SPECIFICATION
OF
BUILDING WORKS

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This specification is published annually and is aligned with BCA Volume 2 of the NCC for Class 1 and Class 10 Buildings.

DEFINITIONS

Specifications are written descriptions of the required quality of the built product and its component products.

Drawings are graphic descriptions which define quantity, position and sometimes quality.

Schedules are written selections, often presented as tables, which form an appendix or addition to another document such as the specification or a drawing.

PURPOSE

The quality of a building project is dependent on the documentation included as part of the contract. The adoption of the National Construction Code (NCC) under State and Territory building regulation establishes a minimum level of quality of construction. Higher standards of construction and quality of workmanship are achieved through the contractual agreement between the owner and the builder and are not defined by the NCC or administered by the certifying or approval authority. The contract documents include the general conditions of contract, the schedules, the drawings and the specification which complement each other to express the owner's intentions to the builder.

The specification has many roles. It may be:

- A written record of design decisions taken.
- A document demonstrating compliance with statutory requirements.
- An estimating document.
- A tendering document.
- A legal (contractual) document.
- An on-site working document.
- A dispute settlement document.
- A project management tool.

THE FORM OF A SPECIFICATION

NATSPEC SIMPLE DOMESTIC SPECIFICATION is divided into worksections classified, numbered and sequenced according to the National Classification System which corresponds to Australian construction industry practice. Where appropriate, each worksection is divided into three parts:

- General including standards, definitions and submission requirements.
- Products including details of materials and components.
- Execution dealing with the fabrication, installation, erection and completion as part of a project.

METHODS OF SPECIFICATION

NATSPEC SIMPLE DOMESTIC SPECIFICATION uses the well recognised methods of specifying by:

- Reference: Where an identifiable printed and published document is incorporated by reference. Such documents may be Australian Standards or manufacturer's technical manuals. The Australian standards referenced in NATSPEC SIMPLE DOMESTIC SPECIFICATION include those which are referenced in the NCC and are relevant to domestic work, have other statutory application, are important to the quality of materials and work in terms of public safety and long-term performance of the building and/or are widely accepted in the building industry.
- Performance: That is, by stating a desired end result and the criteria by which the result will be judged for its acceptability.
- Description: Detailing the materials, workmanship and installation procedures to be used.
- Direct: Specification stating a proprietary trade name product. The owner may specify particular brands or products on the drawings or in the schedules.

NATSPEC SIMPLE DOMESTIC SPECIFICATION is a reference specification and does not require editing or amendment. It is intended for inclusion, along with other documents such as drawings and schedules, as a condition of contract for the building works. It assumes all project specific design information is shown on the drawings or in schedules, including the requirements of the consent authority. The Preliminaries worksection provides for the requirements of the drawings and schedules to override conflicting requirements of this reference specification.

National Construction Code

The National Construction Code (NCC), including State and Territory variations, is enforced by local authorities and controls domestic construction in Australia, along with the requirements of statutory authorities (e.g. electricity and water supply). This specification has been aligned with BCA Volume 2 of the NCC but any local requirements must take precedence. NATSPEC recommends that the users of thisdocument have ready access to BCA Volume 2 for Class 1 and Class 10 Buildings. It is available online. Go to https://ncc.abcb.gov.au/ to register.

Work Health and Safety (WHS)

Everyone at a workplace is responsible for complying with stringent Occupational Health and Safety legislation. However, the accountable person has primary control over the workplace and therefore the greatest WHS responsibility. A builder engaged to manage a project and organise the relevant sub-contractors is the accountable person and must make sure that they, their employees and sub-contractors work in a safe manner. An owner builder, engaging independent tradespeople as required, is the accountable person responsible for ensuring the tradespeople comply with safety standards. WHS legislation in some States and Territories also includes statutory obligations on designers in relation to WHS issues arising out of their designs during and after construction. It is important to note that WHS obligations differ in each State and Territory. Go to www.safeworkaustralia.gov.au to see WHS legislation for each.

Standards and tolerances

Check that the building work conforms to requirements of the drawings, schedules and this specification. *Guide to Standards and Tolerances* is a reference document of best construction practice available on the web, describing acceptable standards of workmanship for domestic building work.

Dispute resolution

Many building contracts include dispute resolution provisions and in most states there are dispute resolution services provided and/or mandated under State legislation.

The following is a checklist of project specific information that may require additional documentation on the drawings or in schedules.
This checklist is provided to assist the owner and does not form part of the contract between the owner and the builder.

0131 Preliminaries

- Prior applications and approvals: List of applications made and approvals received. All items noted in the Local Council Development Approval and Construction Certificate checklist. Conditions of approval that impact design and construction.
- Mines Subsidence Districts: Note Conditions of approval
- Occupied premises: Define.
- Energy efficiency: Approval commitments.
- Site restrictions: Easements, restrictions arising out of actions of adjoining land owners, limitations related to continued occupancy by owner, toxic ground conditions.
- Block and survey pegs for the purpose of setting out, checking or measuring the work.
- Site access: Define access to and within the site, use of the site for temporary works and constructional plant, working and storage areas, parking.
- Conditions for work on adjoining property: Define.
- Existing services: Define use of existing services as temporary services for the performance of the contract.
- Temporary services: Define if it is necssary to specify particular requirements such as temporary services for owner facilities if construction activities interfere.
- Items to be supplied by the owner: Define items and any conditions of supply.
- Requirements for dilapidation records on adjoining properties if there is a danger of damage to adjoining property.

0180 Common requirements

- Bushfire-prne areas. AS3959 (2018) is incorporated in the NCC, but many local authorities have their own requirements which must also be complied with. AS 3959 (2018) defines 6 levels of construction for low to extreme Bushfire Attack Levels (BAL). Consult local councils for any additional bushfire protection requirements.
- Timber durability: See Natural and treated timber durability table of Common requirements. AS 5604 (2022) gives a comprehensive table of the natural durability of timber species. Section 5 sets rules for the use of timber in relation to its natural durability class and for its preservative treatment if it does not have the required natural durability.
- Recycled material: Nominate type, certification and source.
- Corrosion environment: Nominate the Corrosion protection environment as defined in the ABCB Housing Provisions Table 7.2.2a.
- Moisture content: A convenient method for testing the moisture content of new concrete is the hand held hygrometer that is mastic sealed to the surface and left 16 hours overnight. The reading obtained is the relative humidity in the instrument chamber after equalisation with the concrete. A rule of thumb for the approximate drying time for concrete slabs is one month for every 25 mm thickness.

0184 Termite management

- Location: Slab, slab penetrations, slab control joints and footing/slab joints, under slabs, building perimeters, under suspended floors and timber poles and posts.
- Type: Select from concrete slab, sheet materials, woven stainless steel mesh, graded particles, chemical barriers or reticulated systems.
- Termite barrier notice: Locate in the electrical meter box.

0201 Demolition

- Identify items for removal, recycling or re-use.
- Identify items for protection in their existing location.
- Notification of asbestos products.

0221 Site preparation

- Temporary fence: Location. A temporary fence or safety barrier may be required by the local authority.
- Trees and shrubs to be protected. Local authorities often have detailed requirements for protection of trees.
- Trees and shrubs to be removed.
- Include erosion and sedimentation control and any other site management requirements noted by the local authority.
- Soil stockpile locations

0222 Earthwork

- Site classification to AS 2870 (2011).
- Excavation.
- Surface preparation. AS/NZS 3500.3 (2021) is referenced in BCA (2022) H2D2 for drainage.
- Crawl space under suspended floors: See BCA (2022) H2D5 for subfloor ventilation requirements. The requirements vary for different climate zones. Open spaces under timber floors can be subjected to hot drying wind at times that could shrink the flooring and in these circumstances a vapour barrier is recommended under the flooring. A minimum clearance of 400 mm under suspended floors where termite inspection is required. The minimum clearance can be reduced to 150 mm within 2 m of an external wall for sloping sites.
- Placing fill: Requirements for load-bearing fill should be specified by a professional engineer. AS 3798 (2007) gives general advice on earthworks. Inadequate backfilling can lead to differential settlement and damage to paving and landscaping. In reactive clay soils, it is important that service trenches do not act as a conduit to carry moisture into the ground next to the foundations, so impervious material should be used for backfill.

0223 Service trenching

- Trench widths.
- Backfilling material.

0242 Landscape – fences and barriers

- Location, material, manufacturer, height, finish and colour of fencing and gates.
- The construction and maintenance of common fences dividing land with separate titles is covered by state legislation.
- Nominate a preservative treatment.
- Fencing for swimming pools: Check the local authority for additional requirements. AS 1926.1 (2012) and AS 1926.2 (2007) are referenced in the NCC for safety fencing of swimming pools. Hazards such as fountains, fish ponds, incinerators, barbecues, and vehicle manoeuvring areas should also be fenced off or otherwise secured.

0250 Landscape – gardening

- Imported topsoil: Composition and supplier.
- Removal and disposal of excess spoil.
- Turfed areas.
- Schedule of plants: Species, size as supplied and location.

0271 Pavement base and subbase

- Base course material and thickness.

0274 Concrete pavement

Concrete pavements, except footpaths should be specified by a professional engineer. The requirements for in situ concrete may be varied if it is unreinforced. AS 3727.1 (2016) can then be used for design purposes.

- Site preparation.
- Mix, thickness, grading, location of control joints and finish.
- Concrete strength.
- Reinforcement.
- Type: Select concrete colour, broom finish or stamped finish.
- Curing.

0276 Paving – sand bed

- Preparation and bedding sand/mortar edge restraint.
- Thickness, grading and laying.
- Cutting.
- Type: Select from clay brick pavers or concrete.
- Pattern: Select from rectangular or interlocking.

0310 Concrete

- Construction notes/specification on structural engineer's drawings.
- Because ground conditions vary so much within Australia, concrete ground slabs or footings are usually designed by a professional enginee, but this is not always necessary. AS 2870 (2011) has 'deemed-to-comply' provisions. The site classification should be determined by the local council engineer or a geotechnical engineer to S 2870 (2011).
- Formwork: Stripping times and repair. The design of the formwork is the contractor's responsibility. This applies to all formwork types, including conventional, proprietary or purpose-made formwork.
- Ground slab vapour barrier: Note type. Provision of a vapour barrier for external slabs on ground prevents water loss to the subgrade and has the potential to reduce slab curling t edges and corners.
- Concrete strength.
- Reinforcement: Location, cover to reinforcement and splicing.
- Joints.
- Surface finish class: To AS 3610.1 (2018) (Class 1 – 5).

. Class 2 – high.

. Class 3 – good.

- Surface finish type: Select from:

. Machine float: Under dry floor finishes.

. Steel trowel: Under resilient finishes, garage floors.

. Wood float: External

. Broomed/patterned/coloured: External.

. Rough scored: Under tiles in a mortar bed.

. Specify others.

- Slip resistance, if required.
- Curing.

0331 Brick and block construction

For buildings not conforming to the scope of the AS 4773 series use AS 3700 (2018).

Consult the local approval authority to determine where walls over a certain height require design by a professional engineer.

Energy efficiency requirements in BCA (2022) H6 set out minimum insulation performance requirements for walls, roofs, floor slabs and external glazing depending on climate zone and orientation.

Masonry units: Brick or block.

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- Reinforced blockwork.
- Masonry unit description: Type/size, colour, texture, supplier. Check durability if soil is aggressive or heavily fertilized.
- Mortar type: M3 applies generally, except that M4 applies for interior elements subjected to saline wetting and drying, elements below the damp-proof course or in contact with ground that are in aggressive soils, elements in severe marine environments as defined by AS 4773.1 (2015) clause 4.3.1, elements in saline or contaminated watr including tidal and splash zones and elements in especially aggressive environments.
- Mortar colour.
- Damp proof courses.
- Cavity width: Note increased width if wall insulation is required to BCA (2022) H6D2(1)(b)(i).
- Wall ties: Type and location.
- Flashing details.
- Mortar joint types: Select tooled, weatherstruck or raked. Mortar joints which are not completely filled and tooled may not provide adequate weatherproofing. A flush joint which is cut with the trowel without compacting the mortar should not be used externally unless agreed.
- Brick rods.
- Bond patterns.
- Joints.
- Lintels.
- Chasing locations.
- Air vent location: See BCA (2022) H2D5 for subfloor ventilation requirements. The requirements vary for different climate zones.
- Weep holes.
- Weephole guards: Insect only or insect and bushfire ember protection.
- Control joints: Clay bricks grow after they have been fired and concrete slabs shrink after they have been poured. The provision for control joints is based on a minimum age of bricks and supporting concrete. If these ages cannot be complied with, additional joints may be necessary. Refer to AS 4773.2 (2015) Section 7 for joint detail.

0342 Light steel framing

The NASH-1 (2005) (National Association of Steel-framed Housing) is cited in the NCC. It sets out the design criteria to comply with the performance requirements of the NCC for steel framing of low-rise housing as well as commercial buildings. Design of structural steelwork, and cold-formed steel framing except domestic, should be by a professional engineer. The local authority may have requirements for permanent earthing of the frame. Refer to AS/NZS 3000 (2018) Section 5 for earthing arrangements and earthing conductors.

- Framing to NASH-1 (2005) and NASH-2 (2014).
- Cyclonic areas as classified in BCA Figure 3.0.1.
- Steel roof truss: Type and supplier.

0382 Light timber framing

Detailed requirements for timber framing in areas with design gust wind speeds up to 33 m/s are set out in AS 1684.4 but other codes designed for local conditions may be acceptable or mandatory. For cyclonic areas refer to AS 1684.3 (2021).

Design of timber framing to AS 1720.1 (2010) should be by a professional engineer.

- Cyclonic areas as classified in BCA (2022) Figure 3.0.1.
- Framing to AS 1684 series.
- Bracing.
- Timber roof truss: Supplier.

- Truss type. Design of timber trusses to AS 1720.1 (2010) and AS 1720.5 (2015).

- Fascias and barge boards.

0383 Decking, sheet and panel flooring

- Material and fixings.

- Timber decking selection.

0421 Roofing

- Roof tiles: Manufacturer, material, pattern and colour.

- Sheet metal roofing: Manufacturer, profile, finish, BMT and colour.

- Flashing and rainwater goods: Material, finish and colour.

- Roof lights: Selection details. Check the product for compliance, particularly spark arrestor mesh. See BCA (2022) H6D2(1)(b)(i) for thermal performance requirements of roof lights serving a habitable room. See BCA (2022) H3D3 for locating combustible roof lights. See BCA (2022) H7D4 for construction requirements for buildings in bushfire prone areas.

- Roof ventilators: Selection details.

0431 Cladding

- Cladding type: Fibre cement planks or sheeted system, plywood, timber weatherboards, hardboard planks, AAC panels, or EIFS (external insulated finishing system).

- Description: Manufacturer, material, pattern and colour.

0451 Windows and glazed doors

Performance: For each elevation documnt the total U-value, solar heat gain coefficient, reflectance %, WERS energy rating % (heating and cooling) and AWA (Australian Window Association) Compliance certificate. BCA (2022) H6D2(1)(b)(ii) sets out thermal performance of external glazing. See BCA (2022) H6D2(1)(b)(iii) for sealing of windows and doors.

- Location.

- Size.

- Window rating: To AS 2047 (2014).

- Water penetration resistance: To AS 2047 (2014).

- Door and window type.

- Operation: Swing, sliding or cavity sliding.

- Material: Aluminium, timber, PVC-U.

- Sliding internal doors; removable pelmets.

- Finish and colour.

- Insect/security screens.

- Bushfire screens.

- External glazing systems.

0453 Doors and access panels

- Location.

- Size.

- Door type: Flush solid core, flush hollow core, timber panelled, aluminium framed and glazed.

- Operation: Swing, sliding or cavity sliding doors.

- Material.

- Door frames: Timber, steel, or aluminium.

- Multiple folding doors.

- Sliding internal doors; removable pelmets.

- Security screen doors and bushfire screens.

- Floor clearances.

0454 Overhead doors

- Type: Roller, tilting, sectional, plywood, prefinished steel, stain/clear, paint or powder coated.

- Manufacturer.

- Operation. e.g. Direct manual or Motorised.

- Motorised operation: e.g. Direct push-button, Key switch, Radio remote controller, etc.

0455 Door hardware

- Lock function.

- Lock durability, physical security and keying security. Refer to AS 4145.2 (2008).

- Door furniture style.

- Weatherseal requirements.

0467 Glass components

- Mirrors, shower screens, glass balustrades: To AS 1288 (2021).

