OF DESIGN		COMMENTS
													VOLTAGE (V)	PHASE (ø)	FREQUENCY (Hz)	POWER INPUT (kW)	RUNNING CURRENT (A)		MAKE	MODEL	
EF.C.GF-1	EXHAUST	IN-LINE MIXED FLOW	TOILETS	255	100	310	1440	48	-	NO	NO	NOTES 1 & 2	415	3	50	0.37	1.10	MSSB-C	FANTECH	PCD314DD	
EF.C.GF-2	EXHAUST	IN-LINE MIXED FLOW	CHANGE ROOMS + DELIVERY	110	70	150	2500	40	41	NO	NO	NOTES 1 & 2	240	1	50	0.05	0.22	MSSB-C	FANTECH	TD-500/150SIL	
EF.C.GF-3	EXHAUST	CEILING MOUNTED HEADER BOX	CLEANER ROOM	50	50	150	950	39	-	NO	NO	NOTES 1 & 3	240	1	50	0.04	0.16	MSSB-C	FANTECH	ECL29-150	
EF.C.GF-4	EXHAUST	IN-LINE MIXED FLOW	LAUNDRY / PREPARATION	180	80	200	2500	40	40	NO	NO	NOTES 1 & 3	240	1	50	0.09	0.43	MSSB-C	FANTECH	TD-800/200SIL	
EF.C.GF-5	EXHAUST	ROOF MOUNTED ALL METAL VERTICAL DISCHARGE	FOOD TECHNOLOGY - ROOM GENERAL EXHAUST	800	120	560	720	45	-	NO	NO	NOTES 1 & 5	415	3	50	0.37	1.48	MSSB-C	FANTECH	CHD568	PROVIDE SPEED CONTROLLER FOR COMMISSIONING
EF.C.GF-6	EXHAUST	ROOF MOUNTED ALL METAL VERTICAL DISCHARGE	FOOD TECHNOLOGY - ROOM GENERAL EXHAUST	800	120	400	720	45	-	NO	NO	NOTES 1 & 5	415	3	50	0.37	1.48	MSSB-C	FANTECH	CHD568	PROVIDE SPEED CONTROLLER FOR COMMISSIONING
KEF.C.GF-1	KITCHEN EXHAUST HOOD, KH-1	VSD CONTROLLED ROOF MOUNTED ALL METAL VERTICAL DISCHARGE	HOSPITALITY - ISLAND HOOD ABOVE TEACHER'S BENCH	410	250	350	1440	53	-	YES	NO	NOTES 1 & 5	415	3	50	0.55	1.63	MSSB-C	FANTECH	CHD354	
KEF.C.GF-2	KITCHEN EXHAUST HOOD, KH-2 (4 OFF)	VSD CONTROLLED ROOF MOUNTED ALL METAL VERTICAL DISCHARGE	HOSPITALITY - ISLAND HOODS ABOVE STUDENT'S BENCH	2240	350	560	1480	61	68	YES	NO	NOTES 1 & 5	415	3	50	3.00	6.34	MSSB-C	FANTECH	HUD564	
KEF.C.GF-3	KITCHEN EXHAUST HOOD, KH-3	VSD CONTROLLED ROOF MOUNTED ALL METAL VERTICAL DISCHARGE	HOSPITALITY - WALL HOOD	1030	290	400	1480	54	59	YES	NO	NOTES 1 & 5	415	3	50	1.10	2.68	MSSB-C	FANTECH	HUD404	
DELETED																					
DELETED																					
SF.C.GF-1	OUTSIDE AIR	IN-LINE MIXED FLOW	PRACTICE ROOM 1 & STORE	40	100	150	1850	38	40	NO	YES	NOTES 1 & 4	240	1	50	0.05	0.35	MSSB-C	FANTECH	TD-500/150ECO	PROVIDE SPEED CONTROLLER FOR COMMISSIONING IF NON-EC FAN IS...
SF.C.GF-2	OUTSIDE AIR	IN-LINE MIXED FLOW	PRACTICE ROOM 2 & 3	40	110	150	1850	38	40	NO	YES	NOTES 1 & 4	240	1	50	0.05	0.35	MSSB-C	FANTECH	TD-500/150ECO	PROVIDE SPEED CONTROLLER FOR COMMISSIONING IF NON-EC FAN IS...
SF.C.GF-3	OUTSIDE AIR	IN-LINE MIXED FLOW	MUSIC ROOM	220	130	400	850	42	-	NO	YES	NOTES 1 & 4	240	1	50	0.27	1.35	MSSB-C	FANTECH	PCEEC40	PROVIDE SPEED CONTROLLER FOR COMMISSIONING IF NON-EC FAN IS...
SF.C.GF-4	OUTSIDE AIR	IN-LINE MIXED FLOW	DRAMA ROOM	220	130	400	850	42	-	NO	YES	NOTES 1 & 4	240	1	50	0.27	1.35	MSSB-C	FANTECH	PCEEC40	PROVIDE SPEED CONTROLLER FOR COMMISSIONING
KSF.C.GF-1	KITCHEN SUPPLY AIR	VSD CONTROLLED AXIAL FAN	HOSPITALITY	2950	300	800	1440	71	71	YES	YES	NOTES 1 & 7	415	3	50	2.5	4.80	MSSB-C	FANTECH	RDS0804	

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NOTES:
1. VERIFY FAN STATIC PRESSURE PRIOR TO ORDERING. FANS AND MOTORS SHALL BE SELECTED WITH ALLOWANCE TO PROVIDE AIR FLOW RATES OF 10% MORE THAN THAT SPECIFIED AGAINST THE CORRESPONDING INCREASE IN SYSTEM RESISTANCE. FANS AND MOTOR SHALL ALSO COMPLY WITH RECOMMENDED NOISE RATING INSIDE BUILDINGS AND PERFORMANCE NOTED IN NCC 2019 SECTION J5.4.
2. TIME CLOCK CONTROLLED
3. INTERLOCK WITH ROOM LIGHTS. LIAISE WITH ELECTRICAL SERVICES.
4. INTERLOCK WITH ASSOCIATED FAN COIL UNIT.
5. LOCAL ON/OFF SWITCH WITH GREEN NEON RUN LIGHT.
7. INTERLOCK WITH KITCHEN EXHAUST FAN KEF.C.GF-2.

REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	23.04.21	ISSUED FOR CONSTRUCTION	KC	MM	KC

STATUS
ISSUED FOR CONSTRUCTION

SCALE @ A1
NOT TO SCALE

CLIENT
north
BUILDING WITH TRUST®

ARCHITECT
ALLEANZA ARCHITECTURE

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PROJECT
ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE
SITE_BR-M5007_BUILDING C EQUIPMENT SCHEDULES

PROJECT No.	DRAWING No.	REVISION
21-000048	BR-M5007	1

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VRF CONDENSING UNITS SCHEDULE - BUILDING D

REF. No.	TYPE	TOTAL COOLING CAP. GTH(kWr)	MAX. SOUND LEVEL (dBA@3m)	FIRE MODE SHUTDOWN	REFRIGERANT TYPE	NOMINAL ELECTRICAL REQUIREMENTS					SOURCE OF POWER SUPPLY	BASIS OF DESIGN	COMMENTS
						VOLTAGE (V)	PHASE (ø)	FREQUENCY (Hz)	POWER INPUT (kW)	RUNNING CURRENT (A)		MAKE	
CU.D.GF-1	VRF HEAT PUMP	42.6	65	NO	R410A	415	3	50	13.7	23.5	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	
CU.D.GF-2	VRF HEAT PUMP	31.0	65	NO	R410A	415	3	50	9.4	15.5	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	
CU.D.GF-3	VRF HEAT PUMP	62.1	65	NO	R410A	415	3	50	19.9	33.0	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	
CU.D.GF-4	VRF HEAT PUMP	52.0	64	NO	R410A	415	3	50	15.2	25.6	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	

NOTES:
1. SELECT CONDENSERS BASED ON 35 ºC AIR ON.
2. SIZED OUTDOOR UNITS AND INDOOR FAN COILS TO MEET THE TOTAL AND SENSIBLE COOLING WITH ALL UNITS RUNNING SIMULTANEOUSLY. MAX CONNECTION RATIO IS 130%.
3. CONSIDER CAPACITY LOSSES THROUGH PIPING IN THE OUTDOOR UNIT SELECTIONS.
4. UNIT SHALL BE BASED ON DAIKIN OR MITSUBISHI ELECTRIC AS SPECIFIED FOR PRICING / TENDER SUBMISSION PURPOSES. "ALTERNATIVE OFFER" WILL BE CONSIDERED / NEGOTIATED FOLLOWING CONTRACT AWARD IF COST SAVINGS CAN BE ACHIEVED. TENDERER TO COMPLETE THE ALTERNATIVE OFFER FORM AS PART OF THE TENDER SUBMISSION.

LOCAL EXTRACTION VENTILATION ARM - BUILDING D

REF. No.	PURPOSE	TYPE	AREA SERVED	QTY	DUTY (L/s)	DAMPER	NOMINAL DIAMETER (mm)	CONTROLS	OPERATION	BASIS OF DESIGN		COMMENTS
										MAKE	MODEL	
EA-1	WELDING FUME EXTRACTION	MANEUVERABLE WELDING FUME EXTRACTION ARM	WELDING BAYS	4	280	YES	160	STAINLESS STEEL PUSH BUTTON WITH LED RUN AND FAULT LIGHT FOR FAN	NOTES 1 & 2	NEDERMAN	TELESCOPIC	**C/W METAL HOOD AND DAMPER.**

NOTES:
1. EXTRACTION ARM SWITCH ENABLES FAN.
2. LED RUN AND FAULT LIGHT FOR FAN.

DUST EXTRACTION UNIT SCHEDULE - BUILDING D

REF. No.	TYPE	DUTY (L/s)**	ESTIMATED EXTERNAL STATIC...	MAX. SOUND RATING (dB)	VSD	FIREMODE SHUTDOWN	OPERATION	NOMINAL ELECTRICAL REQUIREMENTS					SOURCE OF POWER SUPPLY	BASIS OF DESIGN		COMMENTS
								VOLTAGE (V)	PHASE (ø)	FREQUENCY (Hz)	POWER INPUT (kW)	RUNNING CURRENT (A)		MAKE	MODEL	
D.DEU-1	SEALED CYCLONE WOOD DUST EXTRACTION SYSTEM	1620	1200	75-85	YES	YES	VAV CONTROL	415	3	50	8.0	18.0	MECHANICAL POWER SUPPLY ENCLOSURE			DESIGN, SUPPLY AND INSTALL DUST EXTRACTION UNIT THAT WILL FIT WITHIN THE 3m W x 2m D PLANT ROOM PROVIDED.

NOTES:
1. VERIFY EXTERNAL STATIC PRESSURE PRIOR TO ORDERING.
** BASED ON MAXIMUM 80% OF THE MACHINES ARE RUNNING AT ANY ONE TIME.

SINGLE SPLIT DX AIR CONDITIONING UNIT SCHEDULE - BUILDING D

INDOOR UNIT. NO.	OUTDOOR UNIT NO.	TYPE	AREA SERVED	TOTAL COOLING CAP. GTH (kWr)	SENSIBLE CAPACITY GTSH (kWr)	COIL DATA		SUPPLY AIR (L/s)	OUTSIDE AIR (L/s)	AIR FILTERS (MAX VELOCITY ACROSS FILTER FACE = 2.0 m/s)	MAX. SOUND LEVEL (INDOOR) (dBA@3m)	FIRE MODE SHUTDOWN	NOMINAL ELECTRICAL REQUIREMENTS					SOURCE OF POWER SUPPLY	BASIS OF DESIGN	COMMENTS
						AIR ON COIL	AIR OFF COIL						VOLTAGE (V)	PHASE (ø)	FREQUENCY (Hz)	POWER INPUT (kW)	RUNNING CURRENT (A)		MAKE	
						ºC DB/WB	ºC DB/WB													
FCU.D.GF-5	CU.D.GF-5	WALL MOUNTED INVERTER SPLIT - COOLING ONLT	GF - COMMS ROOM	5.5	5.5	21.0 / 14.5	11.8 / 10.9	350	-	PROPRIETARY FILTERS INTERGAL TO UNIT	51	NO	240	1	50	3.1	9.7	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.D.GF-6	CU.D.GF-6	COMPACT CEILING CASSETTE - 4 WAY - HEAT PUMP	GF - 3D PRINT	2.1	1.9	24.0 / 16.9	14.2 / 13.2	150	-	PROPRIETARY FILTERS INTERGAL TO UNIT	30	NO	240	1	50	1.3	4.5	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.D.GF-7	CU.D.GF-7	CEILING CASSETTE - 4 WAY - HEAT PUMP	GF - MAJOR WORKS 3	5.5	3.6	24.0 / 16.9	10.0 / 8.7	250	-	PROPRIETARY FILTERS INTERGAL TO UNIT	48	NO	240	1	50	2.4	7.9	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	

NOTE:
1. SELECT GENERAL ROOM CONDENSERS BASED ON 35 ºC AIR ON.
2. SELECT COMMS ROOM CONDENSERS BASED ON 38 ºC AIR ON.
3. ONLY AIR CONDITIONING SYSTEMS THAT SATISFY THE CAPACITY, SUPPLY AIR FLOW AND NOISE REQUIREMENTS WILL BE ACCEPTED.
4. UNIT MAKE SHALL BE THE SAME AS THE VRF SYSTEMS.

ROOF COWLS SCHEDULE - BUILDING D

REF. No.	PURPOSE	QTY	DUTY (L/s)	MAX. PRESSURE DROP (Pa)	COLOUR	BASIS OF DESIGN		COMMENTS
						MAKE	MODEL	
D.RC-01	EXHAUST	1	170	15	TO MATCH ROOF COLOUR. CONFIRM WITH ARCHITECT PRIOR TO ORDERING	FANTECH	MRV-2	
D.RC-02	EXHAUST	1	250	15	TO MATCH ROOF COLOUR. CONFIRM WITH ARCHITECT PRIOR TO ORDERING	FANTECH	RV-1	
D.RC-03	EXHAUST	1	100	15	TO MATCH ROOF COLOUR. CONFIRM WITH ARCHITECT PRIOR TO ORDERING	FANTECH	MRV-2	
D.RC-04	INTAKE	1	420	15	TO MATCH ROOF COLOUR. CONFIRM WITH ARCHITECT PRIOR TO ORDERING	FANTECH	RV-1	

MSSB-D SCHEDULE

PHASE A	PHASE B	PHASE C
102.2	101.9	101.8

NOTE: 1. PROVIDE MINIMUM 25% SPARE CAPACITY & POLES FOR FUTURE EXPANSION

VRF FAN COIL UNITS SCHEDULE - BUILDING D

REF. NO.	OUTDOOR UNIT NO.	TYPE	AREA SERVED	TOTAL COOLING CAP. GTH (kWr)	SENSIBLE CAPACITY GTSH (kWr)	COIL DATA		SUPPLY AIR (L/s)	OUTSIDE AIR (L/s)	AIR FILTERS (MAX VELOCITY ACROSS FILTER FACE = 2.0 m/s)	MAX. SOUND LEVEL (dBA@3m)	FIRE MODE SHUTDOWN	NOMINAL ELECTRICAL REQUIREMENTS					SOURCE OF POWER SUPPLY	BASIS OF DESIGN	COMMENTS
						AIR ON COIL	AIR OFF COIL						VOLTAGE (V)	PHASE (ø)	FREQUENCY (Hz)	POWER INPUT (kW)	RUNNING CURRENT (A)		MAKE	
						ºC DB/WB	ºC DB/WB													
FCU.D.GF-1.1	CU.D.GF-1	CEILING CASSETTE - 4 WAY	GF - SCIENCE 1	8.5	7.0	24.0 / 16.9	12.0 / 11.9	480	-	PROPRIETARY FILTERS INTERGAL TO UNIT	41	NO	240	1	50	0.05	0.50	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.D.GF-1.2	CU.D.GF-1	CEILING CASSETTE - 4 WAY	GF - SCIENCE 1	8.5	7.0	24.0 / 16.9	12.0 / 11.9	480	-	PROPRIETARY FILTERS INTERGAL TO UNIT	41	NO	240	1	50	0.05	0.50	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.D.GF-1.3	CU.D.GF-1	CEILING CASSETTE - 4 WAY	GF - MINI LAB	6.0	5.3	24.0 / 16.9	13.7 / 12.7	320	-	PROPRIETARY FILTERS INTERGAL TO UNIT	32	NO	240	1	50	0.03	0.36	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.D.GF-1.4	CU.D.GF-1	CEILING CASSETTE - 4 WAY	GF - COLLABORATIVE LEARNING	8.2	6.8	24.0 / 16.9	12.0 / 11.9	480	-	PROPRIETARY FILTERS INTERGAL TO UNIT	41	NO	240	1	50	0.05	0.50	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.D.GF-1.5	CU.D.GF-1	CEILING CASSETTE - 4 WAY	GF - COLLABORATIVE LEARNING	8.2	6.8	24.0 / 16.9	12.0 / 11.9	480	-	PROPRIETARY FILTERS INTERGAL TO UNIT	41	NO	240	1	50	0.05	0.50	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.D.GF-1.6	CU.D.GF-1	CEILING CASSETTE - 4 WAY	GF - COLLABORATIVE LEARNING	3.2	2.6	24.0 / 16.9	12.9 / 12.0	220	-	PROPRIETARY FILTERS INTERGAL TO UNIT	31	NO	240	1	50	0.03	0.32	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.D.GF-2.1	CU.D.GF-2	CEILING CASSETTE - 4 WAY	GF - SCIENCE PREP	4.0	3.6	24.0 / 16.9	13.9 / 12.9	270	-	PROPRIETARY FILTERS INTERGAL TO UNIT	31	NO	240	1	50	0.03	0.32	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.D.GF-2.2	CU.D.GF-2	CEILING CASSETTE - 4 WAY	GF - SCIENCE 2	7.0	5.5	24.0 / 16.9	13.1 / 12.1	380	-	PROPRIETARY FILTERS INTERGAL TO UNIT	37	NO	240	1	50	0.05	0.50	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.D.GF-2.3	CU.D.GF-2	CEILING CASSETTE - 4 WAY	GF - SCIENCE 2	7.0	5.5	24.0 / 16.9	13.1 / 12.1	380	-	PROPRIETARY FILTERS INTERGAL TO UNIT	37	NO	240	1	50	0.05	0.50	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.D.GF-2.4	CU.D.GF-2	CEILING CASSETTE - 4 WAY	GF - MAJOR WORKS 1	13.0	8.5	24.0 / 16.9	10.0 / 8.5	550	-	PROPRIETARY FILTERS INTERGAL TO UNIT	45	NO	240	1	50	0.11	1.06	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.D.GF-3.1	CU.D.GF-3	CEILING CASSETTE - 4 WAY	GF - DESIGN	6.6	6.0	24.0 / 16.9	13.7 / 12.7	380	-	PROPRIETARY FILTERS INTERGAL TO UNIT	37	NO	240	1	50	0.05	0.50	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.D.GF-3.2	CU.D.GF-3	CEILING CASSETTE - 4 WAY	GF - ART 1	6.5	5.4	24.0 / 16.9	12.3 / 11.3	320	-	PROPRIETARY FILTERS INTERGAL TO UNIT	32	NO	240	1	50	0.03	0.36	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.D.GF-3.3	CU.D.GF-3	CEILING CASSETTE - 4 WAY	GF - ART 1	6.5	5.4	24.0 / 16.9	12.3 / 11.3	320	-	PROPRIETARY FILTERS INTERGAL TO UNIT	32	NO	240	1	50	0.03	0.36	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.D.GF-3.4	CU.D.GF-3	CEILING CASSETTE - 4 WAY	GF - ART 2	7.5	6.0	24.0 / 16.9	13.2 / 12.3	380	-	PROPRIETARY FILTERS INTERGAL TO UNIT	37	NO	240	1	50	0.05	0.50	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.D.GF-3.5	CU.D.GF-3	CEILING CASSETTE - 4 WAY	GF - ART 2	7.5	6.0	24.0 / 16.9	13.2 / 12.3	380	-	PROPRIETARY FILTERS INTERGAL TO UNIT	37	NO	240	1	50	0.05	0.50	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.D.GF-3.6	CU.D.GF-3	CEILING CASSETTE - 4 WAY	GF - CIRCULATION	6.5	5.1	24.0 / 16.9	12.2 / 11.3	320	-	PROPRIETARY FILTERS INTERGAL TO UNIT	32	NO	240	1	50	0.03	0.36	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.D.GF-3.7	CU.D.GF-3	CEILING CASSETTE - 4 WAY	GF - CIRCULATION	10.5	8.1	24.0 / 16.9	12.2 / 11.3	480	-	PROPRIETARY FILTERS INTERGAL TO UNIT	41	NO	240	1	50	0.07	0.67	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.D.GF-3.8	CU.D.GF-3	CEILING CASSETTE - 4 WAY	GF - CIRCULATION	10.5	8.1	24.0 / 16.9	12.2 / 11.3	480	-	PROPRIETARY FILTERS INTERGAL TO UNIT	41	NO	240	1	50	0.07	0.67	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.D.GF-4.1	CU.D.GF-4	CEILING CASSETTE - 4 WAY	GF - STEM	8.5	7.3	24.0 / 16.9	12.2 / 11.8	480	-	PROPRIETARY FILTERS INTERGAL TO UNIT	41	NO	240	1	50	0.05	0.50	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.D.GF-4.2	CU.D.GF-4	CEILING CASSETTE - 4 WAY	GF - STEM	8.5	7.3	24.0 / 16.9	12.2 / 11.8	480	-	PROPRIETARY FILTERS INTERGAL TO UNIT	41	NO	240	1	50	0.05	0.50	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.D.GF-4.3	CU.D.GF-4	CEILING CASSETTE - 4 WAY	GF - WOOD WORKSHOP	8.5	5.5	24.0 / 16.9	10.9 / 9.5	350	-	PROPRIETARY FILTERS INTERGAL TO UNIT	37	NO	240	1	50	0.05	0.50	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.D.GF-4.4	CU.D.GF-4	CEILING CASSETTE - 4 WAY	GF - WOOD WORKSHOP	8.5	5.5	24.0 / 16.9	10.9 / 9.5	350	-	PROPRIETARY FILTERS INTERGAL TO UNIT	37	NO	240	1	50	0.05	0.50	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.D.GF-4.5	CU.D.GF-4	CEILING CASSETTE - 4 WAY	GF - METAL	9.0	6.5	24.0 / 16.9	10.0 / 8.7	380	-	PROPRIETARY FILTERS INTERGAL TO UNIT	37	NO	240	1	50	0.05	0.50	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.D.GF-4.6	CU.D.GF-4	CEILING CASSETTE - 4 WAY	GF - METAL	9.0	6.5	24.0 / 16.9	10.0 / 8.7	380	-	PROPRIETARY FILTERS INTERGAL TO UNIT	37	NO	240	1	50	0.05	0.50	MSSB-D	DAIKIN AND MITSUBISHI ELECTRIC	

NOTES: 1. ONLY AIR CONDITIONING SYSTEMS THAT SATISFY THE CAPACITY, SUPPLY AIR FLOW AND NOISE REQUIREMENTS WILL BE ACCEPTED.

FAN SCHEDULE - BUILDING D

REF. No.	PURPOSE	TYPE	AREA SERVED	DUTY (L/s)	ESTIMATED EXTERNAL STATIC PRESSURE (Pa)	FAN DIA (mm)	SPEED (rpm)	MAX INLET SOUND PRESSURE LEVEL dB(A) @3m	MAX OUTLET SOUND PRESSURE LEVEL dB(A) @3m	VSD	FIREMODE SHUTDOWN	OPERATION	NOMINAL ELECTRICAL REQUIREMENTS					SOURCE OF POWER SUPPLY	BASIS OF DESIGN		COMMENTS
													VOLTAGE (V)	PHASE (ø)	FREQUENCY (Hz)	POWER INPUT (kW)	RUNNING CURRENT (A)		MAKE	MODEL	
EF.D.GF-1	EXHAUST	ROOF MOUNTED CENTRIFUGAL	OXIDISING SUBSTANCE STORAGE CABINET	30-60	250-500	-	2200	74	-	YES	NO	NOTES 1 & 2	415	3	50	0.37	1.00	MSSB-D	SIGRIST	STORM SERIES	CORROSIVE RESISTANT FAN AND DUCT. VSD CONTROLLED. CONNECT EXHAUST DUCT TO THE BOTTOM VENT PORT
EF.D.GF-2	EXHAUST	ROOF MOUNTED CENTRIFUGAL	CORROSIVE SUBSTANCE STORAGE CABINET	30-60	250-500	-	2200	74	-	YES	NO	NOTES 1 & 2	415	3	50	0.37	1.00	MSSB-D	SIGRIST	STORM SERIES	CORROSIVE RESISTANT FAN AND DUCT. VSD CONTROLLED. CONNECT EXHAUST DUCT TO THE BOTTOM VENT PORT
EF.D.GF-3	EXHAUST	ROOF MOUNTED CENTRIFUGAL	FLAMMABLE LIQUID STORAGE CABINET	30-60	250-500	-	2200	74	-	YES	NO	NOTES 1 & 2	415	3	50	0.37	1.00	MSSB-D	SIGRIST	STORM SERIES	FLAME PROOF FAN AND STAINLESS STEEL DUCT. VSD CONTROLLED. CONNECT EXHAUST DUCT TO THE BOTTOM VENT PORT
EF.D.GF-4	EXHAUST	ROOF MOUNTED CENTRIFUGAL	FUME CUPBOARD	60-300	420	-	2900	66	-	YES	NO	NOTES 1 & 4	415	3	50	0.75	1.9	MSSB-D	SIGRIST	SEAT SERIES	CORROSIVE RESISTANT FAN AND DUCT. VSD CONTROLLED. CONNECT EXHAUST DUCT TO THE BOTTOM VENT PORT
EF.D.GF-5	EXHAUST	CEILING MOUNTED	ACC. WC	70	50	150	950	38	-	NO	NO	NOTES 1 & 3	240	1	50	0.06	0.27	MSSB-D	FANTECH	RESPF150	
EF.D.GF-6	EXHAUST	CEILING MOUNTED	CLEANER STORE	100	50	250	1400	40	-	NO	NO	NOTES 1 & 3	240	1	50	0.07	0.28	MSSB-D	FANTECH	RP254	
EF.D.GF-7	EXHAUST	CEILING MOUNTED	WIP STORAGE 1	150	70	350	1150	40	-	NO	NO	NOTES 1 & 3	240	1	50	0.11	0.46	MSSB-D	FANTECH	RP356	
EF.D.GF-8	EXHAUST	CEILING MOUNTED	ART STORE	100	60	250	1400	40	-	NO	NO	NOTES 1 & 3	240	1	50	0.07	0.28	MSSB-D	FANTECH	RP254	
EF.D.GF-9A	EXHAUST	CEILING MOUNTED	WIP STORAGE 2	150	70	350	1150	40	-	NO	NO	NOTES 1 & 3	240	1	50	0.11	0.46	MSSB-D	FANTECH	RP356	
EF.D.GF-9B	EXHAUST	CEILING MOUNTED	WIP STORAGE 3	100	60	250	1400	40	-	NO	NO	NOTES 1 & 3	240	1	50	0.07	0.28	MSSB-D	FANTECH	RP254	
EF.D.GF-10	EXHAUST	IN-LINE MIXED FLOW	POTTERY ROOM	200	70	200	2000	42	44	NO	NO	NOTES 1 & 4	240	1	50	0.10	0.45	MSSB-D	FANTECH	RIL-200	
EF.D.GF-11	EXHAUST	ROOF MOUNTED CENTRIFUGAL	KILN EXHAUST	665	250	-	1450	43	-	YES	NO	NOTES 1 & 5	415	3	50	1.10	2.70	MSSB-D	SIGRIST	SEAT SERIES	KILN SIZE NOT PROVIDED AT THE TIME OF DESIGN. VENTILATION RATES WAS CALCULATED BASED ON HOOD SIZE OF 1150mmW x 1150mmD. MECHANICAL CONTRACTOR TO CONFIRM HOOD SIZE AND FINAL VENTILATION RATE PRIOR TO ORDER THE FAN AND MANUFACTURE THE...
EF.D.GF-12	EXHAUST	IN-LINE MIXED FLOW	3D PRINT ROOM	100	80	150	2500	40	41	NO	NO	NOTES 1 & 4	240	1	50	0.05	0.22	MSSB-D	FANTECH	TD-500/150SIL	
EF.D.GF-13	EXHAUST	ROOF MOUNTED CENTRIFUGAL	WELDING BOOTH	1120	1350	-	-	74	-	NO	NO	NOTES 1 & 4	415	3	50	4.00	7.80	MSSB-D	NEDERMAN	NCF SERIES	
EF.D.GF-14	EXHAUST	ROOF MOUNTED DOWNFLOW	CHEMICAL STORE ROOM	300	100	310	1250	47	-	NO	NO	NOTES 1 & 4	240	1	50	0.14	0.62	MSSB-D	FANTECH	CE314D	PROVIDE SPEED CONROLLER FOR COMMISSIONING

NOTES:
1. VERIFY FAN STATIC PRESSURE PRIOR TO ORDERING. FANS AND MOTORS SHALL BE SELECTED WITH ALLOWANCE TO PROVIDE AIR FLOW RATES OF 10% MORE THAN THAT SPECIFIED AGAINST THE CORRESPONDING INCREASE IN SYSTEM RESISTANCE. FANS AND MOTOR SHALL ALSO COMPLY WITH RECOMMENDED NOISE RATING INSIDE BUILDINGS AND PERFORMANCE NOTED IN NCC 2019 SECTION J5.4.
2. TIME CLOCK CONTROLLED C/W "AUTO-OFF-ON" WALL SWITCH WITH RUN AND FAULT LIGHTS.
3. INTERLOCK WITH ROOM LIGHTS. LIAISE WITH ELECTRICAL SERVICES.
4. LOCAL ON/OFF SWITCH WITH GREEN NEON RUN LIGHT.
7. INTERLOCK WITH THE ASSOCIATED KILN. THE FAN SHALL TURN ON WHEN THE FIRING CYCLE IS STARTED BY THE KILN CONTROLLER AND THE FAN SHALL SET TO RUN FOR 1-HOUR AFTER THE FIRING CYCLE IS COMPLETED. THE FAN SHALL ALSO BE ABLE TO RUN INDEPENDENTLY OF THE KILN. REFER DWG-BR-M5004 FOR FAN SWITCH DETAIL. THE SWITCH SHALL BE AT "AUTO" MODE AT ALL TIME.
6. INTERLOCK WITH THE ASSOCIATED FAN COIL UNIT

REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	23.04.21	ISSUED FOR CONSTRUCTION	KC	MM	KC

STATUS
ISSUED FOR CONSTRUCTION

SCALE @ A1
NOT TO SCALE

CLIENT
north
BUILDING WITH TRUST®

ARCHITECT
ALLEANZA ARCHITECTURE

calibre
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PROJECT
ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE
SITE_BR-M5008_BUILDING D EQUIPMENT SCHEDULES

PROJECT No.	DRAWING No.	REVISION
21-000048	BR-M5008	1

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23/04/2021 12:14:29 AM

A1

VRF FAN COIL UNITS SCHEDULE - BUILDING E1

REF. NO.	OUTDOOR UNIT NO.	TYPE	AREA SERVED	TOTAL COOLING CAP. GTH (kWr)	SENSIBLE CAPACITY GTSH (kWr)	COIL DATA		SUPPLY AIR (L/s)	OUTSIDE AIR (L/s)	AIR FILTERS (MAX VELOCITY ACROSS FILTER FACE = 2.0 m/s)	MAX. SOUND LEVEL (dBA@3m)	FIRE MODE SHUTDOWN	NOMINAL ELECTRICAL REQUIREMENTS					SOURCE OF POWER SUPPLY	BASIS OF DESIGN	COMMENTS
						AIR ON COIL °C DB/WB	AIR OFF COIL °C DB/WB						VOLTAGE (V)	PHASE (ø)	FREQUENCY (Hz)	POWER INPUT (kW)	RUNNING CURRENT (A)		MAKE	
FCU.E1-1.1	CU.E1-1	COMPACT CEILING CASSETTE - 4 WAY	GF - BREAKOUT	2.5	2.2	24.0 / 16.9	13.2 / 12.4	150	-	PROPRIETARY FILTERS INTERGAL TO UNIT	33	NO	240	1	50	0.02	0.22	MSSB-E1	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E1-1.2	CU.E1-1	CEILING CASSETTE - 4 WAY	GF - INQUIRY HUB	8.0	6.4	24.0 / 16.9	12.7 / 11.7	350	-	PROPRIETARY FILTERS INTERGAL TO UNIT	37	NO	240	1	50	0.05	0.50	MSSB-E1	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E1-1.3	CU.E1-1	CEILING CASSETTE - 4 WAY	GF - INQUIRY HUB	5.0	4.0	24.0 / 16.9	12.7 / 11.7	300	-	PROPRIETARY FILTERS INTERGAL TO UNIT	31	NO	240	1	50	0.03	0.32	MSSB-E1	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E1-1.4	CU.E1-1	CEILING CASSETTE - 4 WAY	GF - INQUIRY HUB	7.5	6.4	24.0 / 16.9	12.7 / 11.7	350	-	PROPRIETARY FILTERS INTERGAL TO UNIT	37	NO	240	1	50	0.05	0.50	MSSB-E1	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E1-1.5	CU.E1-1	CEILING CASSETTE - 4 WAY	GF - INQUIRY HUB	3.0	2.4	24.0 / 16.9	12.7 / 11.7	250	-	PROPRIETARY FILTERS INTERGAL TO UNIT	31	NO	240	1	50	0.03	0.32	MSSB-E1	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E1-1.6	CU.E1-1	CEILING CASSETTE - 4 WAY	GF - EXPLICIT LEARN	6.0	5.3	24.0 / 16.9	13.4 / 12.4	320	-	PROPRIETARY FILTERS INTERGAL TO UNIT	32	NO	240	1	50	0.03	0.36	MSSB-E1	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E1-1.7	CU.E1-1	CEILING CASSETTE - 4 WAY	GF - EXPLICIT LEARN	6.0	5.3	24.0 / 16.9	13.4 / 12.4	320	-	PROPRIETARY FILTERS INTERGAL TO UNIT	32	NO	240	1	50	0.03	0.36	MSSB-E1	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E1-1.8	CU.E1-1	CEILING CASSETTE - 4 WAY	GF - INQUIRY HUB	8.0	6.4	24.0 / 16.9	12.7 / 11.7	350	-	PROPRIETARY FILTERS INTERGAL TO UNIT	37	NO	240	1	50	0.05	0.50	MSSB-E1	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E1-1.9	CU.E1-1	CEILING CASSETTE - 4 WAY	GF - INQUIRY HUB	5.0	4.0	24.0 / 16.9	12.7 / 11.7	300	-	PROPRIETARY FILTERS INTERGAL TO UNIT	31	NO	240	1	50	0.03	0.32	MSSB-E1	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E1-1.10	CU.E1-1	CEILING CASSETTE - 4 WAY	GF - INQUIRY HUB	7.5	6.4	24.0 / 16.9	12.7 / 11.7	350	-	PROPRIETARY FILTERS INTERGAL TO UNIT	37	NO	240	1	50	0.05	0.50	MSSB-E1	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E1-1.11	CU.E1-1	CEILING CASSETTE - 4 WAY	GF - INQUIRY HUB	3.0	2.4	24.0 / 16.9	12.7 / 11.7	250	-	PROPRIETARY FILTERS INTERGAL TO UNIT	31	NO	240	1	50	0.03	0.32	MSSB-E1	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E1-1.12	CU.E1-1	COMPACT CEILING CASSETTE - 4 WAY	GF - BREAKOUT	2.5	2.2	24.0 / 16.9	13.2 / 12.4	150	-	PROPRIETARY FILTERS INTERGAL TO UNIT	33	NO	240	1	50	0.02	0.22	MSSB-E1	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E1-2.1	CU.E1-2	WALL MOUNTED	L1 - YEAR 12 GLA	6.5	5.5	24.0 / 16.9	13.4 / 12.4	320	-	PROPRIETARY FILTERS INTERGAL TO UNIT	45	NO	240	1	50	0.05	0.37	MSSB-E1	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E1-2.2	CU.E1-2	WALL MOUNTED	L1 - YEAR 12 GLA	6.5	5.5	24.0 / 16.9	13.4 / 12.4	320	-	PROPRIETARY FILTERS INTERGAL TO UNIT	45	NO	240	1	50	0.05	0.37	MSSB-E1	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E1-2.3	CU.E1-2	WALL MOUNTED	L1 - YEAR 12 GLA	6.5	5.5	24.0 / 16.9	13.4 / 12.4	320	-	PROPRIETARY FILTERS INTERGAL TO UNIT	45	NO	240	1	50	0.05	0.37	MSSB-E1	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E1-2.4	CU.E1-2	CEILING CASSETTE - 4 WAY	L1 - BREAKOUT	8.0	7.1	24.0 / 16.9	13.6 / 12.6	450	-	PROPRIETARY FILTERS INTERGAL TO UNIT	41	NO	240	1	50	0.07	0.67	MSSB-E1	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E1-2.5	CU.E1-2	CEILING CASSETTE - 4 WAY	L1 - EXPLICIT LEARN	7.5	6.1	24.0 / 16.9	13.6 / 12.6	375	-	PROPRIETARY FILTERS INTERGAL TO UNIT	37	NO	240	1	50	0.05	0.50	MSSB-E1	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E1-2.6	CU.E1-2	WALL MOUNTED	L1 - YEAR 12 GLA	6.5	5.5	24.0 / 16.9	13.4 / 12.4	320	-	PROPRIETARY FILTERS INTERGAL TO UNIT	45	NO	240	1	50	0.05	0.37	MSSB-E1	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E1-2.7	CU.E1-2	WALL MOUNTED	L1 - YEAR 12 GLA	6.5	5.5	24.0 / 16.9	13.4 / 12.4	320	-	PROPRIETARY FILTERS INTERGAL TO UNIT	45	NO	240	1	50	0.05	0.37	MSSB-E1	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E1-2.8	CU.E1-2	WALL MOUNTED	L1 - YEAR 12 GLA	6.5	5.5	24.0 / 16.9	13.4 / 12.4	320	-	PROPRIETARY FILTERS INTERGAL TO UNIT	45	NO	240	1	50	0.05	0.37	MSSB-E1	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E1-2.9	CU.E1-2	CEILING CASSETTE - 4 WAY	L1 - BREAKOUT	8.0	7.1	24.0 / 16.9	13.6 / 12.6	450	-	PROPRIETARY FILTERS INTERGAL TO UNIT	41	NO	240	1	50	0.07	0.67	MSSB-E1	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E1-2.10	CU.E1-2	CEILING CASSETTE - 4 WAY	L1 - EXPLICIT LEARN	7.5	6.1	24.0 / 16.9	13.6 / 12.6	375	-	PROPRIETARY FILTERS INTERGAL TO UNIT	37	NO	240	1	50	0.05	0.50	MSSB-E1	DAIKIN AND MITSUBISHI ELECTRIC	

NOTES: 1. ONLY AIR CONDITIONING SYSTEMS THAT SATISFY THE CAPACITY, SUPPLY AIR FLOW AND NOISE REQUIREMENTS WILL BE ACCEPTED.

FAN SCHEDULE - BUILDING E1

REF. No.	PURPOSE	TYPE	AREA SERVED	MINIMUM DUTY (L/s)	ESTIMATED EXTERNAL STATIC PRESSURE (Pa)	FAN DIA (mm)	SPEED (rpm)	MAX INLET SOUND PRESSURE LEVEL dB(A) @3m	MAX OUTLET SOUND PRESSURE LEVEL dB(A) @3m	VSD	FIREMODE SHUTDOWN	OPERATION	NOMINAL ELECTRICAL REQUIREMENTS					SOURCE OF POWER SUPPLY	BASIS OF DESIGN		COMMENTS
													VOLTAGE (V)	PHASE (ø)	FREQUENCY (Hz)	POWER INPUT (kW)	RUNNING CURRENT (A)		MAKE	MODEL	
EF.E1-1	EXHAUST AIR	CEILNG MOUNTED HEADER BOX	L1 - WC	30	50	150	950	30	-	NO	NO	NOTES 1 & 2	240	1	50	0.03	0.13	LOCAL GPO BY ELECTRICAL	FANTECH	RESPF-8	C/W BACKDRAFT DAMPER
EF.E1-2	EXHAUST AIR	CEILNG MOUNTED HEADER BOX	L1 - WC	30	50	150	950	30	-	NO	NO	NOTES 1 & 2	240	1	50	0.03	0.13	LOCAL GPO BY ELECTRICAL	FANTECH	RESPF-8	C/W BACKDRAFT DAMPER
EF.E1-3	EXHAUST AIR	CEILNG MOUNTED HEADER BOX	L1 - ACC WC	60	50	1560	950	39	-	NO	NO	NOTES 1 & 2	240	1	50	0.04	0.16	LOCAL GPO BY ELECTRICAL	FANTECH	ECL19-150	C/W BACKDRAFT DAMPER
EF.E1-4	EXHAUST AIR	CEILNG MOUNTED HEADER BOX	L2 - WC	30	50	150	950	30	-	NO	NO	NOTES 1 & 2	240	1	50	0.03	0.13	LOCAL GPO BY ELECTRICAL	FANTECH	RESPF-8	C/W BACKDRAFT DAMPER
EF.E1-5	EXHAUST AIR	CEILNG MOUNTED HEADER BOX	L2 - WC	30	50	150	950	30	-	NO	NO	NOTES 1 & 2	240	1	50	0.03	0.13	LOCAL GPO BY ELECTRICAL	FANTECH	RESPF-8	C/W BACKDRAFT DAMPER
EF.E1-6	EXHAUST AIR	CEILNG MOUNTED HEADER BOX	L2 - ACC WC	60	50	1560	950	39	-	NO	NO	NOTES 1 & 2	240	1	50	0.04	0.16	LOCAL GPO BY ELECTRICAL	FANTECH	ECL19-150	C/W BACKDRAFT DAMPER

NOTES: 1. VERIFY FAN STATIC PRESSURE PRIOR TO ORDERING. FANS AND MOTORS SHALL BE SELECTED TO COMPLY WITH RECOMMENDED NOISE RATING INSIDE BUILDINGS AND PERFORMANCE NOTED IN NCC 2019 SECTION J5.4.
2. INTERLOCK WITH LIGHT SWITCH

VRF CONDENSING UNITS SCHEDULE - BUILDING E1

REF. No.	TYPE	TOTAL COOLING CAP. GTH(kWr)	MAX. SOUND LEVEL (dBA@3m)	FIRE MODE SHUTDOWN	REFRIGERANT TYPE	NOMINAL ELECTRICAL REQUIREMENTS					SOURCE OF POWER SUPPLY	BASIS OF DESIGN	COMMENTS
						VOLTAGE (V)	PHASE (ø)	FREQUENCY (Hz)	POWER INPUT (kW)	RUNNING CURRENT (A)		MAKE	
CU.E1-1	VRF HEAT PUMP	64.0	38	NO	R410A	415	3	50	19.9	32.3	MSSB-E1	DAIKIN AND MITSUBISHI ELECTRIC	
CU.E1-2	VRF HEAT PUMP	70.0	38	NO	R410A	415	3	50	21.6	36.4	MSSB-E1	DAIKIN AND MITSUBISHI ELECTRIC	

NOTES: 1. SELECT CONDENSERS BASED ON 35 ºC AIR ON.
2. SIZED OUTDOOR UNITS AND INDOOR FAN COILS TO MEET THE TOTAL AND SENSIBLE COOLING WITH ALL UNITS RUNNING SIMULTANEOUSLY. MAX CONNECTION RATIO IS 130%.
3. CONSIDER CAPACITY LOSSES THROUGH PIPING IN THE OUTDOOR UNIT SELECTIONS.
4. UNIT SHALL BE BASED ON DAIKIN OR MITSUBISHI ELECTRIC AS SPECIFIED FOR PRICING / TENDER SUBMISSION PURPOSES. "ALTERNATIVE OFFER" WILL BE CONSIDERED / NEGOTIATED FOLLOWING CONTRACT AWARD IF COST SAVINGS CAN BE ACHIEVE...