- Mirror fixing: Selct adhesive (double sided adhesive tape) or mechanical (screw fixing, frame fixing, bead fixing or clip fixing). Where mirrors are required, by AS 1288, to be Grade A safety glass, ordinary annealed glass may be substituted when the panel is fully backed by and completely adhered to a solid material. Mirrors with backing avoid the distortion problem associated with toughened mirror glass. In wet or moist areas the space behind the mirror should be either well ventilated or entirely sealed.

- Glass balustrades: Framed (post fixing) or frameless (side fixings), pocket fixing (size, set back from concrete, glazing and sealing material). AS/NZS 1170.1 (2002), clause 3.6 deals with imposed loads on barriers, including parapets, balustrades and railings.

- Glazed shower screens: Water shedding details, sliding assemblies.

0471 Thermal insulation and pliable membranes

- Location on plan and within the building element.

- Energy efficiency: Type, thickness and R-value for floors, walls, ceilings and roofs. See Energy Efficiency BCA (2022) H6, and check state and local council regulations.

- Pliable membranes: Note if acting as vapour permeable, vapour barrier, reflective thermal insulation or together in combination. In cool climates provide a vapour barrier on the warm side of bulk insulation.

- Slab edge insulation.

- Pipe insulation.

0511 Lining

- Material: Plasterboard, fibre cement, timber/plywood feature lining.

- Trims: Skirtings, cornices, architraves and picture rails.

0551 Joinery

- Layout and location: Kitchen, laundry, study, bedrooms.

- High moisture resistance materials: Plinths, carcasses, drawer fronts, shelves and doors.

- Finishes and colour: Carcass, bench tops, splashbacks, cupboards and internal surfaces.

- Benchtop details.

- Wardrobe carcasses and frames.

- Wardrobe doors and panels.

- Drawer and door hardware, including handles.

- Edge treatment to laminated panels and benchtops e.g. rolled edge or plastic edgestrip.

- Timber stairs and balustrades.

- Trim.

0572 Miscellaneous furniture, appliances and fixtures
- Kitchen appliances: Product selection, colour and connection details for dishwasher, wall oven, cook top, range hood, microwave.
- Laundry appliances: Product selection, colour and connection details for washing machine and dryer.
- All appliances: Compliance with Minimum Energy Performance Standards (MEPS).
- Bathroom fixtures: Towel rails, soap holders, toilet paper holder, handrails, clothes hooks and cabinets.
- General fixtures / appliances: Clothes line, letterbox, street number, door bell.

0611 Rendering and plastering
- Level of finish: See Guide to Standards and Tolerances.
- Material, substrate, thickness, joints.
- Finish: wood float (sandy finish), steel trowel (polished) and sponge (smooth textured).
- Cornices.
- Cornice cement.

0621 Waterproofing – wet areas
- Extent. To BCA (2022) H4D2.
- Membrane: Manufacturer and type.
- Shower tray: PVC, copper, stainless steel.

0631 Ceramic tiles
- Location.
- Tile layout.
- Falls
- Internal tile selection: Floors, skirtings, walls, dado.
- External tile selection: Slip resistance to A 4586 (2013).
- Grout: Type and colour.

0651 Resilient finishes
- Location.
- Tile layout
- Product and manufacturer.

0652 Carpets
- Location.
- Product and manufacturer.
- Underlay.
- Edge strip: Type, material and colour.
- Fixing method: Select from covers gripper, direct-stick, or double-bond systems.

0654 Multilayered board flooring
- Location.
- Product and manufacturer.

0655 Timber flooring
- Location.
- Species and manufacturer.
- Profile, width.
- Recycled timber flooring: If stained nail holes are unacceptable, specify remedial work such as coring and plugging with matching timber.

0656 Floor sanding and finishing
- Location.
- Product and manufacturer.

Guidance on the properties of coating systems is given in AS 4786.2 (2005) Appendix C. Advice on the properties include edge bonding, fume nuisance, darkening with age, flammability, wear resistance and gloss levels. Coating systems can be selected from the following groups: Oil based finishes, solvent based polyurethane finishes or water based finishes.

0671 Painting
Select your paint and supplier.
- External: Final coat paint type, finish (full, semi, low gloss or flat) and colour for fascias and barges, rainwater goods, eaves, cladding, shutters, balustrades and handrails, posts and beams and masonry.
- Windows and external doors: Final coat paint type, finish (full, semi, low gloss or flat) for internal, external and mouldings. Front and garage door panels and frames and windows.
- Internal: Final coat paint type, finish (full, semi, low gloss or flat) and colour: Room by room schedule for walls, ceilings, doors and frames and joinery.

0702 Mechanical design and install
So that the air conditioning systems can be adequately designed, the drawings should show:
- Preferences for heating and cooling systems (e.g. ducted, non-ducted split etc.) otherwise leave to the contractor's choice.
- The extent and performance (R-Values) of insulation for the walls roof and floor.
- The type, location and performance of windows.
- External shading of windows and intended type of internal shading (e.g. blinds, curtains).
- The preferred location of plant, otherwise leave to the contractor's choice.
- Any provisions for ducts (e.g. duct risers, roof spaces).
- Rooms requiring mechanical ventilation. The BCA requires that where its requirements for natural ventilation are not satisfied, mechanical ventilation must be provided. Identify areas requiring mechanical ventilation on the drawings. If local exhaust fans are required (e.g. for a bathroom), include the fans in Electrical design and install.
- The type of supply, return and exhaust grilles if there is a preference, otherwise leave to the contractor's choice.

It is recommended that the following be provided by tenderers for review before the mechanical tender is accepted:
- Outdoor design conditions, corresponding geographic location and source of data.
- Calculated total and sensible cooling capacities and heating capacity.
- Name of calculation method used.
- Makes and model numbers of proposed equipment.
- Compliance of proposed equipment with Minimum Energy Performance Standard (MEPS).
- Details and locations of controls.
- Total and sensible cooling capacities and heating capacity of the proposed equipment, adjusted for the specified outdoor and indoor conditions and any effects of the proposed plant configuration.
- Any assumptions on which the calculations are based (e.g. that the curtains will be closed at all times).
- Details of any departures from this specification.
- A drawing of the proposed duct, pipe and equipment layout showing proposed zoning.
- An explanation of why the proposed zoning has been chosen.
- Licence numbers and type of licences held by persons responsible for the installation.

Other matters:
- The AIRAH Residential Air Conditioning Best Practice Guideline for each State and Territory (available free from www.airah.org.au) sets out industry best practice guidelines for the selection, installation and maintenance of residential air conditioning units. The guideline addresses issues such as energy efficiency and air conditioner noise in a clear and concise manner.

- The plant should have at least 12 months defects liability and maintenance period to make sure it operates through the full range of cooling and heating seasons.

0802 Hydraulic design and install

The drawings should show:
- Cold water pipe material, otherwise leave to the contractor's choice. In bushfire prone areas, above - ground gas and water pipes, and pipes < 300 mm below ground are to be metal, not plastic.

- Heated water pipe material, otherwise leave to the contractor's choice.

- Mixing valves if required.

- Water heater location and details e.g. gas instantaneous, electric, and solar or heat pump. Include manufacturer, model/capacity and temperature control for thermostatic mixing valves and special taps.

- Cold and heated water: For insulation of heated water pipes see AS/NZS 3500.4 (2021) Sections 8 which require insulation only at the heater and between the heater and the kitchen sink, document additional insulation, if required. A maximum temperature of 50°C is required by AS/NZS 3500.4 (2021) at clause 1.11.2 for all personal hygiene sanitary fixtures. A maximum temperature of 60°C is recommended for kitchen sinks and laundry tubs. This can be achieved by adjusting tempering values, thermostats, regulating flow e.g. with thermostatic mixing valves, or by using special taps.

- Provisions for additional piping for connecting to irrigation, toilet flushing, laundry, swimming pool top-up and similar uses (if required and permitted).

- External hose cock locations.

- Stormwater detention (if required by local authority, and in addition to any rainwater storage).

- Sanitary plumbing and drainage layout including the location of the connection point to the Network Utility Operator's mains and/or rainwater tanks if required by local authority.

- Sanitary ware items, locations and tapware e.g. sinks, basins, baths, WC, shower trays, laundry tub.

- Location of other plumbed items e.g. dishwasher, washing machine.

- For WCS: P-trap or S-trap, dual or single flush, exhaust ventilation through cistern.

- For sinks and hand basins: Number of tap holes for each (0, 1, 2 or 3).

- Waste disposal unit, if required.

- Rainwater tank (if required): Size, material, location, connections, pump and what rainwater serves. Plastic tanks are not to be used in bushfire prone areas.

- Gas and water meter locations.

- Gas appliance connection points.

- Gas bayonet outlet locations.

- Greywater system (if required): Source of greywater (e.g. laundry), location of the greywater diversion devices, surge tanks and connections to intended use (e.g. irrigation system).

0902 Electrical design and install

- Switchboards: The Electricity Distributor's Service and Installations Rules defines further prohibited locations for switchboards and metering equipment.

- Telecommunications installation: Fees in respect of applications for electricity and telecommunications services are normally paid by the owner. Consider specifying as 'smart-wired'. See www.smartwiredhouse.com.au

- Accessory schedule: Type, function and location of socket outlets, light switches, dimmers, telephone outlet, data outlet, exhaust fans, circulating fans, and computer outlets.

- Luminaire schedule: Type, product selection, lamp type and location. The Australian Government has introduced a programme to eliminate low efficiency lamps, including incandescent and low voltage halogen reflector types.

- Smoke detection system: To BCA (2022) H3D6. Details of automatic 'back to base' alarms if required.

- Cable/satellite television network operator.

- Intruder alarm system. Method of arming/disarming and details of automatic action on alarm registering i.e. local or 'back to base' or auto dialler.

- Garage door operation.

- Home automation. Full details of location functionality and equipment selected.

TABLE OF CONTENTS

Make sure all subcontractors are aware of the requirements within *0180 Common Requirements*.

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0131 PRELIMINARIES

1 GENERAL

1.1 THE SITE

Occupied premises

General: For the parts of the site designated as occupied premises:
- 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, by such means as temporary screens.

Proposals: Submit details of proposed methods.
- Purpose of submission: For information.
- Timing of submission: Before commencement of work.

Reinstatement

Accessways and 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. Rectify immediately any obstruction or damage to such services and provide temporary services whilst repairs are carried out.
Trees and properties: Do not interfere with or damage trees and properties that are to remain on or adjacent to the site, including adjoining property encroaching onto the site. Rectify immediately any interference or damage to such trees and properties.

Existing services

Service to be continued: Repair, divert or relocate, 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.
Interruptions to services: Minimise the number and duration of interruptions.

1.2 BUILDING THE WORKS

Order of precedence of documents

Precedence: Requirements of the schedules and drawings override conflicting requirements in this reference specification.

Survey marks

Definition: A survey peg, benchmark, 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 owner's survey marks in their true positions.
Rectification: If the survey marks are disturbed or obliterated, immediately rectify.

Items supplied by owner

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

1.3 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.

0180 OMMON REQUIREMENTS

1 GENERAL

1.1 PRECEDENCE

General

Requirement: Conform to *0180 Common requirements*, as appropriate, in all worksections.
Schedules and drawings: Requirements of the schedules and drawings override conflicting requirements in this reference specification.
Order of precedence: If there is conflict or inconsistency between the worksections of this specification, the requirements of worksections take precedence over *0180 Common requirements*.

1.2 STANDARDS

Current editions

General: All referenced documents are the editions, with amendments, current on 1st March 2023.
Exception to current editions: If statutory requirements reference other editions or standards, conform to those other editions or standards.

1.3 INTERPRETATION

Abbreviations

General: For the purpose of this document the following abbreviations apply:
- BCA: National Construction Code Series Volume 2: Building Code of Australia Class 1 and Class 10 Buildings.
- NCC: National Construction Code.

Definitions

General: For the purposes of this specification, the following definitions apply:
- Contractor: Has the same meaning as builder and is the person or organisation bound to carry out and complete the work under the contract.
- Documented: Documented, as documented and similar terms mean contained in the contract documents.
- Hot-dip galvanized: Zinc coated to AS/NZS 4680 (2006) after fabrication with coating thickness and mass to AS/NZS 4680 (2006) Table 1.

- Metallic-coated: Steel coated with zinc or aluminium-zinc alloy by a continuous or specialised process.
- Owner: Owner has the same meaning as client, principal or proprietor and is the party to whom the contractor is legally bound to construct the works.
- Professional engineer: To NCC (2022) Schedule 1.
- Proprietary: Identifiable by naming manufacturer, supplier, installer, trade name, brand name, catalogue or reference number.
- Provide: Provide and similar expressions mean supply and install and include development of the design beyond that documented.
- Required: Required by the contract documents, the local council or statutory authorities.
- Supply: Supply, furnish and similar expressions mean supply only.

1.4 BUSHFIRE PRONE AREAS

General
Conformance: In areas designated as bushfire-prone, comply with statutory and local authority requirements.
Standard: To AS 3959 (2018).
Bushfire Attack Level (BAL): To AS 3959 (2018) and BCA (2022) H7D4, and as documented.

2 PRODUCTS AND MATERIALS

2.1 PROPRIETARY ITEMS

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

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

2.2 SUBSTITUTIONS

General
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.

2.3TIMBER

Acclimatisation
General: Acclimatise timber fitouts by stacking them for two weeks 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.

Unseasoned timber
General: If unseasoned timber is provided, or variation in moisture content is likely, make allowance for shrinkage, swelling and differential movement.
Durability
General: Provide timbers with natural durability appropriate to the conditions of use or preservative-treated timbers of equivalent durability.
Natural durability class of heartwood: To AS 5604 (2022).
Preservative treatment: To the AS/NZS 1604 series.
Minimum requirement: To the Natural and treated timber durability table.

Natural and treated timber durability table

Exposure	Natural timber	Treated timberRemarks	Required
	Required durability class to AS 5604 (2022)	hazard class to the AS/NZS 1604 series	
Inside, above ground. Completely protected from the weather. Well ventilated	Class 4	H1	Treated timber resistant to lyctids. Untreated timber must be protected from termites
Inside, above ground. Protected from wetting with nil leaching. Well ventilated	Class 3	H2	Treated timber resistant to borers and termites. Untreated timber must be protected with a finish
Above ground, exposed to weather. Periodic moderate wetting and leaching	Class 2	H3	Treated timber resistant to borers, termites and moderate decay. Applicable to weatherboards, fascias, pergolas (above ground), window joinery, framing and decking
In-ground	Class 1	H4 (Severe wetting and leaching)	Treated timber resistant to borers, termites and severe decay. Applicable to fence posts, greenhouses, pergolas (in-ground) and landscaping timbers
		H5 (Extreme wetting and leaching and/or critical uses)	Applicable to retaining walls, piling, house stumps, building poles, cooling tower fill

2.4 STEEL

Durability

General: Provide steel products protected from corrosion to suit the conditions of use.
Internal engineer designed steel members: Remove mill scale, rust, moisture and oil. Coat with a zinc phosphate primer to the manufacturer's instructions.
Built-in products below damp-proof course: Stainless steel 316 or engineered polymer.

Corrosion resistance

Atmospheric corrosivity category: As defined in AS 4312 (2019), the AS/NZS 2312 series and as documented.
Minimum external corrosion protection requirements for corrosive environments: Conform to BCA Volume 2.

Preparation and pre-treatment

Standard: To the AS 1627 series.

Galvanizing

General: Galvanize mild steel components (including fasteners) to AS/NZS 1214 (2016), AS 1397 (2021) or AS/NZS 4680 (2006), as appropriate, and in the following conditions:
- Exposed to weather.
- Embedded in masonry.
- Exposed to or in air spaces behind external leaves of masonry walls.
- In contact with chemically treated timber.

2.5 PROTECTIVE COATINGS

General

Environment: To AS 2312.1 (2014) clause 2.3.
Coating designation: To AS 2312.1 (2014) Table 6.3.

CCA (copper chrome arsenic) treated timber

Greasing: Before plcing bolts or other metal components in cntact with CCA-treated timber, paint contact surfaces or coat in grease or a bituminous coating.

Unseasoned timber

General: Do not fix in contact with steel framing without fully painting the contact surfaces of timber and steel.

2.6 FASTENERS

Self-drilling screws

Standard: To AS 3566.1 (2002).

2.7 VAPOUR BARRIER

General

Vapour barrier to slabs: To AS 2870 (2011) clause 5.3.3.
Minimum thickness: 0.2 mm.

2.8 DAMP-PROOF MEMBRANES

General (Damp-proof)

Damp-proof membrane: To AS 2870 (2011) clause 5.3.3.
Type: High impact resistant polyethylene film, minimum 0.2 mm thick. which has been pigmented and branded by the manufacturer.