MSSB-E1 SCHEDULE

PHASE A	PHASE B	PHASE C
39.4	39.2	39.6

NOTE: 1. PROVIDE MINIMUM 25% SPARE CAPACITY & POLES FOR FUTURE EXPANSION

REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	23.04.21	ISSUED FOR CONSTRUCTION	KC	MM	KC

STATUS

ISSUED FOR CONSTRUCTION

SCALE @ A1

NOT TO SCALE

CLIENT

north
BUILDING WITH TRUST®

ARCHITECT

ALLEANZA ARCHITECTURE

calibre

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PROJECT

ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE

SITE_BR-M5009_BUILDING E1 EQUIPMENT SCHEDULES

PROJECT No.	DRAWING No.	REVISION
21-000048	BR-M5009	1

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A1

VRF & MULTI-HEAD FAN COIL UNITS SCHEDULE - BUILDING E2

REF. NO.	OUTDOOR UNIT NO.	TYPE	AREA SERVED	TOTAL COOLING CAP. GTH (kWr)	SENSIBLE CAPACITY GTSH (kWr)	COIL DATA		SUPPLY AIR (L/s)	OUTSIDE AIR (L/s)	AIR FILTERS (MAX VELOCITY ACROSS FILTER FACE = 2.0 m/s)	MAX. SOUND LEVEL (dBA@3m)	FIRE MODE SHUTDOWN	NOMINAL ELECTRICAL REQUIREMENTS					SOURCE OF POWER SUPPLY	BASIS OF DESIGN	COMMENTS
						AIR ON COIL	AIR OFF COIL						VOLTAGE (V)	PHASE (ø)	FREQUENCY (Hz)	POWER INPUT (kW)	RUNNING CURRENT (A)		MAKE	
						°C DB/WB	°C DB/WB													
FCU.E2-1.1	CU.E2-1	CEILING CASSETTE - 4 WAY	GF - RESOURCE CENTRE	6.0	4.9	24.0 / 16.9	12.9 / 12.0	300	-	PROPRIETARY FILTERS INTERGAL TO UNIT	32	NO	240	1	50	0.03	0.36	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-1.2	CU.E2-1	CEILING CASSETTE - 4 WAY	GF - RESOURCE CENTRE	6.5	5.3	24.0 / 16.9	12.9 / 12.0	300	-	PROPRIETARY FILTERS INTERGAL TO UNIT	32	NO	240	1	50	0.03	0.36	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-1.3	CU.E2-1	CEILING CASSETTE - 4 WAY	GF - RESOURCE CENTRE	6.5	5.2	24.0 / 16.9	12.8 / 11.7	300	-	PROPRIETARY FILTERS INTERGAL TO UNIT	32	NO	240	1	50	0.03	0.36	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-1.4	CU.E2-1	CEILING CASSETTE - 4 WAY	GF - RESOURCE CENTRE	5.0	4.0	24.0 / 16.9	12.8 / 11.7	300	-	PROPRIETARY FILTERS INTERGAL TO UNIT	31	NO	240	1	50	0.03	0.32	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-1.5	CU.E2-1	CEILING CASSETTE - 4 WAY	GF - RESOURCE CENTRE	5.0	4.0	24.0 / 16.9	12.8 / 11.7	300	-	PROPRIETARY FILTERS INTERGAL TO UNIT	31	NO	240	1	50	0.03	0.32	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-1.6	CU.E2-1	CEILING CASSETTE - 4 WAY	GF - RESOURCE CENTRE	3.0	2.4	24.0 / 16.9	12.8 / 11.7	250	-	PROPRIETARY FILTERS INTERGAL TO UNIT	31	NO	240	1	50	0.03	0.32	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-2.1	CU.E2-2	CEILING CASSETTE - 4 WAY	GF - LEARNING SUPPORT	5.0	4.4	25.0 / 17.5	12.3 / 12.3	300	45	PROPRIETARY FILTERS INTERGAL TO UNIT	31	NO	240	1	50	0.03	0.32	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-2.2	CU.E2-2	CEILING CASSETTE - 4 WAY	GF - WELLNESS AREA	4.0	3.3	27.2 / 18.5	13.6 / 12.4	250	30	PROPRIETARY FILTERS INTERGAL TO UNIT	31	NO	240	1	50	0.03	0.32	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-2.3	CU.E2-2	COMPACT CEILING CASSETTE - 2 WAY	GF - CIRCULATION	2.5	2.3	24.0 / 16.9	14.2 / 12.9	150	-	PROPRIETARY FILTERS INTERGAL TO UNIT	33	NO	240	1	50	0.02	0.22	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-3.1	CU.E2-3	COMPACT CEILING CASSETTE - 2 WAY	GF - INTERVIEW	2.0	1.6	26.4 / 18.1	19.6 / 14.7	125	25	PROPRIETARY FILTERS INTERGAL TO UNIT	31	NO	240	1	50	0.02	0.21	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-3.2	CU.E2-3	COMPACT CEILING CASSETTE - 2 WAY	GF - WELLBEING OFFICE	2.0	1.6	26.4 / 18.1	19.6 / 14.7	125	25	PROPRIETARY FILTERS INTERGAL TO UNIT	31	NO	240	1	50	0.02	0.21	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-3.3	CU.E2-3	COMPACT CEILING CASSETTE - 2 WAY	GF - COUNSELLOR	2.5	2.1	25.8 / 17.9	14.0 / 12.9	150	25	PROPRIETARY FILTERS INTERGAL TO UNIT	33	NO	240	1	50	0.02	0.22	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-5.1	CU.E2-5	CEILING CASSETTE - 4 WAY	GF - SEMINAR ROOM	6.8	5.6	26.2 / 18.1	13.7 / 12.6	300	75	PROPRIETARY FILTERS INTERGAL TO UNIT	32	NO	240	1	50	0.03	0.36	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-5.2	CU.E2-5	COMPACT CEILING CASSETTE - 2 WAY	GF - IT OFFICE	2.0	1.7	25.9 / 17.5	17.6 / 14.3	125	20	PROPRIETARY FILTERS INTERGAL TO UNIT	31	NO	240	1	50	0.02	0.21	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-5.3	CU.E2-5	COMPACT CEILING CASSETTE - 2 WAY	GF - WORKROOM	2.5	2.2	24.8 / 17.4	14.2 / 13.1	150	20	PROPRIETARY FILTERS INTERGAL TO UNIT	33	NO	240	1	50	0.02	0.22	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-6.1	CU.E2-6	COMPACT CEILING CASSETTE - 2 WAY	L1 - BREAKOUT	2.8	2.5	24.0 / 16.9	13.6 / 12.6	150	-	PROPRIETARY FILTERS INTERGAL TO UNIT	33	NO	240	1	50	0.02	0.22	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-6.2	CU.E2-6	CEILING CASSETTE - 4 WAY	L1 - YEAR 10 INQUIRY HUB	6.0	5.0	24.0 / 16.9	13.2 / 12.2	300	-	PROPRIETARY FILTERS INTERGAL TO UNIT	32	NO	240	1	50	0.03	0.36	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-6.3	CU.E2-6	CEILING CASSETTE - 4 WAY	L1 - YEAR 10 INQUIRY HUB	6.0	5.0	24.0 / 16.9	13.2 / 12.2	300	-	PROPRIETARY FILTERS INTERGAL TO UNIT	32	NO	240	1	50	0.03	0.36	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-6.4	CU.E2-6	WALL MOUNTED	L1 - YEAR 10 INQUIRY HUB	6.0	5.0	24.0 / 16.9	13.2 / 12.2	320	-	PROPRIETARY FILTERS INTERGAL TO UNIT	45	NO	240	1	50	0.05	0.37	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-6.5	CU.E2-6	WALL MOUNTED	L1 - YEAR 10 INQUIRY HUB	6.0	5.0	24.0 / 16.9	13.2 / 12.2	320	-	PROPRIETARY FILTERS INTERGAL TO UNIT	45	NO	240	1	50	0.05	0.37	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-6.6	CU.E2-6	CEILING CASSETTE - 4 WAY	L1 - EXPLICIT LEARN	7.2	6.4	24.0 / 16.5	11.5 / 11.0	380	-	PROPRIETARY FILTERS INTERGAL TO UNIT	37	NO	240	1	50	0.05	0.50	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-6.7	CU.E2-6	CEILING CASSETTE - 4 WAY	L1 - EXPLICIT LEARN	7.2	6.4	24.0 / 16.5	11.5 / 11.0	380	-	PROPRIETARY FILTERS INTERGAL TO UNIT	37	NO	240	1	50	0.05	0.50	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-6.8	CU.E2-6	WALL MOUNTED	L1 - YEAR 10 INQUIRY HUB	6.0	5.0	24.0 / 16.9	13.2 / 12.2	320	-	PROPRIETARY FILTERS INTERGAL TO UNIT	45	NO	240	1	50	0.05	0.37	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-6.9	CU.E2-6	WALL MOUNTED	L1 - YEAR 10 INQUIRY HUB	6.0	5.0	24.0 / 16.9	13.2 / 12.2	320	-	PROPRIETARY FILTERS INTERGAL TO UNIT	45	NO	240	1	50	0.05	0.37	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-6.10	CU.E2-6	CEILING CASSETTE - 4 WAY	L1 - YEAR 10 INQUIRY HUB	6.0	5.0	24.0 / 16.9	13.2 / 12.2	300	-	PROPRIETARY FILTERS INTERGAL TO UNIT	32	NO	240	1	50	0.03	0.36	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-6.11	CU.E2-6	CEILING CASSETTE - 4 WAY	L1 - YEAR 10 INQUIRY HUB	6.0	5.0	24.0 / 16.9	13.2 / 12.2	300	-	PROPRIETARY FILTERS INTERGAL TO UNIT	32	NO	240	1	50	0.03	0.36	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-6.12	CU.E2-6	CEILING CASSETTE - 4 WAY	L1 - BREAKOUT	2.8	2.5	24.0 / 16.9	13.6 / 12.6	150	-	PROPRIETARY FILTERS INTERGAL TO UNIT	33	NO	240	1	50	0.02	0.22	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	

NOTES: 1. ONLY AIR CONDITIONING SYSTEMS THAT SATISFY THE CAPACITY, SUPPLY AIR FLOW AND NOISE REQUIREMENTS WILL BE ACCEPTED.

VRF & MULTI-HEAD CONDENSING UNITS SCHEDULE - BUILDING E2

REF. No.	TYPE	TOTAL COOLING CAP. GTH(kWr)	MAX. SOUND LEVEL (dBA@3m)	FIRE MODE SHUTDOWN	REFRIGERANT TYPE	NOMINAL ELECTRICAL REQUIREMENTS					SOURCE OF POWER SUPPLY	BASIS OF DESIGN	COMMENTS
						VOLTAGE (V)	PHASE (ø)	FREQUENCY (Hz)	POWER INPUT (kW)	RUNNING CURRENT (A)		MAKE	
CU.E2-1	VRF HEAT PUMP	32.0	61	NO	R410A	415	3	50	11.3	19.0	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
CU.E2-2	VRF-S HEAT PUMP	11.5	54	NO	R410A	240	1	50	3.2	14.7	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	SUPPLY CONDENSER WITH SINGLE HEAT REJECTION FAN
CU.E2-3	MULTI-HEAD SPLIT	6.5	48	NO	R410A	240	1	50	2.6	10.7	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
CU.E2-5	VRF-S HEAT PUMP	11.3	54	NO	R410A	240	1	50	3.2	14.7	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	SUPPLY CONDENSER WITH SINGLE HEAT REJECTION FAN
CU.E2-6	VRF HEAT PUMP	68.0	68	NO	R410A	415	3	50	21.6	36.4	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	

NOTES:
1. SELECT CONDENSERS BASED ON 35 °C AIR ON.
2. SIZED OUTDOOR UNITS AND INDOOR FAN COILS TO MEET THE TOTAL AND SENSIBLE COOLING WITH ALL UNITS RUNNING SIMULTANEOUSLY. MAX CONNECTION RATIO IS 130%.
3. CONSIDER CAPACITY LOSSES THROUGH PIPING IN THE OUTDOOR UNIT SELECTIONS.
4. UNIT SHALL BE BASED ON DAIKIN OR MITSUBISHI ELECTRIC AS SPECIFIED FOR PRICING / TENDER SUBMISSION PURPOSES. "ALTERNATIVE OFFER" WILL BE CONSIDERED / NEGOTIATED FOLLOWING CONTRACT AWARD IF COST SAVINGS CAN BE ACHIEVED. TENDERER TO COMPLETE THE ALTERNATIVE OFFER FORM AS PART OF THE TENDER SUBMISSION.

MSSB-E2 SCHEDULE

PHASE A	PHASE B	PHASE C
65.2	65.6	65.9

NOTE: 1. PROVIDE MINIMUM 25% SPARE CAPACITY & POLES FOR FUTURE EXPANSION

FAN SCHEDULE - BUILDING E2

REF. No.	PURPOSE	TYPE	AREA SERVED	MINIMUM DUTY (L/s)	ESTIMATED EXTERNAL STATIC PRESSURE (Pa)	FAN DIA (mm)	SPEED (rpm)	MAX INLET SOUND PRESSURE LEVEL dB(A) @3m	MAX OUTLET SOUND PRESSURE LEVEL dB(A) @3m	VSD	FIREMODE SHUTDOWN	OPERATION	NOMINAL ELECTRICAL REQUIREMENTS					SOURCE OF POWER SUPPLY	BASIS OF DESIGN		COMMENTS
													VOLTAGE (V)	PHASE (ø)	FREQUENCY (Hz)	POWER INPUT (kW)	RUNNING CURRENT (A)		MAKE	MODEL	
SF.E2-1	OUTSIDE AIR	IN-LINE MIXED FLOW	OFFICES	150	120	200	2780	42	44	NO	NO	NOTES 1 & 2	240	1	50	0.10	0.45	MSSB-E2	FANTECH	TD-800/200SIL	PROVIDE SPEED CONTROLLER FOR COMMISSIONING
SF.E2-2	OUTSIDE AIR	IN-LINE MIXED FLOW	BOOTHS	80	110	150	2500	40	41	NO	NO	NOTES 1 & 2	240	1	50	0.05	0.22	MSSB-E2	FANTECH	TD-500/150SIL	PROVIDE SPEED CONTROLLER FOR COMMISSIONING
SF.E2-3	OUTSIDE AIR	IN-LINE MIXED FLOW	SEMINAR ROOM	75	110	150	2500	40	41	NO	NO	NOTES 1 & 2	240	1	50	0.05	0.22	MSSB-E2	FANTECH	TD-500/150SIL	PROVIDE SPEED CONTROLLER FOR COMMISSIONING
SF.E2-4	OUTSIDE AIR	IN-LINE MIXED FLOW	IT OFFICE	20	90	125	2400	36	37	NO	NO	NOTES 1 & 3	240	1	50	0.02	0.17	MSSB-E2	FANTECH	TD-350/125ECO	PROVIDE SPEED CONTROLLER FOR COMMISSIONING
SF.E2-5	OUTSIDE AIR	IN-LINE MIXED FLOW	WORKROOM	20	90	125	2400	36	37	NO	NO	NOTES 1 & 3	240	1	50	0.02	0.17	MSSB-E2	FANTECH	TD-350/125ECO	PROVIDE SPEED CONTROLLER FOR COMMISSIONING

NOTES:
1. VERIFY FAN STATIC PRESSURE PRIOR TO ORDERING. FANS AND MOTORS SHALL BE SELECTED WITH ALLOWANCE TO PROVIDE AIR FLOW RATES OF 10% MORE THAN THAT SPECIFIED AGAINST THE CORRESPONDING INCREASE IN SYSTEM RESISTANCE. FANS AND MOTOR SHALL ALSO COMPLY WITH RECOMMENDED NOISE RATING INSIDE BUILDINGS AND PERFORMANCE NOTED IN NCC 2019 SECTION J5.4.
2. INTERLOCK WITH BUILDING SECURITY SYSTEM, ie FAN WIRED TO "RUN" WHEN THE BUILDING IS DISARMED AND "OFF" WHEN THE BUILDING IS ARMED.
3. INTERLOCK WITH THE ASSOCIATED FAN COIL UNITS.

SINGLE SPLIT DX AIR CONDITIONING UNIT SCHEDULE - BUILDING E2

INDOOR UNIT. NO.	OUTDOOR UNIT NO.	TYPE	AREA SERVED	MINIMUM TOTAL COOLING CAP. GTH (kWr)	MINIMUM SENSIBLE COOLING CAP. GTH (kWr)	COIL DATA		SUPPLY AIR (L/s)	AIR FILTERS (MAX VELOCITY ACROSS FILTER FACE = 2.0 m/s)	MAX. SOUND LEVEL (INDOOR) (dBA@3m)	FIRE MODE SHUTDOWN	NOMINAL ELECTRICAL REQUIREMENTS					SOURCE OF POWER SUPPLY	BASIS OF DESIGN	COMMENTS
						AIR ON COIL	AIR OFF COIL					VOLTAGE (V)	PHASE (ø)	FREQUENCY (Hz)	POWER INPUT (kW)	RUNNING CURRENT (A)		MAKE	
						°C DB/WB	°C DB/WB												
FCU.E2-4A	CU.E2-4A	WALL MOUNTED INVERTER SPLIT - HEAT PUMP	BOOTH	1.0	0.8	27.0 / 18.4	20.7 / 15.4	100	PROPRIETARY FILTERS INTERGAL TO UNIT	32	NO	240	1	50	1.4	3.5	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-4B	CU.E2-4B	WALL MOUNTED INVERTER SPLIT - HEAT PUMP	BOOTH	1.0	0.8	27.0 / 18.7	20.7 / 15.4	100	PROPRIETARY FILTERS INTERGAL TO UNIT	32	NO	240	1	50	1.4	3.5	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-4C	CU.E2-4C	WALL MOUNTED INVERTER SPLIT - HEAT PUMP	BOOTH	1.0	0.8	27.0 / 18.7	20.7 / 15.4	100	PROPRIETARY FILTERS INTERGAL TO UNIT	32	NO	240	1	50	1.4	3.5	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-4D	CU.E2-4D	WALL MOUNTED INVERTER SPLIT - HEAT PUMP	BOOTH	1.0	0.8	27.0 / 18.7	20.7 / 15.4	100	PROPRIETARY FILTERS INTERGAL TO UNIT	32	NO	240	1	50	1.4	3.5	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-7	CU.E2-7	WALL MOUNTED INVERTER SPLIT - COOLING ONLY	COMMS ROOM 1	5.5	5.5	21.0 / 14.5	11.8 / 10.9	350	PROPRIETARY FILTERS INTERGAL TO UNIT	49	NO	240	1	50	3.1	10.0	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E2-8	CU.E2-8	WALL MOUNTED INVERTER SPLIT - COOLING ONLY	COMMS ROOM 2	5.5	5.5	21.0 / 14.5	11.8 / 10.9	350	PROPRIETARY FILTERS INTERGAL TO UNIT	49	NO	240	1	50	3.1	10.0	MSSB-E2	DAIKIN AND MITSUBISHI ELECTRIC	

NOTE:
1. SELECT BOOTH CONDENSERS BASED ON 35 °C AIR ON.
2. SELECT COMMS ROOM CONDENSERS BASED ON 38 °C AIR ON.
3. ONLY AIR CONDITIONING SYSTEMS THAT SATISFY THE CAPACITY, SUPPLY AIR FLOW AND NOISE REQUIREMENTS WILL BE ACCEPTED.
4. UNIT MAKE SHALL BE THE SAME AS THE VRF SYSTEMS.

REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	23.04.21	ISSUED FOR CONSTRUCTION	KC	MM	KC

STATUS
ISSUED FOR CONSTRUCTION

SCALE @ A1
NOT TO SCALE

CLIENT
north
BUILDING WITH TRUST®

ARCHITECT
ALLEANZA ARCHITECTURE

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PROJECT
ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE
SITE_BR-M5010_BUILDING E2 EQUIPMENT SCHEDULES

PROJECT No.	DRAWING No.	REVISION
21-000048	BR-M5010	1

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VRF FAN COIL UNITS SCHEDULE - BUILDING E3

REF. NO.	OUTDOOR UNIT NO.	TYPE	AREA SERVED	TOTAL COOLING CAP. GTH (kWr)	SENSIBLE CAPACITY GTSH (kWr)	COIL DATA		SUPPLY AIR (L/s)	OUTSIDE AIR (L/s)	AIR FILTERS (MAX VELOCITY ACROSS FILTER FACE = 2.0 m/s)	MAX. SOUND LEVEL (dBA@3m)	FIRE MODE SHUTDOWN	NOMINAL ELECTRICAL REQUIREMENTS					SOURCE OF POWER SUPPLY	BASIS OF DESIGN	COMMENTS
						AIR ON COIL	AIR OFF COIL						VOLTAGE (V)	PHASE (ø)	FREQUENCY (Hz)	POWER INPUT (kW)	RUNNING CURRENT (A)		MAKE	
						°C DB/WB	°C DB/WB													
FCU.E3-1.1	CU.E3-1	CEILING CASSETTE - 4 WAY	GF - BREAKOUT	2.5	2.2	24.0 / 16.9	13.2 / 12.4	150	-	PROPRIETARY FILTERS INTERGAL TO UNIT	33	NO	240	1	50	0.02	0.22	MSSB-E3	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E3-1.2	CU.E3-1	CEILING CASSETTE - 4 WAY	GF - INQUIRY HUB	8.0	6.4	24.0 / 16.9	12.7 / 11.7	350	-	PROPRIETARY FILTERS INTERGAL TO UNIT	37	NO	240	1	50	0.05	0.50	MSSB-E3	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E3-1.3	CU.E3-1	CEILING CASSETTE - 4 WAY	GF - INQUIRY HUB	5.0	4.0	24.0 / 16.9	12.7 / 11.7	300	-	PROPRIETARY FILTERS INTERGAL TO UNIT	31	NO	240	1	50	0.03	0.32	MSSB-E3	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E3-1.4	CU.E3-1	CEILING CASSETTE - 4 WAY	GF - INQUIRY HUB	7.5	6.4	24.0 / 16.9	12.7 / 11.7	350	-	PROPRIETARY FILTERS INTERGAL TO UNIT	37	NO	240	1	50	0.05	0.50	MSSB-E3	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E3-1.5	CU.E3-1	CEILING CASSETTE - 4 WAY	GF - INQUIRY HUB	3.0	2.4	24.0 / 16.9	12.7 / 11.7	250	-	PROPRIETARY FILTERS INTERGAL TO UNIT	31	NO	240	1	50	0.03	0.32	MSSB-E3	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E3-1.6	CU.E3-1	CEILING CASSETTE - 4 WAY	GF - EXPLICIT LEARN	6.0	5.3	24.0 / 16.9	13.4 / 12.4	320	-	PROPRIETARY FILTERS INTERGAL TO UNIT	32	NO	240	1	50	0.03	0.36	MSSB-E3	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E3-1.7	CU.E3-1	CEILING CASSETTE - 4 WAY	GF - EXPLICIT LEARN	6.0	5.3	24.0 / 16.9	13.4 / 12.4	320	-	PROPRIETARY FILTERS INTERGAL TO UNIT	32	NO	240	1	50	0.03	0.36	MSSB-E3	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E3-1.8	CU.E3-1	CEILING CASSETTE - 4 WAY	GF - INQUIRY HUB	8.0	6.4	24.0 / 16.9	12.7 / 11.7	350	-	PROPRIETARY FILTERS INTERGAL TO UNIT	37	NO	240	1	50	0.05	0.50	MSSB-E3	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E3-1.9	CU.E3-1	CEILING CASSETTE - 4 WAY	GF - INQUIRY HUB	5.0	4.0	24.0 / 16.9	12.7 / 11.7	300	-	PROPRIETARY FILTERS INTERGAL TO UNIT	31	NO	240	1	50	0.03	0.32	MSSB-E3	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E3-1.10	CU.E3-1	CEILING CASSETTE - 4 WAY	GF - INQUIRY HUB	7.5	6.4	24.0 / 16.9	12.7 / 11.7	350	-	PROPRIETARY FILTERS INTERGAL TO UNIT	37	NO	240	1	50	0.05	0.50	MSSB-E3	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E3-1.11	CU.E3-1	CEILING CASSETTE - 4 WAY	GF - INQUIRY HUB	3.0	2.4	24.0 / 16.9	12.7 / 11.7	250	-	PROPRIETARY FILTERS INTERGAL TO UNIT	31	NO	240	1	50	0.03	0.32	MSSB-E3	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E3-1.12	CU.E3-1	CEILING CASSETTE - 4 WAY	GF - BREAKOUT	2.5	2.2	24.0 / 16.9	13.2 / 12.4	150	-	PROPRIETARY FILTERS INTERGAL TO UNIT	33	NO	240	1	50	0.02	0.22	MSSB-E3	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E3-2.1	CU.E3-2	WALL MOUNTED	L1 - YEAR 11 GLA	6.5	5.5	24.0 / 16.9	13.4 / 12.4	320	-	PROPRIETARY FILTERS INTERGAL TO UNIT	45	NO	240	1	50	0.05	0.37	MSSB-E3	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E3-2.2	CU.E3-2	WALL MOUNTED	L1 - YEAR 11 GLA	6.5	5.5	24.0 / 16.9	13.4 / 12.4	320	-	PROPRIETARY FILTERS INTERGAL TO UNIT	45	NO	240	1	50	0.05	0.37	MSSB-E3	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E3-2.3	CU.E3-2	WALL MOUNTED	L1 - YEAR 11 GLA	6.5	5.5	24.0 / 16.9	13.4 / 12.4	320	-	PROPRIETARY FILTERS INTERGAL TO UNIT	45	NO	240	1	50	0.05	0.37	MSSB-E3	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E3-2.4	CU.E3-2	CEILING CASSETTE - 4 WAY	L1 - BREAKOUT	8.0	7.1	24.0 / 16.9	13.6 / 12.6	450	-	PROPRIETARY FILTERS INTERGAL TO UNIT	41	NO	240	1	50	0.07	0.67	MSSB-E3	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E3-2.5	CU.E3-2	CEILING CASSETTE - 4 WAY	L1 - EXPLICIT LEARN	7.5	6.1	24.0 / 16.9	13.6 / 12.6	375	-	PROPRIETARY FILTERS INTERGAL TO UNIT	37	NO	240	1	50	0.05	0.50	MSSB-E3	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E3-2.6	CU.E3-2	WALL MOUNTED	L1 - YEAR 11 GLA	6.5	5.5	24.0 / 16.9	13.4 / 12.4	320	-	PROPRIETARY FILTERS INTERGAL TO UNIT	45	NO	240	1	50	0.05	0.37	MSSB-E3	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E3-2.7	CU.E3-2	WALL MOUNTED	L1 - YEAR 11 GLA	6.5	5.5	24.0 / 16.9	13.4 / 12.4	320	-	PROPRIETARY FILTERS INTERGAL TO UNIT	45	NO	240	1	50	0.05	0.37	MSSB-E3	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E3-2.8	CU.E3-2	WALL MOUNTED	L1 - YEAR 11 GLA	6.5	5.5	24.0 / 16.9	13.4 / 12.4	320	-	PROPRIETARY FILTERS INTERGAL TO UNIT	45	NO	240	1	50	0.05	0.37	MSSB-E3	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E3-2.9	CU.E3-2	CEILING CASSETTE - 4 WAY	L1 - BREAKOUT	8.0	7.1	24.0 / 16.9	13.6 / 12.6	480	-	PROPRIETARY FILTERS INTERGAL TO UNIT	41	NO	240	1	50	0.07	0.67	MSSB-E3	DAIKIN AND MITSUBISHI ELECTRIC	
FCU.E3-2.10	CU.E3-2	CEILING CASSETTE - 4 WAY	L1 - EXPLICIT LEARN	7.5	6.1	24.0 / 16.9	13.6 / 12.6	375	-	PROPRIETARY FILTERS INTERGAL TO UNIT	37	NO	240	1	50	0.05	0.50	MSSB-E3	DAIKIN AND MITSUBISHI ELECTRIC	

NOTES: 1. ONLY AIR CONDITIONING SYSTEMS THAT SATISFY THE CAPACITY, SUPPLY AIR FLOW AND NOISE REQUIREMENTS WILL BE ACCEPTED.