3 EXECUTION

3.1 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 that are not documented as structural.

Concrete blockwork chasing table

Block thickness (mm)	Maximum depth of chase (mm)
19	35
0	25
14	20

0
90

3.2 MOISTURE CONTENT

Flooring

General: Do not start installation of flooring unless:
- Concrete substrate: The moisture content of the concrete has been tested to AS 1884 (2021) Appendix A and values in clause A3.1.2 and A3.1.3 have been obtained.
- Plywood substrates and timber flooring products: The moisture content has been tested to AS/NZS 2098.1 (2006) for plywood and AS/NZS 1080.1 (2012) for timber and values obtained as follows:

. Air conditioned buildings: 8 to 10%.
. Intermittently heated buildings: 10 to 12.5%.
. Unheated buildings: 12 to 15%.

3.3 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

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

3.4 FOOTPATH CROSSING

General

Requirement: Provide a footpath and kerb crossing to local authority requirements.

3.5 COMPLETION

General

Removal of temporary work, services and plant: Remove temporary work services and construction plant within 10 working days after occupation of the works.

Final cleaning: Remove rubbish and surplus material from the site and clean the works throughout including interior and exterior surfaces exposed to view. Vacuum clean carpeted and soft surfaces. Clean debris from the site, roofs, gutters, downpipes and drainage systems.
Samples: Remove non-incorporated samples, sample panels and prototypes.
Warranties: Register with manufacturers, as necessary, and provide copies of manufacturers' warranties.
Instruction manuals: Provide the manufacturers' instruction manuals.
Operation: Make sure moving parts operate safely and smoothly.
Surveyor's certificate: Provide a certificate that confirms that the work, including boundary fences, has been correctly located.
Services layout: Provide a plan that shows the location of underground services.
Authorities' approvals: Provide evidence of approval of the local authority or principal accredited certifier and statutory authorities whose requirements apply to the work.
Keys: Provide two keys for each set of locks keyed alike and two keys for each lock keyed to differ.

0184 TERMITE MANAGEMENT

1 GENERAL

1.1 STANDARDS

General
Standard: To AS 3660.1 (2014).
Termite caps, collars and sheeting
General: To AS 3660.1 (2014) Section 5.
Collars: To AS 3660.1 (2014) clauses 4.3.2.4.2 and 5.3.6.
Granular materials
Standard: To AS 3660.1 (2014) Section 6.
Termite management system notice
Signage: Permanently fix a durable notice in a prominent location to BCA (2022) H1D3(3).
Certification
Requirement: Submit installation certificate to AS 3660.1 (2014) Appendix A3.

0201 DEMOLITION

1 GENERAL

1.1 STANDARDS

Demolition
Standard: To AS 2601 (2001).

1.2 SUBMISSIONS

Records
Dilapidation record:
- Before demolition: Submit to each owner of each adjoining or adjacent property, a copy of the part of the record relating to that property and obtain their written agreement to the contents.
- Rectification work: Submit written acceptance of rectification works from the owner of each adjoining or adjacent property affected.

2 EXECUTION 2.1

SUPPORT

Temporary support
Existing buildings: Until permanent support is provided, provide temporary support for sections of existing buildings, or parts of buildings, being retained and which normally rely on support from work to be demolished.

2.2 PROTECTION

Encroachment
General: Prevent the encroachment of demolished materials onto adjoining property, including public spaces.
Weather protection
General: If walls or roofs are opened for alterations and additions, provide temporary covers to prevent water penetration. Provide covers to protect existing plant equipment and materials intended for re-use.
Security
General: If walls or roofs are opened for alterations or additions, provide security against unauthorised entry to the building.

2.3 DEMOLITION

Asbestos removal
Method: Use wet removal methods recommended in the Safe Work Australia Code of Practice - How to safely remove asbestos.
Dilapidation record
Purpose: Use the dilapidation record to assess the damage and rectification work arising from the demolition work.
Notice of completion
General: Give at least 5 working days' notice of completion of demolition so that adjoining or adjacent structures may be inspected following completion of demolition.

0221 SITE PREPARATION

1 EXECUTION

1.1 CONTROL AND PROTECTION

Erosion control
General: Plan and carry out the work so as to avoid erosion, contamination, and sedimentation of the site, surrounding areas, and drainage systems.
Dewatering
Requirement: Keep earthworks free of water. Prevent water flow over freshly laid work.

1.2 TREE PROTECTION

General

Protection: Protect from damage trees which are required to be retained. Provide a temporary fence or safety barrier if required by the local authority. Comply with local authority requirements for protection of trees.

Work near trees

Harmful materials: Keep the area within the dripline free of sheds and paths, construction material and debris.

Work under trees: Do not remove topsoil from, or add topsoil to, the area within the dripline of the trees.

1.3 SITE CLEARING

Extent

Requirement: Clear only areas to be occupied by works such as structures, paving, excavation, regrading and landscaping or other areas designated to be cleared.

Clearing and grubbing

Clearing: Remove everything on or above the site surface, including rubbish, scrap, grass, vegetable matter and organic debris, scrub, tree, timber, stumps, boulders and rubble.

Turf: Remove turf to a depth just sufficient to include the root zone.

Grubbing: Grub out stumps and roots over 75 mm diameter to a minimum depth of 500 mm below subgrade under buildings, embankments or paving, and 300 mm below the finished surface in unpaved areas. Backfill holes remaining after grubbing with sand material to prevent ponding of water. Compact the material t the relative density of the existing adjacent ground material.

Surplus material

Removal: Take possession of surplus material and remove it from the site.

Disposal

Spoil: Remove cleared and grubbed material from the site and dispose of legally.

0222 EARTHWORK

1 GENERAL

1.1 STANDARDS

General

Earthwork: To the recommendations of AS 3798 (2007).

1.2 INTERPRETATION

Definitions

General: For the purposes of this worksection the following definitions 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 m3 that cannot be removed until broken up by rippers or percussion tools.
- Site classification: To AS 2870 (2011).
- 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.

EXECUTION

2.1 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 (2007) clause 6.1.8.

2.2 EXCAVATION

Extent

Site surface: Excavate the site to the levels and profiles required for the documented structures, pavements, filling and landscaping. Make allowance for compaction, settlement or heaving.

Footings: Excavate to the required sizes and depths. Confirm that the foundation conditions meet the design bearing capacity.

Crawl space: Provide a clear space under timber or steel bearers:

- Minimum clearance: 400 mm.

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.
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
Utility services: Contact BEFORE YOU DIG AUSTRALIA to identify location of underground utility services pipes and cables.
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.

2.3 PREPARATION FOR FILLING

Preparation
Stripping: Prepare the ground surface before placing fill (including topsoil fill), ground slabs or load bearing elements to AS 3798 (2007) clause 6.1.5. Remove material that inhibits or prevents satisfactory placement of fill layers, loose material, debris and organic matter.

2.4 PLACING FILL

Placing fill
Placement: To BCA (2022) H1D4.
Layers: Place fill in near-horizontal layers of uniform thickness no greater than 150 mm after compaction, deposited systematically across the fill area.
Moisture content: Adjust the moisture content of fill during compactin to achieve the required density.
Base preparation for under slab vapour barrier or damp-proof membrane: Blind the surface with sufficient sand to cover any hard projections. Dampen the sand just before placing the vapour barrier.

0223 SERVICE TRENCHING

1 PRODUCTS

1.1 FILL MATERIALS

General
Backfill material: To AS 3798 (2007) clause 4.4, free from stones larger than 100 mm maximum dimension and as follows:
- Next to services: Do not place any particles greater in size than 25 mm within 150 mm of services.
- Under paved areas and within 4 m of structures: Coarse sand, controlled low strength material or fine crushed rock.
- In reactive clay: In sites classified M, M-D, H1, H1-D, H2, H2-D, E or E-D to AS 2870 (2011), re-use excavated site material at a moisture content within ± 1% of that of the adjoining in situ clay.

2 EXECUTION

2.1 EXCAVATING

Excavation
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.

2.2 TRENCH BACKFILL

General
Place fill: To AS 3798 (2007) clause 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.
Layers: Compact all material in layers not exceeding 150 mm compacted thickness. Compact each layer to the required relative compaction specified before starting the next layer.

2.3 SURFACE RESTORATION

General
Reinstatement: Reinstate existing surfaces removed or disturbed by trench excavation to match existing and adjacent work.

0242 LANDSCAPE - FENCES AND BARRIERS

1 PRODUCTS

1.1 TIMBER

Posts and rails
Hardwood: To AS 2082 (2007).
Softwood: To AS 2858 (2008).
Pickets and palings
Hardwood: To AS 2796.1 (1999) Section 8.
- Grade to AS 2796.2 (2006): Select.

Softwood: To AS 4785.1 (2002) Section 7.
Seasoned cypress pine: To AS 1810 (1995) Section 5.
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 to be used, provide details.

1.2 STEEL

Steel tubes

Posts, rails, stays and pickets: To AS/NZS 1163 (2016).
- Grade: C350L0.

Post and rail finish: Hot-dip galvanized.

1.3 COMPONENTS

Steel panel fencing

Steel framing: Zinc-coated or aluminium/zinc alloy coated steel to AS 1397 (2021).
Steel sheeting: Prepainted to AS/NZS 2728 (2013).

Timber fencing

General: Conform to the timber members in the

Timber fencing sizes table

Timber fencing sizes table

Member	Preservative treated soft wood picket (mm) paling/lap and cap (mm)	Preservative treated soft wood pine paling/lap and cap (mm)	Hardwood or cypress
Maximum height	1200	1800	1800
End/corner gate posts	90 x 90	100 x 100	125 x 125 or 100 x 100
Intermediate posts	90 x 90	140 x 45 or 100 x 75	125 x 50 or 100 x 75
Maximum post spacing	2400	2400/2700	2700*
Rails 70 x 40		* 75 x 50 or 100x 38	75 x 50 or 100x 38
Picket/paling size	70 x 19	75, 100 or 150* x 15	100 or 150* x 13
Capping -		125 x 35	100 x 50
Concrete footing size (diameter x depth)	300 x 600	300 x 600	300 x 600
Earth footing size (diameter x depth)	200 x 600	250 x 600	250 x 600
* Three rail fences only			

Gates

General: As documented.

Fencing for swimming pools

Design, construction and performance: To AS 1926.1 (2012).
Location of fencing for private swimming pools: To AS 1926.2. (2007)

2 EXECUTION 2.1

GENERAL

Installation

Requirement: Adopt local industry practices for set-out, clearing of vegetation, excavation, minimum footing size materials, components and erection.

0250 LANDSCAPE – GARDENING

1 GENERAL

1.1 STANDARDS

Soils

Site and imported topsoil: To AS 4419 (2018).
Composts, soil conditioners and mulches: To AS 4454 (2012).

2 PRODUCTS

.1 MATERIAL

Topsoil

Requirement: Topsoil containing organic matter, able to support plant life and free from stones, contaminants and weeds.
Source: If the topsoil of documented quality cannot be provided from material recovered from site, provide imported topsoil.

Turf

Description: Cultivated turf of even thickness, free from weeds and other foreign matter.
Supplier: A specialist grower of cultivated turf.

Plants

General: Provide plants in conformance with the local authority approval requirements.

3 EXECUTION 3.1

GENERAL

Weed eradication

Herbicide: Eradicate weeds using environmentally acceptable methods, such as a non-residual glyphosate herbicide in any registered formulae, at the recommended maximum application rate.

Watering

General: Comply with local restrictions.
Turf: Water immediately after laying turf until the topsoil is moistened to its full depth. Maintain moisture to this depth.
Planting: Water as required to maintain planting to the completion of the contract.

0271 PAVEMENT BASE AND SUBBASE

1 PRODUCTS

1.1 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.

2 EXECUTION

2.1 SUBGRADE PREPARATION

General

Requirement: Prepare the subgrade to *0222 Earthwork*.

2.2 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.

2.3 BASE AND SUBBASE COMPACTION

General

Construction operation: Compact each layer of fill to the required depth and density, as a systematic construction operation.

Minimum relative compaction table

Item description	Minimum dry density ratio (modified compaction) to AS 1289.5.2.1 (2017)
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.
Equipment: Use rollers appropriate to the materials and compaction requirements documented.

0274 CONCRETE PAVEMENT

1 GENERAL

1.1 STANDARDS

General

Specification and supply: To AS 1379 (2007).
Materials and construction: To AS 3600 (2018).
Residential pavements: To AS 3727.1 (2016).

Vapour barrier

Requirement: To AS 2870 (2011) clause 5.3.3.

Grading

General: Grade paving to even falls to drain away from buildings to drainage outlets without ponding.
Minimum fall for drainage:

- Vehicle traffic pavements: 1:40.
- Other pavements: 1:100.

0276 PAVING – SAND BED

1 PRODUCTS

1.1 MATERIALS

Concrete and clay pavers

Standard: To AS/NZS 4455.2 (2010).

Sand

Bedding and joint filling: Well-graded and free of deleterious materials such as soluble salts that may cause efflorescence.

Mortar

Mix proportions (cement:sand): 1:3.

2 EXECUTION 2.1

GENERAL

Preparation

General: Trim the subgrade to the required profile and to suit the thickness of pavers and sand bed. Compact to a firm, even surface.

Base course

General: Conform to *0271 Pavement base and subbase*.

Edge restraint

Perimeter: If not provided by other structures, provide edge restraints to bedding and units.
Type: Bed units in mortar at least 40 mm thick.
Drainage: Position edge restraint and pavers so that the tops of the pavers are slightly above the front edge of the edge restraint.

Bedding course

Preparation: Remove all loose material from the prepared base.
Geotextile: Place fabric between the base course and the bedding sand.
Bedding sand: Screed uncompacted sand over prepared base uniformly to achieve a 30 mm thick layer. Maintain sand at a uniform loose density and moisture content.

Grading
General: Grade paving to even falls to drain away from buildings to drainage outlets without ponding.
Minimum fall for drainage:
- Vehicle traffic pavements: 1:40.
- Other pavements: 1:100.

Laying
General: Lay pavers on the screeded sand bedding to the documented set-out and pattern.
Joints: 2 to 5 mm in width.
Cut courses: 50 mm minimum plan dimension. On footpaths and other linear elements, use at least two cut courses and maintain symmetry.
Compaction: Compact the sand bedding after laying paving units using a vibrating plate compactor and appropriate hand methods, and continue until lipping between adjoining units is eliminated.
Joint filling: Spread dry sand over the paving units and fill the joints by brooming. Carry out one or more passes with the vibrating plate compactor and refill the joints with sand. Repeat the process until the joints are completely filled.

0310 CONCRETE

1 GENERAL

1.1 STANDARDS

General
Formwork design and construction: To AS 3610.1 (2018).
Plywood formwork: To AS 6669 (2016).
Reinforced concrete construction: To AS 3600 (2018).
Specification and supply of concrete: To AS 1379 (2007).
Residential ground slabs and footings: To AS 2870 (2011).

Design
Formwork: The design of the formwork is the contractor's responsibility.

Vapour barrier or damp-proof membrane
Requirement: Conform to *0180 Common requirements.*

0331 BRICK AND BLOCK CONSTRUCTION

1 GENERAL

1.1 STANDARD

General
Materials and construction: To AS 4773.1 (2015) and AS 4773.2 (2015).

2 PRODUCTS 2.1

DURABILITY

General
Exposure environment: To AS 4773.1 (2015) clause 4.3.
Exposure locations: To AS 4773.1 (2015) clause 4.4.

2.2 MATERIALS

Masonry units
Standard: To AS/NZS 4455.1 (2008) and AS/NZS 4455.3 (2008).
Salt attack resistance grade: To AS 4773.2 (2015) Table 2.1.

Mortar materials
Sand: Fine aggregate with a low clay content, free from efflorescing salts and deleterious matter selected for colour and grading.
Mortar mixes: To AS 4773.1 (2015) Table 3.1.

2.3 BUILT-IN COMPONENTS

General
Durability class of built-in components: To AS 4773.1 (2015) Table 4.1.

Steel lintels
Angles and flats: Sizes to AS 4773.1 (2015) Table 12.2.
Cold-formed proprietary lintels: Designed to AS/NZS 4600 (2018).
Corrosion protection: To AS 2699.3 (2020).
Cutting: Do not cut after galvanizing.

Wall ties
Standard: To AS 2699.1 (2020).
Type: A.
Corrosion protection: To AS 2699.1 (2020).

Flashings and damp-proof courses
Standard: To AS/NZS 2904 (1995).