FAN SCHEDULE - BUILDING E3

REF. No.	PURPOSE	TYPE	AREA SERVED	MINIMUM DUTY (L/s)	ESTIMATED EXTERNAL STATIC PRESSURE (Pa)	FAN DIA (mm)	SPEED (rpm)	MAX INLET SOUND PRESSURE LEVEL dB(A) @3m	MAX OUTLET SOUND PRESSURE LEVEL dB(A) @3m	VSD	FIREMODE SHUTDOWN	OPERATION	NOMINAL ELECTRICAL REQUIREMENTS					SOURCE OF POWER SUPPLY	BASIS OF DESIGN		COMMENTS
													VOLTAGE (V)	PHASE (ø)	FREQUENCY (Hz)	POWER INPUT (kW)	RUNNING CURRENT (A)		MAKE	MODEL	
EF.E3-1	EXHAUST AIR	CEILNG MOUNTED HEADER BOX	L1 - WC	30	50	150	950	30	-	NO	NO	NOTES 1 & 2	240	1	50	0.03	0.13	LOCAL GPO BY ELECTRICAL	FANTECH	RESPF-8	C/W BACKDRAFT DAMPER
EF.E3-2	EXHAUST AIR	CEILNG MOUNTED HEADER BOX	L1 - WC	30	50	150	950	30	-	NO	NO	NOTES 1 & 2	240	1	50	0.03	0.13	LOCAL GPO BY ELECTRICAL	FANTECH	RESPF-8	C/W BACKDRAFT DAMPER
EF.E3-3	EXHAUST AIR	CEILNG MOUNTED HEADER BOX	L1 - ACC WC	60	50	1560	950	39	-	NO	NO	NOTES 1 & 2	240	1	50	0.04	0.16	LOCAL GPO BY ELECTRICAL	FANTECH	ECL19-150	C/W BACKDRAFT DAMPER
EF.E3-4	EXHAUST AIR	CEILNG MOUNTED HEADER BOX	L2 - WC	30	50	150	950	30	-	NO	NO	NOTES 1 & 2	240	1	50	0.03	0.13	LOCAL GPO BY ELECTRICAL	FANTECH	RESPF-8	C/W BACKDRAFT DAMPER
EF.E3-5	EXHAUST AIR	CEILNG MOUNTED HEADER BOX	L2 - WC	30	50	150	950	30	-	NO	NO	NOTES 1 & 2	240	1	50	0.03	0.13	LOCAL GPO BY ELECTRICAL	FANTECH	RESPF-8	C/W BACKDRAFT DAMPER
EF.E3-6	EXHAUST AIR	CEILNG MOUNTED HEADER BOX	L2 - ACC WC	60	50	1560	950	39	-	NO	NO	NOTES 1 & 2	240	1	50	0.04	0.16	LOCAL GPO BY ELECTRICAL	FANTECH	ECL19-150	C/W BACKDRAFT DAMPER

NOTES: 1. VERIFY FAN STATIC PRESSURE PRIOR TO ORDERING. FANS AND MOTORS SHALL BE SELECTED TO COMPLY WITH RECOMMENDED NOISE RATING INSIDE BUILDINGS AND PERFORMANCE NOTED IN NCC 2019 SECTION J5.4.

2. INTERLOCK WITH LIGHT SWITCH

VRF CONDENSING UNITS SCHEDULE - BUILDING E3

REF. No.	TYPE	TOTAL COOLING CAP. GTH(kWr)	MAX. SOUND LEVEL (dBA@3m)	FIRE MODE SHUTDOWN	REFRIGERANT TYPE	NOMINAL ELECTRICAL REQUIREMENTS					SOURCE OF POWER SUPPLY	BASIS OF DESIGN	COMMENTS
						VOLTAGE (V)	PHASE (ø)	FREQUENCY (Hz)	POWER INPUT (kW)	RUNNING CURRENT (A)		MAKE	
CU.E3-1	VRF HEAT PUMP	64.0	38	NO	R410A	415	3	50	19.9	32.3	MSSB-E1	DAIKIN AND MITSUBISHI ELECTRIC	
CU.E3-2	VRF HEAT PUMP	70.0	38	NO	R410A	415	3	50	21.6	36.4	MSSB-E1	DAIKIN AND MITSUBISHI ELECTRIC	

NOTES: 1. SELECT CONDENSERS BASED ON 35 ºC AIR ON.

2. SIZED OUTDOOR UNITS AND INDOOR FAN COILS TO MEET THE TOTAL AND SENSIBLE COOLING WITH ALL UNITS RUNNING SIMULTANEOUSLY. MAX CONNECTION RATIO IS 130%.

3. CONSIDER CAPACITY LOSSES THROUGH PIPING IN THE OUTDOOR UNIT SELECTIONS.

4. UNIT SHALL BE BASED ON DAIKIN OR MITSUBISHI ELECTRIC AS SPECIFIED FOR PRICING / TENDER SUBMISSION PURPOSES. "ALTERNATIVE OFFER" WILL BE CONSIDERED / NEGOTIATED FOLLOWING CONTRACT AWARD IF COST SAVINGS CAN BE ACHIEVED. TENDERER TO COMPLETE THE ALTERNATIVE OFFER FORM AS PART OF THE TENDER SUBMISSION.

MSSB-E3 SCHEDULE

PHASE A	PHASE B	PHASE C
39.4	39.2	39.6

NOTE: 1. PROVIDE MINIMUM 25% SPARE CAPACITY & POLES FOR FUTURE EXPANSION

REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	23.04.21	ISSUED FOR CONSTRUCTION	KC	MM	KC

STATUS

ISSUED FOR CONSTRUCTION

SCALE @ A1

NOT TO SCALE

CLIENT

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ARCHITECT

ALLEANZA ARCHITECTURE

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PROJECT

ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE

SITE_BR-M5011_BUILDING E3 EQUIPMENT SCHEDULES

PROJECT No.	DRAWING No.	REVISION
21-000048	BR-M5011	1

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GRILLES, DIFFUSERS & LOUVRE SCHEDULE

REF. No.	PURPOSE	DESCRIPTION	OBD	NECK SIZE (mm)	NOMINAL FACE SIZE (mm)	COLOUR	MAX. PRESSURE DROP (Pa)	VERMIN MESH	BASIS OF DESIGN		COMMENTS
									MAKE	MODEL	
S1	SUPPLY AIR	CIRCULAR DIFFUSER	YES	DIA 200	-	TO MATCH CEILING. CONFIRM WITH ARCHITECT PRIOR TO ORDERING	15	NO	HOLYOAKE	ECO-M	PROVIDE CUSHION HEAD BOX
S2	SUPPLY AIR	SWIRL DIFFUSER	NO	DIA 395	450 x 450	TO MATCH CEILING. CONFIRM WITH ARCHITECT PRIOR TO ORDERING	15	NO	HOLYOAKE	CFP 450-8	PROVIDE CUSHION HEAD BOX
S3	SUPPLY AIR	SWIRL DIFFUSER	NO	DIA 545	600 x 600	TO MATCH CEILING. CONFIRM WITH ARCHITECT PRIOR TO ORDERING	15	NO	HOLYOAKE	CFP 600-24	PROVIDE CUSHION HEAD BOX
SS1	SUPPLY AIR	DOUBLE DEFLECTION SIDEWALL DIFFUSER	YES	600 x 300	-	TO MATCH CEILING. CONFIRM WITH ARCHITECT PRIOR TO ORDERING	15	NO	HOLYOAKE	DDL-32/OBD	PROVIDE CUSHION HEAD BOX
SS2	SUPPLY AIR	DOUBLE DEFLECTION SIDEWALL DIFFUSER	YES	600 x 400	-	TO MATCH CEILING. CONFIRM WITH ARCHITECT PRIOR TO ORDERING	15	NO	HOLYOAKE	DDL-32/OBD	PROVIDE CUSHION HEAD BOX
R1	RELIEF AIR	EGG CRATE GRILLE	NO	300 x 300	-	TO MATCH CEILING. CONFIRM WITH ARCHITECT PRIOR TO ORDERING	15	NO	HOLYOAKE	EC-125	PROVIDE CUSHION HEAD BOX
R2	RETURN / RELIEF AIR	EGG CRATE GRILLE	YES	600 x 600	-	TO MATCH CEILING. CONFIRM WITH ARCHITECT PRIOR TO ORDERING	15	NO	HOLYOAKE	EC-125	PROVIDE CUSHION HEAD BOX
R3	RETURN AIR / RELIEF AIR	EGG CRATE GRILLE	YES	900 x 600	-	TO MATCH CEILING. CONFIRM WITH ARCHITECT PRIOR TO ORDERING	15	NO	HOLYOAKE	EC-125	PROVIDE CUSHION HEAD BOX
E1	EXHAUST AIR	EGG CRATE GRILLE	YES	250 x 250	-	TO MATCH CEILING. CONFIRM WITH ARCHITECT PRIOR TO ORDERING	15	NO	HOLYOAKE	EC-125	PROVIDE CUSHION HEAD BOX
E2	EXHAUST AIR	EGG CRATE GRILLE	YES	250 x 400	-	TO MATCH CEILING. CONFIRM WITH ARCHITECT PRIOR TO ORDERING	15	NO	HOLYOAKE	EC-125	PROVIDE CUSHION HEAD BOX
E3	EXHAUST AIR	EGG CRATE GRILLE	YES	450 x 450	-	TO MATCH CEILING. CONFIRM WITH ARCHITECT PRIOR TO ORDERING	15	NO	HOLYOAKE	EC-125	PROVIDE CUSHION HEAD BOX
E4	EXHAUST AIR	EGG CRATE GRILLE	NO	1200 x 600	-	TO MATCH CEILING. CONFIRM WITH ARCHITECT PRIOR TO ORDERING	15	NO	HOLYOAKE	EC-125	PROVIDE CUSHION HEAD BOX
L1	OUTSIDE AIR INLET / RELIEF AIR DISCHARGE	WEATHER LOUVRE	NO	300 x 300	-	TO MATCH WALL MATERIAL / LINING. CONFIRM WITH ARCHITECT PRIOR TO...	15	YES	HOLYOAKE	OHL-45	PROVIDE VERMIN MESH GRILLE BEHIND LOUVRE
L2	OUTSIDE AIR INLET / RELIEF AIR DISCHARGE	WEATHER LOUVRE	NO	450 x 300	-	TO MATCH WALL MATERIAL / LINING. CONFIRM WITH ARCHITECT PRIOR TO...	15	YES	HOLYOAKE	OHL-45	PROVIDE VERMIN MESH GRILLE BEHIND LOUVRE
L3	OUTSIDE AIR INLET / RELIEF AIR DISCHARGE	WEATHER LOUVRE	NO	600 x 300	-	TO MATCH WALL MATERIAL / LINING. CONFIRM WITH ARCHITECT PRIOR TO...	15	YES	HOLYOAKE	OHL-45	PROVIDE VERMIN MESH GRILLE BEHIND LOUVRE
L4	OUTSIDE AIR INLET / RELIEF AIR DISCHARGE	WEATHER LOUVRE	NO	900 x 300	-	TO MATCH WALL MATERIAL / LINING. CONFIRM WITH ARCHITECT PRIOR TO...	15	YES	HOLYOAKE	OHL-45	PROVIDE VERMIN MESH GRILLE BEHIND LOUVRE
L5	OUTSIDE AIR INLET / RELIEF AIR DISCHARGE	WEATHER LOUVRE	NO	800 x 400	-	TO MATCH WALL MATERIAL / LINING. CONFIRM WITH ARCHITECT PRIOR TO...	15	YES	HOLYOAKE	OHL-45	PROVIDE VERMIN MESH GRILLE BEHIND LOUVRE
L6	OUTSIDE AIR INLET / RELIEF AIR DISCHARGE	WEATHER LOUVRE	NO	900 x 400	-	TO MATCH WALL MATERIAL / LINING. CONFIRM WITH ARCHITECT PRIOR TO...	15	YES	HOLYOAKE	OHL-45	PROVIDE VERMIN MESH GRILLE BEHIND LOUVRE
L7	OUTSIDE AIR INLET / RELIEF AIR DISCHARGE	WEATHER LOUVRE	NO	1000 x 500	-	TO MATCH WALL MATERIAL / LINING. CONFIRM WITH ARCHITECT PRIOR TO...	15	YES	HOLYOAKE	OHL-102	PROVIDE VERMIN MESH GRILLE BEHIND LOUVRE

1

FLEXIBLE DUCT SCHEDULE

AIR FLOW (L/s)	DIAMETER (mm)	COMMENTS
0 - 50	150	
51 - 100	200	
101 - 150	250	
151 - 200	300	
201 - 300	350	
301 - 400	400	
401 - 500	450	

DOOR GRILLE SCHEDULE

REF No.	AIR FLOW (L/s)	DOOR GRILLE SIZE (mm)
DG-1	25 - 79	600 x 150 - FULL CHEVRON
DG-2	80 - 149	600 x 300 - FULL CHEVRON
DG-3	150 - 249	600 x 450 - FULL CHEVRON
DG-4	250 - 350	600 x 600 - FULL CHEVRON
U/C	LESS THAN 25	25mm DOOR UNDERCUT

REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	23.04.21	ISSUED FOR CONSTRUCTION	KC	MM	KC

STATUS

ISSUED FOR CONSTRUCTION

SCALE @ A1

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PROJECT

ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE

SITE_BR-M5012_FLEXIBLE DUCT, LOUVRE AND GRILLE SCHEDULES

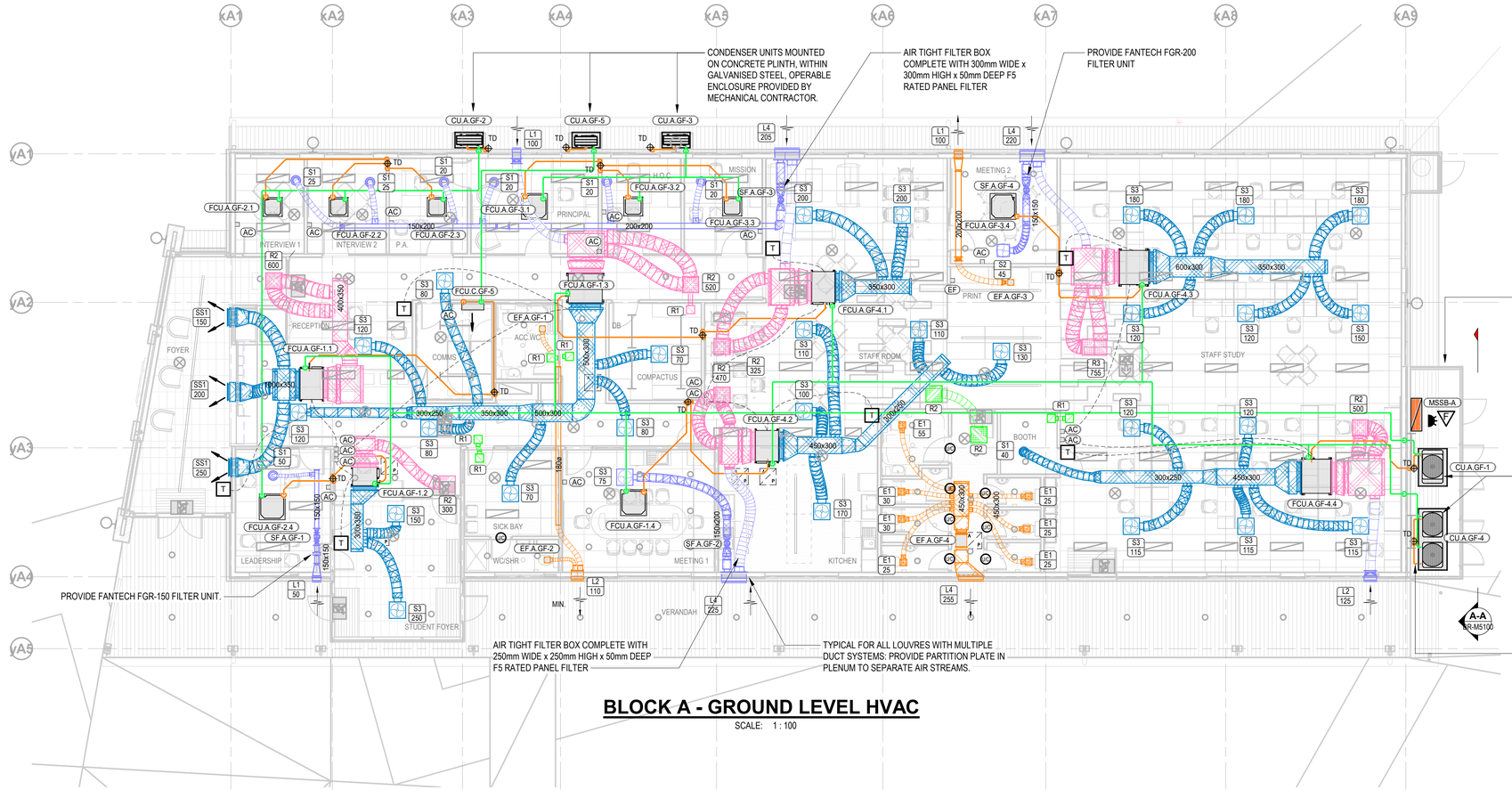
PROJECT No.	DRAWING No.	REVISION
21-000048	BR-M5012	1

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NOTES

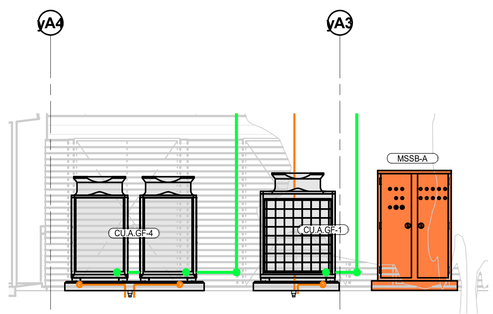
1. PROVIDE SUNHOOD OVER MSSB. SUNHOOD FINISHING TO MATCH MSSB. FOR GROUND MOUNTED MSSBs, PROVIDE GALVANISE CHANNEL PLINTH BETWEEN THE MSSB AND THE SLAB BELOW TO PREVENT WATER POOLING AROUND THE BOTTOM OF THE SWITCHBOARD.



- VRF CONDENSER UNITS MOUNTED ON HEAVY GAUGE STEEL HAT SECTIONS.
- PROVIDE NEOPRENE VIBRATION ISOLATION MOUNTS WHERE CONDENSER UNIT FEET ARE AFFIXED TO HAT SECTION. REFER DETAILS ON DRAWING BR-M5002.
- PROVIDE STAINLESS STEEL DRIP TRAY CATCH CONDENSATE GENERATED BY CONDENSER UNIT DURING REVERSE CYCLE OPERATION. PIPE CONDENSATE DRAIN TO PLANT AREA TUNDISH.

BLOCK A - GROUND LEVEL HVAC

SCALE: 1 : 100



SECTION A-A

SCALE: 1 : 50 BR-H5520

REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	23.04.21	ISSUED FOR CONSTRUCTION	KC	MM	KC

STATUS

ISSUED FOR CONSTRUCTION

SCALE @ A1 0 2000 4000 6000 8000 SCALE: 1:100

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PROJECT

ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE

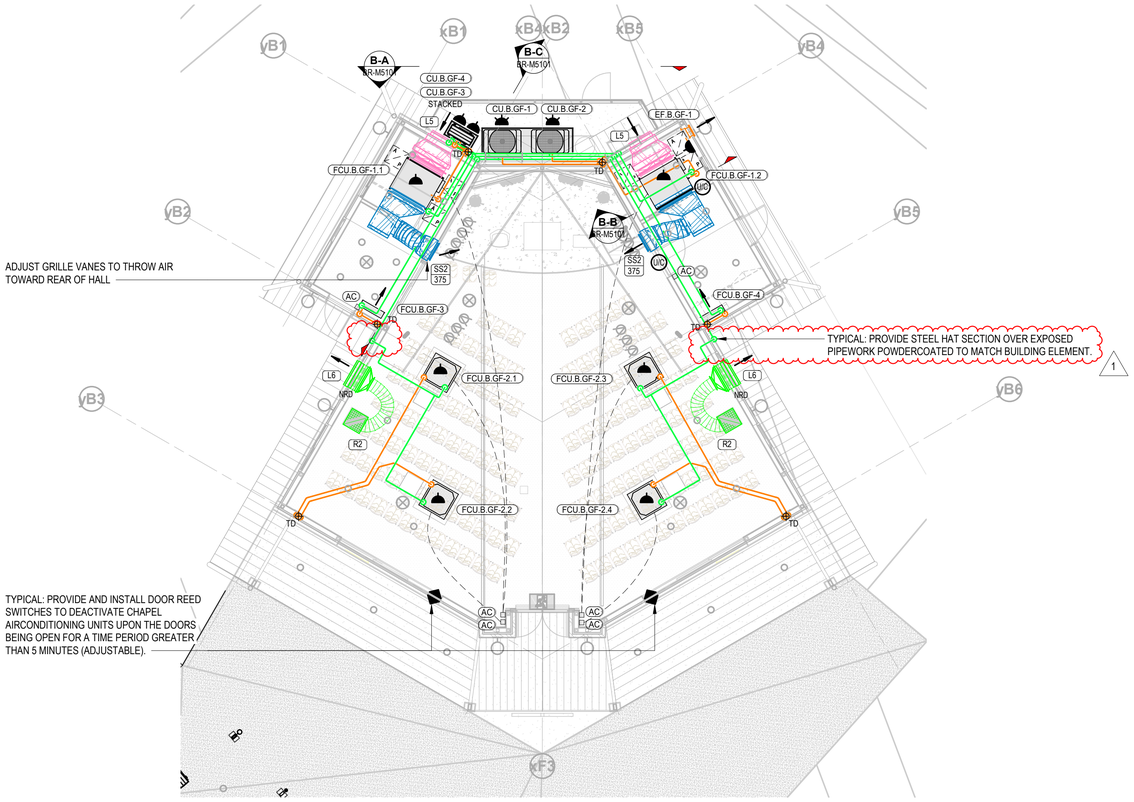
BLOCK A_BR-M5100_HVAC LAYOUT

PROJECT No.	DRAWING No.	REVISION
21-000048	BR-M5100	1

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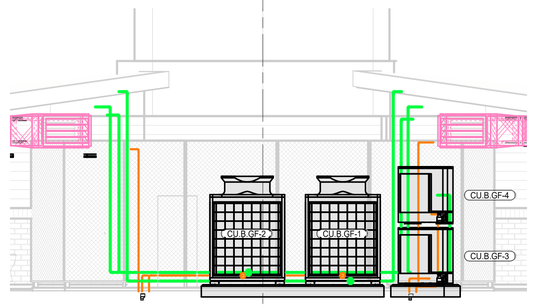
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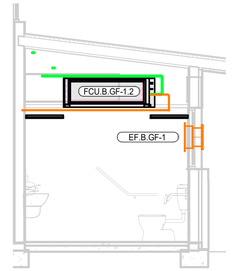
BLOCK B - LEVEL 1 HVAC