3 EXECUTION

3.1 GENERAL

Mortar mixing

General: Measure volumes accurately to the documented proportions. Machine mix for at least six minutes. If the initial set of the cement has taken place, discard the mortar. Do not retemper.

Storage and handling
Masonry units: Store above the surface of the ground and cover to prevent entry of rainwater and contaminants. Locate away from surface and ground water runoff.
Mortar materials: Protect from contamination and as follows:
- Sand: Store away from surface and ground water runoff and allow for free drainage of rainwater.
- Cement and lime: Store bags in a dry, under cover and above ground environment.

Bond
Type: Stretcher bond.

Minimum clearance for timber frame shrinkage
General: In timber framed masonry veneer construction, provide clearances to allow for long-term shrinkage of timber including at windows,

doors, thresholds, at the underside of eaves where the masonry and soffit meet and as follows:
- Single storey (slab on ground): 10 mm.
- Two storey (slab at lower floor): 32 mm.
- Additional clearance: Accommodate additional shrinkage of unseasoned floor timbers.

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 the minimum of cutting of masonry units.
Solid and cored units: Lay on a full bed of mortar. Fill perpends solid. Cut mortar flush.
Hollow units: Face-shell bedded: 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.

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.

Sills and thresholds

General: Solidly bed sills and thresholds and lay them with the top surfaces draining away from the building.
Minimum size of unit: Three quarters full width.

3.3 SUBFLOOR WORK

Access openings

General: In internal walls, provide door-width openings beneath doorways to give access to underfloor areas.

Air vent location

General: Provide air vents to give adequate cross ventilation to the space under suspended ground floors.

3.4 CAVITY WORK

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 loadbearing frame and 25 mm minimum between the masonry leaf and sheet bracing.

3.5 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 one course above. Project 10 mm beyond the external slab edge and turn down 45°.
- Masonry veneer construction: In the bottom course of the outer leaf, continuous horizontally across the cavity. Fastened to the inner frame 75 mm above floor level.
- Internal walls built off slabs on ground in the first course 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 areas that slope away from the wall.
- 50 mm above the finished paved or concreted areas that slope away from the wall and are protected from the direct effect of the weather.

Installation

General: Lay in long lengths. Sandwich damp-proof courses between mortar.
Laps: Lap full width at angles and intersections and at least 150 mm at joints.
Steps: Step as necessary, but not more than two courses per step for brickwork and one course per step for blockwork.

3.6 FLASHINGS

Location

General: Locate flashings as follows:
- Floors: Full width of outer leaf immediately above slab, continuous across cavity and up the inner face bedded in mortar, turned 30 mm into the inner leaf two courses above for brick and one course 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 one 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 on each side of the opening.
- Over lintels to openings in cavity walls: Full width of outer leaf immediately above the lintel, continuous across cavity, turned 30 mm into the inner leaf two courses above for brick and one course for block or turned up against the frame and fastened to it. Extend at least 150 mm beyond the ends of the lintels.

- At abutments with structural frames or supports: Vertically flash in the cavity from 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.
Pointing: Point up joints around flashings to fill voids.

Weepholes

Location: Provide 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.
Weephole guards: Provide insect barrier.

0342 LIGHT STEEL FRAMING

1 GENERAL

1.1 STANDARDS

General

Design, materials and protection: To AS/NZS 4600 (2018).
Residential and low-rise steel framing: To NASH-1 (2005) (National Association of Steel Housing) and NASH-2 (2014) Standard.

2 EXECUTION 2.1

GENERAL

Frame fabrication

Length: Cut members accurately to length so that they fit firmly against abutting members.
Service holes: If not pre-punched, form holes by drilling or punching, conforming to the requirements of NASH-2 (2014).
Swarf: Immediately remove swarf and other debris from cold-formed steel framing.

Prefabricated wall frames and trusses

Assembly: Factory assemble wall frames and trusses.
Bracing: Provide details of bracing.
Certification: Obtain certification from a professional engineer for the erected frames.
Protection: Protect from damage or distortion during storage, transport and erection. Provide temporary protection for members until permanent covering is in place

Site work

Requirement: On-site welded connections are not permitted.

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 to AS/NZS 3000 (2018): Required.

Protection

General: Restore coatings that have been damaged by welding or other causes. Thoroughly clean affected areas back to base metal and coat with a zinc rich organic primer.
Metal separation: Install lagging to separate non-ferrous service pipes and accessories from the framing.
Grommets: Provide grommets to isolate piping and wiring from cold-formed steel framing.
Site cut holes: Provide plastic bushes or grommets to site cut holes.

Decks and balconies

Attachment to external walls: To BCA (2022) H1D11.

Vermin barriers

Requirement: Provide vermin barriers as follows:
- Brick veneer barrier: Close nail steel galvanized wire mesh, with a maximum aperture of 10 mm, to the underside of the bottom plate of external stud walls, extending across the cavity for building into brickwork.

Anti-ponding boards

Standard: To AS 4200.2 (2017).

Fascia, valley and barge boards

Requirement: Fix fascia, valley gutter boards and barge boards in conformance with the manufacturer's recommendations.

0382 LIGHT TIMBER FRAMING

1 GENERAL

1.1 STANDARDS

General

Residential timber framed construction: To AS 1684.2 (2021), AS 1684.3 (2021) or AS 1684.4 (2010), as appropriate.
Nailplated roof trusses: To AS 1720.5 (2015).

2 EXECUTION 2.1

GENERAL

Fabrication

Length: Cut members accurately to length so that they fit firmly against abutting members.
Service holes: Form holes by drilling.

Prefabricated wall frames and trusses

Assembly: Factory assemble wall frames and trusses.
Bracing: Provide details of bracing.
Certification: Obtain certification from a professional engineer for the erected frames.
Protection: Protect from damage or distortion during storage, transport and erection. Provide temporary

protection for members until permanent covering is in place

Timber fasteners

Metal washers: Provide washers to the heads and nuts of all bolts and coach screws.
Connectors: Press connector plates fully into the frame members. Knots not permitted in plate area.

Joints

Requirement: Locate joints only over supports:
- Minimum bearing of bearers: 50 mm.
- Minimum bearing of joists: 30 mm.

Priming

Steel: Before fixing, prime steel which is not galvanized or metallic-coated.

Decks and balconies

Attachment to external walls: To BCA (2022) H1D11.

Vermin barriers

Requirement: Provide vermin barriers as follows:
- Brick veneer barrier: Close nail 10 mm galvanized steel wire mesh to the underside of the bottom plate of external stud walls, extending across the cavity for building into brickwork.
- External walls (not masonry veneer): Turn up at least 75 mm on the inside and tack. Project 10 mm beyond the external slab dge or dwarf wall and turn down at 45°.
- Walls of bathrooms, shower rooms and laundries: Turn up at least 150 mm on the wet side and tack to studs.

Damp-proof course

Requirement: Provide damp-proof courses under the bottom plate of stud walls built off slabs or masonry dwarf walls, as documented and as follows:

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 flashing across cavities and build into brickwork.

Anti-ponding boards

Standard: To AS 4200.2 (2017).

Fascia, valley and barge boards

Requirement: Fix fascia, valley gutter boards and barge boards.

0383 DECKING, SHEET AND PANEL FLOORING

1 GENERAL

1.1 STANDARDS

General

Timber flooring and decking: To AS 1684.2 (2021), AS 1684.3 (2021) or AS 1684.4 (2010), as appropriate.

Slip resistance

Classification: To AS 4586 (2013).

2 PRODUCTS

2.1 DECKING

New timber decking

Standard:
- Preservative-treated softwood to AS 4785.1 (2002) Section 4.
- Hardwood to AS 2796.1 (1999) Section 4.

Composite decking

General: Proprietary composite decking boards, as documented.

2.2 SHEET FLOORING

Plywood

Standard: To AS/NZS 2269.0 (2012).
Plywood certified formaldehyde emission level to AS/NZS 2269.0 (2012): Class E1.
Grading:
- urface grade: CD.
- Bond: Type A to AS/NZS 2754.1 (2016).

Durability: Preservative treatment to AS 1604.1 (2021) Table D1.

Particleboard

Particleboard: To AS/NZS 1860.1 (2017), Class 1.

Compressed fibre cement sheet

Standard: To AS/NZS 2908.2 (2000).
Category: Minimum 4.
Classification:
- External: Type A.
- Internal: Type B.

Autoclaved aerated concrete (AAC) panels

Standard: To AS 5146.1 (2015).
Accessories: To the manufacturer's recommendations for the AAC panel system.

3 EXECUTION

3.1 PREPARATION

Timber decking on steel joists

General: Screw fix seasoned battens to the steel joists so that their top surfaces are aligned.
- Batten size: Minimum 35 mm thick.
- Spacing of fasteners: Less than 600 mm.

3.2 FIXING DECKING

Timber decking

Standard: To AS 1684.2 (2021), AS 1684.3 (2021) or AS 1684.4 (2010) as appropriate.
Installation: Lay in long lengths with the ends of each board firmly butted to the next and firmly in contact with the joists. Stagger the end joints and locate them centrally over joists.
Minimum gap between edges of seasoned boards: 4 mm.
Minimum number of spans across support: 3.
Nailing:
- General: Make sure the boards are in contact with the joists at the time of nailing, particularly where boards are machine nailed. If nails are to be less than 10 mm from ends of boards, pre-drill nail holes 0 to 1 mm undersize.

- Top nailing: Double nail at each bearing with nails driven flush. Offset nails at intermediate fixings or skew nail 10° in opposite directions.

Sealing: Apply one coat of water repellent preservative and one coat of finish coat to top surface of joists and all surfaces of boards before fixing.

Installation: To manufacturer's recommendations.

Composite decking

3.3 FIXING SHEET FLOORING

Particleboard flooring

Installation: To AS 1860.2 (2006).

Plywood flooring

Installation: To AS 1684.2 (2021), AS 1684.3 (2021) or AS 1684.4 (2010), as appropriate.

Compressed fibre cement flooring

General: To manufacturer's recommendations.

Installation: Lay the length of the sheets at right angles to the joists. Stagger the end joints and locate centrally over joists. Apply adhesive to edges of sheets and firmly butt join together.

Minimum number of spans across supports: 2.

Fixing: Pre-drill screw holes with 1 mm clearance over screw diameter and countersink. Fix with corrosion-resistant countersunk screws.

Spacing of fasteners:

- Sheet edge and intermediate: Less than 450 mm.
- Corners and sheet edges: At least 12 mm from sheet edges and 50 mm from corners.

Wet area flooring: Stop screw heads with sealant.

3.4 AAC PANEL FLOORING

Standard

General: To AS 5146.3 (2018).

Subfloor

Requirement: Conform to AS 5146.3 (2018) Table 3.4 for maximum joist spacing.

Cutting

General: Do not cut panels, except in documented locations.

Cut edges: Protect exposed reinforcing with anti-corrosion agent to manufacturer's recommendations.

AAC panel installation

Requirement: Install panels to manufacturer's recommendations and as follows:

- Minimum end bearing length: Greater of 60 mm or span / 80.
- Minimum edge bearing length: 60 mm.
- Apply construction adhesive between the panels and the joists and screw fix the panels to the joists. Conform to AS 5146.3 (2018) Section 6.
- Progressively apply AAC adhesive to joints between adjacent panels.
- Fit panels snugly together to fully bed adhesive.

Control joints

Requirement: Provide minimum 10 mm wide control joints as follows:

- Spaced at maximum 8 m centres in floors up to 100 mm thick.
- Where AAC panels abut adjacent building elements.

Slip joints

General: Provide slip joints to allow for differential movement as documented.

Sealant

Locations: Install fire-resisting and acoustic sealant as documented and as follows:

- At all control joints.
- At services penetrations.

0421 ROOFING

1 PRODUCTS

1.1 COMPONENTS

Fasteners

Prefinished exposed fasteners: Finish with an oven baked polymer coating to match the roofing material.

Insulation spacers

Description: Proprietary spacer system to prevent excessive compression of insulation between roof sheeting and framing.

1.2 MATERIALS

Sheet metal roofing

Standard: To AS 1562.1 (2018).

Corrosion protection: To BCA (2022) H1D7(2).

Roof tiling

Standard: To AS 2049 (2002).

Accessories: Compatible with the tiles and necessary to complete the tiling.

Plastic sheet roofing

Unplasticised polyvinyl chloride (PVC-U) sheet: To AS 4256.2 (2006).

Glass fibre reinforced polyester (GRP) sheet: To AS 4256.3 (2006).

Polycarbonate: To AS 4256.5 (2006).

Skylights

Standard: To AS 4285 (2019).

Skylights (roof lights) in bushfire-prone areas: To AS 3959 (2018).

Roof windows

Standard: To AS 4285 (2019).

Type: A proprietary window system for non-vertical installation in roofs pitched greater than 15° and less than 90°.

Roof windows (roof lights) in bushfire-prone areas: To AS 3959 (2018).

Roof ventilators

Description: A proprietary roof ventilator system, including framing, fixing, trim, seals, accessories and flashings.

Finish: Match adjacent roofing.

Roof plumbing goods

Standard: To AS/NZS 3500.3 (2021).

Flashing and capping

Standard: To AS/NZS 2904 (1995).

2 EXECUTION

2.1 GENERAL

Installation

General: To the manufacturer's recommendations.
Sheet metal roofing: To AS 1562.1 (2018).
Roof tiling: To AS 2050 (2018).
Plastic sheet roofing: To AS 1562.3 (2006).

Ventilation of roof space

General: To BCA (2022) H4D9.

2.2 ROOF PLUMBING

Jointing sheet metal rainwater goods

Sealing: Seal fasteners and mechanically fastened joints. Fill the holes of blind rivets with silicone sealant.

Flashings and cappings

Upstands: Flash projections above or through the roof with two part flashings consisting of an apron flashing and an over-flashing, with at least 100 mm vertical overlap. Provide for independent movement between the roof and the projection.
Wall abutments: Provide overflashings where a roof abuts a wall, provide as follows:
- In masonry, 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, sloping inward across the cavity and fixed to or built in to the inner leaf at least 75 mm above.

Gutters

Minimum slope of eaves gutters: 1:200.
Minimum width overall of valley gutters: 400 mm.
Eaves gutter overflow measures: To BCA (2022) H2D6.

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.
Downpipe support: Provide supports and fixings for downpipes.

0431 CLADDING

1 PRODUCTS

1.1 MATERIALS

Autoclaved aerated concrete (AAC) panels

Requirement: Proprietary AAC panels.
Standard: To AS 5146.1 (2015).
Joint adhesive: Proprietary adhesive to manufacturer's recommendations.
Control joints: At all external and internal corners, adjacent to all openings and at maximum 6 m centres.

Fibre cement (FC) planks

Requirement: Proprietary system of single faced fibre cement building planks.
Standard: To AS/NZS 2908.2 (2000). Type A Category 3.
Plank thickness: 7.5 mm.
Joints and edges: PVC-U extrusion.
Corners: Preformed metal joining pieces.

Fibre cement (FC) sheets

Standard: To AS/NZS 2908.2 (2000).
Cladding, eaves and soffit linings: Type A Category 3.
Compressed cladding: Type A Category 5.
Sheet cladding: A proprietary system of single faced fibre cement sheets:
- Arrangement: Set out in even panels with joints coinciding with framing.
- Sheet thickness: 6 mm.
- Joints, corners and edges: PVC-U extrusion.

Eaves lining: Single faced fibre cement:
- Sheet thickness: 4.5 mm.
- Joints: PVC-U extrusion.

Hardboard planks

Requirement: Proprietary wet process fibreboard planks.
Standard: To AS/NZS 1859.4 (2018).
Classification: Exterior.
Plank thickness: 9.5 mm.
Joints and edges: PVC-U extrusions.
External corners: Preformed metal joining pieces.
Internal corners: Scribe.

Plastic sheets

Requirement: Proprietary plastic sheets.
Unplasticised polyvinyl chloride (PVC-U) sheet: To AS 4256.4 (2006).
Glass fibre reinforced polyester (GRP) sheet: To AS 4256.3 (2006).
Polycarbonate: To AS 4256.5 (2006).

Profiled sheet metal

Standard: To AS 1562.1 (2018).

1.2 COMPONENTS

Flashing material

Standard: To AS/NZS 2904 (1995).

2 EXECUTION

2.1 GENERAL

Cladding

Installation: To the manufacturer's recommendations.

0451 WINDOWS AND GLAZED DOORS

1 GENERAL

1.1 STANDARDS

General

Selection and installation: To AS 2047 (2014).

Glazing

Glass type and thickness: To AS 1288 (2021), if no glass type or thickness is nominated.
Quality requirements for cut-to-size and processed glass: To AS/NZS 4667 (2000).

2 PRODUCTS

2.1 GENERAL

Glass

Safety glass: To AS/NZS 2208 (1996).

Aluminium frame finishes

Powder coating: To AS 3715 (2002).

Anodising: To AS 1231 (2000):
- Thickness:

. Internal: 15 microns.

. External: 20 microns.

Flashings

Standard: To AS/NZS 2904 (1995).

Window labelling and certification

Requirement: To AS 2047 (2014) Section 8.

Protection of openable windows

Fall prevention: To BCA (2022) H5D3.

Testing: To AS 5203 (2016).

2.2 COMPONENTS

Aluminium framed screens: Aluminium extruded or folded box frame sections with mesh fixing channel, mitred, staked and screwed at corners. If necessary to adapt to window opening gear, provide an extended frame section.
- Mesh: Bead the mesh into the frame channel with a continuous resilient gasket, so that the mesh is taut and without distortion.

Insect screens

Bushfire screens and seals

Protection: Protect glazed windows and doors from the ingress of embers.

Standard: T AS 3959 (2018).

Security window grilles

Standard: To AS 5039 (2008).

Installation: To AS 5040 (2003).

2.3 HARDWARE

Hardware documented generically

General: Provide hardware of sufficient strength and quality to perform its function, appropriate to the intended conditions of use, compatible with associated hardware, and fabricated with fixed parts firmly joined.

3 EXECUTION

3.1 INSTALLATION

Preglazing

Window assemblies and glazed doors: Supply inclusive of glazing, shop preglazed.

Weatherproofing

Flashings and weatherings: Install flashings, weather bars, threshold plates, drips, storm moulds, joint sealant and pointing to prevent water from penetrating the building between frames and the building structure under prevailing service conditions, including normal structural movement of the building.

Fixing

Packing: Pack behind fixing points with durable full width packing.

Prepared masonry openings: If fixing of timber windows to prepared anchorages is by fastening from the frame face, conceal the fasteners by sinking the heads below the surface and filling the sinking flush with a material compatible with the surface finish.

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.

0453 DOORS AND ACCESS PANELS

1 PRODUCTS

1.1 DOOR FRAMES

Aluminium frames

Construction: Assembled from aluminium sections, including accessories such as buffers, pile strips, strike plates, fixing ties or brackets and cavity flashing, with provision for fixing documented hardware and seals.

Timber frames

Hardwood: To AS 2796.1 (1999).
- Grade: Select.

Softwood: To AS 4785.1 (2002).
- Grade: Select.

Joints:

- Morticed head and through tenons.

- Trenched head:

. Bare faced tenons on jambs.

. Full let-in jambs.

Construction: Assembled from timber sections, with provision for fixing documented hardware including rebates for door seals, where documented.

1.2 DOORS

General

Doors: Proprietary products manufactured for interior or exterior applications and for the finish required.

Flush panel doors

General: Provide flush panel doors of balanced construction.

Tolerances

Standard: To AS 2688 (2017) clauses 4.1 and 5.3.

Security screen doors

Standard: To AS 5039 (2008).

Bushfire screens and seals

Protection: Protect glazed windows and doors from the ingress of embers.

Standard: To AS 3959 (2018).

1.3 SLIDING INTERNAL DOORS

Face mounted

General: Provide overhead track supports and head and jamb linings appropriate to the arrangement of the door, and removable pelmets at the head to allow access to the wheel carriages for adjustment.

Wheel carriages: Fully adjustable precision ball race type providing smooth, quiet operation.

Cavity sliding

Door assemblies: 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.

1.4 ANCILLARY MATERIALS

Flashings

Standard: To AS/NZS 2904 (1995).

2 EXECUTION

2.1 GENERAL

Security screen doors

Installation: To AS 5040 (2003).

Ceiling access

General: Trim an opening and provide a loose access panel of minimum size 600 x 400 mm.

Under floor access

Requirements: Provide a frame and a door, minimum size 620 mm wide x 600 mm high, complete with padbolt.

Priming

General: Prime timber door leaves on top and bottom edges before installation.

2.2 FRAMES

Timber frames

Building into masonry: Screw galvanized steel brackets twice to jambs and build in.

Fixing to masonry openings: 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.

Heads of fasteners: Conceal where 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. Install to make neat and clean junctions between the frame and the adjoining building surfaces.

Weatherproofing

Flashings and weatherings: Install flashings, weather bars, threshold plates, 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.

0454 OVERHEAD DOORS

1 GENERAL

1.1 STANDARD

General

Garage doors: To AS/NZS 4505 (2012).

0455 DOOR HARDWARE

1 PRODUCTS

1.1 COMPONENTS

Hinges

Requirement: Provide 3 hinges for external doors and door leafs over 2040 mm in height and 600 mm in width. Conform to the Hinges table

Hinges table

Size of door (mm leaf)	Number of hinges (per door leaf)	Size of hinges x mm) (steel)
2040 x 920	3	100 x 75 x 2.5 mm
2040/2400 x 1020	4	100 x 100 x 2.5 mm

Locksets

External doors: Push-button key and knob set and a double-cylinder dead bolt to each door.

Internal doors:

- Generally: Passage sets.
- Bathrooms, showers and toilets: Privacy sets.
- Sliding patio doors and windows: Key-lockable surface mounted bolts.

Keying

Requirement: Key doors (excluding garage doors) alike and key windows alike.

2 EXECUTION

2.1 INSTALLATION

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.
- Including the necessary templates, accessories, fixings and fixing instructions.

Mounting height

Door lockset mounting heights: 1000 mm above finished floor to centreline of spindle.

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.

0467 GLASS COMPONENTS

1 GENERAL

1.1 SUBMISSIONS

Certification
Barrier design: Submit a professional engineer's certificate confirming conformance with AS/NZS 1170.1 (2002) clause 3.6.
Sealant compatibility: Submit statements from all parties to the installation certifying the compatibility of sealants and glazing systems to all substrates.

2 PRODUCTS 2.1

MIRRORS

Reflective surface
Type: Silver layer deposited on the glass or glazing plastic.
Protective coatings: Electrolytic copper coating at least 5 microns thick, and 2 coats of mirror backing and edge sealing paint having a total dry film thickness of at least 50 microns.

Safety glass mirrors
Type: Grade A safety glass to AS 1288 (2021).

Safety compliance: To AS/NZS 2208 (1996).

2.2 SHOWER SCREENS

Type

General: Proprietary system comprising frames of extruded aluminium, stainless steel, or PVC-U, assembled around safety glass to form fixed panels and sliding, hinged or pivoted doors.
Glass: To AS 1288 (2021) clause 5.8.

2.3 GLASS BARRIERS

Glass barrier systems
Requirement: To AS 1288 (2021) Section 7.
Glass: Grade A safety glass.

0471 THERMAL INSULATION AND PLIABLE MEMBRANES

1 GENERAL

1.1 INTERPRETATION

Definitions
General: For the purposes of this worksection the following definition applies:
- Pliable building membrane: To AS 4200.1 (2017) and equivalent to sarking-type materials as defined in the NCC.

2 PRODUCTS

2.1 MATERIALS

Thermal insulation
General: To AS/NZS 4859.1 (2018).
Pliable building membrane
Standard: To AS 4200.1 (2017) and BCA (2022) H6D2(1)(b)(i).

3 EXECUTION

3.1 GENERAL

Thermal insulation
Standard: To AS 3999 (2015) and BCA (022) H6D(1)(b)(i).
Pliable building membrane
Standard: To AS 4200.2 (2017) and BCA (2022) H6D2(1)(b)(i).

3.2 FLOORS

Under suspended framed floors
Fibre batts: Fit tightly between framing members. If other support is not provided, staple nylon twine to the framing and stretch tight.
Below concrete slab on ground
Rigid cellular insulation boards:
- Laying pattern: Stretcher bond, with edges tightly butted.
- Damp-proof membrane: Lay over insulation.

3.3 WALLS

Framed walls
Fibre batts: Friction fit between framing members. If other support is not provided, staple nylon twine to the framing and stretch tight.
Thermal break strips: To steel or timber framing with lightweight external cladding:
- Screw fixing: Button head screws at 1 m centres.
- Adhesive fixing: Wallboard adhesive walnuts at 1 m centres.

Vapour permeable (breathable) membrane
Requirement: Provide a vapour permeable membrane behind the external facing material that does not provide permanent weatherproofing or that 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.

3.4 CEILINGS

Framed ceilings

Fibre batts: Fit tightly between framing members.

3.5 ROOFS

Metal roofs

Fibre batts: Fit tightly between framing members.
Fibre 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 fibre blanket and reflective insulation: Lay facing reflective insulation face downward.
Thermal break strips: Provide to steel framing supporting sheet metal roofing.

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 presure sensitive adhesive tape.

0511 LINING

1 GENERAL

1.1 STANDARDS

Plasterboard

Standard: To AS/NZS 2588 (2018).

Fibre cement

Standard: To AS/NZS 2908.2 (2000).

Wall and ceiling linings: Type B, Category 2.
Minimum thickness: 4.5 mm.

2 EXECUTION

2.1 SHEET LINING

Installation

Gypsum plasterboard: To AS/NZS 2589 (2017).

Supports

General: Install timber battens or proprietary cold-formed galvanized steel furring channels as follows:
- Where framing member spacing exceeds the recommended spacing.
- Where direct fixing of the 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 to support fixtures.

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.
Control joints: Provide purpose-made metallic-coated control joint beads at not more than 12 m centres in plasterboard linings or 7.2 m centres in fibre cement lining 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.

0551 JOINERY

1 PRODUCTS 1.1

MATERIALS

Certification

Timber based products: Label panels under the authority of a recognised certification scheme applicable to the product. Locate the brand on faces or edges that will be concealed in the works.
Plywood certified formaldehyde emission class to AS/NZS 2270 (2006) and AS/NZS 2271 (2004): E1.
Reconstituted wood-based panel certified formaldehyde emission class to AS/NZS 1859 series: E1.

Joinery timber

Hardwood for trim: To AS 2796.1 (1999).
Hardwood for furniture: To AS 2796.3 (1999).
Seasoned cypress pine: To AS 1810 (1995).
Softwood for trim: To AS 4785.1(2002).
Softwood for furniture: To AS 4785.3 (2002).
Finished sizes for milled timber: Not less than the documented dimension 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 (2006).
Interior use, exposed to moisture: To AS/NZS 2271 (2004).

Wet process fibreboard (including hardboard)

Standard: To AS/NZS 1859.4 (2018).

Particleboard

Standard: To AS 1859.1 (2017).

Dry process fibreboard (including medium density fibreboard)

Standard: To AS/NZS 1859.2 (2017).

Decorative overlaid wood panels

Standard: To AS/NZS 1859.3 (2017).

High pressure decorative laminate (HPDL) sheets

Standard: To AS/NZS 2924.1 (1998).
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.

HPDL sheet application table

Class to AS/NZS 2924.1 (1998)	Application
HGS or HGP	Kitchen work-tops
VGS or VGP	Kitchen front panels
VLS	Other vertical locations

1.2 JOINERY ASSEMBLIES

General

Standard: To AS 4386 (2018).

1.3 WARDROBE, CUPBOARD AND DRAWER UNITS

Plinths, carcasses, drawer fronts, shelves and doors

Material: Select from the following:
- Overlaid high moisture resistant particleboard.
- Overlaid high moisture resistant medium density fibreboard.

Thickness: 16 mm.

Adjustable shelves: Support on proprietary pins in holes bored at equal spacing of 32 mm centres vertically.
Fasteners: Conceal with finish.
Drawer fronts: Rout for drawer bottoms.

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.

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.

Hardware

Requirement: Provide details of handles and locks.

1.4 WORKING SURFACES

Laminated benchtops

Material: High moisture-resistant particleboard or medium density fibreboard.
Finish: High pressure decorative laminate sheet.
Exposed edges: Extend laminate over shaped nosing, finishing more than 50 mm back on underside. Splay outside corners at 45°.
Minimum thickness: 32 mm.
Balance underside: Extend laminate to the undersides of benchtops if subject to excessive moisture from equipment such as dishwashers.

Stone or engineered stone benchtops

General: Provide stone or engineered stone slabs within the visual range of the approved samples.

Splashbacks

Glass: 6 mm toughened colourback glass to AS/NZS 2208 (1996).
Stainless steel: Type 304, No. 4 finish.

2 EXECUTION 2.1

JOINERY

General

Joints: Provide materials in single lengths where possible. If joints are necessary, make them over supports.
Framing: Frame and trim where necessary for openings, including those required by other trades.

Fasteners

Installation: Secure plinths and carcasses to floors, walls, or both at not more than 600 mm centres.
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.

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.
Edge strips: Finish exposed edges of sheets with edge strips that match sheet faces.

Benchtops

Stone benchtops: Repair mud veins or lines of separation that are integral to the selected pattern with resin fillers and back lining.
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, that matches the finish colour.

Glass splashbacks

Adhesive: Fix with non-acidic silicone adhesive. Apply at the rate recommended by the manufacturer.
Installation: Clean the back of the glass panel and apply walnuts of adhesive together with double sided adhesive tape for temporary support, and affix directly to the substrate.

2.2 TRIM

General

Requirement: Provide timber or medium density fibreboard trim, such as architraves, beads, mouldings and stops, and skirtings to make neat junctions to openings and between components, finishes and adjacent surfaces.
Proprietary items: Provide complete with installation accessories.

Fixing

To masonry walls: Wall plugs at 600 mm centres, maximum.
To stud walls: Nail to plate or framing at 600 mm centres, maximum.

0572 MISCELLANEOUS FIXTURES AND APPLIANCES

1 PRODUCTS

1.1 COMPONENTS

General

Requirement: Provide kitchen and laundry appliances, and bathroom and other fixtures as documented.

1.2 PROPRIETARY STAIR SYSTEM

General

Materials, design and construction: To BCA (2022) H5D2.
Balustrades: To BCA (2022) H5D3.
Requirement: Provide details of stairs, including proposed finishes, before fabrication and/or construction.

0611 RENDERING AND PLASTERING

1 PRODUCTS

1.1 MATERIALS AND COMPONENTS

Aggregates

Sand: Fine, sharp, well-graded sand with a clay content between 1% and 5% and free from efflorescing salts.

Cement

Standard: To AS 3972 (2010).
Type: GP.

Lime

Limes for building: To AS 1672.1 (1997).

Mixes

General: Select a mix proportion to suit the conditions of application.
Measurement: Measure binders and sand by volume using buckets or boxes. Do not allow sand to bulk by absorption of water.
Plaster mixing: Machine mix for 3 to 6 minutes.
Strength of successive coats: Make sure successive coats are no richer in binder than the coat to which they are applied.

Mix proportion table - Cement render, by volume

Mix type	Substrate		Upper and lower limits of proportions by volume		
			Cement	Lime	Sand
- Single or multi-coat systems with integral finishing treatments - Base coats in multi-coat systems with cement or gypsum finishes	CRS	Dense and smooth concrete and masonry	1	0 0.5	3 4.5
	CRM	Regular clay or concrete masonry	1 1	0.5 1	4.5 6
	CRW	Lightweight concrete masonry and other weak substrates	1 1	1 2	6 9
Second coat - internal	CRF Second	Cement render base cots	1	1 2	6 9
coat - external	CRF	Cement render base coats	1	1 2	5 6

Lath

General: Provide a proprietary product for use with plaster.
Internal: Expanded metal to AS 1397 (2021) coating class Z350, minimum.
External: Stainless steel or PVC-U.

Beads

General: Provide a proprietary product for use with plaster.
Internal: Metallic-coated sheet AZ 150, minimum.
External: Stainless steel or PVC-U.

Water

General: Clean and free from any deleterious matter.

2 EXECUTION

2.1 PREPARATION

Substrates

General: Prepare substrates as follows:
- Clean and free from any deposit or finish that may impair adhesion of render or plaster.
- If framed or discontinuous, support members in full lengths without splicing.
- If solid or continuous, remove excessive projections and fill voids and hollows with render or plaster stronger than the first coat and not weaker than the substrate.

Absorbent substrates: If suction is excessive, control it by dampening but avoid over-wetting. Do not render or plaster substrates showing surface moisture.
Dense concrete: If not sufficiently rough to provide a mechanical key, roughen to remove 2 mm of the laitance and expose the aggregate then apply a bonding treatment.
Painted surfaces: Remove paint and hack the surface at close intervals.
Untrue substrates: If the substrate is not sufficiently true for conformity with the thickness limits for the render or plaster system, or has excessively uneven suction resulting from variations in the composition of the substrate, apply additional coats without exceeding the thickness limits for the substrate or system.