SCALE: 1 : 100



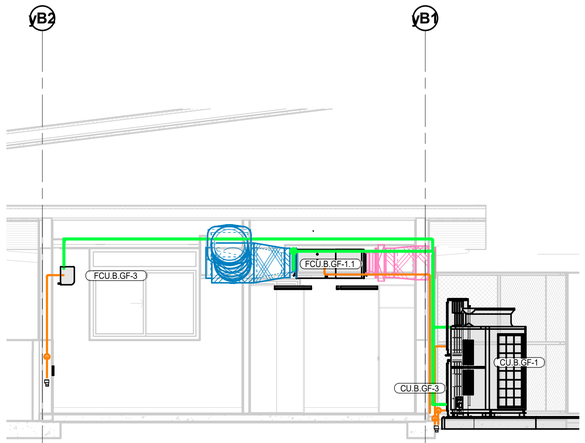
SECTION B-A

SCALE: 1 : 50 — BR-H5522



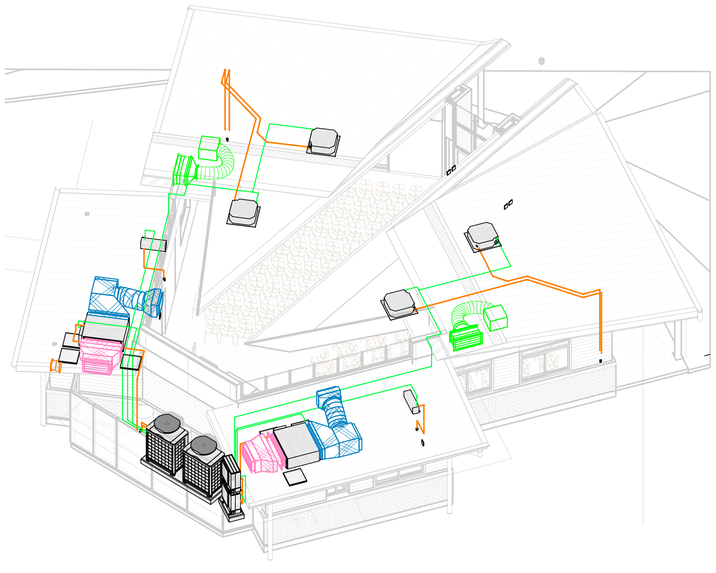
SECTION B-B

SCALE: 1 : 50 — BR-H5522



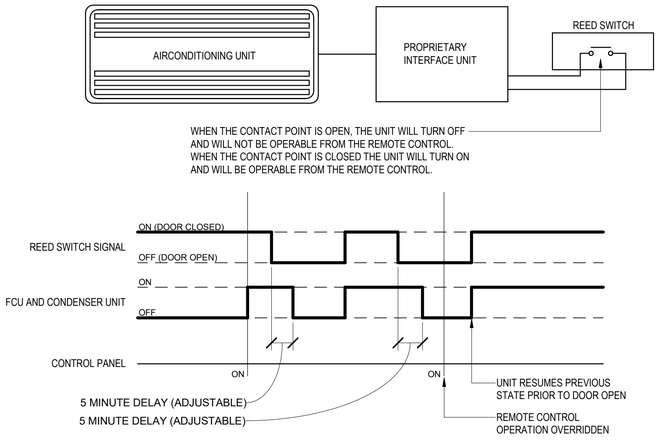
SECTION B-C

SCALE: 1 : 50 — BR-H5522



OVERALL ISOMETRIC VIEW

SCALE:



DOOR REED SWITCH AC CONTROLS FUNCTIONALITY

NOT TO SCALE

REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	23.04.21	ISSUED FOR CONSTRUCTION	KC	MM	KC

STATUS

ISSUED FOR CONSTRUCTION

SCALE @ A1 — 0 2000 4000 6000 8000 — SCALE: 1:100

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PROJECT

ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE

BLOCK B_BR-M5101_HVAC LAYOUT

PROJECT No.	DRAWING No.	REVISION
21-000048	BR-M5101	1

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NOTES

1. MECHANICAL OUTSIDE AIR HAS NOT BEEN PROVIDED TO HABITABLE ROOMS WHICH ARE UNDERSTOOD TO HAVE BEEN DESIGNED TO MEET THE REQUIREMENTS OF NCC-F4.8 NATURAL VENTILATION PROVISION.
2. PROVIDE SUNHOOD OVER MSSB. SUNHOOD FINISHING TO MATCH MSSB. FOR GROUND MOUNTED MSSBs, PROVIDE GALVANISE CHANNEL PLINTH BETWEEN THE MSSB AND THE SLAB BELOW TO PREVENT WATER POOLING AROUND THE BOTTOM OF THE SWITCHBOARD.
3. KITCHEN EXHAUST DUCTWORK SHALL NOT BE INSTALLED CLOSER THAN 300MM TO ANY COMBUSTIBLE MATERIAL AS PER THE REQUIREMENTS OF AS1668.1-2015. SHOULD THE DUCTWORK BE INSTALLED LESS THAN 300MM FROM COMBUSTIBLE MATERIAL, THE DUCTWORK SHALL BE INSULATED TO ACHIEVE -/-/30 FRL. MECHANICAL CONTRACTOR TO PROVIDE OPTIONAL PRICE TO SUPPLY AND INSTALL -/-/30 FRL INSULATION ON ALL KITCHEN EXHAUST DUCTWORK AS PART OF THE TENDER SUBMISSION.

CONDENSERS FOR PRACTICE 2 AND PRACTICE 3 MOUNTED ON BRACKETS FIXED TO WALL AT HIGH LEVEL.

300x300 DUCTWORK RISE TO CONNECT TO ROOF MOUNTED DOWNFLOW COWL, C.RC-01.

AIRTIGH FILTER BOX C/W 254mm WIDE x 508mm HIGH x 50mm THICK F5 RATED FILTER.

300x300 DUCTWORK RISE TO CONNECT TO ROOF MOUNTED DOWNFLOW COWL, C.RC-02.

PROVIDE FANTECH FGR-150 FILTER UNIT.

ø3.66m HIGH VOLUME LOW SPEED (HVLS) FAN

AIRTIGH FILTER BOX C/W 254mm WIDE x 508mm HIGH x 50mm THICK F5 RATED FILTER.

PROVIDE FANTECH FGR-150 FILTER UNIT.

300x300 DUCTWORK RISE TO CONNECT TO ROOF MOUNTED DOWNFLOW COWL, C.RC-03.

APPROX. 550mm HIGH CONDENSER FOR PRACTICE 1 AND STORE MOUNTED ON BRACKETS FIXED TO WALL AT HIGH LEVEL.

- VRF CONDENSER UNITS MOUNTED ON HEAVY GAUGE STEEL HAT SECTIONS.
- PROVIDE NEOPRENE VIBRATION ISOLATION MOUNTS WHERE CONDENSER UNIT FEET ARE AFFIXED TO HAT SECTION. REFER DETAILS ON DRAWING BR-M5002.
- PROVIDE STAINLESS STEEL DRIP TRAY CATCH CONDENSATE GENERATED BY CONDENSER UNIT DURING REVERSE CYCLE OPERATION. PIPE CONDENSATE DRAIN TO PLANT AREA TUNDISH.

MINIUM 50% FREE AREA LOUVRE/SCREEN SURROUND C/W HINGED ACCESS DOORS BY BUILDER.

SPACE PROVISION FOR MSB AND PV SWITCHBOARD AND INVERTERS. LIAISE WITH ELECTRICAL SERVICES FOR COORDINATION.

TYPICAL FOR KH-3:
- 3050 LONG x 1600 WIDE x 600 HIGH ECOCANOPY SIACRA PROPRIETARY LOW VELOCITY WALL HOOD BY KITCHEN CONTRACTOR.
- CEILING HEIGHT AT 3000mm. KITCHEN CONTRACTOR TO SUPPPLY AND INSTALL STAINLESS STEEL IN-FILL PANEL OF THE SAME QUALITY AND FINISH AS THE KITCHEN HOOD BETWEEN THE TOP OF HOOD AND CEILING.

TYPICAL FOR ALL KITCHEN EXHAUST RISERS: PROVIDE GREASE TIGHT CLEAN OUT PLUG AT BOTTOM OF RISER.

450x450 EXHAUST AIR RISER TO ROOF MOUNTED FAN, KEF.C.GF-3.

IN-DUCT HEAT DETECTOR BY FIRE SERVICES

TYPICAL FOR KH-2:
- 1200 LONG x 2400 WIDE x 600 HIGH ECOCANOPY SIACRA-V PROPRIETARY LOW VELOCITY WALL HOOD BY KITCHEN CONTRACTOR.
- CEILING HEIGHT AT 3000mm. KITCHEN CONTRACTOR TO SUPPPLY AND INSTALL STAINLESS STEEL IN-FILL PANEL OF THE SAME QUALITY AND FINISH AS THE KITCHEN HOOD BETWEEN THE TOP OF HOOD AND CEILING.

600x600 EXHAUST AIR RISER TO ROOF MOUNTED FAN, KEF.C.GF-2.

IN-DUCT HEAT DETECTOR BY FIRE SERVICES

ø3.66m HIGH VOLUME LOW SPEED (HVLS) FAN

KITCHEN EXHAUST FAN CONTROL PANEL COMPLETE WITH ENGRAVED LABELLING. REFER DETAIL ON DRAWING BR-M5004.

300x300 EXHAUST AIR RISER TO ROOF MOUNTED FAN, KEF.C.GF-1.

IN-DUCT HEAT DETECTOR BY FIRE SERVICES

200x200 EXHAUST AIR RISER TO ROOF MOUNTED FAN, EF.C.GF-4.

DISHWASHER WITH INTEGRAL CONDENSING HOOD BY KITCHEN CONTRACTOR

TYPICAL FOR KH-1:
- 1200 LONG x 1300 WIDE x 600 HIGH ECOCANOPY SIACRA PROPRIETARY LOW VELOCITY WALL HOOD BY KITCHEN CONTRACTOR.
- CEILING HEIGHT AT 3000mm. KITCHEN CONTRACTOR TO SUPPPLY AND INSTALL STAINLESS STEEL IN-FILL PANEL OF THE SAME QUALITY AND FINISH AS THE KITCHEN HOOD BETWEEN THE TOP OF HOOD AND CEILING.

- MAKE UP AIR OPENINGS FOR HVLS FANS AND SMOKE-AND-HEAT-VENTS.
- LOUVRES ARE TO BE OPEN BY THE COLLEGE OCCUPANTS WHENEVER THE HVLS FANS ARE ENABLED.
- LOUVRES ARE TO TRIP OPEN IN THE EVENT OF FIRE. FIRE SERVICES TO PROVIDE.

BUILDER TO PROVIDE FULL HEIGHT WALL TO THE UNDERSIDE OF ROOF.

FIRE ESSENTIAL SERVICES BOARD FOR SMOKE EXHAUST SYSTEM.

- VRF CONDENSER UNITS MOUNTED ON HEAVY GAUGE STEEL HAT SECTIONS.
- PROVIDE NEOPRENE VIBRATION ISOLATION MOUNTS WHERE CONDENSER UNIT FEET ARE AFFIXED TO HAT SECTION. REFER DETAILS ON DRAWING BR-M5002.
- PROVIDE STAINLESS STEEL DRIP TRAY CATCH CONDENSATE GENERATED BY CONDENSER UNIT DURING REVERSE CYCLE OPERATION. PIPE CONDENSATE DRAIN TO PLANT AREA TUNDISH.

6000 MIN. CLEAR INTERNAL

MAINTAIN MINIMUM REQUIRED CLEARANCES FOR FRONT ACCESS TO ALL SWITCHBOARDS.

COLD ROOM AND FREEZER ROOM PLANT BY FREFRIGERATION CONTRACTOR

MINIUM 50% FREE AREA LOUVRE/SCREEN SURROUND C/W HINGED ACCESS DOORS BY BUILDER.

REFRIGERANT PIPEWORK, POWER AND CONTROL CABLING TO RUN UNDERGRUOUND IN TRENCH. ALL UNDERGROUND PIPES ARE TO BE PRESSURE AND LEAK TEESTED PRIOR TO BACKFILLING. RECORD AND SUBMIT TEST RESULTS. SEPARATE UNDERGROUND PIPING FROM ELECTRICAL CABLES BY A MINIMUM OF 300mm.

APPROX. 800mm HIGH CONDENSER FOR FOR CANTEEN MOUNTED ON BRACKETS FIXED TO WALL AT HIGH LEVEL.

BUILDER TO PROVIDE SELF-CLOSING DOOR TO COMPLY WITH NCC SECTION J3.4d..

TYPICAL FOR ALL KITCHEN EXHAUST DUCTWORK: PROVIDE CLEAN OUT ACCESS PANELS AT NO LESS THAN 3m INTERVALS AND AT EVERY CHANGE OF DIRECTION AS PER AS1668.1-2015.

700x700 OUTSIDE AIR DROPPER FROM ROOF MOUNTED FAN, KSF.C.GF-1.

BUILDER TO PROVIDE SELF-CLOSING DOOR TO COMPLY WITH NCC SECTION J3.4d.

COLD ROOM AND ASSOCIATED REFRIGERATION EQUIPMENT BY KITCHEN CONTRACTOR.

BUILDER TO PROVIDE SELF-CLOSING DOOR TO COMPLY WITH NCC SECTION J3.4d.

400x400 EXHAUST AIR RISER TO ROOF MOUNTE FAN, EF.C.GF-5.

400x400 EXHAUST AIR RISER TO ROOF MOUNTE FAN, EF.C.GF-6.

TYPICAL: RECIRCULATING RANGEHOOD ABOVE COOKTOP BY BUILDER.

- 7No. COOKTOPS IN FOOD TECH.
- TO COMPLY WITH AS1668.2-2012 SECTION 3.3 AND TO OBVIATE THE NEED FOR COMMERCIAL HOODS, THE TOTAL ELECTRICAL OR GAS INPUT FOR THE COOKING EQUIPMENT SHALL BE LIMITED TO:
  1. 0.5kW/m² MAXIMUM FOR ELECTRICAL EQUIPMENT AND;
  2. 1.8Mj/m² MAXIMUM FOR GAS EQUIPMENT.

REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	23.04.21	ISSUED FOR CONSTRUCTION	KC	MM	KC

STATUS

ISSUED FOR CONSTRUCTION

SCALE @ A1 — 0 2000 4000 6000 8000 — SCALE: 1:100

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PROJECT

ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE

BLOCK C_BR-M5102_HVAC LAYOUT

PROJECT No.	DRAWING No.	REVISION
21-000048	BR-M5102	1

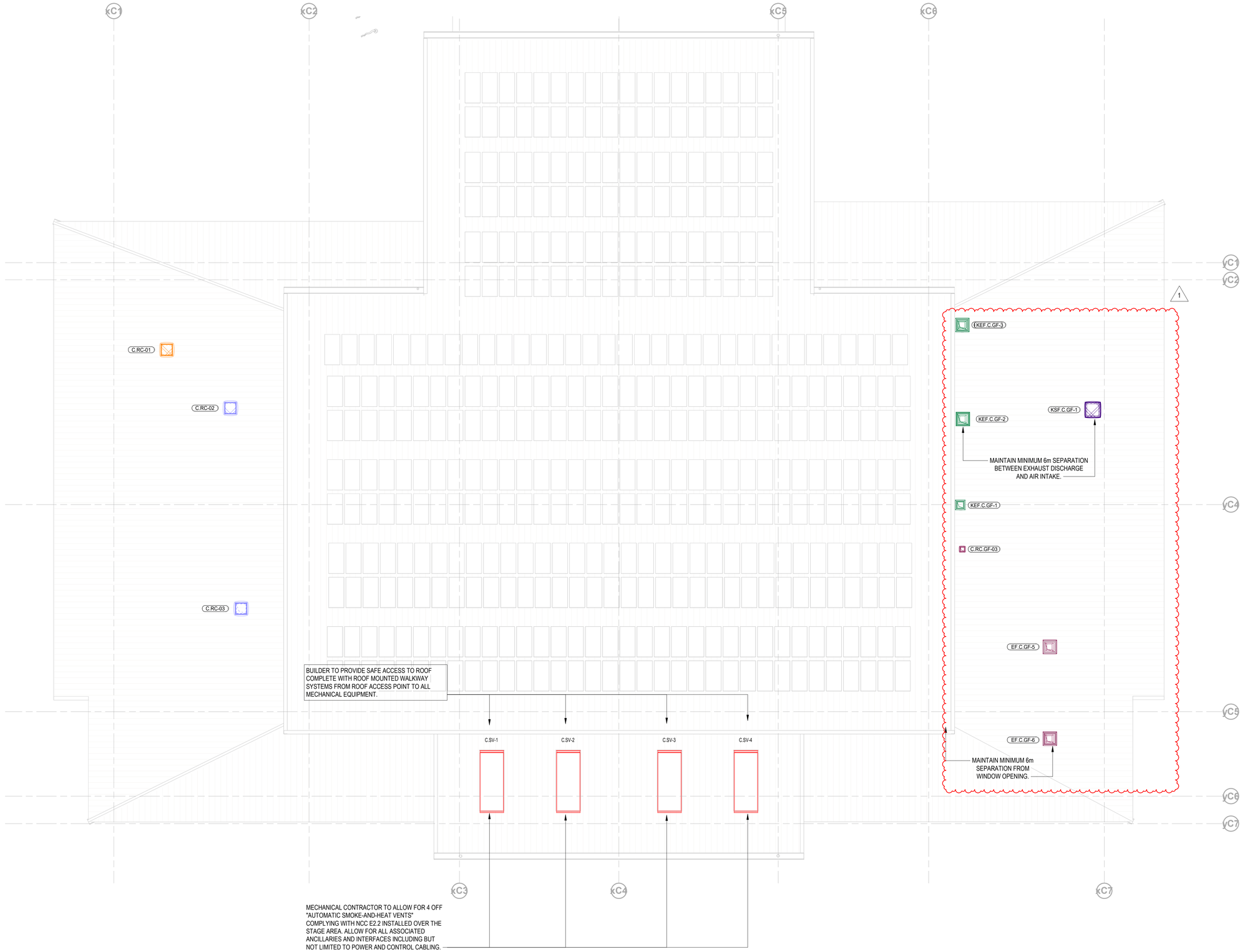
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NOTES

1. BUILDER TO PROVIDE SAFE ACCESS TO ROOF COMPLETE WITH ROOF MOUNTED WALKWAY SYSTEMS AND ANCHOR POINTS FROM ROOF ACCESS POINT TO EACH ROOF MOUNTED MECHANICAL EQUIPMENT.



REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	23.04.21	ISSUED FOR CONSTRUCTION	KC	MM	KC

STATUS

ISSUED FOR CONSTRUCTION

SCALE @ A1

0 2000 4000 6000 8000

NOT TO SCALE
SCALE: 1:100

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PROJECT

ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE

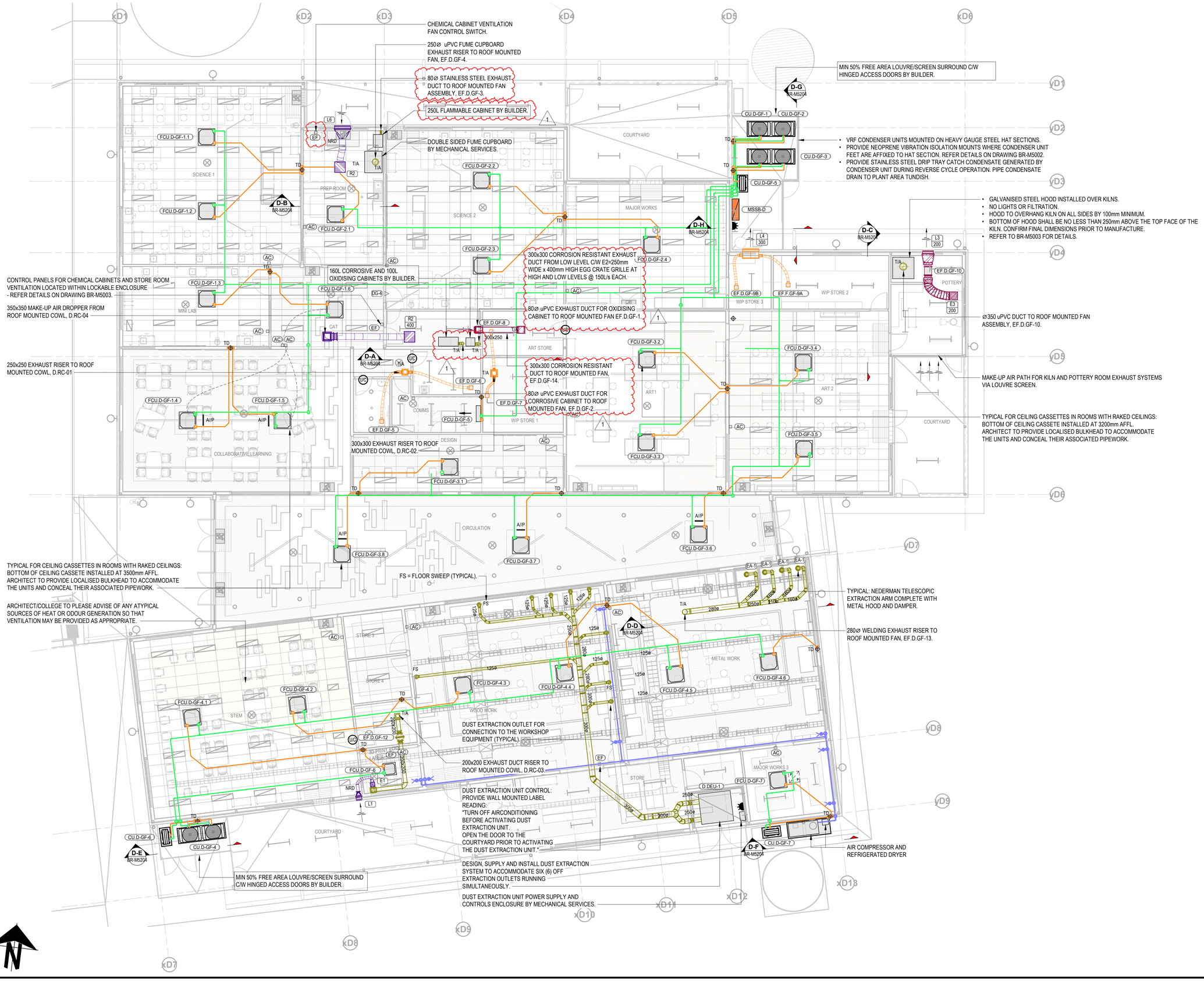
BLOCK C_BR-M5103_ROOF HVAC LAYOUT

PROJECT No.	DRAWING No.	REVISION
21-000048	BR-M5103	1

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NOTES

1. MECHANICAL OUTSIDE AIR HAS NOT BEEN PROVIDED TO HABITABLE ROOMS WHICH ARE UNDERSTOOD TO HAVE BEEN DESIGNED TO MEET THE REQUIREMENTS OF NCC-F4.8 NATURAL VENTILATION PROVISION.
2. PROVIDE SUNHOOD OVER MSSB. SUNHOOD FINISHING TO MATCH MSSB. FOR GROUND MOUNTED MSSBs, PROVIDE GALVANISE CHANNEL PLINTH BETWEEN THE MSSB AND THE SLAB BELOW TO PREVENT WATER POOLING AROUND THE BOTTOM OF THE SWITCHBOARD.

REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	23.04.21	ISSUED FOR CONSTRUCTION	KC	MM	KC

STATUS

ISSUED FOR CONSTRUCTION

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SCALE: 1:100

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PROJECT

ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE

BLOCK D_BR-M5104_HVAC LAYOUT

PROJECT No.	DRAWING No.	REVISION
21-000048	BR-M5104	1

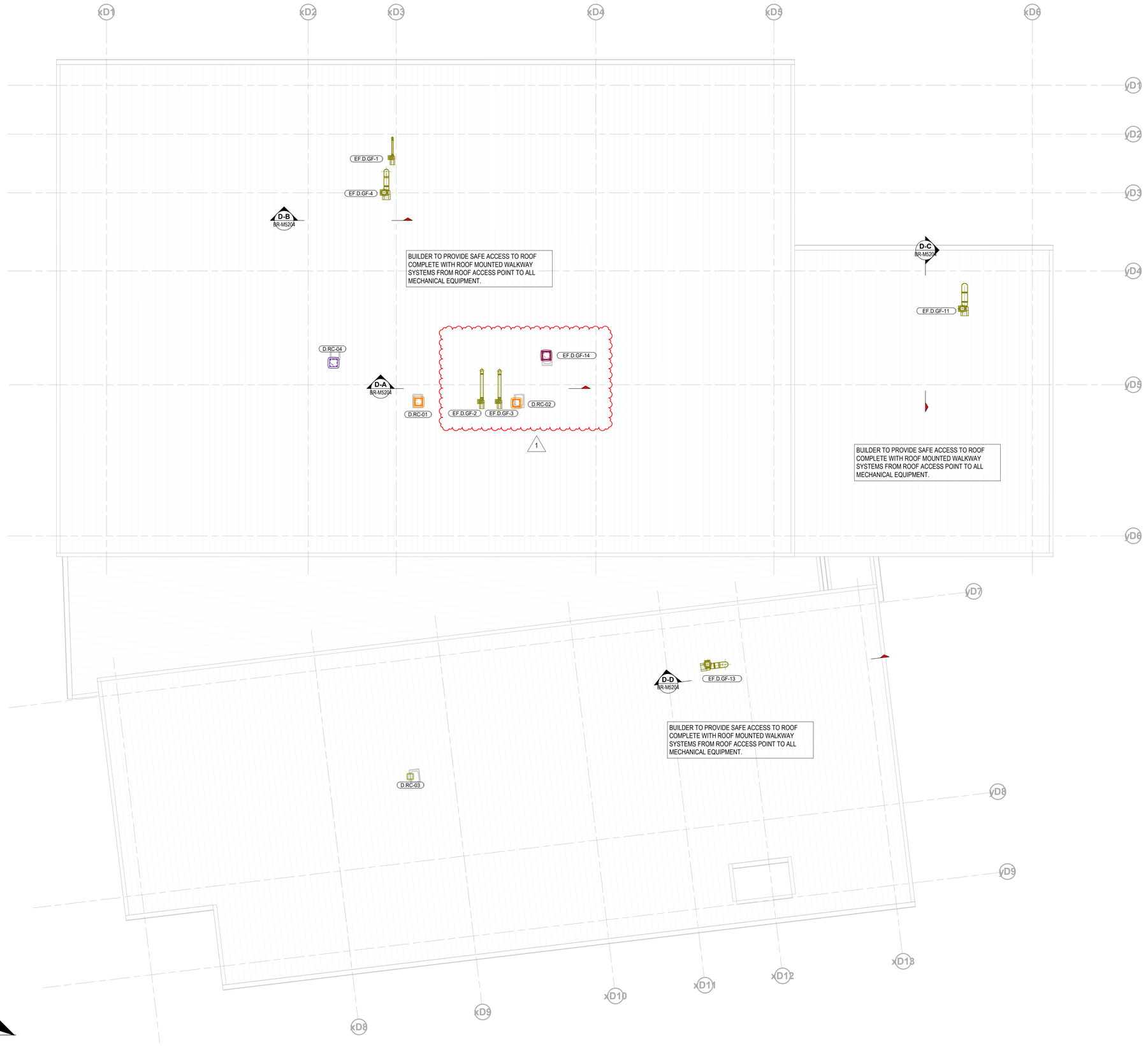
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NOTES

1. BUILDER TO PROVIDE SAFE ACCESS TO ROOF COMPLETE WITH ROOF MOUNTED WALKWAY SYSTEMS FROM ROOF ACCESS POINT TO EACH ROOF MOUNTED MECHANICAL EQUIPMENT.



REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	23.04.21	ISSUED FOR CONSTRUCTION	KC	MM	KC

STATUS

ISSUED FOR CONSTRUCTION

SCALE @ A1

0 2000 4000 6000 8000

SCALE: 1:100

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PROJECT

ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE

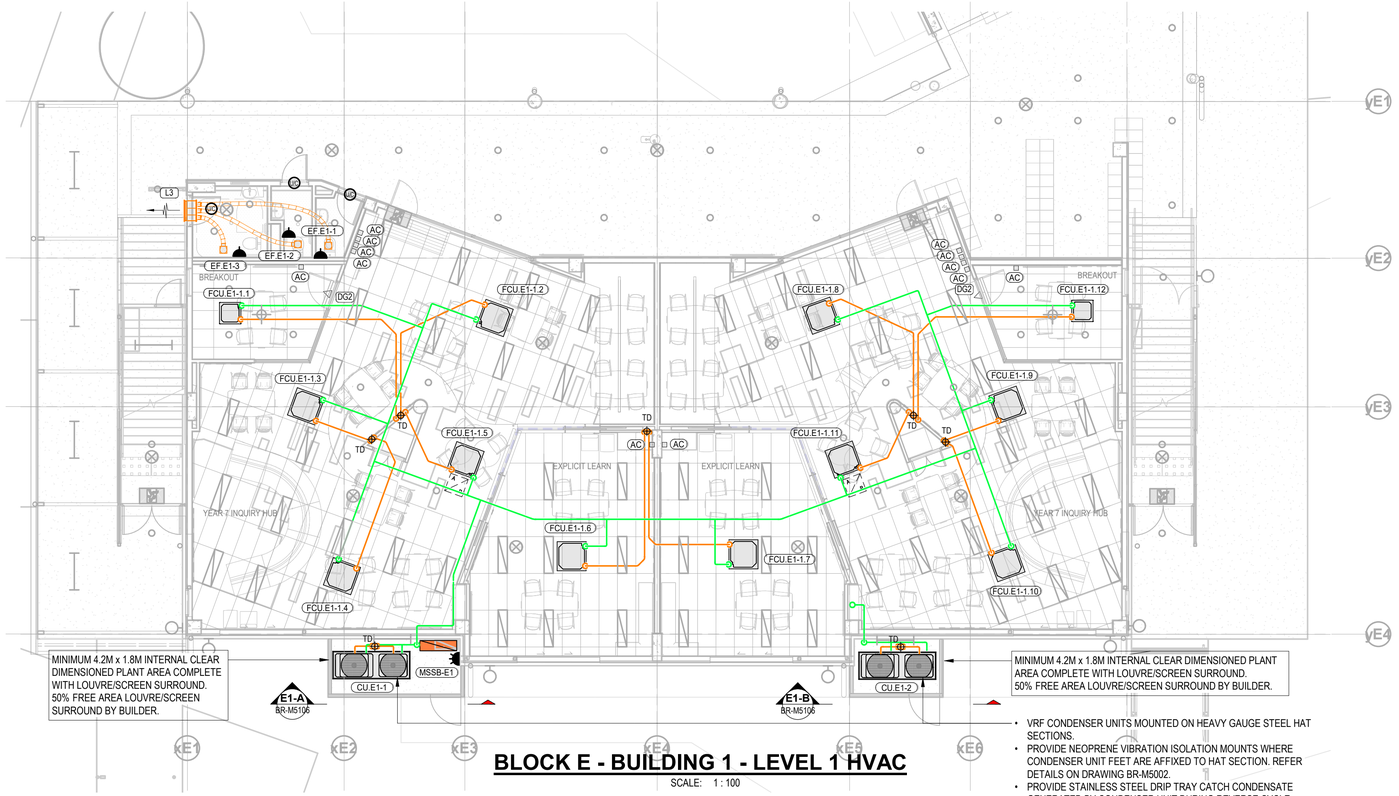
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PROJECT No.	DRAWING No.	REVISION
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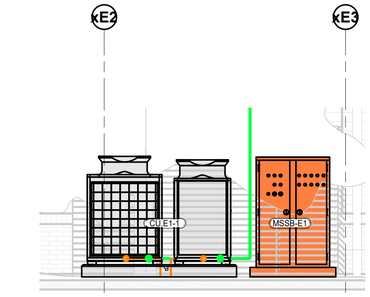
MINIMUM 4.2M x 1.8M INTERNAL CLEAR DIMENSIONED PLANT AREA COMPLETE WITH LOUVRE/SCREEN SURROUND. 50% FREE AREA LOUVRE/SCREEN SURROUND BY BUILDER.

MINIMUM 4.2M x 1.8M INTERNAL CLEAR DIMENSIONED PLANT AREA COMPLETE WITH LOUVRE/SCREEN SURROUND. 50% FREE AREA LOUVRE/SCREEN SURROUND BY BUILDER.

- VRF CONDENSER UNITS MOUNTED ON HEAVY GAUGE STEEL HAT SECTIONS.
- PROVIDE NEOPRENE VIBRATION ISOLATION MOUNTS WHERE CONDENSER UNIT FEET ARE AFFIXED TO HAT SECTION. REFER DETAILS ON DRAWING BR-M5002.
- PROVIDE STAINLESS STEEL DRIP TRAY CATCH CONDENSATE GENERATED BY CONDENSER UNIT DURING REVERSE CYCLE OPERATION. PIPE CONDENSATE DRAIN TO PLANT AREA TUNDISH.

BLOCK E - BUILDING 1 - LEVEL 1 HVAC

SCALE: 1 : 100



SECTION E1-A

SCALE: 1 : 50 BR-H5530

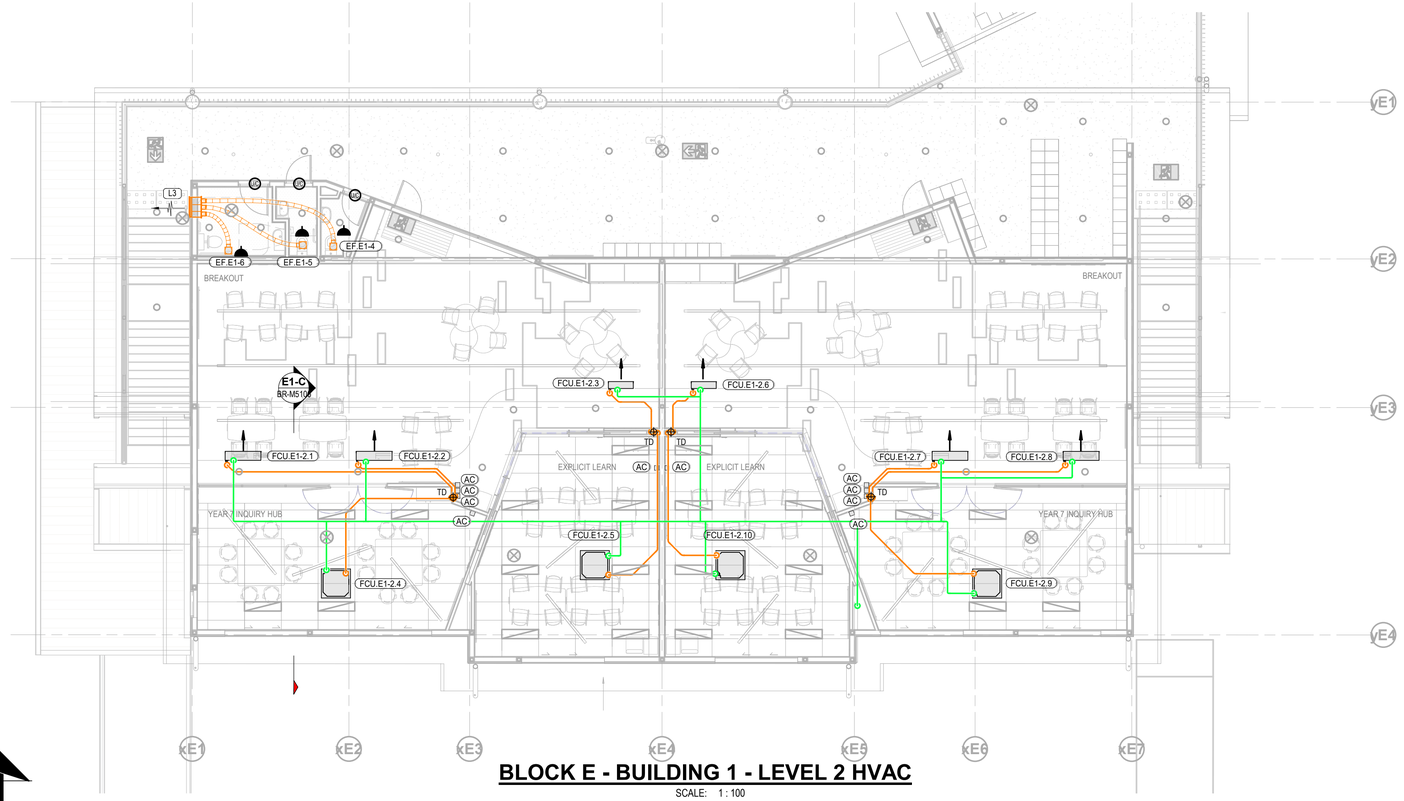


SECTION E1-B

SCALE: 1 : 50 BR-H5530

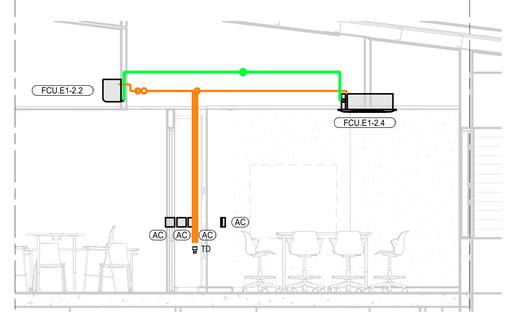
NOTES

1. MECHANICAL OUTSIDE AIR HAS NOT BEEN PROVIDED TO HABITABLE ROOMS WHICH ARE UNDERSTOOD TO HAVE BEEN DESIGNED TO MEET THE REQUIREMENTS OF NCC-F4.8 NATURAL VENTILATION PROVISION.
2. PROVIDE SUNHOOD OVER MSSB. SUNHOOD FINISHING TO MATCH MSSB. FOR GROUND MOUNTED MSSBs, PROVIDE GALVANISE CHANNEL PLINTH BETWEEN THE MSSB AND THE SLAB BELOW TO PREVENT WATER POOLING AROUND THE BOTTOM OF THE SWITCHBOARD.



BLOCK E - BUILDING 1 - LEVEL 2 HVAC

SCALE: 1 : 100



SECTION E1-C

SCALE: 1 : 50 BR-H5530

REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	23.04.21	ISSUED FOR CONSTRUCTION	KC	MM	KC

STATUS

ISSUED FOR CONSTRUCTION

SCALE @ A1 0 2000 4000 6000 8000 SCALE: 1:100

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PROJECT

ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE

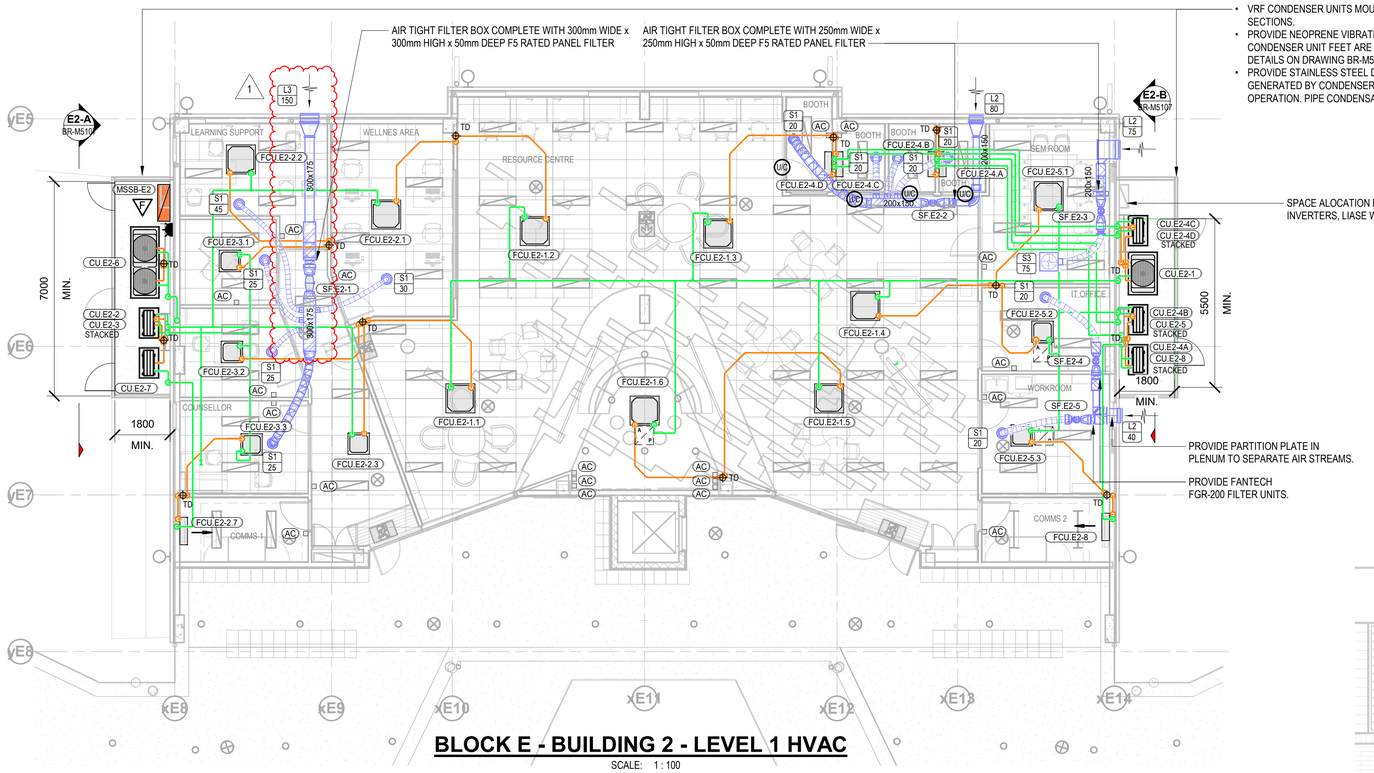
BLOCK E_BR-M5106_BUILDING 1 HVAC LAYOUT

PROJECT No.	DRAWING No.	REVISION
21-000048	BR-M5106	1

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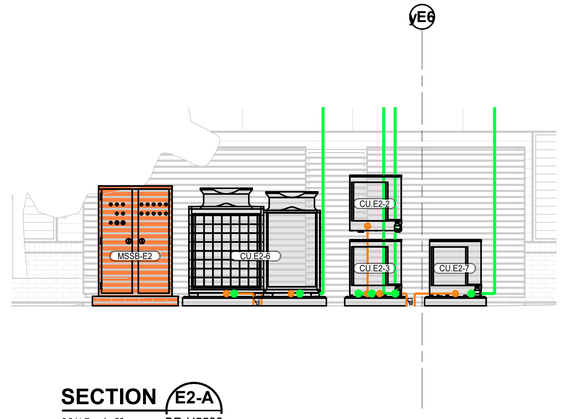
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A1



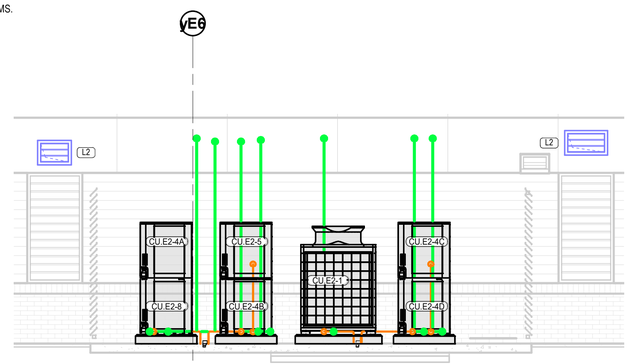
BLOCK E - BUILDING 2 - LEVEL 1 HVAC

SCALE: 1 : 100



SECTION E2-A

SCALE: 1 : 50 — BR-H5532

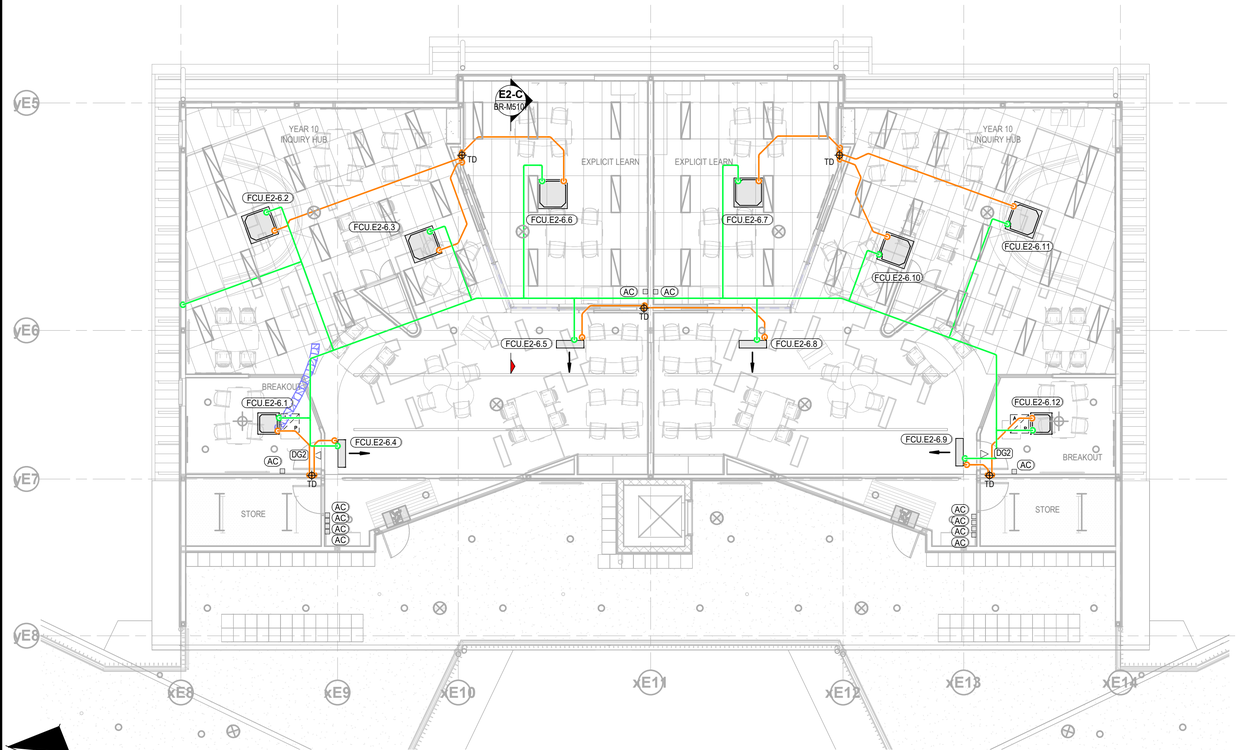


SECTION E2-B

SCALE: 1 : 50 — BR-H5532

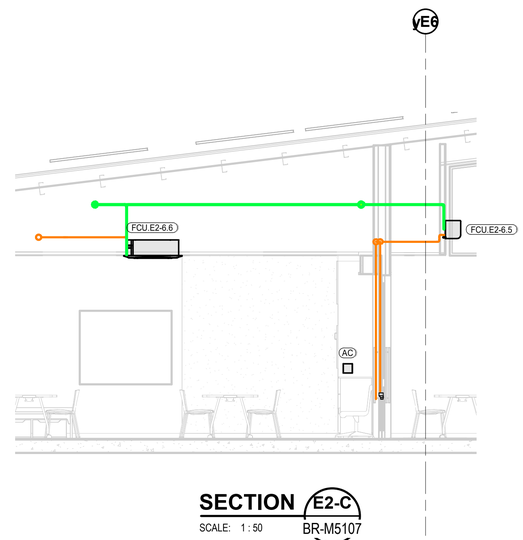
NOTES

1. MECHANICAL OUTSIDE AIR HAS NOT BEEN PROVIDED TO HABITABLE ROOMS WHICH ARE UNDERSTOOD TO HAVE BEEN DESIGNED TO MEET THE REQUIREMENTS OF NCC-F4.8 NATURAL VENTILATION PROVISION.
2. PROVIDE SUNHOOD OVER MSSB. SUNHOOD FINISHING TO MATCH MSSB. FOR GROUND MOUNTED MSSBs, PROVIDE GALVANISE CHANNEL PLINTH BETWEEN THE MSSB AND THE SLAB BELOW TO PREVENT WATER POOLING AROUND THE BOTTOM OF THE SWITCHBOARD.