Beads

Location: Fix beads as follows:
- Angle beads: At all external corners.
- Drip beads: At all lower terminations of external render.
- Beads for control of movement: At all control joints.
- Stop beads: At all terminations of render or plaster and junctions with other materials and render or plaster systems.

Joints in beads: Provide dowels to maintain alignment.
Mechanical fixing to substrate: ≤ 300 mm centres.

Bonding treatment

General: If bonding treatment is required to the substrate, throw a wet mix onto the substrate. Mix proportions to the following:
- Cement render (cement:sand): 1:2.
- Gypsum plaster (gypsum:sand): 1:2.

Curing: Cure as follows:
- Keep continuously moist for 5 days or more and allow to dry before applying plaster coats.
- Protect cement render from direct sun and drying winds for at least 16 hours after application.

Thickness: ≥ 3 < 6 mm.

Embedded items

General: If there are water pipes and other embedded items, sheath them to allow for thermal movement.

Lath

Location: Provide lath as follows:
- Chases: If chases or recesses are 50 mm wide or greater, fix lath extending 75 mm or more beyond each side of the chase or recess.
- Masonry and concrete substrates: If mechanical key cannot be attained by scabbling and bonding, fix lath.
- Metal and other non-porous backgrounds: Fix lath to provide a key.

Weepholes

Requirement: Keep opening free of render. Maintain consistent opening size.

2.2 APPLICATION

Control joints

General: Provide joints in the finish to coincide with control joints in the substrate. Make sure that the

joint in the substrate is not bridged during rendering or plastering.
Size:
- Depth: Extend the joint right through the render or plaster and reinforcement to the substrate.
- Width: 3 mm, or the same width as the substrate joint, whichever is greater.

Damp-proof courses: Do not continue render or plaster across damp-proof courses.
Rendering or plastering on lath: Provide control joints to divide the rendering or plastering area into rectangular panels 10 m2 or less.
V-joints: Provide V-joints, cut right through the render or plaster to the substrate, at the following locations:
- Abutments with metal door frames.
- Abutments with other finishes.
- Junctions between different substrates.

Tolerances

General: Finish plane surfaces within a tolerance of 6 mm in 2400 mm, determined using a 2400 mm straightedge placed anywhere in any direction. Finish corners, angles, edges and curved surfaces within equivalent tolerances.

Render and plaster thickness table

Substrate	Rende and plaster, total thickness of single or multi-coat work (mm)
Brickwork and blockwork	12 min
Lightweight concrete and blocks	12 min
Metal lath measured from the face of the lath.	18 min

Curing

General: Prevent premature or uneven drying out and protect from the sun and wind.
Keeping moist: If a proprietary curing agent is not used, keep the render or plaster moist as follows:
- Base coats and single coat systems: Keep continuously moist for 2 days and allow to dry for 5 days before applying further render or plaster coats.
- Finish coats: Keep continuously moist for 2 days.

0621 WATERPROOFING - WET AREAS

1 GENERAL

1.1 STANDARDS

Waterproofing wet areas

Standard: To AS 3740 (2021).

2 PRODUCTS

2.1 PRODUCTS

Membranes

Standard: To AS/NZS 4858 (2004).

Membrane system

Requirement: Proprietary membrane system suitable for the intended internal waterproofing.

Shower tray

General: Purpose-made jointless shower tray, with wall upstands at least 50 mm higher than the hob upstands. Set hob on the inside of the tray upstands.

3 EXECUTION

3.1 PREPARATION

Substrates

General: Prepare substrates as follows:
- Clean and remove any deposit or finish that may impair adhesion of membranes.
- If walls or floors are framed or discontinuous, make sure support members in full lengths without splicing.
- If floors are solid or continuous remove excessive projections and fill voids, hollows and cracks.

Concrete substrates: Cure for at least 28 days.

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.

3.2 INSTALLATION

Ambient conditions

Requirement: Do not install in conditions outside the manufacturer's recommendations.

Protection

Damage: Protect membrane from damage during installation and for the period after installation until the membrane achieves its service characteristics that resist damage and an overlaying finish is installed.

Extent of waterproofing

Waterproof or water resistant surfaces: To the requirements of BCA (2022) H4D2.

Drainage connections

Floor wastes: Turn membrane down 50 mm minimum into the floor waste leak control flanges and adhere to form a waterproof connection.

Vertical membrane terminations

Upstands:
- Shower areas with hobs and step-downs: Minimum 150 mm above the finished tile level of the shower area or 25 mm above the maximum retained water level, whichever is the greater.
- Shower areas without hobs: Minimum 150 mm above the highest finished tile level of the floor within the shower area.

Anchoring: Secure sheet membranes along the top edge.
Edge protection: Protect edges of the membrane.
Waterproofing above terminations: Waterproof the structure above the termination to prevent moisture entry behind the membrane using tiler's angle and finish overlaps.

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.

Showers with hobs

Masonry or concrete hob: Extend membrane over the hob and into the room at least 50 mm.
Metal hob: Provide metal angle with height at least 15 mm above the finished floor level of the floor outside the shower. Terminate the membrane within 5 mm from the top of the angle. Seal the gap between the shower screen and the angle.

Unenclosed showers

Requirement: Extend membrane at least 1500 mm into the room from the shower rose outlet on the walls and floor.

Curing of liquid membrane systems

General: To the manufacturer's recommendations.
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.
Bonded or partially bonded membrane: If the topping or bedding mortar is to be bonded to the membrane, provide sufficient control joint in the topping or bedding mortar to reduce the movement over the membrane.

3.3 COMPLETION

Protection

General: Keep traffic off membrane surfaces until bonding has set or for 24 hours after laying, whichever period is the longer.

Reinstatement

Extent: Repair or replace faulty or damaged work. If the work cannot be repaired satisfactorily, replace the whole area affecte.

0631 CERAMIC TILING

1 GENERAL

1.1 STANDARDS

Tiling

General: Conform to the recommendations of AS 3958.1 (2007).

Slip resistance

Stair treads, ramps and landings: Classification to AS 4586 (2013).

2 PRODUCTS 2.1

MATERIALS

Adhesives

Standard: To AS ISO 13007.1 (2020).
PVA (polyvinyl acetate)-based adhesives: Do not use in wet areas or externally.

Mortar materials

Cement type to AS 3972 (2010): GP.
Sand: Fine aggregate with a low clay content selected for grading, sharp and free from efflorescing salts.

Bedding mortar

Mix proportion (cement:sand), by volume: Select proportions from the range 1:3 to 1:4 for satisfactory adhesion. Provide minimum water.

Water

General: Clean and free from any deleterious matter.

Grout

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.
Pigments for coloured grout: Colourfast fillers compatible with the grout material. For cement-based grouts, provide lime-proof natural or synthetic metallic oxides compatible with cement.

3 EXECUTION

3.1 APPLICATION

Preparation of substrate

General: Conform to the following:
- Clean off any deposit or finish that may impair adhesion or location of tiles.
- Compatible with all components of floor system.

Floor finish dividers

General: Finish tiled floors at junctions with differing floor finishes with a corrosion-resistant metal dividing strip fixed to the substrate. If changes of floor finish occur at doorways, make the junction directly below the closed door.

Bath ventilation

General: If required, ventilate the space below fully enclosed baths with at least 2 vermin proofed ventilating tiles.

Falls and levels

General: Grade floor tiling to even and correct falls generally and to floor wastes and elsewhere as required. Make level junctions with walls. If falls are not required, lay level.
Fall: Conform to falls as documented and the following:
- Falls to floor wastes: 1:80 minimum.
- Continuous fall of floor plane to floor waste: 1:50 maximum.

Change of finish: Maintain finished floor level across changes of floor finish including carpet.

Sealant joints

General: Provide sealant joints filled with silicone sealant and finish flush with the tile surface where tiling joins sanitary fixtures and at internal corners of walls.

0651 RESILIENT FINISHES

1 GENERAL

1.1 STANDARDS

General
Installation: To AS 1884 (2021).

2 PRODUCTS

2.1 MATERIALS

Wet process fibreboard (hardboard) hard underlay

Standard: To AS/NZS 1859.4 (2018).
Classification: General purpose medium board, manufactured specifically as flooring underlay.
Thickness: 5.5 mm.

3 EXECUTION

3.1 PREPARATION

Substrates
General: To AS 1884 (2021) Section 3.
Concrete substrates
Substrate rectification: Conform to the following:
- Surface treatments: Mechanically remove any incompatible surface treatments, including the following:
. Sealers and hardeners.
. Curing cmpounds.
. Waterproofing aditives.
. Surface coatings and contamination.
- Surface quality: Remove projections and fill voids and hollows with a self-smoothing 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
Substrate rectification: Remove projections. If conformance to a planeness tolerance of 4 mm in 2 m determined using a 2 m straightedge 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.

3.2 INSTALLATION

General
Fixtures: Remove door stops and other fixtures, and refix in positions undamaged on completion of the 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 cut tiles so that any variation in appearance is minimised.
Plank set-out
General: Set out planks from the centre of the room. Align patterns, texture and grain in one direction.
Joints
Non-welded: Butt edges together to form tight neat joints showing no visible open seams.
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 using a damp cloth.
Junctions
General: Scribe neatly up to returns, edges, fixtures and fittings. Finish flush with adjoining surfaces.

3.3 COMPLETION

Protection

Finished floor surface: Keep traffic off floors for minimum 24 hours after laying or until bonding has set, whichever period is the longer. Avoid contact with water for minimum 7 days.
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.

0652 CARPETS

1 PRODUCTS 1.1

MATERIALS

Carpet
Minimum grade: Residential Medium Duty under the Australian Carpet Classification Scheme.
Total VOC emission tested to ISO 10580 (2010): < 0.5 mg/m2/h.
Wet process fibreboard (hardboard) hard underlay
Standard: To AS/NZS 1859.4 (2018).
Classification: General purpose medium board, manufactured specifically as flooring underlay.
Thickness: 5.5 mm.
Soft underlay
Standard: To AS 4288 (2003).
Hot-melt adhesive tapes
General: Glass fibre and cotton thermoplastic adhesive-coated tape 60 mm wide on a 90 mm wide metal foil base and backed with silicon-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 (2019) clause 1.5.4.
Edge strips
Location: At exposed edges of the carpet, and at junctions with different floor finishes or finishes of a

different thickness. Where edge strips occur at doorways, locate the junctions directly below the closed door.

2 EXECUTION

2.1 PREPARATION

Substrates

Cleaning concrete surfaces: Mechanically remove the following surface treatments:
- Sealers and hardeners.
- Curing compounds.

Cleaning timber surfaces: Remove oil, grease and traces of applied finishes.
Concrete substrate rectification: Remove projections and fill voids and hollows with a levelling compound compatible with the adhesive.
Timber substrate rectification: Remove projections. If conformance to a flatness tolerance of 6 mm in 3000 mm, determined using a 3000 mm straightedge placed anywhere in any direction cannot be achieved, fix a hardboard underlay in brick pattern with joints avoiding substrate joints.
Fixtures: Remove door stops and other fixtures, and refix in position undamaged on completion of the installation.

2.2 LAYING CARPET

Standard

General: To AS 2455.1(2019).

0654 MULTILAYERED BOARD FLOORING

1 RODUCTS

1.1 MATERIALS

Flooring panels

General: Provide proprietary flooring system, as documented.

Storage and handling

General: Deliver flooring to site in unbroken boxes.

Store in dry conditions equivalent to those suitable for the installation of the flooring, preferably in the installation location, a minimum 100 mm above the subfloor. Do not store in areas with wet plaster or paint.

Material

Multilayered board flooring: Manufactured board flooring with a decorative wearing surface layer bonded to a core layer such as solid timber, high-density plywood, HDF or polymer based material.

Floating flooring underlay

General: If the flooring is not provided with an integrated underlay, provide proprietary closed cell foam sheeting, with acoustic properties if required, compatible with the subfloor, any levelling compound and the documented flooring.

Adhesive fixed flooring acoustic underlay

General: Provide proprietary acoustic underlay, if required, compatible with the subfloor, any levelling compound and the documented flooring, fixed to subfloor with compatible adhesive.

Adhesive

Requirement: Polyurethane or polymer adhesive, to the flooring manufacturer’s recommendations, compatible with the subfloor, underlay and documented flooring.
Ventilation: Provide adequate ventilation appropriate for moisture curing.

2 EXECUTION

2.1 PREPARATION

Cleaning

Requirement: Prior to installation remove loose material, dust and any deposits or existing finishes from the subfloor that may impair adhesion, any adhesive performance or the location and functioning of expansion or control joints.
Rectification: Conform to the following:
- Solid or continuous subfloors: Remove excessive projections and fill voids and hollows with a self-smoothing levelling compound compatible with the flooring including any adhesive.
- Plywood and particleboard subfloors: If required to achieve a smooth finish, sand joints between sheets.
- Existing timber flooring subfloors: Remove cupping, rough material and surface finishes by rough sanding.

2.2 INSTALLATION

Trial set-out

General: Prepare a trial panel set-out to each area, as follows:
- Maximise the size of equal margins of cut panels.
- Locate control joints.

Laying multilayered board flooring

Method: To the manufacturer's recommendations.
Expansion and control joints: Provide as follows:
- Against vertical building elements: Provide allowance for expansion of between 8 to 15 mm, to manufacturer's recommendations.

0655 TIMBER FLOORING

1 PRODUCTS

1.1 GENERAL

Storage and handling

General: Deliver timber flooring to site in unbroken plastic wrapping or packs. Store in dry conditions equivalent to those suitable for the installation of the floor, preferably in the installation location, a minimum 100 mm above the subfloor, to the supplier or manufacturer's recommendations. Do not store in areas of wet plaster or paint.

Adhesive

Requirement: A flooring adhesive (polyurethane or polymer) to the flooring manufacturer’s recommendations, compatible with the subfloor, underlay and documented flooring.

1.2 STRIP FLOORING

New timber

General: Conform to the Grading table.

Grading table

Product	Standard	Grade
Hardwood AS 2796.2 (2006) High Feature Grade if available for the species Select Grade		selected, otherwise
Seasoned AS 1810 (1995) 1 cypress pine		
Softwood - pinus ssp	AS 4785.2 (2002) Appearance	
Softwood - other	AS 4785.2(2002) Select	

Recycled timber

Standard: To FWPA PN06.1039 (2008).
- Grading: To Section 5.1.

2 EXECUTION

2.1 FIXING TIMBER FLOORING

Battens for strip flooring on steel joists

General: Fix seasoned battens along the steel joists with countersunk screws so that their top surfaces are aligned.
- Batten size: Minimum 35 mm thick.
- Spacing of fasteners: < 600 mm.

Control joints

Requirement: To the manufacturer's recommendations or as follows if undocumented:
- Perimeters: Provide 10 mm wide expansion joints against vertical building elements.
- Strip flooring: For floors greater than 6000 mm (measured perpendicular to the run of the boards), provide for intermediate expansion using one of the following methods:
  . Expansion gaps: Partially cramp strip flooring to allow a 1 mm gap every 600 mm or 1.5 mm every metre.
  . Regular spaced gaps: Provide a gap of 1.5 mm every 800 mm.
  . Intermediate expansion joints: Provide 12 mm wide cork filled expansion joints at maximum widths of 6000 mm. Install cork 2 mm proud of floor surface and sand flat with the floor.

Strip flooring

General: Blend floor boards to ensure a relatively even distribution of the colour range and grade features throughout the floor.
Installation: Lay in straight and parallel lines with each board firmly butted to the next and firmly in contact with the subfloor. If laid over joists or battens, cramp as required to bring the boards tight at edges.
Strip flooring direct mechanically fixed to joists: To AS 1684 and as follows:
- Boards up to 85 mm wide: Top nail or secretly fix.
- Boards over 85 mm wide: Top nail.
- Top nailing boards 80 to 135 mm wide: Fix with 2 nails at each joist crossing. Punch nails 3 mm below finished surfaces.
- Plain end flooring: If nails are less than 12 mm from ends of boards, pre-drill nail holes 0.8 mm undersize.
- Secret fixing: Fix with one staple or cleat at each joist crossing, angled at 45° through the base of the tongue.
- Adhesive: Use a 6 to 10 mm bead of polyurethane adhesive along each joist for both secret fixing and top fixing.

Strip flooring direct mechanically fixed to battens:
- Boards up to 135 mm: Top nail or secretly fix.
- Boards over 135 mm wide: Top nail to 35 mm (min) thick seasoned battens.
- Top nailing boards 80 to 135 mm wide: Fix with 2 nails at each batten crossing. Punch nails 3 mm below finished surfaces.
- Top nailing boards over 135 mm wide: Fix with 3 nails at each batten crossing. Punch nails 3 mm below finished surfaces.
- Plain end flooring: If nails are less than 12 mm from ends of boards, pre-drill nail holes 0.8 mm undersize.
- Secret fixing: Fix with one staple or cleat at each batten crossing, angled at 45° through the base of the tongue.
- Adhesive: Use a 6 to 10 mm bead of polyurethane adhesive along each joist for both secret fixing and top fixing.

2.2 COMPLETION

Protection

General: Provide protection as follows:
- Floors: With MDF taped at all butt joints. Do not cover with sheet plastic.
- Stair treads: Full MDF or plywood casing.

0656 FLOOR SANDING AND FINISHING

1 GENERAL

1.1 STANDARDS

General

Timber flooring - sanding and finishing: To AS 4786.2 (2005) and the recommendations of ATFA *Solid Timber Flooring Industry Standard* (2022).

0671 PAINTING

1 GENERAL

1.1 STANDARDS

Painting

General: To the recommendations of those parts of AS/NZS 2311 (2017) referenced in this worksection.

2 PRODUCTS

2.1 PAINTING MATERIALS

Handling

Delivery: Deliver paints to the site in the manufacturer's labelled and unopened containers.

Low VOC emitting paints

VOC limits for low odour/low environmental impact paint types:

- Primers and undercoats: < 65 g/litre.
- Low gloss white or light coloured latex paints for wall areas: < 16 g/litre.
- Coloured low gloss latex paints: < 16 g/litre.
- Gloss latex paints for timber doors and trims: < 75 g/litre.

Combinations

General: Do not combine products from different manufacturers in a system.
Clear timber finish systems: Provide only the combinations of putty, stain and sealer recommended by the manufacturer of the top coats.

Putty and fillers

Material: To the recommendation of the paint system manufacturer as suitable for the substrate and compatible with the primer.

Tinting

General: Provide only products that are colour tinted by the manufacturer or supplier.

3 EXECUTION

3.1 PREPARATION

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 from dust contamination. Use drop sheets and masking agents to protect surfaces, including finished surfaces and adjacent surfaces during painting.
Fixtures and furniture: Remove door furniture, switch plates, light fittings and other fixtures before painting, and refix in position on completion of painting.

Substrate preparation - generally

General: Prepare substrates to receive the painting systems.
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 nail heads.
- 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.

Unpainted surfaces

Standard: To AS/NZS 2311 (2017) Section 3.

Previously painted surfaces

Preparation of a substrate in good condition: To AS/NZS 2311 (2017) clause 7.4.
Preparation of a substrate in poor condition: To AS/NZS 2311 (2017) clause 7.5.
Preparation of steel substrates with protective coatings: To AS 2312.1 (2017) Section 8 and AS 1627.1 (2003).

3.2 PAINTING

Light levels

General: ≥ 400 lux.

Paint application

Standard: To AS/NZS 2311 (2017) Section 6.

Timing: 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.

Priming before fixing

General: Apply one coat of wood primer (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 trim and glazing beads.
- Timber board cladding.

Spraying

General: If the paint application is by spraying, use conventional or airless equipment that 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: Not permitted on site.

Sanding

Clear finishes: Sand the sealer, using abrasive 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. Touch up new damaged decorative paintwork or misses with the paint batch used in the original application.

Repair of galvanizing

Cleaning: For galvanized surfaces that 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 (2009).

Services

General: Paint new services and equipment if not embedded, except chromium, anodised aluminium, GRP, PVC-U, stainless steel, non-metallic flexible materials and normally lubricated machined surfaces. Repaint proprietary items only if damaged.

Notice: Place in a conspicuous location and do not remove until the paint is dry.

Wet paint warning

3.3 PAINT SYSTEMS

Paint system desription

Primers and undrcoats: Provide primers and undercoats recommended by the manufacturer of the selected final coat as suitable for the substrate and the final coat.

Number of coats: Unless specified as one or two coat systems, each paint system consists of at least 3 coats.

Paint final coat table

Final coat	Applicable Australian Standard
Interior	
Flat latex	AS 3730.1 (2006)
Floor varnish - moisture cured	AS 3730.27 (2006)
Floor varnish - two pack isocyanate cured	AS 3730.27 (2006)
Low gloss latex	AS 3730.3 (2006)
Semi-gloss latex	AS 3730.2 (2006)
Gloss latex	AS 3730.12 (2006)
Exterior	
Full gloss solvent-borne	AS 3730.6 (2006)
Flat latex	AS 3730.7 (2006)
Low gloss latex	AS 3730.8 (2006)
Semi-gloss latex	AS 3730.9 (2006)
Gloss latex	AS 3730.10 (2006)
Stain, tightly pigmented	AS 3730.28 (2006)
Latex stain, opaque	AS 3730.16 (2006)
Paving	
Paving paint, semi-gloss	AS 3730.29 (2006)
Paving paint, gloss	AS 3730.29 (2006)

0702 MECHANICAL DESIGN AND INSTALL

1 GENERAL

1.1 DESIGN

Air conditioning design

Outdoor design conditions: Use outdoor design conditions listed in AIRAH DA09 (2022) or ASHRAE Fundamentals (2021) for:

- The location geographically closest to the site.
- Comfort (or non-critical process) conditions.

Indoor design conditions:

- Summer:24°C dry bulb, 50% relative humidity.
- Winter: 21°C dry bulb.

Heating and cooling performance: Maintain the air conditioned spaces, as measured at the points of control, within the documented cooling indoor design conditions at the highest cooling and heating loads due to the combination of loads imposed by the outdoor design conditions, countering solar loads, loads due to system and other losses, and building fabric, lighting and internal equipment loads.

Building fabric loads: Allow for loads from the construction documented.

Temperature variation: Limit the temperature difference in air conditioned spaces served by the same zone or system to 2°C as follows:

- Between any 2 points in the space from floor level to 1500 mm above floor level.
- More than 2000 mm from cooking equipment and more than 1000 mm from any other appliance.
- When outdoor conditions are in the range specified above.
- After the plant has been operating for one hour.
- With the temperatures measured in the same 5 minute period.

Zoning: Divide the systems into temperature controlled zones to meet the specified permissible limits in temperature variation and the system divisions documented.

Fresh air: Supply fresh air to spaces with air conditioning systems via the air handling system.

Heating: Reverse cycle.

Ambient noise emitted: Lower than the level that can be heard within a habitable room in any neighbouring residential premises, regardless of whether any door or window to that room is open.

2 PRODUCTS

2.1 AIR CONDITIONING EQUIPMENT

Standards

Ducted air conditioners: To AS/NZS 3823.1.2 (2012).

Non-ducted air conditioners: To AS/NZS 3823.1.1 (2012).

Controls

General: Provide the following functions:

- Temperature control for each zone located to accurately sense zone temperature.
- Fan speed selection for multi and variable speed fans.
- Day/night zone changeover if scheduled.
- Time switch for each system with ≥ 6 temperature programs per day, separate programs for each day of the week, manual set point over ride and Vacation temperature set back.

0802 HYDRAULIC DESIGN AND INSTALL

1 GENERAL

1.1 STANDARDS

General

Plumbing and drainage: To the PCA (2022).

2 EXECUTION

2.1 INSTALLATION

Connections to mains

General: Excavate to locate and expose the connection points and connect to the Network Utility Operator and gas Network Operator mains. On completion, backfill and compact the excavation and reinstate surfaces and elements that have been disturbed such as roads, pavements, kerbs, footpaths and nature strips to *0223 Service trenching*.
Metering: Prvide metering, valves and fittings to Network Utility Operator requirements.

Piping

Embedded pipes: Do not embed pipes that operate under pressure in concrete or surfacing material.
Concealment: If practicable, conceal piping and fittings requiring maintenance or servicing so that they are accessible within non-habitable enclosed spaces such as roof spaces, subfloor spaces and ducts. Keep pipelines in subfloor spaces at least 150 mm above ground and make sure access can be provided throughout for inspection. Provide at least 25 mm clearance between adjacent pipelines (measured from the piping insulation where applicable).
Cover plates: If exposed piping emerges from wall, floor or ceiling finishes, provide cover plates of non-ferrous metal, finished to match the piping, or of stainless steel.
Pipe support materials: The same as the piping, or galvanized or non-ferrous metals, with bonded PVC-U or glass fibre woven tape sleeves where needed to separate dissimilar metals.

2.2 FINISHES

General

Exposed piping: 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 (2004) service condition 2, bright.
- Externally and steel piping or worn fittings internally: Paint.
- In concealed but accessible spaces (including cupboards and non-habitable enclosed spaces): Leave copper and plastic unpainted except for required identification marking. Prime steel piping and iron fittings.
- Valves: Finish valves to match connected piping.

2.3 COLD AND HEATED WATER

Standards

General: To AS/NZS 3500.1 (2021) and AS/NZS 3500.4 (2021).

Water heaters

Location: Locate water heaters where they can be maintained or replaced without damaging adjacent structures,fixtures or finishes.
Tariff: Install so that the heating system qualifies for the tariff concession or subsidy offered by the statutory authority.
Isolating valves: Provide isolation valves to water heaters.
Types:
- Electric storage water heaters: To AS/NZS 4692.1 (2005).
  . Energy performance: To AS/NZS 4692.2 (2005).
- Gas storage water heaters: To AS/NZS 5263.1.2 (2020). If a flue damper is available for the water heater supplied, provide one.
  . Energy performance: To AS/NZS 4552.2 (2010).
- Solar water heaters: To AS/NZS 2712 (2007).
- Heat pump water heaters: To AS/NZS 2712 (2007).
  . Safety: To AS/NZS 60335.2.40 (2019).
  . Performance evaluation: To AS/NZS 5125.1 (2014).
- Gas instantaneous water heaters: To AS/NZS 5601.1 (2022).
- Electric instantaneous water heaters: To AS/NZS 60335.2.35 (2013).

Heated water temperature

Standard: To AS/NZS 3500.4 (2021).

2.4 STORMWATER

Standards

General: To AS/NZS 3500.3 (2021).

Downpipe connections

General: Turn up drain branch pipelines to finish 50 mm above finished ground or pavement level.

Subsoil drains

Requirement: Provide subsoil drains to intercept groundwater seepage and prevent water build-up behind walls and under floors and pavements.
Connect subsoil drains to surface drains or to the stormwater drainage system as applicable.
Trench width: Minimum 450 mm.
Subsoil drains: Provide proprietary perforated plastic pipe.
Filter fabric: Provide a polymeric fabric formed from a plastic yarn containing stabilisers or inhibitors to make the filaments resistant to deterioration due to ultraviolet light.

Filter sock: Provide a polyester permeable sock capable of retaining particles of 0.25 mm size. Securely fit or join the sock at each joint.

Pits

Metal access covers and grates: To AS 3996 (2019).
Cover levels: Locate the top of covers or gratings, including frames as follows:
- In paved areas: Flush with the paving surface.
- In landscaped areas: 25 mm above finished surface.
- Gratings taking surface water runoff: Set to receive the runoff without ponding.

2.5 WASTEWATER

Standards

General: To AS/NZS 3500.2 (2021).

Cleaning

General: During construction, use temporary covers to openings and keep the system free of debris. On completion, clean and flush the system.

Septic tanks

Standard: To AS/NZS 1546.1 (2008).

Vent pipes

Requirement: Provide upstream and downstream vents to AS/NZS 3500.2.
Staying to roof: If fixings for stays penetrate the roof covering, seal the penetrations and make watertight.
Terminations: Provide bird-proof vent cowls made of the same material and colour as the vent pipe.

2.6 RAINWATER STORAGE SYSTEMS

Standards

Design, installation, maintenance and repairs: To the recommendations ofSA HB 230 (2008).
Metal tanks and rainwater goods: To AS/NZS 2179.1 (2014).
Products in contact with drinking water: Tested to AS/NZS 4020 (2018).
Rotationally moulded tanks: To AS/NZS 4766 (2020).
Water filters for drinking water: To AS 3497 (2021) and the requirements of the statutory authorities having jurisdiction.

2.7 FUEL GAS

Standard

Reticulated gas systems: To AS/NZS 5601.1 (2022).

Buried pipes

Warning tape: During backfilling, lay plastic warning tape 300 mm above and for the full length of buried gas pipes.
- Type: Minimum 100 mm wide, with GAS PIPE UNDER marked continuously.

Commissioning

General: On completion of installation and testing, turn on isolating and control valves and purge and charge the installation.

0902 ELECTRICAL DESIGN AND INSTALL

1 GENERAL

1.1 DESIGN

Maximum demand and spare capacity

Maximum demand: Calculation method to AS/NZS 3000 (2018) Appendix C. Submit a copy of the calculations.
Spare capacity: Provide the following:
- > 10% spare capacity in mains and submains.
- > 25% spare capacity in final subcircuits.

Spare poles: ≥ 25% for future circuits.

Protection

Fault protection: Automatic disconnection to AS/NZS 3000 (2018) clause 2.4.

1.2 STANDARDS

General

Electrical installation: To AS/NZS 3000 (2018).
Selection of cables: To AS/NZS 3008.1.1 (2017).
Communications cable systems: To AS/CA S008 (2020), AS/CA S009 (2020) and AS/NZS 11801.1 (2019).

2 EXECUTION

2.1 GENERAL

Applications and compliance

General: Submit all necessary applications for electricity supply. Liaise with the electricity distributor and comply with the Electricity Distributor's Service and Installation Rules (ED S&IR).

Consumers mains and metering

General: Provide consumers mains, associated services and all necessary fault and overload current protection equipment to AS/NZS 3000 (2018) Section 3 and the ED SI&R. Connect consumer mains to the electricity distributor mains.

Switchboards

Standard: To AS/NZS 61439.1 (2016) and AS/NZS 61439.3 (2016).
Construction: Enclosed type with a hinged lid.
Protective devices: Provide circuit breakers and residual current devices.
Material: Metallic-coated sheet steel.
Location: Verify that the location selected is compliant before proceeding.

Accessories

General: Provide accessories necessary for a complete installation including but not limited to switches, dimmers, socket outlets, and telecommunications outlets. Provide accessories of the same style, and from the same manufacture.
Mounting: Flush mount accessories to the wall (or ceiling) unless noted otherwise. Provide proprietary wall boxes in masonry and wall brackets in stud walls.

Wiring

Sequence of work: Install conduits and cables before the installation of wall and ceiling linings, and before any external landscaping works.
Installation: Do not penetrate damp-proof courses. Run wiring in cavity tied against inner brick surface.
Minimum conduit diameter: 20 mm.
Conduits for future use: Provide a non-metallic drawstring having a breaking strain > 100 kg.

Labelling

General: Provide labels including control and circuit equipment ratings, functional units, notices for operational and maintenance personnel, incoming and outgoing circuit rating, sizes and origin of supply.
Telecommunications cables: Label telecommunications cables, cross connects and outlets in accordance with the requirements of AS/NZS 11801.1 (2019).

Earthing systems

Protective earthing system with a multiple earth neutral (MEN) connection: To AS/NZS 3000 (2018) Section 5.

Luminaires

Standard: To AS/NZS 60598.1 (2017).
Non-specified luminaires: Provide a bayonet cap batten holder and lamp at each lighting point location where no luminaire is documented.
Minimum energy performance standards:
- General: To AS 4782.2 (2019) and AS/NZS 4783.2 (2002).
- Self-ballasted lamps: To AS 4847.2 (2019).

Appliances

General: Provide final subcircuits and terminate at fixed appliances, hot water units, packaged air conditioning and other plant and equipment.
Isolation switch: Provide isolating switch adjacent to equipment.

Telecommunications

General: Liaise with the telecommunication services carrier.
Installations requiring telephony only: To AS/CA S009 (2020).
Communications cable systems for small office/home office: Category 6, to AS/CA S009 (2020), AS/NZS 11801.1 (2019), AS 11801.4 (2019) and AS/NZS 14763.2 (2020).

Television systems

General: Provide a digital television distribution system to AS/NZS 1367 (2016) and conforming to the recommendations of Australian Communications and Media Authority (ACMA).
Antennas: Provide and locate antennas to receive all locally available free-to-air television stations.
External network: Liaise with each external communications carrier and determine the services and site access requirements for each network carrier's connection.

Intruder alarm system

General: Provide intruder alarm system to AS/NZS 2201.1 (2007).

Smoke detection system

General: Provide smoke alarms to BCA (2022) H3D6. Connect smoke alarms to mains power.