BLOCK E - BUILDING 2 - LEVEL 2 HVAC

SCALE: 1 : 100



SECTION E2-C

SCALE: 1 : 50 — BR-M5107

REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	23.04.21	ISSUED FOR CONSTRUCTION	KC	MM	KC

STATUS

ISSUED FOR CONSTRUCTION

SCALE @ A1: 0 2000 4000 6000 8000 — SCALE: 1:100

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PROJECT

ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

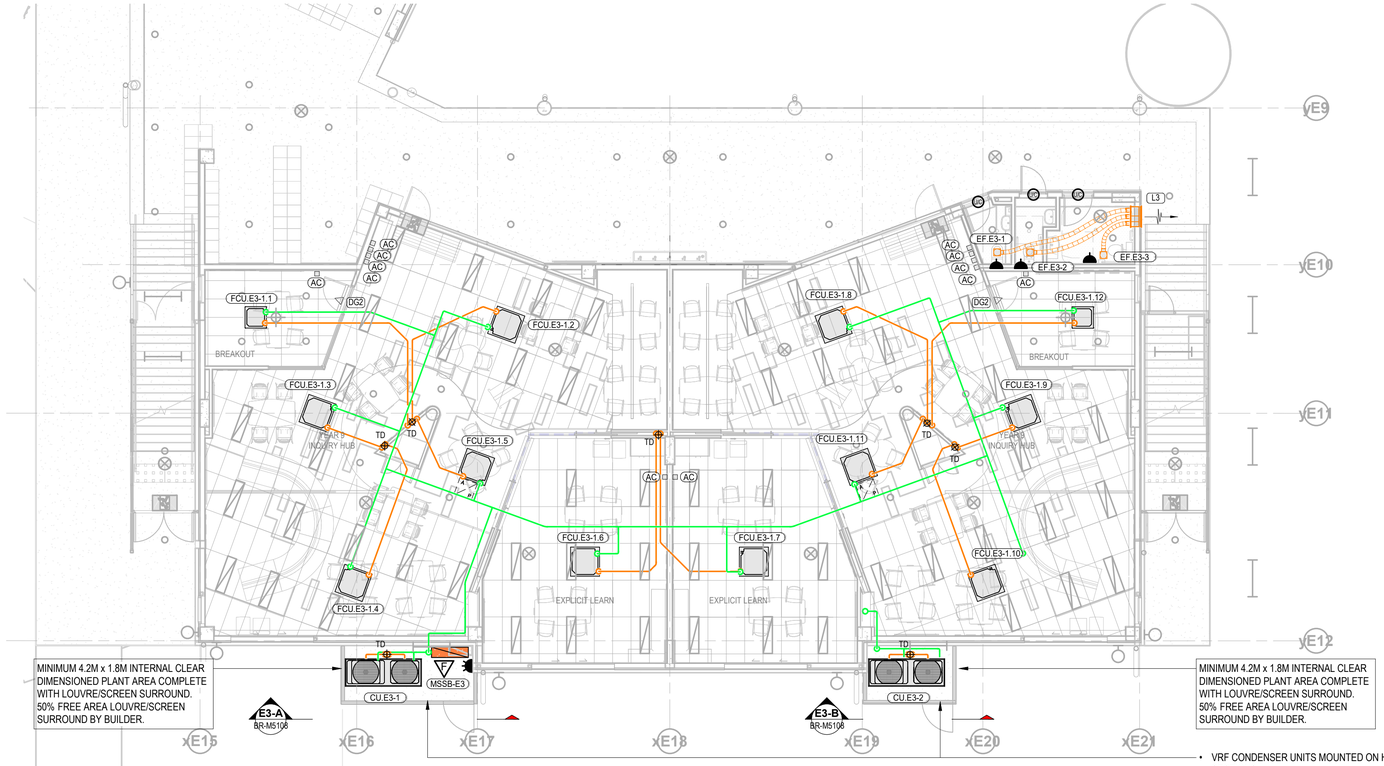
DRAWING TITLE

BLOCK E_BR-M5107_BUILDING 2 HVAC LAYOUT

PROJECT No.	DRAWING No.	REVISION
21-000048	BR-M5107	1

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A1

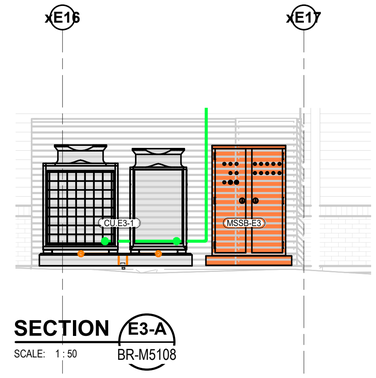


MINIMUM 4.2M x 1.8M INTERNAL CLEAR DIMENSIONED PLANT AREA COMPLETE WITH LOUVRE/SCREEN SURROUND. 50% FREE AREA LOUVRE/SCREEN SURROUND BY BUILDER.

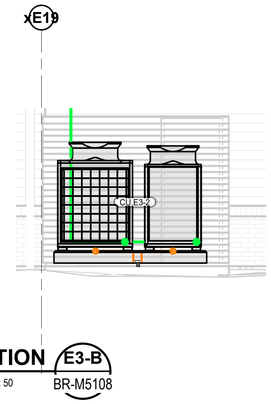
MINIMUM 4.2M x 1.8M INTERNAL CLEAR DIMENSIONED PLANT AREA COMPLETE WITH LOUVRE/SCREEN SURROUND. 50% FREE AREA LOUVRE/SCREEN SURROUND BY BUILDER.

BLOCK E - BUILDING 3 - LEVEL 1 HVAC

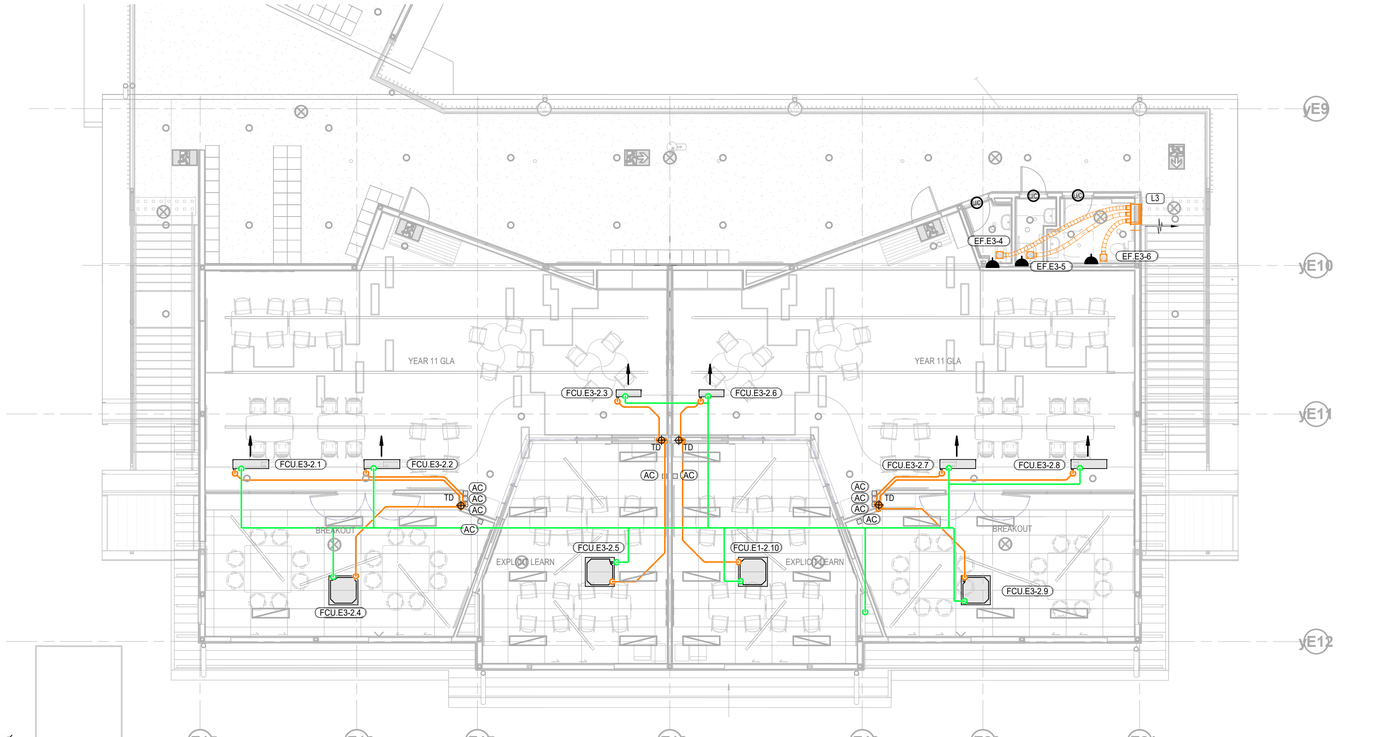
- VRF CONDENSER UNITS MOUNTED ON HEAVY GAUGE STEEL HAT SECTIONS.
- PROVIDE NEOPRENE VIBRATION ISOLATION MOUNTS WHERE CONDENSER UNIT FEET ARE AFFIXED TO HAT SECTION. REFER DETAILS ON DRAWING BR-M5002.
- PROVIDE STAINLESS STEEL DRIP TRAY CATCH CONDENSATE GENERATED BY CONDENSER UNIT DURING REVERSE CYCLE OPERATION. PIPE CONDENSATE DRAIN TO PLANT AREA TUNDISH.



SECTION E3-A
SCALE: 1 : 50 BR-M5108



SECTION E3-B
SCALE: 1 : 50 BR-M5108



BLOCK E - BUILDING 3 - LEVEL 2 HVAC

NOTES
1. MECHANICAL OUTSIDE AIR HAS NOT BEEN PROVIDED TO HABITABLE ROOMS WHICH ARE UNDERSTOOD TO HAVE BEEN DESIGNED TO MEET THE REQUIREMENTS OF NCC-F4.8 NATURAL VENTILATION PROVISION.
2. PROVIDE SUNHOOD OVER MSSB. SUNHOOD FINISHING TO MATCH MSSB. FOR GROUND MOUNTED MSSBs, PROVIDE GALVANISE CHANNEL PLINTH BETWEEN THE MSSB AND THE SLAB BELOW TO PREVENT WATER POOLING AROUND THE BOTTOM OF THE SWITCHBOARD.

REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	23.04.21	ISSUED FOR CONSTRUCTION	KC	MM	KC

STATUS
ISSUED FOR CONSTRUCTION

SCALE @ A1
0 2000 4000 6000 8000
SCALE: 1:100

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ARCHITECT
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PROJECT
ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

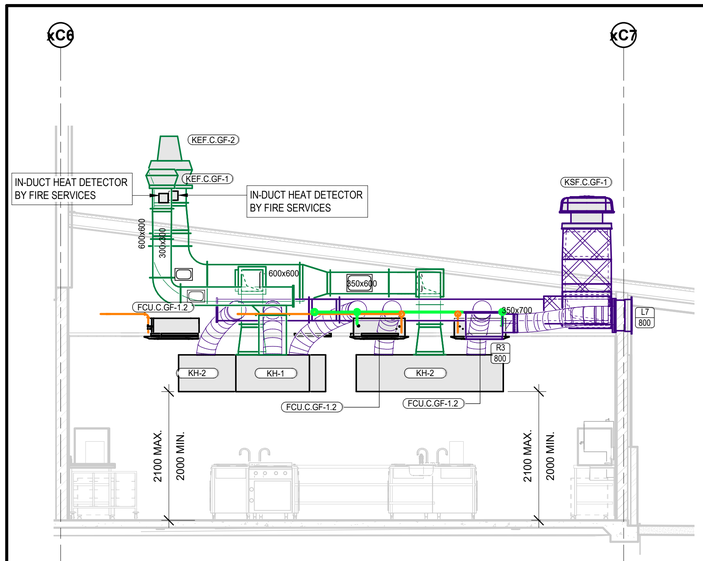
CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE
BLOCK E_BR-M5108_BUILDING 3 HVAC LAYOUT

PROJECT No.	DRAWING No.	REVISION
21-000048	BR-M5108	1

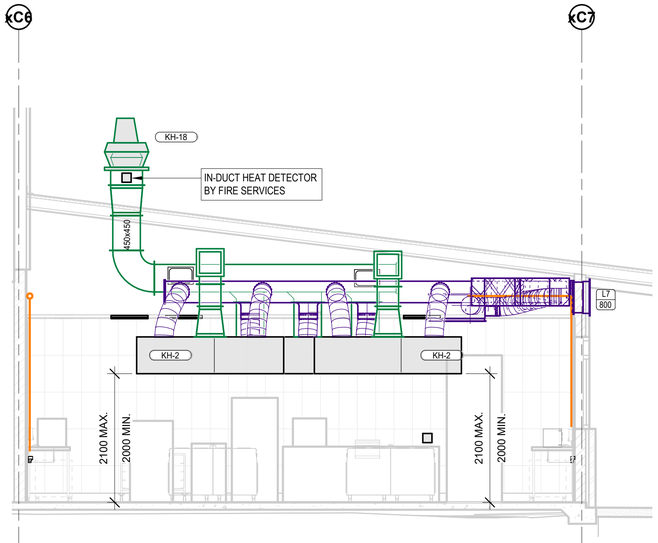
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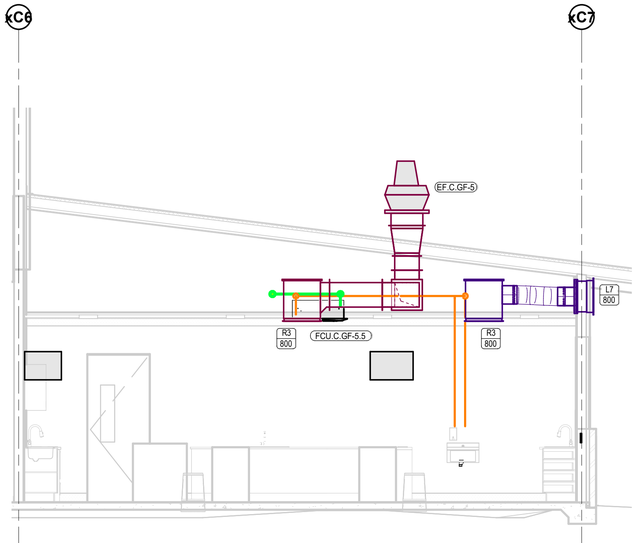
SECTION C-A

SCALE: 1 : 50 BR-H5524



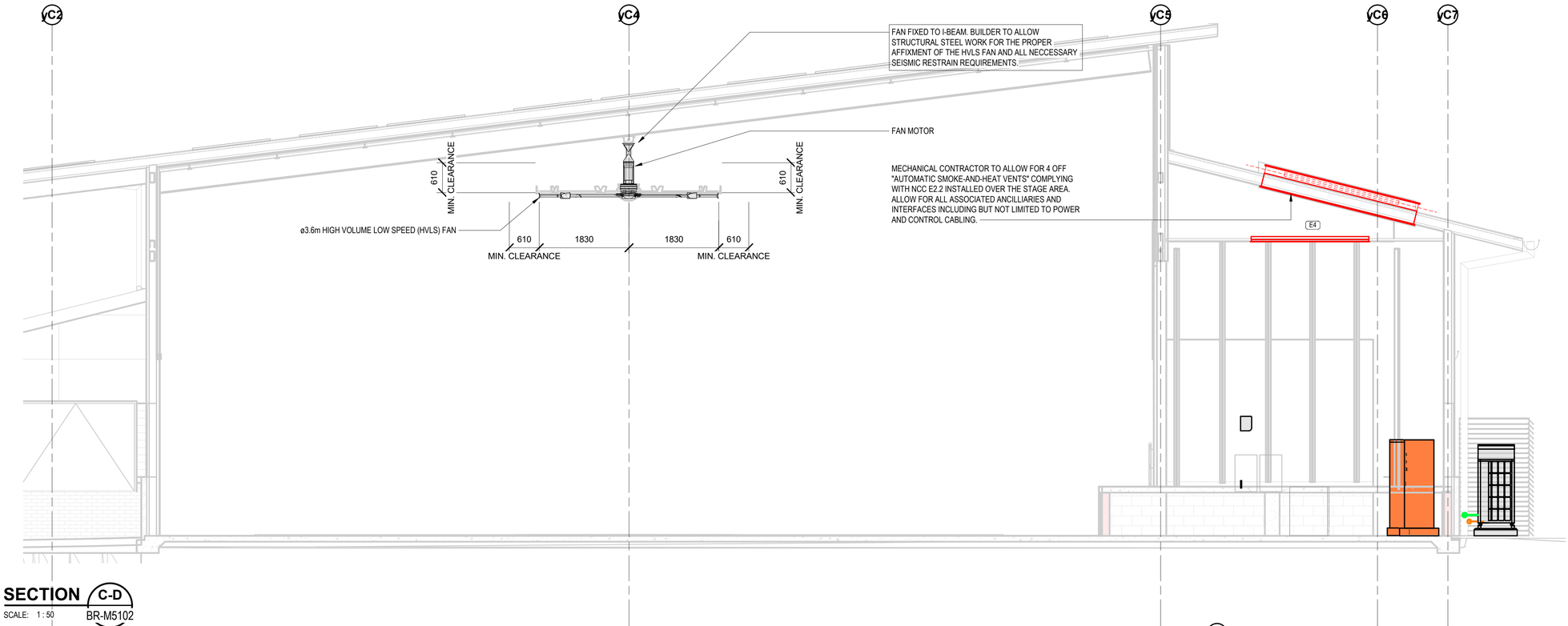
SECTION C-B

SCALE: 1 : 50 BR-H5524



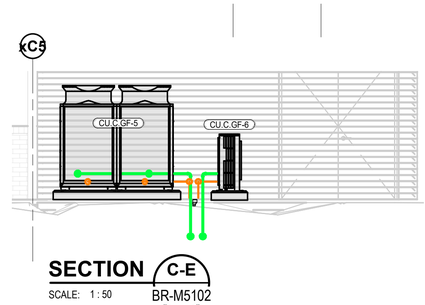
SECTION C-C

SCALE: 1 : 50 BR-H5524



SECTION C-D

SCALE: 1 : 50 BR-M5102



SECTION C-E

SCALE: 1 : 50 BR-M5102

REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	23.04.21	ISSUED FOR CONSTRUCTION	KC	MM	KC

STATUS

ISSUED FOR CONSTRUCTION

SCALE @ A1 0 1000 2000 3000 4000 SCALE: 1:50

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PROJECT

ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE

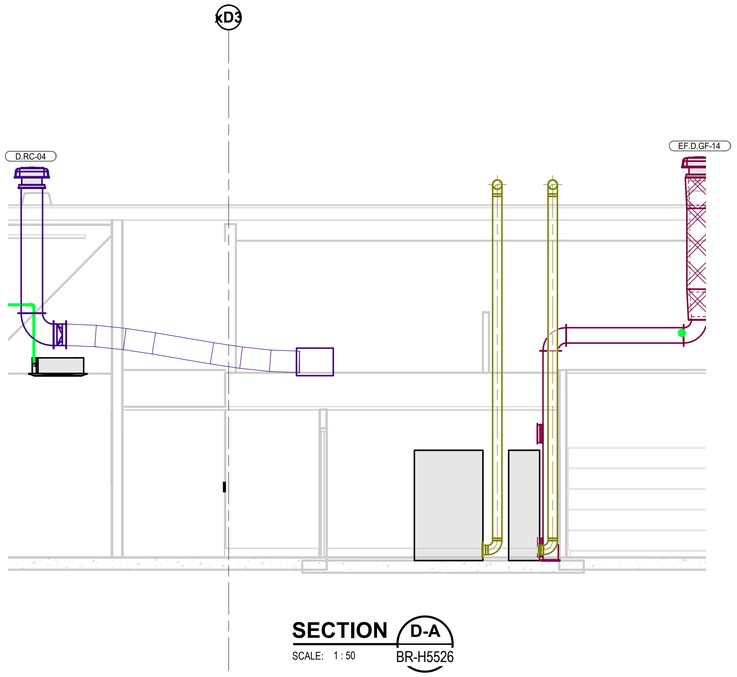
BLOCK C_BR-M5203_ SECTIONS

PROJECT No.	DRAWING No.	REVISION
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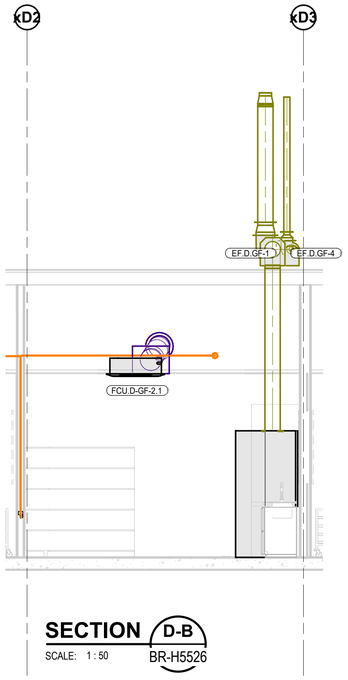
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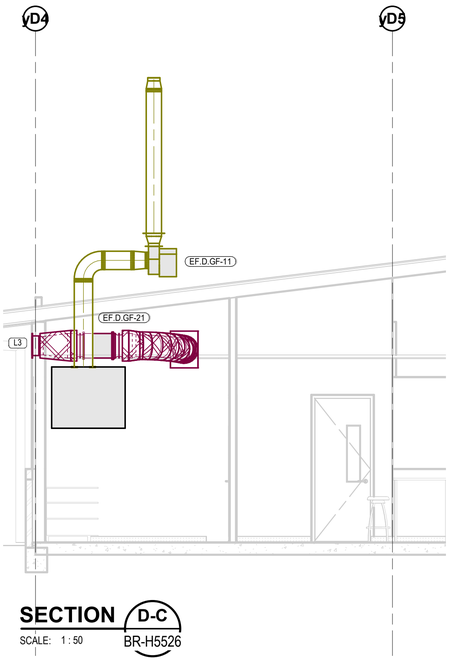
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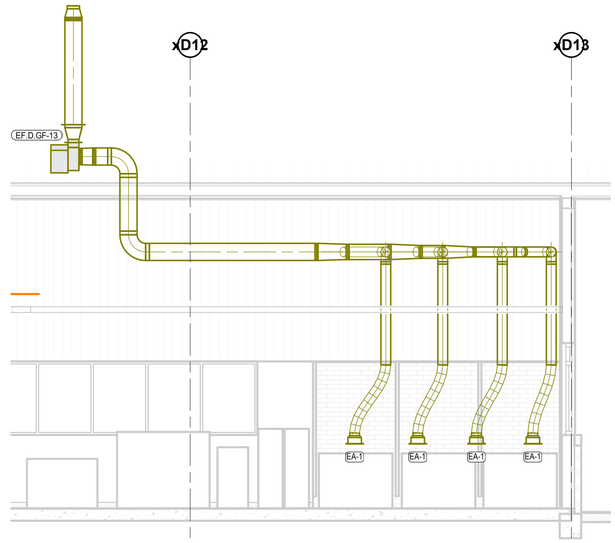
SECTION D-A
SCALE: 1 : 50 BR-H5526



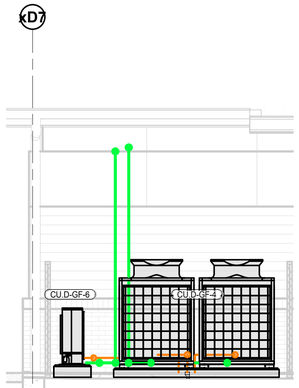
SECTION D-B
SCALE: 1 : 50 BR-H5526



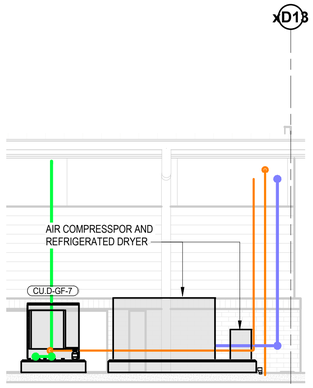
SECTION D-C
SCALE: 1 : 50 BR-H5526



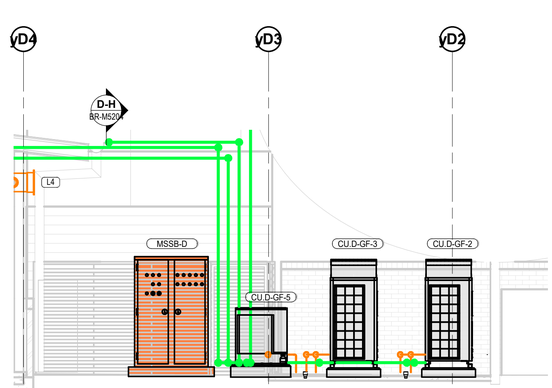
SECTION D-D
SCALE: 1 : 50 BR-H5526



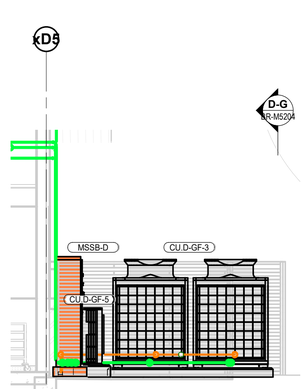
SECTION D-E
SCALE: 1 : 50 BR-H5526



SECTION D-F
SCALE: 1 : 50 BR-H5526



SECTION D-G
SCALE: 1 : 50 BR-H5526



SECTION D-H
SCALE: 1 : 50 BR-H5526

REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	23.04.21	ISSUED FOR CONSTRUCTION	KC	MM	KC

STATUS

ISSUED FOR CONSTRUCTION

SCALE @ A1 0 1000 2000 3000 4000
SCALE: 1:50

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PROJECT

ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE

BLOCK D_BR-M5204_ SECTIONS

PROJECT No.	DRAWING No.	REVISION
21-000048	BR-M5204	1

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22/04/2021 11:25:35 PM

A1

BLOCK A
BLOCK B
BLOCK C
BLOCK D
BLOCK E BUILDING 1
BLOCK E BUILDING 2
BLOCK E BUILDING 3
FIRE HYDRANT
20kL TANK 01
20kL TANK 02
100kL TANK
20kL TANK 06
20kL TANK 07
SIC-1
SIC-2
SIC-3
SIC-4
SIC-5
DRAWINGS COLOURED CODED – PRINT ALL COPIES IN COLOUR.

REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	27.04.21	FOR APPROVAL			
2	25.05.21	FOR APPROVAL			

STATUS
ISSUED FOR CONSTRUCTION

SCALE @ A1
0 5000 10000 15000 20000
SCALE: 1:250

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PROJECT
ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE
SITE_BR-H5514_PART SITE PLAN - SOUTH FIRE HYDRANT COVERAGE

PROJECT No.	DRAWING No.	REVISION
21-000048	BR-5805	2

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27/04/2021 3:41:28 PM
A1



REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	27.04.21	FOR APPROVAL			

STATUS

PRELIMINARY

NOT FOR CONSTRUCTION

SCALE @ A1

0 2000 4000 6000 8000

SCALE: 1:100

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PROJECT

ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE

BLOCK A – FIRE HYDRANT COVERAGE LAYOUT

PROJECT No.	DRAWING No.	REVISION
21-000048	BR-5810	1

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A1



REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	27.04.21	FOR APPROVAL			

STATUS

PRELIMINARY

NOT FOR CONSTRUCTION

SCALE @ A1

0 2000 4000 6000 8000

SCALE: 1:100

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PROJECT

ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE

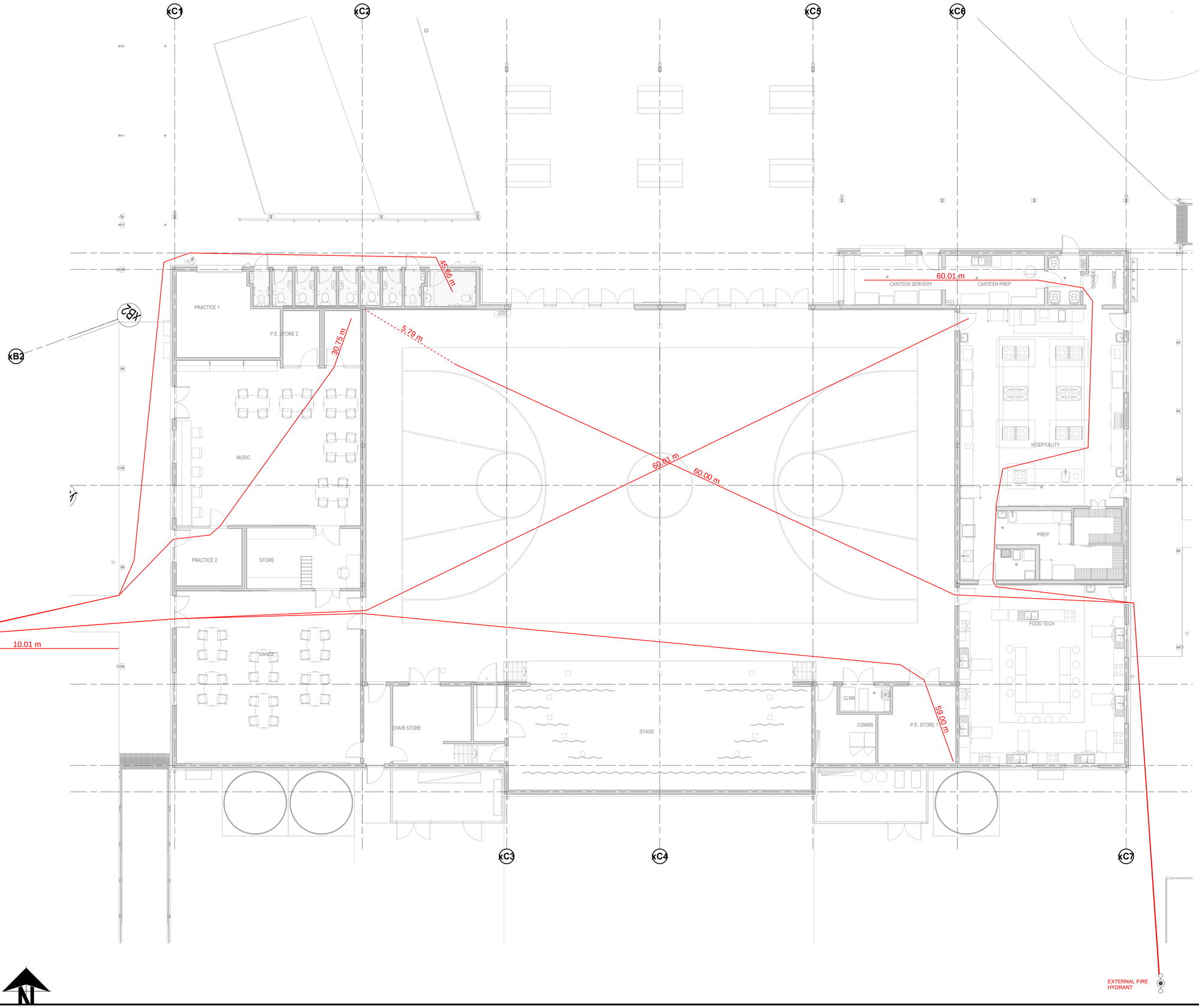
BLOCK A – FIRE HOSE REEL COVERAGE LAYOUT

PROJECT No.	DRAWING No.	REVISION
21-000048	BR-5811	1

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26/04/2021 2:45:23 PM

A1



REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	27.04.21	FOR APPROVAL			
2	25.05.21	FOR APPROVAL			

STATUS

PRELIMINARY

NOT FOR CONSTRUCTION

SCALE @ A1

0 2000 4000 6000 8000

SCALE: 1:100

CLIENT

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PROJECT

ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE

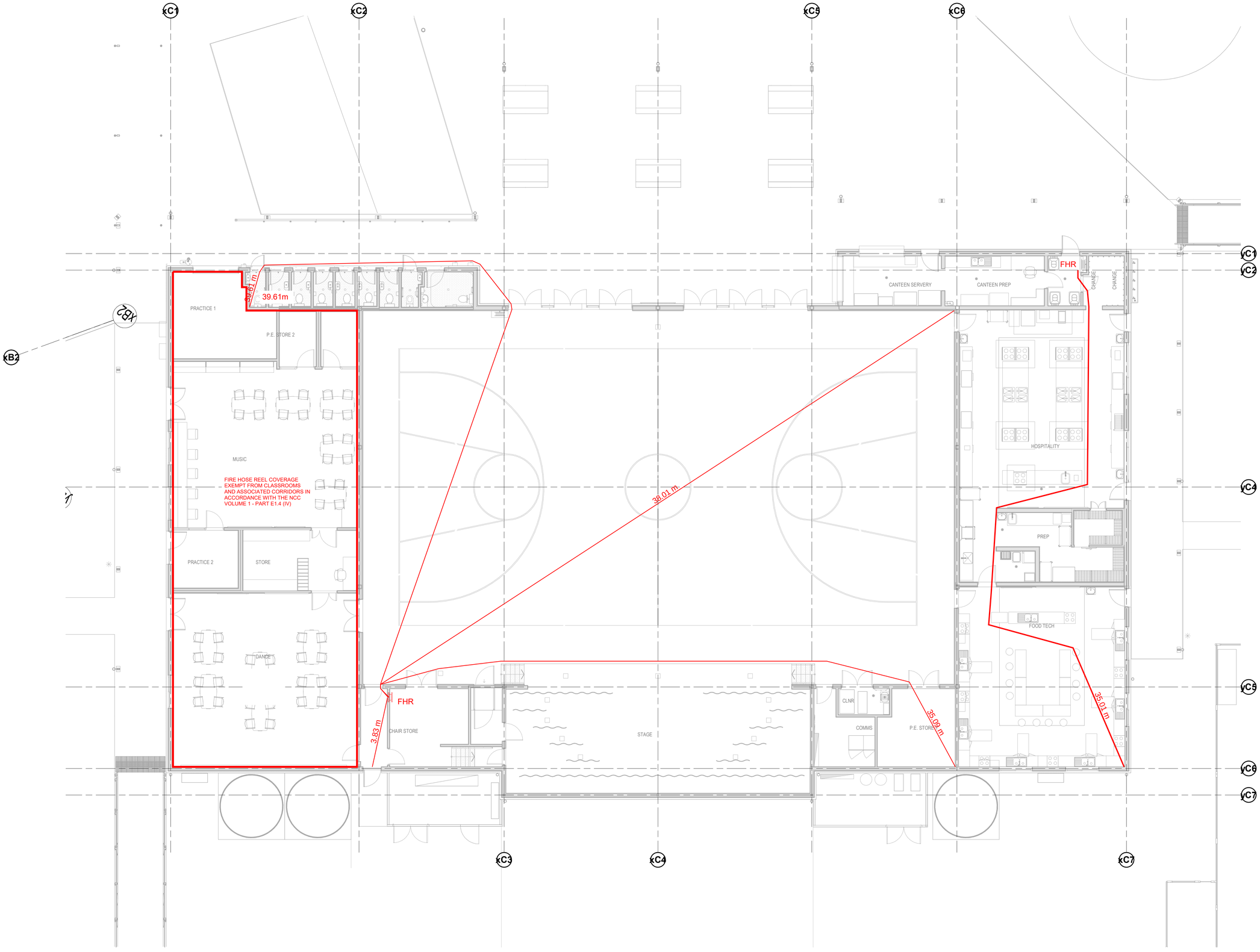
BLOCK C – FIRE HYDRANT COVERAGE LAYOUT

PROJECT No.	DRAWING No.	REVISION
21-000048	BR-5820	2

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A1



REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	27.04.21	FOR APPROVAL	CJM	CJM	
2	19.05.21	FOR APPROVAL	CJM	CJM	

STATUS

PRELIMINARY

NOT FOR CONSTRUCTION

SCALE @ A1

0 2000 4000 6000 8000

SCALE: 1:100

CLIENT

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PROJECT

ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE

BLOCK C – FIRE HOSE REEL COVERAGE LAYOUT

PROJECT No.	DRAWING No.	REVISION
21-000048	BR-5821	2

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A1



REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	27.04.21	FOR APPROVAL			

STATUS

PRELIMINARY

NOT FOR CONSTRUCTION

SCALE @ A1

0 2000 4000 6000 8000

SCALE: 1:100

CLIENT

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PROJECT

ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE

BLOCK D – FIRE HYDRANT COVERAGE LAYOUT

PROJECT No.	DRAWING No.	REVISION
21-000048	BR-5830	1

C:\temp\21-000048 - St Matthews FC_R18_Central_Andrew.Chong.82537.rvt

26/04/2021 2:45:32 PM

A1



REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	27.04.21	FOR APPROVAL			

STATUS

PRELIMINARY

NOT FOR CONSTRUCTION

SCALE @ A1

0 2000 4000 6000 8000

SCALE: 1:100

CLIENT

north
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ARCHITECT

ALLEANZA ARCHITECTURE

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PROJECT

ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE

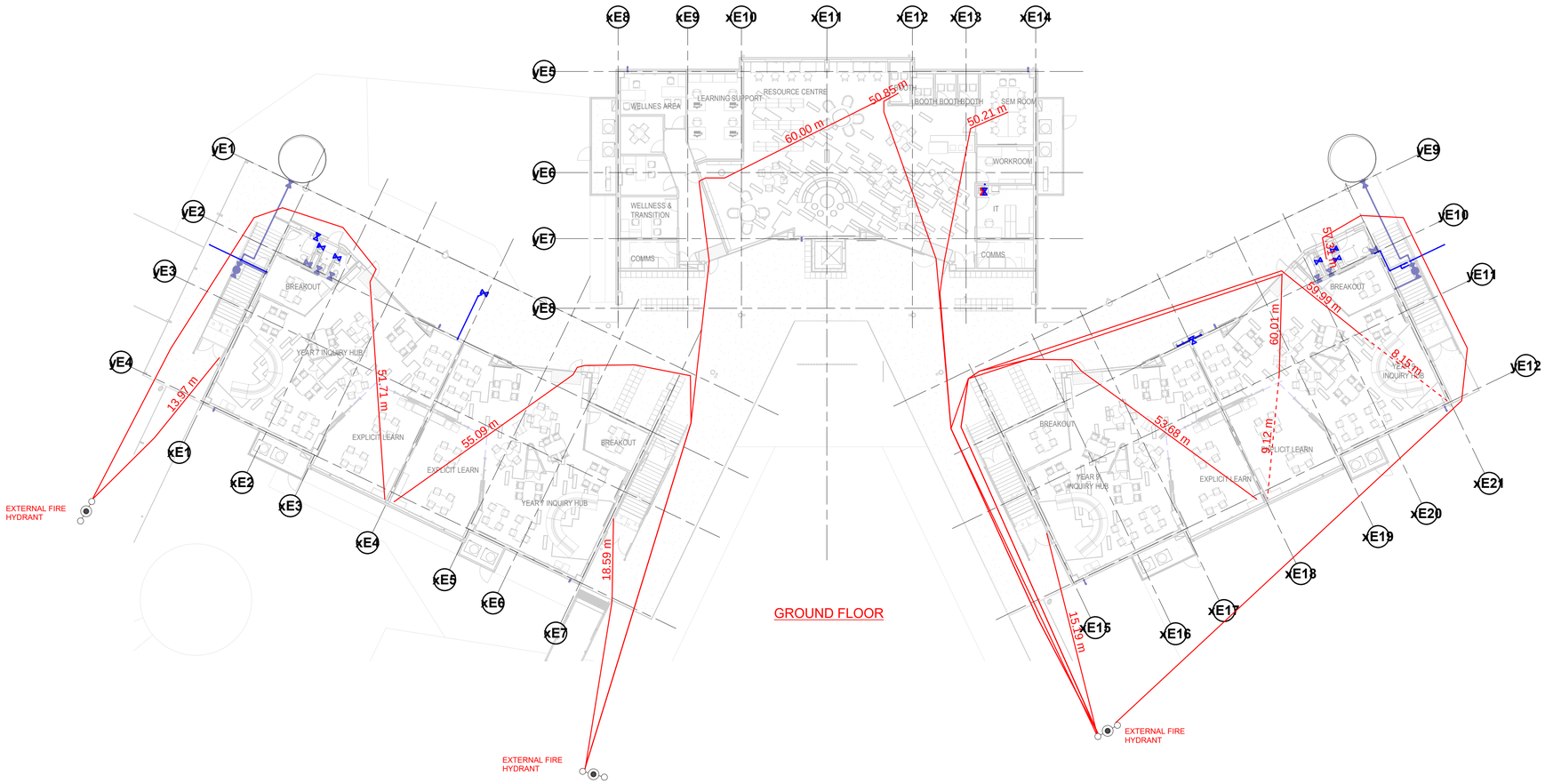
BLOCK D – FIRE HOSE REEL COVERAGE LAYOUT

PROJECT No.	DRAWING No.	REVISION
21-000048	BR-5831	1

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26/04/2021 2:45:38 PM

A1



REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	27.04.21	FOR APPROVAL			
2	25.05.21	FOR APPROVAL			

STATUS

PRELIMINARY

NOT FOR CONSTRUCTION

SCALE @ A1

0 4000 8000 12000 16000

SCALE: 1:200

CLIENT

north

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PROJECT

ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE

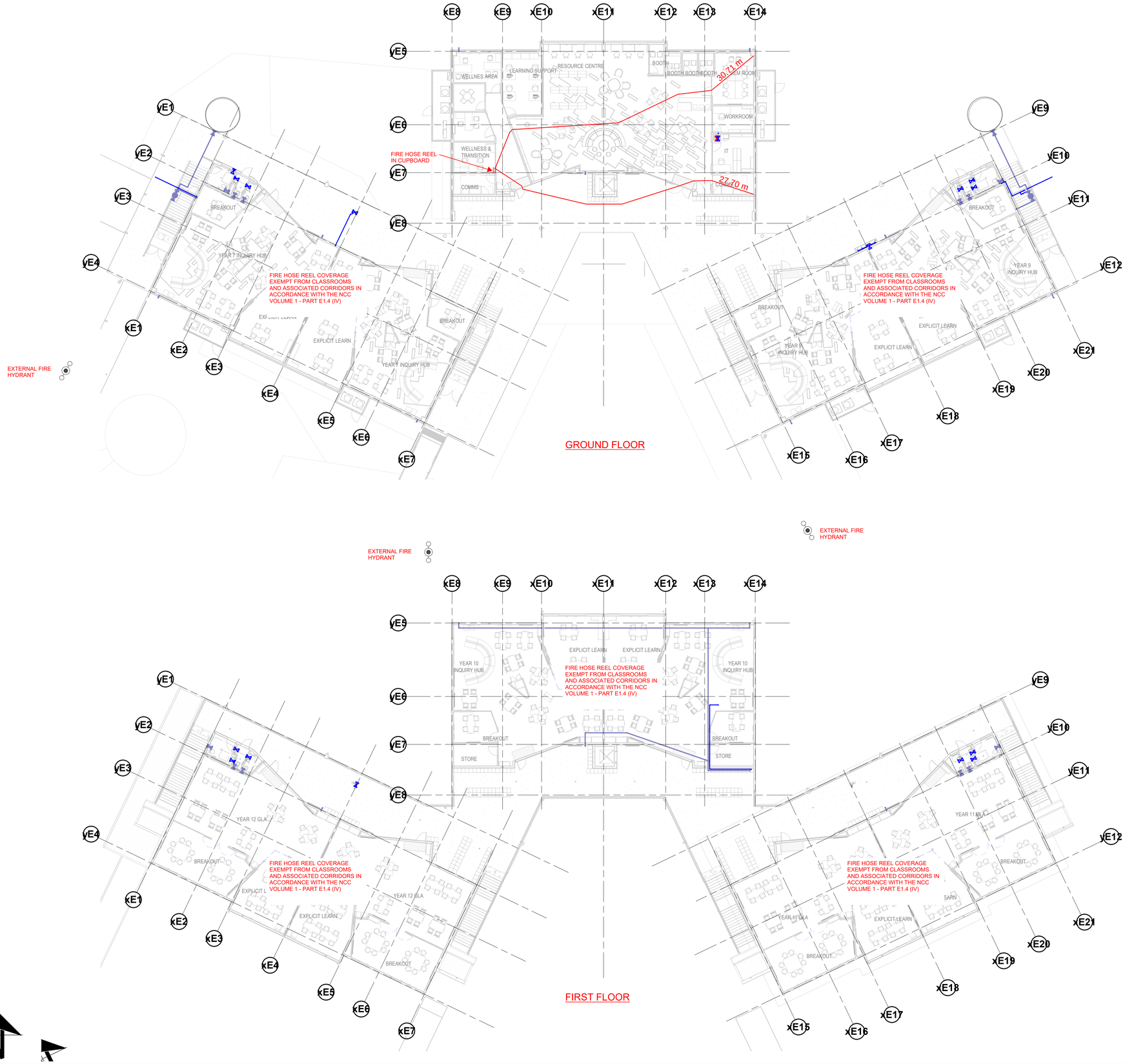
BLOCK E – FIRE HYDRANT COVERAGE LAYOUT

PROJECT No.	DRAWING No.	REVISION
21-000048	BR-5810	2

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A1



GROUND FLOOR

FIRST FLOOR

REV	DATE	ISSUE DETAILS	DSN	DRW	CHK
1	19.05.21	FOR APPROVAL	CJM	CJM	

STATUS

PRELIMINARY

NOT FOR CONSTRUCTION

SCALE @ A1

0 4000 8000 12000 16000

SCALE: 1:200

CLIENT

north

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PROJECT

ST MATTHEWS CATHOLIC SCHOOL MUDGEE - SECONDARY CAMPUS

CORNER OF BROADHEAD & BRUCE RD MUDGEE, NSW 2850

DRAWING TITLE

BLOCK E – FIRE HYDRANT COVERAGE LAYOUT

PROJECT No.	DRAWING No.	REVISION
21-000048	BR- 5841	1

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A1