2.2 COMPLETION

Testing and certification

Electrical installations: Test to AS/NZS 3017 (2022). Submit a certificate showing test results and certifying compliance with AS/NZS 3000 (2018).
Telecommunications cabling: To AS 11801.4 (2019). Submit a certificate showing test results and certifying compliance with AS 11801.4 (2019).
Submit ACMA Telecommunications Cabling Advice (TCA1) form.
Television and audio systems: To AS/NZS 1367 (2016). Test the complete television and audio system. Submit a certificate showing test results and certifying compliance.

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REFERENCED DOCUMENTS

The following documents are incorporated into this worksection by reference:

AS/CA S008	2020	Requirements for customer cabling products
AS/CA S009	2020	Installation requirements for customer cabling (Wiring Rules)
AS/NZS 1080		Timber - Methods of test
AS/NZS 1080.1	2012	Moisture content
AS/NZS 1163	2016	Cold-formed structural steel hollow sections
AS/NZS 1170	2002	Structural design actions
AS/NZS 1170.1	2004	Permanent, imposed and other actions
AS 1192	2016	Electroplated coatings - Nickel and chromium
AS/NZS 1214		Hot-dip galvanized coatings on threaded fasteners (ISO metric coarse thread series) (ISO 10684:2004, MOD)
AS 1231	2000	Aluminium and aluminium alloys - Anodic oxidation coatings
AS 1288	2021	Glass in buildings - Selection and installation
AS 1289	2017	Methods of testing soils for engineering purposes
AS 1289.5.2.1		Soil compaction and density tests - Determination of the dry density/moisture
AS/NZS 1367	2016	content relation of a soil using modified compactive effort
AS 1379	2007	Coaxial cable and optical fibre systems for the RF distribution of digital television, radio and in-house analog signals in single and multiple dwelling installations
AS 1397	2021	Specification and supply of concrete
AS/NZS 1546		Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS/NZS 1546.1	2008	On-site domestic wastewater treatment units
AS 1562		Septic tanks
AS 1562.1	2018	Design and installation of sheet roof and wall cladding
AS 1562.3	2006	Metal
AS/NZS 1604	2021	Plastics
AS/NZS 1604.1		Preservative-treated wood-based products
AS 1627	2003	Products and treatment
AS 1627.1		Metal finishing - Preparation and pretreatment of surfaces
AS 1672	1997	Removal of oil, grease and related contamination
AS 1672.1		Limes and limestones
AS 1684	2021	Limes for building
AS 1684.2	2021	Residential timber-framed construction
AS 1684.3	2010	Non-cyclonic areas
AS 1684.4		Cyclonic areas
AS 1720	2010	Simplified - Non-cyclonic areas
AS 1720.1	2015	Timber structures
AS 1720.5	1995	Design methods
AS 1810		Nailplated timber roof trusses
AS/NZS 1859	2017	Timber - Seasoned cypress pine - Milled products
AS 1859.1	2017	Reconstituted wood-based panels - Specifications
AS/NZS 1859.2	2017	Particleboard
AS/NZS 1859.3	2018	Dry process fibreboard
AS/NZS 1859.4	2017	Decorative overlaid wood panels
AS 1860	2006	Wet process fibreboard
AS/NZS 1860.1	2021	Particleboard flooring
AS 1860.2		Specifications
AS 1884	2012	Installation
AS 1926	2007	Floor coverings - Resilient sheet and tiles - Installation practices
AS 1926.1	2014	Swimming pool safety
AS 1926.2	2002	Safety barriers for swimming pools
AS 2047	2018	Location of safety barriers for swimming pools
AS 2049	2007	Windows and external glazed doors in buildings
AS 2050	2006	Roof tiles
AS 2082		Installation of roof tiles
AS/NZS 2098	2014	Timber - Hardwood - Visually stress-graded for structural purposes
AS/NZS 2098.1		Methods of test for veneer and plywood
AS/NZS 2179	2007	Moisture content of veneer and plywood
AS/NZS 2179.1	1996	Specifications for rainwater goods, accessories and fasteners
AS 2201	2012	Metal shape or sheet rainwater goods, and metal accessories and fasteners
AS/NZS 2201.1	2006	Intruder alarm systems
AS/NZS 2208	2004	Client's premises - Design, installation, commissioning and maintenance
AS/NZS 2269	2017	Safety glazing materials in buildings
AS/NZS 2269.0		Plywood - Structural
AS/NZS 2270		Specifications
AS/NZS 2271		Plywood and blockboard for interior use
AS/NZS 2311		Plywood and blockboard for exterior use
AS/NZS 2312	2014	Guide to the painting of buildings
AS 2312.1		Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings
		Paint coatings

AS 2455		Textile floor coverings - Installation practice
AS 2455.1	2019	General
AS/NZS 2588	2018	Gypsum plasterboard
AS/NZS 2589	2017	Gypsum linings - Application and finishing
AS 2601	2001	The demolition of structures
AS 2688	2017	Timber and composite doors
AS 2699		Built-in components for masonry construction
AS 2699.1	2020	Wall ties
AS 2699.3	2020	Lintels and shelf angles (durability requirements)
AS/NZS 2712	2007	Solar and heat pump water heaters - Design and construction
AS/NZS 2728	2013	Prefinished/prepainted sheet metal products for interior/exterior building applications - Performance requirements
AS/NZS 2754		Adhesives for timber and timber products
AS/NZS 2754.1	2016	Adhesives for manufacture of plywood and laminated veneer lumber (LVL)
AS 2796		Timber - Hardwood - Sawn and milled products
AS 2796.1	1999	Product specification
AS 2796.2	2006	Grade description
AS 2796.3	1999	Timber for furniture components
AS 2858	2008	Timber - Softwood - Visually stress-graded for structural purposes
AS 2870	2011	Residential slabs and footings
AS/NZS 2904	1995	Damp-proof courses and flashings
AS/NZS 2908	2000	Cellulose-cement products
AS/NZS 2908.2		Flat sheets
AS/NZS 2924	1998	High pressure decorative laminates - Sheets made from thermosetting resins
AS/NZS 2924.1	2018	Classification and specifications
AS/NZS 3000	2017	Electrical installations (known as the Australian/New Zealand Wiring Rules)
AS/NZS 3008		Electrical installations - Selection of cables
AS/NZS 3008.1.1	2022	Cables for alternating voltages up to and including 0.6/1 kV - Typical Australian installation conditions
AS/NZS 3017	2021	Electrical installations - Verification guidelines
AS 3497	2021	Drinking water treatment systems - Design and performance requirements
AS/NZS 3500	2021	Plumbing and drainage
AS/NZS 3500.1	2021	Water services
AS/NZS 3500.2	2021	anitary plumbing and drainage
AS/NZS 3500.3	2002	Stormwater drainage
AS/NZS 3500.4	2018	Heated water services
AS 3566	2018	Self-drilling screws for the building and construction industries
AS 3566.1	2018	General requirements and mechanical properties
AS 3600		Concrete structures
AS 3610	2014	Formwork for concrete
AS 3610.1	2018	Specifications
AS 3660	2002	Termite management
AS 3660.1		New building work
AS 3700		Masonry structures
AS 3715	2016	Metal finishing - Thermoset powder coating for architectural applications of aluminium and aluminium alloys
AS 3727		Pavements
AS 3727.1	2006	Residential
AS 3730	2006	Guide to the properties of paints for buildings
AS 3730.1	2006	Latex - Interior - Flat
AS 3730.2	2006	Latex - Interior - Semi-gloss
AS 3730.3	2006	Latex - Interior - Low gloss
AS 3730.6	2006	Solvent-borne - Interior/exterior - Full gloss enamel
AS 3730.7	2006	Latex - Exterior - Flat
AS 3730.8	2006	Latex - Exterior - Low gloss
AS 3730.9	2006	Latex - Exterior - Semi-gloss
AS 3730.10	2006	Latex - Exterior - Gloss
AS 3730.12	2006	Latex - Interior - Gloss
AS 3730.16	2006	Latex - Self-priming timber finish - Exterior
AS 3730.27	2006	Clear coatings for interior timber floors
AS 3730.28	2021	Wood stain - Solvent-borne - Exterior
AS 3730.29	2003	Solvent-borne - Exterior/interior - Paving paint
AS 3740		Waterproofing of domestic wet areas
AS 3743	2009	Potting mixes
AS/NZS 3750	2007	Paints for steel structures
AS/NZS 3750.9	2012	Organic zinc-rich primer
AS 3798		Guidelines on earthworks for commercial and residential developments
AS/NZS 3823		Performance of electrical appliances - Airconditioners and heat pumps
AS/NZS 3823.1.1	2012	Non-ducted airconditioners and heat pumps - Testing and rating for performance (ISO 5151:2010, MOD)
AS/NZS 3823.1.2	2007	Ducted airconditioners and air-to-air heat pumps - Testing and rating for performance (ISO 13253:2011, MOD)
AS 3958	2018	Ceramic tiles
AS 3958.1	2010	Guide to the installation of ceramic tiles
AS 3959		Construction of buildings in bushfire-prone areas
AS 3972		General purpose and blended cements

AS 3996	2019	Access covers and grates
AS 3999	2015	Bulk thermal insulation - Installation
AS 4145	2008	Locksets and hardware for doors and windows
AS 4145.2		Mechanical locksets for doors and windows in buildings
AS/NZS 4200	2017	Pliable building membranes and underlays
AS/NZS 4200.1		Materials
AS 4200.2	2017	Installation
AS 4256	2006	Plastic roof and wall cladding materials
AS 4256.2	2006	Unplasticized polyvinyl chloride (uPVC) building sheets
AS 4256.3	2006	Glass fibre reinforced polyester (GRP)
AS 4256.4	2006	Unplasticized polyvinyl chloride (uPVC) wall cladding boards
AS 4256.5	2019	Polycarbonate
AS 4285	2003	Rooflights
AS 4288	2019	Soft underlays for textile floor coverings
AS 4312	2018	Atmospheric corrosivity zones in Australia
AS 4386	2018	Cabinetry in the built-in environment - Commercial and domestic
AS 4419	2012	Soils for landscaping and garden use
AS 4454	2008	Composts, soil conditioners and mulches
AS/NZS 4455	2010	Masonry units, pavers, flags and segmental retaining wall units
AS/NZS 4455.1	2008	Masonry units
AS/NZS 4455.2	2012	Pavers and flags
AS/NZS 4455.3	2010	Segmental retaining wall units
AS/NZS 4505	2013	Garage doors and other large access doors
AS/NZS 4552	2018	Gas fired water heaters for hot water supply and/or central heating
AS/NZS 4552.2	2000	Minimum energy performance standards for gas water heaters
AS 4586	2006	Slip resistance classification of new pedestrian surface materials
AS/NZS 4600		Cold-formed steel structures
AS/NZS 4667	2005	Quality requirements for cut-to-size and processed glass
AS/NZS 4680	2005	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AS/NZS 4692	2020	Electric water heaters
AS/NZS 4692.1		Energy consumption, performance and general requirements
AS/NZS 4692.2		Minimum Energy Performance Standard (MEPS) requirements and energy labelling
AS/NZS 4766	2015	Rotationally moulded buried, partially buried and non-buried storage tanks for water and chemicals
AS 4773	2015	Masonry in small buildings
AS 4773.1	2019	Design
AS 4773.2		Construction
AS/NZS 4782	2002	Double-capped fluorescent lamps - Performance specifications
AS 4782.2		Minimum Energy Performance Standard (MEPS)
AS/NZS 4783	2002	Performance of electrical lighting equipment - Ballasts for fluorescent lamps
AS/NZS 4783.2	2002	Energy labelling and minimum energy performance standards requirements
AS 4785	2002	Timber - Softwood - Sawn and milled products
AS 4785.1	2002	Product specification
AS 4785.2		Grade description
AS 4785.3	2005	Timber for furniture components
AS 4786	2019	Timber flooring
AS 4786.2		Sanding and finishing
AS/NZS 4847	2004	Self ballasted lamps for general lighting services
AS 4847.2	2018	Minimum energy performance standard (MEPS)
AS/NZS 4858		Wet area membranes
AS/NZS 4859	2021	Thermal insulation materials for buildings
AS/NZS 4859.1	2008	General criteria and technical provisions
AS 4934	2003	Incandescent lamps for general lighting services
AS 4934.2	2014	Energy performance and marking requirements
AS 5039		Security screen doors and security window grilles
AS 5040		Installation of security screen doors and window grilles
AS/NZS 5125	2015	Heat pump water heaters - Performance assessment
AS/NZS 5125.1	2018	Air source heat pump water heaters
AS 5146	2016	Reinforced autoclaved aerated concrete
AS 5146.1		Structures
AS 5146.3		Construction
AS 5203	2020	Protection of openable windows/ fall prevention – Test sequence and compliance method
AS/NZS 5263		Gas appliances
AS/NZS 5263.1.2	2022	Gas fired water heaters for hot water supply and/or central heating
AS/NZS 5601	2022	Gas installations
AS/NZS 5601.1	2016	General installations
AS 5604		Timber - Natural durability ratings
AS 6669	2019	Plywood - Formwork
AS 11801	2019	Information technology - Generic cabling for customer premises
AS/NZS 11801.1	2020	General requirements (ISO/IEC 11801-1:2017, MOD)
AS 11801.4		Single-tenant homes (ISO/IEC 11801-4:2017, MOD)
AS ISO 13007	2020	Ceramic tiles
AS ISO 13007.1		Grouts and adhesives - Terms, definitions and specifications for adhesives
AS/NZS 14763		Information Technology - Implementation and operation of customer premises cabling
AS/NZS 14763.2		Planning and installation (ISO/IEC 14763-2 (ED. 2.0) MOD)

AS/NZS 60335		Household and similar electrical appliances - Safety
AS/NZS 60335.2.35	2013	Particular requirements for instantaneous water heaters
AS/NZS 60335.2.40	2019	Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers
AS/NZS 60598	2017	Luminaires
AS/NZS 60598.1		General requirements and tests (IEC 60598-1, Ed. 8.0 (2014) MOD)
AS/NZS 61439	2016	Low-voltage switchgear and controlgear assemblies
AS/NZS 61439.1	2016	General rules (IEC 61439-1, Ed. 2.0 (2011), MOD)
AS/NZS 61439.3	2008	Distribution boards intended to be operated by ordinary persons (DBO) (IEC 61439-3, Ed 1.0 (2012), MOD)
SA HB 230	1998	Rainwater tank design and installation handbook
AIRAH DA09	2022	Air conditioning load estimation
NCC Schedule 1	2019	Schedule 1 Definitions
BCA Figure 3.0.1	2022	Acceptable construction - Structural provisions - Determinations of individual actions - Wind regions
BCA H1D3	2022	Class 1 and 10 buildings – Structure – Site preparation
BCA H1D4	2022	Class 1 and 10 buildings - Structure - Footings and slabs
BCA H1D7	2022	Class 1 and 10 buildings - Structure - Roof and wall cladding
BCA H1D11	2022	Class 1 and 10 buildings - Ancillary provisions and additional construction requirements - Attachment of decks and balconies to external walls of buildings using a waling plate
BCA H2D2	2022	Class 1 and 10 buildings - Damp and weatherproofing - Drainage
BCA H2D5	2022	Class 1 and 10 buildings - Damp and weatherproofing - Subfloor ventilation
BCA H2D6	2022	Class 1 and 10 buildings - Damp and weatherproofing – Roof and wall cladding
BCA H3D3	2022	Class 1 and 10 buildings - Fire safety - Fire separation of external walls -
BCA H3D6	2022	Class 1 and 10 buildings - Fire safety - Smoke alarms and evacuation lighting
BCA H4D2	2022	Class 1 and 10 buildings - Health and amenity - Wet areas
BCA H4D9	2022	Class 1 and 10 buildings -Health and amenity - Condensation management
BCA H5D2	2022	Class 1 and 10 buildings - Safe movement and access - Stairway and ramp construction
BCA H5D3	2022	Class 1 and 10 buildings - Safe movement and access - Barriers and handrails
BCA H6	2022	Class 1 and 10 buildings - Energy efficiency
BCA H6D2	2022	Class 1 and 10 buildings - Energy efficiency - Application of Part H6
BCA H7D4	2022	Class 1 and 10 buildings - Ancillary provisions and additional construction requirements - Construction in bushfire prone areas
FWPA PN06.1039	2008	Interim industry standard – Recycled timber – Visually graded recycled decorative products
NASH	2005	NASH Standard Residential and Low-rise Steel Framing
NASH-1	2014	Design criteria
NASH-2	2020	Design solutions
Safe Work Australia	2010	Code of Practice: How to safely remove asbestos
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